

# STREET RAILWAY JOURNAL

VOL. XIX. No. 23.

JUNE 7, 1902.

\$4.00 PER YEAR.  
SINGLE COPIES, THIS ISSUE, 35 CENTS.

## TABLE OF CONTENTS.

**Electric Railway Practice on the Continent of Europe.** By HEINRICH VELLGUTH. - - - - - 673

The writer, who is chief engineer of the Hamburg Street Railway Company and secretary of the German Street Railway and Light Railways Associations, compares street railway practice in Europe and America, and describes some of the most interesting and important installations in Germany, Switzerland, France, and Holland.

**Street Railway Accounting.** CONDUCTED BY J. F. CALDERWOOD. - - - - - 708

This is the second installment of an interesting series of practical articles upon approved methods of accounting in large street railway systems.

- FROM THE BANK TO THE PAYEE..... 708
- REQUISITES ..... 709
- NATIONAL ORDER OF CHARTERED ACCOUNTANTS ..... 709
- THE STREET RAILWAY MONTHLY REPORT. By C. N. DUFFY..... 709

**Freight Business on the Chicago, Harvard & Geneva Lake Railway,** - - - - - 721

This article describes an interesting line in a farming section of Wisconsin upon which freight and passenger business is handled in conjunction with large steam trunk lines. Freight is hauled over the electric road and delivered at its destination in the steam cars in which it was originally shipped. Some interesting statistics are presented, and the advantages of the electric system are described.

**Train Resistance.** BY W. J. DAVIS, JR. - - - - - 724

The author replies to the criticisms by Dr. Lundie, Dr. Bell and Messrs. Dodd and Wille on his original contribution on this subject, and presents some additional data in explanation of the results obtained in the Buffalo & Lockport tests, and in support of his conclusions.

**Results of Tests for Air Resistance on the Berlin-Zossen Experimental High-Speed Line** - - - - - 726

A number of curves are given in this article showing the relation between speed and wind resistance up to a speed of 100 miles per hour. World-wide interest has been taken in these tests by railway men, but this is the first important data from the official records to be made public.

**Electric Traction on Main Lines.** By E. HUBER. - - - - - 733

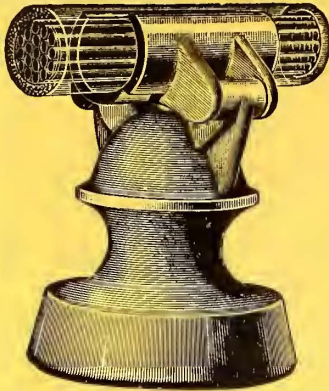
The author, who is an eminent authority on European electric railway practice, advocates the use of electric locomotives on established steam railway trunk lines for hauling heavy freight trains instead of attempting to introduce single car units. It is proposed to employ alternating-currents of 15,000 volts and equip locomotives with motor-generator sets. It is claimed that this will enable electric lines to work in conjunction with steam roads without disturbing the organization of the latter.

Editorials.....	716	Novel Elevator and Transfer Table at the Brill Works...	740
Association Meetings at the World's Fair.....	723	Handsome Convertible Combination Cars.....	741
Special Tests vs. Commercial Practice.....	725	A Novel Electric Switching Locomotive.....	742
Mileage, Car and Capitalization of Street Railway Companies in the United States and Canada in 1901.....	725	The Edge Moor Water-Tube Boiler.....	742
Rolling Lift Bridges Prevent Draw-Bridge Accidents.....	737	An Efficient Water Softener.....	743
New Cars for Seattle and Tacoma.....	738	Modern Automatic Couplers.....	744
Automatic Alternating-Current Circuit-Breaker.....	739	First Cars From the New Kuhlman Factory.....	744
An Improved Cooling Tower and Condenser.....	739	An Improved Boiler Tube Cleaner.....	745
		An Improved Railway Cut-Off Saw.....	745

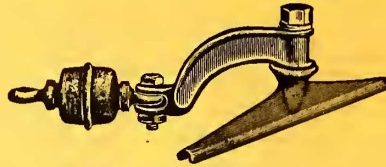


INDEXED

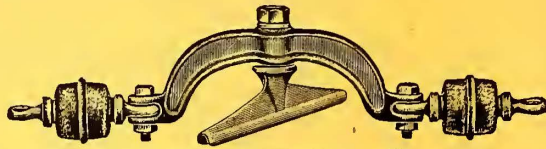




"H. W. J." TOGGLE-CLAMP FEED WIRE INSULATOR. No. 908. [PATENTED.]



SINGLE GIANT PULL-OVER. Beam—No. 345.



DOUBLE GIANT PULL-OVER. Brace—No. 355.

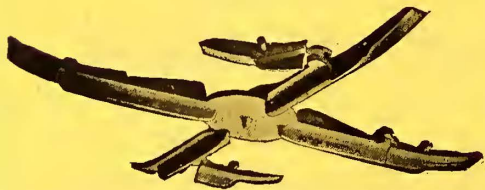


TROLLEY WHEELS. No. 770.

# LINE MATERIAL



No. 990.—Philadelphia Section Insulator. Takes all sizes wire up to 4/0. Quickly cut into line



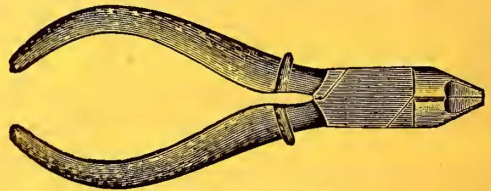
No. 985.—Metallic Crossing. Right Angle or Adjustable.



No. 999.—Philadelphia Adjustable Insulated Crossing. Takes all sizes wire up to 4/0. Mica insulation. Embodies the latest improvements in crossings



PHILADELPHIA SLEEVE. No. 1127.



INSULATED PLIERS.



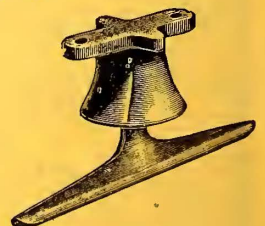
ROUND TOP HANGER. No. 100.



CAP AND CONE HANGERS AND PULL-OVERS. No. 209. Molded Mica.



No. 834. With Clevis. No. 1 GIANT STRAIN INSULATORS. [PATENTED.]



ROUND TOP BARN OR BRIDGE HANGER No. 208.



No. 211.



No. 2 GIANT STRAIN INSULATORS. No. 826. [PATENTED]



No. 210.

## H. W. JOHNS-MANVILLE CO.

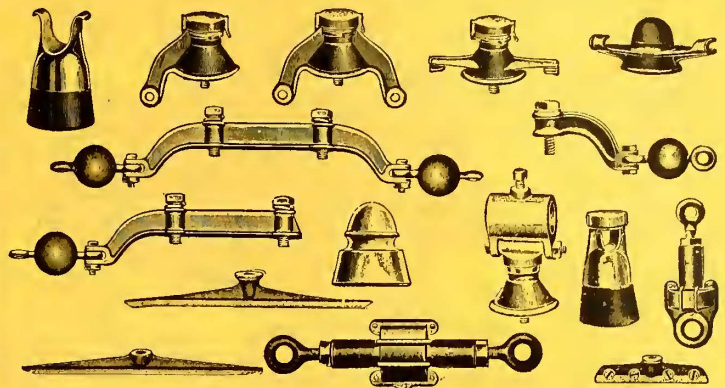
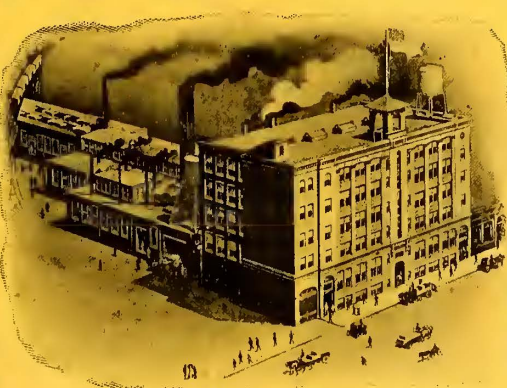
100 WILLIAM STREET, NEW YORK

MILWAUKEE  
CHICAGO  
ST. LOUIS

BOSTON  
PHILADELPHIA  
PITTSBURGH

COLUMBUS  
NEW ORLEANS  
LONDON





# TROLLEY LINE MATERIAL & HECLA INSULATORS FOR ELECTRIC RAILWAYS

**ALBERT & J. M. ANDERSON MFG. COMPANY**

**BOSTON, MASS., U. S. A.**

**NEW YORK OFFICE: 135 BROADWAY**

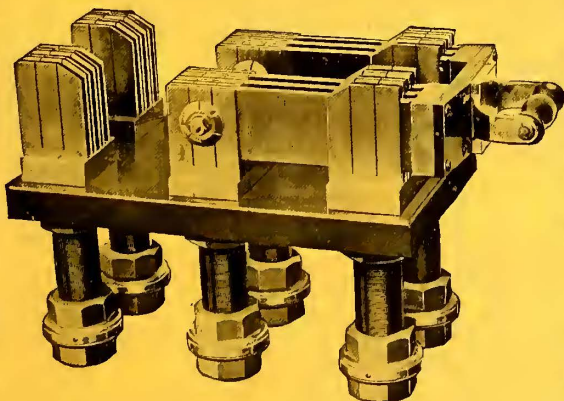
English and European Representative—R. W. BLACKWELL & CO., Ltd., of London, Liverpool and Manchester, England;  
Paris, France; and Brussels, Belgium.

