

ELECTRIC RAILWAY JOURNAL

A CONSOLIDATION OF
STREET RAILWAY JOURNAL AND ELECTRIC RAILWAY REVIEW

PUBLISHED EVERY SATURDAY

McGRAW PUBLISHING COMPANY

239 W. 39th St., New York City
Branch Offices: Chicago, Cleveland,
Philadelphia, London.

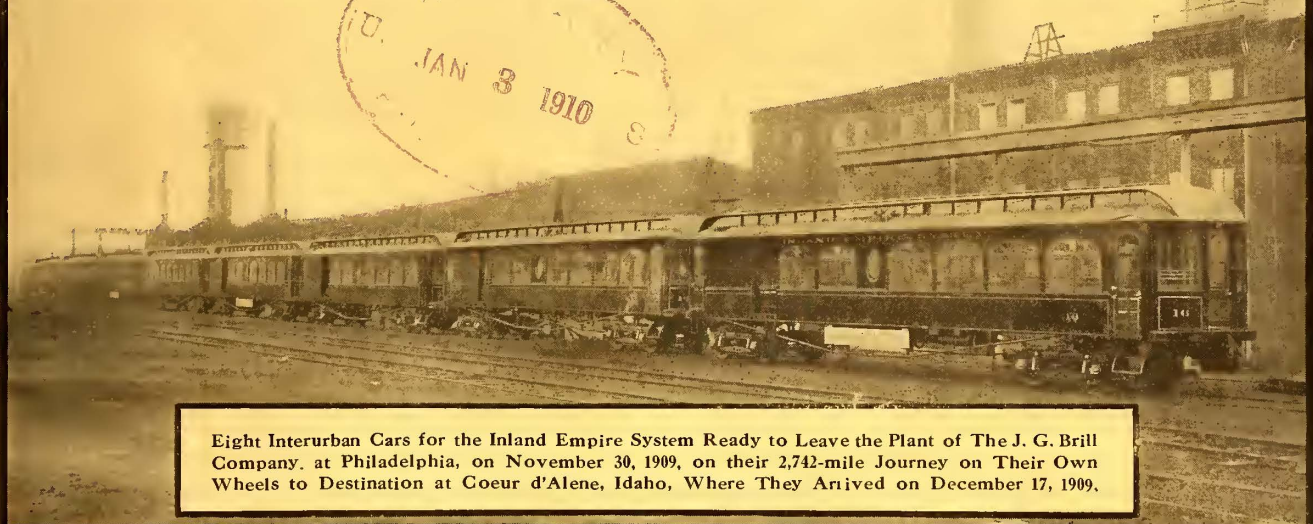
Vol.
XXXV.

JANUARY 1, 1910

No. 1

Subscription: U. S. and Mexico, \$3.00
Canada, \$4.50
Other Countries, . \$6.00

BRILL INTERURBAN CARS



Eight Interurban Cars for the Inland Empire System Ready to Leave the Plant of The J. G. Brill Company, at Philadelphia, on November 30, 1909, on their 2,742-mile Journey on Their Own Wheels to Destination at Coeur d'Alene, Idaho, Where They Arrived on December 17, 1909.

WHEN you buy Brill Interurban Cars, you place at your command the combined experience and resources of the six Brill plants, each with a staff of expert designers. Every one of these plants has produced interurban cars of many types from the modest cars for suburban service to the large, high-speed interurban car with steel frame and the finest interior finish and appointments. In building this equipment a knowledge has been acquired of construction methods, of the most practical and substantial design and of all modern features which in the aggregate can not be had elsewhere, even from a specialist in interurban equipment. Regardless of which Brill plant builds your cars you purchase the services of the entire Brill organization.

THE J. G. BRILL COMPANY
PHILADELPHIA, PENNSYLVANIA

AMERICAN CAR COMPANY, ST. LOUIS, MO.
G. C. KUHLMAN CAR COMPANY, CLEVELAND, O.
JOHN STEPHENSON COMPANY, ELIZABETH, N. J.

DANVILLE CAR COMPANY, DANVILLE, ILL.
WASON MANUFACTURING COMPANY, SPRINGFIELD, MASS.
COMPAGNIE J. G. BRILL, PARIS, FRANCE

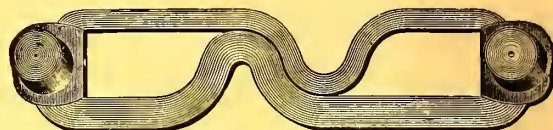
H.W. Johns-Manville Co.

J-M LINE MATERIAL

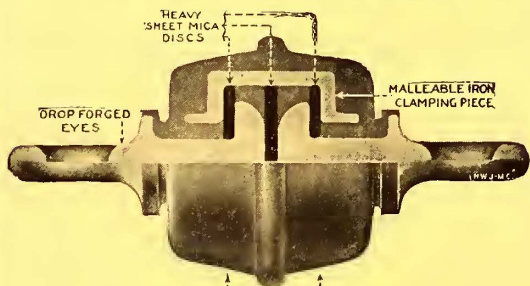
J-M Railway Supplies consist of a complete line of Overhead and Track Materials, High Tension Transmission Materials, Power House Insulation, etc. A stock of these materials is carried at each of our eighteen branches shown below and orders can be shipped promptly on receipt, eliminating delays and saving freight.



J-P PORCELAIN STRAIN INSULATOR



J-M RAIL BOND



GIANT HIGH POTENTIAL STRAIN INSULATOR



J-M INSULATED CROSS-OVER



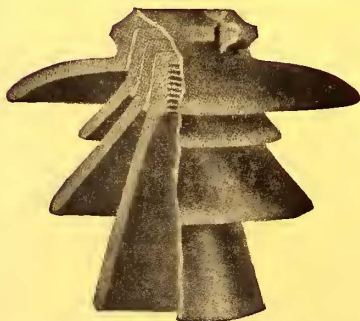
J-M ADJUSTABLE METALLIC CROSS-OVER



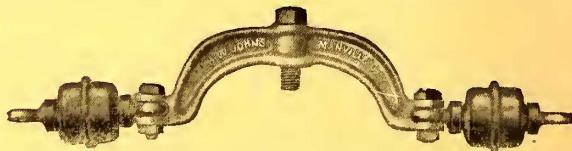
ROUND TOP HANGER



PHILADELPHIA SECTIONAL INSULATOR



J-M HIGH TENSION PORCELAIN INSULATOR



DOUBLE GIANT PULL-OVER



J-M SOLDERED STRAIGHT LINE EAR



J-M DOUBLE CLAMP SCREW CLIP

Write nearest branch for Catalog—or simply write your name and address on margin of this advertisement and mail it to us



Baltimore
Boston
Buffalo

Chicago
Cleveland
Dallas

Detroit
Kansas City
London

Los Angeles
Milwaukee
Minneapolis

New Orleans
New York
Philadelphia

Pittsburg
San Francisco
Seattle
St. Louis

For Canada: CANADIAN H. W. JOHNS-MANVILLE CO., Toronto (1145)
For Great Britain and Continent of Europe:

TURNERS & MANVILLE, LTD., Hopetoun House, 5, Lloyds Ave., London, E.C.





Automatic Electric Pump Governor

Allows a Wide Range of Adjustments

The cut-out pressure may be adjusted anywhere between 15 and 200 pounds, and the difference between the cutting-in and cutting-out pressures may be from 5 pounds up. The adjustments can be made accurately, without removing any parts or breaking any pipe joints. This governor can be used on either direct-current or single-phase alternating-current circuits.

See Instruction Pamphlet T-5042



Westinghouse Traction Brake Co., Pittsburg, Pa.

New York: City Investing Building

Chicago: Railway Exchange Building

St. Louis: 1932 North Broadway

For Canada: Canadian Westinghouse Co., Ltd., Hamilton, Ontario

Send for this
Circular, No. 501

The Westinghouse Machine Company

Designers and Builders of
Steam Turbines, Steam Engines,
Gas Engines, Gas Producers, Con-
densers and Mechanical Stokers

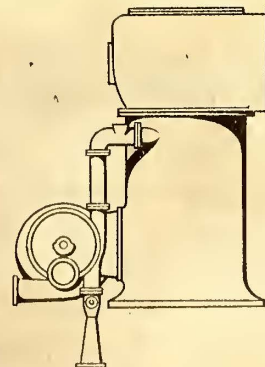
Address Nearest Office:

New York, 165 Broadway
Boston, 131 State Street
Cleveland, New England Bldg.
Atlanta, Candler Bldg.
Chicago, 171 La Salle Street
Cincinnati, Traction Bldg.

St. Louis, Chemical Bldg.
Pittsburg, Westinghouse Bldg.
Philadelphia, North Amer. Bldg.
Denver, McPhee Bldg.
San Francisco, Hunt, Mirk & Co.
Mexico, G. & O. Braniff & Co.
City of Mexico

The Westinghouse Machine Company

The
Westinghouse - Leblanc

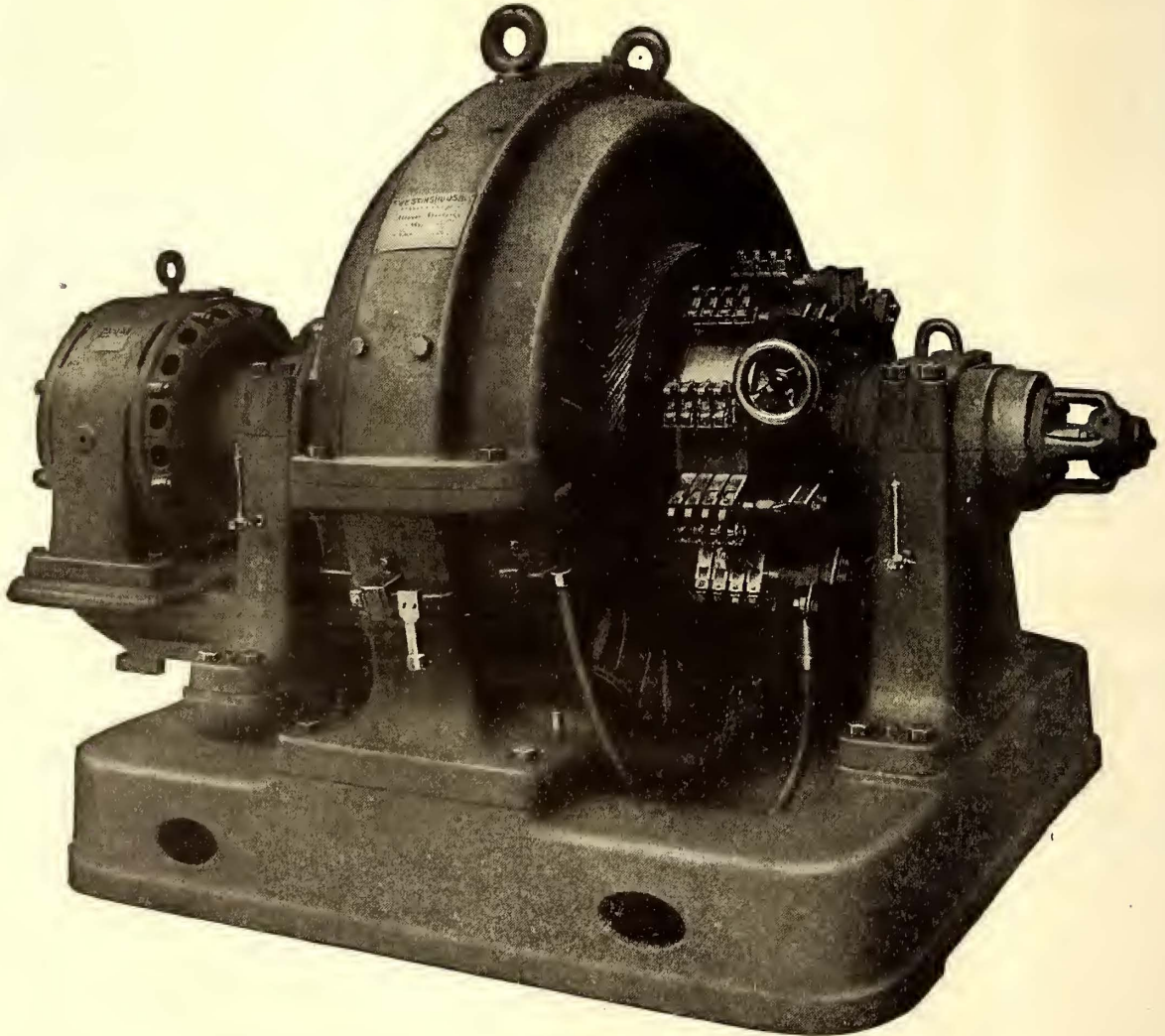


Condenser

EAST PITTSBURG, PA.



Rotary Converters



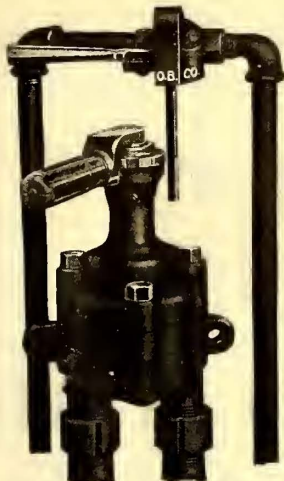
The continued popularity of Westinghouse Rotary Converters is largely owing to their strong mechanical construction, ease of installation, ease of inspection, high efficiency, perfect commutation and to absence of hunting.

Other reasons are given in Circular 1028; any of our offices will send you a copy

Westinghouse Electric & Manufacturing Co.

Atlanta	Buffalo	Cleveland	Detroit	New Orleans	Pittsburg	San Francisco
Baltimore	Chicago	Dallas	Kansas City	New York	St. Louis	Seattle
Boston	Cincinnati	Denver	Los Angeles	Minneapolis	Salt Lake City	Syracuse
Canada: Canadian Westinghouse Co., Ltd., Hamilton, Ont.			Mexico: G. & O. Braniff & Co., City of Mexico			

The increased efficiency and ultimate economy of O-B Car Equipment Specialties can be proved by a trial.



"Universal" Air Sander Equipment



Tomlinson Coupler, Type A, Form 5;
Size No. 1
(The new size for city cars)

For full list see Catalog No. 7 and Supplement



O-B Electric Car Signal System
(Absolutely Dependable)

Also see O-B Adjustable Track Brush Holder, Fire Hose Bridge, Trolley Pick-Up, "Bell Metal" Motor Bearings, Motor Metal, Etc., Etc.

THE OHIO BRASS CO., Mansfield, Ohio

NEW YORK

PITTSBURG

CHICAGO

SAN FRANCISCO

LOS ANGELES

SEATTLE

OVERHEAD Line Material

Iron and Steel Tubular Poles for Electric Lighting, Railway and Signal Service. Trolley Brackets, Plain and Ornamental, for Wood and Iron Poles. Mast Arms.

Catalogue on request

Electric Railway Equipment Co.

Main Office: Cincinnati, Ohio

2

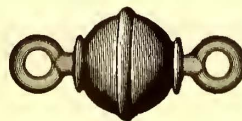
The Macallen Company

FOUNDRY AND DIVISION STREETS

Boston, Mass.

Manufacturers of

Electric Railway Material

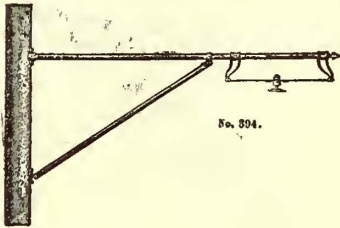
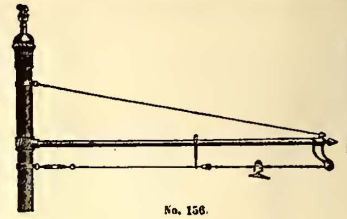
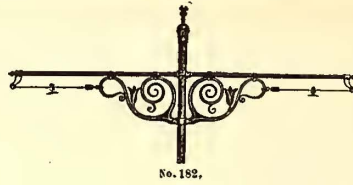
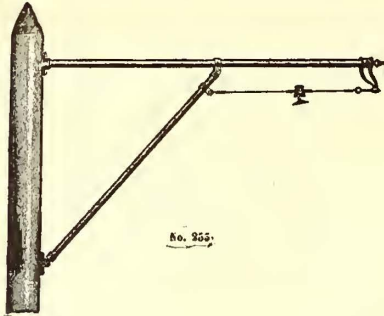


Overhead Insulation, Ears, Frogs, Crossings, Section Insulators, Etc. Third-Rail Insulators, High Potential Insulation, Bronze, Composition and Brass Castings.

CATALOG ON APPLICATION

Prompt Attention Given to Specifications and Quotation Sheets

CABLE ADDRESS: MACALLEN, BOSTON



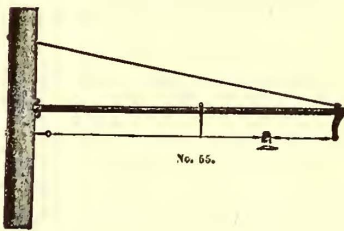
USE

Creaghead Flexible Brackets

THEY ARE STANDARD

THOUSANDS IN USE

An experience of eighteen years in the manufacture of pole brackets enables us to render intelligent service



POLE LINE FITTINGS

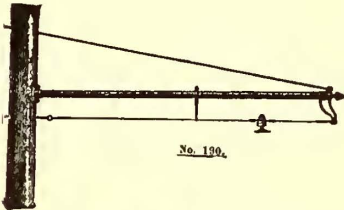
Pole Tops

Pole Bands

MALLEABLE IRON CROSS ARMS

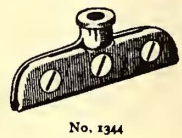
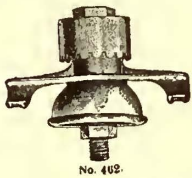
Pole Steps

Pole Collars



Creaghead

Trolley Line Material



EARS

FROGS

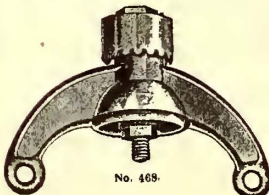
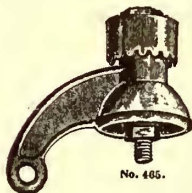
HANGERS

CROSSINGS

STRAIN INSULATORS

SECTION INSULATORS

INSULATED CROSSINGS

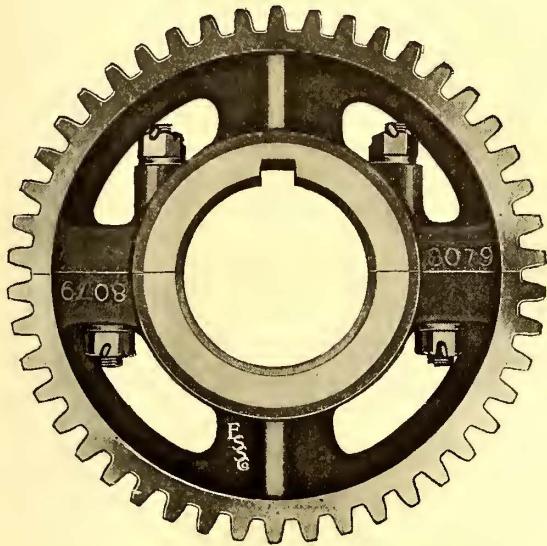


Complete Equipment for Overhead Line Construction

The Creaghead Engineering Co.

344 Main Street, Cincinnati, Ohio

Your Particular Service Requires Particular Gears



"Any gear for any service," has proven to be an expensive fallacy in street railway operation.

Gears and pinions are now designed and manufactured to meet the special conditions for which they are to be used. The Nuttall Company, the pioneer in the manufacture of railway gearing, have special grades of gears and pinions adapted to every kind of service.

Tell us the types of motors you are using, the approximate weight of your equipment, the average life you are receiving from your present gearing, and let us make some suggestions toward increased life and lower cost for motor gearing.

Ball bearing trolleys for long life and minimum wear on wheels and overhead

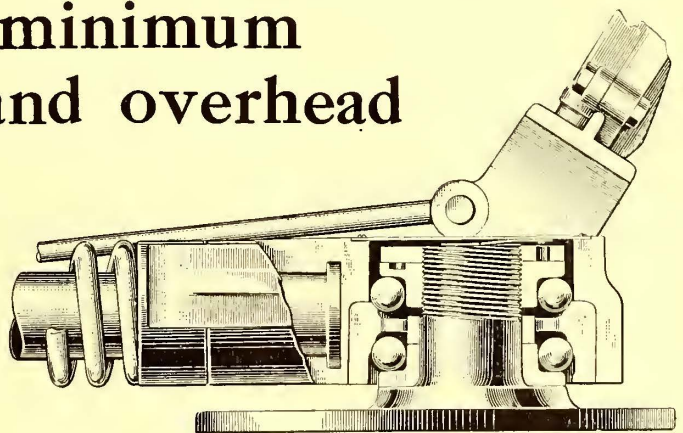
The sensitive action of the Nuttall ball bearing trolley bases will show savings which at first may not be apparent to you.

The alleviation of all friction and binding at the base swivel allows the trolley wheel to easily follow the slightest curvatures in the trolley wire.

The base swivels equally well with the pole at any angle between vertical and horizontal.

The ball bearing base not only lasts longer than an ordinary base, but also increases the life of trolley wheels and overhead construction.

By the way, have you a copy of our 650-page car equipment catalog, describing these, as well as hundreds of other car equipment specialties? Send for it.



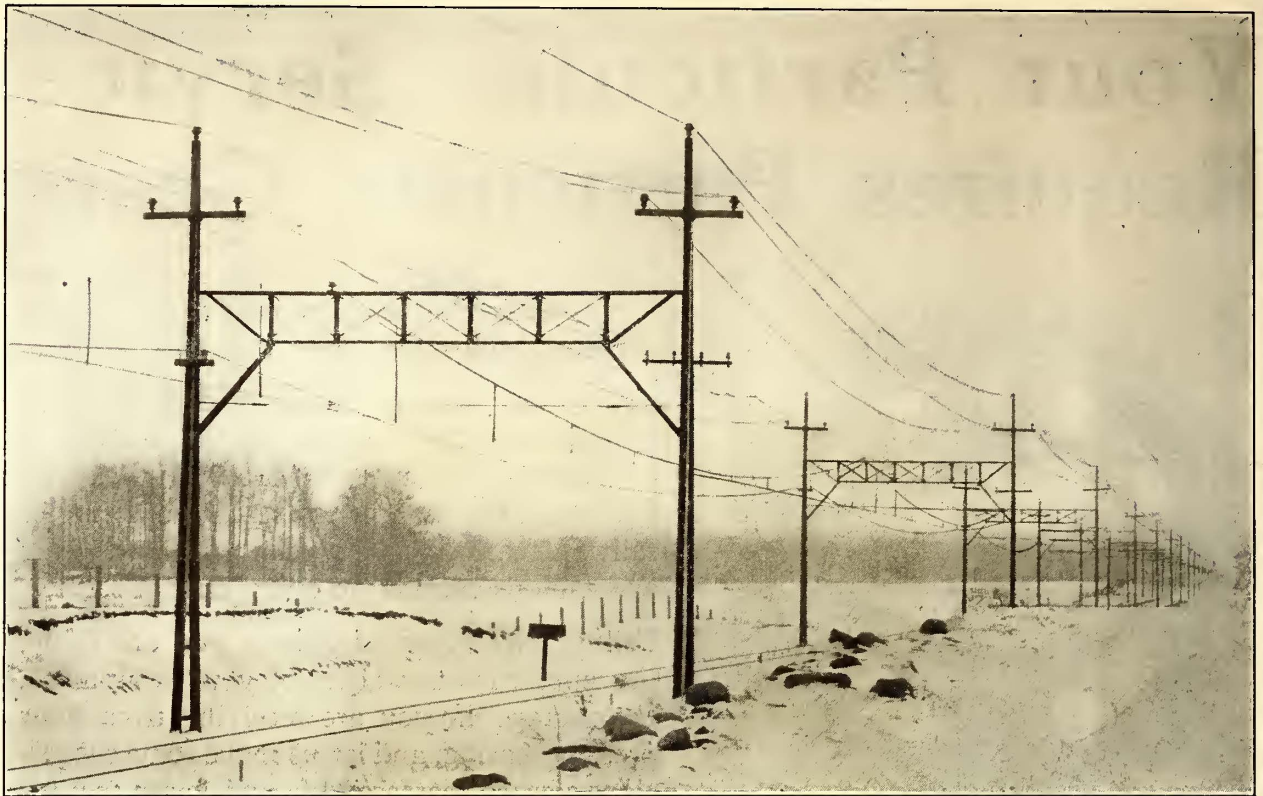
ELECTRIC SERVICE SUPPLIES Co.

Railway Material & Electrical Supplies

PHILADELPHIA
1020-1024 Filbert St.

NEW YORK
Hudson Terminal

CHICAGO
303-305 Dearborn St.



The Difference in Cost

of catenary construction on our steel bridges with concrete foundations over the cost of ordinary trolley construction was only about \$200.00 per mile of double track road on the Rochester, Syracuse & Eastern Railroad.

We illustrate above a line of the bridges on the Syracuse, Lake Shore & Northern Railroad which were of the same design as the three hundred and seventeen we furnished for the R., S. & E. R. R. Mr. Thomas H. Mather, Onondaga County Savings Bank Building, Syracuse, N. Y., was the chief engineer of both properties. Their standard construction from Rochester to Weedsport was ordinary trolley on wooden poles and the excess cost of our construction over the old-style construction was so small and the advantage so great that they changed their standard.

The impression prevails in some quarters that this type of construction is a luxury, but while relative costs may vary, in many cases the difference between the two classes of construction is small.

Can you afford to use temporary wooden pole construction when you can have permanent overhead construction any more than you can afford to use wooden trestles instead of steel bridges or concrete arches?

Write for detailed information.

Archbold-Brady Company
Engineers and Contractors
Syracuse, N. Y.

Little to Install

100,000 FEET IN ACTUAL OPERATION

**5,000 Feet Sold Within the
Last Six Weeks**



National Trolley Guard

has been in successful service for eight years and has proven its merits beyond a doubt; never one complaint and every foot working satisfactorily.

We guarantee it to be the only guard that absolutely protects trolley cars at steam grade crossings.

It is fully protected by patents, and we will protect our customers against any patent litigation.

Write for descriptive pamphlet and revised price list. Write to our customers, they know.

The National Railroad Trolley Guard Co.

General Sales Office: 37 Wall Street, New York

Works: Olean, N. Y.

Authorized Agents { The Ohio Brass Company, Mansfield, Ohio
The Electric Service Supplies Company, Philadelphia and Chicago

Nothing to Maintain



A Happy New Year
is assured if you use

Aetna Insulation Line Material

It has been in use by a large majority of the electric railways in this country and abroad for more than twenty years. Can any similar product show such a record?

Get details from our nearest office.

Albert & J. M. Anderson Mfg. Co.
(ESTABLISHED 1877)
289-293 A St., Boston, Mass., U. S. A.

BRANCHES:
New York, 135 Broadway Chicago, 175 Dearborn St.
Philadelphia, 427 Real Estate Trust Bldg.
London, Moorgate Station Chambers

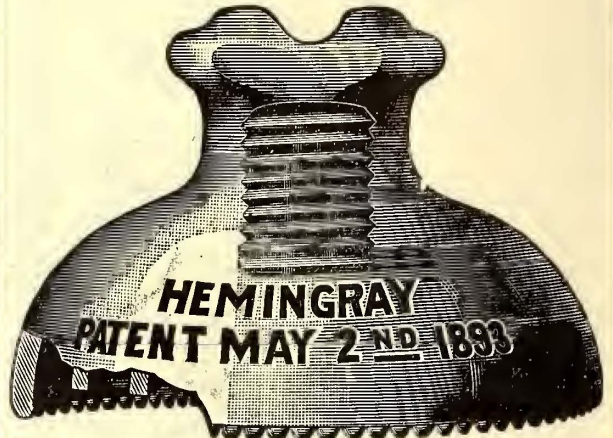
AGENCIES:

San Francisco, Eccles & Smith Co.
St. Louis, T. C. White
Toronto, A. H. Winter Joyner
Birmingham, Ala., L. M. Robertson
Pittsburg, Doubleday-Hill Electric Co.
Kansas City, Mo., Moss and Satterlee



SEE THE Teats on the Petticoat

They take all the moisture from the inner and outer surface of the insulator and keep the pin dry



HEMINGRAY GLASS COMPANY

Established 1848 } Covington, Ky.
Incorporated 1870 }

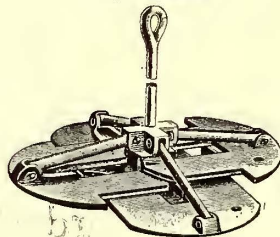
Factories MUNCIE, INDIANA

4-Way Closed



To Guy Anchor Users

4-Way Expanded



We want you to sit up and take notice of The Everstick Anchor.

No Anchor before has ever made such a phenomenal growth in same time (less than three years) as has The Everstick.

It is our opinion that during 1909 there were more Everstick Anchors sold than was sold of any other make.

Judging from contracts made and the number of large companies recently adopting Everstick Anchors, there will be more Everstick Anchors sold during 1910 than the combined sales of all other mechanical Anchors on the market.

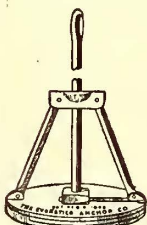
The cost of installing Everstick Anchors is very slight. Eversticks installed cost less per square inch of holding surface and holds more per square inch than any other Anchor.

The Everstick possesses unusual merit worthy of your consideration.

Write for Booklet and Prices

THE EVERSTICK ANCHOR CO.

St. Louis, Mo.



2-Way Closed



2-Way Expanded

1500 Lightning Arresters



supplied one satisfied customer during 1909 and not one of these proved defective. Other large buyers are on our books in the same class. What class are you in?

Ask the Lord Electric Co. if you want results. That's satisfaction. Get it from the Lord Electric Co. Bulletins H and I describe them.



LORD ELECTRIC COMPANY
213 West 40th Street, New York

1/1/10

New Type DOSSERT CABLE TAP

Aluminum contact on aluminum feeder cable.
Copper contact on copper branch cable.



Dossert & Company, 242 W. 41st St. New York

GOLD TROLLEY WIRE

would wear faster than Copper and cost more.

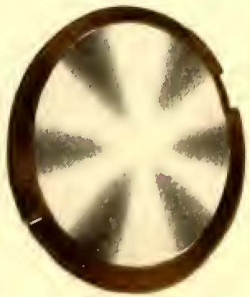
Copper wears faster than Copper-Clad and costs more too.

Use a larger feeder and a small Copper-Clad trolley wire. The feeder doesn't wear out.

The combination

SAVES MONEY

TRADE MARK



WELD CLAD

DUPLEX METALS CO.

Singer Building

149 Broadway

NEW YORK

To Demonstrate:

You string No. 4/0 Copper Trolley for conductivity and strength.

Area	- - - -	211,600 c. ms.
Elastic limit	- -	4,986 lbs.
Cost per mile	- -	\$490.00
Cost of renewal	-	\$490.00



No. 4/0 Copper

By the time it is worn out it is reduced 50%.

Area	-	105,800 c. ms.
------	---	----------------



Using a No. 1 Copper Feeder and No. 0 COPPER-CLAD TROLLEY:

Equivalent combined copper area (when new)	- - -	125,890 c. ms.
After trolley is worn 50%	-	104,790 c. ms.
Elastic limit of trolley	- -	4,707 lbs.
Combined cost per mile	- -	\$423.00
Cost of renewal	- - - -	\$230.00



No. 1 Copper Feeder



No. 0 COPPER-CLAD Trolley

A Trolley Wire Certainly Comes In For Very Hard Service—

At intersections, on the main line, at turnouts, it gets hard knocks from the trolley wheel or shoe; all sorts of pounding and wrenching, occasional vicious arcing, heating from overloads and accidental short circuits—For economical maintenance you need the toughest trolley wire you can procure.

“Phono-Electric” Trolley Wire has stood these tests with the most remarkable results. It means a permanent, *reliable overhead construction*—a wire you can depend upon.

Every Street Railway Manager is interested in producing the lowest cost of maintenance for his overhead construction—Let us show you why “Phono-Electric” is the best trolley wire to use. Write us.



BRIDGEPORT BRASS COMPANY

253 Broadway, New York





TRADE MARK
Registered U. S. Pat. Office

RAILWAY FEED WIRES insulated with OKONITE are unequalled for flexibility, durability, and efficiency, and are in use by the leading Electric Street Railway Companies. OKONITE is preferred above any other insulation for Car Wiring, Telegraph and Telephone Purposes.

OKONITE WIRES—OKONITE TAPE—MANSON
TAPE—CANDEE WEATHERPROOF WIRES—
CANDEE PATENTED POTHEADS

Samples and Estimates on Application

THE OKONITE COMPANY, 253 Broadway, NEW YORK

WILLARD L. CANDEE, *President*
H. DURANT CHEEVER, *Treasurer*

GEORGE T. MANSON, *Gen'l Supt.*
WM. H. HODGINS, *Secretary*

The Waclark Wire Co.

Manufacturers of

Trolley Wire

ROUND, GROOVED and FIG. 8

Cables

BOTH BARE AND WEATHERPROOF
ALL SIZES — FOR ALL PURPOSES

Copper Wire

BARE—TINNED—STRANDED

Material furnished to conform to the highest specifications

The Waclark Wire Co.

New York Office:
49 Wall St.

Works located at
Elizabeth, N. J.

Trolley Wire

Wire Rope

Wire Strand

John A. Roebling's Sons Company

TRENTON, NEW JERSEY

ALUMINUM

Railway Feeders

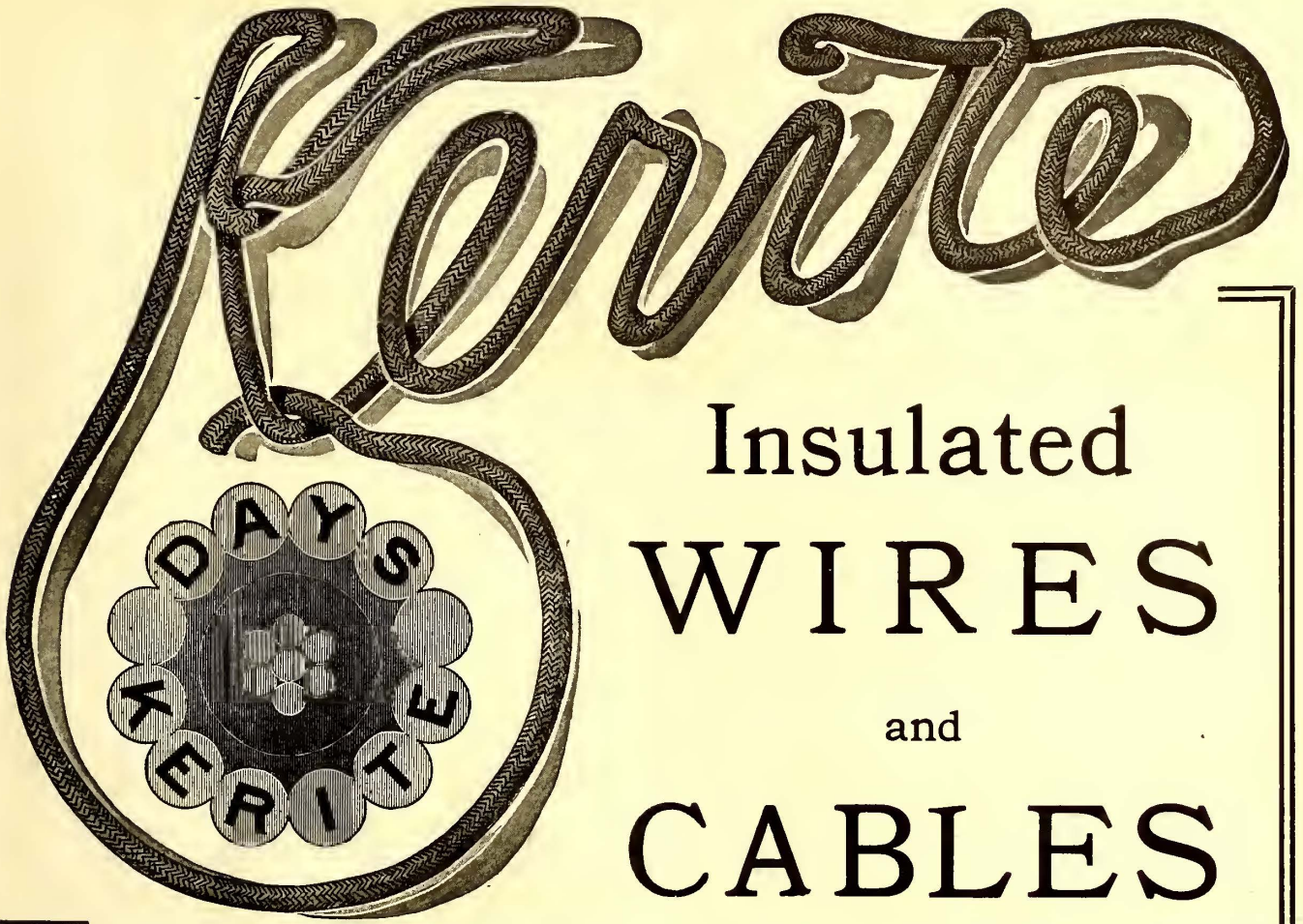
And all kinds of Electrical Conductors

Aluminum feeders are less than one-half the weight of copper feeders and are of equal conductivity and strength. If insulated wire or cable is required, high-grade insulation is guaranteed.

Write for prices and full information.

Aluminum Company of America

PITTSBURGH, PA.



Insulated
WIRES
 and
CABLES

ASK THE PEOPLE WHO
 HAVE USED THEM. :: ::

For Feeders, A.C. and D.C.
 Transmission, Signals, Tele-
 phone, Telegraph, Car Wir-
 ing and Car House Wiring.

"The Insulation which has withstood successfully the test of half a century"

KERITE INSULATED WIRE & CABLE COMPANY

INCORPORATED BY W. R. BRIXEY

Sole Manufacturer

Hudson Terminal, 30 Church St., NEW YORK

Western Representative

WATSON INSULATED WIRE CO.
 Railway Exchange, CHICAGO, ILL.

Trolley Wire

American Electrical Works

F. N. Phillips, Pres.
E. R. Phillips, Vice-Pres.
C. H. Wagenseil, Treas.
C. R. Remington, Sec.

PHILLIPSDALE,
RHODE ISLAND

NEW YORK OFFICE: 21 Cortlandt St. CHICAGO OFFICE: 135 Adams St.
MONTREAL BRANCH: Eugene F. Phillips Electrical Works.

We can supply promptly
Round, Grooved or Figure 8
Trolley Wire. Also Bare
Stranded and Weatherproof
Feeder Cables, Field and
Armature Magnet Wire,
Galvanized Iron Wire and
Strands.

The
Electric Cable Co.
BRIDGEPORT, CONN.

RUBBER COVERED WIRE AND CABLE, MAGNET WIRE, WEATHER-
PROOF WIRE AND CABLE, OFFICE WIRE, ANNUNCIATOR WIRE

Our products are manufactured of the best material
on new and improved machinery and in well de-
signed modern buildings where everything is con-
ducive to the highest grade of product.

NEW YORK OFFICE, 17 Battery Place
BOSTON OFFICE, 200 Congress Street
CLEVELAND OFFICE, Lenox Bldg.

CHICAGO OFFICE, 1530 Monadnock Bldg.
RICHMOND, Va., American Nat'l Bank Bldg.
SAN FRANCISCO OFFICE, 438 Market St.

The National Conduit & Cable Co.
Executive Offices: 41 PARK ROW, NEW YORK, N. Y.

Trolley Wire
Copper Transmission Wire and Cable
Weatherproof Feeder Wire and Cable
Paper Insulated Transmission and
Feeder Cable

BOSTON PHILADELPHIA CHICAGO SAN FRANCISCO

COILS WON'T BURN OUT IF MADE OF

"Deltabeston" Magnet Wire

Fire-Proof—Moisture-Proof—Uniform—Flexible

D & W FUSE CO., PROVIDENCE, R. I.




Round—Square—Flat
MAGNET WIRE
ALL INSULATIONS
STANDARD UNDERGROUND CABLE CO.

BOSTON
NEW YORK
PHILADELPHIA

PITTSBURGH, PA.

CHICAGO
ST. LOUIS
SAN FRANCISCO

It is a paying investment to carry an
advertisement in every issue of the
Electric Railway Journal.

Western Electric



TELEPHONES



FOR

Electric Railway Work

have the

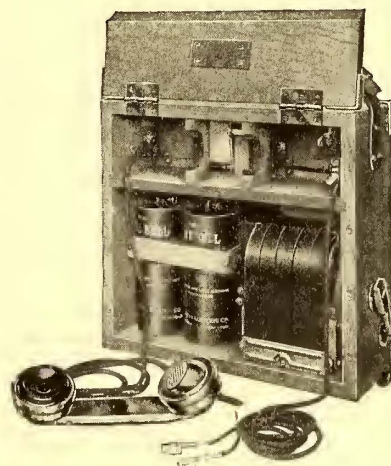
Quality, Efficiency, Reliability



Railway Telephone for Inside Use.

so necessary in this field. They are the celebrated "Bell" telephones with which the local and long-distance traffic of the country is conducted.

Our railway telephones are made in all practical types, both the portable and the well-known stationary telephones for sidings and protected stations.



Portable Set for Car Service.

Western Electric tele-
phones will increase the efficiency of your system. They are durable and guaranteed to give satisfactory and lasting service.

Always specify Western Electric "Bell" grade telephones and you will get the best.

Full information and the services of our special railway telephone engineers are at your disposal. Write our nearest house.

WESTERN ELECTRIC COMPANY

New York,
Philadelphia

Boston,
Pittsburg,
Atlanta.

Chicago,
Indianapolis,

Cincinnati,
Minneapolis,

*Write Our
Nearest House*

St. Louis
Kansas City

Denver,
Dallas,
Omaha,

San Francisco,
Los Angeles,

Seattle,
Salt Lake City.

Montreal, Winnipeg and Vancouver,
Northern Electric and
Manufacturing Co., Ltd.

Antwerp,
Bell Telephone
Manufacturing Co.

London,
Western Electric
Company.

Berlin,
Telephon Apparat Fabrik,
E. Zweitusch & Co.

Paris,
Société de Matériel
Telephonique.

The Lindsley Brothers Company

Producers and Shippers of

and Manufacturers of

WESTERN CEDAR POLES

RED FIR CROSS ARMS

Eastern Sales Office, Monadnock Bldg., CHICAGO

SPOKANE, WASHINGTON

IDAHO CEDAR POLES

Buy Direct from
The Producers
Humbird Lumber Co. Ltd.
Largest producers of Idaho Cedar Poles
Sandpoint, Idaho.

Winter Cut Chestnut Poles
Poles Any Length—25 to 80 Feet
Write for Prices—Prompt Shipments—Buy Direct from Producers
CHERRY RIVER BOOM & LUMBER CO.
Yards on B. & O. R. R. RICHWOOD, W. VA.

For prompt deliveries of
Cedar Poles RED OR WHITE
write either office to-day.
NATIONAL POLE COMPANY
EVERETT, WASH ESCANABA, MICH.

WHITE OAK TIES

Bridge, Track and Car Timbers.
Cypress Trolley Poles—Piling.
ABELES & TAUSSIG, St. Louis, Mo.

POLES, TIES and PILING

THEODORE G. EMPIE
WILMINGTON, N. C.

CALIFORNIA POLE & PILING CO.
Offices: Fife Building, San Francisco; 605-606 Lumbermen's Building, Portland, Ore.
Yards: St. Helens, Oregon, on Northern Pacific Railway; Point San Pablo, California, on Southern Pacific and Santa Fe Tracks.

**WASHINGTON CEDAR POLES
FIR CROSS ARMS**
WRITE FOR DELIVERED PRICES

CEDAR POLES AND TIES
We carry a large stock in Chicago for rush shipments
NAUGLE POLE AND TIE CO.
CHICAGO OFFICE: 226 LA SALLE STREET

Cedar Trolley Poles
Idaho Cedar Michigan Cedar
Write us for Bestwood Prices
Western Lumber & Pole Company
Main Office—Denver, Colo.—Chicago, Ill.

CYPRESS POLES and PILING
ALL SIZES UP TO 80 FEET
Buy direct from the producer and save middlemen's profit.
KENNETT CYPRESS & HARDWOOD LUMBER CO.
Timber and Shipping point: Kennett, Mo. Sales Offices: Davenport, Iowa

TIES—POLES—TIMBERS
Buy direct and save commissions
We have 20442 acres in South West Florida of finest heart
Long Leaf Yellow Pine
35,000 6" x 8" x 8 ft. ties ready for immediate shipment.
Let us bid and save you money.
Florida Tie & Lumber Co.
50 Church Street New York City

CEDAR POLES
SPECIAL PRICES ON SMALL STOCK
C. H. WORCESTER COMPANY
PRODUCERS OF WHITE CEDAR PRODUCTS
1708-1712 TRIBUNE BLDG. CHICAGO, ILL.

Cedar Poles TIES and POSTS
Direct from the stump to the consumer.
KAYE & CARTER, Minneapolis, Minn.

Yellow Pine and Cypress Railroad Cross Ties
Manufacturers and Shippers of All Sizes
American Tie & Timber Co., 11 Broadway New York
Shipping Ports: Brunswick, Ga.; Fernandina, Fla.; Jacksonville, Fla.

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.

The Valley Tie and Lumber Co.

Staunton, Va. Roanoke, Va. Lexington, N. C. Johnson City, Tenn.

CONTRACTORS FOR

Street Railway Ties and Construction Lumber

We are the largest producers and contractors in Oak and Chestnut Cross Ties east of the Mississippi River and will give your inquiries prompt attention. We are prepared to bid on any contracts large or small, so write us your requirements and let us name you a price for the delivered stock. 50,000 to 100,000 ties in stock all the time.

**Address Main Office
Staunton, Virginia**

Cedar Poles, Ties & Posts

Being Producers, we can, perhaps, supply you with Poles, Ties and Posts at more favorable prices than you have been paying.

Our Cedar is the finest quality of Michigan White Cedar. We can make prompt shipments and shall be glad to quote you delivered prices.

WARNER NEWTON LUMBER CO.

**Producers
Grand Rapids, Michigan**

STANDARD RAILROAD and TROLLEY TIES

T. S. THOMPSON - Thompsettown, Pa.

TRIPARTITE STEEL POLES

Practical, Permanent,
Overhead Construction

FRANKLIN STEEL COMPANY, Franklin, Penn.



WILLIAM P. COOK & CO.
Manufacturers and Shippers
Yellow Pine Cross Ties
MAIN OFFICE:
100 Wall Street, New York
BRANCH OFFICES:
Jacksonville, Fla. Charleston, S. C.
Room 203, West Bldg. 30 Broad St.
Send Us Your Inquiries

White Cedar Poles

We have a large stock of Long Poles suitable for Trolley and Transmission Lines.

Send itemized list for special delivered prices.

J. W. Morrison Lumber Co.
Main Office: 918-19 Lumber Exchange, Minneapolis, Minn.
Yards—Northern Minn.

CEDAR POLES

Northern White and Idaho Red

Rush orders shipped from our Minnesota Transfer Yards

Lumber
Exchange

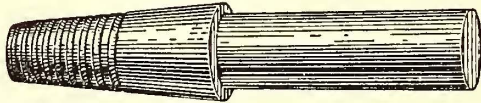
Jager Hill Co.

Inneapolis,
Minn.

Locust Insulator Pins

First Class Stock Prompt Delivery
Right Prices

Shipped Direct from Factory



There are none better than I can produce and ship in any quantity desired.
Let me quote you.

CLARENCE CALL

Largest Manufacturer of
Locust Pins in the World.

North Wilkesboro, N. C.

RAILWAY EQUIPMENT CO.

72-74 First St.

PORTLAND, OREGON

The largest stock of Railroad Supplies West of Chicago.

We want a few active specialties to add to our line.

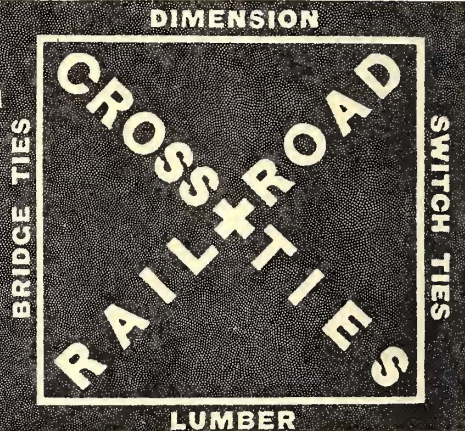
G.S. BAXTER & CO.

17 WILLIAM ST., NEW YORK

Yellow Pine and Cypress Cross Ties

JACKSONVILLE, FLA.

MILL AND TIE CAMPS AT FARGO, CLINCH CO., GA.



Barcol
REGISTERED U. S. PATENT OFFICE
(COPPERED CARBOLINEUM)

The only perfect wood preservative

FOR
Railroad Ties, Poles, Cross-arms, Trestles, etc.

List of available publications on request.

ANTHRACENOL WOOD PRESERVING CO., 264A Spring St., New York

Atlantic Creosoting & Wood Preserving Works
NORFOLK, VA.

Creosoted Poles, Ties, Bridge and Trestle Timbers
Correspondence Solicited Our Prices Will Interest You

AMERICAN CREOSOTE WORKS, INC.
NEW ORLEANS, LA.
(Station B.)

Creosoted Timber of All Kinds
CAPACITY—50,000,000 Feet B. M. per Annum

Gulfport Creosoting Co.
 Gulfport Miss.
CREOSOTING TIES
POLES, BRIDGE MATERIAL
NEW & MODERN PLANT
 Capacity 2,000,000 ft B M per Mo



Maintenance Cost of Overhead Equipment

is greatly reduced when poles are treated with

"C. A. Wood Preserver"

(Carbolineum America)

Open Vat Method

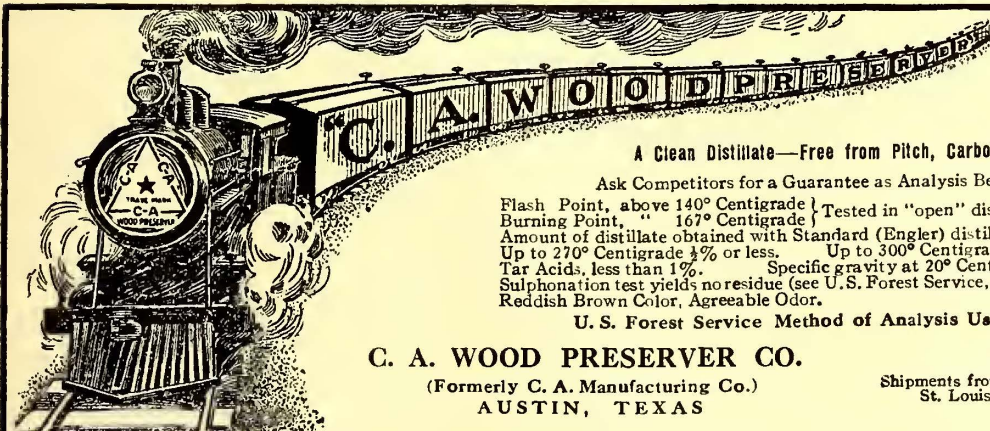
We have a complete plant, of large capacity, at Minnesota Transfer. We can sell you Michigan or Western Cedar Poles, either treated or untreated—also Cedar Ties, Piling, etc. Send us your list and let us estimate.