Canada — CANADIAN RAND DRILL CO., Sherbrook, Que.

Chicago, Ill.—STANDARD RAILWAY MATERIALS CO.

St. Louis, Mo.—LOUIS P. QUENTIN

San Francisco, Cal.—Messrs. ECCLES & SMITH

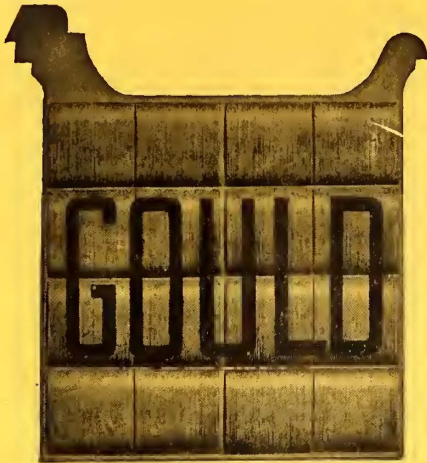


## Our Switch Department

Produces properly constructed and finely finished Switches and Switchboards

Requests for Estimates on Switchboards will receive our careful consideration





RAILWAY REGULATING,  
RAILWAY SUBSTATION,  
CENTRAL STATION,  
AND ISOLATED PLANTS,

COMPLETE EQUIPMENTS WITH THE GOULD (PATENTED)  
C, E-M-F and "EXCITER" **Booster Systems.**

"Facts about the  
Gould Battery"  
on application.

**Gould Storage Battery Co.**

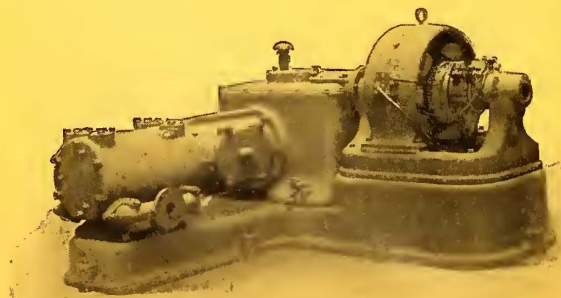
Sales Offices:  
New York, 25 W. 33d St. Chicago, Rookery Bldg. Boston, 53 State St.

Electrically  
Operated

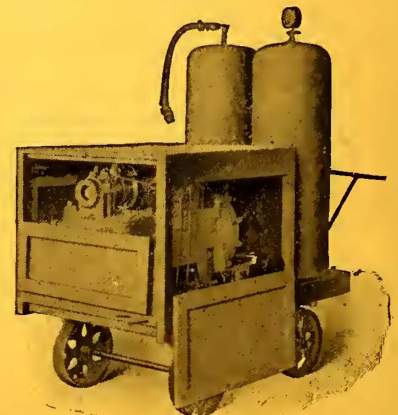
# AIR COMPRESSORS

Stationary  
and Portable

For service wherever pneumatic tools or other compressed air appliances are used



Capacities  
4 to 1,000 cubic feet  
of free air  
per minute



These Compressors may be installed at the most convenient point of distribution, thereby avoiding expensive piping  
Our Automatic Governor starts and stops the motor, so that power is used only when work is being performed

Ask for Catalogue 16

**Christensen Engineering Co.**  
**Milwaukee**

New York Office: 135 Broadway

London Office: 59 City Road



# THE WALWORTH MFG. CO.,

128-136 FEDERAL STREET, BOSTON, MASS.

MAKE THE INSTALLATION OF

## High Pressure Power Plants

—A SPECIALTY—

WROUGHT IRON OR STEEL PIPE BENT TO ANY PRACTICAL FORM

Exclusive Manufacturers of the

### WALMANCO PIPE JOINT

which does not weep under the Highest Pressures.

No Threads, No Rivets, Flanges Swivel. . . . .

WALWORTH BRONZE SEAT GATE VALVES FOR HIGH PRESSURE WORK

OUR BOOK OF TABLES AND DIMENSIONS FOR YOUR DRAUGHTING ROOM FREE

NEW YORK OFFICE: Rooms 807-808 Park Row Building

# THE ELECTRIC STORAGE BATTERY CO.

PHILADELPHIA, PA.

Manufacturer of the

“Chloride Accumulator” for

Electric Railway Power Houses

Feeder Sub-Stations

Rotary Sub-Stations, etc., etc.

Send for Bulletins describing Railway Installations.

SALES OFFICES  
BALTIMORE:  
Equitable Bldg.

PHILADELPHIA:  
Allegheny Av. & 19th St.  
ST. LOUIS:  
Wainwright Bldg.

NEW YORK:  
100 Broadway.  
CLEVELAND:  
New England Bldg.

BOSTON:  
60 State Street.  
SAN FRANCISCO:  
Nevada Block.

CHICAGO:  
Marquette Bldg.  
DETROIT:  
Michigan Electric Co.

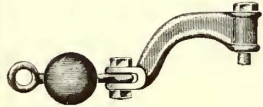
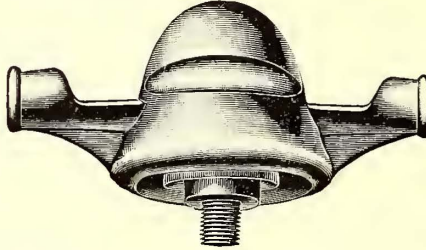
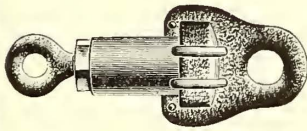


# Electric Railway, Light and Telephone Supplies

## Export and Domestic

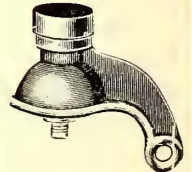


We keep a large stock of Overhead Line Material at Manufacturers' prices. We furnish everything for Electric Railways, Light and Telephone Service.



Exclusive territorial representatives for

Heil Rail Joint Welding Co.  
New Century Car Heater Co.  
Scranton Fire Brick & Conduit Co.



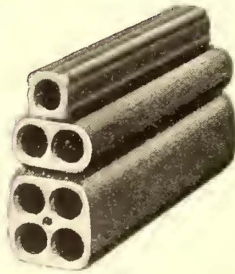
Cable Address  
"CURTHARR" NEW YORK  
Lieber's Code

### C. J. HARRINGTON

15 Cortlandt Street, New York

CHAS. REMSEN  
Special

# VITRIFIED CONDUITS



High Insulation.  
Indestructibility.  
Perfect Resistance to all Chemical Elements.  
Prompt Shipments.

## NOT IN THE TRUST

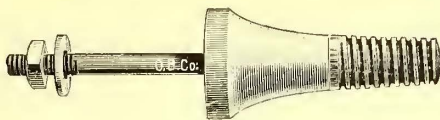
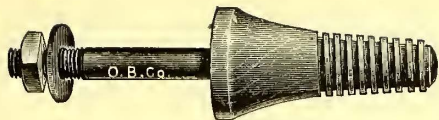
We have as large capacity as any manufacturer

# Scranton Fire Brick and Conduit Co.

Factories :  
SCRANTON, PA.  
ITHACA, N. Y.

C. J. HARRINGTON, General Sales Agent  
15 Cortlandt Street, New York





# HIGH VOLTAGE LINE MATERIALS



HIGH TENSION GLASS AND  
PORCELAIN INSULATORS

SPECIAL STEEL PINS WITH  
PORCELAIN AND WOOD TOPS

SPECIAL PARAFFINED  
ALL WOOD PINS

CROSS ARMS

CROSS ARM BRACES

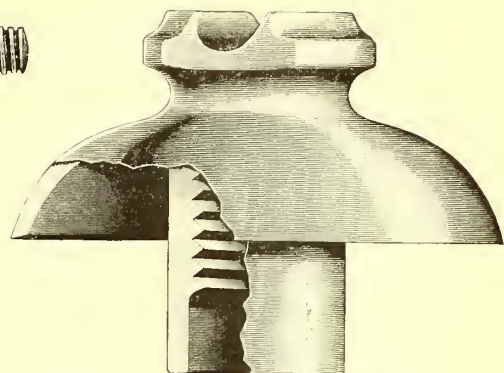
POLE STEPS, ETC.



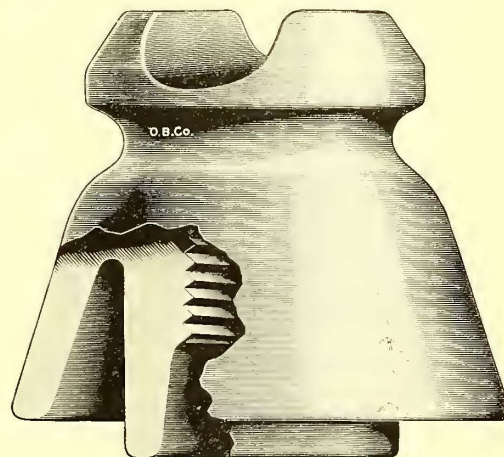
## The Ohio Brass Company

MANSFIELD, OHIO, U.S.A.

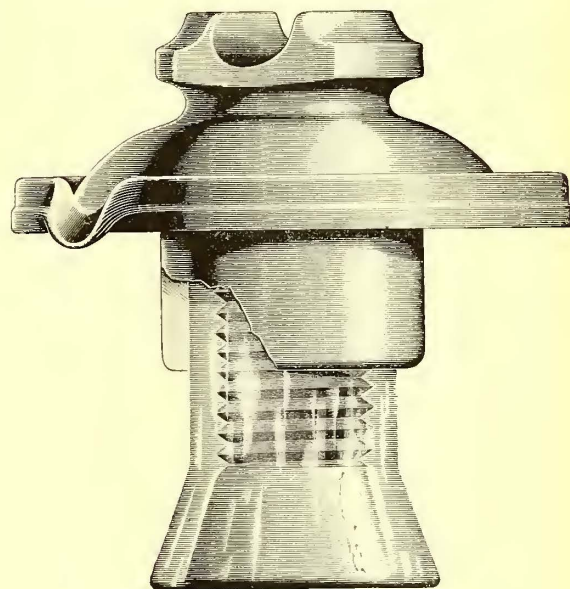
New York City, 1702 Commercial Cable Building, N. M. GARLAND  
Pittsburg, Pa., 704 Times Building, BURT GELLATLY  
Norfolk, Va., 413 Citizens' Bank Building, J. C. WARREN  
Chicago, Ill., 309 Dearborn Street, PORTER & BERG  
St. Louis, Mo., 1107 Chemical Building, OTTO W. UTHOFF  
Toronto, Can., 14-18 King Street, East, CANADIAN GENERAL ELECTRIC CO., Limited



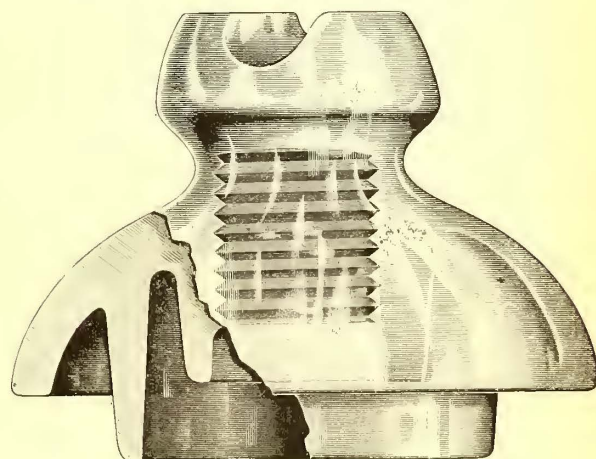
Nos. 4334-4339. All Porcelain Insulator.



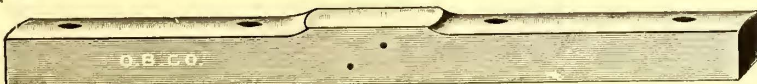
No. 2621. Porcelain Insulator, Double Petticoat.



Nos. 4340-4355. Porcelain and Glass Insulator.



No. 4332. Glass Insulator, Triple Petticoat.





WILLARD L. CANDEE  
H. DURANT CHEEVER  
Managers



TRADE MARK

GEORGE T. MANSON  
Gen'l Supt.  
W. H. HODGINS  
Secretary

## The Standard for Rubber Insulation

OKONITE WIRES      OKONITE TAPE      MANSON TAPE  
CANDEE WATER-PROOF WIRES

# THE OKONITE CO., LIMITED

POSTAL TELEGRAPH BUILDING

253 BROADWAY, NEW YORK

## "CIRCULAR LOOM" IN ELECTRIC RAILWAY WORK

*(From the Street Railway Journal.)*

"In electric railroading there are many places where it is necessary to use a flexible conduit. This condition arises both in the power house and in the car wiring, and the serviceability of circular loom as made by the American Circular Loom Company, of Chelsea, Mass., is being more and more appreciated by street railway engineers. It is a flexible conduit that may be used with the greatest advantage and economy in protecting wires and cables subjected to wear or weather, so that it answers the somewhat rigid requirements which are present in all electric railroading in a most excellent fashion. \* \* \* \* \*

"\* \* \* \* \* Wherever insulation is in danger of abrasion, exposed to the weather or subjected to the many conditions which militate against insulating qualities such as are found throughout the whole range of electric railway work, circular loom has been used to great advantage, and its introduction on large roads is rapidly increasing. In neatness of appearance, long life, and efficient protection it is unsurpassed, and it meets exactly the requirements which obtain in street railway practice."



# American Circular Loom Company

CHELSEA, MASSACHUSETTS

NEW YORK:  
R. B. COREY, 26 Cortlandt Street.

CHICAGO:  
THOS. G. GRIER, 128 W. Jackson Boulevard.



## Index to Advertisers.

\*Indicates advertisements appearing only in the International Edition and in copies of American Edition circulating outside of the United States.

*Aiton & Co., London, England.....	66
Alberger Condenser Co., New York.....	17
*Allen, W. H., Son & Co., Bedford, England.	71
Allis-Chalmers Co., Chicago.....	148-149
Allison, Giles S., New York.....	107
Allston Foundry Co., Boston.....	175
*Ambroin Werke, Berlin, Germany.....	79
American Blower Co., Detroit, Mich.....	133
American Car Seat Co., Brooklyn.....	158
American Circular Loom Co., Chelsea, Mass.	8
American Electric Switch Co., Pittsburgh,	124
Pa.....	115
American Elect. Works, Providence.....	123
American Frog & Switch Co., Hamilton, O.	140
American Oil Filter Co., Phila., Pa.....	117
American Steel & Wire Co., Chicago.....	114, 116
American Vitrified Conduit Co., New York.	113
American Vulcanized Fibre Co., Wilming-	20
ton, Del.....	3
Anderson, A. & J., Mfg. Co., Boston.....	105
Apex Equipment Co., New York.....	26
Armitage-Herschell Co., North Tonawanda,	97
N. Y.....	176
Arnold Electric Power Station Co., Chicago,	127
Ill.....	94
Atha, Benj. & Co., Newark, N. J.....	154
Atlas Railway Supply Co., Chicago, Ill.....	138
Audit Co. of Illinois, Chicago, Ill.....	
Aultman Co., Canton, Ohio.....	
Automatic Water Purifying Co., New York..	

Babcock & Wilcox Co., The, New York.....	143
*Babcock & Wilcox, Ltd., London.....	66
Baker, Wm. C., New York.....	164
Baker, W. E., & Co., New York.....	95
Baker Engine & Machine Co., Phila.....	152
Baldwin Locomotive Works, Phila.....	B
Ball & Wood Co., The, New York.....	146
Baltimore Car Wheel Co., Baltimore, Md....	186
Barbour-Stockwell Co., Cambridgeport, Mass.	129
Barstow, W. S., New York.....	95
Bay State Electric Heat & Power Co., Bos-	164
ton, Mass.....	22
Bestosking Packing & Supply Co., Boston,	107
Mass.....	83
Beidler Francis & Co., Chicago, Ill.....	9
*Bell Punch & Ptg. Co., Ltd., London.....	62
Big Four Route.....	157
Billings & Spencer Co., Hartford, Conn.....	94
*Blackwell, Robert W., & Co., Ltd., London.	28
Bliss, R., Mfg. Co., Pawtucket, R. I.....	140
Blood & Hale, Boston.....	102
Bonner & Co., Toledo, Ohio.....	95
Boyle, John, & Co., New York.....	115
Boyton, Capt. Paul, Coney Island, N. Y.....	196-199
Bowser, S. F., & Co., Inc., Fort Wayne, Ind.	100
Brady Brass Co., Jersey City, N. J.....	
Breed, George, Philadelphia, Pa.....	
Bridgeport Brass Co., Bridgeport, Conn.....	
Brill, J. G., Co., Philadelphia.....	
Bristol Co., The, Waterbury, Conn.....	
*British Electric Traction Co., Ltd., Lon-	
don, Eng.....	
*British Elec. Car Co., Ltd., London.....	56-57
*British Insulated Wire Co., Prescott, Eng...	77
*British Thomson-Houston Co., London.....	54
*British Westinghouse Electric & Mfg. Co.,	87-90
Ltd., London.....	133
Broomell, Schmidt & Steacy Co., York, Pa...	151
Brown, C. H., & Co., Fitchburg, Mass.....	147
Brown-Corliss Engine Co., Milwaukee.....	118, 119
Brown, Harold P., New York.....	153
Brown Hoisting Machinery Co., Inc., Cleve-	
land, Ohio.....	
*Brush Electrical Engineering Co., Ltd.,	51
London.....	25
Bryan-Marsh Co., New York.....	123
Buda Foundry & Mfg. Co., Chicago, Ill.....	137
Bullock, Henry W., Orange, N. J.....	48
Bullock Elec. Mfg. Co., Cincinnati.....	94
Burch, Edw. P., Minneapolis, Minn.....	17
Burt Mfg. Co., Akron, Ohio.....	