The Valentine-Clark Co.

234 La Salle Street

(3)

CHICAGO



"C. A. Wood Preserver"
 (Carbolineum America)

A Clean Distillate—Free from Pitch, Carbon, Petroleum, or Similar Adulterations


Ask Competitors for a Guarantee as Analysis Below:

Flash Point, above 140° Centigrade	} Tested in "open" dish,
Burning Point, " 167° Centigrade	
Amount of distillate obtained with Standard (Engler) distilling flask:	
Up to 270° Centigrade 1/2% or less.	Up to 300° Centigrade 8% or less.
Tar Acids, less than 1%.	Specific gravity at 20° Centigrade, 1.138.
Sulphonation test yields no residue (see U.S. Forest Service, Cir. 112).	
Reddish Brown Color, Agreeable Odor.	

U. S. Forest Service Method of Analysis Used

C. A. WOOD PRESERVER CO.
 (Formerly C. A. Manufacturing Co.)
 AUSTIN, TEXAS

Factories in Germany
 Shipments from stocks at New York, New Orleans,
 St. Louis, San Francisco, Salt Lake City,
 Galveston and Denver



Reg. U.S. Pat. O.
 Nos. 22396-51987

Terse Talks on Timber Treatment

(Talk FOUR)

- BECAUSE** it is a pure Coal-tar oil especially treated to secure greater "body" and increased antiseptic power.
- BECAUSE** it does not distill below 300 C. (572 Fahr.)—will not evaporate from wood even under tropical heat.
- BECAUSE** of its heavy weight and insolubility it is not dissipated by torrential rains or submersion in water.
- BECAUSE** it contains all of the non-volatile, insoluble, pungent and acid antiseptics of Coal-tar oil in their most active form, which makes it not only a germ-excluder but a germicide that exerts its influence permanently.
- BECAUSE** it positively reduces the inflammability of the wood to which it is applied. (Creosote is highly inflammable.)
- BECAUSE** it means maximum results from timber treatment with all of the bother and uncertainty left out.

These are a few of the reasons why you should ally yourself with progress by insistently specifying

Antiseptine

Registered.

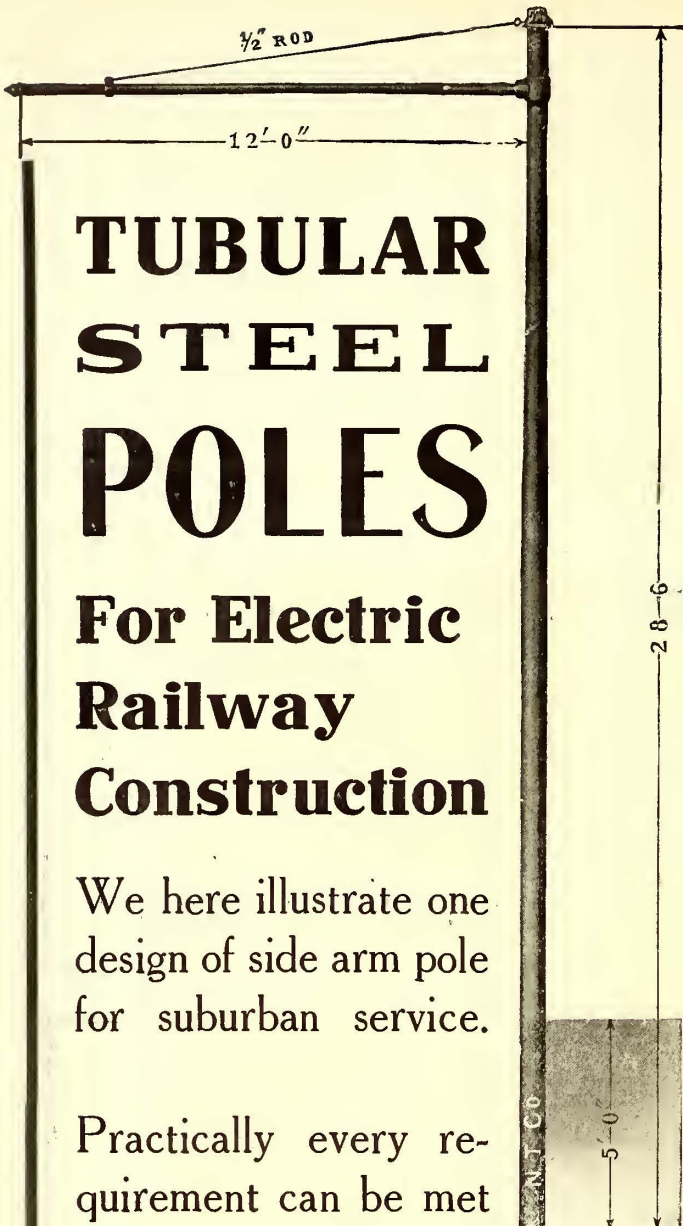
"The Wood-preserver that stays put."

If you are from Missouri, let us show you—if you're not, let us show you anyway. Read Prof. Gellert Alleman's official analysis of Antiseptine. It tells its own story.

Don't wait until the "good old summer-time." Lay this journal down right now and write us.

Incorporated 1892

AMERICAN WOOD-PRESERVING COMPANY, The Rookery, CHICAGO



TUBULAR STEEL POLES

For Electric Railway Construction

We here illustrate one design of side arm pole for suburban service.

Practically every requirement can be met by a selection from our wide variety of plain and ornamental styles.

Write for descriptive literature

**National
Tube Company**
PITTSBURGH, PA.

DISTRICT SALES OFFICES:

Atlanta	New Orleans	Pittsburgh	St. Louis
Chicago	New York	Portland	Salt Lake City
Denver	Philadelphia	San Francisco	Seattle

Export Representatives: U. S. Steel Products Export Co., New York City

"DIAMOND" TAPERED STEEL POLES

FOR
ELECTRIC RAILWAY
CONSTRUCTION,
TRANSMISSION AND
SIGNAL SERVICE,
TELEGRAPH
AND
TELEPHONE
LINES,
ETC.

These poles have no transverse joints—no unsightly features. They cannot telescope and they have uniform strength for entire length.

Special bracket designs furnished to match existing work or to carry out new ideas.

Write for descriptive catalogs.

U. S. Metal & Mfg. Co.
165 Broadway NEW YORK

(1)
AGENTS FOR DIAMOND STEEL POLE CO.

The Only Scientific Method Of Reconstructing Iron Poles

This method applied to a badly corroded pole restores to it more than its original strength and nullifies the effect of further corrosion. The grout is injected under air pressure by specially designed portable equipment, entirely surrounding the reinforcing cage, which is built of high carbon steel. Process and apparatus are fully covered by patents. Further particulars upon request

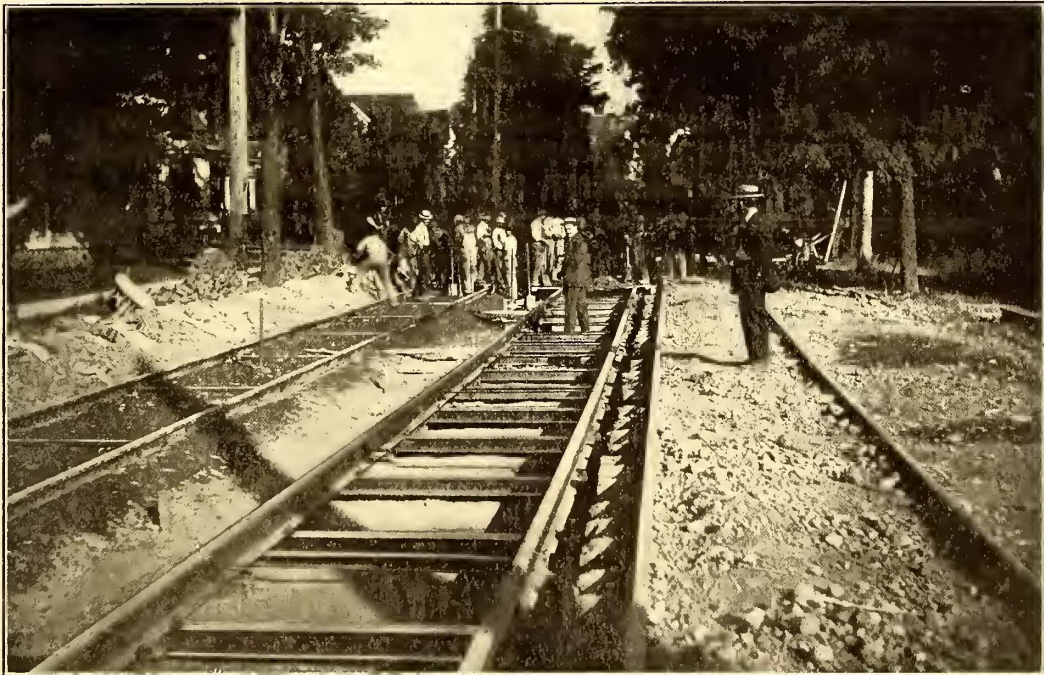
The NEW YORK POLE Company
G. M. GEST, Gen. Mgr.

NEW YORK CINCINNATI CHICAGO
277 Broadway Union Trust Bldg. Monadnock Block

Carnegie Steel Company

Pittsburgh, Pa.

Steel Cross Ties



INSTALLATION OF STEEL CROSS TIES, CORTLAND, N. Y.

THE INITIAL EXPENSE FOR CONCRETE CONSTRUCTION WITH STEEL CROSS TIES IS NO GREATER THAN THAT FOR WOOD TIES. THE ULTIMATE SAVING IS IN FAVOR OF STEEL CROSS TIES.

Let Us Give You Full Information

BIRMINGHAM
BOSTON
BUFFALO
CHICAGO

CLEVELAND
CINCINNATI
DENVER
DETROIT

NEW ORLEANS
NEW YORK
PHILADELPHIA
PITTSBURGH

PORTLAND
SAN FRANCISCO
ST. PAUL
ST. LOUIS

Export Representatives: UNITED STATES STEEL PRODUCTS EXPORT CO., New York, N. Y

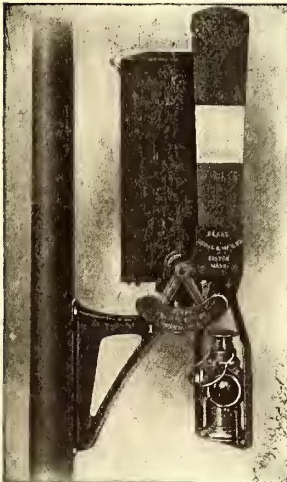


A WINNER

**THE NEW CAR COUNTING SIGNAL IS A DEVELOPMENT,
NOT AN EXPERIMENT; A GROWTH, NOT AN INNOVATION;
A FULFILLMENT, NOT A PROMISE.**

**UNITED STATES ELECTRIC SIGNAL CO.
WEST NEWTON, MASS., U. S. A.**

Send for Bulletin No. 3.



Get ready for the heavy traffic you will have this year
by ordering

Blake Dispatcher's Signals

now. You cannot afford to be without them. They will enable you to handle more traffic with more safety and convenience to the public and at less expense.

Write *NOW* for further information.

Blake Signal & Manufacturing Co., BOSTON MASS.

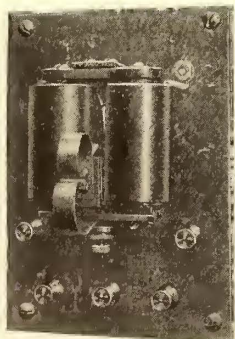
National Crossing Signals

give positive, visible and audible protection against accidents at highway crossings.

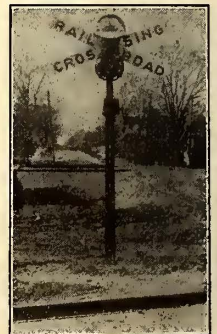
The National Relay is a simple practical solution of the relay problem for high voltage—it is positive in action, non-arcing, and has long life. The National Bell is a heavy, non-arcing, loud-ringing gong, which requires no delicate adjustment. It is the only bell on the market which is efficient on circuits varying from 500 to 800 volts.

The National Signal System is simple, easily installed and inexpensive to maintain—fully proven by four years' successful service.

Will you have details?



The Relay That Does the Work



The Crossing Signal

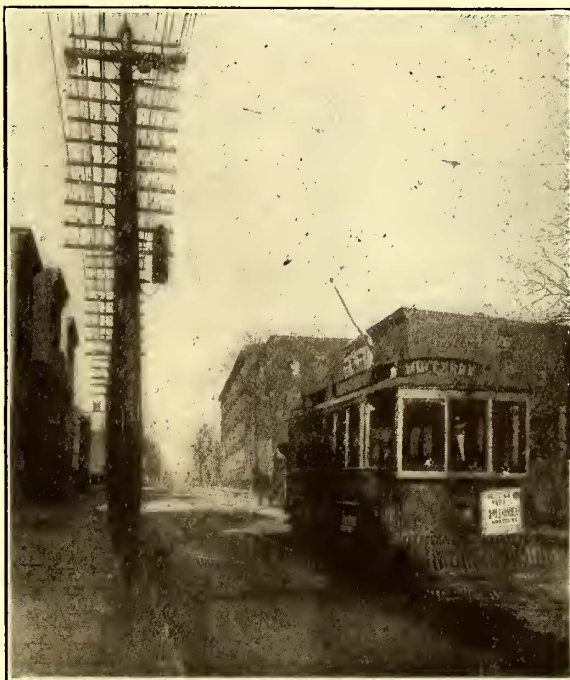
National Electrical Mfg. Co., Wheaton, Ill.

Insure Safe Single-Track Operation

by equipping your entire line with the

Kinsman Block Signal

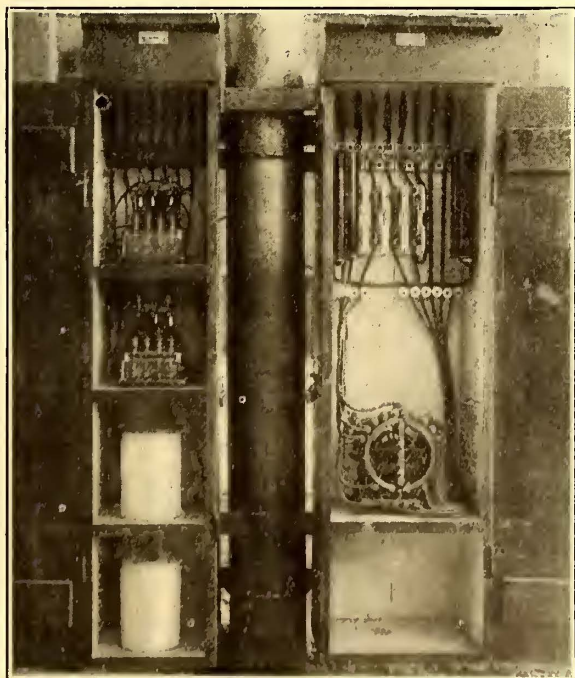
Operated Through the Rail
Eliminates Overhead Switches



When a car enters a clear block, it sets a cautionary signal for following cars and a danger signal for opposing cars. The step-by-step mechanism of the signal allows following cars to enter the block without changing the signals set by the first car. As each car leaves the block, the step-by-step mechanism moves back one tooth, until the last car out restores the safety signals and extinguishes the danger and caution signals.

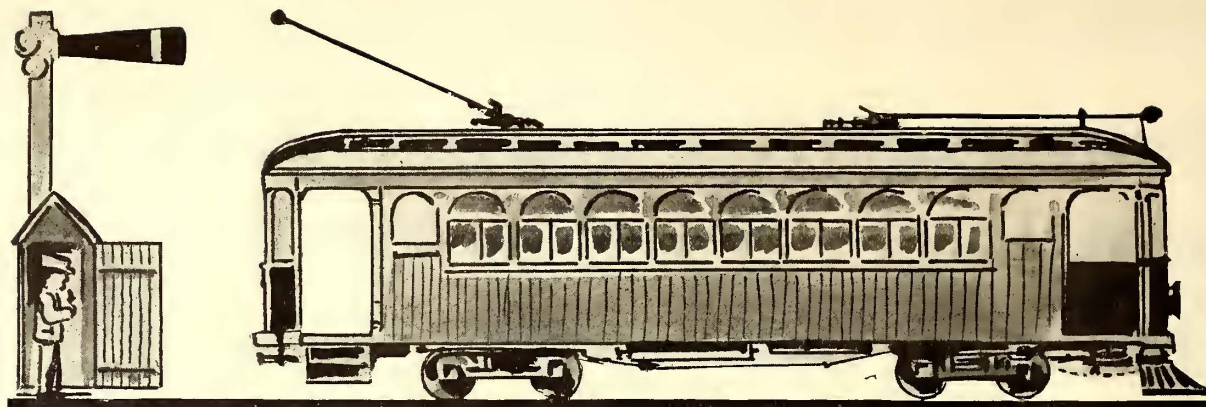
In the installation shown here 17 cars can enter the block. Full particulars are yours upon request.

Write!



**Kinsman Block
System Co.** ⁵⁰ Church
Street

NEW YORK



Collisions Are

when the dispatcher can change or enforce

STROMBERG

Despatching

is of the very greatest practical value in handling regular trains on inter-urban roads, in wild-catting special cars, or in increasing the number of cars to handle unusually heavy traffic—its emergency value is beyond estimation. At each siding or meeting point, a booth with a single blade semaphore is installed. The movement of the semaphore is controlled by a simple, reliable mechanism, operated by the dispatcher in his office. When he determines the proper meeting place for two cars, he plugs in on the selected number in his master machine, thus setting the semaphore at the selected point to the stop position. When the semaphore is thrown to full stop, the fact is recorded on the dispatcher's tape register.

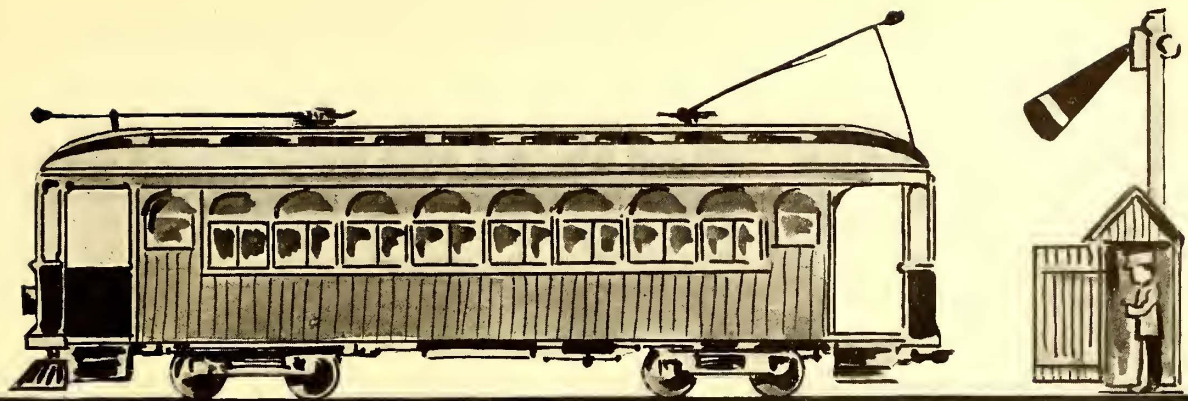
Just Out—Bulletin No. 1001- —Send For It!

STROMBERG-CARLSON TEL MFG CO

ROCHESTER, NEW YORK, U.S.A.

CHICAGO, ILL.

KANSAS CITY, MO.



Impossible

his orders to car crews at meeting points.

CARLSON

Signal System

Since the dispatcher has full control of the signals at meeting points, he can stop any car or train anywhere along the line, call the conductor to the telephone, and verbally change or reinforce his orders.

While the Stromberg-Carlson Despatching Signal System greatly facilitates traffic and adherence to schedules, its chief value to any interurban road is in the prevention of accidents. Any day—any hour—any minute—your motorman may lose or forget the wording of a written order, causing distressing loss of life and heavy damage expense. Stromberg-Carlson Despatching Signals compel obedience to orders. Our catalog gives full particulars of its construction and operation. Shall we send a copy?

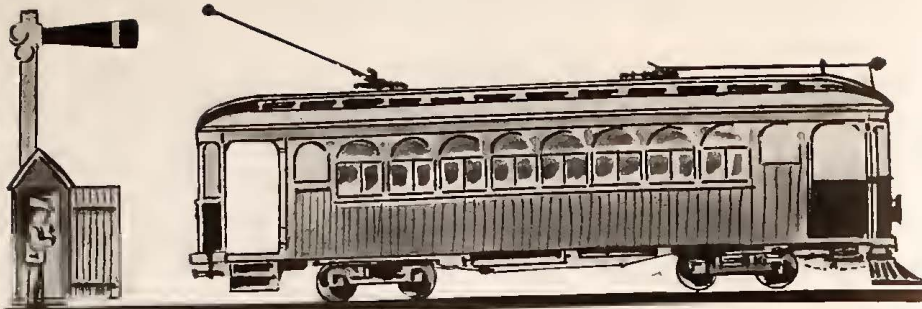
Sixteen Pages of Useful Information—Bulletin No. 1001-A

STROMBERG-CARLSON TEL. MFG. CO.

ROCHESTER, NEW YORK, U.S.A.

CHICAGO, ILL.

KANSAS CITY, MO.



Collisions Are

when the dispatcher can change or enforce

STROMBERG

Despatching

is of the very greatest practical value in handling regular trains on inter-urban roads, in wild-cattling special cars, or in increasing the number of cars to handle unusually heavy traffic—its emergency value is beyond estimation. At each siding or meeting point, a booth with a single blade semaphore is installed. The movement of the semaphore is controlled by a simple, reliable mechanism, operated by the dispatcher in his office. When he determines the proper meeting place for two cars, he plugs in on the selected number in his master machine, thus setting the semaphore at the selected point to the stop position. When the semaphore is thrown to full stop, the fact is recorded on the dispatcher's tape register.

Just Out—Bulletin No. 1001- —Send For It!

STROMBERG-CARLSON TELMFG.CO

ROCHESTER, NEW YORK, U.S.A.

CHICAGO, ILL.

KANSAS CITY, MO.



Impossible

his orders to car crews at meeting points.

CARLSON

Signal System

Since the dispatcher has full control of the signals at meeting points, he can stop any car or train anywhere along the line, call the conductor to the telephone, and verbally change or reinforce his orders.

While the Stromberg-Carlson Despatching Signal System greatly facilitates traffic and adherence to schedules, its chief value to any interurban road is in the prevention of accidents. Any day—any hour—any minute—your motorman may lose or forget the wording of a written order, causing distressing loss of life and heavy damage expense. Stromberg-Carlson Despatching Signals compel obedience to orders. Our catalog gives full particulars of its construction and operation. Shall we send a copy?

Sixteen Pages of Useful Information—Bulletin No. 1001-A

STROMBERG-CARLSON TELMFG.CO

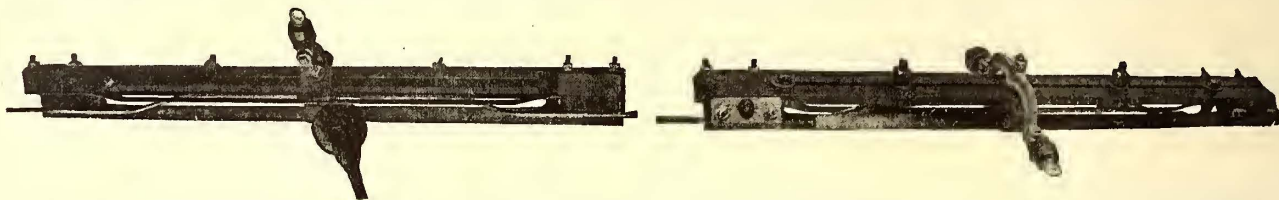
ROCHESTER, NEW YORK, U.S.A.

CHICAGO, ILL.

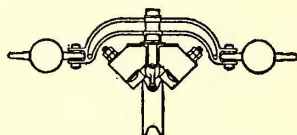
KANSAS CITY, MO.

The Trolley Switch in the
Nachod Automatic Signal

is very simple, has no moving parts, does not project below the wire. A light angle iron frame supports at its ends, the insulated contact strips which are inclined to each other.



One strip connects to trolley, the other to signal box. The wheel merely bridges them,



the wire being raised above its path. Could anything be simpler? There is no shock to trolley, and the contact strips extending lengthwise combine flexibility with great wear.

The Nachod Signal Company
 929 CHESTNUT STREET, PHILADELPHIA, PA.


Send Us a Timetable
 and a rough sketch of your road, and we will submit an estimate for installing the

Simmen System
 —the signal system that will make your road SAFE. In operation on the Toronto and York Radial Railway, it produced 88,734 indications during July, and showed an efficiency of 99.993%.

SIMMEN AUTOMATIC RAILWAY SIGNAL CO.
 1753 Queen St., West Toronto, Canada

RAMAPO IRON WORKS
 Main Office: Hillburn, N. Y.
 Works: Hillburn, N. Y., and Niagara Falls, N. Y.
 New York Office: 170 Broadway

Automatic and Safety Switch Stands for Electric and Steam Railways



Frogs, Switches, Crossings, Curves, Ground Levers, Tie Plates, Etc.

Aut. Return Stand No. 12
 Write Dept. "S" for Descriptive Catalogues

MORDEN FROG AND CROSSING WORKS
 MANUFACTURERS OF
Street Railway Special Track Work

823 Commercial Bank Bldg. Chicago

Works: SOUTH CHICAGO and CHICAGO HEIGHTS

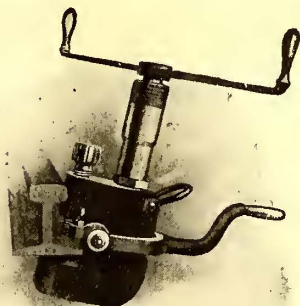
"UNION" Track Jacks, Switches, Frogs, Crossings, Rail Braces, Etc.

When Writing to Advertisers YOU WILL CONFER A FAVOR UPON BOTH ADVERTISER AND PUBLISHER BY MENTIONING THIS PAPER

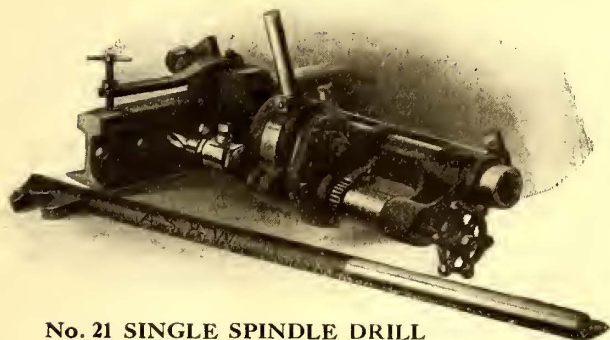
THE AMERICAN FROG AND SWITCH CO. Hamilton, Ohio **SPECIAL TRACK WORK FOR ELECTRIC RAILWAYS**



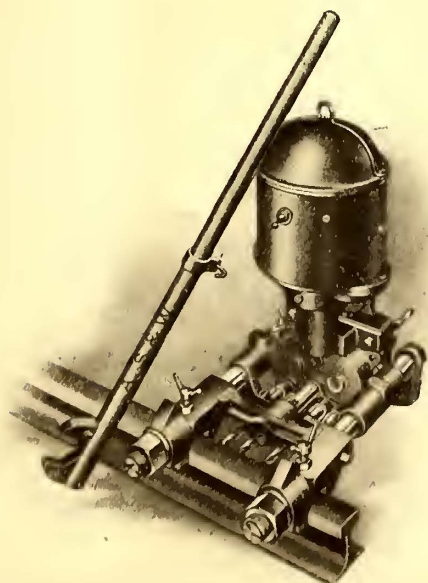
No. 40 SCREW COMPRESSOR



HYDRAULIC SCREW COMPRESSOR No. 68



No. 21 SINGLE SPINDLE DRILL



DOUBLE TWIN MOTOR DRIVEN DRILL No. 24M

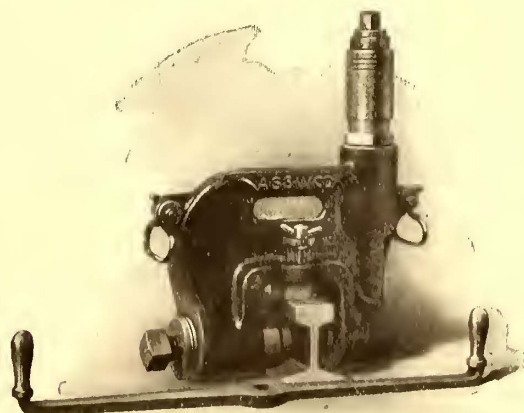
The Service you get from Rail Bonds

is largely dependent upon the tools you use in installing the bonds.

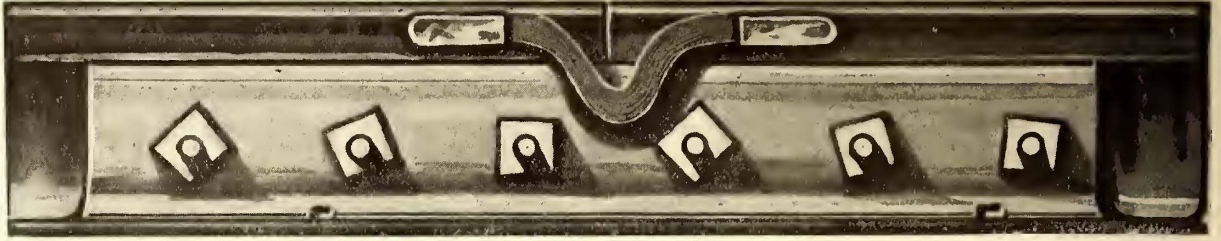
To help you get the best service from our bonds we've designed a full line of bond tools, each being developed to the highest point of perfection. We go further—expert superintendence. Also expert investigations—this at our expense.

AMERICAN STEEL & WIRE CO.
CHICAGO NEW YORK WORCESTER
DENVER SAN FRANCISCO

Export Representatives:
UNITED STATES STEEL PRODUCTS EXPORT CO., New York



No. 61 SCREW HYDRAULIC COMPRESSOR



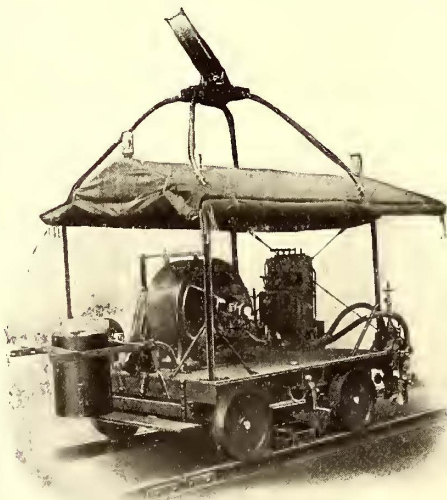
Electric Weld Bond

Cost of Rebonding Per Joint With Electric Weld Rail Head Type Bond.

Opening and repaving per joint, 25c,		\$.25
Applying 4/0 rail head type bond,		.50
Total cost per bond installed.		\$.75
Rebonding sixty per cent of the protected bonds, per ten years, 21,000 x \$3.00	}	\$63,000
Rebonding ten per cent Weld Bonds, 3,500 x 75c each,		
Cost bonding car outfit,	2,500	
		5,125
Net saving in favor of Electric Weld Bonds,		\$57,875

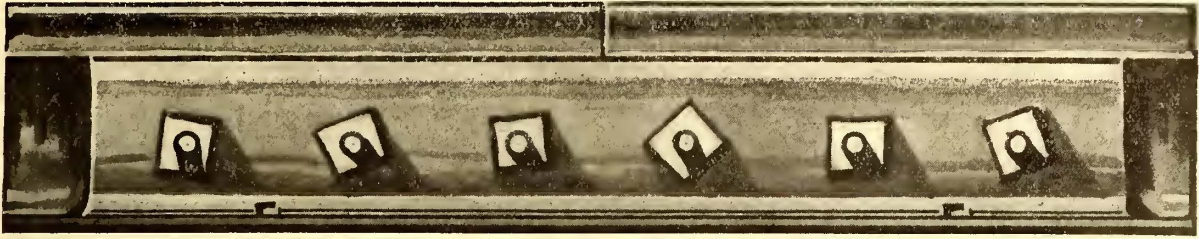
The above computations show a net saving of \$57,875 in the cost of rebonding 100 miles of paved city work, in favor of Electric Weld Bonds.

As the steel companies do not charge extra for drilling high rail for bond terminals, we have assumed the first cost of installing Plug Bonds and Electric Weld Bonds on new work to be the same.



The saving in this instance would therefore be due to the longer life of Electric Weld Bonds and the difference in cost of rebonding.

Electric Railway Improvement Co.,



ds vs. Plug Bonds

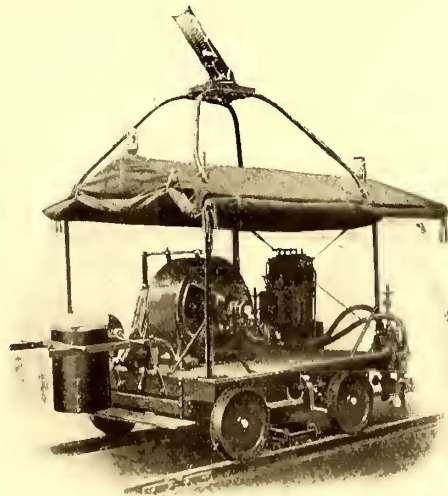
Cost of Rebonding Per Joint with Plug Bonds.

Opening and repaving 8 sq. ft. of pavement @ 20c per sq. ft.,	\$1.60
Opening and replacing fish plates,	.50
Twelve new bolts @ 4c each,	.48
New bond,	.40
Removing, reaming and applying bond,	.20
Total cost per bond installed,	\$3.18
Credit 1 lb. Scrap Copper,	.10
Net cost per bond installed,	\$3.08

The longer life of Electric Weld Bonds is due to the fact that they are electrically fused to the rail. Copper and steel become, mechanically and electrically, one piece, without surface-to-surface contact. Moisture can never penetrate between them and start corrosion.

They are rapidly and economically applied by our light, compact bonding cars, which carry all necessary apparatus, and can be so quickly removed from and replaced upon the track as to offer minimum interference with traffic.

Write for our new Bonding Book.



6005 Carnegie Ave., Cleveland, Ohio



Electric Weld Bonds vs. Plug Bonds

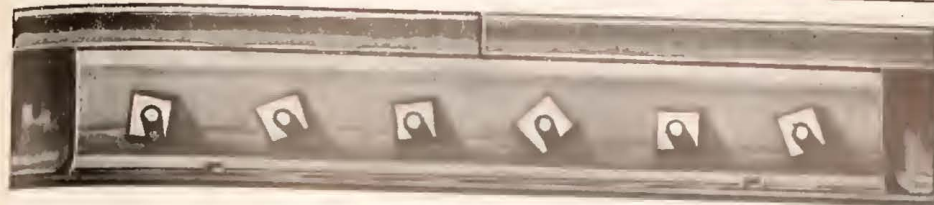
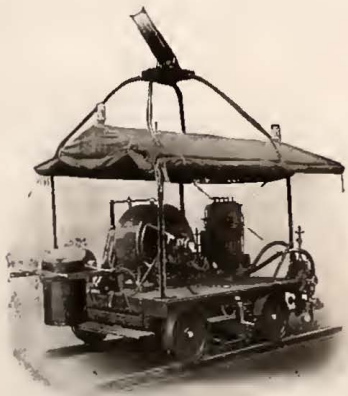
Cost of Rebonding Per Joint With Electric Weld Rail Head Type Bond.

Opening and repaving per joint, 25c,	\$.25
Applying 4/0 rail head type bond,	.50
Total cost per bond installed.	\$.75
Rebonding sixty per cent of the protected bonds, } per ten years, 21,000 x \$3.00	\$63,000
Rebonding ten per cent Weld Bonds, } 3,500 x 75c each,	\$2,625
Cost bonding car outfit,	2,500
	5,125
Net saving in favor of Electric Weld Bonds.	\$57,875

The above computations show a net saving of \$57,875 in the cost of rebonding 100 miles of paved city work, in favor of Electric Weld Bonds.

As the steel companies do not charge extra for drilling high rail for bond terminals, we have assumed the first cost of installing Plug Bonds and Electric Weld Bonds on new work to be the same.

The saving in this instance would therefore be due to the longer life of Electric Weld Bonds and the difference in cost of rebonding.



Cost of Rebonding Per Joint with Plug Bonds.

Opening and repaving 8 sq. ft. of pavement @ 20c } per sq. ft.,	\$1.60
Opening and replacing fish plates,	.50
Twelve new bolts @ 4c each,	.48
New bond,	.40
Removing, reaming and applying bond,	.20
Total cost per bond installed.	\$3.18
Credit 1 lb. Scrap Copper,	.10
Net cost per bond installed,	\$3.08

The longer life of Electric Weld Bonds is due to the fact that they are electrically fused to the rail. Copper and steel become, mechanically and electrically, one piece, without surface-to-surface contact. Moisture can never penetrate between them and start corrosion.

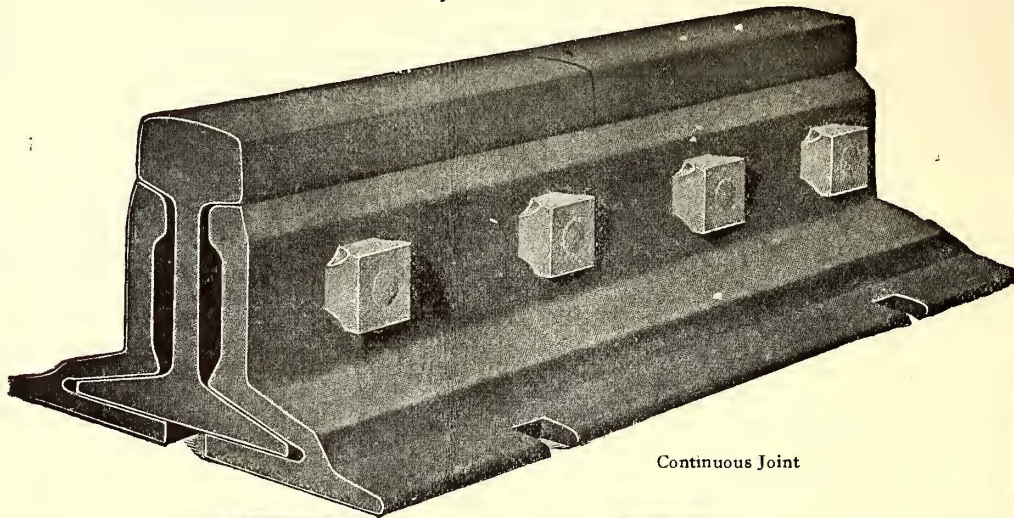
They are rapidly and economically applied by our light, compact bonding cars, which carry all necessary apparatus, and can be so quickly removed from and replaced upon the track as to offer minimum interference with traffic.

Write for our new Bonding Book.



Electric Railway Improvement Co., 6005 Carnegie Ave., Cleveland, Ohio

Over 50,000 Miles in Use

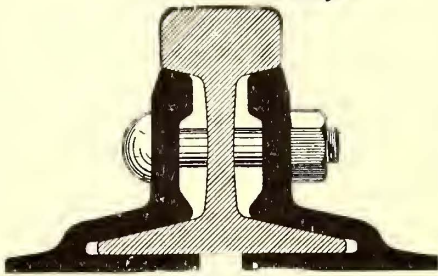


Continuous Joint

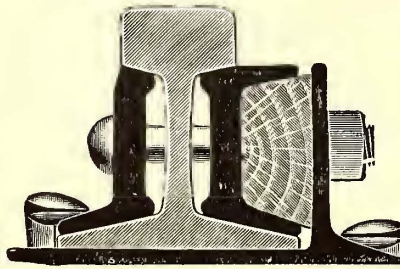
Showing the unprecedented approval of the **BASE SUPPORTED RAIL JOINT** by Railway Managers **AFTER 14 YEARS' SERVICE**, the extent of which is evidence of their excellence.

Made from Rolled Steel to Fit over 145 Sections of Rails.

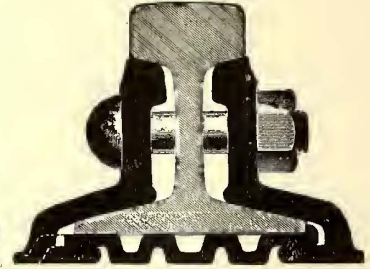
Received the **Highest** awards, Paris, 1900; Buffalo, 1901; St. Louis, 1904.



Continuous Joint



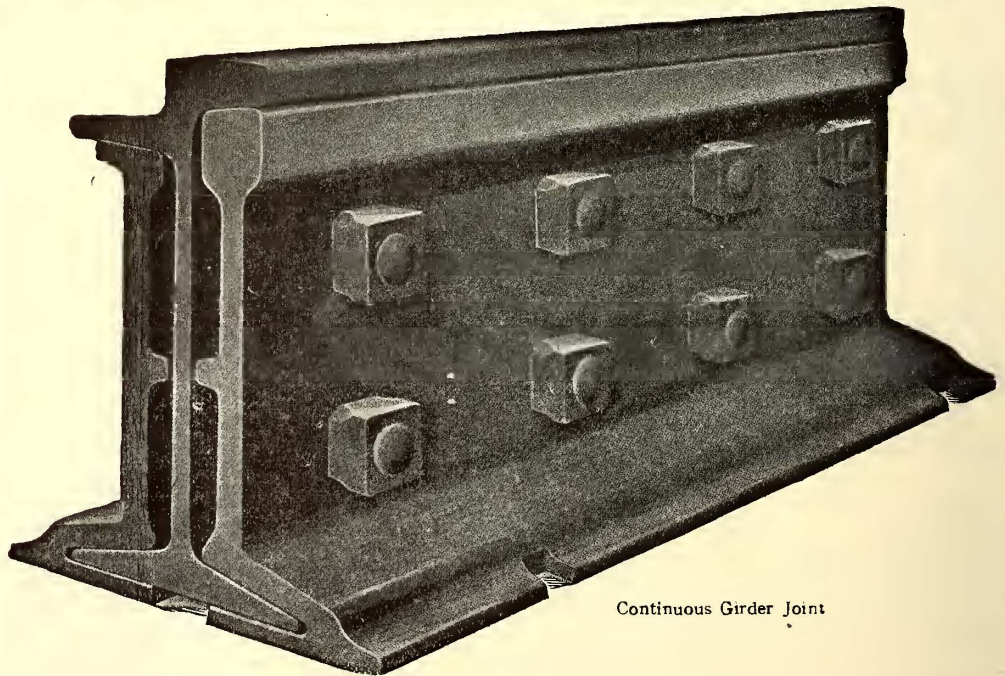
Weber Joint



Wolhaupter Joint

Catalogs Furnished at All Agencies

BALTIMORE, MD., Union Trust Bldg.
 BOSTON, MASS., India Bldg.
 CHICAGO, ILL., Monadnock Bldg. F. A. Poor, W. J. McCaskey.
 DENVER, COLO., Equitable Bldg. F. C. Webb, Western Agent.
 NEW YORK, N. Y.
 PITTSBURG, PA., Park Bldg.
 PORTLAND, ORE., Wells Fargo Bldg.
 SAN FRANCISCO, CAL., Call Bldg.
 ST. LOUIS, MO., Commonwealth Trust Bldg.
 TROY, N. Y., Burden Ave.
 MONTREAL, CAN., Board of Trade Bldg. Wm. A. Chapman, Representative.
 LONDON, E. C., ENG., 71 King William St.



Continuous Girder Joint

The Rail Joint Company

Exclusive Makers of

Base-Supported Rail Joints for Standard and Special Rail Sections, also Girder, Step or Compromise, Frog and Switch, and Insulating Rail Joints, protected by Patents

**Eastern Works at
Troy, New York**

We make deliveries from Troy, Buffalo and New York City, N. Y.; New Castle, Del.; Steelton and Pittsburg, Pa.; Chicago and Joliet, Ill.; Columbus, O.; and Milwaukee, Wis.

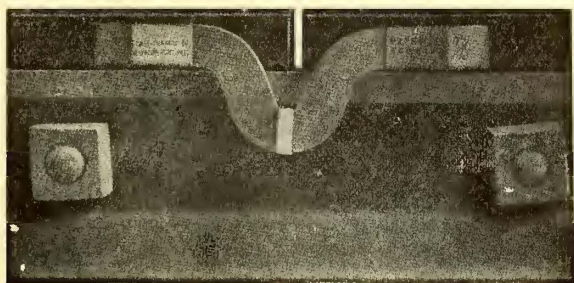
**General Offices:
29 W. 34th St., New York**

FREDERICK T. FEAREY
President

L. F. BRAINE and PERCY HOLBROOK
Vice-Presidents

BENJAMIN WOLHAUPTER
Secretary

F. C. RUNYON
Treasurer



Install Shawmut Bonds

on your road and you'll never use another type.

Our guarantee makes your protection doubly sure.

If you haven't our catalog, write for a copy to-day.



Condit Electrical Mfg. Co.
BOSTON, MASS., U. S. A.

2

A $\frac{7}{8}$ " Hole

in the web of a rail, 70 lbs. or more, plugged with a copper terminal attached to a 4/0 wire gives poor conductivity for the return current.

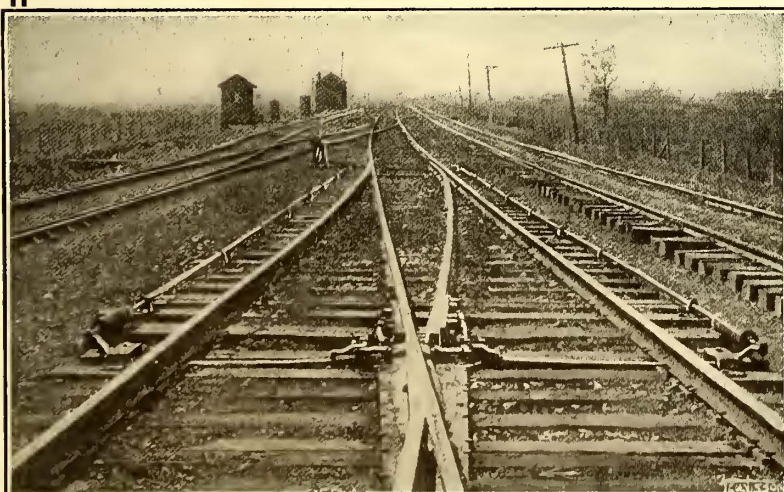
The Standard Plastic Bond

gives conductivity equal to the capacity of the rail, and it has a record for greater durability than any other make of rail bond.

**ECONOMICAL TO INSTALL.
RAIL NOT INJURED.
TOOLS FEW AND SIMPLE.**

HAROLD P. BROWN,
120 Liberty Street New York

CONTINUOUS RAIL AND SAFETY SWITCH



Continuous Rail in line for the main track, held rigidly in position, both by the locking device and inside lugs. The rods as shown, connecting the rail with the switch, are only for the purpose of moving the rail so as to co-operate with the switch.

This continuous rail eliminates the use of frogs and guard rails, avoids creeping of rails at this point and will last the life of the abutting rails.

Continuous Rail and Safety Switch Co.

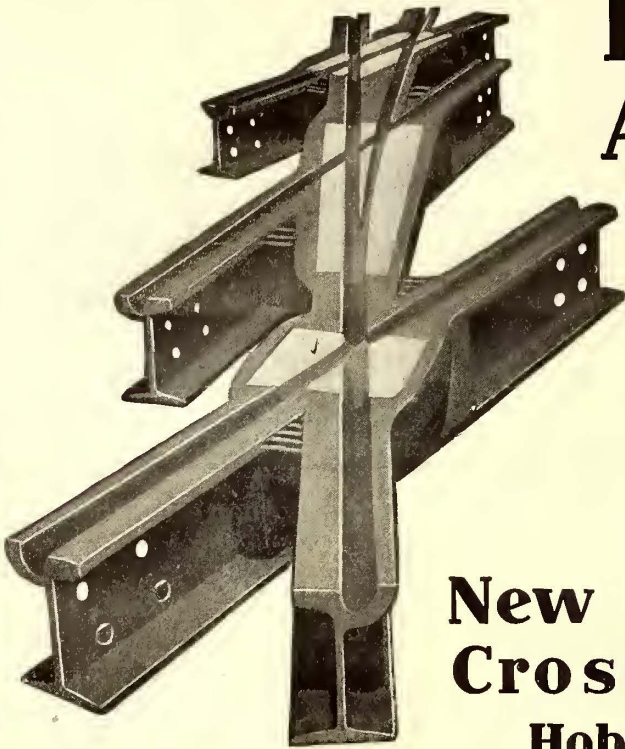
HOME OFFICE: ST. LOUIS

149 Broadway, New York

Geo. S. Griscom, Jr., General Sales Agent.

TEL. 5520 CORTLANDT

Hard Center A Specialty



May we
estimate
on your
requirements?

**New York Switch and
Crossing Company**
Hoboken, New Jersey

SPECIAL WORK FOR STREET RAILWAYS
FROGS-CROSSINGS-SWITCHES AND MATES-
MANGANESE STEEL CENTER LAYOUTS



BOLTED MANGANESE STEEL FROG

BARBOUR-STOCKWELL CO.,
205 BROADWAY,
CAMBRIDGEPORT, MASS.

CHICAGO, ILL.
Monadnock Block

NEW YORK CITY, N. Y.
Hudson Terminal

PHILADELPHIA, PA.
Pennsylvania Building

ATLANTA,
GA.
Equitable Bldg.

CLEVELAND
O.
Rockefeller Bldg.