Carey, Geo. H., New York.....	105
Car Wheel Truing Brake-Shoe Co., Buffalo,	175
N. Y.....	111
Central Electric Co., Chicago.....	94
Chapman, C. A., Chicago, Ill.....	115
Chase-Shawmut Co., Boston, Mass.....	161
Cheswick Mfg. Co., Cheswick, Pa.....	189
Chicago Truck Co., Chicago, Ill.....	
*Chloride Electrical Storage Syndicate, Ltd.,	53
Manchester, England.....	4, 47
Christensen Engineering Co., Milwaukee,	124
Wis.....	21
Cincinnati, Hamilton & Dayton Ry.....	99
Clow, Jas. B., & Sons, Chicago.....	16
Columbia Construction Co., Milwaukee,	157
Wis.....	30
Columbia Lock Nut Co., New York.....	13
Columbia Machine Works, Brooklyn, N. Y..	22
Compressed Air Co., New York.....	28
Condit, S. B., Jr., & Co., Boston, Mass.....	134
Conklin, H., New York.....	31-46
Conner, Jas. G., & Co., Phila., Pa.....	163
Conover Mfg. Co., Jersey City, N. J.....	145
Consolidated Car Fender Co., New York.....	
Consolidated Car Heating Co., Albany.....	
Consolidated Engine Stop Co., New York....	

**RAILWAY and STREET CAR TICKETS and TRANSFERS**

*N.Y. & H.R.R. CITY LINE*

**TRANSFER TICKET**

*GOOD ONLY AT 86<sup>th</sup> ST. & MADISON AVE.*

*THIS DAY FOR ONE CONTINUOUS RIDE ON*

*86<sup>th</sup> STREET AND 3<sup>rd</sup> ASTORIA FERRY LINE.*

For Estimates and Samples write . . .

**Keller Printing Co.**

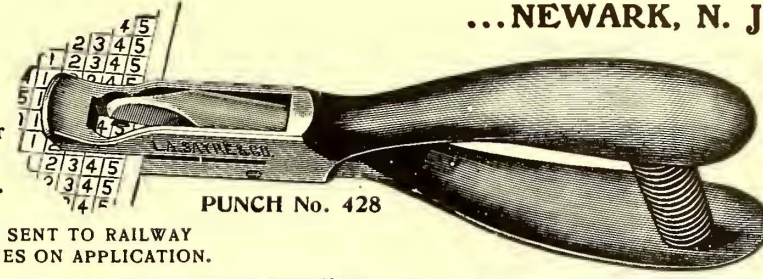
**722 Broadway**

**New York**

## L. A. SAYRE & CO.

...NEWARK, N. J.

The Best Punch Ever Made for Transfer Tickets...



**PUNCH No. 428**


SAMPLES SENT TO RAILWAY COMPANIES ON APPLICATION.

# TIES

We make a specialty of all varieties and sizes of TIES for electric and steam railroads, in cedar, hackmatack, oak and pine, both Northern and Southern.

**POLES** Squared, Octagoned and Tapered, in Cedar, Hard Pine and Chestnut

**JOS. A. HURD & Co.,**  
BOSTON, MASS.



Pat. Feb 2, 1897


**B. & S. CONICAL INSULATED STUD**

The Strongest Made

## The Billings & Spencer Co.

Hartford, Conn., U.S.A.

and No. 8 Long Lane, Aldersgate Street, London, E. C., England.



**Manufacture Substantial Line Material. Drop Forged Commutator Bars, Accurate to Gauge, and Drop Forgings for all purposes. The Conical Insulated Stud used in B. & S. Trolley Hangers has withstood a stress of 12,000 pounds without injury. The B. & S. Ball Strain Insulator has Drop Forged Metal Parts.**

**SEE CIRCULAR T.**

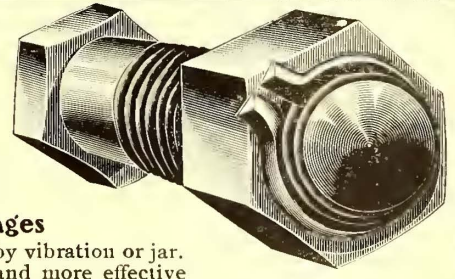
## Spiral Nut-Lock

**What is it?**

A graduated circle of crucible steel wire that follows nut on bolt when same is in position, absolutely locking nut.

**Some of its Advantages**

It requires no special tool. Not affected by vibration or jar. Mechanical in construction. Cheaper and more effective than a jamb-nut or Cotter key. Specially adapted for equipment, track, bolts, etc.



**SPIRAL NUT-LOCK COMPANY**

Owners and Manufacturers 102 CHAMBERS STREET, NEW YORK

# POLES

We not only furnish you with Poles and Ties but are prepared to erect your entire overhead equipment.

**THOMAS McCaffrey,**

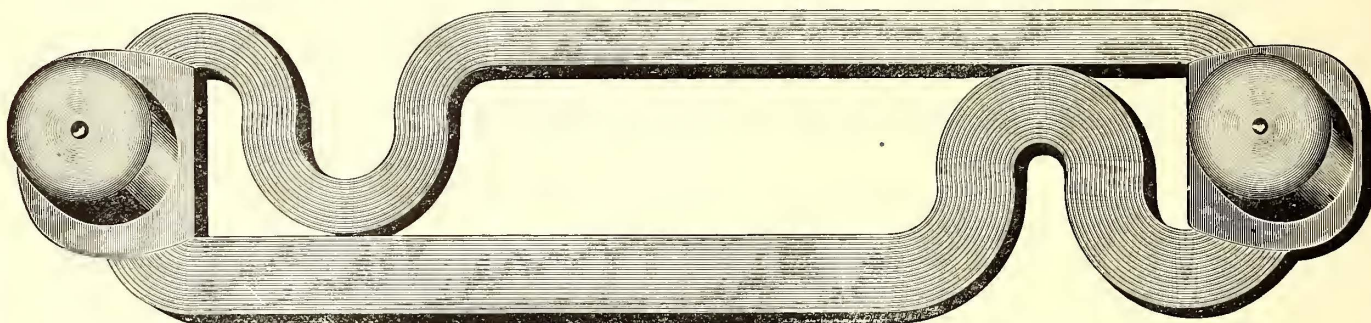
Electrical Contractor. 27 KILBY ST., BOSTON, MASS.

# TIES



# PROTECTED RAIL BONDS

## A MATTER OF CALCULATION



An honest dollar's worth of rail bonds for a dollar is what we offer—nothing more, nothing less.

'Tis a risky business, this getting of a dollar's worth for your fifty cents. Don't jump at the lowest offer received; see which bond has proven itself to be the more durable; which carries the current better; which wears better. These things are important; railroads are not built for a day or a year. They are permanent. Add it up; see what result you get—in ninety-nine cases out of a hundred you will find the prospective dollar's worth for fifty cents really means fifty cents' worth for a dollar.

In the qualifications enumerated above we claim superiority for the Protected Rail Bond, and if this be true, at its price it is the cheapest bond on the market. Shall we submit our proofs?

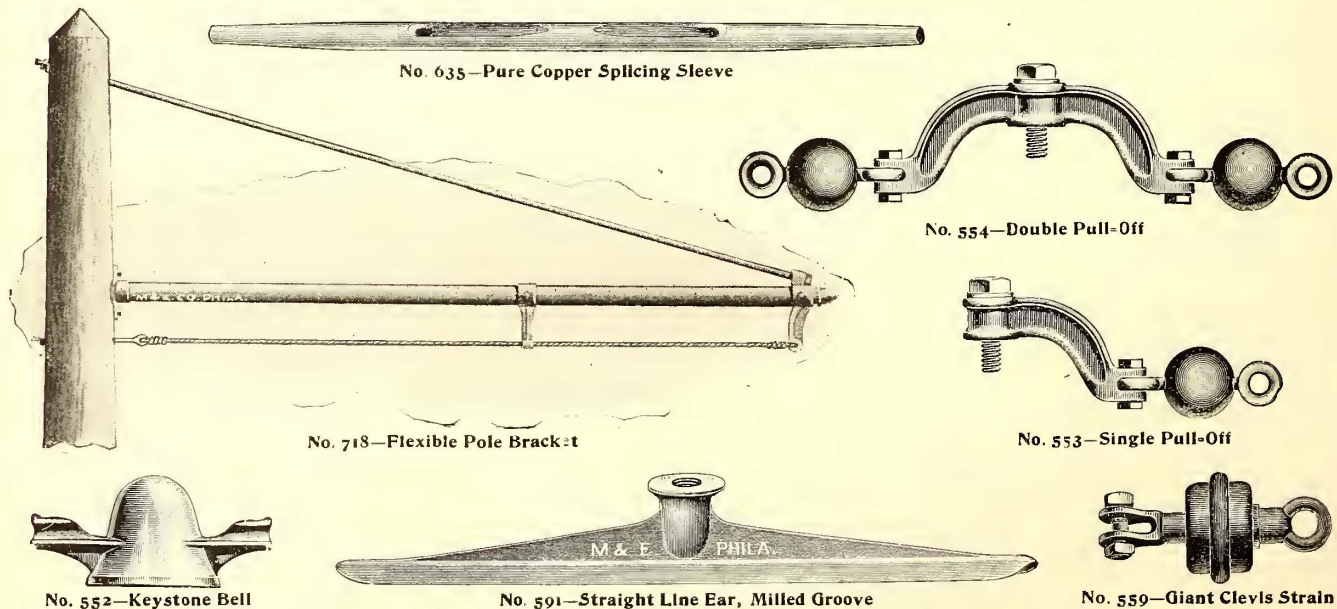
**THE PROTECTED RAIL BOND Co.**  
MANUFACTURER

**THE MAYER & ENGLUND Co.**  
GENERAL SALES AGENT

10 SOUTH 10TH ST  
PHILADELPHIA  
U. S. A.

# "KEYSTONE" LINE MATERIAL

HIGHEST GRADE INSULATION . . . THE BEST DESIGNS



We carry the largest stock of electric railway supplies exclusively in the country

Prompt shipments and at correct prices

## THE MAYER & ENGLUND COMPANY

10 South 10th Street, PHILADELPHIA

NEW YORK: 85 Liberty Street

PITTSBURG: Park Building

ATLANTA: Equitable Building

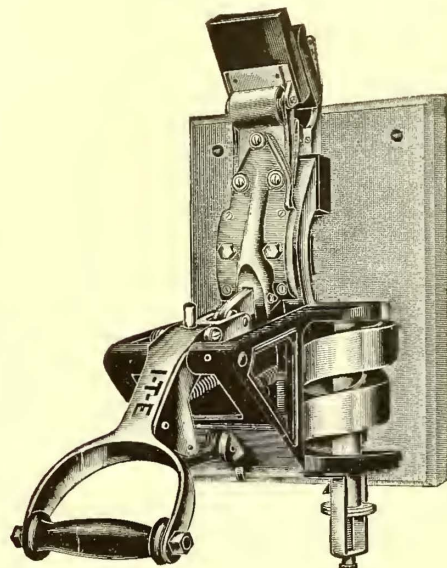


INDEX TO ADVERTISERS—Continued

Continuous Rail-Joint Co. of America, Newark, N. J.	128	Harrison Safety Boiler Works, Philadelphia, Pa.	137
Cooper, C. & G., Co., Mt. Vernon, Ohio	152	Hartshorn, Stewart, Co., E. Newark	19
Crane Co., Chicago	134	Hayes, W. J., & Sons, Cleveland, Ohio	94
Craghead Eng. Co., Cincinnati, Ohio	120	Hazard Mfg. Co., Wilkesbarre, Pa.	113
Crescent Brake-Shoe Co., Phila.	176	Heil Rail-Joint Welding Co., Milwaukee, Wis.	128
Crocker-Wheeler Co., Ampere, N. J.	49	Heine Safety Boiler Co., St. Louis	142
Crouse-Hinds Electric Co., Syracuse, N. Y.	160	Herschell, Spillman & Co., North Tonawanda, N. Y.	27
Cullen, Wm. A., Newark, N. J.	96	Heywood Bros. & Wakefield Co., Wakefield, Mass.	158
Curtain Supply Co., Chicago, Ill.	158	Hicks, F. M., Chicago, Ill.	104
Cutter Co., The, Phila.	11	Hoffman, Geo. W., Indianapolis, Ind.	23
D. & W. Fuse Co., Providence, R. I.	164	Holcomb-Lobb Co., Chicago	121
Dallett & Co., Philadelphia, Pa.	108	Hooven, Owens, Rentschler Co., Hamilton, Ohio	151
Dearborn Drug & Chemical Works, Chicago, Ill.	140	Hope Webbing Co., Providence, R. I.	107
Dentzel, G. A., Philadelphia, Pa.	27	Hoppes Mfg. Co., The, Springfield, Ohio	137
De Ronde, F. S., Co., New York	18	Horsburgh & Scott, Cleveland, Ohio	168
Devitt, Tremble & Co., Chicago, Ill.	93	Hubbard, Hall & Co., Cincinnati, Ohio	100
De Witt Sand Box Co., Troy, N. Y.	175	Humphrey, Henry H., St. Louis, Mo.	95
*Dick, Kerr & Co., London	52	Hunter Automatic Fender Co., Cincinnati, Ohio	156
*Diener, Alf., & Co., Zülich, Switzerland	75	Hunter Illuminated Car Sign Co., Cincinnati, Ohio	157
Doubleday-Hill Elec. Co., Pittsburgh, Pa.	16	Hurd, Jos. A., & Co., Boston, Mass.	9
Dressel Ry. Lamp Works, New York	161	Hyde Bros. & Co., Pittsburgh, Pa.	105
Drummond's Detective Agency, New York	102		
Duff Mfg. Co., The, Pittsburgh, Pa.	161		
Dumee, Son & Co., Philadelphia, Pa.	93		
Dustin, Chas. E., Co., New York	103		
Eccleston Lumber Co., New York	121	*Imperial Electric Supplies, Ltd., London	78
Edge Moor Iron Co., Edge Moor, Del.	142	Indianapolis Switch & Frog Co., Springfield, Ohio	124
*Elec. Construction Co., Ltd., London, Eng.	84	International Correspondence Schools, Scranton, Pa.	24
Electric Fountain Co. of America, Philadelphia, Pa.	27	*International Electrical Engineering Co., London	80
Electric Launch Co., Bayonne, N. J.	28	International Power Co., Providence, R. I.	147
Electric Motor & Generator Ventilating Co., Philadelphia, Pa.	168	International Register Co., Chicago	171
Electric Railway Equipment Co., Cincinnati, Ohio	122	Ironsides Co., The, Columbus, Ohio	100
Electric Ry. Equipment Co., Phila., Pa.	105		
*Electric Railway & Tramway Carriage Works, Ltd., Preston, England	53	Jeffrey Mfg. Co., Columbus, Ohio	153
Electric Storage Battery Co., Philadelphia, Pa.	5	Jewett Car Co., Newark, Ohio	179
*Electric Tramway Equipment Co., Birmingham, England	83	Johns-Manville Co., H. W., New York	2
Electrical Engineering & Development Co., New York	98	Jones, Edward C., Co., New York	94
Electrical Installation Co., Chicago	98	Jones' Sons, J. M., West Troy, N. Y.	178
*Electrical Power Storage Co., Ltd., London, England	90A		
Elliot Frog & Switch Co., East St. Louis, Ill.	123	Keasbey, Robt. A., New York	142
*Elliott Bros., London, England	82	Keller Printing Co., New York	9
Engstrom, Axel H., Philadelphia	94	Kellogg Switchboard & Supply Co., Chicago, Ill.	121
Equitable Trust Co., Chicago, Ill.	92	*Kelvin & James, White, Ltd., Glasgow, Scotland	80
*Estler Bros., London, England	82	Keystone Electrical Instrument Co., Phila., Pa.	11
Exeter Machine Works, Pittston, Pa.	154	Kennicott Water Softener Co., Chicago, Ill.	139
*European McGuire Mfg. Co., London	63	Kerschner, W. R., Allentown, Pa.	105
		Kinnear Mfg. Co., Columbus, Ohio	16
		Kissam, Geo., & Co., New York	28
Falk Co., Milwaukee, Wis.	126	Kitfield, E. H., Boston, Mass.	95
Farson, Leach & Co., New York	92	Kohler Bros., Chicago, Ill.	99
*Ferranti, Ltd., Hollinwood, England	—	Koppel, Arthur, New York	153
Finn, John, Metal Works, San Francisco, Cal.	176	Kuhlman, G. C., Car Co., Collinwood, O.	190, 191
Fisher & Saxton Co., Washington, D. C.	103		
Ford, Bacon & Davis, New York and New Orleans	95	Laclede Car Co., St. Louis, Mo.	180, 181
*Forest City Electric Co., Manchester, Eng.	79	Laconia Car Co. Works, Boston	189
Forest City Paint & Varnish Co., Cleveland, Ohio	22	Lagonda Mfg. Co., Springfield, Ohio	141
Fowler, John H., Chicago, Ill.	104	Lake Shore & M. S. Ry.	120
Frink, E. A., Baltimore, Md.	95	Lchigh Car, Wheel & Axle Works, Catsaqua, Pa.	177
		Leonhardt Wagon Mfg. Co., Baltimore, Md.	21
		Le Valley Vita Carbon Brush Co., New York	14
Garrison Bros., Berwick, Pa.	104	Levis, Henry, & Co., Philadelphia, Pa.	104, 107
Garton-Daniels Co., Keokuk, Ia.	12	Ley, Fred T., & Co., Springfield, Mass.	98
Gem Mfg. Co., Pittsburgh, Pa.	141	Liberty Mfg. Co., Pittsburgh, Pa.	141
General Electric Co., Schenectady, N. Y.	50 and back cover	Lieber Code Co., New York	165
Gest, Guy M., Cincinnati, Ohio	96	Lindsay, J. D., New York	93
Gillie Engine & Machine Co., Tonawanda, N. Y.	27	Lobdell Car Wheel Co., Wilmington, Del.	176
*Glacier Anti-Friction Metal Co., Ltd., London, England	64	Lombard Governor Co., Boston	135
*Glasgow Numerical Printing Co., The, Glasgow	80	Lorain Steel Co., Lorain, Ohio, and Johnstown, Pa.	131
Gold Street Car Heating Co., N. Y.	164	Lumen Bearing Co., Buffalo, N. Y.	168
Gouhert Mfg. Co., The, New York	135	Lundie, John, New York	95
Gould Storage Battery Co., New York	4		
Green Engineering Co., Chicago, Ill.	154	MacAfee, John Blair, Philadelphia, Pa.	98
Green Fuel Economizer Co., Matteawan, N. Y.	16	*Maguire & Baucus, London	63
Green, Samuel M., Holyoke, Mass.	95	Maltby Lumber Co., Bay City, Mich.	121
		Maryland Trust Co., Baltimore, Md.	92
*Hadfield's Steel Foundry Co., Sheffield, Eng.	76	*Maschinenfabrik Oerlikon, Oerlikon, Zurich, Switzerland	58
Hale & Kilburn Mfg. Co., Phila.	159	Masury, John W., & Son, New York and Chicago	23
Ham Sand Box Co., Troy, N. Y.	175	Maus, H. H., & Co., Philadelphia	104
Hammond, J., & Co., San Francisco	178	Mayer & Englund Co., Philadelphia	10
Harrington, C. J., New York	78	McCaffrey, Thomas, Boston, Mass.	9
Harris, N. W., & Co., Chicago, New York and Boston	93	McCardell, J. R. Co., Trenton, N. J.	20
Harrisburg Foundry & Machine Works, Harrisburg, Pa.	147	McCord & Co., Chicago, Ill.	134
		McCormick Mfg. Co., Des Moines, Ia.	28
		McGuire Mfg. Co., Chicago, Ill.	182, 183
		McIntosh, Seymour & Co., Auburn, N. Y.	146
		McLaughlin Car Coupler Co., Phila.	165