**THE
LORAIN
STEEL
COMPANY**

PITTSBURG,
PA.
Frick Building
Annex

Girder Rails, High Tee Rails
and Special Track Work

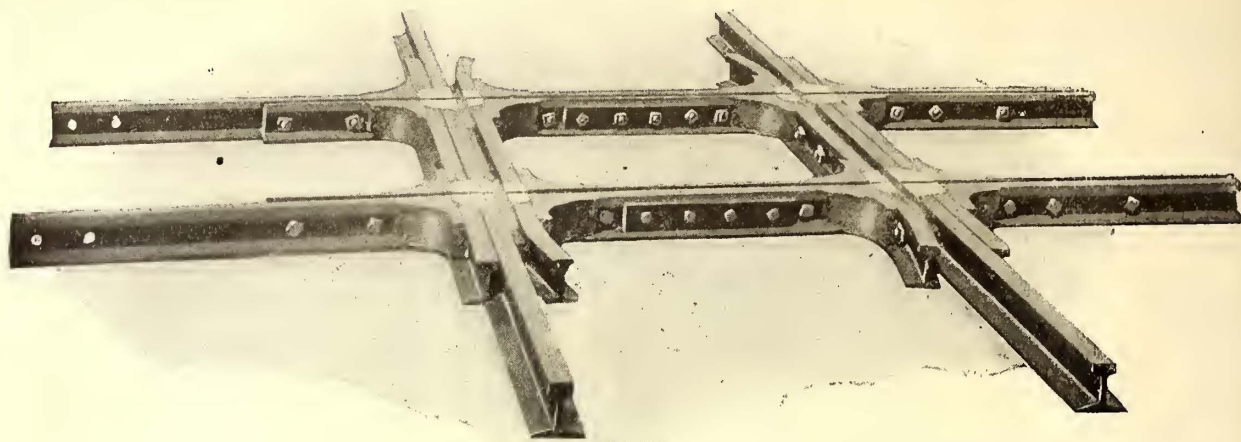
ST. LOUIS,
MO.
Third National
Bank Bldg.

Electrically Welded Joints

SAN FRANCISCO, CAL.
Crocker Building

GENERAL OFFICES:
Pennsylvania Building, Philadelphia, Pa.

LONDON, ENGLAND
71 King William St., E.C.



NOTE THE MANGANESE INSERT PLATES AND FILLERS—STEEL BOUND—CANNOT GET LOOSE

Special Track Work

Hardened Center Plate.—Solid Manganese or Cast Steel.
Integral "Steel Bound."—Built-Up.
Surveys Made and Plans Submitted.

Gears—cut from best open hearth steel blanks
and **FOR LONG SERVICE**
Pinions—from special high carbon and manganese forgings

OPEN HEARTH STEEL CASTINGS
From 2 oz. to 50 tons

THE FALK COMPANY

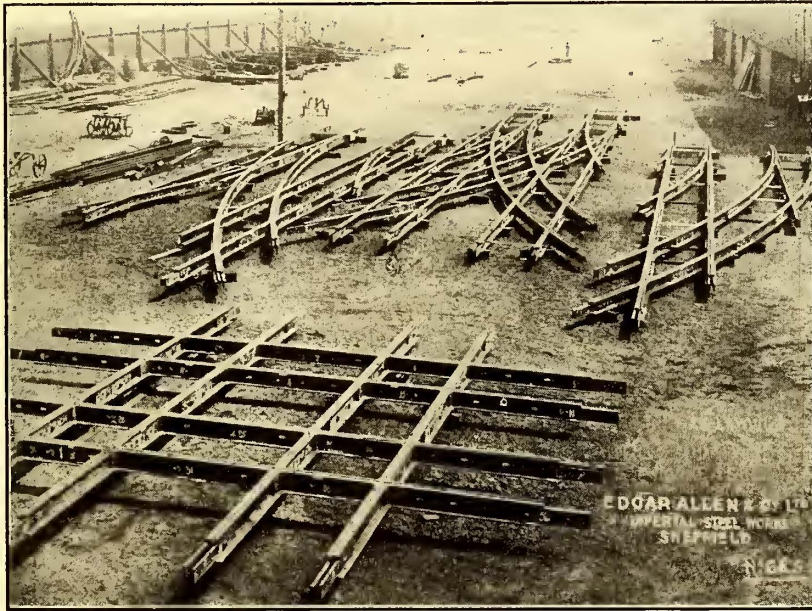
MILWAUKEE, WIS., U. S. A.

Eastern Representative: WENDELL & MACDUFFIE, NEW YORK CITY

Western Representative: WIGMORE BROS., LOS ANGELES, CAL.

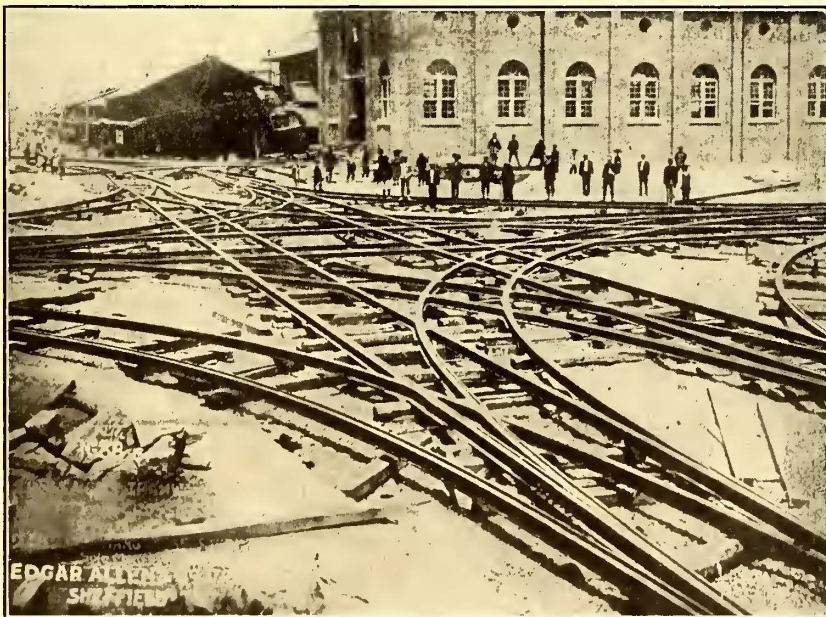
European Representative: WATLINGTON & CO., LONDON, E. C.

EDGAR ALLEN & CO., LTD.



SPECIAL TRAMWAY TRACK-WORK CONSTRUCTED BY EDGAR ALLEN & CO. FOR SWITZERLAND AND JAPAN

THE CONSTRUCTION OF LAYOUTS IS OUR SPECIALTY



IMPERIAL STEEL WORKS, SHEFFIELD

282 PEARL STREET, NEW YORK

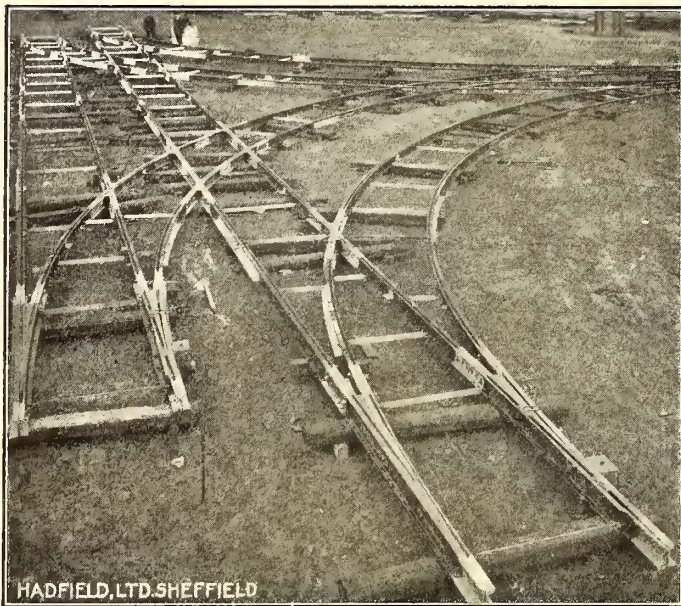
23 WEST RANDOLPH STREET, CHICAGO

HADFIELD'S STEEL FOUNDRY CO., LTD.

SHEFFIELD,

ENGLAND

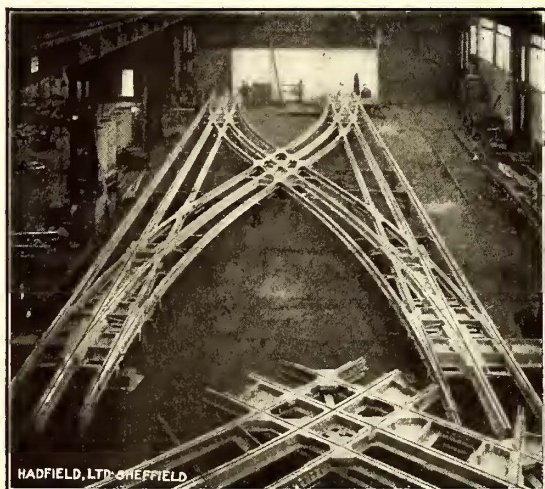
Specialists in Designing and Constructing Complete Lay-outs and Junctions for Electric Railways and Tramways.



SPECIAL TRAMWAY TRACK-WORK CONSTRUCTED BY HADFIELD'S, AT THEIR WORKS, FOR THE ST. PETERSBURG TRAMWAYS.



HADFIELD'S STEEL TIRED CAR WHEELS SUPPLIED WITH OR WITHOUT AXLES.



CONDUIT TRAMWAY TRACK-WORK, CONSTRUCTED BY HADFIELD'S AT THEIR WORKS, FOR THE LONDON COUNTY COUNCIL.

"Era" Manganese Steel
POINTS,
CROSSINGS,
CURVED RAILS,
CHECK RAILS

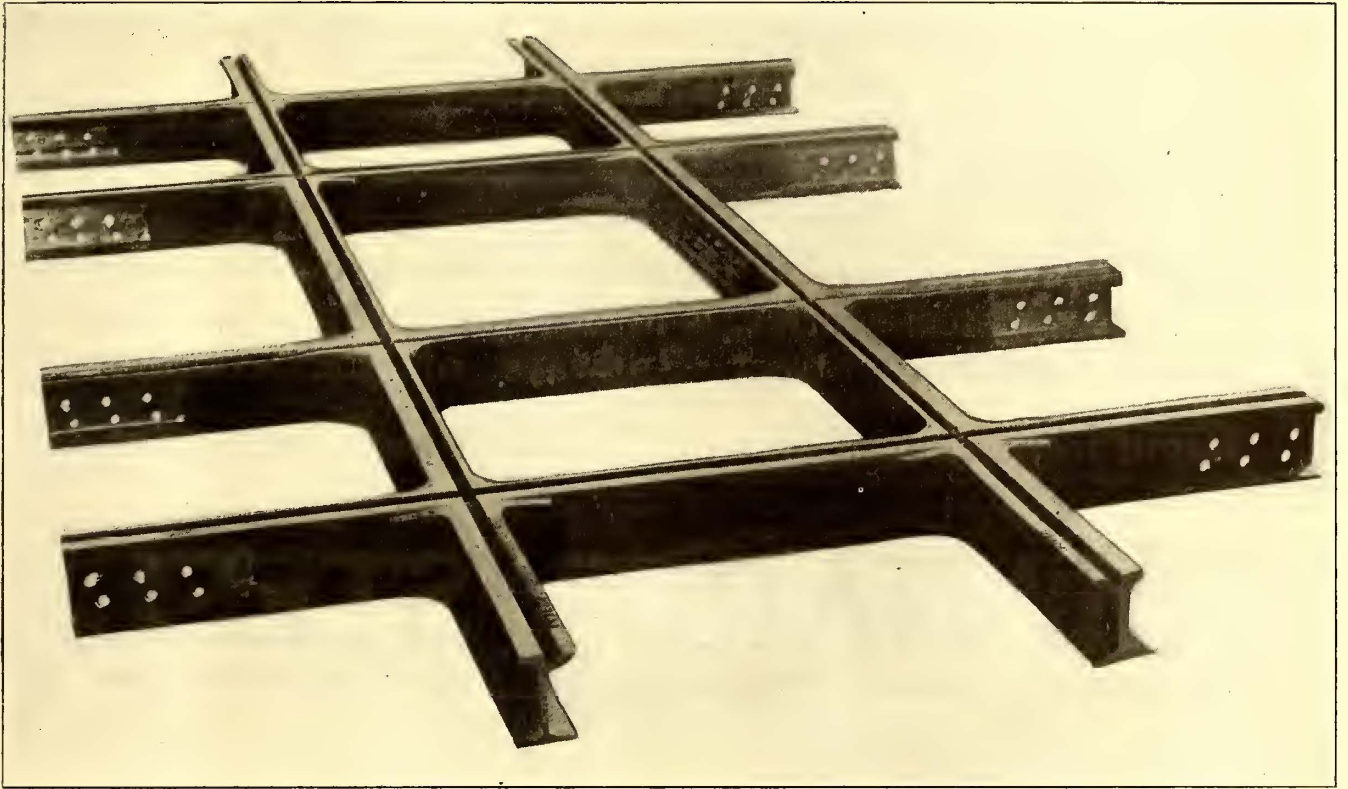
HADFIELD'S PORTABLE PETROL MOTOR WITH SUITABLE ATTACHMENTS FOR GRINDING, DRILLING AND SAWING RAILS

HADFIELD'S

Patent "ERA" Manganese Steel

IS THE SUPREME MATERIAL FOR THE WEARING PARTS OF TRAMWAY TRACK WORK, CRUSHING AND GRINDING MACHINERY, ETC., ETC.

WHARTON SPECIAL TRACK WORK
 OF SUPERIOR DESIGNS
 FOR ALL CLASSES OF SERVICE



7" and 9" high Wharton Solid Manganese Steel, Street over Steam Crossing, with easer at intersections to carry wide steam wheel.

MANGANESE STEEL TRACK WORK IS OUR SPECIALTY

WM. WHARTON JR. & CO.
 INCORPORATED
 PHILADELPHIA, PA. JENKINTOWN, PA.

Special Work for Street Railways

RAPID RENEWABLE "MANARD" HARD CENTRE FROGS PINLESS and BIG PIN SWITCHES KEY FAST MATES

Our iron-bound Open Hearth rail construction, with "Manard" steel centres, is in use on a large majority of the leading Street Railways of the country. Rigid inspection of all work before it leaves our plant.

"MANARD" STEEL

Steam and Street Railway crossings of the best types. Rolled "Manard" rails for curves and wearing parts of crossings.

When Others Fail Try Us

The Pennsylvania Steel Co.
Frog and Switch Department
STEELTON, PA.

GENERAL SALES OFFICE: FRANKLIN BANK BUILDING, PHILADELPHIA, PA.

SALES OFFICES:

BOSTON
BALTIMORE

CHICAGO
NEW YORK

PHILADELPHIA
SAN FRANCISCO

STEELTON
ST. LOUIS

LONDON, ENG.
CITY OF MEXICO

Kilby Frog & Switch Co.

Birmingham, Ala.

TONGUE SWITCHES,
MATES,
FROGS,
CURVES,
and SPECIAL WORK of all kinds for
STREET RAILWAYS

FROGS, SWITCHES, CROSSINGS
SWITCH-STANDS, RAIL BRACES

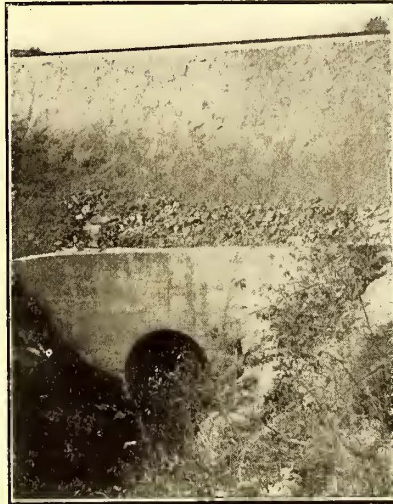
The Cincinnati Frog and Switch Company
CINCINNATI, - - - OHIO

RAIL CORRUGATION

WE ARE PREPARED TO REMOVE IT
WRITE FOR PARTICULARS
WILLIAM D. CHERKY, Head Bldg., Philadelphia, Pa.

"Acme" Corrugated Metal Culverts

(NESTABLE-PATENTED)



A 42-inch
"Acme" Nestable
No-Co-Ro Metal
Corrugated
Culvert With a
30-Foot Fill
Under a
Prominent
Line in
Pennsylvania

The compressive and tensile strength of "Acme" Nestable Corrugated Metal Culverts is best evidenced by the fact that they are giving absolute satisfaction in railroad and highway construction imbedded from fifteen inches to thirty feet or more below the surface of the roadbed.

Send for Booklet M-3 and Delivered Prices

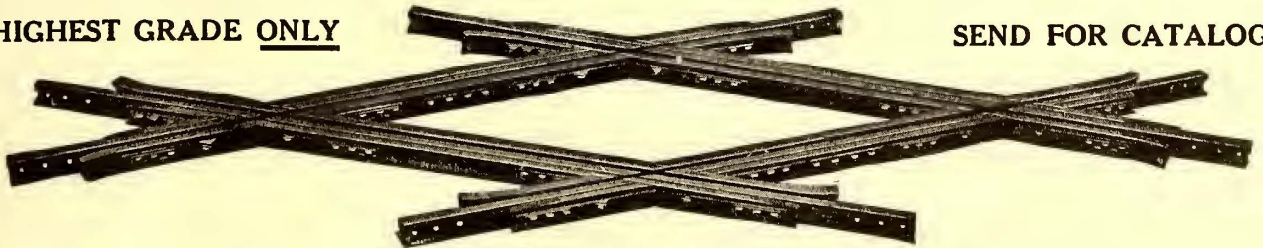
THE CANTON CULVERT CO.

Sole Manufacturers

CANTON, OHIO, U. S. A.

HIGHEST GRADE ONLY

SEND FOR CATALOG



CROSSINGS AND SPECIAL TRACK WORK

New York Office:
29 BROADWAY
J. A. FOULKS, Representative

INDIANAPOLIS SWITCH AND FROG CO.
SPRINGFIELD, OHIO

CLEVELAND FROG & CROSSING CO. SPECIAL WORK

FOR ALL SECTIONS OF RAIL
"HARD CENTER" and BUILT UP CONSTRUCTION

PORTER'S PATENT DERAILING SWITCHES

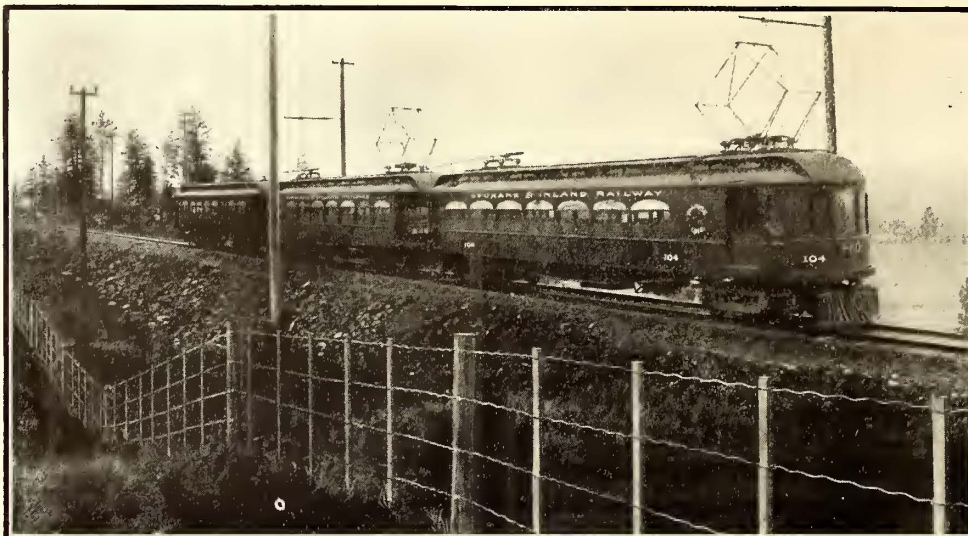
CLEVELAND



RAILROAD FENCING A SPECIALTY

👉 NOTICE THAT STAYS ARE APPLIED WITH OUR PATENT CLAMPS—NOT STAPLED ON. 👈

Excelsior
IS USED
Exclusively
BY
EVERY
ELECTRIC
RAILROAD
IN
THE
INLAND
EMPIRE



Excelsior
Stays
and
Clamps
(PATENTED)

PROTECT
AND
EFFECT

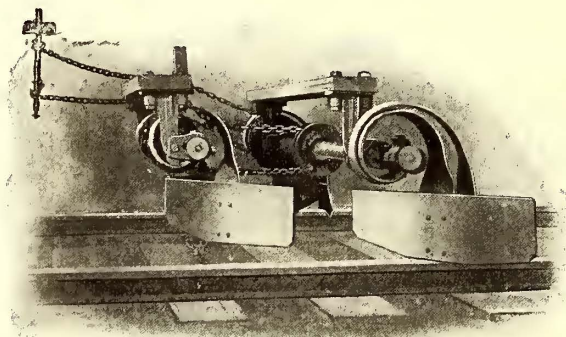
All Kinds
of
Wire Fences
OLD
AND
NEW

ESTIMATES PROMPTLY FURNISHED.

EXCELSIOR FENCE WORKS, SPOKANE, WASH.

EXCELSIOR FENCE IS EASILY SEEN AT A DISTANCE. IT CAN'T BE LIFTED UP FROM THE BOTTOM, BENT OVER AT THE TOP NOR SAG. IT'S HUMANE AND IT'S CHEAP. NO OTHER FENCE HAS THESE ADVANTAGES COMBINED.

WHY NOT HAVE THE BEST?



THE ROOT NO. 5 SCRAPER

We are prepared to ship Scrapers and Repairs on receipt of order.

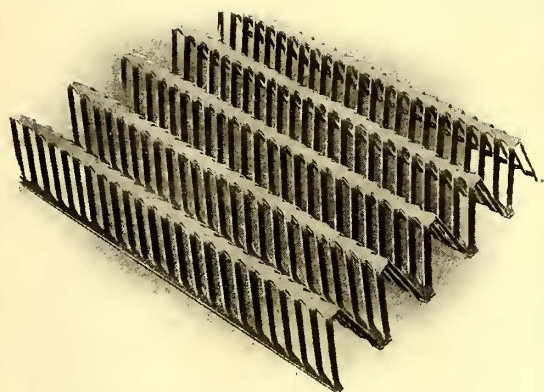
Root Scrapers as now made are fully perfected and are making good.

A 100% investment.

Root Spring Scraper Company
Kalamazoo, Mich.

"Trussit"

(Registered Trademark)



FIREPROOF

Reinforced Concrete

ROOFS, WALLS

and **PARTITIONS**

REDUCE Your INSURANCE

Easy to Construct

No Forms

No Centering

COST WITHIN YOUR REACH

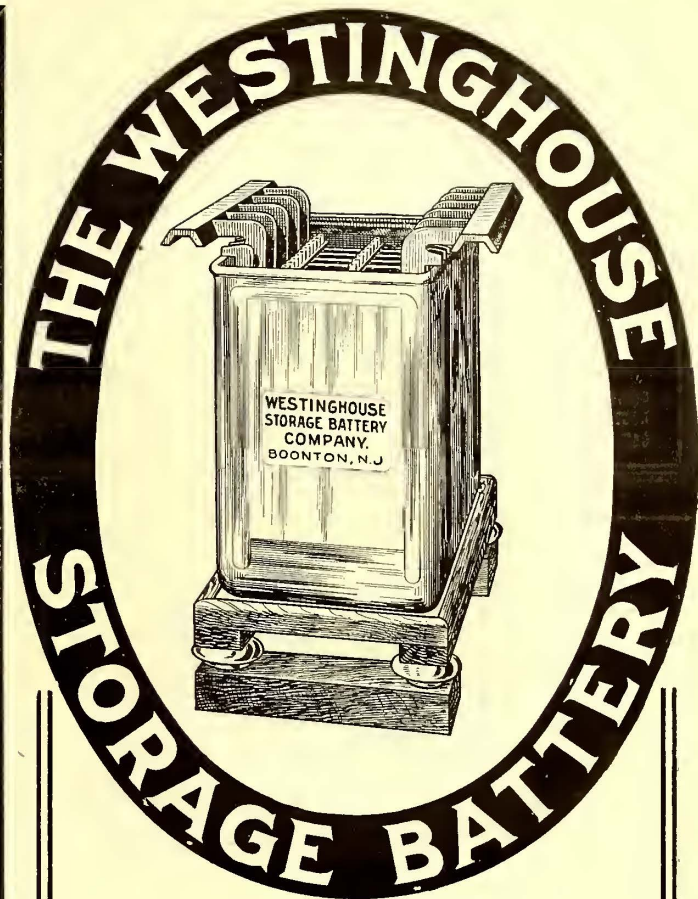
Let us send you our New Booklet on Railroad Structures. Ask for

Form A-163

**THE GENERAL
FIREPROOFING COMPANY
YOUNGSTOWN, OHIO**

MANUFACTURERS OF

"Herringbone" Expanded Steel Lath "Trussit" Metal
Diamond Mesh and Sheet Steel Lath Expanded Metal
Metal Furring Lug Bars
Wall Ties "Herringbone" Trussed Bars
"Allsteel" Furniture, Filing Devices, Desks, Tables,
Lockers, Etc.
Complete "Allsteel" Equipment for Banks, Offices,
Libraries and Public Buildings.



Maximum efficiency.
Exceedingly long life.
Absolute freedom from
injurious sulphation.

Ask for Catalogue 256-D

**Westinghouse
Storage Battery
Company**

Boonton, N. J.

Additional Reserve

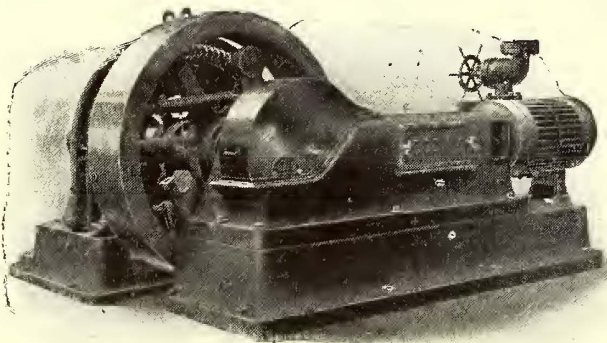
boiler capacity is not the only advantage to be realized from the installation of Gould Storage Batteries. Steam consumption can be greatly reduced and current provided for the maintenance of all-night car service, the main generators being shut down meanwhile. The services of our Engineering Department are at your disposal.

Write for Bulletins.

Sales Offices:
CHICAGO, Rookery Building
BOSTON, 89 State Street
SAN FRANCISCO, Atlas Building

Gould Storage Battery Co.

Main Office:
341-347 Fifth Avenue, New York City
Works:
Depew, New York



QUALITY

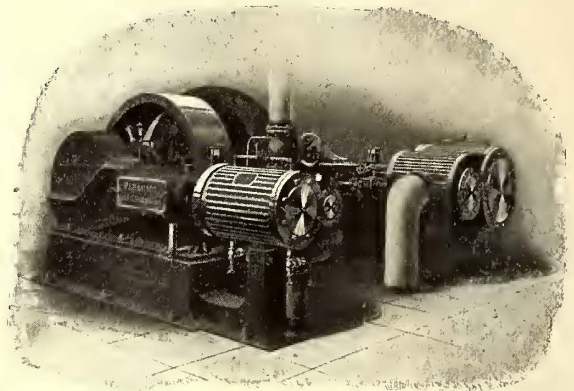
should be the first consideration in purchasing power equipment. Without quality, no equipment, however low the initial cost, is a good proposition.

RIDGWAY UNITS

leave nothing to be desired as to their quality of construction and operation. They are a very profitable investment.

ASK FOR BULLETINS 19, 20 & 21A.

RIDGWAY DYNAMO & ENGINE CO.
RIDGWAY, PA



Fleming-Harrisburg Engines

ARE MADE

**SIMPLE, TANDEM AND CROSS-COMPOUND
SINGLE AND CORLISS-VALVE TYPE**

All types are noted for their close regulation, economy of operation, effectiveness of lubrication and ability to cope with the most sudden and heavy overloads.

Detailed information is in our Catalog.

HARRISBURG FOUNDRY AND MACHINE WORKS,
HARRISBURG, PA., U. S. A.

McINTOSH, SEYMOUR & CO., Auburn, N. Y.

ENGINES

VERTICAL,
HORIZONTAL,

BELTED,
DIRECT COUPLED.

**Simple, Compound,
Triple Expansion.**

New York:
McIntosh, Seymour & Co.
50 Church St.

San Francisco:
Charles C. Moore & Co.
99 First Street.

Boston:
J. A. Grant & Co.
Tremont Building.

SMOOTH OUT THE VOLTAGE HUMMOCKS

Steady the Load on your Generators and Feeders.
 Insure Economical and Continuous Operation.
 The "Chloride Accumulator"

THE ELECTRIC STORAGE BATTERY CO.

1888
1909

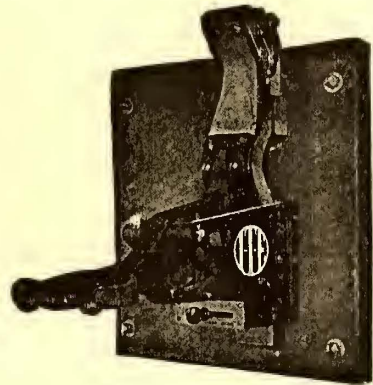
PHILADELPHIA, PA.

New York Boston Chicago St. Louis Cleveland Atlanta San Francisco Toronto

GENERATOR SPECIALISTS

are likely to give you satisfaction.
 The CROCKER-WHEELER COMPANY,
 Ampere, N. J., supply one part of the
 system—the most vital part,—the

GENERATOR



I-T-E

Circuit Breakers for Heavy Railway Service

New General Catalogue will be supplied on Application

Specify "DALITE" and secure the Latest Improved I-T-E Circuit Breaker with Time Limit Feature.

THE CUTTER ELECTRICAL & MFG. CO.
 Nineteenth and Hamilton Sts., PHILADELPHIA, PA.

DEMING PUMPS

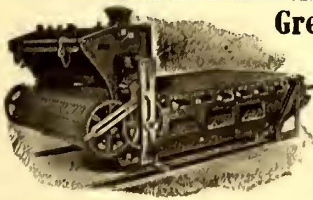
For All Purposes And Any Power



Ask for Catalogue "G" and Circular "Feeding Boilers"

The Deming Company, Salem, Ohio

AGENCIES
 HENION & HUBBELL, General Western Agents, 61-69 N. Jefferson Street, Chicago
 Harris Pump & Supply Co., 320 Second Avenue, Pittsburg, Pa.
 W. P. Dallett, 49 North 7th Street, Philadelphia, Pa.
 Chas. J. Jaeger Co., 281 Franklin Street, Boston, Mass.
 Hendrie & Bolthoff Mfg. & Supply Co., Denver, Col.
 Henshaw, Bulkley & Co., Denver, Col.
 L. Booth & Sons, Los Angeles, Cal.



Green Chain Grate Stokers

Highest Capacity Automatic Labor Saving Highest Efficiency Smokeless Cheap Fuel

Green Engineering Co.

115 Adams Street, Chicago
 Pittsburg St. Louis St. Paul

Savogran

For Engine Room Floors and General Cleaning.

Shield Oil Soap

For painted surfaces.

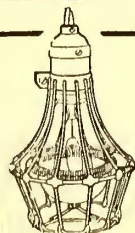
"30 YEARS AT IT"

INDIA ALKALI WORKS, BOSTON, MASS.

WILLIAMS STEAM SPECIALTIES

Feed Water Regulators, Steam Operated Traps, Steam Pump Governors

THE WILLIAMS GAUGE CO., PITTSBURG
 AGENCIES IN PRINCIPAL CITIES



The LOSS of LAMPS by THEFT

can be eliminated by using

MATTHEWS' HOLDFAST GUARDS and TRAPS

You can lock the guard to the socket by bending the set screw, and you can lock the lamp in the guard by attaching the TRAP to the bottom ring. See cut.

W. N. MATTHEWS & BRO., 217 N. 2d St., ST. LOUIS (1)

Wagner Electric

Manufacturing Company, St. Louis, Mo.

Alternating Current Motors

Single-Phase and Polyphase

A Revenue

largely overlooked by Electric Railways exists in furnishing power to industries along the transmission lines—connecting to one of the phases for small motors and to all three phases for larger motors. Every hamlet or cluster of houses, in fact, every farm, is a possible customer.

The Unique Position

of the Wagner Company in the single-phase field, being pioneers in the development of a commercially successful single-phase motor, is worthy of examination by electric railway officials who have such matters to consider. The Wagner Company also builds a full line of polyphase motors and solicits an opportunity to figure with Electric Railways on their requirements in this line. Correspondence invited. Address the nearest office.

Wagner, Quality

Atlanta, Empire Bldg.
 Boston, 110 State St.
 Charlotte, N. C., Trust Bldg.
 Chicago, Marquette Bldg.
 Cincinnati, First National Bank Building.
 Cleveland, New England Bldg.
 Denver, Ideal Bldg.
 Kansas City, 1113 Wyandotte St.
 Los Angeles, 326 S. Los Angeles St.

Minneapolis, Security Bank Bldg.
 Montreal, Bell Telephone Bldg.
 New York, 50 Church St.
 Philadelphia, Real Estate Trust Bldg.
 Pittsburg, Lewis Block.
 St. Louis, 6400 Plymouth Ave.
 San Francisco, Balboa Bldg.
 Seattle, Pacific Block.
 Sioux City, 515-517 5th St.



Convert Smoke Into Dividends

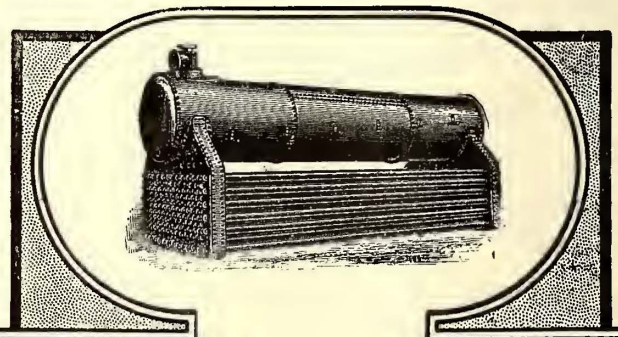
Your stockholders would probably be satisfied with the value of the fuel represented by the smoke that issues from your stacks. Why not give it to them? Perfect combustion means smoke elimination and a saving of the fuel otherwise wasted.

The MURPHY AUTOMATIC SMOKELESS FURNACE

automatically feeds the fuel, removes the refuse, and by insuring perfect combustion practically eliminates smoke, insuring economies otherwise not obtainable. The illustration above shows the Cambria Steel Co. plant in full operation. No smoke there—264 Murphy Furnaces under 48,660 H.P. boilers prevent it. Better invest in that Murphy. Book describes.

Murphy Iron Works 10 Walker St. Detroit, Mich.

New York Boston Chicago Philadelphia Pittsburg Cincinnati Cleveland St. Paul Buffalo Birmingham



Built Entirely of Flange Steel Plate HEINE BOILERS

are completed and tested in the shop before shipment. When they are ready for shipment they are as nearly perfect as a boiler can be made.

HEINE SAFETY BOILER COMPANY
 421 OLIVE STREET, ST. LOUIS, MO.

Dearborn Scientific Water Treatment

Dearborn Scientific Treatment of Boiler Waters

Preliminary

Analysis of the water. Investigation of plant conditions and present state of boilers.

Application

Preparation of treatment exactly adjusted to bring about proper reactions and satisfy the mineral salts in the water. Careful application of the treatment according to directions.

Results

Clean boilers. No expensive delays or shutdowns account of damaged boilers. Fuel saved. Repair bills lessened. Life of boilers and accessories greatly increased.

TRY IT ON YOUR BOILERS

Dearborn Drug & Chemical Works,

Robt. F. Carr, President.

General Offices Laboratories and Works Chicago
General Eastern Offices 259 Broadway New York City

The Babcock & Wilcox Company

85 Liberty Street - - - - NEW YORK

WATER TUBE STEAM BOILERS

Steam Superheaters. = Mechanical Stokers.

Works: BARBERTON, OHIO - BAYONNE, N. J.

BRANCH OFFICES:

BOSTON, Delta Bldg.
PHILADELPHIA, North American Bldg.
SAN FRANCISCO, 99 First Street.
PITTSBURGH, Farmers' Deposit Nat. Bank Bldg.
NEW ORLEANS, 533 Baronne Street.

DENVER, 435 Seventeenth Street.
SALT LAKE CITY, Atlas Block.
WASHINGTON, Colorado Bldg.
CHICAGO, Marquette Bldg.
ATLANTA, GA., Candler Bldg.

CLEVELAND, New England Bldg.
MEXICO CITY, 7 Avenida Juarez.
HAVANA, CUBA, 116½ Calle de la Habana.
LOS ANGELES, Trust Bldg.
CINCINNATI, O., Traction Bldg.

PORTLAND, ORE., Wells, Fargo Bldg.

SEATTLE, WASH., Mutual Life Bldg.

EDGE MOOR BOILERS

WATER TUBE

EDGE MOOR IRON CO.
EDGE MOOR
DELAWARE

Special Features to
Meet All Conditions.

Send for Catalog J.

FOSTER SUPERHEATERS

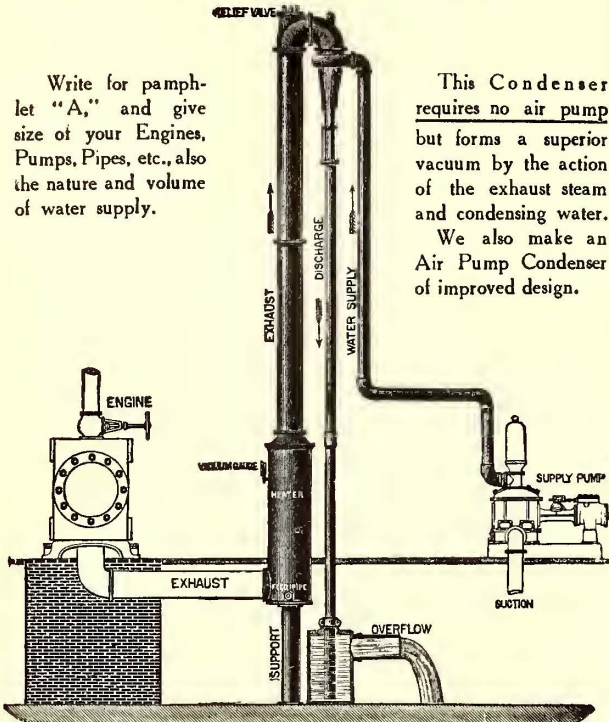
Greatly Increase
Efficiency and Power of
Steam Turbines

POWER SPECIALTY CO.
Trinity Build'ng, 111 Broadway
NEW YORK

**THE BULKLEY
"Injector"
CONDENSER**

Write for pamphlet "A," and give size of your Engines, Pumps, Pipes, etc., also the nature and volume of water supply.

This Condenser requires no air pump but forms a superior vacuum by the action of the exhaust steam and condensing water. We also make an Air Pump Condenser of improved design.



HENRY W. BULKLEY
New York Office, 145 Broadway. Orange, N. J.

**SPECIALTIES FOR
POWER HOUSE
LUBRICATION**

TURBOIL

TRADE MARK

FOR

TURBINE LUBRICATION



GAS CYLINDER OIL

TRADE MARK

For High-Duty Gas Engines Using Natural, Producer or Furnace Gas

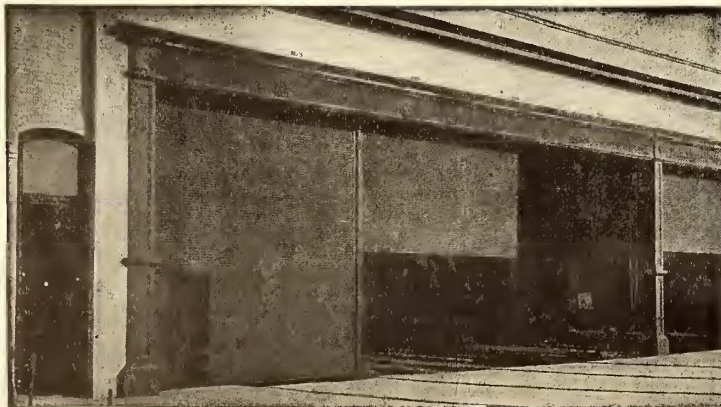
BORNE, SCRYMSER COMPANY

80 South Street, New York

STUART-HOWLAND CO.

BOSTON

Largest and most complete line of RAILWAY, TELEPHONE and LIGHTING SUPPLIES in the East. Prompt shipments from stock. Send us a trial order.



KINNEAR

**Steel and Wood
Rolling Doors**

For Car Barns and Power Houses

Write for new Catalog "M," and Booklet
"Car Barn Doors."

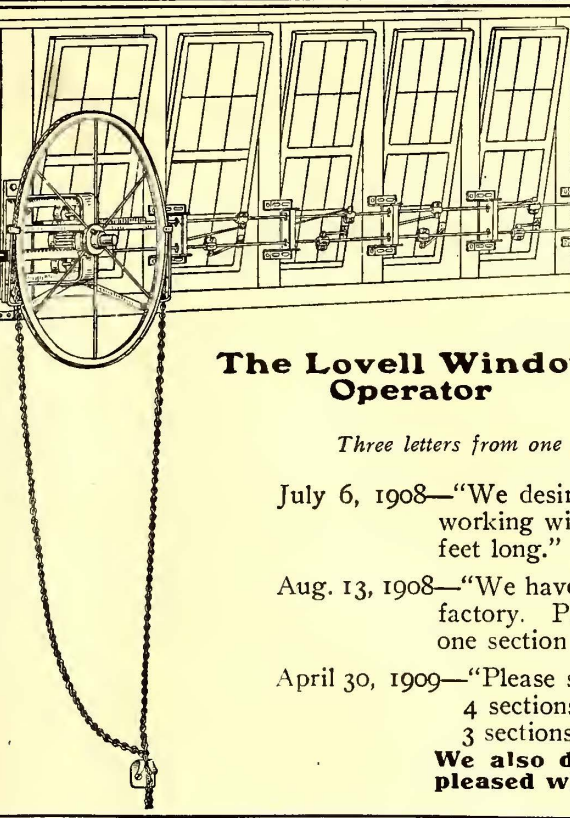
The Kinnear Mfg. Co., Columbus, O.
Boston Philadelphia Chicago

In Your Shop sash can be controlled with the **Lovell Window Operator**

The Lovell Window Operator

just as easily

Locked
at
any
point
with
direct
control
at
any
place



Three letters from one user (name on request) that present the facts:

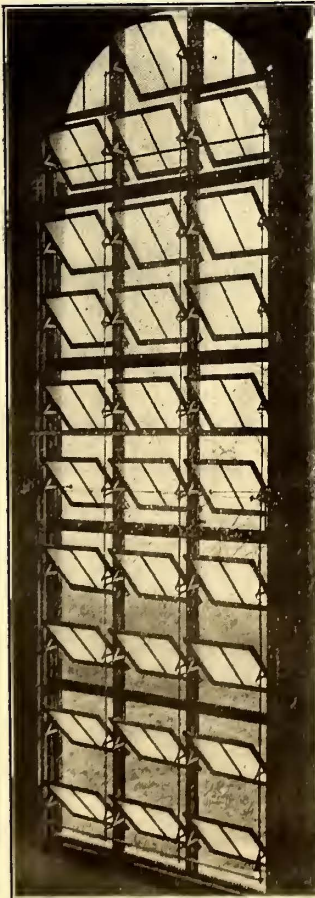
July 6, 1908—"We desire you to send us enough of your apparatus for working windows on three of our saw-teeth, each section 112 feet long."

Aug. 13, 1908—"We have applied your apparatus and the operation is satisfactory. Please ship us five more sections 112 feet each, and one section 76 feet long."

April 30, 1909—"Please ship us promptly the following 'Lovell' apparatus:
4 sections each 112 feet long, 28 windows to the section.
3 sections each 192 feet long, 48 windows to the section."
We also desire to add that we have been very much pleased with the apparatus which you furnished."

May we furnish you with details and prices?

THE G. DROUVÉ CO., - - - Bridgeport, Conn.
CHICAGO



Operating windows in power house of Detroit Edison Co., Dearborn, Mich., Messrs. Westinghouse, Church, Kerr & Co., Architects. These windows are ten sash high and three sash wide.

Pond Operating Device

(PATENTED)

Will do all we claim for it and much more. It has no equal. Model sent on request.

We also manufacture

**LUPTON ROLLED
STEEL SKYLIGHT**

and

Rolled Steel Windows

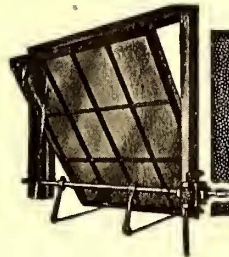
Send for Catalogue and Prices.

**David Lupton's Sons
Company**

Tulip & Westmoreland Sts.

PHILADELPHIA

SASH OPERATING APPARATUS



For any kind of hinged and pivoted sash, arranged singly, in series, or in multiple. Send for Catalog No. 6

LORD & BURNHAM CO.,
IRVINGTON-ON-HUDSON, NEW YORK

*"Never put off till to-morrow
the advertising you should
do to-day."*

E. G. LONG COMPANY

50 CHURCH ST., N. Y.

**ELECTRIC TRACTION EQUIPMENT
AND SUPPLIES**

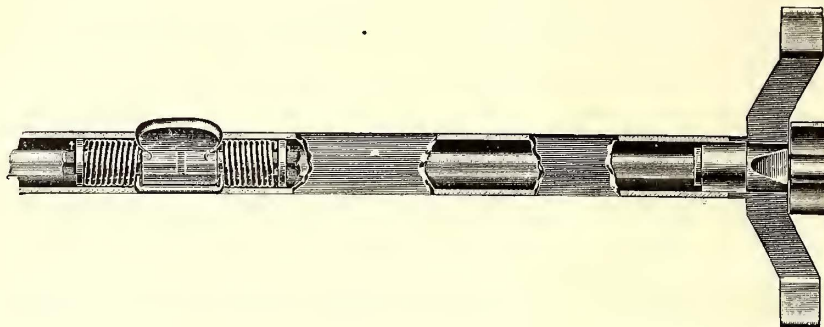
SPECIAL ATTENTION GIVEN TO EXPORT TRADE

The Eclipse Curtain Fixture

Passengers cannot get it out of the grooves,
Easily removed by trainmen.

Want
Details?

Write
Us!



Simple
Durable
Inex-
pensive.

THE PLANET COMPANY,
1303 First National Bank Bldg.,
CHICAGO

GENERAL RAILWAY SUPPLY CO.

531-532-533 MARQUETTE BLDG., CHICAGO

Flexolith Composition Flooring

Schroyer Friction Curtain Rollers and Fixtures

Imperial Car Window Screens

Roller Deck Sash Ratchets

National Standard Roofing

NATIONAL!

**CURTAIN FIXTURES, SASH
LOCKS, SASH BALANCES
AND NUT LOCKS,
COMPLETE CURTAINS**

The National Lock Washer Company
NEWARK, NEW JERSEY
529 Monadnock Block, Chicago, Ill.

Self Righting and Positive
Holding Ring No. 88
and No. 89 Curtain
Fixtures

The Curtain Supply Co.
Car
Curtains

320-330 Ohio St., Chicago
Hudson Terminal, 50 Church St., N. Y.

PERFECTION CAR SEATS



This is a slide-over seat, swung upon pivoted levers, whose pivots are not rigidly attached to the frame, thereby giving a smoothness and ease of motion in shifting the seat which is not attained by any other construction. This seat has the greatest possible strength and solidity and has no sliding parts to produce friction. It will work easily and stand the hardest service.

THE FORD & JOHNSON CO.
CHICAGO, ILL.

TRADE
"PAOWNYC"
MARK

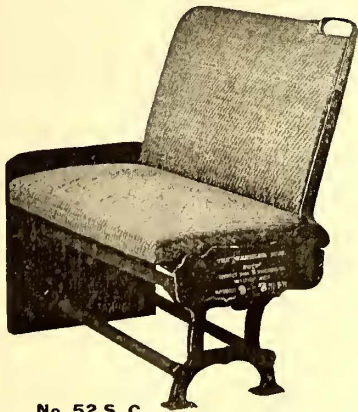
Edwards Sash Lock No. 13-0



will hold sash in any position. The sash moves without binding, but when the lock is released, it not only prevents the sash from falling but tightly wedges it so that rattling is absolutely impossible. Specify it on new cars and use it in overhauling old cars, and save damage suits for injury to passengers by falling sash.

Shall we send detailed information?

The O. M. Edwards Co.
Syracuse, N. Y.



No. 52 S. C.

HEYWOOD BROTHERS AND WAKEFIELD COMPANY WAKEFIELD, MASS.

"The best is the cheapest in the long run."

The Distingu'ishing Characteristics of
our Car Seats are:

First. The smoothest operating and most simple mechanism on the market, of both the slideover and turnover types.

Second. Steel top spring construction, and upholstery of a high order, which is second to none on the market.

Third. Pedestal base, adjustable footrest, grip handle and all other desirable features which go to make up a first-class modern car seat.

Fourth. Comfort, durability and general satisfaction as a result of the above.

The fact that the largest, best equipped and most successful roads are using our seats is the most conclusive confirmation of the above statements.



No. 54 A. G.



HALE & KILBURN Walkover Seats Lead the World

They give more room,
more comfort and more
money-value than any
other seat made.

SPECIFY OUR SEATS FOR
YOUR NEW CARS

The Hale & Kilburn Mfg. Co. PHILADELPHIA
New York, Chicago, Washington

PANTASOTE

The National Standard
for Car Curtains and
Car Upholstery.

AGOSOTE HEADLINING

The only headlining made in one solid piece. Will not separate, warp or blister. Waterproof and homogeneous.

THE PANTASOTE COMPANY

11 Broadway, New York

707 Fisher Bldg., Chicago, Ill.

793 Monadnock Bldg., San Francisco, Cal.

THE more-than-pay-for-itself merits of our Indicating, Recording and Printing Register System have been tried out on hundreds of street and interurban railway properties through years of practical service, and they have saved thousands and thousands of dollars for users.



One of our various types of Indicating
Recording and Printing Registers

As a result of our long experience, and the attainment of first position in the manufacturing world as manufacturers of devices for the proper protection and accounting of all classes of railway receipts, *our service will be better than ever during 1910.*

We have registers to meet *all possible requirements* in street and interurban railway operation.

OHMER FARE REGISTER CO.

Dayton, Ohio, U. S. A.

Our Prepayment System

embraces in its totality a registration of all forms of receipts and the total

number of passengers carried. These results are accomplished automatically and outside of the volition of either passenger or conductor.

As the highest efficiency of a collection system can only be obtained by knowing the total number of passengers carried, we recommend the installation of our specially designed turnstile, which makes the system complete. This turnstile and farebox utilizes but eight inches and the turnstile retards traffic in no way, as the extreme speed of our change maker, more than counteracts any delay."

H. R. Langslow
Rochester, N. Y.

Get A Nickel

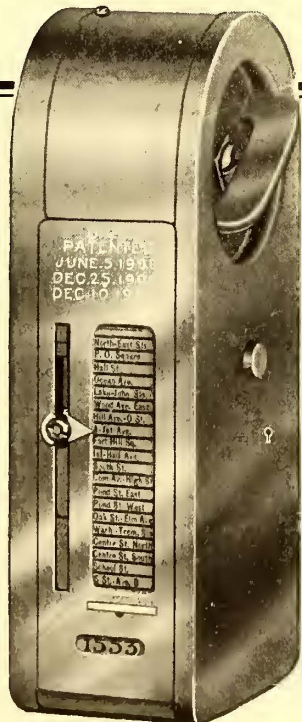
for every transfer issued—stop all misuse and abuse of transfers.

You can do it by use of this transfer issuing machine.

Shall we send a representative to demonstrate every detail of its operation?

Write for full particulars.

The Transfer Issuing Machine Co.
53 State Street, Boston, Mass.



COLLECT REGISTER

You Can't Separate Them

They become inseparable the moment you introduce our

"Registered-as-Paid" System of Enforced Registration

Further, the order of things is reversed. Registration precedes collection without delaying or impeding it. The conductor still gets immediate possession of collections, but every coin he gets is a registered coin.

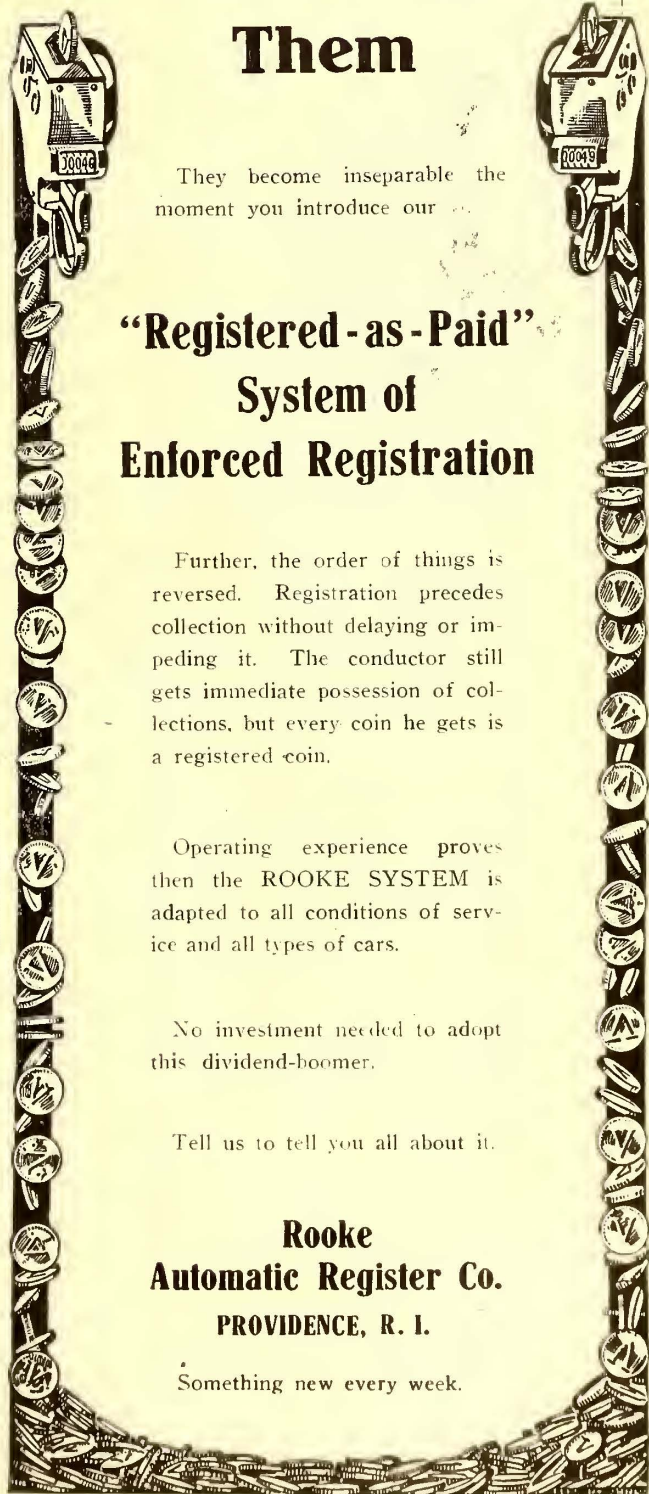
Operating experience proves then the ROOKE SYSTEM is adapted to all conditions of service and all types of cars.

No investment needed to adopt this dividend-boomer.

Tell us to tell you all about it.

Rooke Automatic Register Co.
PROVIDENCE, R. I.

Something new every week.



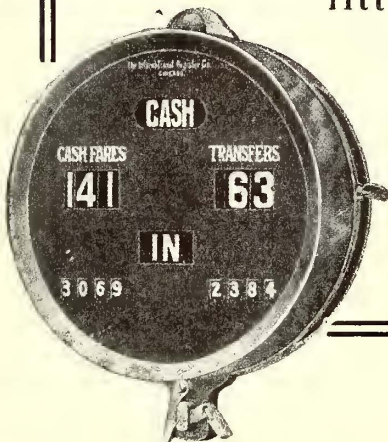
What You Want

in fare collection is a register of positively demonstrated reliability. This requirement is filled by

International Registers

They are easy to repair, yet seldom need repairs. The two largest register orders ever placed called for Internationals.

Write for details of these and all our other specialties—trolley cord, register fittings, bell cord, punches and badges.



The International Register Co.
625 West Jackson Boulevard
CHICAGO, ILL.

The Mighty Midget

HOT WATER CAR HEATER

Adapted for Large Electric Cars and Long Distance Lines. Exclusively used on Largest Electric Systems. Ask for Catalog.

THE WILLIAM C. BAKER HEATING & SUPPLY CO.
143 Liberty Street
NEW YORK

10c. PER DAY
WILL HEAT YOUR CAR IF EQUIPPED WITH A
Cooper Hot Water Heater
The Cooper Heater Co., Dayton, Ohio

PETER SMITH HEATER CO.
DETROIT, MICH.
Manufacturers of
Hot Water and Hot Air Heaters

FOR PUNCHING TRANSFERS
or any other sort of railway ticket;
our Cast Steel Ticket Punches are used almost universally. Send for complete catalogue of all kinds of railway supplies.
R. Woodman Mfg. & Supply Co.
63 Oliver St., Boston, Mass., U.S.A.

PUNCHES TO STAND HARD SERVICE ?
That's the only kind we make—built only from carefully selected materials, by highly skilled specialists. We have types for every service. Write for catalog.
Bonney-Vehslage Tool Co.
Factory: Newark, N. J. Offices: 124 Chambers St.

ADVERTISE in every issue of the **ELECTRIC RAILWAY JOURNAL** because you will obtain proportionately better **RESULTS**

Every Genuine Roller has the name of manufacturer, **STEWART HARTSHORN** in script on label

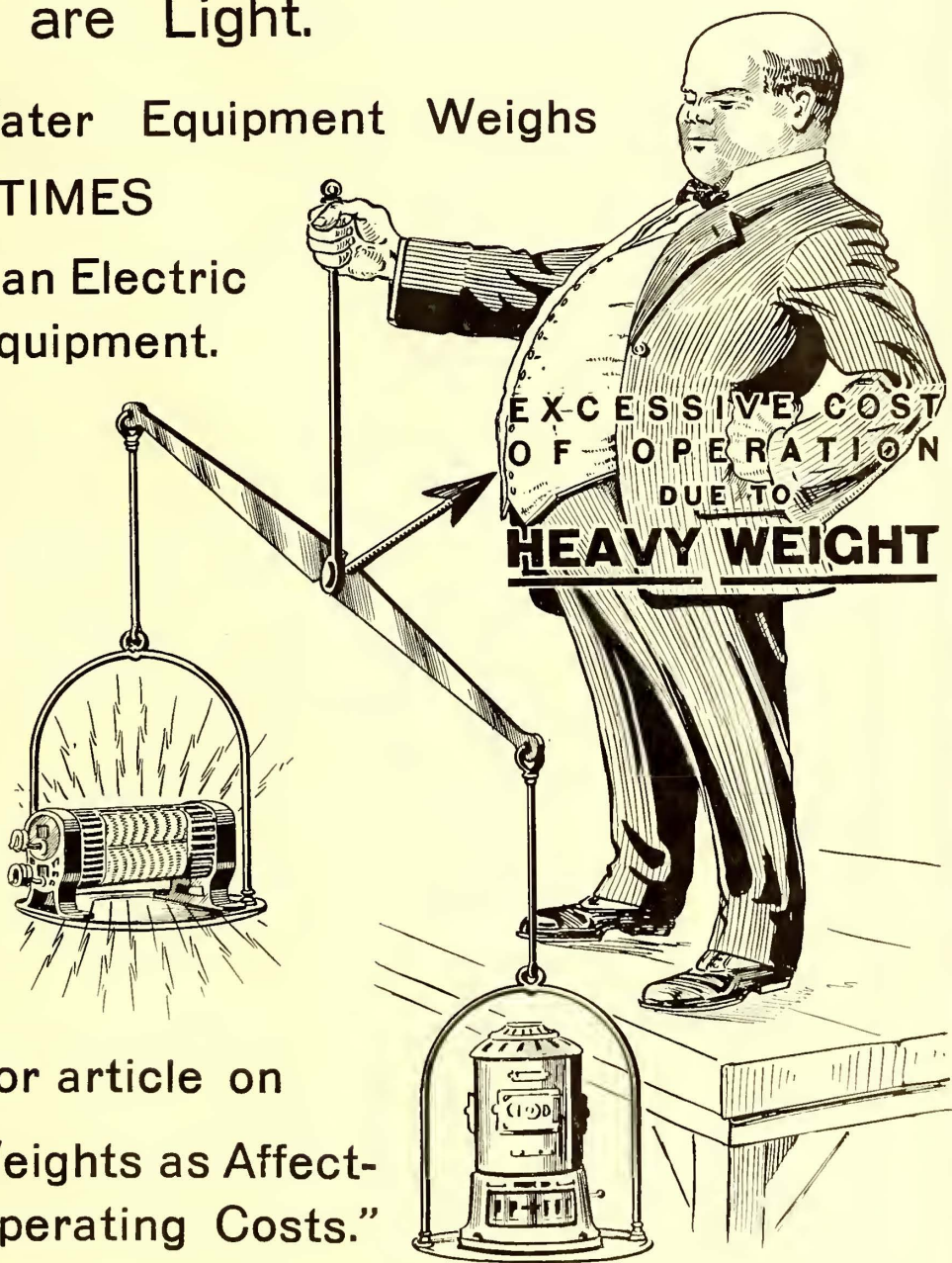
HARTSHORN'S SPECIAL CAR ROLLERS
For street and steam railway cars. Brackets suitable for all classes of fittings. Used the world over, wherever cars are run.
SPECIAL FAC LIST SENT ON REQUEST.
STEWART HARTSHORN CO., Office and Factory: E. Newark, N. J.
NEW YORK: 382 Lafayette St. CHICAGO: 338-344 Wabash Ave.

Reduce Your Weight

ELECTRIC HEATERS

are Light.

A Hot Water Equipment Weighs
TEN TIMES
More Than an Electric
Heater Equipment.



Write us for article on
"Car Weights as Affect-
ing Operating Costs."

Consolidated Car Heating Company

ALBANY

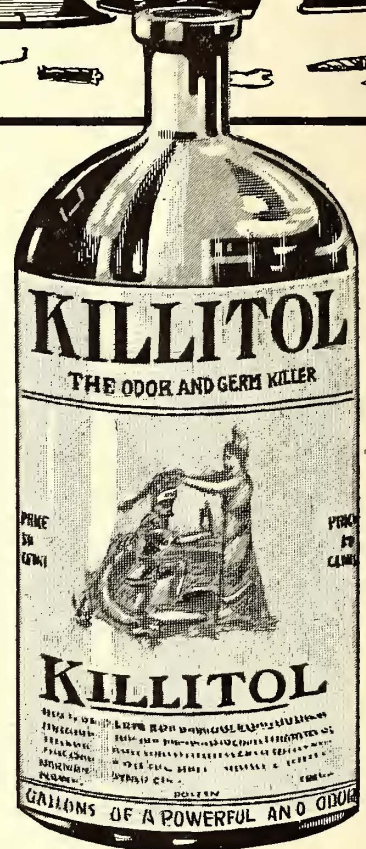
NEW YORK

CHICAGO



We Can Eliminate These Odors Instantly

Keep Your Cars
 Odorless and
 Sanitary
 By Using
“KILLITOL”
 The Odorless Chlorine Germicide



It will not harm the finest varnished surface, floor covering or upholstery.

To give you an opportunity to see for yourself what “Killitol” will do, we want to send you a liberal sample. Use it in your cars and stations and see how quickly all odors disappear.

Fill out, tear off and mail to-day.

Norman C. Hayner Company, Rochester, N. Y.

Please send me a sample of “Killitol,” as per your offer in Electric Railway Journal.

Write name here.....

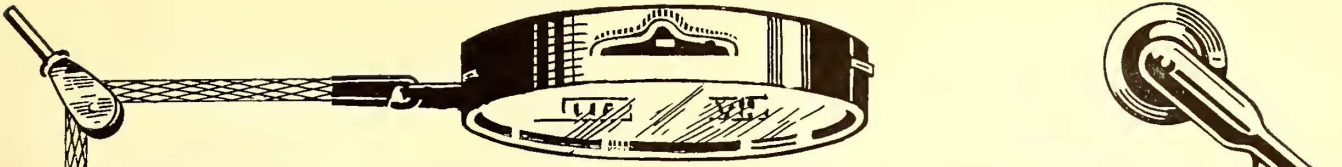
..... with.....

Position held

Name of Road Here

City

State



SAMSON
Spot Trolley Cord
SAMSON
Bell and Register Cord

outlasts any other brand on the market.

The smooth braid and finish insure minimum abrasion and maximum wear.

Samson Spot Trolley Cord has been proved by long years of use to be the most durable and economical under all conditions.


Samson Bell and Register Cord costs much less than leather or rawhide, but tests show that it wears on the average twice as long as either. All colors and sizes, with or without wire centre.

Send for samples and catalogue.



Samson Cordage Works

Boston, Mass.



Maintain Schedules

and avoid accidents by equipping all your cars with the

Ackley Adjustable Brake

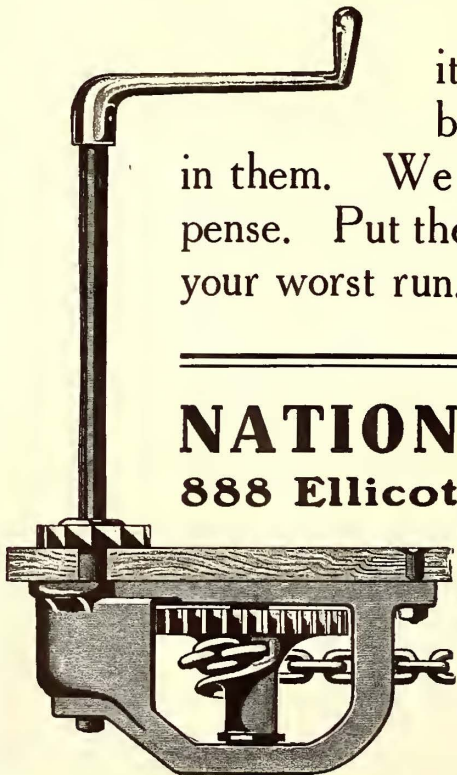
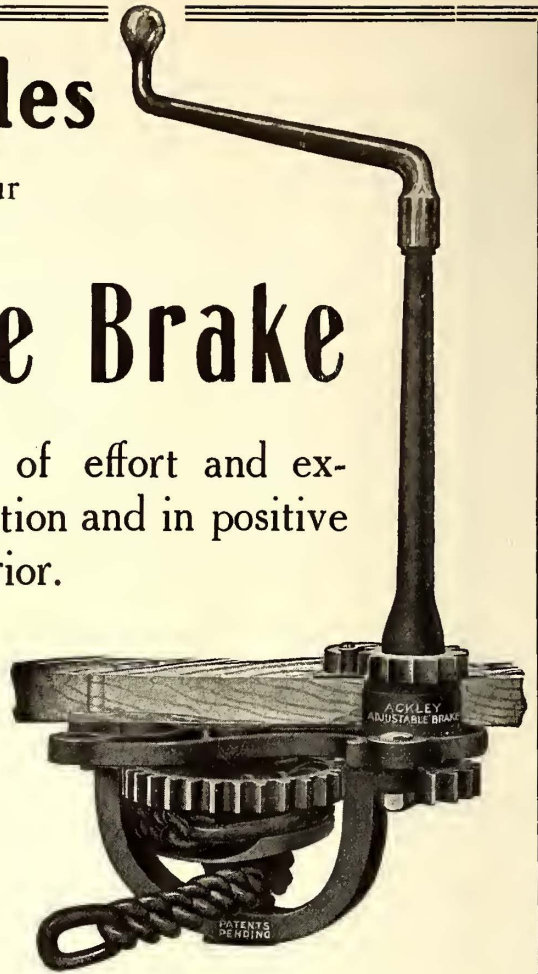
It is the crowning achievement of years of effort and experiment—in ease and speed of application and in positive braking power it has absolutely no superior.

It can be easily applied to cars where no other brakes will fit and it is protected by patents allowed or applied for in twenty-one countries.

The Peacock Brake

is used by the best managed roads all over this country. It is too well and favorably known to require further description.

Our Test-Before-Purchase Plan makes it possible for you to test a set of either or both of these brakes before you invest a cent in them. We will ship you the brakes for trial at our expense. Put them on your biggest car and test them out over your worst run. Don't keep them unless they make good.



NATIONAL BRAKE COMPANY

888 Ellicott Square

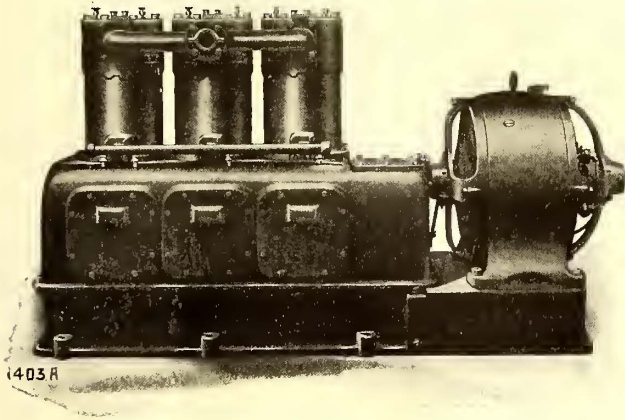
Buffalo, N. Y.

Alphonso A. Wigmore, Pacific Coast Agent, Los Angeles, Cal.

European Agencies for the Ackley Brake:

G. S. Albanese, Ingenieur, 62, rue Saint-Lazare, Paris	The Equipment and Engineering Co., Northampton Park, Canonbury, London, N.
Kontinentale Bremsen, Ges., m.b.h. Lankwitz, Berlin	Schmassmann & Co., 110 Bahnhofstrasse, Zurich
	C. Dubbelman, 45, rue de la Caserne, Bruxelles

National Air Compressors



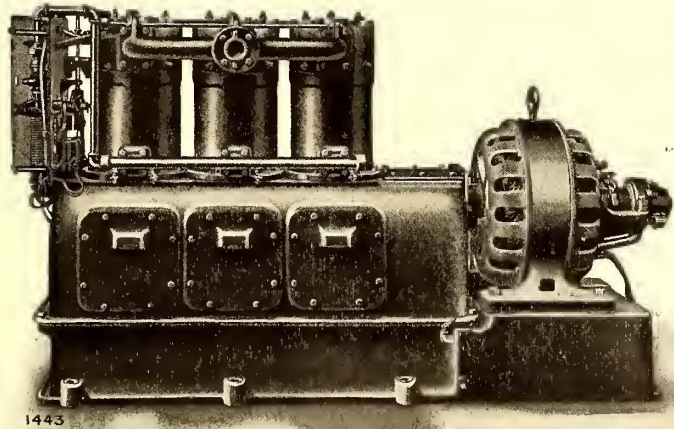
100 cu. ft. Type "3VS" Air Compressor with Direct Current Motor

Type "3VS"

THESE compressors are especially adapted for service in car shops and barns where compressed air is used for such operations as drilling, riveting, chipping, etc., as well as for blowing dust and other accumulations out of car motors, controllers and seats. Either direct or alternating current motors can be furnished to operate same.

AUTOMATIC controlling device, which embodies automatic starter, unloading device and water governor, can be furnished with these compressors.

This controlling device is positive and entirely automatic in action and permits of starting the direct current compressors with not to exceed $\frac{1}{2}$ full load current and starting the alternating current compressors with not to exceed full load current.



150 cu. ft. Type "3VS" Air Compressor with Alternating Current Motor and Combined Automatic Controlling Apparatus

Write for Descriptive Bulletin No. 84E

National Brake & Electric Co.
Milwaukee, U. S. A.

Sales Offices

NEW YORK - 111 Broadway
CHICAGO - 1344 First National Bank Bldg.
PHILADELPHIA, W. H. Goble, 1722 Westmoreland St.
BOSTON, F. E. Huntress - 131 State St.

SAN FRANCISCO, F. F. Bodler - 71 First St.
LOS ANGELES, C. Eccles - 524 So. Los Angeles St.
PORTLAND, ORE., Wm. F. McKenney - 68 First St.
LONDON, ENGLAND,
14 Great Smith Street, Westminster

Decrease the Wear on Your Trolley Wheels



The arcing, pounding and wrenching, unavoidable with the ordinary form of trolley base, is greatly lessened by using the

US-13 Trolley Base

The extreme sensitiveness of this type not only insures a minimum wear of trolley wheels, but also lessens the liability of the trolley wheel being thrown from the wire when sharp turns are taken at high speed.

Roller Bearings

34 tool-steel rollers are carried in a bearing cup so constructed as to be both water and dust-proof and to form a retaining well for the lubricating oil. This method of construction gives a constant and uniform lubrication of the rollers, the oil being retained indefinitely.

No Pitting of Rollers

Pitting of rollers is prevented by the good contact obtained by having the center stud rest firmly on the stationary base.

Heavy Tension Springs

are used in the US-13 Base. A heavily ribbed adjusting arm and slide operated by a single adjusting screw gives a range in pressure of from 20 to 45 pounds at the wire.

Ask our nearest sales office to tell you more about the great improvements in service afforded by US-13 Bases.

General Electric Company

Largest Manufacturer of Electrical Apparatus in the World

Sales Offices in the Following Cities:

Atlanta, Ga.
Baltimore, Md.
Boston, Mass.
Buffalo, N. Y.
Butte, Mont.
Charleston, W. Va.
Charlotte, N. C.
Chicago, Ill.

Cincinnati, O.
Cleveland, O.
Columbus, O.
Denver, Colo.
Duluth, Minn.

Indianapolis, Ind.
Kansas City, Mo.
Los Angeles, Cal.
Minneapolis, Minn.
Nashville, Tenn.

New Haven, Conn.
New Orleans, La.
New York, N. Y.
Philadelphia, Pa.
Pittsburg, Pa.

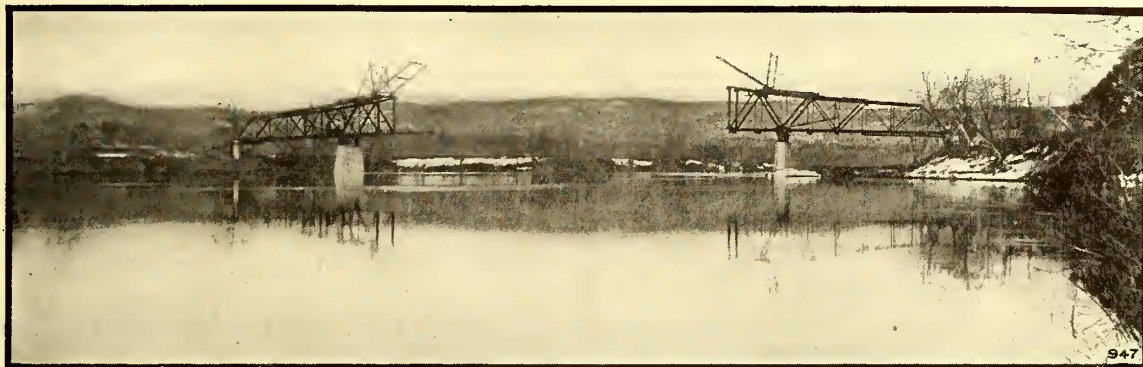
Portland, Ore.
Richmond, Va.
Salt Lake City, Utah.
San Francisco, Cal.
St. Louis, Mo.
Seattle, Wash.
Spokane, Wash.
Syracuse, N. Y.

Principal Office:

Schenectady, N. Y.

American Bridge Company of New York

Structural Steel for Every Purpose



Erection of Bridge over Connecticut River, Northfield, Mass.

General Offices: Hudson Terminal, 30 Church Street, New York

JUST OUT

THE MOODY MANUAL SERVICE

December Edition

A necessity in the office of the Executive, the Comptroller and the Operating Manager. A recognized authority on all public utility corporations. Complete historical data, together with detailed operating figures relative to every street railway and other utility corporations in the world which are owned or controlled by interests in this country. Absolutely essential to the official desiring a ready reference to operating and financial facts regarding other companies. Costs but \$12—(3,300 pages)—full Russia—including the Monthly Digest of Corporation News.

MOODY MANUAL COMPANY
33 BROADWAY, N. Y. C.

We Specialize on Efficient and Economical Engineering, Construction and Operation

If you are planning new work, we can do it all, from the preliminary survey to the operation of the road after completion.

Our service embraces efficient and economical handling of designing, construction and operation in all details.

Write for detailed information.

Construction Service Co.
15 William St., New York City

SANDERSON & PORTER
ENGINEERS AND CONTRACTORS
 REPORTS DESIGNS
 CONSTRUCTION MANAGEMENT
 HYDRO-ELECTRIC DEVELOPMENTS
 RAILWAY, LIGHT AND POWER
 PROPERTIES
 NEW YORK SAN FRANCISCO

J. G. WHITE & COMPANY
 INCORPORATED
Engineers, Contractors
 43-49 Exchange Place, } New York, N. Y.
 41-43 Wall Street, }

First National Bank Bldg. Alaska Commercial Bldg.
 CHICAGO, ILL. SAN FRANCISCO, CAL.

LONDON CORRESPONDENTS:
J. G. WHITE & COMPANY, LIMITED
 9 CLOAK LANE, CANNON ST.

PRINCIPAL PHILIPPINE OFFICE: MANILA, P. I.

E. Sarton,

CONTRACTOR,

*Specialties: Conduit-Electric Railways,
 Trolley Lines, City and Suburban,
 Conduit Systems, Etc.*

Office: 841 Bladensburg Road, Washington, D. C.
 LONG DISTANCE TELEPHONE, LINCOLN 887

W. E. Harrington, B.S.
 CONSULTING ENGINEER
 (Member A. I. E. E.)
Railroad Gasoline Cars
 for
 All Types of Railroads and Railways
 (Steam) (Electric)

EXAMINATIONS—REPORTS—CONSULTATION
 Covering
 CONSTRUCTION, EQUIPMENT and OPERATION

834 Land Title Bldg., Philadelphia, Pa.

THE ARNOLD COMPANY
 ENGINEERS—CONSTRUCTORS
 ELECTRICAL—CIVIL—MECHANICAL
 101 LA SALLE STREET
 CHICAGO

A. L. REGISTER & CO.
 SUCCESSORS TO
PEPPER & REGISTER
 ESTABLISHED 1889
ENGINEERS AND GENERAL CONTRACTORS
 112 North Broad Street, Philadelphia

Ford, Bacon & Davis,
 Engineers.

115 BROADWAY.
 NEW YORK

A. L. DRUM & COMPANY
 CONSULTING AND CONSTRUCTING ENGINEERS
 ELECTRICAL · CIVIL · MECHANICAL
 PHYSICAL AND FINANCIAL REPORTS

American Trust Building

CHICAGO

H. M. BYLLESBY & Co.
 INCORPORATED
ENGINEERS

218 LA SALLE STREET
 CHICAGO

OKLAHOMA CITY, OKLAHOMA

MOBILE, ALA.

SAN DIEGO, CAL.

Jno. J. Cone A.W. Piero Robert W. Hunt Jas. C. Hallsted D.W. McNaugher

ROBERT W. HUNT & CO.

Bureau of Inspection, Tests and Consultation. ENGINEERS

90 WEST ST., NEW YORK 1121 THE ROOKERY, CHICAGO
 MONONGAHELA BANK BLDG., PITTSBURG NORFOLK HOUSE CANNON ST., E. C., LONDON
 1445 SYNDICATE TRUST BLDG., ST. LOUIS 425 WASHINGTON ST., SAN FRANCISCO
 CANADIAN EXPRESS BLDG., MONTREAL

Inspection of Rails and Fastenings, Cars, Motors, Etc., Bridges, Buildings
 and other Structures. Chemical and Physical Laboratories.

Reports and Estimates on Electrical Properties

DAVID PEPPER, Jr.

RAILWAYS, LIGHT, POWER and GENERAL CONTRACTS

1201 CHESTNUT ST.

PHILADELPHIA, PA.

R. H. PIERCE S. G. NEILER H. A. ROBINSON E. P. RICH

PIERCE, RICHARDSON & NEILER, (Inc.) Engineers

Manhattan Building, CHICAGO, ILL.

SMETHURST & ALLEN
 Electrical Engineers and Railway Contractors
 NORTH AMERICAN BUILDING, PHILADELPHIA, PA.

HANFORD & BLACKWELL
 ENGINEERS
 RAILROADS, POWER PLANTS, INDUSTRIAL PLANTS
 Alaska Building Seattle, Wash.

CHAMBERS & HONE

Members American Society of Civil Engineers.

Engineers

No. 1 Liberty Street, NEW YORK

Surveys, Plans, Estimates, Superintendence and Reports.
Railways, Bridges, Buildings and Foundations.**C. G. YOUNG**ENGINEERING AND CONSTRUCTION
EXAMINATIONS AND REPORTS
REPRESENTATIVES IN LONDON, PARIS, RUSSIA AND FAR EAST
MERITORIOUS PROJECTS FINANCED
No. 60 WALL STREET, NEW YORK**The Campion McClellan Co.**

INCORPORATED

ENGINEERING - - CONSTRUCTION

90 West Street, New York

GULICK-HENDERSON COMPANYTRACTION EQUIPMENT BRIDGES PIPE POWER PLANTS.
MACHINERY, CEMENT, EXAMINATIONS and REPORTS.
PHYSICAL AND CHEMICAL LABORATORIES.

RAILWAY EQUIPMENT INSPECTION

PITTSBURG
439 3rd Ave.CHICAGO
315 Dearborn St.NEW YORK
30 Church St.**D. C. & WM. B. JACKSON**MEMBERS AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS
AMERICAN SOCIETY OF MECHANICAL ENGINEERS
AMERICAN SOCIETY OF CIVIL ENGINEERS

ENGINEERS EXPERTS

CHICAGO

BOSTON

**EDWIN L. REED**
STRIKE-BREAKERSTREET-CAR CHECKING AND INVESTIGATIONS.
LABOR MATTERS ONLY.Room 707, 185 Dearborn St., CHICAGO, ILL.
Phone Randolph 2991**HILDRETH & CO.****INSPECTING ENGINEERS**

135 BROADWAY

NEW YORK

3754 Main St., Philadelphia, Pa.
Monadnock Block, Chicago, Ill.Liberty Bank Bldg., Pittsburgh, Pa.
Humboldt Bank Bldg., San Francisco, Cal.Consultation, Bridges and Structural Steel.
—Examinations and Reports of Properties.—
Inspection and Tests of Rails, Equipment,
Structural Steel, Machinery and Cement.**HERBERT A. WAGNER**

ENGINEER

Electric Railways. Alternating Current
Railway and Power Installations.

60 WALL STREET. NEW YORK CITY

GEO. W. KNOX, President

R. M. HESKETT, Secretary

Knox Engineering Company

1410 Fisher Bldg., Chicago

Engineers and Builders—Electric Railways—Light and Power Work—
Examinations—Reports—Plans—Specifications—Superintendence.**FARRINGTON COMPANY**Manufacturing Chemists
Chemical Engineers

15 State St., BOSTON, MASS., U. S. A.

MOTOR—DYNAMO INSULATION

PERRY, COFFIN & BURR

60 STATE STREET - - BOSTON, MASS.

WE PURCHASE TOTAL ISSUES OF

STREET RAILWAY AND ELECTRIC LIGHTING BONDS

LAND-WHARTON CO., Inc. 910 Pennsylvania Building
Engineers ▽ Design and Construction of complete properties
for light, power, railway and industrial purposes
PHILADELPHIA, PA.**ALBERT S. RICHEY**, Worcester, Mass.

ELECTRIC RAILWAY ENGINEER

Practical solutions of railway and power plant problems.
Improvements in Economy, Tests, Estimates, Specifications.**BURNS & COMPANY**, Isabella Bldg., CHICAGO

RAILROAD CONSTRUCTION

Special financial services that bring results
ENGINEERING CONTRACTING**TIMOTHY W. SPRAGUE** **FREDERIC H. KEYES** **HENRY D. JACKSON**
And Associates
ENGINEERS EXPERTS
88 Broad Street Boston, Mass.**COLUMBIA CONSTRUCTION COMPANY**

Engineers and Contractors for Electric Railways

Principal Office, - - - MILWAUKEE, WISCONSIN

Frederick Sargent

A. D. Lundy

SARGENT & LUNDY, Engineers

Railway Exchange Bldg. Chicago, Ill.

DRUMMOND'S DETECTIVE AGENCY
RAILWAY WORK A SPECIALTYA. L. DRUMMOND, General Manager
Ex-Chief U. S. Secret Service
Park Row and Ann Street, New York

WE WILL BUY YOUR CONSERVATIVE BONDS

—of public service companies,
in whose issues we specialize.

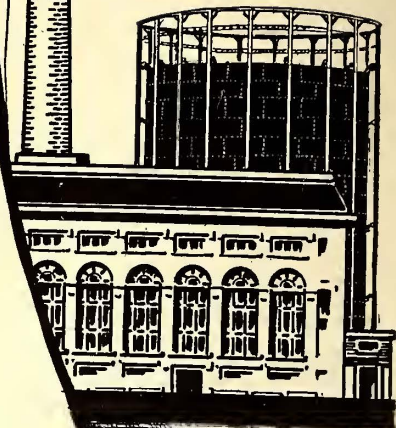
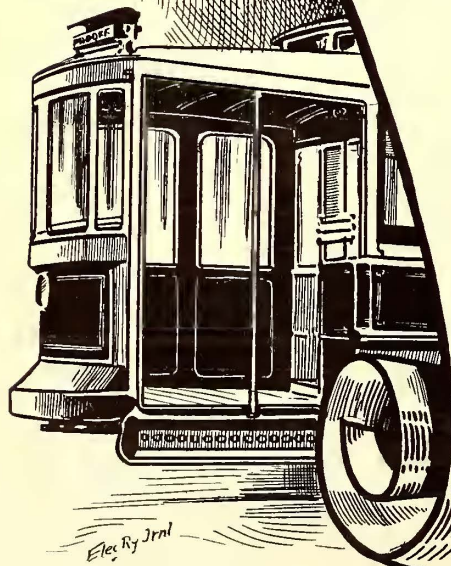
¶ If you are planning to make extensions or improvements which call for a bond issue, we feel certain it will be to your interest to communicate with us.

¶ Among our clients we have, besides institutions, a large number of wealthy investors who are favorably disposed toward public utility bonds as permanent investments. In their hands your bonds will be well placed and safe from speculative influences.

P. W. Brooks & Co.

115 Broadway
NEW YORK CITY

70 State Street
BOSTON



The Lamp We Want To Sell Is The Lamp You Ought To Buy

THE Buckeye Street Railway Tantalum has made a place for itself solely by virtue of its intrinsic merit. In no case where it has received a thorough *practical* test has this lamp failed to make good all of our claims. Let us tell you about the *re-orders*.

THE BUCKEYE ELECTRIC COMPANY

MAIN OFFICE AND WORKS:

CLEVELAND, OHIO

CHICAGO:
23 East Lake Street

PITTSBURG:
Fulton Building

DALLAS:
220-221 Linz Building

INDEX TO ADVERTISEMENTS

(An asterisk * indicates advertisements appearing only in the International Edition.)

Table listing various companies and their page numbers, organized in three columns. Includes entries like 'Abel, G. T.', 'American Car Co.', 'Babcock & Wilcox Co.', etc.

Classified Directory of Advertisers, Pages 66-74

"Want" and "For Sale" Advertisements, Pages 76-78



IF YOU WANT TO READ SOMETHING INTERESTING

let us send you the current issue of "Reactions" which contains an account of the welding of a 48-ton fly-wheel in the wilds of North Carolina. The repair was made without shop facilities of any kind and under the greatest difficulties imaginable.

There are lots of other interesting articles in "Reactions," including an account of the welding of the stern-post of the Quartermaster Steamer "Gen. McDowell" at San Francisco; Chromium, its history and application; Repairing Steel and Iron Rolls; Locomotive Repairs, etc.

When writing for "Reactions" please mention this advertisement

GOLDSCHMIDT THERMIT COMPANY

90 WEST STREET, NEW YORK

432-436 Folsom St., San Francisco

103 Richmond St., W., Toronto, Can.



CLASSIFIED DIRECTORY

OF MANUFACTURERS, MANUFACTURERS' AGENTS, ENGINEERS, CONTRACTORS, BANKERS, BROKERS, ETC., ETC.

ADVERTISING IN THIS ISSUE OF THE ELECTRIC RAILWAY JOURNAL.

NOTE.—For reference to the advertisements, see alphabetical index on page 64. *Indicates the advertisements appearing in the International Edition.

- Advertising, Street Car,**
Collier, Barron G., Inc.
Kissam & Co., Geo.
McBee Co., A. E.
- Alloys and Bearing Metals. (See also Bearings for Trucks and Motors.)**
American Gen'l Eng'g Co.
Brown, Harold P.
Gilbert & Sons Brass Foundry Co., A.
Lanning & Co., J. Frank.
Lumen Bearing Co.
Ohio Brass Co.
Planet Co., The.
Post & Co., E. L.
Ridlon Co., Frank.
Westinghouse Elec. & Mfg. Co.
- Alternators. (See Generators, Alternating Current.)**
- Anchors, Guy.**
Everstick Anchor Co.
Garton Co., W. R.
Matthews & Bro., W. N.
Western Electric Co.
- Armature and Field Coils.**
Amer. Gen'l Eng'g Co.
Buffalo Fdry. & Mach. Co.
Cleveland Armature Works.
Electric Cable Co.
Elliott Elec. Co., The S. K.
General Electric Co.
McLeer Elec. & Mfg. Co.
Ridlon Co., Frank.
Roebing's Sons Co., John A.
Stuart-Howland Co.
Van Dorn Electric & Mfg. Co.
Western Electric Co.
Westinghouse Elec. & Mfg. Co.
- Armature and Field Coils, Machines for Handling and Winding.**
Buffalo Foundry & Machine Co.
Columbia Machine Works & Malleable Iron Co.
Garton Co., W. R.
Griswold Machine Co., Geo. M.
Ridlon Co., Frank.
- Armature Lifts. (See Cranes, Hoists and Lifts.)**
- Babbling Devices.**
Columbia Machine Works & Malleable Iron Co.
Ridlon Co., Frank.
- Babbling Metals. (See Alloys & Bearing Metals.)**
- Badges and Buttons.**
American Ry. Supply Co.
International Register Co., The.
- Ballast Cars and Ballasting Machinery.**
Hadfield's Steel Foundry Co., Ltd.
Hicks Locomotive & Car Works.
Jeffrey Mfg. Co.
- Bankers and Brokers.**
Brooks & Co., P. W.
Perry, Coffin & Burr.
- Bases, Trolley.**
Bayonet Trolley Harp Co.
Nuttall Co., R. D.
Trolley Supply Co.
Union Electric Co.
- Batteries, Dry.**
American Carbon & Battery Co.
National Carbon Co.
Western Electric Co.
- Batteries, Storage.**
Electric Storage Battery Co.
Gould Storage Battery Co.
Westinghouse Storage Battery Co.
- Bearings for Trucks and Motors. (See also Alloys and Bearing Metals.)**
Columbia Machine Works & Malleable Iron Co.
General Electric Co.
Gilbert & Sons Brass Foundry Co., A.
Lanning & Co., J. Frank.
Lumen Bearing Co.
Ohio Brass Co.
Post & Co., E. L.
Ridlon Co., Frank.
St. Louis Car Co.
Symington Co., T. H.
Taylor Electric Truck Co.
Westinghouse Elec. & Mfg. Co.
- Bells and Gongs.**
American Car Co.
Electric Service Supplies Co.
Brill Co., The J. G.
Kuhlman Car Co., G. C.
National Tube Co.
Ohio Brass Co.
St. Louis Car Co.
Southern Railway Supply Co.
Stephenson Co., John.
Wason Mfg. Co.
Western Electric Co.
- Belt Conveyors.**
Jeffrey Mfg. Co.
- Beltting.**
Jeffrey Mfg. Co.
Southern Railway Supply Co.
Zelnicker Supply Co., Walter A.
- Benders, Rail.**
Buda Co., The.
Hadfield's Steel Foundry Co., Ltd.
Niles-Bement-Pond Co.
Pittsburgh Pole & Forge Co. O M S Co.
Watson-Stillman Co.
Wharton, Jr., & Co., Inc., Wm.
Zelnicker Supply Co., W. A.
- Block Systems. (See Signal Systems.)**
- Blowers. (See Mechanical Draft Apparatus.)**
- Blue Printing Machines.**
Buckeye Engine Co.
- Boilers.**
Babcock & Wilcox Co.
Edge Moor Iron Co.
Heine Safety Boiler Co.
*Howden & Co., Ltd., James.
Partridge, Arthur S.
- Boiler Cleaning Compounds.**
Amer. Gen'l Eng'g Co.
Dearborn Drug & Chemical Works.
Johns-Manville Co., H. W.
- Boiler Coverings. (See Coverings, Pipe and Boiler.)**
- Bolts. (See Nuts and Bolts.)**
- Bonds, Rail.**
American Steel & Wire Co.
Brown, Harold P.
Condit Electrical Mfg. Co.
- Dossert & Co.**
Electric Cable Co.
Electric Ry. Improvement Co.
Electric Service Supplies Co.
Garton Co., W. R.
General Electric Co.
Goldschmidt Thermit Co.
Johns-Manville Co., H. W.
Lorain Steel Co.
Lord Electric Co.
Ohio Brass Co.
Roebing's Sons Co., John A.
Stuart-Howland Co.
Union Electric Co.
Western Electric Co.
- Bond Testers.**
American Steel & Wire Co.
Lord Electric Co.
Ohio Brass Co.
- Book Publishers, Technical.**
McGraw-Hill Book Co.
- Books for Investors.**
Moody Manual, Co.
- Boosters.**
Crocker-Wheeler Co.
General Electric Co.
National Brake & Electric Co.
Ridgway Dynamo & Engine Co.
Western Electric Co.
- Borers, Wheel. (See Machine Tools.)**
- Boxes, Journal. (See Journal Boxes.)**
- Brackets and Cross Arms. (See also Poles, Ties, Posts, etc.)**
California Pole & Piling Co.
Craghead Engineering Co.
Electric Railway Equipment Co., Cincinnati.
Electric Service Supplies Co.
Elliott Elec. Co., The S. K.
Ohio Brass Co.
Pittsburgh Pole & Forge Co.
Ridlon Co., Frank.
Southern Railway Supply Co.
Western Electric Co.
- Brakes, Brake Systems and Brake Parts.**
American Brake Co.
American Car Co.
Barber Car Co.
Brill Co., The J. G.
Columbia Machine Works & Malleable Iron Co.
General Electric Co.
Kuhlman Car Co., G. C.
McGuire-Cummings Mfg. Co.
Momentum Automatic Brake Co.
National Brake Co.
National Brake & Electric Co.
Ohio Brass Co.
St. Louis Car Co.
Stephenson Co., John.
Taylor Electric Truck Co.
U. S. Metal & Mfg. Co.
Wason Mfg. Co.
*Westinghouse Brake Co., Ltd., The.
Westinghouse Traction Brake Co.
- Brakes, Momentum.**
Momentum Automatic Brake Co.
- Brake Shoes.**
American Car Co.
American Brake Shoe & Fdy. Co.
- Brill Co., The J. G.**
Columbia Machine Works & Malleable Iron Co.
Hadfield's Steel Foundry Co., Ltd.
Kuhlman Car Co., G. C.
Long Co., E. G.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.
Standard Brake Shoe Co.
Stephenson Co., John.
Taylor Electric Truck Co.
U. S. Brake Shoe Co.
Wason Mfg. Co.
Wheel Truing Brake Shoe Co.
- Brazing and Welding Processes.**
Goldschmidt Thermit Co.
- Bridges and Buildings.**
American Bridge Co. of N. Y.
Brown Hoisting Machinery Co.
General Fireproofing Co.
Pennsylvania Steel Co.
- Bridge Timbers.**
American Creosote Works.
Gulport Creosoting Co.
- Brushes, Carbon.**
American Carbon & Battery Co.
American Gen'l Eng'g Co.
Dixon Crucible Co., Jos.
Elliott Elec. Co., The S. K.
General Electric Co.
Jcandron, W. J.
LeValley Vitæ Carbon Brush Co.
National Carbon Co.
Speer Carbon Co.
Stuart-Howland Co.
Universal Carbon Co.
Western Electric Co.
- Bumpers, Car and Seat.**
American Car Co.
Brill Co., The J. G.
Cincinnati Car Co.
Danville Car Co.
Elastic Tip Co.
Kuhlman Car Co., G. C.
Ridlon Co., Frank.
Stephenson Co., John.
Wason Mfg. Co.
- Bushings. (See Wheels and Bushings, Trolley.)**
- Buttons. (See Badges and Buttons.)**
- Cables. (See Wires and Cables.)**
- Calculating Machines.**
Morschhauser, W. A.
- Carbon Brushes. (See Brushes, Carbon.)**
- Car Doors, Folding Vestibule.**
Duner Co.
- Cars, Passenger, Freight and Express.**
American Car Co.
Barber Car Co.
Brill Co., The J. G.
Buda Co., The.
Cincinnati Car Co.
Danville Car Co.
Hanna Co., J. A.
Hicks Locomotive & Car Works.
Jewett Car Co.
Kuhlman Car Co., G. C.
McGuire-Cummings Mfg. Co.
Niles Car & Mfg. Co.
Pay-as-You-Enter Car Corporation, The.
Pay-Within Car Co.
Pressed Steel Car Co.
- St. Louis Car Co.**
Stephenson Co., John.
*United Electric Car Co.
Wason Mfg. Co.
- Cars, Construction and Repair.**
Buda Co., The.
Cincinnati Car Co.
Hanna Co., J. A.
Hicks Locomotive & Car Works.
Males Co., The.
McGuire-Cummings Mfg. Co.
Niles Car & Mfg. Co.
- Car Equipment. (For Fenders, Heaters, Registers, Wheels, etc., see those headings.)**
- Cars, Dump.**
Hicks Locomotive & Car Works.
- Car Signals.**
Nichols, A. O.
- Car Trimmings. (See also Curtains and Curtain Fixtures, Registers and Register Fittings, etc.)**
American Car Co.
Brill Co., The J. G.
Cincinnati Car Co.
Danville Car Co.
Gilbert & Sons Brass Foundry Co., A.
Hale & Kilburn Mfg. Co.
Kuhlman Car Co., G. C.
Southern Railway Supply Co.
Stephenson Co., John.
St. Louis Car Co.
Wason Mfg. Co.
- Castings, Composition or Copper.**
Anderson Mfg. Co., A. & J. M.
- Castings, Gray Iron and Steel.**
American Brake Shoe & Foundry Co.
American Bridge Co. of N. Y.
Buffalo Foundry & Machine Co.
Columbia Machine Works & Malleable Iron Co.
Falk Co., The.
Green Engineering Co.
Hadfield's Steel Foundry Co., Ltd.
Jeffrey Mfg. Co.
McConway & Torley Co., The.
St. Louis Car Co.
Standard Steel Works Co.
Wharton, Jr., & Co., Inc., Wm.
- Castings, Malleable or Brass.**
American Brake Shoe & Foundry Co.
Gilbert & Sons Brass Foundry Co., A.
Hadfield's Steel Foundry Co., Ltd.
Jeffrey Mfg. Co.
Lanning & Co., J. Frank.
Long Co., E. G.
Ohio Brass Co.
Ridlon Co., Frank.
St. Louis Car Co.
- Cast Welded Joints. (See Joints, Rail.)**
- Catchers and Retriever, Trolley.**
Holland Trolley Supply Co., The.
Lord Electric Co.
Ridlon Co., Frank.
Stuart-Howland Co.
Trolley Supply Co.
Union Electric Co.
*Wilson & Co.

How About Fire Protection?

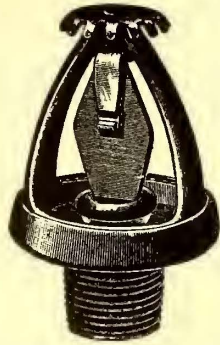
Your barn and equipment are probably insured against fire, but that doesn't keep your whole equipment from being crippled.

Paid fire losses won't put your cars in commission and erect a new building at a minute's notice. Keep up your insurance, but cut down the rate by installing the Grinnell Sprinkler System; it will do more than a fire insurance policy, it will help to keep your system in constant operation.

Estimates and particulars gladly given.

GENERAL FIRE EXTINGUISHER CO.

Executive Offices: Union Trust Bldg., PROVIDENCE, R. I.



The New Weston Alternating Current Switchboard Ammeters and Voltmeters will be found vastly superior in accuracy, durability, workmanship and finish to any other instrument intended for the same service.

They are **ABSOLUTELY DEAD BEAT** and **EXTREMELY SENSITIVE.**

Their indications are **PRACTICALLY INDEPENDENT OF FREQUENCY** and also of **WAVE FORM.**

They are **PRACTICALLY FREE FROM TEMPERATURE ERROR.**

They require **EXTREMELY LITTLE POWER TO OPERATE** AND THEY ARE **VERY LOW IN PRICE.**



The New Weston Portable Alternating-Current Ammeters Milli-Ammeters and Voltmeters possess the same excellent characteristics

The performance of all these instruments will be a revelation to users of alternating-current apparatus.



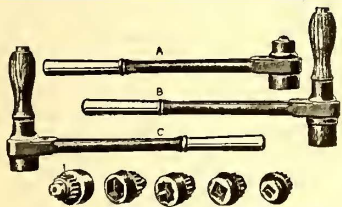
New Weston Eclipse Direct-Current Switchboard Ammeters, Milli-Ammeters and Voltmeters are of the "Soft Iron" or Electro-Magnetic type, but they possess so many novel and valuable characteristics as to practically constitute a new type of instrument.