# KEYSTONE

Measuring Instruments, Switchboard and Portable Ammeters and Voltmeters, Round pattern and Illuminated dial. These instruments are simple and strong in construction, absolutely "dead beat," and having tested them carefully we can guarantee them fully.



## I-T-E

### "LAMINATED" CIRCUIT BREAKER

Heavy, Strong and Reliable, Specially Built for Railway Work

CATALOGUES UPON REQUEST

## THE CUTTER CO.

19th and Hamilton Streets  
Philadelphia  
15 Cortlandt Street, New York

## American Street Railway Investments

The "RED BOOK" is the most complete and valuable manual of street railway statistics published. Shall we send you the 1902 edition? \$5.00 per copy.

STREET RAILWAY PUBLISHING COMPANY, 114 LIBERTY STREET, NEW YORK





Cut No. 940A. Pole Arrester, in Iron Cover Showing Pole Bands.

**A SPECIAL PROPOSITION TO Interurban Electric Railways**



Cut No. 941. Pole Arrester, in Wooden Cover.

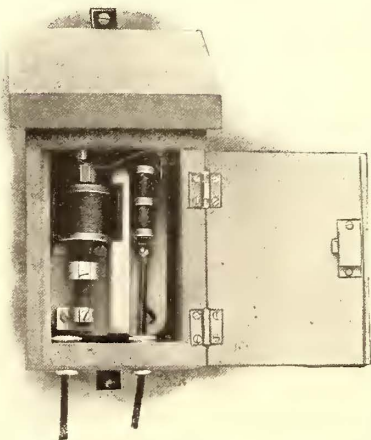
No other Electrical installations are so difficult to protect from Lightning. Garton Lightning Arresters are particularly suited to this service.

They discharge more readily than other makes, thus preventing the building up of such disastrous potentials of static electricity on long lines as occurs with other Arresters that cost less money, but have much higher resistances in their discharge path.

They are therefore the most economical in the long run and by installing them in proper numbers, according to our proposition, we give a definite guarantee of one year's service. Several years' service may reasonably be expected, but there is the absolute certainty for the first year.

The more Arresters on the line the less trouble at the Station, and the less work each Arrester has to do during severe Storms—the result is, that you secure a greater degree of protection and a longer life for the Arresters.

Write for our proposition, stating how many miles of line operated, and the number of cars.



Cut No. 941A. Pole Arrester, in Wooden Cover with Hook Door.

**Garton Arresters Protect**

**FULL INFORMATION FROM THE MANUFACTURER**

**Garton-Daniels Company**

**KEOKUK, IOWA, U. S. A.**

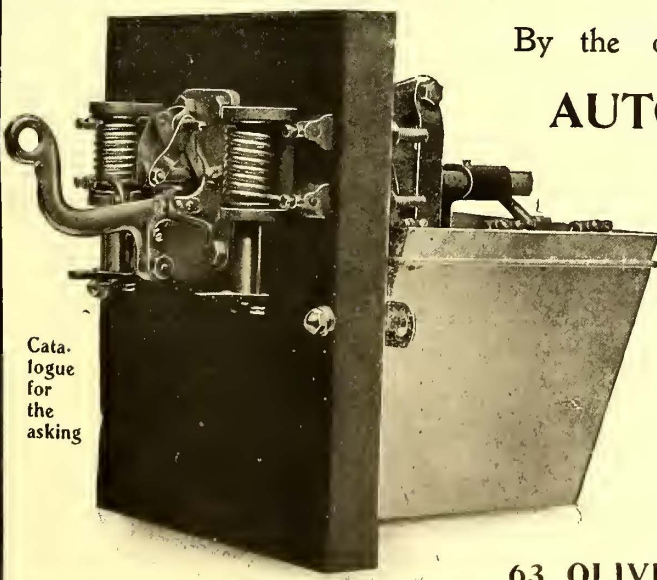


Cut No. 940. Pole Arrester, in Iron Cover.