They are **exceedingly cheap**, but are remarkably accurate and well made and nicely finished instruments, and are admirably adapted for general use and small plants, where cost is frequently an important consideration.

Correspondence concerning these new Weston instruments is solicited by

WESTON ELECTRICAL INSTRUMENT CO.

New York Office: 114 Liberty St. Waverly Park, Newark, N. J.
London Branch: Audrey House, Ely Place, Holborn.
Paris, France: E. H. Cadiot, 12 Rue St. Georges.
Berlin: Weston Instrument Co., Ltd., Ritterstrasse No. 88.



This Street Railway Wrench

is easily changeable for various sizes by means of different sockets. It will turn nuts on fish plates or bolts either way, without removing wrench from nut.

Write for more detailed information.

A. W. Secor, 65 Fulton Street, New York

The IXL Track Drill

will drill holes for a joint without drawing spikes or moving clamp. It is strong, light and easily adjusted. The adjustment from one hole to another is done more easily than with any similar tool.

Write for particulars and prices.

THE AUTOMATIC FRICTION FEED OF THE GROFF DRILL prevents breaking of drills due to hard spots in rails. The feed adjusts itself automatically to the hardness of different material and cannot crowd or break the drill as the feed screw ceases to rotate when the thrust on the drill is excessive. For track drilling, signal bonding or general construction work no quicker or easier operated drill is to be found. Our catalog describes it in every detail. Shall we send it?

THE GROFF DRILL & MACHINE TOOL CO.

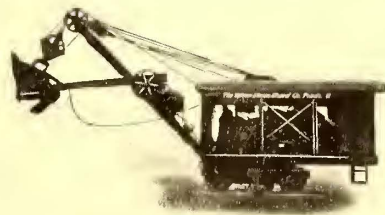
Sole Manufacturers Camden, N. J., U. S. A.
STANDARD SUPPLY AND EQUIPMENT CO.
Distributors 1710 Market Street, Philadelphia, Pa.



CAR SEAT BUMPERS

VARIOUS SHAPES
Elastic Tip Co.

370 Atlantic Ave.
BOSTON - MASS.



Steam and Electric Shovels

For digging ballast, etc., for Electric Railways

Giant Boom shovels, 6 sizes, 1½ to 5 cu. yd. dippers.

Little Giant shovels, 3 sizes, 1 to 1½ cu. yd. dippers.

Revolving shovels, 4 sizes, ½ to 1½ cu. yd. dippers.

Traction Wheels or Trucks, Steam or Electric power, also **Locomotive Cranes, Dredges, etc.** Send to-day for Booklets.

THE VULCAN STEAM SHOVEL CO.

Toledo, O.

U. S. METAL POLISH

If you want an article that will repeat itself, try **U. S. METAL POLISH** For polishing all kinds of metals. Sold by Dealers. Samples free Highest Award, Chicago World's Fair, 1893, and Louisiana Purchase Exposition, St. Louis, Mo., '04 3 oz. box, 10c., 5 lb. box, \$1. Geo. W. Hoffman, Mfr., 295 E. Washington St., Indianapolis, Ind.

HAYES DERAILS 30,000 in Use on 300 Railroads
HAYES TRACK APPLIANCE CO., Geneva, N. Y.

INGERSOLL'S RACER DRAWS BIG CROWDS

Ingersoll Engineering and Constructing Co.
FREDERICK INGERSOLL, President 146 Sixth St., PITTSBURG, PA.
Builders of Racing Roller Coasters. Racing Scenic Railways. We also remodel old rides.
Foreign business solicited Send for Illustrated Booklet

CLASSIFIED DIRECTORY—Continued

- Catenary Bridge and Transmission Towers.**
Archbold-Brady Co.
Ohio Brass Co.
- Cattle Guards. (See Stock Guards.)**
- Checks, Employees'.**
American Railway Supply Co.
- Chemists, Manufacturing.**
Farrington Co.
- Circuit Breakers.**
*British Thomson-Houston Co.
*British Westinghouse Elec. & Mfg. Co.
Cutter Co.
Garton Co., W. R.
General Electric Co.
Ohio Brass Co.
Western Electric Co.
Westinghouse Electric & Mfg. Co.
- Clamps and Connectors for Wires and Cables.**
Anderson Mfg. Co., A. & J. M.
Brown, Harold P.
Condit Elec'l Mfg. Co.
Dossert & Co.
Jordan Bros.
Matthews & Bro., W. N.
Ohio Brass Co.
Ridlon Co., Frank.
Standard Underground Cable Co.
- Cleaners and Scrapers, Track. (See also Snow-Plows, Sweepers and Brooms.)**
American Car Co.
American Gen'l Eng'g Co.
Brill Co., The J. G.
Cincinnati Car Co.
Kuhlman Car Co., G. C.
McGuire-Cummings Mfg. Co.
Ohio Brass Co.
Root Spring Scraper Co.
Stephenson Co., John.
Stuart-Howland Co.
Van Dorn & Dutton Co.
Wason Mfg. Co.
- Cleaners, Boiler. (See Boiler Cleaners.)**
- Cleaners, Car.**
Modoc Co.
- Cleaning Powders, Soaps and Washes.**
India Alkali Works.
Modoc Co.
- Closets, Car, Flush or Dry.**
Duner Co.
- Clusters and Sockets.**
General Electric Co.
Stuart-Howland Co.
- Coal Handling Machinery. (See Conveyors, Coal and Ash.)**
- Colls, Choke & Kicking.**
Electric Service Supplies Co.
General Electric Co.
Lord Electric Co.
Westinghouse Elec. & Mfg. Co.
- Commutators and Parts.**
Amer. Gen'l Eng'g Co.
Cameron Electrical Mfg. Co., The.
Columbia Machine Works & Malleable Iron Co.
Elliott Elec. Co., The S. K.
Garton Co., W. R.
Ridlon Co., Frank.
Stuart-Howland Co.
Van Dorn Electric & Mfg. Co.
Western Electric Co.
Westinghouse Electric & Mfg. Co.
- Commutator Truing Devices.**
Jordan Bros.
Ridlon Co., Frank.
- Compounds, Boiler Cleaning. (See Boiler Cleaning Compounds.)**
- Compounds, Insulating. (See Insulations & Insulating Compounds.)**
- Compressors, Air.**
General Electric Co.
National Brake & Electric Co.
Westinghouse Traction Brake Co.
- Concrete Steel. (See Bridges and Buildings.)**
- Condensers.**
Bulkley, Henry W.
- Conduits, Underground.**
New York Pole Co.
Standard Underground Cable Co.
- Controlling Systems.**
General Electric Co.
Westinghouse Electric & Mfg. Co.
- Controllers & Controller Parts.**
*British Thomson-Houston Co.
Columbia Machine Works & Malleable Iron Co.
Crocker-Wheeler Co.
General Electric Co.
Johns-Manville Co., H. W.
Kerschner, W. R.
Westinghouse Electric & Mfg. Co.
- Controller Regulators.**
Electric Service Supplies Co.
Lord Electric Co.
- Converters, Rotary.**
General Electric Co.
Westinghouse Electric & Mfg. Co.
- Conveyors, Coal and Ash.**
American Gen'l Eng'g Co.
Brown Hoisting Machinery Co.
Hadfield's Steel Foundry Co., Ltd.
Jeffrey Mfg. Co.
- Cooling Towers. (See Towers, Cooling.)**
Cord, Bell and Trolley.
American Car Co.
American Gen'l Eng'g Co.
Brill Co., The J. G.
Danville Car Co.
Elliott Elec. Co., The S. K.
Garton Co., W. R.
International Register Co., The.
Kuhlman Car Co., G. C.
Samson Cordage Works.
Silver Lake Co.
Stephenson Co., John.
Stuart-Howland Co.
Wason Mfg. Co.
- Couplers, Car.**
American Car Co.
Brill Co., The J. G.
Cincinnati Car Co.
Danville Car Co.
Kuhlman Car Co., G. C.
Long Company, E. G.
McConway & Torley Co., The.
McGuire-Cummings Mfg. Co.
Ohio Brass Co.
Stephenson Co., John.
Van Dorn Co., W. T.
Washburn Steel Castings & Coupler Co.
- Wason Mfg. Co.**
- Westinghouse Traction Brake Co.**
- Coverings, Pipe and Boiler.**
Johns-Manville Co., H. W.
- Cranes, Hoists and Lifts.**
Box & Co., Alfred.
Brill Co., The J. G.
Brown Hoisting Machinery Co.
Duff Manufacturing Co.
Niles-Bement-Pond Co.
Patten Co., Paul B.
Q M S Co.
Southern Railway Supply Co.
Van Dorn & Dutton Co.
Wontham, Magor & Sanger.
Yale & Towne Mfg. Co.
- Creosoting. (See Wood Preservatives.)**
- Cross Arms. (See Brackets and Cross Arms.)**
- Crossing Signals, Railway. (See Signals, Railway Crossing.)**
- Crossings, Track. (See Track Work.)**
- Crushers and Pulverizers.**
Jeffrey Mfg. Co.
- Culverts.**
Canton Culvert Co.
- Curtains, Curtain Fixtures and Curtain Material.**
American Car Co.
Brill Co., The J. G.
Curtain Supply Co.
Danville Car Co.
Edwards Co., The O. M.
Electric Service Supplies Co.
General Railway Supply Co.
Hartshorn Co., Stewart.
Kuhlman Car Co., G. C.
National Lock Washer Co.
Pantastote Co., The.
Plant Co., The.
Stephenson Co., John.
St. Louis Car Co.
Wason Mfg. Co.
- Cushions, Field Coll.**
Massachusetts Chemical Co.
- Derailing Devices. (See Also Track Work.)**
Buda Co., The.
Cleveland Frog & Crossing Co.
Hadfield's Steel Foundry Co., Ltd.
Hayes Track Appliance Co.
Lorain Steel Co.
U. S. Metal & Mfg. Co.
Wharton, Jr., & Co., Inc., Wm.
Zelnicker Supply Co., Walter A.
- Detective Service.**
Drummond's Detective Agency.
- Disinfectants.**
Hayner Co., Norman C.
- Dispatching Systems.**
Matthews & Bro., W. N.
Stromberg-Carlson Tel. Mfg. Co.
Western Electric Co.
- Doors and Door Fixtures.**
American Car Co.
Brill Co., The J. G.
Danville Car Co.
Edwards Co., The O. M.
Kuhlman Car Co., G. C.
Ridlon Co., Frank.
Stephenson Co., John.
Stromberg-Carlson Tel. Mfg. Co.
Wason Mfg. Co.
- Doors and Shutters, Fire-proof.**
Kinnear Mfg. Co.
- Doors, Asbestos.**
Johns-Manville Co., H. W.
- Doors, Folding, Vestibule.**
Duner Co.
- Doors, Steel Rolling.**
Kinnear Mfg. Co.
- Draft, Mechanical. (See Mechanical Draft Apparatus.)**
- Draft Rigging and Draw Bars. (See Couplers, Car.)**
- Drills, Track.**
Brown, Harold P.
Buda Co., The.
Cleveland Armature Works.
Groff Drill & Mach. Tool Co.
Ohio Brass Co.
Ridlon Co., Frank.
Secor, A. W.
Stuart-Howland Co.
Union Electric Co.
Van Dorn Electric & Mfg. Co.
Zelnicker Supply Co., Walter A.
- Drying Apparatus. (See also Heating and Ventilating Apparatus.)**
American Blower Co.
Buffalo Fdy. & Machine Co.
Jeffrey Mfg. Co.
- Dust Guards. (See Lubricating Devices.)**
- Dynamos. (See Generators.)**
- Electrical Testing. (See Testing, Electrical.)**
- Engineers, Consulting, Contracting & Operating.**
Archbold-Brady Co.
Arnold Co.
*British Westinghouse Elec. & Mfg. Co.
Burns & Co.
Bylleshy & Co., H. M.
Campion, McClellan Co.
Chambers & Hone.
Columbia Construction Co.
Construction Service Co.
Drum & Co., A. L.
Ford, Bacon & Davis.
Gulick-Henderson Co.
Hanford & Blackwell.
Harrington, W. A.
Hildreth & Co.
Hunt & Co., Robt. W.
Ingersoll Engineering & Constructing Co.
Jackson, D. C. & Wm. B.
Jackson, Henry D.
Land-Wharton Co.
Nelson & Co., I. R.
Pepper, David, Jr.
Pierce, Richardson & Neiler.
Register & Co., A. L.
Richey, Albert S.
Sanderson & Porter.
Sargent & Lundy.
Saxton, E.
Smethurst & Allen.
Wagner, Herbert A.
White & Co., J. G.
*White & Co., Ltd., J. G.
Young, C. G.
- Engines, Gas and Oil.**
Buckeye Engine Co.
Westinghouse Machine Co.
- Engines, Steam.**
*British Westinghouse Elec. & Mfg. Co.
Buckeye Engine Co.
Harrisburg Fdy. & Machine Works.
*Howden & Co., Ltd., James.
- McIntosh, Seymour & Co.**
- Ridgway Dynamo & Engine Co.**
- Westinghouse Machine Co.**
- Fans. (See Mechanical Draft Apparatus.)**
- Fare Boxes.**
American Car Co.
Brill Co., The J. G.
Danville Car Co.
Kuhlman Car Co., G. C.
Langslow, H. R.
Rooke Automatic Register Co.
Stephenson Co., John.
Wason Mfg. Co.
- Feed - Water Apparatus. (See Heaters and Purifiers, Feed-Water.)**
- Fences and Fence Posts.**
American Steel & Wire Co.
Excelsior Wire Fence Co.
- Fenders & Wheel Guards.**
American Car Co.
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Fender Co.
Danville Car Co.
Eclipse Railway Supply Co.
Electric Service Supplies Co.
Kuhlman Car Co., G. C.
McGuire-Cummings Mfg. Co.
Parmenter Fender & Wheel-guard Co.
Star Brass Works.
Stephenson Co., John.
Stuart-Howland Co.
Wason Mfg. Co.
Western Electric Co.
Wontham, Magor & Sanger.
- Fibre.**
American Gen'l Eng'g Co.
American Vulcanized Fibre Co.
Diamond State Fibre Co.
- Field Colls. (See Armature and Field Colls.)**
- Filters, Oil.**
*Vacuum Oil Co.
- Financiers.**
Brooks & Co., P. W.
Young, C. G.
- Fire Extinguishers.**
General Fire Extinguisher Co.
Johns-Manville Co., H. W.
Zelnicker Supply Co., Walter A.
- Fireproofing Materials.**
Johns-Manville Co., H. W.
- Flooring Composition, Car.**
General Railway Supply Co.
- Forgings, Car.**
Standard Motor Truck Co.
Standard Steel Works Co.
- Friction Tape & Cloths.**
Massachusetts Chemical Co.
- Frogs, Track. (See Track Work.)**
- Furnaces.**
Murphy Iron Works.
- Furniture, Metal, Office.**
Edwards Co., The O. M.
- Fuses & Fuse Boxes.**
American Gen'l Eng'g Co.
Columbia Machine Works & Malleable Iron Co.
Condit Electrical Mfg. Co.
D. & W. Fuse Co.
Elliott Elec. Co., The S. K.

TAXITE

PAINT AND VARNISH REMOVER,

Spells economy and satisfaction to every user. It works quickly and easily and cuts the most stubborn coats of old paint or varnish as effectively on upright as on horizontal surfaces.

S-W. TAXITE can be spread over large surfaces without danger of drying, and does not injure the finest grained woods. It is entirely free from harmful acids and can be freely handled without injury to the hands. It is the most popular article in use in many of the largest paint and repair shops.

Prices on request.

THE SHERWIN-WILLIAMS Co.

MAKERS OF PAINTS AND VARNISHES FOR RAILWAY USES

FACTORIES: CLEVELAND, CHICAGO, NEWARK, MONTREAL, LONDON, ENG.

SALES OFFICES AND WAREHOUSES IN PRINCIPAL CITIES. 725

THE PROOF OF NEPONSET SPLICING COMPOUND

is in its use. When it's on, it's on to stay, for it is permanently adhesive, of exceptional strength, and an absolute guarantee against short circuiting and grounding.

Massachusetts Chemical Co.

Sole Factors:
Walpole Rubber Works
Walpole Varnish Works
Electric Insulation Laboratory

Walpole, Mass.

Canadian Sales Office:
Eastern Township Bank Bldg., Montreal

Pioneers in Insulation Engineering

14-28



Packard

Insulating Varnishes

crack nor crumble. We make several kinds, each for a **specific** service—and each kind is the safest ever offered for the purpose. Other Packard Products: Transformers, Insulating Cloth, Bias-Cut Cambric Tape and Rubber Friction Tape, Auto Ignition Cable.

Retain their flexibility indefinitely, and will not

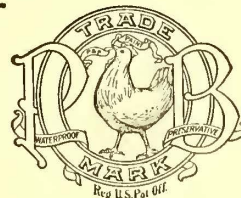
The Packard Electric Co., 318 Dana Ave., Warren, Ohio

SCHENECTADY VARNISH COMPANY SCHENECTADY, N. Y.

Manufacturers of railway finishing varnishes and insulating varnishes and compounds for all purposes.

We manufacture an impregnating compound for railway field coils which is constant under all running conditions of the motor and which does not throw out when overheated.

THIS
TRADE
MARK



IS
YOUR
Protection

T
A
P
E
S

When Buying Insulating Varnishes

CLEAR BAKING, BLACK BAKING
BLACK FINISHING, BLACK AIR
DRYING AND CORE PLATE VARNISHES

T
A
P
E
S

The Standard Paint Company

100 William Street, New York City

CHICAGO KANSAS CITY PHILADELPHIA BOSTON
ATLANTA DENVER MEMPHIS 2

CLASSIFIED DIRECTORY—Continued

- Johns-Manville Co., H. W.
General Electric Co.
Stuart-Howland Co.
Westinghouse Electric & Mfg. Co.
- Gages, Oil & Water.**
Ohio Brass Co.
Williams Gauge Co.
- Gaskets.**
Johns-Manville Co., H. W.
Power Specialty Co.
Southern Railway Supply Co.
- Gas Producers.**
Westinghouse Machine Co.
- Gates, Car & Other.**
American Car Co.
Brill Co., The J. G.
Cincinnati Car Co.
Jewett Car Co.
Kuhlman Car Co., G. C.
Stephenson Co., John.
Wason Mfg. Co.
- Gear Cases.**
Columbia Machine Works & Malleable Iron Co.
*Consolidated Supply Co., Ltd.
Electric Service Supplies Co.
General Electric Co.
Jeffrey Mfg. Co.
Kerschner, W. R.
- Gears and Pinions.**
American Gen'l Eng'g Co.
Columbia Machine Works & Malleable Iron Co.
Elliott Elec. Co., The S. K.
Falk Co., The.
Garton Co., W. R.
General Electric Co.
Hadfield's Steel Foundry Co., Ltd.
Kerschner, W. R.
Long Co., E. G.
McCord & Co.
Nuttall Co., R. D.
Union Electric Co.
Van Dorn & Dutton Co.
- Generators, Alternating Current.**
Crocker-Wheeler Co.
General Electric Co.
National Brake & Electric Co.
Ridgway Dynamo & Engine Co.
Western Electric Co.
Westinghouse Electric & Mfg. Co.
- Generators, Direct Current.**
*British Thomson-Houston Co.
*British Westinghouse Elec. & Mfg. Co.
Crocker-Wheeler Co.
*Dick, Kerr & Co.
General Electric Co.
Jeffrey Mfg. Co.
National Brake & Electric Co.
Ridgway Dynamo & Engine Co.
Western Electric Co.
Westinghouse Electric & Mfg. Co.
- Generators and Motors, Spare Parts of.**
Crocker-Wheeler Co.
General Electric Co.
Westinghouse Electric & Mfg. Co.
- Glue Heaters. (See Heaters, Glue.)**
- Gongs. (See Bells and Gongs.)**
- Governors, Pump.**
Williams Gauge Co.
- Greases. (See Lubricants.)**
- Grinders & Grinding Wheels.**
Abrasive Material Co.
Brown, Harold P.
Buda Co., The.
- Hadfield's Steel Foundry Co., Ltd.
Niles-Bement-Pond Co.
Planet Co., The.
Q M S Co.
Western Electric Co.
- Grounds.**
Lord Electric Co.
- Guards, Cattle. (See Stock Guards.)**
- Guards, Trolley.**
National Railroad Trolley Guard Co.
- Harps, Trolley.**
Bayonet Trolley Harp Co.
Garton Co., W. R.
Holland Trolley Supply Co., The.
Lumen Bearing Co.
Nuttall Co., R. D.
Ridlon Co., Frank.
Star Brass Works.
Western Electric Co.
- Headlights.**
Electric Service Supplies Co.
Garton Co., W. R.
General Electric Co.
Ohio Brass Co.
Ridlon Co., Frank.
St. Louis Car Co.
Southern Railway Supply Co.
Trolley Supply Co.
Union Electric Co.
Westinghouse Elec. & Mfg. Co.
Zelnicker Supply Co., Walter A.
- Headlining.**
Pantasote Co., The.
- Heaters, Car (Electric).**
Consolidated Car Heating Co.
Johns-Manville Co., H. W.
- Heaters, Car, Hot Air.**
Smith Heater Co., Peter.
- Heaters, Car, Hot Water.**
Baker Heating & Supply Co., Wm. C.
Cooper Heater Co.
Smith Heater Co., Peter.
- Heaters, Car, Stove.**
Electric Service Supplies Co.
McGuire-Cummings Mfg. Co.
- Heaters, Glue.**
Advance Machinery Co.
- Heaters and Purifiers, Feed-Water. (Including Feed-Water Regulators.)**
Williams Gauge Co.
- Heating & Ventilating Apparatus. (See also Mechanical Draft.)**
General Electric Co.
*Howden & Co., Ltd., James.
- Holsts. (See Cranes, Hoists and Lifts.)**
- Hoppers, Flush or Dry.**
Duner Co.
- Hose.**
American Gen'l Eng'g Co.
Southern Railway Supply Co.
Zelnicker Supply Co., Walter A.
- Hose Bridges.**
Hadfield's Steel Foundry Co., Ltd.
Ohio Brass Co.
- Hydraulic Machinery.**
Hadfield's Steel Foundry Co., Ltd.
Hydrostatic Machinery Co.
Niles-Bement-Pond Co.
Secor, A. W.
Watson-Stillman Co.
- Impregnating Apparatus. (See also Vacuum Drying & Impregnating Apparatus.)**
Buffalo Fdy. & Machine Co.
Devine Co., J. P.
- Inspection.**
Gulick-Henderson Co.
Hildreth & Co.
Hunt & Co., Robt. W.
Nelson & Co., I. R.
- Instruments, Electrical Measuring.**
General Electric Co.
Johns-Manville Co., H. W.
Wagner Elec. & Mfg. Co.
Westinghouse Electric & Mfg. Co.
Western Electrical Instrument Co.
- Instruments, Testing and Recording.**
General Electric Co.
Western Electrical Instrument Co.
- Insulations & Insulating Compounds. (See also Paints and Varnishes.)**
American Gen'l Eng'g Co.
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
Elliott Elec. Co., The S. K.
Farrington Co.
Garton Co., W. R.
General Electric Co.
Johns-Manville Co., H. W.
Massachusetts Chemical Co.
Okonite Co., The.
Packard Elec. Co.
Standard Underground Cable Co.
Standard Varnish Works.
Stromberg-Carlson Tel. Mfg. Co.
Western Electric Co.
- Insulating Cloths, Paper and Tape.**
American Gen'l Eng'g Co.
American Vulcanized Fibre Co., The.
Electric Cable Co.
Elliott Elec. Co., The S. K.
Garton Co., W. R.
General Electric Co.
Hope Webbing Co.
Johns-Manville Co., H. W.
Massachusetts Chemical Co.
Ohio Brass Co.
Okonite Co., The.
Packard Elec. Co.
Standard Paint Co.
Sterling Varnish Co.
Western Electric Co.
- Insulators (Including Third-Rail). (See also Line Material.)**
Amer. Carbon & Battery Co.
Anderson Mfg. Co., A. & J. M.
Creaghead Engineering Co.
Electric Service Supplies Co.
Elliott Elec. Co., The S. K.
Garton Co., W. R.
General Electric Co.
Hemingray Glass Co.
Johns-Manville Co., H. W.
Ohio Brass Co.
Union Electric Co.
Western Electric Co.
- Inventions Developed & Perfected.**
Peters & Co., G. D.
- Jacks. (See also Cranes, Hoists and Lifts.)**
American Gen'l Eng'g Co.
American Car Co.
Brill Co., The J. G.
Buda Co., The.
Columbia Machine Works & Malleable Iron Co.
Duff Manufacturing Co.
Kuhlman Car Co., G. C.
Morden Frog & Crossing Co.
Ohio Brass Co.
Secor, A. W.
Southern Railway Supply Co.
Stephenson Co., John.
Union Electric Co.
Wason Mfg. Co.
- Watson-Stillman Co.
Zelnicker Supply Co., Walter A.
- Jack Boxes. (See also Telephone Apparatus.)**
Matthews & Bro., W. N.
Stromberg-Carlson Tel. Mfg. Co.
- Jacks, Pit.**
Q M S Co.
- Joints, Rail.**
Falk Co., The.
Goldschmidt Thermit Co.
Hadfield's Steel Foundry Co., Ltd.
Lorain Steel Co.
Q M S Co.
Rail Joint Co., makers Continuous, Weber and Wolhaupter Joints.
- Journal Boxes.**
American Car Co.
Brill Co., The J. G.
Danville Car Co.
Kuhlman Car Co., G. C.
McCord & Co.
McGuire-Cummings Mfg. Co.
Stephenson Co., John.
Symington Co., T. H.
Wason Mfg. Co.
- Journal Lubricators. (See Lubricating Devices.)**
- Lamp Guards and Fixtures.**
Electric Service Supplies Co.
Matthews & Bro., W. N.
- Lamps, Arc and Incandescent. (See also Headlights.)**
American Gen'l Eng'g Co.
Anderson Mfg. Co., A. & J. M.
Buckeye Electric Co.
Creaghead Engineering Co.
General Electric Co.
Union Electric Co.
Western Electric Co.
Westinghouse Electric & Mfg. Co.
- Lamp Parts. (See Clusters and Sockets.)**
- Lifters, Car Step.**
Consolidated Car Fender Co.
- Lifts. (See Cranes, Hoists and Lifts.)**
- Lightning Protection.**
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
Elliott Elec. Co., The S. K.
Garton Co., W. R.
General Electric Co.
Lord Brass Co.
Stuart-Howland Co.
Union Electric Co.
Western Electric Co.
Westinghouse Electric & Mfg. Co.
- Line Material. (See also Brackets and Cross Arms, Insulators, Wires and Cables.)**
American Gen'l Eng'g Co.
Anderson Mfg. Co., A. & J. M.
Archbold-Brady Co.
*British Thomson-Houston Co.
Creaghead Engineering Co.
*Dick, Kerr & Co.
Dossert & Co.
Electric Ry. Equip. Co., Cincinnati.
Electric Service Supplies Co.
Elliott Elec. Co., The S. K.
Garton Co., W. R.
General Electric Co.
Gilbert & Sons Brass Foundry Co., A.
Indianapolis Brass Co.
Johns-Manville Co., H. W.
- Macallen Co., The.
Matthews & Bro., W. N.
Ohio Brass Co.
Pittsburgh Pole & Forge Co.
Ridlon Co., Frank.
Southern Railway Supply Co.
Stuart-Howland Co.
Union Electric Co.
Western Electric Co.
Westinghouse Electric & Mfg. Co.
- Lockers, Metal.**
Edwards Co., The O. M.
General Fireproofing Co.
- Lockers, Steel.**
General Fireproofing Co.
- Locks, Nuts and Washers. (See Nuts and Bolts.)**
- Locomotives, Electric.**
American Car Co.
American Locomotive Co.
Baldwin Locomotive Works.
Brill Co., The J. G.
*British Thomson-Houston Co.
Danville Car Co.
General Electric Co.
Jeffrey Mfg. Co.
Kuhlman Car Co., G. C.
McGuire-Cummings Mfg. Co.
Stephenson Co., John.
Wason Mfg. Co.
Westinghouse Electric & Mfg. Co.
- Lubricants, Oil & Grease.**
Borne, Scrymser Co.
Dearborn Drug & Chemical Works.
Dixon Crucible Co., Jos.
Galena Signal Oil Co.
Graphite Lubricating Co.
Modoc Co., The.
Southern Railway Supply Co.
Whitmore Mfg. Co.
- Lubricating Devices.**
Armstrong Oiler Co.
- Lubricators, Force Feed.**
Westinghouse Electric & Mfg. Co.
- Lumber. (See Poles, Ties, Posts, Etc.)**
- Machine Tools.**
Packoff Drill & Mach. Tool Co.
Hydrostatic Machinery Co.
Niles-Bement-Pond Co.
Watson-Stillman Co.
- Mail Bags.**
American Railway Supply Co.
- Mats.**
Massachusetts Chemical Co.
- Mechanical Draft Apparatus. (See also Heating and Ventilating Apparatus.)**
Crocker-Wheeler Co.
- Metals.**
St. Louis Smelting & Refining Co.
- Mirrors for Motormen.**
Brown, Harold P.
- Motors, Electric.**
*British Thomson-Houston Co.
*British Westinghouse Elec. & Mfg. Co.
Crocker-Wheeler Co.
*Dick, Kerr & Co.
General Electric Co.
National Brake & Electric Co.
Ridgway Dynamo & Engine Co.
Wagner Elec. & Mfg. Co.
Western Electric Co.
Westinghouse Electric & Mfg. Co.

There is a Sterling Product for Every Insulating Purpose

ONE THAT WILL MEET YOUR NEEDS
A LITTLE BETTER THAN ANY OTHER

Sterling Black Plastic Insulator

Permanently plastic, oil and water proof. For
machines subjected to heat and overloads.

We shall be glad to send you catalogue.

THE STERLING VARNISH COMPANY
PITTSBURGH, PA.

2

IMPREGNITE is used exclusively in connection with the
Vacuum Drying and Impregnating method of treating
Electrical Windings.

IMPREGNITE can be relied upon to give the desired results.
It has been proved severest dependable by the
practical tests.



IMPREGNITE is put up in Liquid,
Semi-Solid and Solid form. In order to
demonstrate to YOU the merits of IMPREGNITE we will treat a
sample coil free of charge. Write for particulars.

STANDARD VARNISH WORKS

New York Chicago London Berlin Brussels
Canadian Branch: INTERNATIONAL VARNISH Co., Ltd., TORONTO

The Paint That's Backed by a Bond

Thermalite
A PROTECTIVE PAINT

For Trolley Poles, Buildings, Roofs—any
surface, either metal or wood, that needs pro-
tection.

Made in Eight Standard Colors.

We guarantee this paint to last five years,
and back our guarantee with a Bond, written
by the Banker's Surety Co.

Write for sample copy of Bond, descriptive
booklet, color card and prices.

THE HASCALL PAINT COMPANY
Cleveland, Ohio



HOPE

**TAPES AND WEBBINGS
FOR
ELECTRICAL WORK**

Tapes in any width, thickness or
texture. Samples in accordance
with suggestions gladly submitted.

HOPE WEBBING CO.
PROVIDENCE, R. I.

C. A. WILLEY CO.

MANUFACTURERS OF

The
"Eclipse"
Surfacing
Specialties



And
Standard
Car Body
Colors

SOLID COVERING

Signal, Deck and Truck Finishes

HUNTER'S POINT, NEW YORK CITY, N. Y.

The "LE CARBONE" Brush

decreases both commutator wear and brush cost per car mile. Although it
costs more than others, it is the most economical brush for railway work, as is
conclusively proven by the records of over fifty per cent. of the electric railways
in this country. Full particulars await your word. Write!

W. J. Jeandron, 20 Vesey Street
New York

CLASSIFIED DIRECTORY—Continued

- Motor Leads.**
Dossert & Co.
- Movers, Car. (See Pushers, Car.)**
- Multiple Unit Control. (See Control Systems.)**
- Nuts and Bolts.**
Condit Electrical Mfg. Co.
Frank, M. K.
Lorain Steel Co.
National Lock Washer Co.
Pennsylvania Steel Co.
Pittsburgh Pole & Forge Co.
Standard Motor Truck Co.
U. S. Metal & Mfg. Co.
- Oils. (See Lubricants.)**
- Oils, Paint.**
Sherwin-Williams Co.
Standard Paint Co.
Sterling Varnish Co.
- Overhead Equipment. (See Line Material.)**
- Packing for Car Journals and Parts of Steam Machinery.**
American Gen'l Eng'g Co.
Electric Service Supplies Co.
Garton Co., W. R.
Johns-Manville Co., H. W.
Post & Co., E. L.
Power Specialty Co.
Zelnicker Supply Co., Walter A.
- Painting Cars by Contract.**
Abel, G. T.
Nelson & Co., I. R.
- Paints & Varnishes. (Insulating.)**
American Gen'l Eng'g Co.
General Electric Co.
Massachusetts Chemical Co.
Packard Elec. Co.
Schenectady Varnish Co.
Sherwin-Williams Co.
Standard Paint Co.
Standard Varnish Works.
Sterling Varnish Co.
- Paints & Varnishes. (Preservatives.)**
Brown, Harold P.
Dixon Crucible Co., Jos.
Electric Cable Co.
Hascall Paint Co.
Massachusetts Chemical Co.
Schenectady Varnish Co.
Sherwin-Williams Co.
Standard Paint Co.
Sterling Varnish Co.
- Paints & Varnishes for Woodwork.**
Schenectady Varnish Co.
Wiley Co., C. A.
- Park Equipment.**
Ingersoll Engineering & Constructing Co.
Langslow, H. R.
- Paving Material.**
American Brake Shoe & Fdy. Co.
U. S. Metal & Mfg. Co.
U. S. Wood Preserving Co.
- Paving Pltch.**
Barrett Manufacturing Co.
- Pickups, Trolley Wire.**
Electric Service Supplies Co.
Ohio Brass Co.
- Pinions. (See Gears and Pinions.)**
- Pins, Wood and Iron.**
Call, Clarence.
Pittsburgh Pole & Forge Co.
- Pipe Fittings.**
National Tube Co.
Power Specialty Co.
Standard Steel Works Co.
- Planers. (See Machine Tools and Woodworking Machinery.)**
- Platforms, Extension.**
Edwards Co., The O. M.
- Pliers.**
Norvell-Shapleigh Hardware Co.
- Plows, Snow. (See Snow Plows, Sweepers and Brooms.)**
- Pole Clamps.**
Bayonet Trolley Harp Co.
- Pole Erectors.**
Matthews & Bro., W. N.
- Pole Reinforcing.**
New York Pole Co.
- Poles, Ties, Posts, Piling and Lumber.**
Abeles & Taussig.
American Creosote Wks., Inc.
American Tie & Timber Co.
Atlantic Creosote & Wood Preserving Co.
Baxter & Co., G. S.
California Pole & Piling Co.
Cherry River Boom & Lumber Co.
Cook & Co., Wm. P.
Empie, Theo. G.
Florida Tie & Lumber Co.
Garton Co., W. R.
Gulfport Creosoting Co.
Humbird Lumber Co.
Kaye & Carter.
Kennett Cypress & Hardwood Lumber Co.
Lindsley Bros. Co.
Morrison Lumber Co., J. W.
National Pole Co.
Naugle Pole & Tie Co.
Page & Hill Co.
Thompson, T. S.
Valentine-Clark Co.
Valley Tie & Lumber Co.
Warren-Newton Lumber Co.
Western Electric Co.
Western Lumber & Pole Co.
Worcester Co., C. H.
- Poles, Trolley.**
Columbia Machine Works & Malleable Iron Co.
Garton Co., W. R.
Holland Trolley Supply Co., The.
National Tube Co.
Pittsburgh Pole & Forge Co.
Stuart-Howland Co.
- Poles, Metal Street.**
American Bridge Co. of N. Y.
Creaghead Engineering Co.
Electric Railway Equipment Co., Cincinnati.
Franklin Steel Co.
National Tube Co.
Pittsburgh Pole & Forge Co.
- Pollshes, Metal.**
Hoffman, Geo. W.
- Posts, Fence. (See Fences and Fence Posts.)**
- Preservatives. (See Wood Preservatives.)**
- Presses, Hydraulic Wheel. (See Machine Tools.)**
- Pressure Regulators.**
Ohio Brass Co.
- Pumps. (See also Condensers.)**
Buffalo Fdy. & Mach. Co.
Deming Co., The.
General Electric Co.
Watson-Stillman Co.
- Punches, Hydraulic.**
Secor, A. W.
- Punches, Ticket.**
American Railway Supply Co.
Bonney-Vehslage Tool Co.
International Register Co., The.
Woodman Mfg. & Supply Co., R.
- Punching Machinery.**
Secor, A. W.
Watson-Stillman Co.
- Purifiers, Feed - Water. (See Heaters and Purifiers.)**
- Pushers, Car.**
Woodman Mfg. & Supply Co., R.
Zelnicker Supply Co., Walter A.
- Rails (See Track Work.)**
- Rail Welding.**
Falk Co., The.
Goldschmidt Thermit Co.
- Ratchets, Deck Sash.**
General Railway Supply Co.
- Rattan.**
American Car Co.
Brill Co., The J. G.
Electric Service Supplies Co.
Hale & Kilburn Mfg. Co.
Heywood Bros. & Wakefield Co.
Kuhlman Car Co., G. C.
McGuire-Cummings Mfg. Co.
Southern Railway Supply Co.
Stephenson Co., John.
St. Louis Car Co.
Wason Mfg. Co.
- Registers & Register Fittings.**
Cincinnati Car Co.
Electric Service Supplies Co.
International Register Co., The.
Langslow, H. R.
Ohmer Fare Register Co.
Ridlon Co., Frank.
Rooke Automatic Register Co.
Union Electric Co.
Woodman Mfg. & Supply Co., R.
- Repair Shop Appliances. (See also Armature and Field Coils, Machines for Handling and Winding.)**
American Gen'l Eng'g Co.
Buffalo Foundry & Machine Co.
Columbia Machine Works & Malleable Iron Co.
Gross Drill & Mach. Tool Co.
Hydrostatic Machinery Co.
Ridlon Co., Frank.
- Repair Work. (See also Armature and Field Coils.)**
American Car Co.
Brill Co., The J. G.
Cleveland Armature Works.
Columbia Machine Works & Malleable Iron Co.
Electric Cable Co.
Elliott Elec. Co., The S. K.
Jordan Bros.
Kuhlman Car Co., G. C.
McLeer Elec. & Mfg. Co.
Nelson & Co., I. R.
Ridlon Co., Frank.
Standard Steel Works Co.
Stephenson Co., John.
Stuart-Howland Co.
- Replacers, Car.**
Buda Co., The.
Hayes Track Appliance Co.
U. S. Metal & Mfg. Co.
Washburn Steel Castings & Coupler Co.
- Reseating Machines.**
Hadfield's Steel Foundry Co., Ltd.
- Resistances, Wire and Tube.**
General Electric Co.
Stromberg-Carlson Tel. Mfg. Co.
Westinghouse Electric & Mfg. Co.
- Retrievers, Trolley. (See Catchers and Retrievers, Trolley.)**
- Rheostats.**
General Electric Co.
- Roofing.**
General Fireproofing Co.
Johns-Manville Co., H. W.
Southern Railway Supply Co.
Standard Paint Co.
Zelnicker Supply Co., Walter A.
- Rubber Specialties.**
Massachusetts Chemical Co.
- Sand Boxes. (Including Pneumatic Sanders.)**
American Car Co.
Brill Co., The J. G.
Ham Sand Box Co.
Jewett Car Co.
Kuhlman Car Co., G. C.
McGuire-Cummings Mfg. Co.
Ohio Brass Co.
Ridlon Co., Frank.
St. Louis Car Co.
Stephenson Co., John.
Wason Mfg. Co.
- Sash Fixtures.**
Drouvé Co., G.
Lupton's Sons Co., David.
- Sash Fixtures, Car. (See also Curtains.)**
American Car Co.
Brill Co., The J. G.
Edwards Co., The O. M.
Kuhlman Car Co., G. C.
National Lock Washer Co.
Stephenson Co., John.
Wason Mfg. Co.
- Sash Operating Apparatus.**
Drouvé Co., G.
Lord & Burnham Co.
Lupton's Sons Co., David.
- Saws, Rail.**
Hadfield's Steel Foundry Co., Ltd.
- Scrap Iron.**
Frank, M. K.
- Scrapers, Track. (See Cleaners and Scrapers, Track.)**
- Screens, Car Window.**
General Railway Supply Co.
- Seating Materials. (See Curtains and Curtain Materials.)**
- Seats, Car.**
American Car Co.
Brill Co., The J. G.
Danville Car Co.
Ford & Johnson Co.
Hale & Kilburn Mfg. Co.
Heywood Bros. & Wakefield Co.
- Second-Hand Equipment. (See pages 76-78.)**
- Shades, Vestibule.**
Electric Service Supplies Co.
Planet Co., The.
- Shovels, Power.**
Hicks Locomotive & Car Works.
Males Co.
Vulcan Steam Shovel Co.
- Shutters, Steel Rolling. (See Doors, Steel Rolling.)**
- Signal Systems.**
Blake Signal & Mfg. Co.
Kinsman Block System Co.
Nachod Signal Co.
National Electrical Manufacturing Co.
Ohio Brass Co.
Safety Switch & Signal Co.
Simmen Automatic Railway Signal Co.
U. S. Electric Signal Co.
- Signals, Railway Crossing.**
National Electrical Manufacturing Co.
- Signs, Car and Track.**
Columbia Machine Works & Malleable Iron Co.
Creaghead Engineering Co.
Western Electric Co.
- Skids.**
Garton Co., W. R.
- Skylights.**
Drouvé Co., G.
Lord & Burnham Co.
Lupton's Sons Co., David.
- Sleet Cutters.**
Bayonet Trolley Harp Co.
Garton Co., W. R.
Holland Trolley Supply Co., The.
Matthews & Bro., W. N.
Nuttall Co., R. D.
Stuart-Howland Co.
- Sleeving. (See Tapes and Cloths.)**
- Sleeves, Protective, for Metal Poles.**
Gherky, Wm. D.
- Snow Plows, Sweepers and Brooms.**
American Car Co.
Brill Co., The J. G.
Columbia Machine Works & Malleable Iron Co.
Consolidated Car Fender Co.
Kuhlman Car Co., G. C.
McGuire-Cummings Mfg. Co.
Stephenson Co., John.
Wason Mfg. Co.
- Soaps. (See Cleaning Powders, Soaps and Washes.)**
- Solder and Solder Flux.**
Blake Signal & Mfg. Co.
Condit Electrical Mfg. Co.
Lumen Bearing Co.
- Speed Indicators.**
Woodman Mfg. & Supply Co., R.
- Spikes.**
Frank, M. K.
Severance Mfg. Co., S.
- Splice and Angle Bars.**
Frank, M. K.
- U. S. Metal & Mfg. Co.**
Van Dorn Electric & Mfg. Co.
Wason Mfg. Co.
- Jewett Car Co.**
Kuhlman Car Co., G. C.
Peters & Co., G. D.
St. Louis Car Co.
Stephenson Co., John.
Wason Mfg. Co.

*a definite sum for all
your car advertising
space—*

That is our proposition in a nut shell.

We pay you the same sum, month after month.

Our trouble in filling the space needn't interest you.

Loss through failure to collect from advertisers is ours alone.

The cost to us of making drawings and engravings does not affect you.

We do all the work, take all the risk—you simply sell your space to us for so much a month.

How much? We are ready to tell you.

STREET
CAR
ADVERTISING

Geo. Kissam & Co.

949
B'WAY
N. Y.

CLASSIFIED DIRECTORY—Concluded

- Splicing Compound.**
Massachusetts Chemical Co.
- Splicing Sleeves. (See Clamps and Connectors for Wires and Cables.)**
- Springs, Car & Truck.**
American Car Co.
Brill Co., The J. G.
Danville Car Co.
Hanna Co., J. A.
Kuhlman Car Co., G. C.
Long Co., E. G.
McCord & Co.
McGuire-Cummings Mfg. Co.
Niles Car & Mfg. Co.
Railway Steel Spring Co.
Standard Steel Works Co.
Stephenson Co., John.
Taylor Electric Truck Co.
Union Spring & Mfg. Co.
Wason Mfg. Co.
- Sprinklers, Track & Road.**
American Car Co.
Brill Co., The J. G.
Kuhlman Car Co., G. C.
McGuire-Cummings Mfg. Co.
Stephenson Co., John.
Wason Mfg. Co.
- Steps, Car.**
Q M S Co.
- Stock Guards.**
American Bridge Co. of N. Y.
- Stokers, Mechanical.**
Babcock & Wilcox Co.
Box & Co., Alfred.
Green Engineering Co.
Jeffrey Mfg. Co.
Murphy Iron Works.
Westinghouse Machine Co.
- Storage Batteries. (See Batteries, Storage.)**
- Stoves.**
Buda Co., The.
- Strike Breaker.**
Reed, Edwin L.
- Strips, Protecting. (See Paving Materials.)**
- Structural Iron Work. (See Bridges & Buildings.)**
- Superheaters.**
Babcock & Wilcox Co.
Power Specialty Co.
- Sweepers, Snow. (See Snow Plows, Sweepers and Brooms.)**
- Switchboard Mats.**
Massachusetts Chemical Co.
Western Electric Co.
- Switch Stands. (See also Track Work.)**
Buda Co., The.
Hayes Track Appliance Co.
Indianapolis Switch & Frog Co.
Ramapo Iron Works.
Wharton, Jr., & Co., Inc., Wm.
- Switches, Automatic.**
American Auto. Switch Co.
Continuous Rail & Safety Switch Co.
Safety Switch & Signal Co.
Wonham, Magor & Sanger.
- Switches, Track. (See also Track Work.)**
American Auto. Switch Co.
American Frog & Switch Co.
Buda Co., The.
Continuous Rail & Safety Switch Co.
Frank, M. K.
Indianapolis Switch & Frog Co.
Kilby Frog & Switch Co.
Morden Frog & Crossing Co.
Safety Switch & Signal Co.
Stuart-Howland Co.
Wharton, Jr., & Co., Inc., Wm.
Wonham, Magor & Sanger.
Zelnicker Supply Co., Walter A.
- Switches & Switchboards.**
Anderson Mfg. Co., A. & J. M.
*British Thomson-Houston Co.
*British Westinghouse Elec. & Mfg. Co.
Consolidated Car Heating Co.
Cutter Electrical & Mfg. Co.
Elliott Elec. Co., The S. K.
General Electric Co.
Ohio Brass Co.
Stromberg-Carlson Tel. Mfg. Co.
Wagner Elec. & Mfg. Co.
Western Electric Co.
Westinghouse Electric & Mfg. Co.
- Tapes & Cloths. (See Insulating Cloths, Paper & Tape.)**
- Telephones & Parts.**
Blake Signal & Mfg. Co.
Electric Service Supplies Co.
Matthews & Bro., W. N.
Stromberg-Carlson Tel. Mfg. Co.
Western Elec. Co.
- Testing, Electrical.**
American Gen'l Eng'g Co.
Gulick-Henderson Co.
Hildreth & Co.
Hunt & Co., Robert W.
Jackson, H. D.
Nelson & Co., I. R.
Stromberg-Carlson Tel. Mfg. Co.
- Testing Instruments. (See Instruments, Electrical Measuring, and Bond Testers.)**
- Ticket Choppers and Destroyers.**
Patten Co., Paul B.
- Tickets & Transfers.**
American Ry. Supply Co.
- Ties. (See Poles and Ties.)**
- Tools, Track & Miscellaneous. (See also Grinders and Grinding Wheels.)**
Buda Co., The.
Columbia Machine Works & Malleable Iron Co.
Electric Service Supplies Co.
Elliott Elec. Co., The S. K.
Groff Drill & Mach. Tool Co.
Hadfield's Steel Foundry Co., Ltd.
Johns-Manville Co., H. W.
Norvell-Shapleigh Hardware Co.
Ohio Brass Co.
Pittsburg Pole & Forge Co.
Q M S Co.
Ridlon Co., Frank.
Secor, A. W.
Southern Railway Supply Co.
Wonham, Magor & Sanger.
Zelnicker Supply Co., W. A.
- Tower Wagons. (See Wagons, Tower.)**
- Track Work.**
Allen & Co., Ltd., Edgar.
American Bridge Co.
American Frog & Switch Co.
Barber Car Co.
Barbour-Stockwell Co.
Buda Co., The.
Carnegie Steel Co.
Cincinnati Frog & Switch Co.
Cleveland Frog & Crossing Co.
Continuous Rail & Safety Switch Co.
Falk Co., The.
Frank, M. K.
Gherky, Wm. D.
Goldschmidt Thermit Co.
Hadfield's Steel Foundry Co., Ltd.
Hayes Track Appliance Co.
Indianapolis Switch & Frog Co.
Kilby Frog & Switch Co.
Lorain Steel Co.
Morden Frog & Crossing Co.
New York Switch & Crossing Co.
Pennsylvania Steel Co.
Ramapo Iron Works.
Ridlon Co., Frank.
Robinson & Orr.
Wharton & Co., Inc., Wm., Jr.
Wonham, Magor & Sanger.
- Transfer Issuing Machines.**
Ohmer Fare Register Co.
Transfer Issuing Machine Co.
- Transformers.**
Crocker-Wheeler Co.
General Electric Co.
National Brake & Electric Co.
Packard Elec. Co.
Wagner Elec. & Mfg. Co.
Western Electric Co.
Westinghouse Elec. & Mfg. Co.
- Traps, Steam.**
Williams Gauge Co.
- Treads, Step.**
Q M S Co.
- Trolley Bases, Poles, Harps and Wheels. (See Bases, Poles, Harps and Wheels, Trolley.)**
- Trolley Wagons. (See Wagons, Tower.)**
- Trucks, Car.**
American Car Co.
American Locomotive Co.
Baldwin Locomotive Works.
Barber Car Co.
Brill Co., The J. G.
Cincinnati Car Co.
Danville Car Co.
Hanna Co., J. A.
Hicks Locomotive & Car Works.
Kuhlman Car Co., G. C.
Long Co., E. G.
McGuire-Cummings Mfg. Co.
Niles Car & Mfg. Co.
Standard Motor Truck Co.
Stephenson Co., John.
St. Louis Car Co.
Taylor Electric Truck Co.
Wason Mfg. Co.
- Trucks, Storage Battery.**
Westinghouse Storage Battery Co.
- Turbines, Hydraulic. (See Hydraulic Machinery.)**
- Turbines, Steam.**
General Electric Co.
Western Electric Co.
Westinghouse Machine Co.
- Under Frames. (Steel.)**
American Car Co.
Brill Co., J. G.
Kuhlman Car Co., G. C.
Pressed Steel Car Co.
St. Louis Car Co.
Standard Motor Truck Co.
Stephenson Co., John.
Wason Mfg. Co.
- Union Couplings.**
National Tube Co.
- Vacuum Drying & Impregnating Apparatus. (See also Impregnating Apparatus.)**
Buffalo Foundry & Machine Co.
Devine Co., J. P.
McLeer Elec. & Mfg. Co.
- Varnishes. (See Paints and Varnishes.)**
- Ventilating Apparatus. (See Heating and Ventilating Apparatus.)**
- Ventilators.**
Drouvé Co., G.
Lord & Burnham Co.
Perry Ventilator Co.
- Ventilators, Car.**
Mudge & Co., Burton W.
- Vestibules, Portable.**
American Car Co.
Brill Co., The J. G.
Kuhlman Car Co., G. C.
Sjoberg & Co., J. P.
Stephenson Co., John.
Wason Mfg. Co.
- Voltmeters. (See Instruments, Electrical Measuring.)**
- Wagons, Tower.**
Leorhardt Wagon Mfg. Co.
McCardell & Co., J. R.
- Waste Boxes.**
Garton Co., W. R.
Zelnicker Supply Co., W. A.
- Watches.**
New England Watch Co.
- Water Softening Plants.**
Buda Co., The.
- Water Wheels and Governors. (See Hydraulic Machinery.)**
- Welding Rail. (See Brazing & Welding Processes, and also Rail Welding.)**
- Wheel Grinders. (See also Grinders and Grinding Wheels.)**
Wheel Truing Brake Shoe Co.
- Wheel Guards. (See Fenders & Wheel Guards.)**
- Wheel Presses. (See Machine Tools.)**
- Wheels and Axles.**
American Car Co.
Atlanta Car Wheel & Mfg. Co.
Brill Co., The J. G.
Carnegie Steel Co.
Cincinnati Car Co.
Danville Car Co.
Griffin Wheel Co.
- Wheels and Bushings, Trolley.**
Anderson Mfg. Co., A. & J. M.
Bayonet Trolley Harp Co.
Electric Service Supplies Co.
Elliott Elec. Co., The S. K.
Garton Co., W. R.
General Electric Co.
Gilbert & Sons Brass Foundry Co., A.
Graphite Lubricating Co.
Holland Trolley Supply Co., The.
Johns-Manville Co., H. W.
Lumen Bearing Co.
Nuttall Co., R. D.
Ridlon Co., Frank.
Star Brass Works.
Stuart-Howland Co.
Trolley Supply Co.
- Winding Machines. (See Armature and Field Coils, Machines for Handling and Winding.)**
- Window Operating Devices. (See Sash Operating Apparatus.)**
- Window Sashes, Metal.**
Lupton's Sons Co., David.
- Wires and Cables.**
Aluminum Co. of America.
American Electrical Works.
American Gen'l Eng'g Co.
American Steel & Wire Co.
Blake Signal & Mfg. Co.
Bridgeport Brass Co.
D. & W. Fuse Co.
Duplex Metals Co.
Electric Cable Co.
Garton Co., W. R.
General Electric Co.
Kerite Insulated Wire & Cable Co.
National Conduit & Cable Co.
Okonite Co., The.
Packard Elec. Co.
Roebbling's Sons Co., John A.
Standard Underground Cable Co.
Stromberg-Carlson Tel. Mfg. Co.
Waclark Wire Co.
Watson Insulated Wire Co.
Western Electric Co.
*Wire & Cable Co.
- Wood Preservatives.**
Anthracenol Wood Preserving Co.
American Creosote Works, Ltd.
American Wood Preserving Co.
Atlantic Creosote & Wood Preserving Co.
Buffalo Foundry & Machine Co.
C. A. Wood Preserver Co.
Gulfport Creosoting Co.
U. S. Wood Preserving Co.
Valentine-Clark Co.
- Woodwork, Car. (See also Vestibules, Portable.)**
Sjoberg & Co., J. P.
- Woodworking Machinery.**
Fay & Egan Co., J. A.
- Wrenches, Track.**
Jeffrey Mfg. Co.
Secor, A. W.



Barrett's PAVING PITCH



Twelfth Street South, Minneapolis. Wood Block Pavement Filled with Barrett's Paving Pitch

The Ideal Pavement Filler

A good filler for the joints of brick or block pavements must have certain qualifications. It must, for instance, seal up the joints and make them watertight so as to prevent water from reaching the foundation. That requirement cuts out sand filler from consideration, since sand is not watertight.

A good filler must be elastic so as to provide for the expansion and contraction of the blocks in changing temperatures. That cuts out cement, whose rigidity accounts indirectly for cracks and breaks in brick pavements.

It also cuts out asphalt, which, being compressible but not ductile, yields to the expansion of the blocks but does not stick to the blocks when they contract.

Barrett's Paving Pitch answers all the requirements of the ideal filler. It remains elastic and always sticks to the sides of the blocks, thus automatically maintaining an unbroken waterproof seal at all times.

Booklets on request

BARRETT MANUFACTURING COMPANY

New York
Cleveland

Chicago
Pittsburg

Philadelphia
Cincinnati

Boston
Kansas City

Minneapolis
New Orleans

St. Louis
London, Eng.

SECOND HAND EQUIPMENT

Rossiter, MacGovern & Co.
ESTABLISHED 1893 (INCORPORATED)

Alternating and Direct-Current Generators and Motors
Electrical Apparatus of All Kinds in Stock.

West Street Bldg., 90 West Street, NEW YORK
TELEPHONE, CORTLANDT 8876

DIRECT CURRENT MOTORS

500-600 Volts

- 1—100 HP Akron, 500 RPM.
- 1—75 HP Eddy, 900 RPM.
- 1—60 HP Sprague, 610 RPM.
- 1—50 HP Akron, 636 RPM.
- 1—30 HP Thomson-Houston, 1200 RPM.
- 1—20 HP Northern, 1300 RPM.
- 1—7½ HP Triumph, 1050 RPM.
- 2—7½ HP General Electric, 1050 RPM.
- 1—7½ HP General Electric, 1600 RPM.
- 2—7½ HP Eddy, 1500 RPM.
- 1—6½ HP Crocker Wheeler, 1325 RPM.
- 2—5 HP Westinghouse, 1500 RPM.
- 1—5 HP Crocker Wheeler, 1575 RPM.
- 1—5 HP Sprague, 1200 RPM.
- 1—5 HP Westinghouse, 1800 RPM.
- 1—5 HP General Electric, 1800 RPM.
- 1—5 HP Crocker Wheeler, 1065 RPM.
- 1—5 HP Crocker Wheeler, 1075 RPM.
- 1—5 HP Eddy, 800 RPM.
- 1—4 HP Claus, 1000 RPM.
- 1—½ HP General Electric, 2500 RPM.

We also carry in stock a complete line of Direct and Alternating Current Apparatus, thoroughly overhauled and refitted, fully guaranteed

St. Louis Smelting & Refining Co.

BUYERS OF

Lead Drosses, Oxides of Lead, Peroxide of Lead, Sulphate of Lead from Acid Chambers and Storage Batteries, Battery Plates, Tank Linings, Scrap Lead, Hardened Red Lead and White Lead, etc.

613-614 FRISCO BUILDING
ST. LOUIS, MO.

Write for Prices

POSITIONS WANTED

EX-GENERAL MANAGER, Ex-Secretary and Treasurer, Ex-Director of Street Railway and Lighting plant, is open for an engagement. Address W. W. McKee, 1110 West 7th St., Wilmington, Del.

WANTED—By an experienced railway man a position as superintendent or general manager. The harder the proposition the better. At present employed by large New England railway. To better present position only reason for change. Address "B. K. H.," care of ELECTRIC RAILWAY JOURNAL, New York.

WANTED—Electric Railway men, experienced, to tell technical writer in New York, or write practical side of Trolley construction: Track construction; Elevated Railways; Subways; Power house; Car equipment and shops; Transportation as the dispatcher sees it; Electric Railway history. Day or evenings. Liberal pay. Address "No. 1488," care of ELECTRIC RAILWAY JOURNAL, New York.

GENERAL MANAGER desires a change. Is in charge of property operating street and interurban lines, sixty miles in all; also gas light and power plants. Over fifteen years' experience as engineer and operator; age 42. Address "No. 1492," care of ELECTRIC RAILWAY JOURNAL, 590 Old Colony Building, Chicago.

FOR IMMEDIATE DELIVERY: 1—425 KW., 550-volt, G.E., 8-pole, 120 R.P.M. D.C., 773 amps., Dir. Connected to 22 x 42 Improved Greene Engine Complete with 12-22-24 Dean Jet Condenser, and Connecting Pipes, Panel board and instruments; also, 260-H.P. Altman & Taylor Water-Tube Boilers Stack, Flue, Heater and Pumps. Prices individually on application.

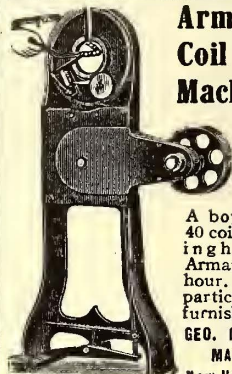
CALVIN H. CURRIER, Room 708
Oliver Building, BOSTON

POSITIONS VACANT

FIRST CLASS SALESMEN WANTED

An electric railway specialty house wants two or three reliable men with railway experience and established sales ability, for traveling and city work. The right men can get good salary, and a chance to increase their income upon results secured. In replying state age, height, weight, previous experience, present connections, references and salary expected. Address 1491, care of Electric Railway Journal, New York.

WANTED A-1, first-class track draftsman and designer, excellent opportunities; state experience, salary, how soon available, with references. Address No. 1493, care ELECTRIC RAILWAY JOURNAL, 590 Old Colony Bldg., Chicago.



Armature Coil Taping Machine

Saves Time Labor and Money

A boy can tape 40 coils for Westinghouse 12A Armature in an hour. Further particulars gladly furnished.

GEO. M. GRISWOLD
MACHINE CO.
New Haven, Conn.

Coal and Flat Cars in Lots to Suit. Give us your wants. Send for latest car and contractors' list. 8

THE MALES CO.
26 Cortlandt St., 1500 1st Nat. Bank Bldg., NEW YORK, N. Y. CINCINNATI, OHIO

RAILS
Locomotives Cars Etc.
Bought & Sold
Walter A. ZELNICKER Supply Co.
IN ST. LOUIS

STEEL RAILS

All sections New and Relaying In stock for immediate shipment. Rails cut to length. M. K. FRANK, Pittsburgh, Pa.

MOTOR FRAME WANTED

Wanted—One Westinghouse 12-A motor frame complete with field coils and brush holders. This is for use in testing armatures in shops so could use a frame without suspension lugs or axle bearing. Must be cheap.

Selma Street and Suburban Railway, Selma, Ala.

BELTED RAILWAY GENERATORS PROMPT DELIVERY

- 1—500 K.W., mp4, 550-volt, 375 r.p.m., G.E.
- 2—250 K.W., mp6, 550-volt, 450 r.p.m., Westinghouse
- 1—200 K.W., mp6, 550-volt, 425 r.p.m., G.E.
- 1—200 K.W., mp4, 500-volt, 425 r.p.m., I.T.I.
- 1—200 K.W., mp4, 500-volt, 450 r.p.m., Walker.
- 1—150 K.W., mp6, 550-volt, 400 r.p.m., G.E.
- 1—150 K.W., Bipolar, 500-volt, Edison.
- 24" to 46" two and three-ply leather belting.

NATIONAL MACHINERY AND WRECKING CO.
1916 Scranton Road Electrical Dept. Cleveland, Ohio

SPECIAL OFFER

New York Elevated Passenger Coaches—Standard Gauge—Suitable for any light passenger service, interurban freight, trailers, etc.

For particulars

BIRMINGHAM RAIL & LOCOMOTIVE CO.

66 Beaver St., N. Y. 315 Woodward Bldg., Birmingham, Ala.

WE CAN SHIP IMMEDIATELY

2—300 KW., 60 CYCLE, GENERAL ELECTRIC ROTARY CONVERTERS. Type HC, 60 cycle, 8 poles, form P, 900 RPM.

Each Complete with:

1—330 KW. TRANSFORMER, 2300-9200-440 volts, type ABH, form BI. Also
1—REACTANCE, type BT 60-45-60-250, form D5. Also A. C. and D. C. machine panels and one feeder panel.

Frank MacGovern

J. Warren Archer

MacGovern, Archer & Co.**ELECTRICAL AND STEAM MACHINERY****114-118 Liberty Street**

Phone Cort. 5577

New York

Send for full list of Dynamos, Motors, Engines, and Electrical and Steam Machinery of every description.

Direct Connected

RAILWAY GENERATORS

GENERATOR ENGINE

1—850 K.W. GEN. ELEC..WILLIAMS.
2—500 K.W. GEN. ELEC..GREENE.
1—500 K.W. GEN. ELEC..McINTOSH & SEY.
1—400 K.W. CROC.-WH...BATES.
1—400 K.W. GEN. ELEC..PORTER ALLEN.
3—300 K.W. GEN. ELEC..GREENE.
1—250 K.W. WESTG....HAMILTON.
1—225 K.W. GEN. ELEC..McINTOSH & SEY.
1—200 K.W. GEN. ELEC..FULTON-COR.
1—200 K.W. CROC.-WH...IDEAL.
1—150 K.W. WESTG....WESTG.

Arthur S. Partridge, St. Louis**Center and Side
Dump Cars**

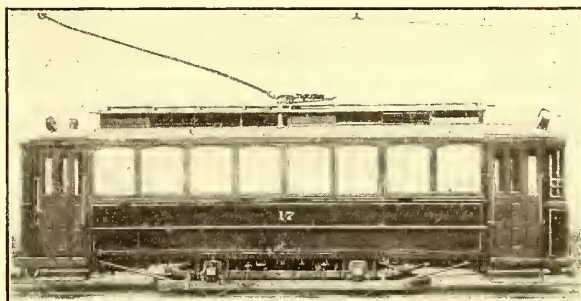
17 to 35 cu. yds.

**FREIGHT CARS of all Types
New or Rebuilt****HICKS LOCOMOTIVE & CAR WORKS**
Fisher Building Chicago**ELECTRIC HEATERS FOR SALE**

FIFTEEN sets of eight heater equipments Consolidated Car Heating Co.'s No. 203-S. Truss plank type, used only six months.

LEHIGH VALLEY TRANSIT CO.,
Allentown, Pa.**FOR SALE**

2000 tons relaying 80 lb. STEEL T-RAILS; also other weights relaying rails and all weights of New T-Rails and angle bars. We buy old rails.
Robinson & Orr, Pittsburg, Pa.

**20 CARS LIKE CUT
EXCELLENT CONDITION**

Replaced by double-truck Cars

ALSO

**MOTORS, GENERATORS
ENGINES, BOILERS, PUMPS**Fare Registers, A. A. 1 Air
Brake CompressorsCar Replacers, Trucks
Wheel Press

DORNER
RAILWAY EQUIPMENT CO.

1307 Manhattan Building, Chicago

**ALL KINDS OF
SECOND-HAND CARS**

Electric Equipment Co.

COMMONWEALTH BUILDING, PHILADELPHIA

LOCOMOTIVES—CARS

for Any Service

Locomotives repaired for railroads and others

Central Shops: Chicago

Eastern Shops: New York

FITZ-HUGH, LUTHER CO.Monadnock Block
CHICAGO140 Cedar Street
NEW YORK

A MENTION of this publication when writing to
advertisers would be appreciated by
both advertiser and publisher.

F. H. HERRING

Electric Railway Equipment
Steam and Electrical Machinery

1912 PARK AVENUE
NEW YORK

Street Railway Motors

14 West. 93a	28 G. E. 57
8 West. 112	60 G. E. 87
20 West. 56	16 G. E. 52
30 West. 68	24 G. E. 1000
16 West. 12a	30 G. E. 800
18 West. 38B	6 G. E. 54
32 West. 49	4 G. E. 62
16 West. 69	

Extra Armatures

2 West. 101B	8 G. E. 57
5 West. 56	3 G. E. 52
7 West. 68	4 G. E. 54
6 West. 12a	9 G. E. 1000
4 West. 38B	6 G. E. 800
6 West. 49	5 G. E. 67
3 West. 69	3 G. E. 80

Cars

226 Closed, Convertible, Semi-Convertible and Open Cars, with and without trucks or equipments.

CONTROLLERS TRUCKS SNOW PLOWS
ENGINES BOILERS GENERATORS MOTORS

For Sale

- 8—18' Gilbert Closed Cars, Vestibuled, equipped with Westinghouse No. 49 or G. E. No. 1000 Motors, K-10 Controllers, Peckham Trucks.
- 5—18' Jones Closed Cars, equipped with Westinghouse No. 12A Motors, K-10 Controllers, Manier Trucks.
- 4—18' Brill Closed Cars, equipped with Westinghouse No. 12A Motors, K-10 Controllers, Manier Trucks.
- 2—Taunton Single Truck Nose Snow Plows.
- 2—Brill Single Truck Nose Snow Plows.
- 6—Laconia Interurban Cars, Equipped with G. E. No. 67 Motors.
- 40—G. E. No. 87C Railway Motors, complete.
- 18—G. E. No. 1000 Railway Motors, complete.
- 6—G. E. No. 62 Railway Motors, complete.
- 30—Westinghouse No. 56 Railway Motors, complete.
- 16—Westinghouse No. 49 Railway Motors, complete.
- 1—Westinghouse No. 49 Railway Motor Casing. Top Half.
- 16—Westinghouse No. 12A Railway Motors, complete.
- 7—Westinghouse No. 12A Railway Motor Casings. Top Half.
- 8—Westinghouse No. 68 Railway Motors, complete.
- 4—Westinghouse No. 3 Railway Motors, complete.
- 1—Westinghouse No. 12A Armature Core, with Commutator.
- 1—Westinghouse No. 12A Armature Core, without Commutator.
- 14—Lorain No. 22 Railway Motors, complete.
- 2—G. E. No. 73 Brand New Armatures.
- 3—G. E. No. 80 Brand New Armatures.
- 1—Westinghouse No. 93A Brand New Armature.
- 20—Westinghouse No. 56 Armatures, old cores wound with new Coils.
- 10—Westinghouse No. 68 Armatures, old cores wound with new Coils.
- 30—K-11 Controllers.
- 8—K-10 Controllers.
- 12—K-2 Controllers.
- 15—K-10 Controller Frames.
- 2—K-14 Controller Frames.
- 60—Providence, Model B Car Fenders.

All of Above Apparatus is in First-Class
Condition for Service

W. R. KERSCHNER
39 North Fifteenth St.,
Allentown, Pa.



It meets every requirement

—
**THE CELEBRATED
TRENTON TROLLEY
WAGON**

J. R. McCARDELL & CO.

Patentees and
Sole Manufacturers
TRENTON, N. J.

CORRESPONDENCE SOLICITED

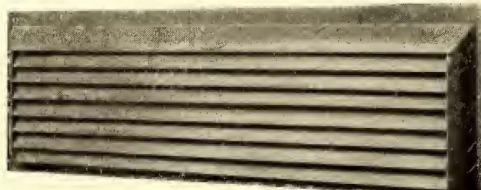
Leonhardt Tower Wagons

Meet All Requirements

Built in 2 Sizes, 1 and 2 Horse. Write for Illustrated Folder

LEONHARDT WAGON MFG. CO., Baltimore, Md.

See illustrated ad. in first issue of last or next month's JOURNAL



Pure Air. No Rain
or Snow

Send for circular.

**Perry
Car Ventilator**

Perry Ventilator Co.
New Bedford, Mass.

Boston Office: 174 Devonshire St., F. C. STOWELL, Sales Agent



PATTEN TICKET DESTROYER

Don't burn your used tickets. Destroy them, and avoid fraud. Remember, it is difficult to get a man to destroy anything of value to him. Sell the old stock—it will soon pay for machine. In use in all parts of the world. Write for Circular.

PAUL B. PATTEN CO. 2
78 Lafayette St. Salem, Mass., U. S. A.

FLUSH or DRY

DUNER CLOSETS

also Vestibule Folding Door Tracks

DUNER COMPANY,

101 South Clinton Street
CHICAGO

Pittsburgh Pole and Forge Company
WORKS, VERONA, PA. PITTSBURGH, PA.

Seamless Trolley Poles
Trolley Brackets

Tubular Iron Poles
for Electric Railways

All New Books On All Branches of Engineering

are for sale as soon as published, by the

McGraw-Hill Book Company, 239 W. 39th St., New York

ELECTRIC RAILWAY JOURNAL

==== For 1910 ====

A new volume begins with this issue. If you have not already done so, please send your subscription for 1910 at once.

DURING the coming year, the *Electric Railway Journal* will maintain the engineering and technical standing which it now possesses and will add to it by following even more closely than in the past the subjects which are of vital interest to electric railway companies.

No matter in what branch of the work you are interested, no matter what position you occupy, the *Journal* will help you during 1910 to achieve a greater measure of success for yourself and for your company. It will keep you abreast of all important developments and happenings of current interest in the field. Its articles are the most interesting reading obtainable, and the most helpful for those engaged in electric railroading. Its readers are kept constantly posted on the progress of the industry and on the best practice in all the allied but distinct branches of the work.

Your Personal Subscription.

Even if you have access to the *Journal*, it is of great importance that you receive your own copy of the paper each week. In this way only can you be sure of getting all the news of the field while it is still fresh and valuable, and of having the *Journal* to read when you want it and as long as you want it.

Your own subscription also makes it possible for you to maintain your own file of the paper—an invaluable reference library on all phases of electric railroading.

Please Send Your Subscription for 1910 AT ONCE.

Electric Railway Journal, 239 West Thirty-ninth Street, New York

ESTABLISHED 1828

RAILROAD

SPIKES

OF ALL SIZES

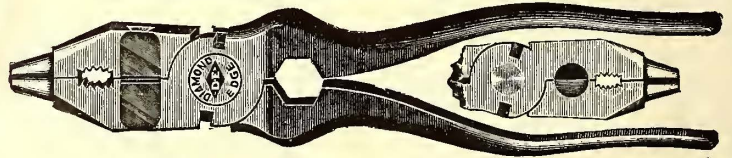
S. SEVERANCE M'F'G CO.
GLASSPORT, PENNA.

Every lineman — every electrician — every mechanic

recognizes in Diamond Edge tools the hand of a master designer. They have not only the intrinsic value, but that "balance" — "bite" — "snip" — and "grip" that the skilled workman so appreciates.

We specialize on electrical supplies of every kind.

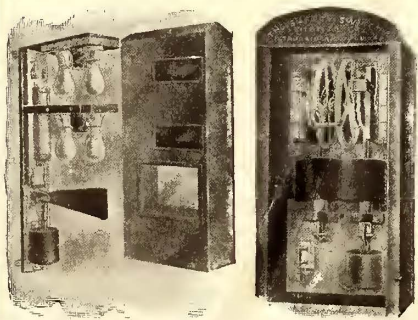
"Diamond Edge is a Quality Pledge."



NORVELL-SHAPLEIGH HARDWARE CO.,

St. Louis, Mo.

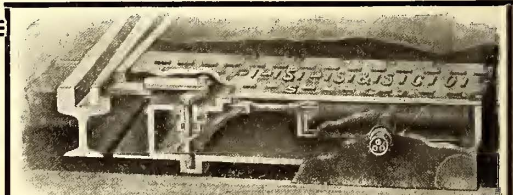
Multiple Recording
Interlocking
Block Signal



Sure Simple Saving

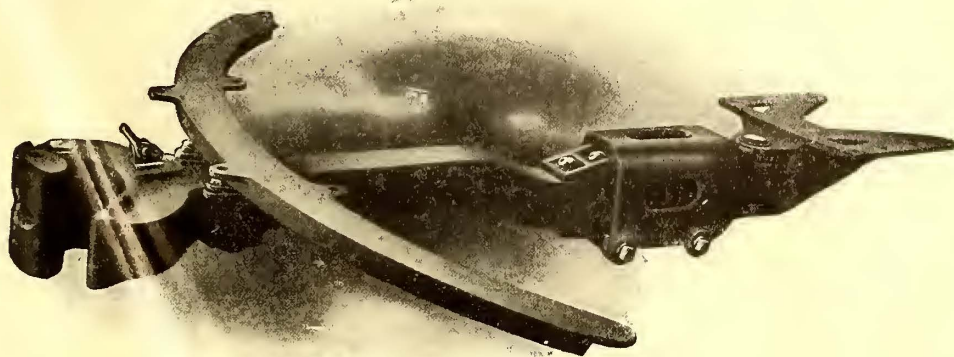
Reasonable in price.

The Safety Switch & Signal Co.
2 Rector Street New York



Electric Automatic Watertight
Traction Switch

Standardize your coupler and draft rigging



We are now prepared to furnish our new TRACTION coupler, giving good delivery and the best coupler and attachment ever designed. Simple, strong, durable and standardized to suit all equipment.

Write me and I will tell you all about it.

EDWIN C. WASHBURN, Manager
Washburn Steel Castings & Coupler Co.
 Minneapolis, Minn.



For Operative Economy

you need first-class overhead material. Aided by the counsel of some of the best engineers in the country, we have produced a line which we know will show better wearing quality, higher tensile strength and nicer mechanical construction than is generally offered.

Handbook of overhead material shows our line and gives a lot of generally useful information.

A copy is yours for a word.

INDIANAPOLIS BRASS COMPANY
 Indianapolis, Ind.



The Only Scientific Car Brass Ever Constructed

CAST IN STEEL MOULDS SO THERE CAN BE NO GRIT



THE HOWARD COMPOSITE CAR JOURNAL BRASS

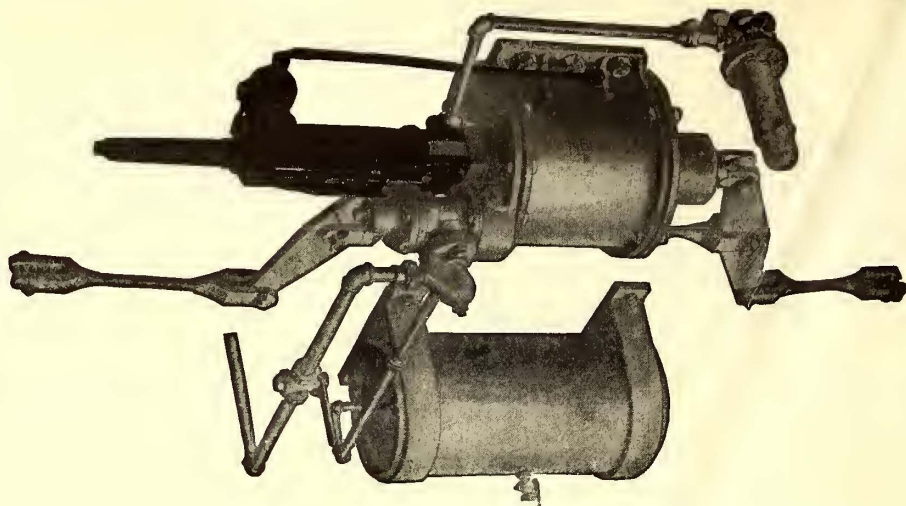
Guaranteed to give double the life of any solid brass or solid babbitt on the market and the price is **right**. Order a few sets and let them tell their own story.

J. FRANK LANNING & CO.
 Sole Agents

914 Union Bank Building
PITTSBURG, PA., U. S. A.

Post's "MOTOR" Metal for Armature Bearings

Westinghouse American Automatic Slack Adjuster



Automatically Regulates Piston Travel
Its use secures Uniform Piston Travel Maximum Brake Efficiency Saving of Brake Shoes
Minimum Wear of Adjuster Parts Device does not Operate until Adjustment is Required

FOR INFORMATION ADDRESS THE

AMERICAN BRAKE COMPANY
ST. LOUIS, MO.

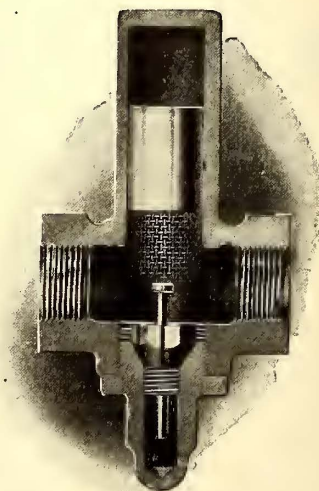
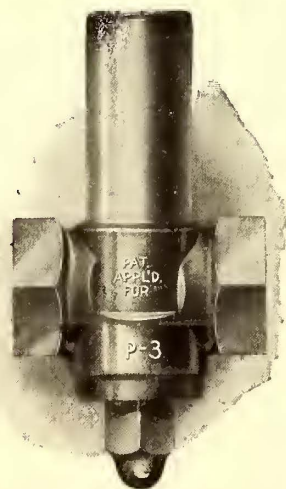
The "Emery Pneumatic" System of Air Lubrication

**Will Automatically
Clean and Lubricate**

**Brake Valves Feed Valves
Triple Valves Brake Cylinders**

Also

**Magnet Valves
and Switch Cylinders**
for Multiple Control Systems



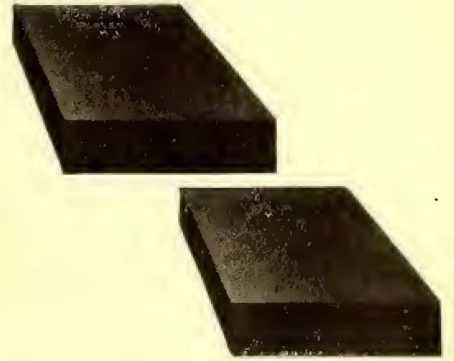
This lubricator is inserted in the air supply pipe of the brake system close to main reservoir, and all air passing into service pipes is charged with lubricant and carries it to all frictional surfaces in contact with the air current.

If interested, write for particulars to

The Emery Pneumatic Lubricator Company
1112 New Bank of Commerce Bldg., St. Louis, Mo.

If you Knew

of the excellent results now being given
under the most trying conditions by

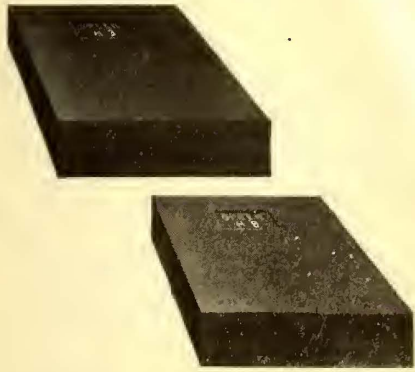


Speer Carbon Brushes

H, H-1, H-3, and H-8

—no power on earth could keep you from using them.

Why not find out about them? We are ready
with circulars and samples. Write!



Speer Carbon Co.
St. Marys, Pa.



START RIGHT

The improvements were made especially for you.—Are you
taking advantage of them?

25,000 to 50,000 miles with motor carbons and no flat
spots or commutator troubles.

We'll show you how—Just tell us when.

Our 1910 literature is all ready for distribution and all we want
is to know where to send it. A postal will do.

AMERICAN CARBON & BATTERY COMPANY
SIGNAL HILL :: E. ST. LOUIS :: ILLINOIS



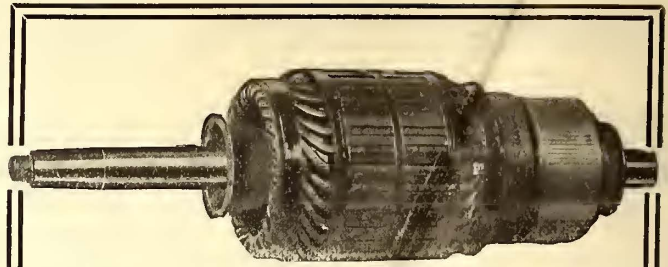
IT DOESN'T PAY

to let your rolling stock go until it is ready for the scrap heap. We can overhaul motors, trucks, car body and auxiliary equipment; repaint your cars and put them in shape to give you another five years' service.

We take this work by contract; do it with our own men at your own shop and guarantee satisfaction.

Also
Send us your armatures for rewinding, and if you are in need of coils, we make the best there is.

I. R. NELSON & CO., NEWARK, N. J.



We Do Good Work And Do It Quickly

—that is one of the reasons why our repair department is now the largest in the Middle West.

Armature and field coil repairs are right in our line.

Send them to us.

The S. K. Elliott Electric Co.

Successors to S. K. Elliott and The Elliott Bros. Electric Co.
322 Champlain Ave., N. W., Cleveland, Ohio

Ninety-five Per Cent Of Your Old Coils

Can Be Saved By

Vacuum Impregnating

and made absolutely oil- and water-proof. When we return them to you they will be fit for years of service. The equipment of our shop is second to none in the United States. We do good work, and we do it quickly.

Send us your next repairs and see what we can do.

McLeer Electric & Manufacturing Co.

220 36th Street (Bush Terminal)

Brooklyn, N. Y.

ASSEMBLED COMMUTATORS

AND

COMMUTATOR SEGMENTS

Our Commutator Segments are made from absolutely pure Hard Drawn Copper to specifications, either stamped or sawed, to fit any size or type of motors and generators, same as original factory segments. Dense, smooth and soft Canada Amber Mica is used in our commutators. All work guaranteed.

The CAMERON ELECTRICAL MFG. CO., Ltd., Ansonia, Conn.



WHEN WRITING TO ADVERTISERS

you will confer a favor on both publisher and advertiser by mentioning the
ELECTRIC RAILWAY JOURNAL

COMMUTATORS

NEW REFILLED ASSEMBLED

ARMATURE COILS, FIELD COILS FOR RAILWAY AND STATIONARY MOTORS

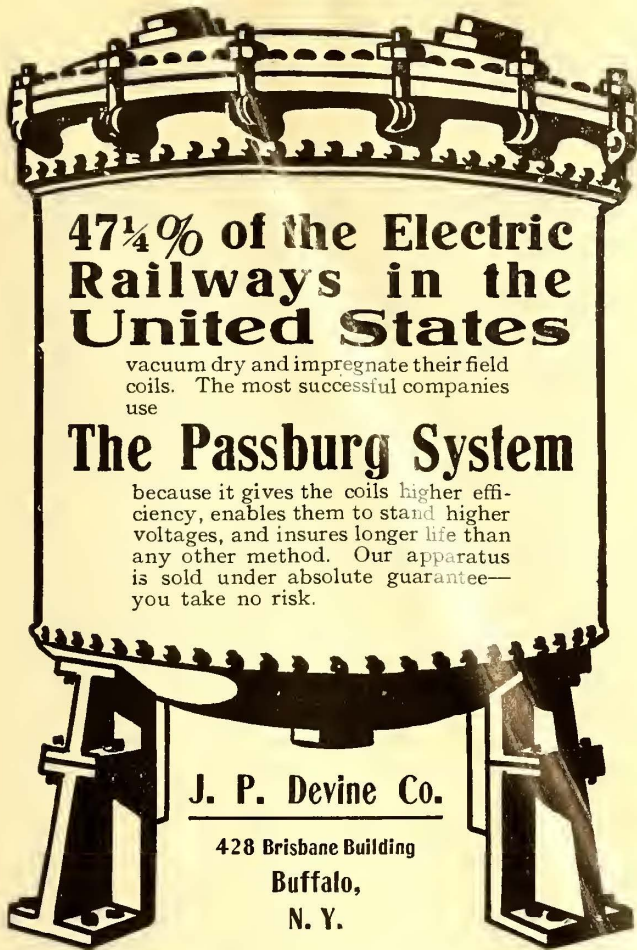
OUR MOTTO

PROMPT SHIPMENT AND FIRST-CLASS MATERIAL AT ALL TIMES

TRY US

THE VAN DORN ELECTRIC & MFG. CO.

CLEVELAND, OHIO



47¼% of the Electric Railways in the United States

vacuum dry and impregnate their field coils. The most successful companies use

The Passburg System

because it gives the coils higher efficiency, enables them to stand higher voltages, and insures longer life than any other method. Our apparatus is sold under absolute guarantee—you take no risk.

J. P. Devine Co.
428 Brisbane Building
Buffalo,
N. Y.



ABRASIVE

Take a hammer and

Smash it—Get right into the heart of it—

you find a new series of cutting points all the way through.

That's why Abrasive Wheels don't merely grind—they "cut"—cut fast and yet are durable.

They stand investigation, and they'll stand any test you want to put them through.

If you have grinding troubles, we'll help you solve them. Tell us what you have to do, we'll send the wheel that will do it—do it quickly and do it right.

ABRASIVE MATERIAL COMPANY, Philadelphia, Pa.



Remove the Trouble
which usually goes with
COMMUTATORS
AND **CARBON BRUSHES**

We'll do it for you
Write us
The W. R. Garton Company
CHICAGO

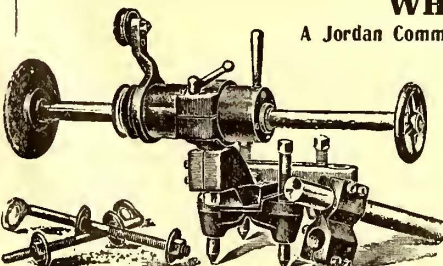


Silver Medal Awarded at Jamestown Exposition, 1907; Highest Award of Its Class.

Every Electric Railway Plant Should Have It.

WHAT?

A Jordan Commutator Truing Device.



This device will true your commutator without removing the armature; easy to attach and operate. Does not take large cuts which shorten the life of a commutator; no dragging of copper across the insulation between the bars, thereby short circuiting the same, and will soon pay for itself.

Patented April 16, 1898. Patented May 16, 1905.
Manufactured by
JORDAN BROS., Inc., 74 Beekman St. New York City

Write for Catalogue No. 2, with list of Users, Prices, etc.

Manufacturers of **HARD** and **FLEXIBLE FIBRE**

For **ELECTRICAL INSULATION** and **MECHANICAL PURPOSES**

DIAMOND STATE
ELSMERE
U.S.A.
DELAWARE
FIBRE COMPANY

Made in SHEETS, RODS, TUBES, WASHERS, DISCS and SPECIAL SHAPES

COLORS: RED, GREY and BLACK Write for Estimates

ORIGINAL VULCANIZED FIBRE

In Sheets, Tubes, Rods and Special Shapes for Electrical Insulation and General Mechanical Uses.

Noiseless Gears, Handles, Insulating Parts for Controllers, Overhead Crossings, Etc.

SEND FOR CATALOGUE AND SAMPLES

AMERICAN VULCANIZED FIBRE CO., Wilmington, Del.

GARLAND VENTILATORS

The Natural System for ventilating cars. It has withstood the test of time and severe service in railway operation

Write for circular giving full information.

BURTON W. MUDGE & COMPANY
400 Commercial National Bank Bldg. CHICAGO.

CAR PAINTING

Estimates cheerfully submitted for the painting of all kinds of railway equipment, anywhere. All work is done by practical car painters. Prices reasonable.

We make a specialty of **CAR PAINTING ONLY.**

G. T. ABEL
1010 Halsey St.,
Brooklyn, N. Y.

Instant, Positive Feeds Increase Production from 12 to 15 per cent.

Bement Slotting Machines

Feeds are actuated by cam on crankshaft and act in an exceptionally small portion of stroke.

This permits stroke to be adjusted practically to length of the actual cut. It means a saving of several inches on each stroke, depending on size of machine. It means a perfectly square cut with the same depth at beginning and end of cut.

Write for Catalog "Slotters"

NILES-BEMENT-POND COMPANY

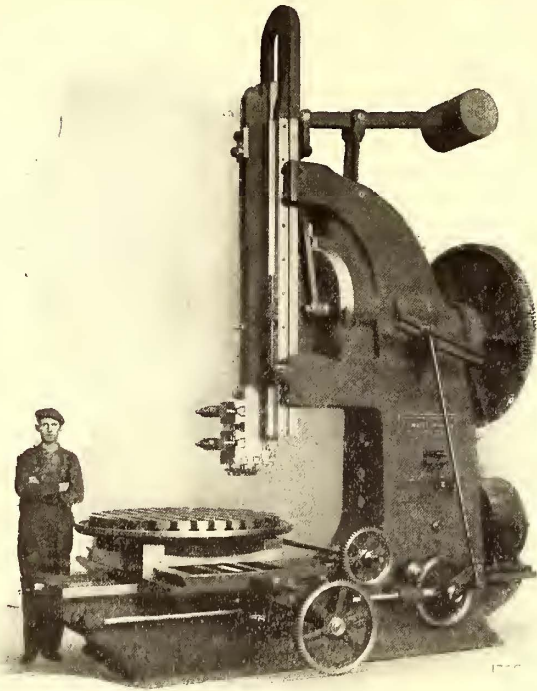
111 BROADWAY, NEW YORK

OFFICES:

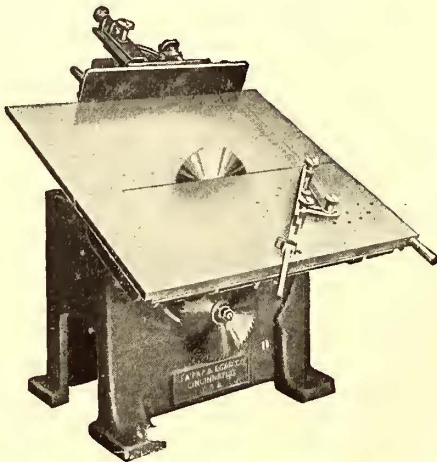
BOSTON: Oliver Building
 CHICAGO: Commercial National Bank Building
 PITTSBURGH: Frick Building
 ST. LOUIS: 516 North Third Street
 PHILADELPHIA: 21st and Callowhill Streets
 LONDON: 23-25 Victoria Street, S. W.

Agents for Canada:

THE CANADIAN FAIRBANKS CO., Ltd.
 Montreal, St. John, Toronto, Winnipeg,
 Calgary Vancouver.



28-inch Bement Crank Slotting Machine



A Double Saw for Pattern Work in Car Shops

For over fifty years Fay & Egan's line of Pattern Shop Tools for use in car shops have been considered the standard of the world.

Our No. 205 Double Circular Saw, illustrated herewith, is designed especially for the pattern shop and is the strongest and best Double Circular Saw made. The table tilts to an angle of 45 degrees—one section moves on roller bearings. Ripping fence has micrometer adjustment, necessary for fine work. The mandrels are mounted in a revolving plate gibbed in ways at the front of machine and which protects the mechanism inside from dust.

Ask for our booklet fully describing this machine.

585-605 W. FRONT ST.

J. A. FAY & EGAN CO.

CINCINNATI, OHIO

WETMORE PATENT GLUE HEATER

COPPER AND BRASS

Prevents

- Scum-Crust
- Sour Glue
- Evaporation
- Dirty Glue
- Guess Work
- Sloppy Floors
- Too Thick Glue
- Too Hot Glue
- Loss of Strength
- Escaping Steam

Encourages

- Industry
- Cleanliness
- Economy
- Sanitary
- Conditions
- Speed
- Accuracy
- High Grade Work
- Good Jobs



Steam-Gas-Electricity

64-Page Catalogue

Steam does not come in contact with the glue
THE ADVANCE MACHINERY CO., TOLEDO, OHIO, U. S. A.

American General Engineering Co.

Electrical, Mechanical and Manufacturing Engineers

253 Broadway, New York

N. Y. Shops: 155 West St.

Electric Railway, Labor Saving
 Machines, Devices and Supplies.



COMPLETE ARMATURES FOR SALE

FOR ALL THE STANDARD
 STREET RAILWAY MOTORS

GET OUR PRICE WE CAN SAVE YOU MONEY

America's Greatest Repair Works

CLEVELAND ARMATURE WORKS, Cleveland, O.

THIS CATALOG
of the
**BUCKEYE ELECTRIC
BLUE PRINTING MACHINE**



should be in the files of every Railroad Company in the country. It contains information of value to the Purchasing Agent, Engineer, Draftsman and Blue Printer.

It will be mailed upon request.

BUCKEYE ENGINE COMPANY
Specialty Dept. SALEM, OHIO

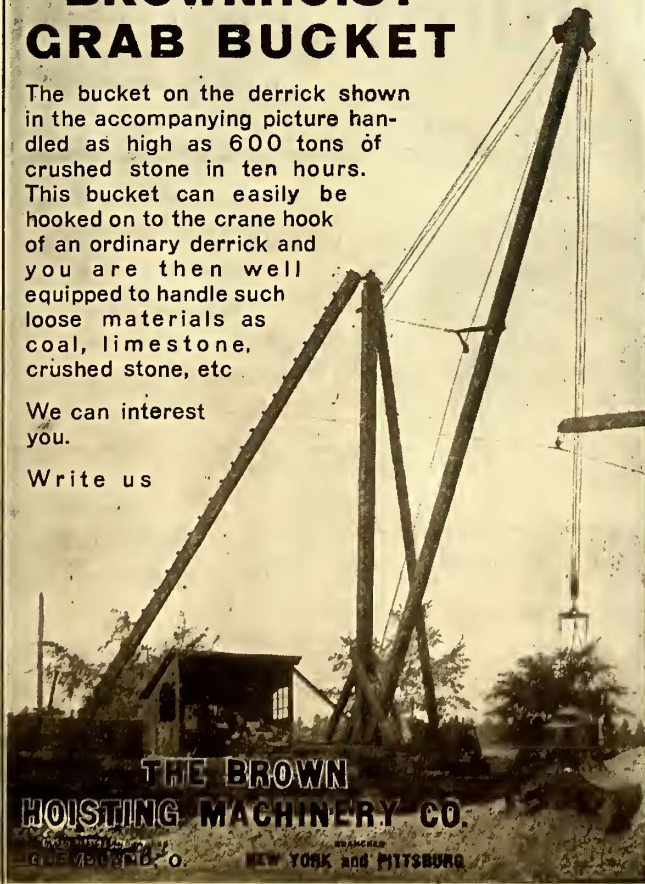
E.R.J. 18

**"BROWNHOIST"
GRAB BUCKET**

The bucket on the derrick shown in the accompanying picture handled as high as 600 tons of crushed stone in ten hours. This bucket can easily be hooked on to the crane hook of an ordinary derrick and you are then well equipped to handle such loose materials as coal, limestone, crushed stone, etc.

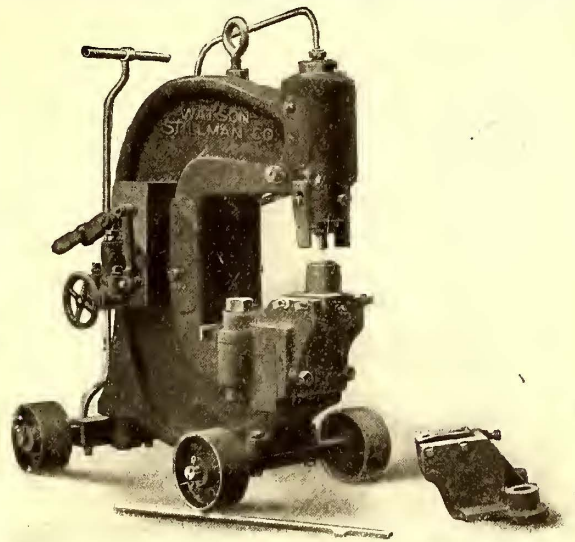
We can interest you.

Write us



**THE BROWN
HOISTING MACHINERY CO.**

NEW YORK and PITTSBURG



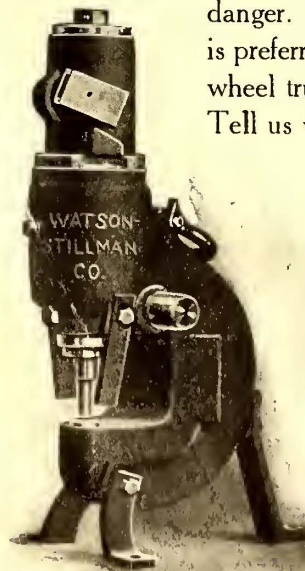
**WATSON-STILLMAN
HYDRAULIC PUNCHES**

Are made in suitable sizes and types for any work from punching the small rivet holes in plate metal and standard sections, to stamping out boiler manholes.

Our full hydraulic punches as shown avoid the usual tricky working and short wearing qualities often found in tools of this type. The head may be turned to bring the lever to any desired position and irregular dies may be used without danger. If a portable punch is preferred we furnish suitable wheel truck mounting.

Tell us what you wish to use a punch for and we will quote prices.

We also make presses, pumps, jacks, accumulators, benders, and other tools for every purpose to which it is practical to apply hydraulic power.



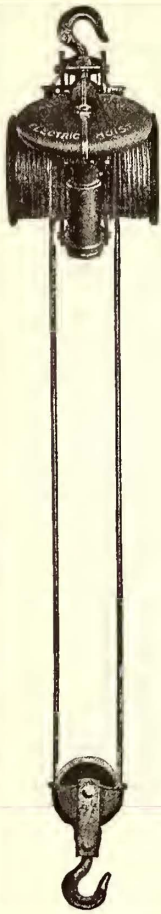
WRITE FOR
CATALOGS.

The WATSON-STILLMAN CO.

46 CHURCH STREET,

NEW YORK

33



In the Field, the Shop, the Power House

WE build Hoists to do the hoisting work of an Electric Railway, wherever and whenever it needs to be done with safety, precision and despatch. For Hand Hoisting, the TRIPLEX represents perfection.

With it one man can do a giant's work—can handle rails, wheels, trucks and axles, and other heavy things.

With an Electric Hoist the handling is done with the same safety and precision, but quicker. Ready for every emergency in the Shop or Power House.

Simple, durable, easily portable and its power follows by wire—nothing quicker.

4 styles: Differential, Duplex, Triplex, Electric.

41 sizes: An eighth of a ton to twenty tons.

300 active stocks: Ready for instant delivery all over the United States.

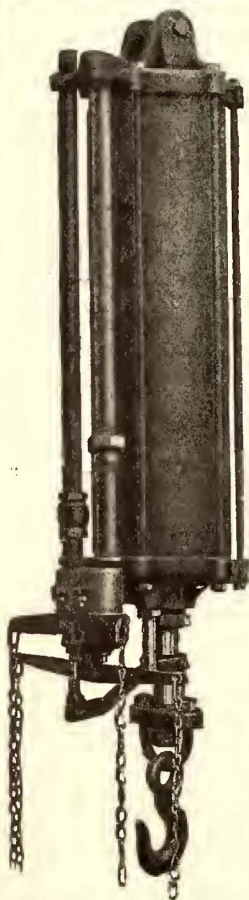
Traveling Cranes, Turntables, Trolleys, and Overhead Track. The book of Hoists tells much. *Yours for a postcard.*

The YALE & TOWNE Mfg. Co.

Only Makers of Genuine Yale Locks

9 Murray Street

New York



AIR HOISTS

**No. 6
STYLE**

AIR BALANCED
POSITIVE
LOAD RETAINING
TWO SPEEDS

The best hoist made
for street railway
shops.