INDEX TO ADVERTISERS—Continued

Mead, John A., Mfg. Co., New York.....	154	Railways & Light Co. of America, Balti-	96	Taunton Locomotive Mfg. Co., Taunton,	136
Merritt & Co., Philadelphia, Pa.....	15	more, Md.....	123	Mass.....	186
Mica Insulator Co., New York and Chi-	17	Reconstructed Granite Co., New York.....	123	Taylor Electric Truck Co., Troy, N. Y.....	106
ago, Ill.....	17	Ridlon, Frank, Co., Boston.....	165	Thompson, Son & Co., New York.....	92
Michigan Central R. R.....	—	Ristine & Conklin, Philadelphia, Pa.....	93	Thompson, Tenny & Crawford, N. Y.....	94
Michigan Mfg. Co., Ypsilanti, Mich.....	—	*Robb Engineering Co., Ltd., Amherst, N. S.	75	Tingley, R. H., Co., Providence, R. I.....	104
*Miller & Co., Ltd., Edinburgh.....	64	Roberts, E. P., & Co., Cleveland, Ohio.....	94	Toomey, Frank, Philadelphia, Pa.....	84A
*Milnes, Geo. F., & Co., Hadley and Birken-	55	*Robey & Co., Ltd., Lincoln, England.....	70	Tosi, Franco, Legnano, Italy.....	99
head, England.....	55	Robins Conveying Belt Co., New York.....	153	Townsend, Reed & Co., Chicago, Ill.....	93
Miniature Railway Co., New York.....	26	Roebing, John A., Sons Co., Trenton, N. J.	114	Trask, Spencer & Co., New York.....	—
*Mirrless-Watson Co., Ltd., Glasgow, Scot-	65	Root Track Scraper Co., Kalamazoo, Mich..	165	Trolley Vestibule Shade Co., Bridgeport,	—
land.....	65	Roovers Mfg. Co., New York.....	28	Conn.....	—
Mitshkun Co., M., Detroit, Mich.....	107	Rosenbaum, Wm. A., New York.....	96	U. S. Electric Signal Co., West Newton,	162
Monarch Lumber Co., Chicago, Ill.....	121	Rossiter, MacGovern & Co., New York.....	105	Mass.....	91
Moore, Baker & Co., Boston.....	92	*Rowland, B. R., & Co., Ltd., Keddish, near	75	U. S. Mortg. & Trust Co., New York.....	169
Morden Frog & Crossing Wks., Chicago, Ill.	123	Manchester, England.....	152	U. S. Projectile Co., Brooklyn, N. Y.....	48
Morris Electric Co., New York.....	111	Russell Engine Co., Massillon, O.....	162	U. S. Steel Co., Boston, Mass.....	157
Morris-Ireland Safe Co., Boston, Mass.....	15	Safety Car Htg. & Ltg. Co., New York.....	15	Universal Safety Tread Co., New York.....	96
Moser, Chas., Co., New York.....	22	Samson Cordage Works, Boston.....	97	Upton, W. B., & Co., Washington.....	121
Mulford & Petry Co., New York.....	102	Sanderson & Porter, New York.....	95	Van Dorn, W. T., Co., Chicago.....	193
Munsell, Eugene, & Co., New York and Chi-	17	Sargent & Lundy, Chicago.....	103	Van Dorn & Dutton Co., Cleveland, Ohio...	166
ago.....	17	Saxton, E., Washington, D. C.....	9	Van Dorn-Elliott Electric Co., Cleveland,	166
*Musgrave & Sons, Ltd., Bolton, Lanc., Eng-	72, 73	Sayre, L. A., & Co., Newark, N. J.....	125	Ohio.....	134
land.....	82	Scherzer Rolling Lift Bridge Co., Chicago,	67	Wadhams Oil & Grease Co., Milwaukee, Wis.	74
*Nalder Brothers & Thompson, Ltd., Lon-	113	Schoonmaker, A. G., Co., New York.....	106, 107	*Wallsend Slipway & Eng'g Co., Wallsend-	5
don.....	124	*Scott & Mountain, Ltd., Ernest, Newcastle-	6	on-Tyne.....	16
National Conduit & Cable Co., New York...	124	on-Tyne, England.....	96	Walworth Mfg. Co., Boston.....	161
National Elastic Nut Co., Milwaukee, Wis.	162	Scranton Fire Brick & Conduit Co., Scranton	113	*Ward-Leonard Electric Co., Bronxville,	106
New Century Car Heater Co., Jersey City,	22	Pa.....	95	N. Y.....	123
N. J.....	170	Serrell, Lemuel W., New York.....	140	Watson-Stillman Co., The, New York.....	134
New Haven Car Register Co., New Haven,	22	Shaw, H. M., & Co., New York.....	60, 61	Watson, Benjamin, New York.....	124
Conn.....	166	Sheaff & Jaastad, Boston.....	14	Weber Ry. Joint Mfg. Co., New York.....	175
New Jersey Zinc Co., New York.....	59	Siegrist Lubricator Co., St. Louis, Mo.....	20	Webster, Warren & Co., Camden, N. J.....	81, 109
New Process Raw Hide Co., The, Syracuse,	120	*Siemens Bros. & Co., Ltd., London.....	168	Weir Frog Co., Cincinnati, Ohio.....	29
N. Y.....	166	Sills-Eddy Mica Co., Newark, N. J.....	161	*Weir, G. & J., Glasgow, Scotland.....	81, 109
*Newton Elec. Works, Taunton, England...	120	Silver Lake Co., Boston, Mass.....	178	Wendell & MacDuffie, New York.....	29
N. Y. Central & Hudson River R. R.....	129	Simonds Mfg. Co., Pittsburgh, Pa.....	75	Western Electrical Supply Co., St. Louis, Mo.	161
New York Switch & Crossing Co., Hoboken,	28	Simplex Electrical Co., Cambridgeport, Mass.	86	Westinghouse Air Brake Co., Pittsburgh,	14
N. J.....	167	Sjoberg, J. P., & Co., New York.....	14	Pa.....	85
Niles Car & Mfg. Co., Niles, Ohio.....	173	Smethurst & Allen, Philadelphia.....	9	*Westinghouse Brake Co., Ltd., London...	A
Nuttall, R. D., Co., Pittsburgh, Pa.....	8	*Smith, Frederick & Co., Ltd., Wire Mfrs.,	48	Westinghouse, Church, Kerr & Co., Pitts-	B, C
Ohio Brass Co., Mansfield, Ohio.....	7	Manchester, England.....	184, 185	burgh, Pa.....	A
Ohmer Car Register Co., Dayton, Ohio.....	173	*Smith, Peter, Heater Co., Detroit, Mich....	177	Westinghouse Electric & Mfg. Co., Pitts-	97
Okonite Co. (Ltd.), The, New York.....	8	France.....	152	burgh, Pa.....	100
Paige Iron Works, Chicago.....	123	Speer Carbon Co., St. Mary's, Pa.....	168	Westinghouse Mach. Co., Pittsburgh, Pa...	143
Pantasote Co., The, New York.....	158	Spiral Nut Lock Co., New York.....	177	Weston Bros., Chicago, Ill.....	130
Parmenter, George A., Cambridgeport, Mass.	155	Sprague Electric Co., New York.....	19	Weston Electrical Instrument Co., Waverly	138
Peckham Mfg. Co., New York.....	187, 188	St. Louis Car Co., St. Louis, Mo.....	121	Park, Newark, N. J.....	175
Peerless Rubber Mfg. Co., New York.....	144	St. Louis Car-Wheel Co., St. Louis.....	19	Wetherill, Robt., & Co., Chester, Pa.....	97
Pennsylvania Electrical & Railway Supply	144	St. Louis Iron & Machine Works, St. Louis,	D	Wharton, Wm., Jr., & Co., Phila.....	138
Co., Pittsburgh, Pa.....	132	Mo.....	19	Wheeler Condenser & Eng. Co., New York..	175
Pennsylvania Steel Co., Steelton, Pa.....	96	Standard Automatic Lubricator Co., Phila-	166	White, J. G., & Co., New York.....	59
Pepper & Register, Philadelphia.....	93	delphia, Pa.....	153	*White, J. G., & Co., Ltd., London.....	106
Perry, Coffin & Burr, Boston, Mass.....	121	Standard Car-Wheel Co., Cleveland.....	107	Wickes Bros., Pittsburgh, Pa.....	142
Phelan, D. W., New York.....	115	Standard Paint Co., New York.....	195	Wilkinson Mfg. Co., Bridgeport, Montgomery	68, 69
Phillips, Eugene F., Bare & Insulated Wires.	150	Standard Pole & Tie Co., New York.....	121	County, Pa.....	20
Phoenix Iron Works Co., Meadville, Pa.....	16	Standard Traction Brake Co., New York...	19	*Willans & Robinson, Ltd., Rugby, England.	90B
Phosphor Bronze Smelting Co., Phila.....	152	Standard Varnish Works, New York.....	166	Willard Storage Battery Co., Cleveland, Ohio.	23
Pierce, Frank M., Eng. Co., New York.....	95	Star Brass Works, Kalamazoo, Mich.....	19	*Wilson & Co., Brooklyn, N. Y.....	64
Pierce, Richardson & Neiler, Chicago.....	22	Steel Cable Eng. Co., Boston.....	135, 137	Wisconsin Graphite Co., Pittsburgh, Pa....	17
Pittsburgh Insulating Co., Pittsburgh, Pa...	75	Steel Rail Supply Co., New York.....	143	*Witting Bros., Electrical Engineers & Con-	110
*Pittsburgh Insulating Co., Birmingham,	166	Stephenson, John, Co., Elizabeth, N. J.....	123	tractors, Ltd., London, England.....	65
England.....	10	Sterling-Meaker Co., Newark, N. J.....	121	Woodman, The R., Mfg. & Supply Co., Bos-	—
Pittsburgh Reduction Co., Pittsburgh, Pa...	150	*Sterling Varnish Co., Birmingham, Eng-	19	ton.....	—
Porter & Berg, Chicago, Ill.....	10	land.....	133	Woods, S. A., Machine Co., South Boston,	—
Protected Rail Bond Co., Phila., Pa.....	150	Ohio.....	133	Mass.....	—
Providence Engineering Wks., Providence,	150	Stirling Co., The, Chicago.....	121	*Worthington Pumping Engine Co., London.	—
R. I.....	150	Stocker, George J., St. Louis, Mo.....	19	—	—
Quincy Engine Works, Quincy, Ill.....	150	*Stow Mfg. Co., Binghamton, N. Y.....	121	—	—
Railway Register Mfg. Co., New York.....	174	Strock, S. C., New York.....	19	—	—
—	—	Stuart-Howland Co., Boston, Mass.....	133	—	—
—	—	Studebaker Bros. Mfg. Co., South Bend, Ind.	133	—	—
—	—	Sturtevant, B. F., Co., Boston.....	144	—	—
—	—	Swain Lubricator Co., Chicago, Ill.....	—	—	—



By the operation of any one Tripping Coil in our

## AUTOMATIC ALTERNATING OIL CIRCUIT BREAKER

Protection is secured to two-phase or three-phase apparatus. This circuit breaker has a capacity up to 300 amperes at pressures up to 10,000 volts. Let us send you descriptive circular illustrating our various types. . . . .

### S. B. CONDIT, JR., & CO.

63 OLIVER STREET, - BOSTON, MASS.

Cata- logue for the asking



Self-Lubricating



Non-Cutting



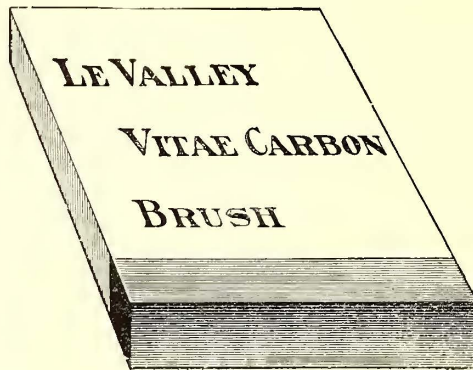
Non-Sparking



Noiseless

**Will carry 100 per cent. more load  
than any other Carbon Brush**

Commutators last five  
times longer with  
Le Valley Brushes



Le Valley Brushes last  
four times longer  
than any other

## Le Valley Vitae Carbon Brush Co.

Offices and Storerooms, 119-125 East 42d St., New York, U. S. A.

Telephone, 5215 38th Street

Cable Address, Vitaebrush, New York

All sizes carried in stock for immediate shipment, including brushes with special attachments

**WE CHALLENGE THE WORLD**  
to produce a Carbon Brush that will last longer, work better or give more thorough satisfaction than do  
**SPEER CARBON BRUSHES**  
**SPEER CARBON COMPANY, ST. MARYS, PA.**

SALES AGENTS:

WESTERN ELECTRICAL SUPPLY CO., St. Louis, Mo.  
PORTER & BERG, 309 Dearborn St., Chicago, Ill.  
THE MAYER & ENGLUND CO., Philadelphia and New York.  
FRANK RIDLON CO., 200 Summer St., Boston, Mass.  
ALBERT THODE & CO., Hamburg, Germany.  
LUDLOW SUPPLY CO., 313 Electric Bldg., Cleveland, O.  
GENERAL RAILWAY SUPPLY CO., Park Bldg., Pittsburg, Pa.  
GENERAL ELECTRIC CO., 69 Queen Victoria St., London, Eng.