Q M S CO.

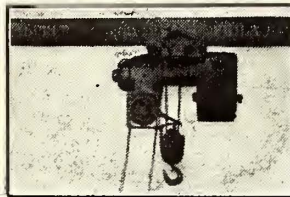
PLAINFIELD, N. J.

Jeffrey

ELEVATING, CONVEYING
POWER TRANSMISSION
SCREENING CRUSHING
DREDGING, COAL CUTTING
HAULING, DRILLING
WASHING MACHINERY

Write for Catalogs Series "MA"

THE JEFFREY MFG. CO. COLUMBUS, OHIO
New York. Denver



ELECTRIC HOISTS

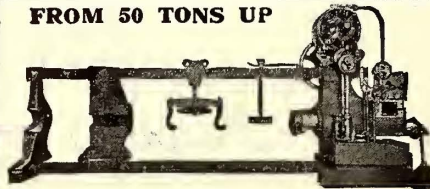
Write for new catalogue,

CRANES

All types. Any capacity.

Alfred Box & Co., Philadelphia, Pa.

FROM 50 TONS UP



Send us your
inquiries.

**THE
Hydrostatic
Machinery Co.**


Rochester
N. Y.

Vacuum Drying and Impregnating Machines

Manufactured by

Buffalo Foundry & Machine Co.

51 Winchester Ave., BUFFALO, N. Y.



What Oil To Use? and How To Use It?

A large proportion of your maintenance and operating costs can be saved if you know the answers to these two questions. If you are at all interested in the economical use of oil, the services of our Expert Department are at your disposal, free of charge. :: :: ::

These highly skilled railway mechanics will look into your methods of lubricating rolling stock and power plant equipment. After careful, painstaking study of your road, they will suggest what oils to use, and how to use them. :: :: ::

A guarantee of cost per thousand miles, and per thousand kilowatt hours, accompanies their recommendations when conditions warrant it. :: :: :: :: :: :: :: ::

Many large street and interurban railways are profiting by this service — why should not you? :: :: :: ::

GALENA-SIGNAL OIL CO.

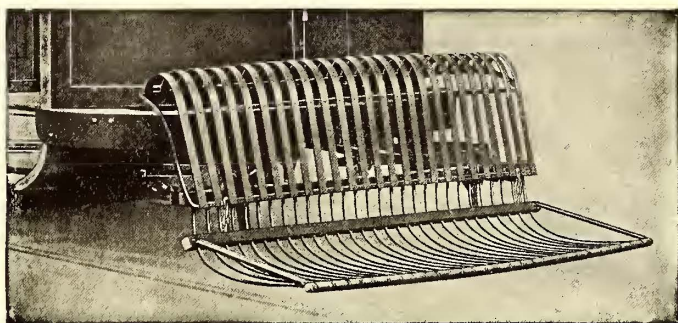
FRANKLIN, PA.



Low Maintenance Cost

OF

PROVIDENCE FENDERS AND WHEEL GUARDS

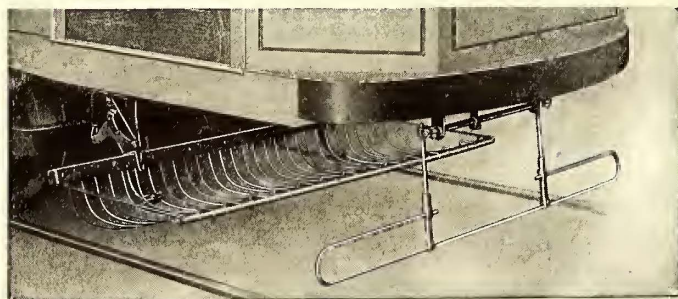


is largely due to the materials employed in their construction. They are built throughout of malleable iron and spring steel.

Both fender and wheel guard are basket shaped, to retain any object which may lodge upon them. They are very elastic, and are not seriously harmed even by collision.

Our **Fenders** are dropped in two ways; by foot trip or application of emergency air brake—our **Wheel Guards** are operated in any one or all of three ways: by gate trip, foot trip or application of emergency air brake.

They are accelerated in dropping and held down by powerful springs. Can be reset from the platform.



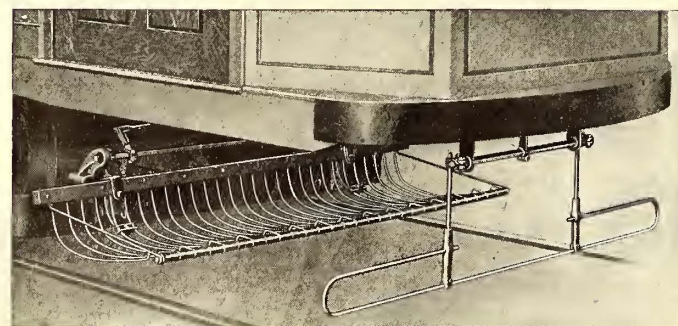
Wheel Guard Attached to Frame

The Consolidated Car Fender Co.

Manufacturers of the
Providence Fender and Wheel Guard

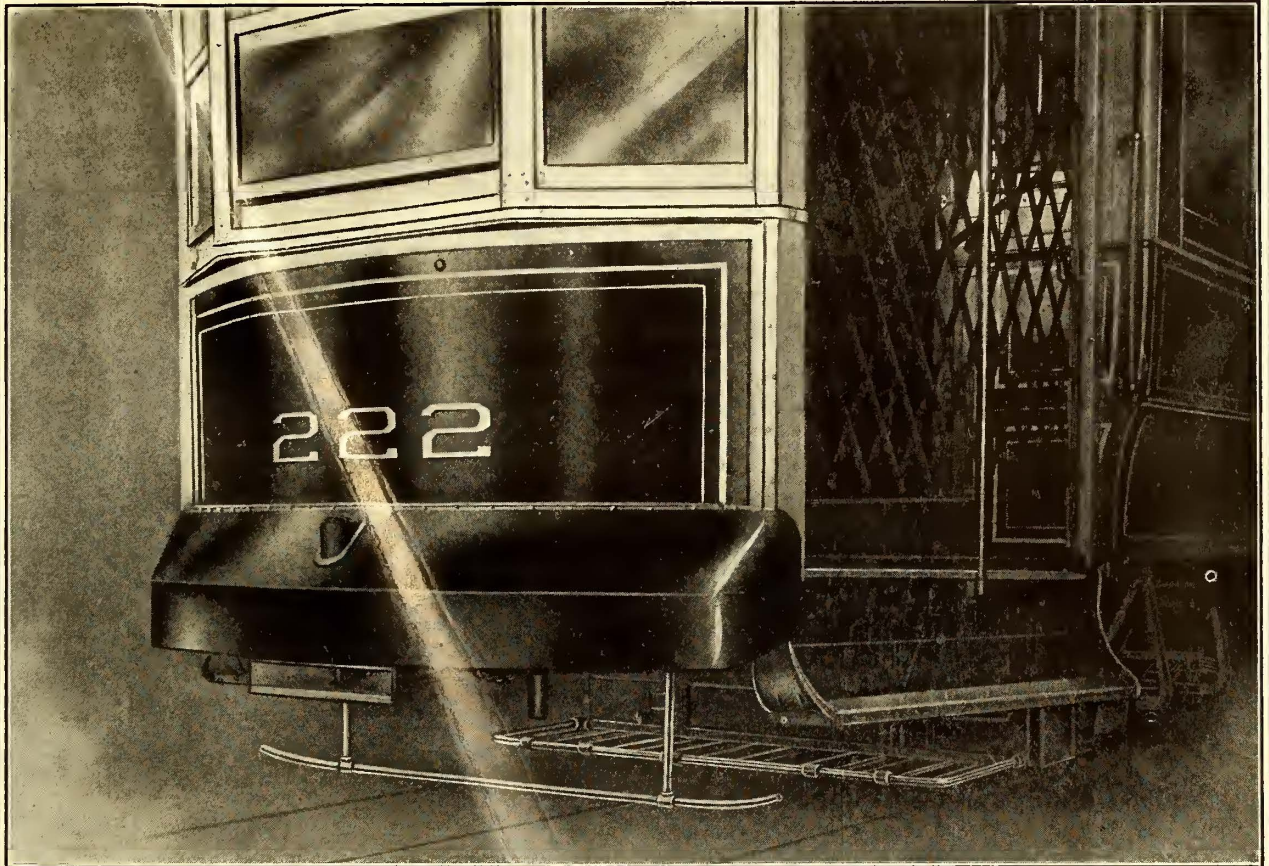
OFFICE AND FACTORY :
PROVIDENCE, R. I.

BRANCH OFFICE:
110 East 23d Street, New York



Wheel Guard Attached to Truck

European Agents: Comptoirs d'Electricite,
6 Rue Boudreau, Paris, France.



1200 Parmenter Wheel Guards

have recently been ordered by the

Metropolitan Street Railway

of New York. These new 1909 model wheel guards are provided with an anti-vibrating hanger which overcomes rigid vibration from the truck and carries the guard more flexibly than if the latter were attached to the car body. :: :: :: :: ::
They are absolutely automatic, can be used with or without fender, and can be reset from the platform. :: :: :: ::

Five reasons why a wheel guard should be attached to the trucks:

- | | |
|--|--|
| 1st. Because a wheel guard suspended from the car body will in time sag the platform or split the sills. | 3rd. They will cover the rails at all times. |
| 2nd. They can be carried twelve inches nearer the wheels. | 4th. They are easier to adjust and maintain. |
| | 5th. They have a very much neater appearance on a car. |

We are ready to demonstrate the truth of all our claims.

Write for particulars.

Parmenter Fender and Wheel Guard Co.

84 Fiske Building, Boston, Mass.

"H-B" Universal Life Guard



fitted to this type of car made

U. S. A. RECORD

Third Avenue System (N. Y.) returns;—

2 men simultaneously picked up by one guard. Neither seriously injured when removed from tray.

5 persons picked up during October

Chicago City Railway;—

with only about 100 cars equipped.

Boy picked up on the 29th of November. Scrambled off tray and ran away before crew of car could ascertain name and address.

WONHAM, MAGOR & SANGER

30 CHURCH STREET (Hudson Terminal Bldg.), NEW YORK

141 MILK STREET, BOSTON

WORKS: PASSAIC, N. J.

Every Possible Calculation

in Addition, Subtraction, Multiplication and Division can be made more rapidly, and with less chance of error, with

The Millionaire Calculating Machine

than with any other mechanical computing device. It handles fractions as easily as you can add 2+2, and is an absolute necessity in any office where there is much figuring. It meets all the needs of modern business, including

Pro Rating in Railroad and Express Companies.

Cost Systems in Manufacturing Corporations.

Percentages, Foreign exchange and interest accounts in Banks and Financial Institutions.

Bill Extensions, and in fact all kinds of Simple and Compound calculations.

Our list of users is our best advertisement. Here are some of them.

United Traction Co., Albany, N. Y.
 Boston Elevated Ry. Co., Boston
 Mass.
 International Ry. Co., Buffalo, N. Y.
 Chicago City Railway Co., Chicago, Ill.
 Chicago Union Traction Co., Chicago, Ill.
 Cincinnati Traction Co., Cincinnati, O.
 Indiana, Col. & Eastern Trac. Co., Cincinnati, O.
 Cleveland Electric Street Ry. Co., Cleveland O.
 Fonda, Johnstown & Gloversville Ry., Gloversville, N. Y.
 Public Service Corporation, Newark, N. J. (3)

Rochester Railway Co., Rochester, N. Y. (2)
 Rochester Railway & Light Co., Rochester, N. Y.
 Toronto Street Ry. Co., Toronto, Can.
 Rockford & Interurban Ry. Co., Rockford, Ill.
 Springfield Consolidated Ry. Co., Springfield, Ill.
 Hodenpyl Walbridge Co., New York, N. Y.
 Stone & Webster, Boston, Mass.
 Utica & Mohawk Valley Ry., Utica, N. Y.
 Saginaw Valley Traction Co., Saginaw, Mich.

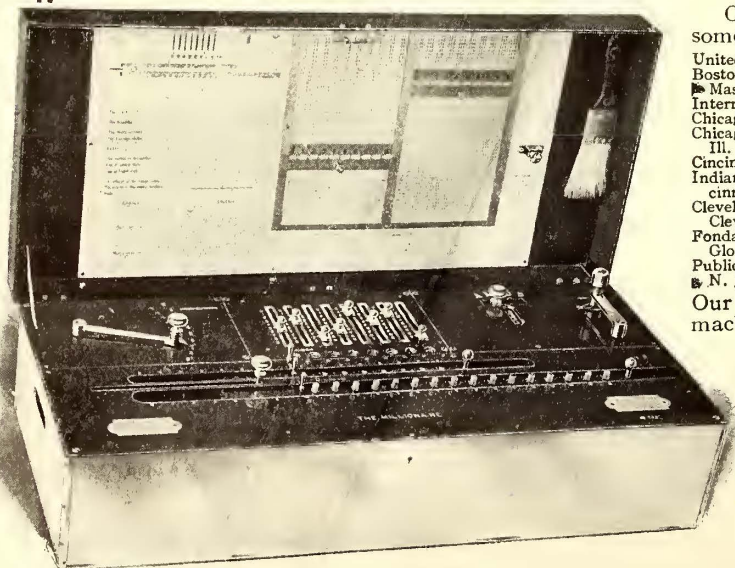
Our Booklet tells you about the many advantages of our machine over others. Better write for it today.

W. A. Morschhauser

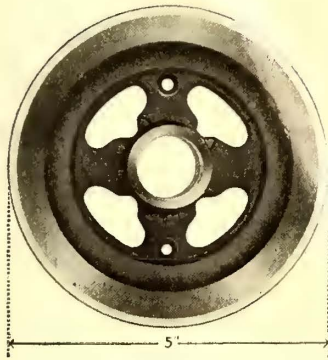
Sole Agent

Metropolitan Bldg., 23d St.

New York



"QUALITY Counts— PRICE is an Incident"



TYPE "D" WHEEL



**TYPE "D" HARP
WITH 5" WHEEL**

This harp is adapted for city or light Interurban service. The wheel is self-oiling from bearing which is 1" diameter, with 13/16" chamber space for lubricant, and fills from end of bearing. No screws to remove, and not necessary to disturb trolley wheel in any way. Large, durable contacts with large contact surface. Harp fits outside of trolley pole, and is reversible. Used either side. Design prevents fouling overhead.

Type "C" for 6" Wheel—City or Interurban service.

Type "B" for 6" Wheel—Flange extends above wheel and will retain the wire in Interurban service where sharp radius occurs.

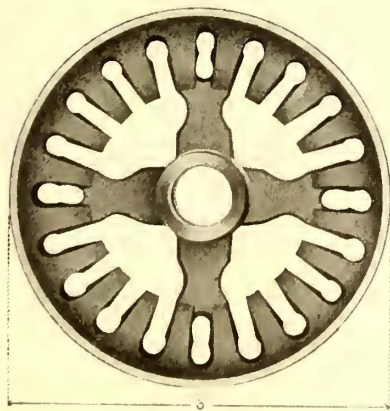
Type "A" insures tight fit, with perfect contact between harp and axle pin.

No. 3 Ball Bearing Base *IS THE KING*. Recommended by the best Interurban high speed service lines.

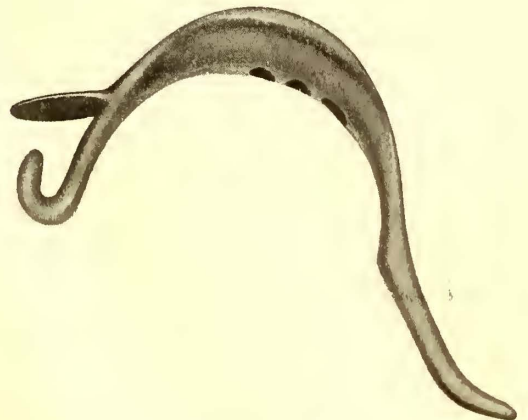
Our Anti-Friction Self-Oiling Pin Plate can be used with any standard socket and springs.

Tell us your troubles. If we can't cure them, we'll tell you so. Let us send you *at our expense* a No. 3 B.B. Base with harps and wheels indicated, and we will prove every statement made.

There are some Street Railway men who have never counted what it costs to "*light up*" the country *through which their line runs*.



SLEET WHEEL

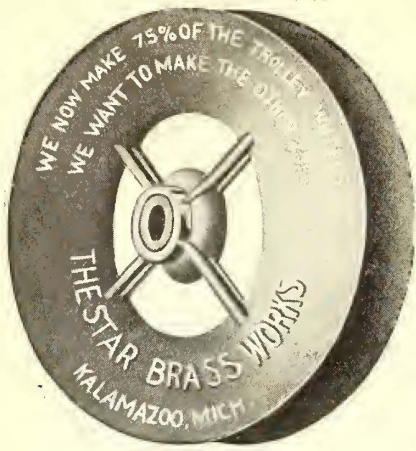


SLEET CUTTER

Let us have your inquiries for Trolley Poles, Catchers, Retrievers, Trolley, Register, and Bell Cord.

Yours to save money,

The HOLLAND TROLLEY SUPPLY CO.
Schofield Building, Cleveland, Ohio



The Kalamazoo Trolley Wheels

have always been made of entirely new metal, which accounts for their long life **WITHOUT INJURY TO THE WIRE.** Do not be misled by statements of

large mileage, for a wheel that will run too long, will damage the wire. If our catalogue does not show the style you need, write the

**LARGEST EXCLUSIVE TROLLEY
WHEEL MAKERS IN THE WORLD**

THE STAR BRASS WORKS
KALAMAZOO, MICH., U. S. A.

For City, Suburban and Interurban Cars

the one trolley base that gives most satisfaction is

The National Trolley Base

It has the same roller bearing feature as our regular Peerless Base, besides a cage of balls around the centre pin, which takes the friction of the end thrust, and makes it absolutely frictionless in its sidewise motion. Pressure on the wire is uniform at all angles of pole.

Our catalog describes it in every detail.
Shall we send it?

The Trolley Supply Co.
Canton, Ohio



Trolley Catchers

THE RIDLON No. 2

Manufactured of

Malleable Iron, No Screws Used



The Locking Device is positive in its action, and will not allow the pole to step upward in case the pole rebounds.

Catchers Sent on 30 days' Trial.

FRANK RIDLON COMPANY

253 A Street, Boston, Mass.

Representatives:

The H. M. ESTES CO., San Francisco, Cal.

H. DE STEESE, 26 Cortlandt Street, New York City

W. R. GARTON CO., Chicago, Ill.

ELECTRIC AGENCIES CO.,

1010 Howard Street, San Francisco, Cal.

High-Speed Trolley Equipment

Pleases the
Traveling
Public



Use

The Bayonet.

Harps, wheels or poles that become damaged from long usage can be

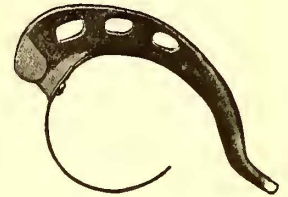
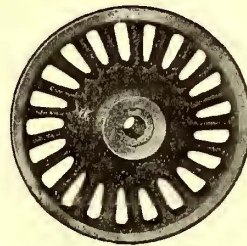
Changed in Ten Seconds.

Perfect alignment of wheel. Perfect traction. Easiest and cheapest maintained.

Only ten seconds to change from Wheel to Sleet Cutter. Perfect conductivity. Cannot clog up with ice. Has two cutting edges; when one side wears out, turn it over and use the other. In satisfactory use for four years. Outwears ten of other makes, and cost only half as much. Try them and see.

Bayonet Trolley Harp Co.

Springfield, Ohio



A New Year's Resolution

that every traction manager will find it wise to keep in the interest of his road, is to always have on hand a stock of

Nuttall

Sleet Wheels and Sleet Scrapers

Thus prepared the worst sleet storms with the resulting icy lines, have no terrors, no matter how unexpected their arrival.

Nuttall---Pittsburg

When in a hurry, wire us

REDUCE TROUBLE AND EXPENSE

of your railway motors by installing

LA CLEDE BRUSHES

Various textures to apply to various local conditions. Samples free.

NATIONAL CARBON COMPANY, Cleveland, Ohio,

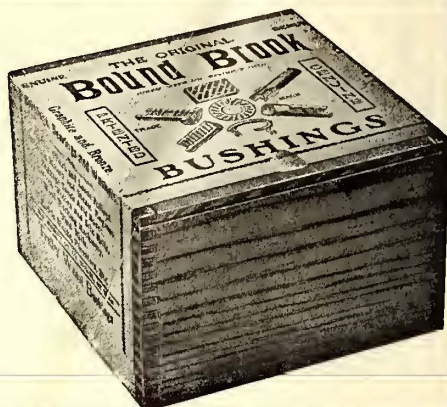
Bound Brook Trolley Wheel Bushings

are in use by a large majority of the electric roads in the United States and foreign countries.

More than twenty years of experience and improvement are back of each bushing.

Packed in boxes of 50 and cases of 1,000.

Look for the trademark and the green label. Write for booklet.



GRAPHITE LUBRICATING CO.

2 Church Street - - - - - Bound Brook, N. J., U. S. A.

FULL PROTECTION

We are prepared to close in the sides of the platforms on cars that already have front protection.

See illustration.

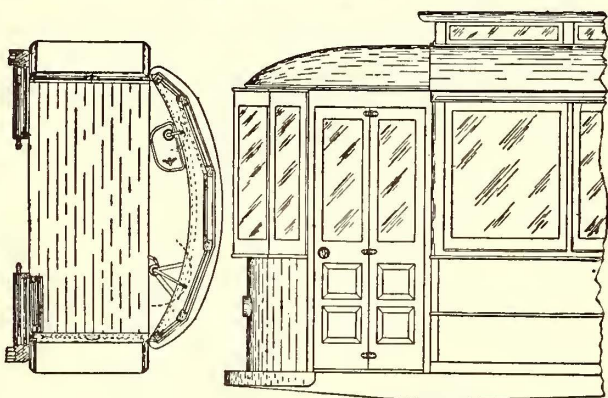
Write for particulars.



The Most Popular Car Sash and Blind Spring on the Market

J. P. SJOBERG & CO.

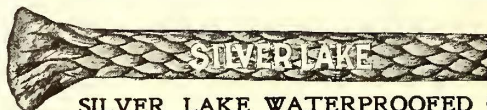
533-539 West 32d Street, New York City



PREVENT ACCIDENTS

by installing a SIGNAL that will keep people from going back of one car to in front of another on adjoining track. Electric lights and gong inside, operated by motorman in front.

A. O. NICHOLS
P. O. Box 580 OMAHA, NEB.



Send for Sample

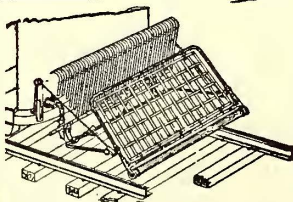
SILVER LAKE WATERPROOFED CORD FOR ARC LIGHT AND TROLLEY CORD

SILVER LAKE CO., Boston, Mass.

THE ONE SUCCESSFUL MOMENTUM BRAKE

Depends only on the brake shoes for stops. Brake handle no bigger than that of air brake. Makes smooth stop or emergency stop. For any car anywhere. Write.

MOMENTUM AUTOMATIC BRAKE CO., 12 Broadway, New York



ECLIPSE LIFE GUARD

Manufactured by the ECLIPSE RAILWAY SUPPLY CO. CLEVELAND, O.



LINE MATERIAL
RAIL BONDS
GEARS AND PINIONS
FARE REGISTERS
TRACK JACKS AND DRILLS
MOTOR AND CONTROLLER PARTS
LIGHTING SUPPLIES
LIGHTNING ARRESTERS

Railroad and Tram Car Specialties

New Inventions developed, perfected and worked for the English Market

Messrs. G. D. Peters & Co., Ltd.

Moorgate Works Moorfields, LONDON, E. C.

MOTORMEN — CONDUCTORS

Begin The New Year
by discarding that cheap watch
UNRELIABLE — OUT-OF-DATE — BULKY
and substitute

Our "Trolley Special"

A STRICTLY HIGH GRADE MOVEMENT



Thoroughly Reliable
Correct to the Second
Double Roller Lever
Jeweled—Breguet
Hairspring
Cut Expansion
Balance
and other
Railroad
Requirements

Cased in Nickel
\$4.00

Cased in—20 year
—Gold Filled
\$9.00

Heavy Black Figures and Hands
Easily distinguished in a dim light

Of all dealers or direct if dealer's name accompanies

The New England Watch Co.

110 Dover Street

Waterbury, Conn.

A 30% saving
can be
shown to result
from the use of



**Lumen Bronze Metal
Mold Motor Bearings**

They eliminate machine work
and the extra weight of sand
castings which must be turned
off. 8 sizes are ready for use
and we can make prompt
shipments. ∴ ∴ ∴ ∴

Also Truck Bearings
Check Plates
and Trolley Wheels

**LUMEN
BEARING CO.**
BUFFALO, N. Y.

Post's ZERO and MOTOR Metals

for axles and armature bearings.
Made from absolutely new and best grade of
raw materials, thus insuring uniformity and
reliability.

Zero for your axles.
Motor No. 1 for your armatures.

The Standard babbitt for a quarter century

Post's Corrugated Metal Discs
for high and low pressure steam and other valves.

E. L. POST & CO., Inc.
Sole Manufacturers

50 Cliff Street,

New York

GILBERT

"C" GRADE

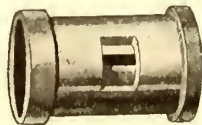
BABBITT METAL

is the "best ever" for armature bearings.
More mileage, less friction. A test will
show you. Write for our prices.

A. Gilbert & Sons Brass Foundry Co.

ST. LOUIS,

MO., U. S. A.



**Elliptical and
Helical Springs**

and

**STEEL-TIRED
WHEELS**

for

**Electric Railway
Service**

**RAILWAY
STEEL-SPRING**

CHICAGO
ST. LOUIS
ST. PAUL

CO., WASHINGTON
DETROIT
LOUISVILLE

General Office,

30 Church Street, New York

Business Books for Electric Railways

Freight Transportation on Trolley Lines

By Charles S. Pease

62 pages, 4½ x 7½, \$1.00 (4/6) net postpaid.

A valuable little book on possibilities that have been developed by few trolley lines. The book is a report, such as a progressive general manager would find most useful, on a phase of street railroading that has not been considered feasible by the average road. Its results are convincing and clearly set forth.

Freight transportation is not only feasible but profitable in a great majority of cases. In this little book Mr. Pease demonstrates that fact clearly.

He takes up the general considerations and the many objections and obstacles. He shows how these have been adjusted and how they can be avoided. He then considers the possibilities, the kinds of freight that can be handled, including primarily night haulage, the best methods of developing the business, etc. He takes up as well the organization and equipment, rates and accounting.

CONTENTS: General Considerations. The Canvass. Maps and Statistics. Routes and Time Schedules. Stations and Depots. Cars. Side Tracks. Employes. Classification and Rates. Interstate Commerce and Public Service Commissions. Accounts and Stationery. Instructions to Employes. Connecting Lines. The Platform Package System. The Public. In Conclusion.

Electric Railway Auditing and Accounting

By Wm. H. Forse, Jr., Vice-President American Street and Interurban Accountant Association. 160 pages, 6 x 9, 50 illustrations. \$2.00 (8/6) net postpaid.

The accounting requirements of interurban railways engaged in local and interline business have been carefully considered, and some special features of city railway accounting are explained.

The three essentials of any good system of accounting are clarity, accuracy and comparative economy. It has been the author's endeavor to eliminate from the methods outlined those which tend to sacrifice these valuable features.

The forms illustrated are copies of ones actually used by American electric railways, with the exception that company names are omitted.

CONTENTS

CHAPTER I.—Introductory. II.—Construction Accounts. III.—Ledgers, Posting Mediums, and the Balance Sheet. IV.—The Income Account. V.—Auditing Conductors' Collections. VI.—Tickets and Ticket Accounting. VII.—Freight and Express. VIII.—Baggage. IX.—Interline Tickets and Baggage. X.—Interline Freight Accounts. XI.—Station Records and Accounts. XII.—Station Audits. XIII.—Damage Claims. XIV.—Material and Supplies Account. XV.—Shop Records. XVI.—Amusement Park Accounts. XVII.—Voucher Disbursements. XVIII.—The Pay Roll. XIX.—Interest, Taxes and Dividends. XX.—Additions and Betterments. XXI.—Car Miles, Car Houses and other Units. XXII.—Graphic Statistics. XXIII.—Reserves and Sinking Funds. XXIV.—Classification of Accounts.

Guarantee: When cash accompanies an order for McGraw-Hill books the purchaser may, within five days of receipt of the books, return any or all of his purchase for any reason whatsoever, and his money will be refunded promptly and without question.

We can supply any engineering book in print.

McGRAW-HILL BOOK COMPANY

239 West 39th Street, New York

London Office: 6 Bouverie Street, E.C.

Publishers of Books for The Electric Railway Journal

Electric Railway Accounting

The Monthly Report, The Accounting Department and the Accountant

By W. B. BROCKWAY

Ex-President of the American Street and Interurban Railway Accountants' Association.

Cloth, 90 pages with blank forms, price, \$1.25 (5/6) net postpaid.

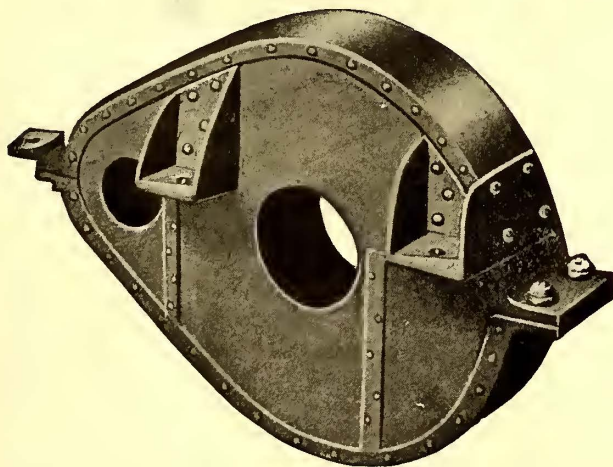
The subject of accounting is very large; it is the beginning and the result of all effort wherein money or its equivalent forms a part. It follows, therefore, that such a comprehensive subject must be treated in its different lines of action, that is, specialized.

Many works have considered the accounting of electric railways, but always from a standpoint outside the actual operation of such work. It is hoped here to show the subject in a somewhat more intimate light.

CONTENTS

I.—What a Report Should Be. II.—Suggested Form of Report. III.—Relation of Operating Expenses to Earnings. IV.—Some Other Units of Comparison. V.—Curves as a Means of Expression. VI.—Statistical Formation. VII.—What Standardization of Accounts Means. VIII.—The Balance Sheet. IX.—Accrued and Suspended Accounts. X.—Expert Examinations. XI.—Accounting Department Not a Revenue Producing Department. XII.—Some Qualifications of a Railway Accountant. XIII.—The Accounting Office. XIV.—Taking Things for Granted.

COLUMBIA STEEL GEAR CASES



All patent rights reserved

Made to wear. Minimum of weight and maximum of strength. Dust-tight, water-tight, oil-tight.

This gear case is made of Steel throughout, top and bottom being flanged over sides and ends. SPECIAL FEATURE: Brackets are bent over sides, removing all strain from rivets.

Opening in cut shows bracket bent over inside. Bracket is also reinforced on inside and braced from bottom. Ends of gear case are reinforced and bottom and top double-riveted.

They are endorsed by all Railways using them. We make all types.

Prices on Request.

**Columbia Machine Works
and Malleable Iron Co.,
BROOKLYN :-: NEW YORK**

VAN DORN COUPLERS

have made a world's record for 10 years' most rigid service on the heaviest electrical equipment throughout the country. 200,000 in use. Our latest achievement is our No. 20 through the tubes of the Hudson Tunnel.

Write for booklet of information on couplings and drafterings.

W. T. VAN DORN CO., Chicago, Ill.
2325 So. Paulina Street

The Janney Radial Coupler

For Electric Interurban Service. Of the M. C. B. type. Couples interchangeably with steam equipment.

Manufactured only by

The McConway & Torley Co.
Pittsburgh, Pa.

GENUINE Barrett Jacks

**Duff Ball-Bearing
Screw Jacks
Barrett Motor
Armature Lifts**

THE STANDARD ON THE RAILWAYS OF THE WORLD FOR TRACK WORK, CAR REPAIRS AND FOR THE EMERGENCY CAR EQUIPMENT OF ELECTRIC RAILWAY SYSTEMS.

SEND FOR CATALOGUE "K"

THE DUFF MFG. CO.
NEW YORK: 50 Church St. PITTSBURGH, PA.



**UNION SPRING &
MANUFACTURING CO.**

Springs

Coil and Elliptic

**M.C.B. Pressed Steel
Journal Box Lids**

General Office: Farmers Bank Bldg.
PITTSBURGH, PA.

Works: New Kensington, Pa.

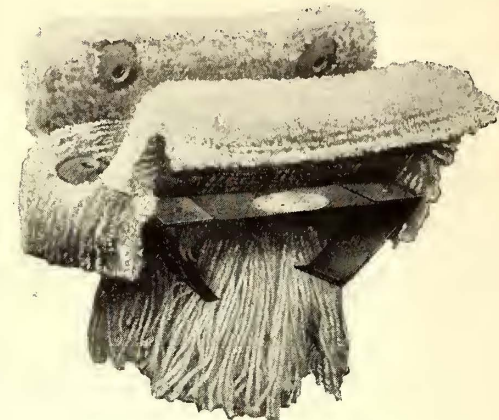
50 Church St., New York
1204 Fisher Bldg., Chicago, Ill.
Missouri Trust Bldg., St. Louis, Mo.

PERFECT SAVES OIL

JOURNAL

SAVES MONEY **LUBRICATION**

PREVENTS HOT BOXES




Armstrong Journal Oiler

SAMPLES FOR TRIAL
Catalogue and Information Cheerfully Given

ARMSTRONG OILER CO.
31st and Chestnut Streets, Philadelphia

OHIO BRASS CO.
MANSFIELD, OHIO Agents West of Pennsylvania



SYMINGTON


JOURNAL BOXES

FOR CITY SERVICE

The

T. H. Symington Company

Calvert Building Railway Exchange
BALTIMORE, MD. CHICAGO, ILL.



SPECIAL NOTICE—We are prepared to furnish at once **REPAIR BOXES** for any make of Truck in service

The reason that all competitors say, "We have something as good as **Whitmore's Gear Protective Composition**," is because they recognize this as being a superior article to others; and while they have failed to accomplish the same results as **Whitmore's Gear Protective Composition** will produce, they admit that there is nothing on the market in this or foreign countries to be compared with it.

The Whitmore Manufacturing Company
Cleveland, Ohio, U. S. A.

4

APPLY

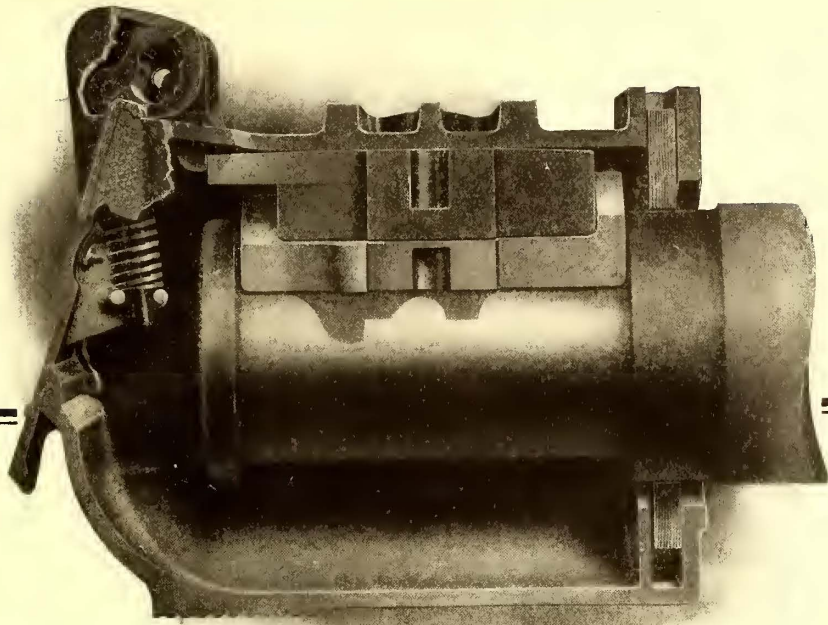
Dixon's Flake Graphite

to all bearings that
squeal or run hot.
They'll cool quickly.

Sample 108-C free to you.

JOSEPH DIXON CRUCIBLE COMPANY,
JERSEY CITY, N. J.

1



There are More
McCord Journal Boxes

in use on the railroads
of this country than all
other makes combined.

MADE IN CAST STEEL,
MALLEABLE IRON,
"SEMI" STEEL AND
G R A Y I R O N .

McCord & Company

Chicago—Old Colony Bldg.
New York—50 Church St.

If The Brake Shoe Problem Keeps You Guessing

—let us send one of our experts to study your road. He will be able to pick out a type from our line of

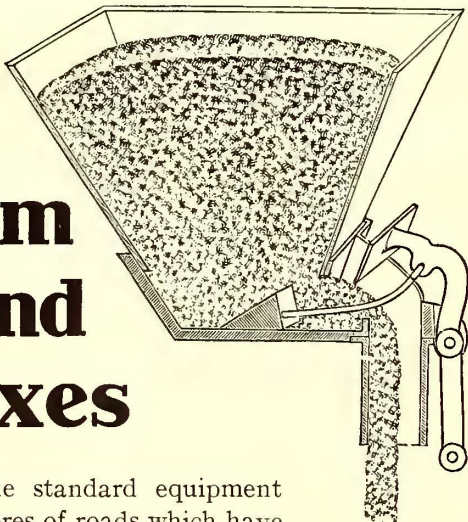
STANDARD BRAKE SHOES

that will show minimum wear on wheels, and make your brake shoe money go farther than it does now.

We are certain we can save you money. Ask us why—and make us prove it.

Standard Brake Shoe Co. General Offices and Works
—AURORA, ILL.—
Chicago Office; Fisher Building

Ham Sand Boxes



are the standard equipment on scores of roads which have tested competing boxes and found them wanting. Moisture is positively excluded from the hopper, and packing and freezing of the sand are prevented. Our catalog describes our entire line.

Write for it.

Cable address:
"HAMBOX"

Ham Sand Box Co., Troy, N. Y.



No costly grinding machine

for truing up flat wheels is needed in your shops if you use

The Wheel Truing Brake Shoe

It makes it unnecessary to remove worn wheels, and gives you the full use of your cars, in regular service, while the truing process is going on. *Will you have details?*

Wheel Truing Brake Shoe Co.

Detroit, Mich.

BUDA MOTOR CARS

If you are not acquainted with the advanced types made by us learn of them now by writing for our catalogue. We have styles particularly adapted for use in connection with construction work.

THE BUDA COMPANY

NEW YORK

CHICAGO

ST. LOUIS

GEARS AND PINIONS

Of the GUARANTEED kind only

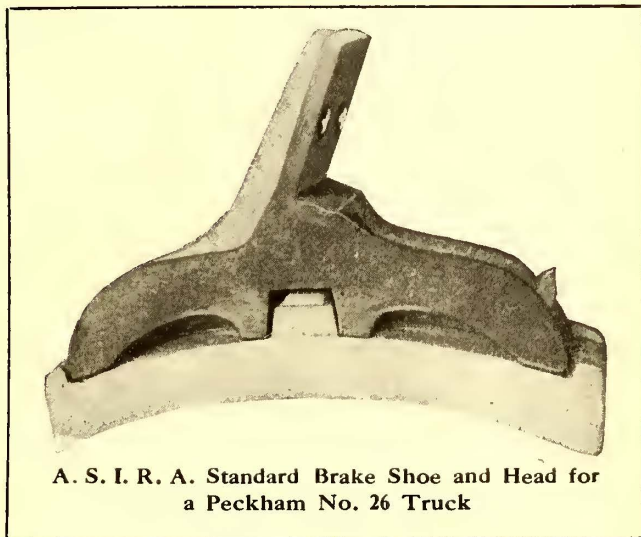
We solicit your business on the basis of good workmanship, prompt deliveries and attractive prices.

VAN DORN & DUTTON CO., Cleveland, O.

Your Experience Plus Ours

ought to make a winning team if we concentrate on the problem of reducing your brake shoe costs. Your experience and familiarity with the conditions existing on your road plus our experience in applying our brake shoe knowledge to hundreds of roads—a combination that will solve any solvable problem. We're ready to send our engineers and let them work for you at our expense.

When can we get together?



A. S. I. R. A. Standard Brake Shoe and Head for a Peckham No. 26 Truck

American Brake Shoe & Foundry Co.

Hudson Terminal Bldg., 30 Church St., NEW YORK

MAHWAH, N. J.

Western Union Bldg., CHICAGO



Brake Shoes



What are you paying now? How many miles are you getting? Are you wearing out wheels to get longer mileage of shoes?

WE HAVE MADE BRAKE SHOES FOR 22 YEARS AND HAVE MADE GOOD

Minimum Wear on Wheels. Minimum Wear on Shoes. Long Life and Uniform Wear.
Let us convince you. Don't make contracts without getting our proposition.

LOUIS STREUBER, President, Erie, Pa.
ELMER P. MORRIS, Vice-Pres., New York

J. F. AUSTIN, Secy. and Treas., Corry, Pa.
J. J. RESSLER, Gen. Manager, Walton, N. Y.

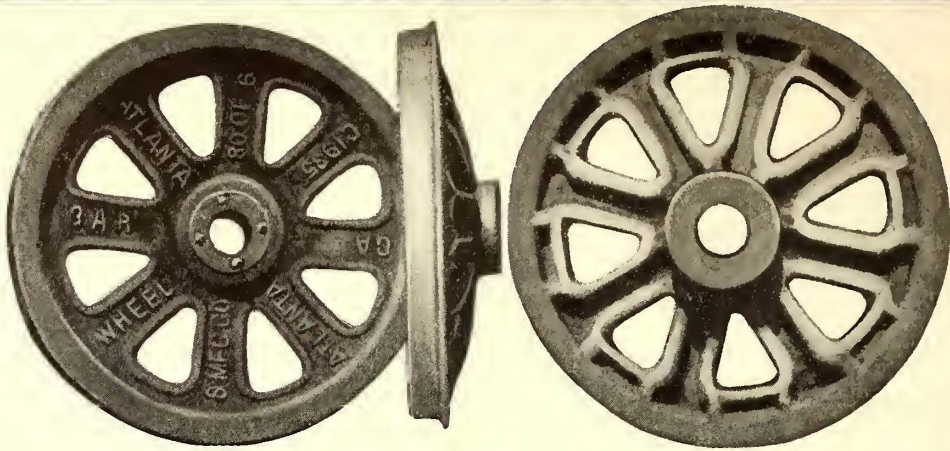


U. S. Brake Shoe Co.

Sales Office:
90 West St., New York

Foundries
Walton, N. Y., Corry, Pa.,
Pittsburg, Pa.





Reinforced Spoke Car Wheels

are especially adapted to high speed service. Their deep, uniform chill insures greater mileage. The strength of flanges insures maximum safety at high speeds, and make them superior for any service. We make a specialty of fitting and refitting.

Write for illustrated booklet.

Atlanta Car Wheel & Mfg. Co., ATLANTA, GA.

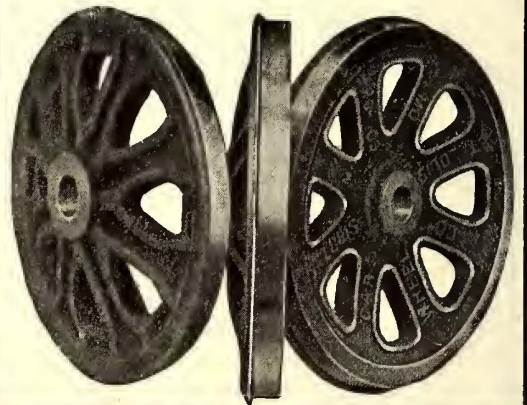
Re-Enforced Spoke Wheels FOR CITY AND SUBURBAN CARS

This Wheel is being substituted in place of the Old-Style Plate Wheel because it does not rumble and roar when on paved city streets. The only spoke wheel for Heavy, High-Speed Service.

Stronger Spokes Stronger Flange Deep, Even Chill
Greater Mileage Absolute Safety

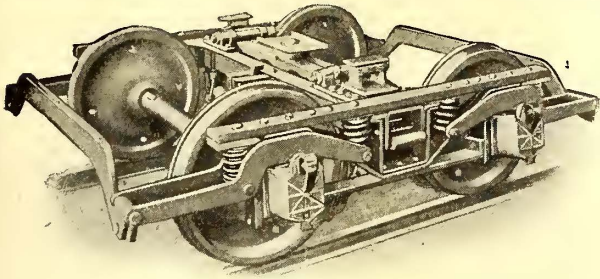
Sample order will prove its superiority over the Old-Style Spoke Wheel.
 Write for Booklet on Wheels.

ST. LOUIS CAR WHEEL CO., St. Louis, Mo.



FOUNDRIES
 CHICAGO DETROIT
 DENVER ST. PAUL
 TACOMA BOSTON
 KANSAS CITY
 GENERAL OFFICES
 WESTERN UNION BLDG.
 CHICAGO

GRIFFIN WHEEL COMPANY
 CHILLED IRON
Car Wheels
 OF EVERY DESCRIPTION
 FOR ALL CLASSES OF SERVICE
 IRON OR STEEL AXLES. REFITTING A SPECIALTY



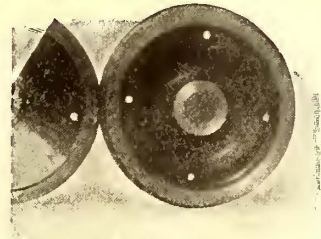
Baldwin Trucks

Carefully designed to meet operating conditions, built of the highest grade materials and put together like a machine by experienced workmen.

Write for Catalog.

Baldwin Locomotive Works Philadelphia, Pa., U. S. A.

Branch Offices:
New York, Hudson Terminal. Chicago, Railway Exchange.
St. Louis, Security Bldg. Portland, Ore., Couch Bldg.



Standard Wheels

Solid forged, rolled and turned or steel tired as you prefer. Also highest grade axles, springs, etc. You can depend upon the quality of all "Standard" products.

Catalog on request.

Standard Steel Works Co. Harrison Bldg., Philadelphia, Pa., U.S.A.

New York, N. Y. Cleveland, O. St. Louis, Mo.
Portland, Ore. Richmond, Va. Chicago, Ill. St. Paul, Minn.
San Francisco, Cal. Pittsburgh, Pa. Seattle, Wash.

Carbon Brushes

HAVE YOU EVER TRIED

Le Valley Vitae Brushes?



If not, then you don't know what they are or what they will do. We will let the man who has used them tell the story, or we will tell you ourselves if you write us.

Samples? Certainly. Write for some.

Le Valley Vitae Carbon Brush Co.
685 Tremont Avenue, New York

DIAMO

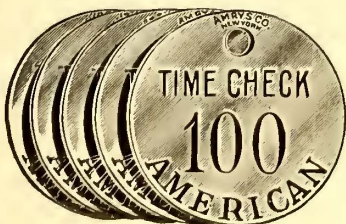
Carbon Brushes

are manufactured from carbon formed with integral coherency from the burned products of hydrocarbon. They have wonderful electrical conductivity, do not scratch, blacken nor discolor the commutator, and last much longer than any other. Non-sparking and self-lubricating.

Samples are yours for a word. Write!

Universal Carbon Co.
6 Beacon Street, Boston, Mass.

Factory Time Checks



No other system has proved so simple, so inexpensive to install and so satisfactory in operation as the TIME CHECK SYSTEM.

Our pamphlet "Time Checks and Their Use" is well worth the three minutes necessary for a reading.

Send for our Form 13

American Railway Supply Company
24 Park Place, New York

SOUTHERN RAILWAY SUPPLY CO.

GENERAL RAILWAY SUPPLIES

ST. LOUIS, U. S. A.



"MODOC" CAR CLEANER

Preserves the finish. Not a soap nor an acid. The standard for 10 years.

THE MODOC CO., Inc.
FERNWOOD, PA.

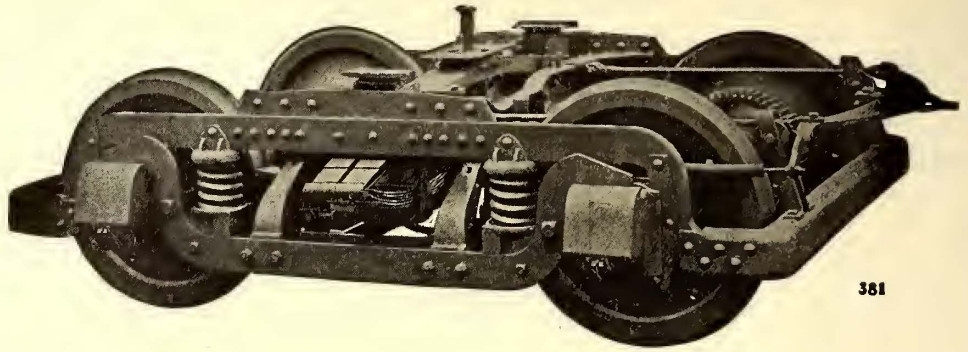
Philadelphia Office: 109 Chestnut Street

STANDARD HIGH-SPEED "INTERBOROUGH" DOUBLE TRUCK
TYPE C-60

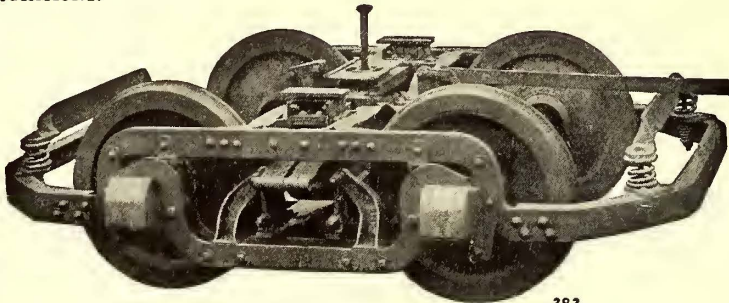
"Solid Forged"

WITHOUT WELDS

FRAMES ARE MADE FROM ROLLED OPEN-HEARTH STEEL WITHOUT WELDS. ALL WEARING BOLTS ARE TURNED AND CASE HARDENED, AND WEARING HOLES STEEL THIMBLED. M. C. B. STANDARD PRINCIPLES ARE FOLLOWED. WE ARE PREPARED TO BUILD TRUCKS IN ACCORDANCE WITH PURCHASER'S DESIGNS AND SPECIFICATIONS.



381

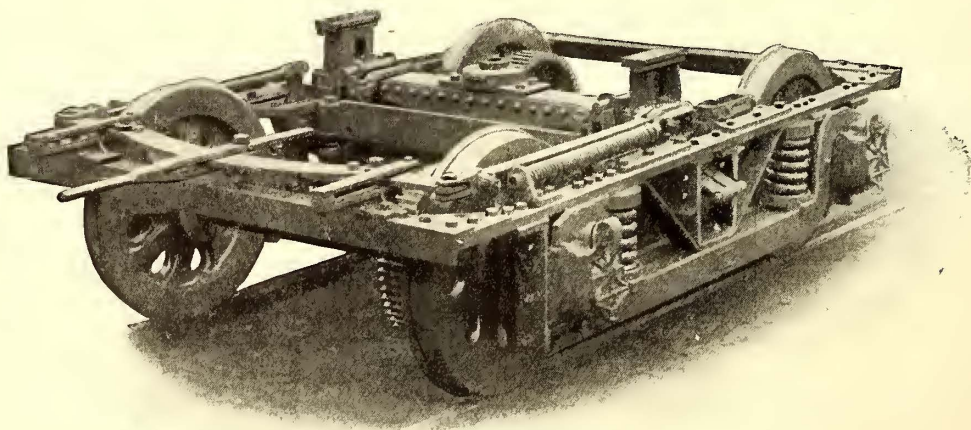


383

STANDARD
"SHORT WHEEL BASE"
 CITY AND SUBURBAN
DOUBLE TRUCK
 TYPE O-50

STANDARD MOTOR TRUCK COMPANY, Frick Bldg., PITTSBURGH, PENNSYLVANIA
 NEW YORK OFFICE: 170 BROADWAY WORKS: NEW CASTLE, PA. (2) CHICAGO OFFICE: FISHER BUILDING

HIGH-SPEED ELECTRIC MOTOR TRUCK



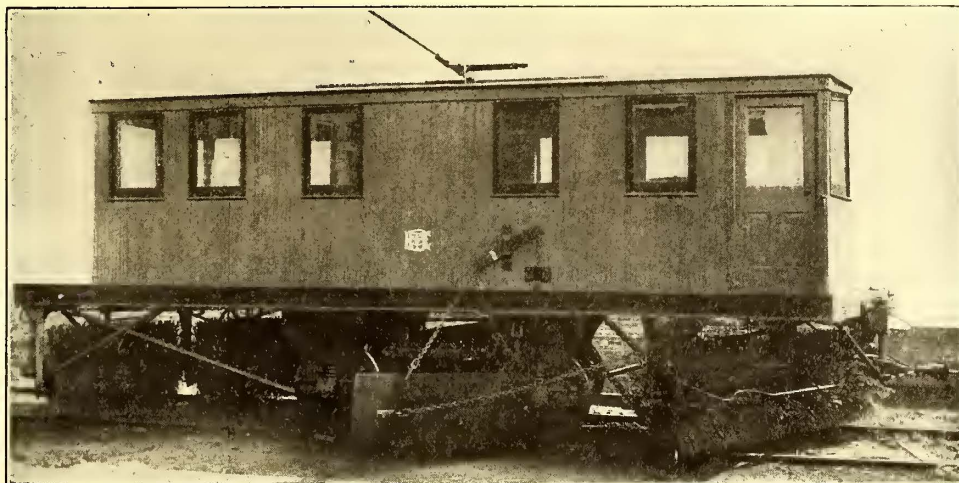
Type "B" Electric Motor Truck, built for a speed of from 30 to 50 miles an hour, and for a carrying capacity of from 20,000 to 30,000 pounds at center plate.

The frame is constructed of wrought iron bars, tied together at ends by heavy angles and reinforced at corners with plate steel gussets.

The frame construction of this type of truck presents advantages over the solid forged for quick repairs.

AMERICAN LOCOMOTIVE COMPANY, 30 Church Street
NEW YORK 4

McGuire-Cummings Mfg. Co.



McGUIRE-CUMMINGS MFG. CO.'S SINGLE TRUCK SWEEPER (Patented)

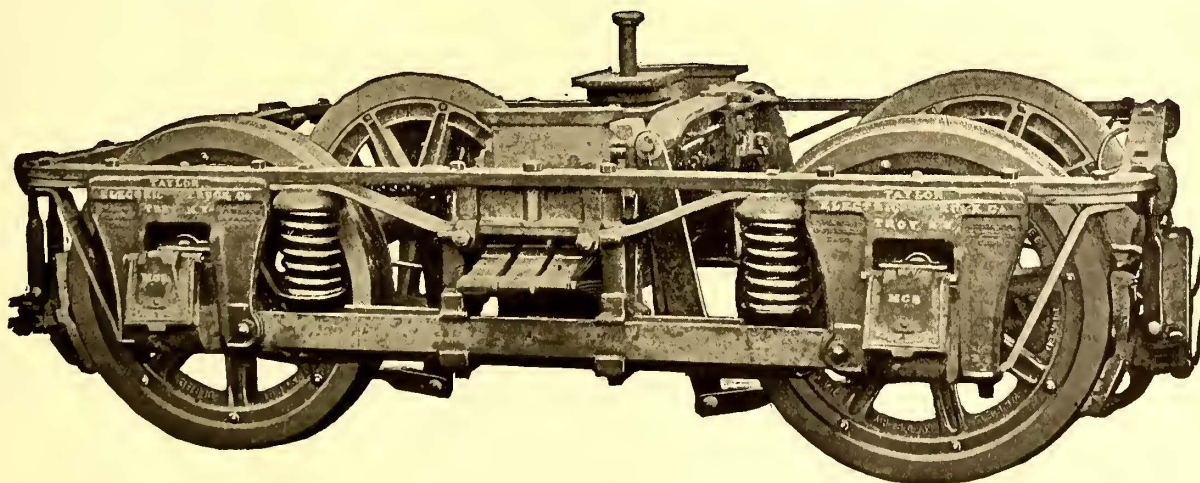
Single and Double Truck Snow Sweepers and Plows, Cars,
Trucks and Sprinklers.

Works: CHICAGO and PARIS, ILL. General Offices: CHICAGO, ILL.

TAYLOR

M. C. B. DOUBLE TRUCK

IS SUPERIOR TO ALL OTHERS FOR HIGH-SPEED SERVICE

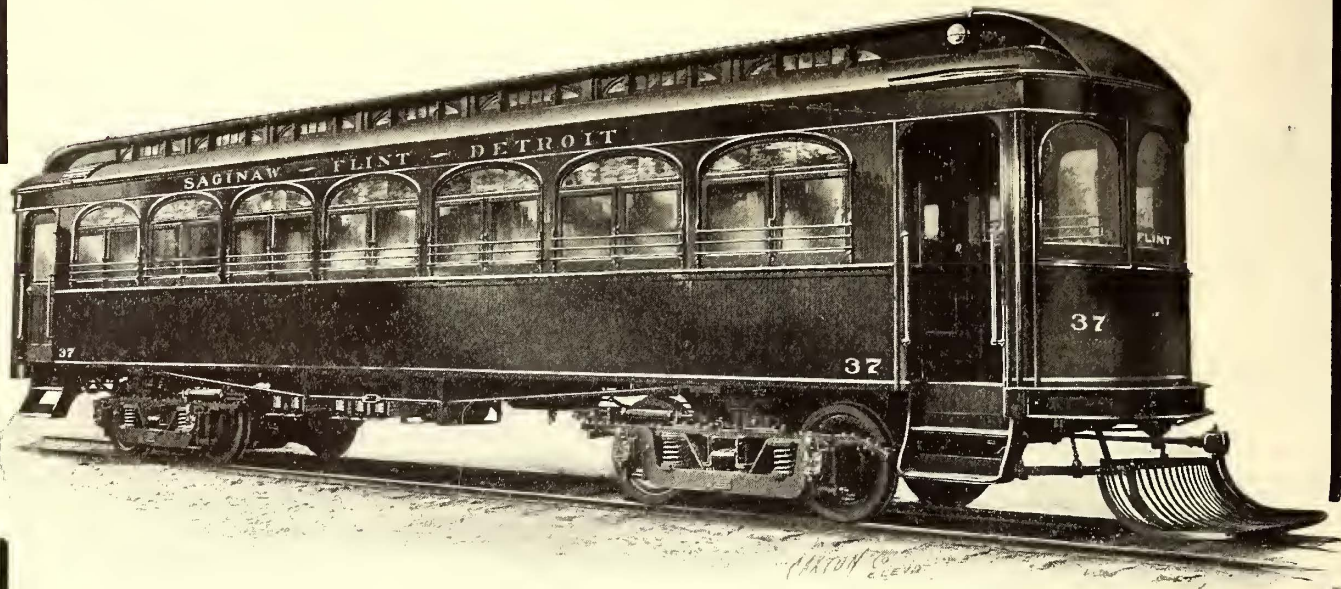


TAYLOR ELECTRIC TRUCK CO., TROY, N. Y.
U. S. A.

MANUFACTURERS OF

Highest-Grade Electric Car Trucks
Coil and Elliptic Springs for any type of truck
Steel-Tired Wheels with Malleable Center

NILES CARS



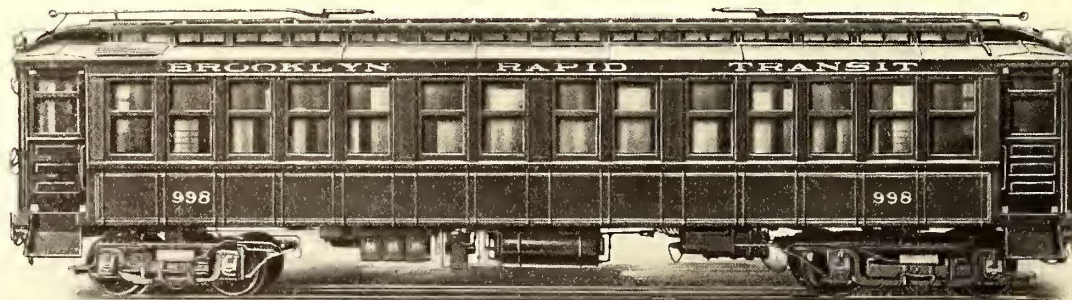
NILES CAR AND MFG. CO.

Works: Niles Ohio—Sales Office: 312 Electric Building, Cleveland

Makers of all Classes of Cars for Electric Railways Catalogs, Specifications and Prices for Prospective Purchasers.

PRESSED STEEL CAR COMPANY

STEEL PASSENGER CARS AND TRUCKS For STEAM and ELECTRIC RAILWAYS



Steel Passenger Car, "Easy Access" Type.

STEEL and COMPOSITE FREIGHT CARS

Offices: New York

Chicago

Pittsburg

St. Louis

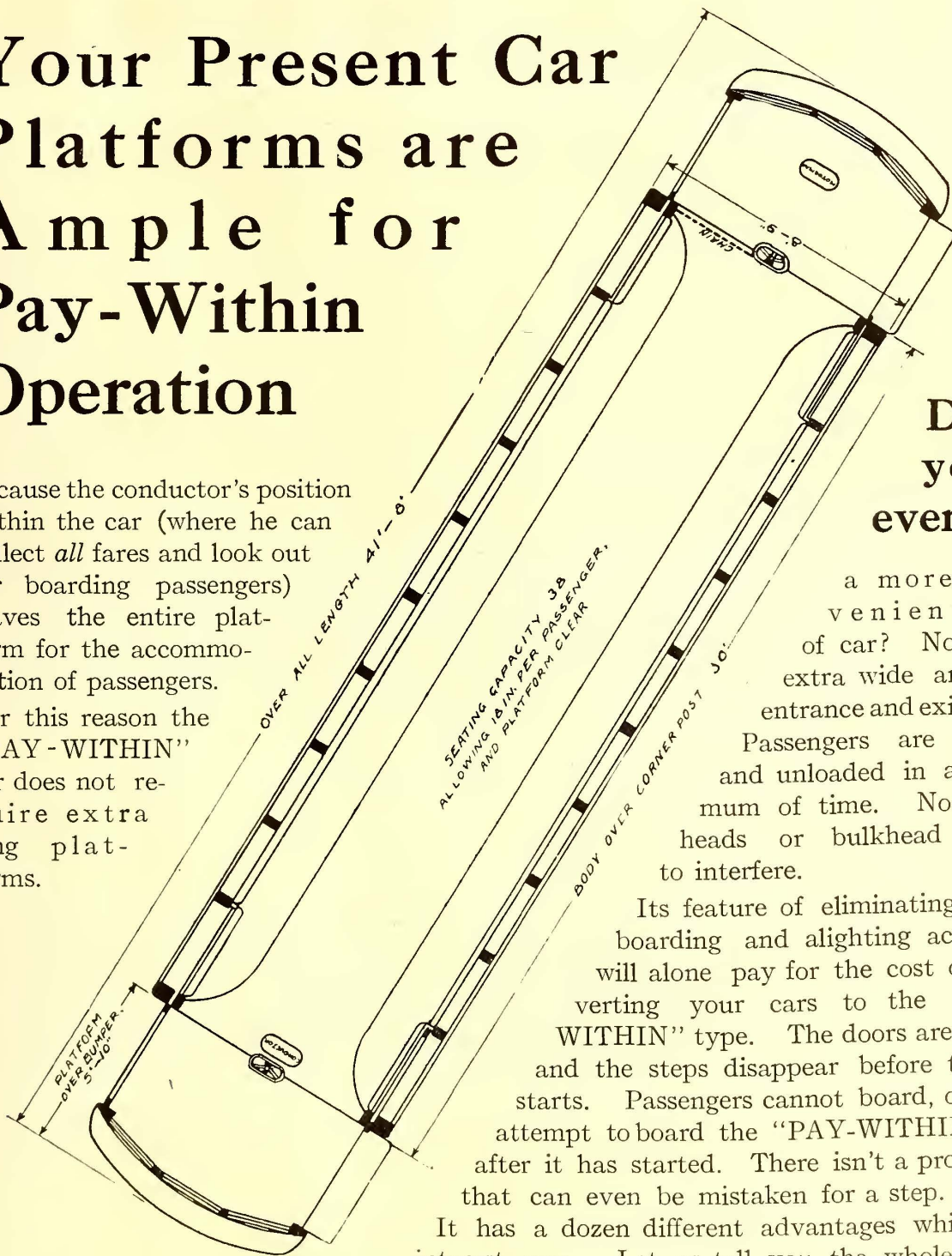
Atlanta

Mexico City

Your Present Car Platforms are Ample for Pay-Within Operation

because the conductor's position within the car (where he can collect *all* fares and look out for boarding passengers) leaves the entire platform for the accommodation of passengers.

For this reason the "PAY-WITHIN" car does not require extra long platforms.



**Did
you
ever see**

a more convenient type of car? Note the extra wide and free entrance and exit ways. Passengers are loaded and unloaded in a minimum of time. No bulkheads or bulkhead doors to interfere.

Its feature of eliminating ALL boarding and alighting accidents will alone pay for the cost of converting your cars to the "PAY-WITHIN" type. The doors are closed and the steps disappear before the car starts. Passengers cannot board, or even attempt to board the "PAY-WITHIN" car after it has started. There isn't a projection that can even be mistaken for a step.

It has a dozen different advantages which will interest you. Let us tell you the whole story.

ELECTRIC SERVICE SUPPLIES CO.

Railway Material & Electrical Supplies

PHILADELPHIA

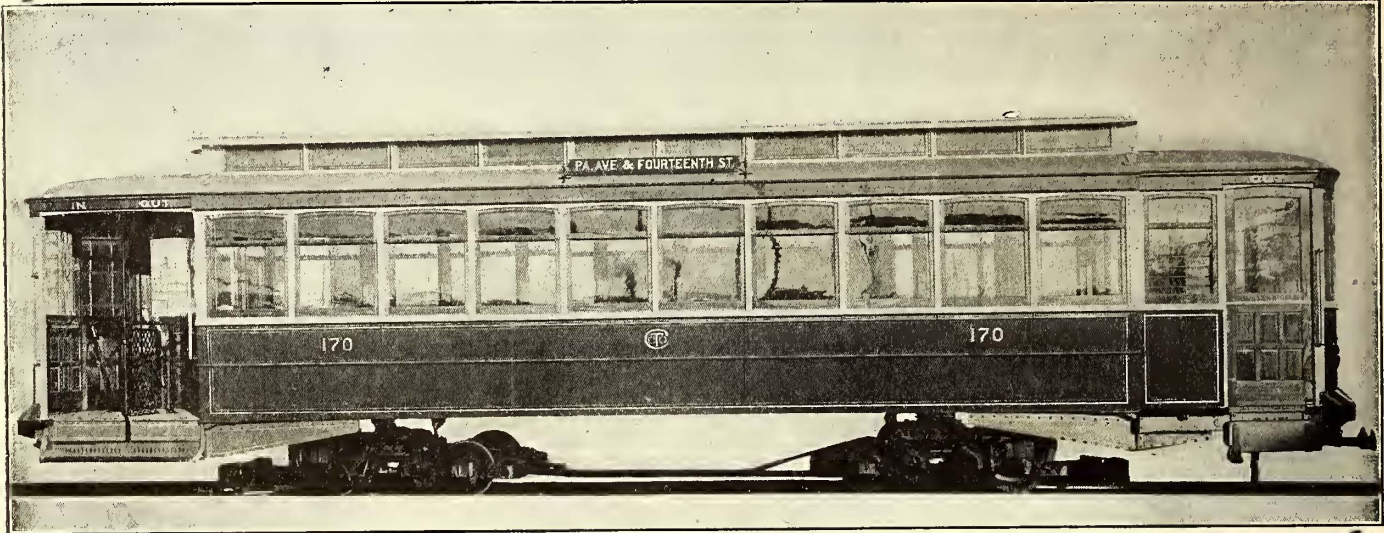
General Sales Agent for

CHICAGO

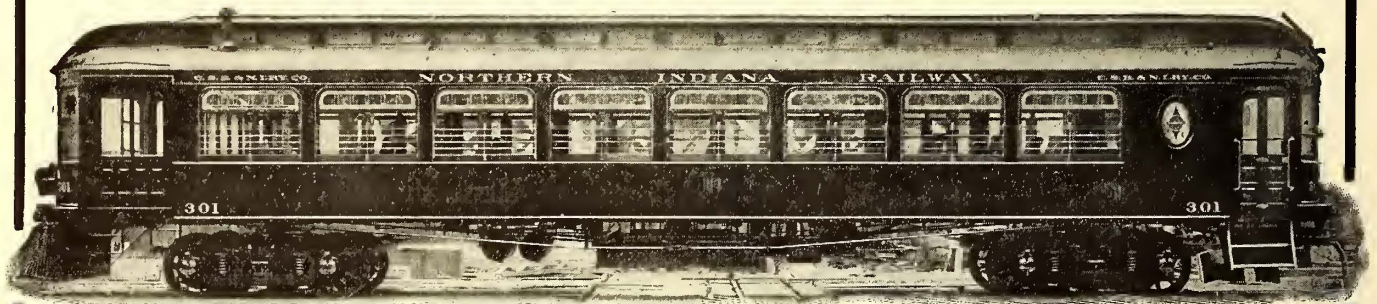
THE PAY-WITHIN CAR CO.

THE CINCINNATI CAR COMPANY

Winton Place, Cincinnati, Ohio



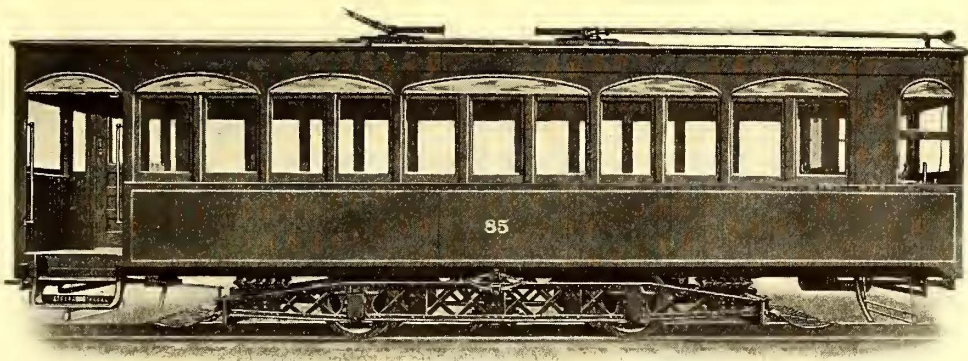
Type "Pay-As-You-Enter" Cars. Built for The Capital Traction Co.,
Washington, D. C.



High-Speed Interurban Cars on Lines of Chicago,
South Bend & Northern Indiana Railway.

**Builders and Designers of all types of elevated,
interurban and surface cars**

SPECIFICATIONS AND DRAWINGS PROMPTLY FURNISHED



Can You Afford To Operate "Standard" Cars

when, with equal carrying capacity, you can cut your maintenance and operating expenses practically in two by using

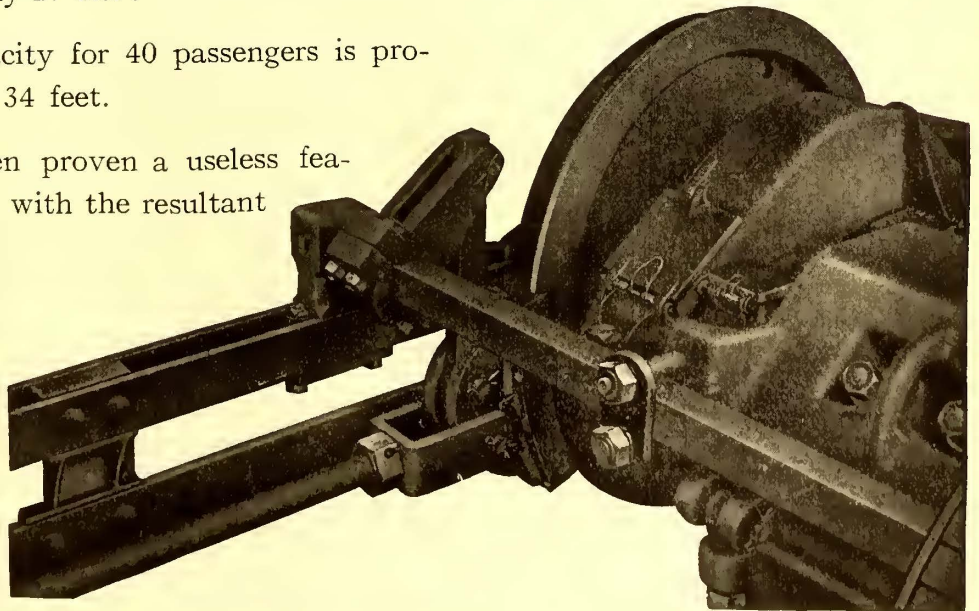
The Barber Car

Its light weight—only 11 tons—is due largely to the unique construction of its single truck, which gives practically double-truck support and does away with the disagreeable galloping motion common to other single-truck cars. Its current consumption at 28 miles per hour is only 40 amperes at 500 volts—practically 27 H.P.

Comfortable seating capacity for 40 passengers is provided in a length of only 34 feet.

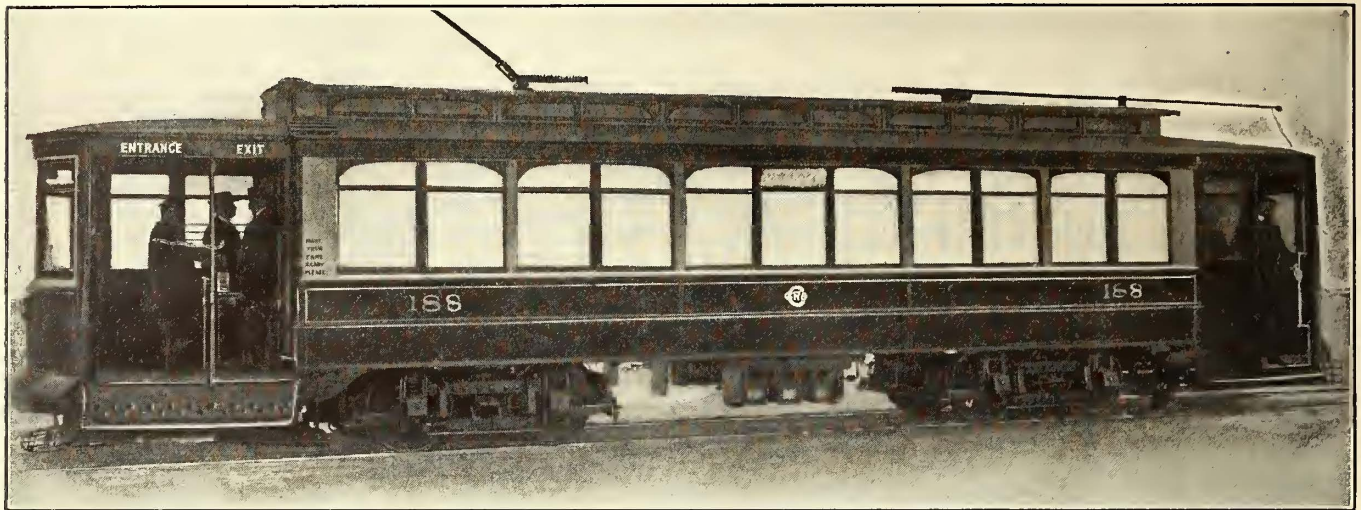
The monitor, having been proven a useless feature, has been eliminated, with the resultant gain of all the advantages of the semi-convertible type. If you are responsible for results, we have a message for you.

Write!



Barber Car Company

York, Pa.



Pay-as-You-Enter Car of the Chicago City Railway Co., Chicago

Accident Reduction in Chicago

“Pay-As-You-Enter Cars have practically eliminated platform accidents.”—*President T. E. Mitten.*

Accidents of all kinds have been very substantially reduced on all Chicago lines operating Pay-As-You-Enter Cars. Both the Chicago City Railway Co. and the Chicago Railways Co. confidently expect to show a still further accident reduction when their other lines are also equipped for Pay-As-You-Enter operation, and this reduction has invariably followed the use of Pay-As-You-Enter Cars in other cities.

The Pay-As-You-Enter Car has

We license manufacturers and railways to build and use the Pay-As-You-Enter Car, the patents on which are owned by

The Pay-As-You-Enter Car Corporation

DUNCAN McDONALD
President

50 Church Street, New York

THOS. W. CASEY
Manager



Pay-as-You-Enter Car of the Metropolitan Street Railway Co., New York

Accident Reduction

in New York

Both the Metropolitan and Third Ave. roads find a very material decrease of accidents on lines equipped for Pay-As-You-Enter operation.

The New York Telegram quotes Mr. Root as saying that "Thirty per cent. of the accidents on surface cars occur in getting on and off," and that the Pay-As-You-Enter cars "make accidents of this sort practically impossible."

Mr. Maher, Gen'l Mgr. for the Receiver of the Third Ave. road, states that on lines on which he operates Pay-As-You-Enter Cars, "a marked decrease" has been shown "in the number of platform accidents."

reduced accidents on 37 roads

We license manufacturers and railways to build and use the Pay-As-You-Enter Car, the patents on which are owned by

The Pay-As-You-Enter Car Corporation

DUNCAN McDONALD
President

50 Church Street, New York

THOS. W. CASEY
Manager



Pay-as-You-Enter Car of the Chicago City Railway Co., Chicago

Accident Reduction in Chicago

"Pay-As-You-Enter Cars have practically eliminated platform accidents."—*President T. E. Mitten.*

Accidents of all kinds have been very substantially reduced on all Chicago lines operating Pay-As-You-Enter Cars. Both the Chicago City Railway Co. and the Chicago Railways Co. confidently expect to show a still further accident reduction when their other lines are also equipped for Pay-As-You-Enter operation, and this reduction has invariably followed the use of Pay-As-You-Enter Cars in other cities.

The Pay-As-You-Enter Car has reduced accidents on 37 roads

We license manufacturers and railways to build and use the Pay-As-You-Enter Car, the patents on which are owned by

The Pay-As-You-Enter Car Corporation

DUNCAN McDONALD
President

50 Church Street, New York

THOS. W. CASEY
Manager



Pay-as-You-Enter Car of the Metropolitan Street Railway Co., New York

Accident Reduction in New York

Both the Metropolitan and Third Ave. roads find a very material decrease of accidents on lines equipped for Pay-As-You-Enter operation.

The New York Telegram quotes Mr. Root as saying that "Thirty per cent. of the accidents on surface cars occur in getting on and off," and that the Pay-As-You-Enter cars "make accidents of this sort practically impossible."

Mr. Maher, Gen'l Mgr. for the Receiver of the Third Ave. road, states that on lines on which he operates Pay-As-You-Enter Cars, "a marked decrease" has been shown "in the number of platform accidents."

We license manufacturers and railways to build and use the Pay-As-You-Enter Car, the patents on which are owned by

The Pay-As-You-Enter Car Corporation

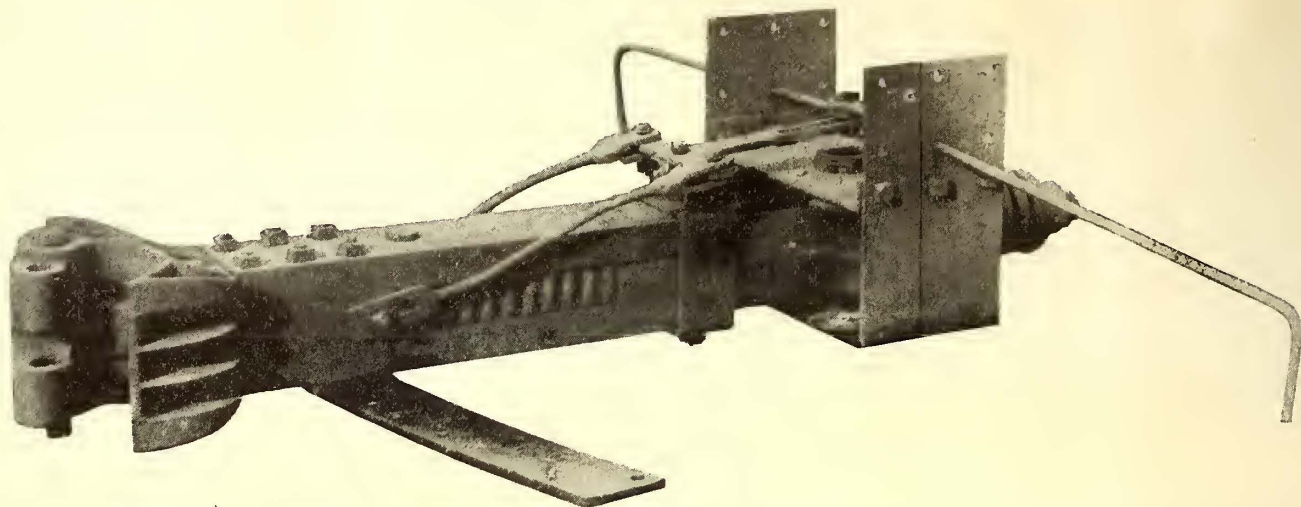
DUNCAN McDONALD
President

50 Church Street, New York

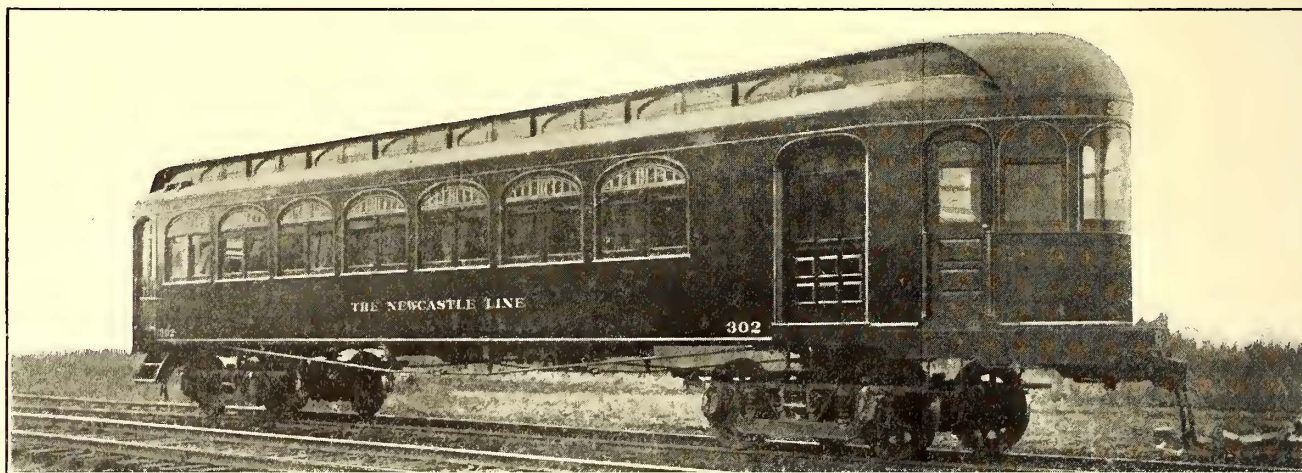
THOS. W. CASEY
Manager

The Jewett Car Company

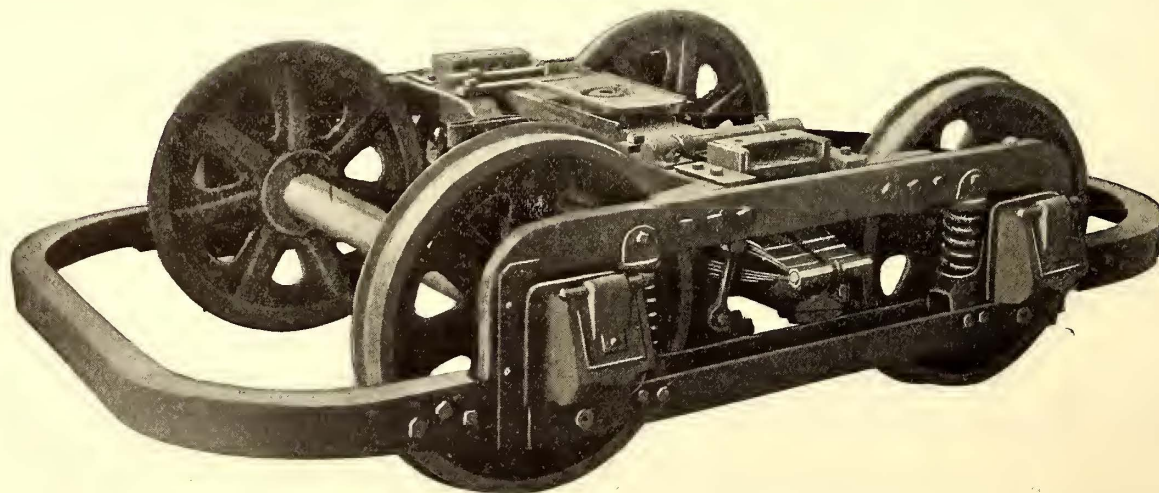
Newark, Ohio



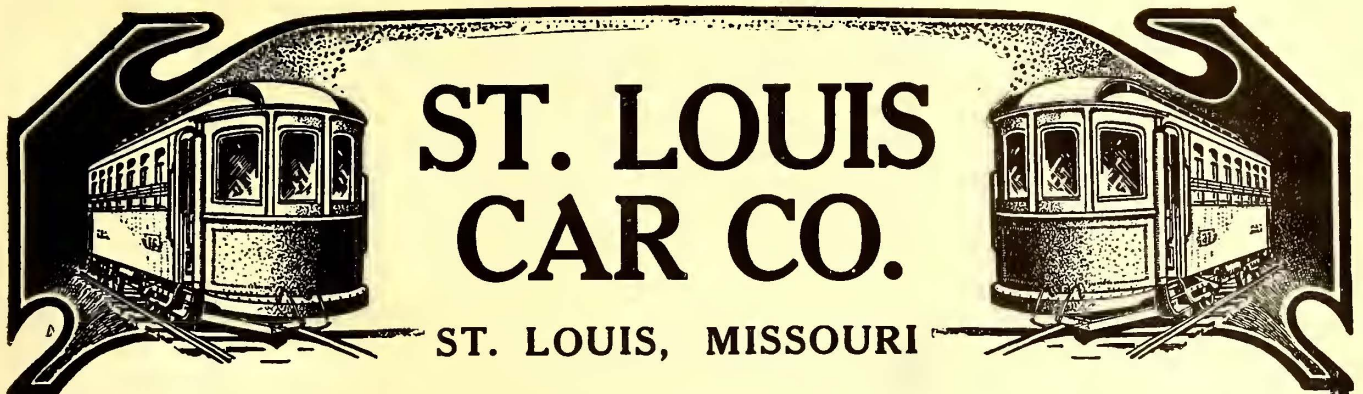
Self-Centering Radiating M. C. B. Draw Bar with Remote Disconnecting Levers



Latest Type High-Speed Interurban Car



Short Wheel Base M. C. B. Type Truck with Side Equalizers and Swing Bolster Builders and Designers of all Types of Electric Cars



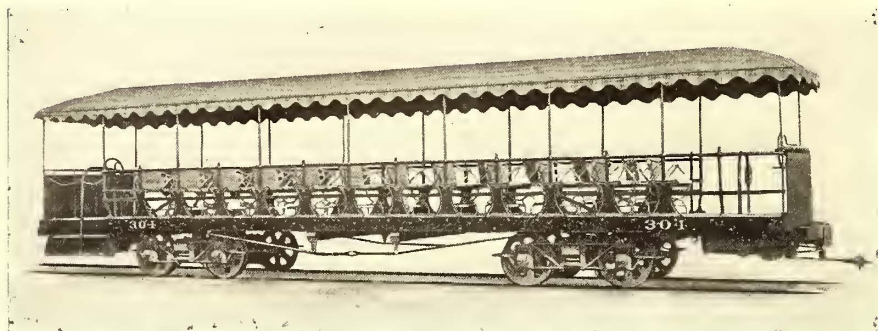
Above cut represents one of ten (10) cars of

“Pay-on-Platform” Type

recently built and delivered to the Chicago
& Milwaukee Electric Railroad Company
by St. Louis Car Company, St. Louis, Mo.

**Electric and Steam Railway Coaches, Steel Cars,
Trucks, Journal Bearings, Curtains, Seats, Rattan
Bronze Trimmings, Miscellaneous Car Supplies.**

BRILL



Forty-Foot Excursion Trail Car for "Moonlight" Service

WE may be able to be of assistance to you in your plans for ways and means to increase the income of your road during the coming year. Perhaps you have plans for developing extra excursion business during the slack hours of the summer season. We shall be glad to submit specifications and prices on various types of open cars, excursion cars, or trail cars. Perhaps you have discovered that you can save money by hauling your own coal and ashes. We shall be glad to submit photographs, specifications and prices on ash cars of various types which you may be able to use for hauling coal or ashes for other corporations in your town, or for some additional service. We also build various types of work cars, from the simplest flat car to cars with cranes and devices which adapt them to special service. Perhaps one of these would be of service to you and with a little skirmishing around town among the manufacturers and shippers you would discover that the car could be utilized to secure additional income in handling materials for others.

THE BRILL COMPANIES ARE

THE J. G. BRILL COMPANY
Philadelphia

WASON MANUFACTURING COMPANY
Springfield, Mass.

JOHN STEPHENSON COMPANY
Elizabeth, N. J.

G. C. KUHLMAN CAR COMPANY
Cleveland, Ohio

AMERICAN CAR COMPANY
St. Louis, Mo.

DANVILLE CAR COMPANY
Danville, Ill.

COMPAGNIE J. G. BRILL
Paris, France

London:
110 Cannon Street, E. C.
Cable: "Axles" London

THE J. G. BRILL COMPANY
PHILADELPHIA, PENNA.

BRILL

THE BRILL COMPANIES ARE

THE J. G. BRILL COMPANY
Philadelphia

WASON MANUFACTURING COMPANY
Springfield, Mass.

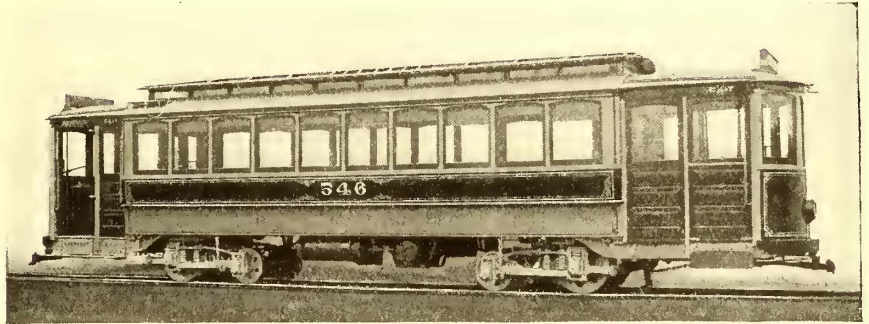
JOHN STEPHENSON COMPANY
Elizabeth, N. J.

G. C. KUHLMAN CAR COMPANY
Cleveland, Ohio

AMERICAN CAR COMPANY
St. Louis, Mo.

DANVILLE CAR COMPANY
Danville, Ill.

COMPAGNIE J. G. BRILL
Paris, France



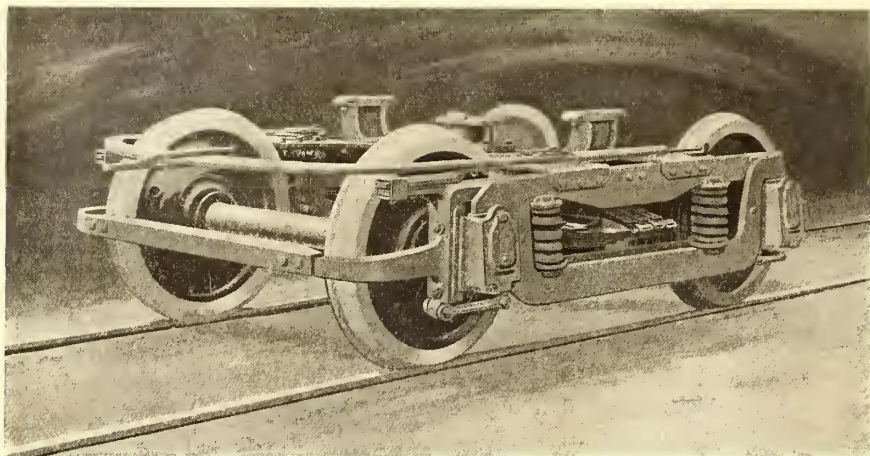
Twenty-eight Foot Pay-As-You-Enter Car Mounted on Brill No. 22 Special Single-Motor Trucks—Weight Complete 36,550 lbs.

PERHAPS the subject of weights of equipment and the relation they bear to operating economy appeals to you, particularly in connection with Pay-As-You-Enter cars, and if so the figures for a car of the above type will be of interest. The car shown has a length over end panels of 28 ft. 0 in.; width over posts 8 ft. 0 in. The weight of the car body is 15,779 lbs. The car is mounted on Brill No. 22 Special single-motor trucks, each carrying one of the new type 65-h.p. inter-polar motors. With this equipment the weight is: Trucks 8,728 lbs.; motors, air brakes and electrical equipment 12,043 lbs., making the total weight of the car complete 36,550 lbs. This weight has been secured without any sacrifice of strength and is unusual for a car of the type. The side-sills are plated with $15\frac{1}{2} \times \frac{3}{8}$ -in. steel, and the platform side knees have steel reinforcing. Some saving in weight has been secured by the platform framing construction and elsewhere in the underframe. We shall be glad to furnish further particulars.

London:
110 Cannon Street, E. C.
Cable: "Axles" London

THE J. G. BRILL COMPANY
PHILADELPHIA, PENNA.

BRILL



The Brill No. 27 M. C. B. Truck with Side Frames, Including Pedestals, Solid-Forged in a Single Piece

THE BRILL No. 27 M. C. B. truck is the only truck of the M. C. B. class in which the side frames including yokes are forged solid in a single piece. Beginning with superiority in this fundamental part the No. 27 M. C. B. has many other features. The method by which the ample gusset plates are folded over the side frames and bolted through them ties the transoms to the side frames with minimum number of bolts in shear, makes the transom construction most substantial and insures the continued squareness of the truck under severe service. The bolster is cast steel. The bolster and transom chafing plates are of such proportion and ample size as to wear uniformly and support the bolster against tilting. They can be renewed without removing the bolster. The usual type of tie bar with longitudinal bolts, which have their threads in shear, is eliminated and channel tie bars connect the inner pedestals and short tie bars connect each pair of pedestals. The pedestal tie bars are bolted through the frame in such a manner that they form a rigid reinforcement of the pedestals and by a simple device absolutely remove the shearing strain from the bolts.

THE BRILL COMPANIES ARE

THE J. G. BRILL COMPANY
Philadelphia

WASON MANUFACTURING COMPANY
Springfield, Mass.

JOHN STEPHENSON COMPANY
Elizabeth, N. J.

G. C. KUHLMAN CAR COMPANY
Cleveland, Ohio

AMERICAN CAR COMPANY
St. Louis, Mo.

DANVILLE CAR COMPANY
Danville, Ill.

COMPAGNIE J. G. BRILL
Paris, France

London:
110 Cannon Street, E. C.
Cable: "Axles" London

THE J. G. BRILL COMPANY
PHILADELPHIA, PENNA.

BRILL

THE
BRILL COMPANIES
 ARE

THE J. G. BRILL COMPANY
 Philadelphia

WASON MANUFACTURING COMPANY
 Springfield, Mass.

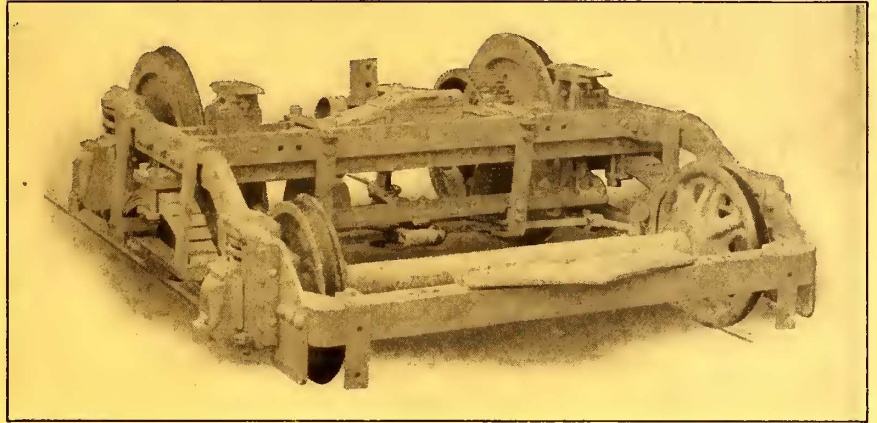
JOHN STEPHENSON COMPANY
 Elizabeth, N. J.

G. C. KUHLMAN CAR COMPANY
 Cleveland, Ohio

AMERICAN CAR COMPANY
 St. Louis, Mo.

DANVILLE CAR COMPANY
 Danville, Ill.

COMPAGNIE J. G. BRILL
 Paris, France



The Brill No. 39-E. Center-Bearing Single-Motor Truck

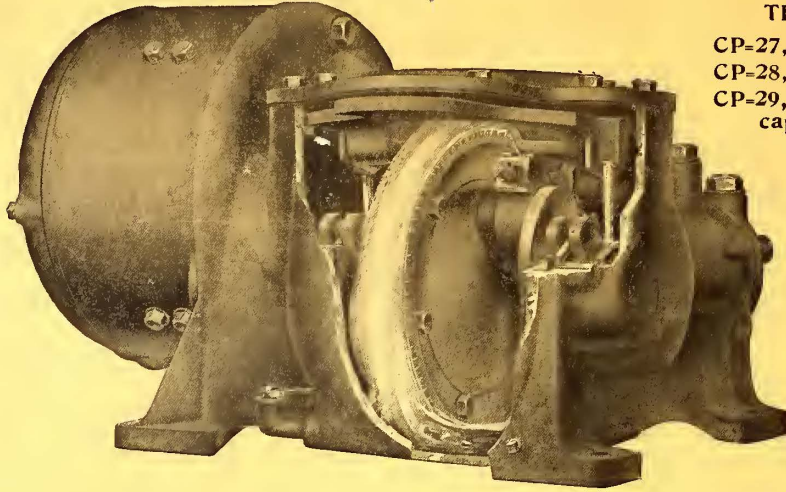
TO date 1412 Brill No. 39-E trucks have been sold—all within a period of fifteen months. We doubt if any other type of truck has an equal record for rapid adoption by electric railways. But an analysis of the situation shows the reason. In the first place the No. 39-E is just a little bit better in design than any single-motor truck previously placed on the market. Its reversed position under the car body to reduce platform overhang is one point of advantage. The arrangement of the equalized brake rigging with a center pull lever is another of the many advantages of the design. But undoubtedly one of the principal factors in the success of the No. 39-E is the opportunity it offers for a saving in initial cost, operating and maintenance expenses, because with a single 65-h.p. motor the No. 39-E will give service for city lines equivalent to that of a two-motor truck. There is saving in the cost of the equipment to start with; there is less weight to carry around and only two motors per car to take care of. The proposition can be reduced to figures to show the actual saving for any given number of cars.

London:
 110 Cannon Street, E. C.
 Cable: "Axles" London

THE J. G. BRILL COMPANY
 PHILADELPHIA, PENNA.

atwell

All bearings automatically lubricated
with only one place to oil



THREE TYPES:

CP-27, capacity 15 cu. ft.
CP-28, " 25 cu. ft.
CP-29, (600-1200 volts),
capacity 25 cu. ft.

Air Compressors

(Motor Driven)

There are no oil rings in this compressor.

The oiling system is positive in action and continuously delivers oil to all the bearings.

The driving gear picks up oil from the well and throws it in a steady stream into an oil pan on the underside of the crank chamber cover. The distribution to bearings is effected through large channels formed in the oil pan, from which the oil flows to the various bearings. *All* parts of the compressor are perfectly lubricated, even when the oil level is below the connecting rods.

Many other interesting features of this
compressor are described in Bulletin 4699.

General Electric Company

Largest Manufacturer of Electrical Apparatus in the World.

Sales Offices in the following cities:

Atlanta, Ga.
Baltimore, Md.
Boston, Mass.
Buffalo, N. Y.
Butte, Mont.
Charleston, W. Va.
Charlotte, N. C.
Chicago, Ill.
Cincinnati, O.
Cleveland, O.

Columbus, O.
Denver, Colo.
Duluth, Minn.

Indianapolis, Ind.
Kansas City, Mo.
Los Angeles, Cal.
Minneapolis, Minn.

Nashville, Tenn.
New Haven, Conn.
New Orleans, La.
New York, N. Y.

Philadelphia, Pa.
Pittsburg, Pa.
Portland, Ore.
Richmond, Va.
Salt Lake City, Utah.
San Francisco, Cal.
St. Louis, Mo.
Seattle, Wash.
Spokane, Wash.
Syracuse, N. Y.

Principal Office: Schenectady, N. Y.