*An American Idea, Well Worth the  
Attention of the World's Electricians.*

## Imperial Varnish Muslin

Five and seven milles thick, unexcelled for armature winding. A popular insulation on account of its low cost in comparison with other materials of equal insulating value.

These goods stand a breakdown test of 5,000 to 8,000 volts for our No. 1 goods, seven milles thick, and 3,500 to 6,000 volts for our No. 2 goods, five milles thick.

Sold in tape, any width, rolled on one-inch paste-board centers, 45 yards per roll, or in 36-inch rolls, any length desired.

FOR SAMPLES AND PRICES, ADDRESS

**Tulloch & Co.,**  
No. 4 Fenchurch Avenue, - LONDON.

OR

**Sills-Eddy Mica Co.,**  
Broad Exchange, NEW YORK, U. S. A.



No.	Diameter.	Average Weight per Coil.
8	$\frac{1}{4}$ in.	30 lbs.
9	$\frac{3}{8}$ "	38 "
10	$\frac{5}{16}$ "	48 "
12	$\frac{3}{8}$ "	72 "
14	$\frac{7}{16}$ "	92 "
16	$\frac{1}{2}$ "	120 "

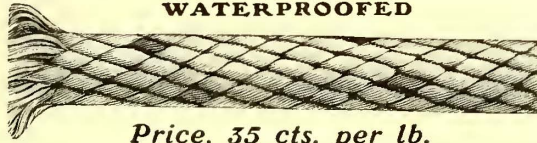
Regular coils, about 1,200 feet each.

For Hardness of Braid, Smoothness of Finish and Thorough Waterproofing

# SAMSON CORDAGE HAS NO EQUAL

## SAMSON SPOT TROLLEY CORD WATERPROOFED

Hard braid, smooth finish, thus allowing minimum abrasion. Thoroughly waterproofed. The colored SPOT is a trade mark used only in this extra quality cord. Made in sizes No. 6 to No. 16.



Size No. 12

Price, 35 cts. per lb.

## MASSACHUSETTS TROLLEY CORD WATERPROOFED



Size No. 10

A durable, firmly braided and smoothly finished cord. Will wear longer than any other cord made except the extra quality "Samson Spot Cord." Made in sizes No. 6 to No. 12 only.

Price, 30 cts. per lb.

## BELL CORD AND REGISTER CORD



Size No. 8

Samson Mahogany Bell Cord, Size No. 8, 45 cts. per lb.  
Samson Mahogany Wire Centre Register Cord, No. 6. 3 cts per ft.

## SAMSON WINDING CORD

For Armatures



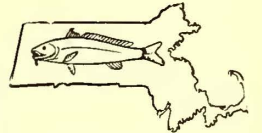
Size No. 4

Does not kink or ravel. Put up in coils of 1,000 yards each. No. 3½, ¾c. per yd.; No. 4, 1c. per yd.; No. 4½, 1¼c. per yd.

Send for Samples  
**SAMSON CORDAGE WORKS**  
BOSTON, MASS.

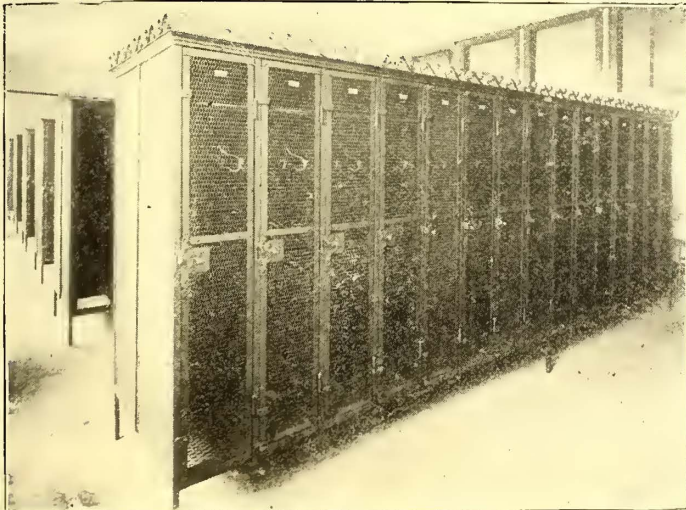


Samson Trade Mark.



Massachusetts Trade Mark.

## Expanded Metal Lockers



One of the Locker Rooms of the Penna. R. R.

The safety, economy, durability and the excellent sanitary qualities possessed by our Lockers have led the largest concerns in this country to adopt them. Our catalogue contains information regarding different types of Lockers with a list of users.

## Merritt & Company

1124 Ridge Avenue PHILADELPHIA

## Special Conductors' Safes

—FOR—

## STREET RAILWAYS



Conductors can deposit their returns without access to safe

Made in several sizes

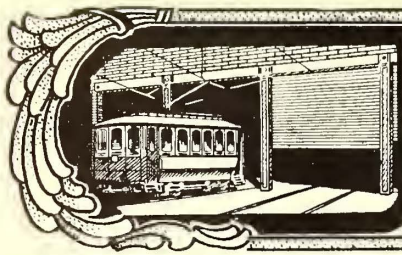
In use on over 100 roads

SEND FOR PRICES AND CATALOGUE

## Morris-Ireland Safe Co.

64 Sudbury St. BOSTON, MASS.



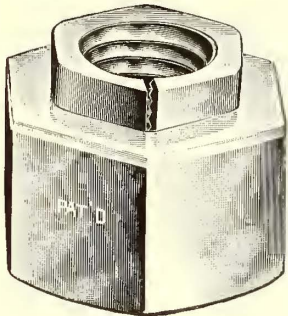


**KINNEAR STEEL ROLLING } DOORS and SHUTTERS**

Boston 85 Water Street.  
Philadelphia, 1011 Chestnut St.  
Chicago, 112 Clark Street.

SEND FOR CATALOGUE "K."

**THE KINNEAR MFG. CO.**  
COLUMBUS, OHIO, U. S. A.



VIEW OF NUT ASSEMBLED

**The Columbia Lock Nut**

A Positive Lock, as well as an Improved Nut of Universal Application

**SOME OF ITS SPECIAL ADVANTAGES**

- It is a device automatically fastening both bolt and nut absolutely.
- It is a binding lock nut of immense power, because the greater the strain the firmer the grip.
- It does not injure the bolt and will never slack back or work loose.
- No washer of any kind is required.
- It will straighten the threads of an abused bolt, thus avoiding the necessity of recutting the threads.
- It does not require exact size or taper bolt, because it readily receives full or scant diameter bolts.
- No springs, jamb nuts, dogs, palls, slots, pins, or other extra devices necessary, because it is a unit fastening.
- It is more effective than double nuts and stronger than rivets.
- It can be placed in any position, and can at any time be removed without special tools.
- It never diminishes its grip in expansion and contraction of metals.

**COLUMBIA LOCK NUT CO., Inc'd.**

Patentees and Manufacturers of the Columbia Lock Nut, an Improved Nut adapted for Railway Fish Plates, Locomotives, Cars and Car Trucks, Automobiles, Carriages, Axles, Air Compressors, Power Transmitters and all kinds of Machinery, and for all purposes where a secure fastening is required.

NEW YORK OFFICE, - 10 and 12 Vandewater Street

Write for price list and discounts. Will send samples free upon application. Mention STREET RAILWAY JOURNAL.

Assists the boiler to keep steady steam pressure on the peaks of the load, is why

**GREEN'S ECONOMIZER**

has been so readily adopted in the larger ELECTRIC RAILWAY, LIGHT AND POWER PLANTS.

✿ Keeps the feed water heated to the evaporative point. ✿  
Saves 10 to 20 per cent. in FUEL SUPPLY



Twenty Prize Medals, Latest from the Pan-American Exposition. More explicit details in our booklet "Green's Economizer." Our engineers also are ready to explain.

**THE GREEN FUEL ECONOMIZER CO.,**  
MATTEAWAN, N. Y.

Sole manufacturers in the U. S. A.

REG. TRADE MARKS



**THE PHOSPHOR BRONZE SMELTING CO. LIMITED,**  
2200 WASHINGTON AVE., PHILADELPHIA.  
"ELEPHANT BRAND PHOSPHOR-BRONZE"  
INGDTS, CASTINGS, WIRE RODS, SHEETS, ETC.  
— DELTA METAL —  
CASTINGS, STAMPINGS AND FORGINGS.  
ORIGINAL AND SOLE MAKERS IN THE U. S.

**WARD LEONARD CIRCUIT BREAKERS**

**WARD LEONARD ELECTRIC CO., BRONXVILLE, N. Y., U. S. A.**



**Promptness in Electrical Repairing**

means much in these busy days. The quickest work consistent with thoroughness, work that will last—that's our specialty. *We are experts in armature winding, repairing of dynamos, motors, arc lamps, and every other kind of electrical apparatus.* We use nothing but the best quality of electrical supplies, and our shop is equipped with the most modern tools, in the hands of none but skilled workmen. Our charges are right—the lowest consistent with high-class work. The test of the quality of our work is of course the work itself. Give us a chance to demonstrate our superiority. . . . .

**DOUBLEDAY-HILL ELECTRIC CO.**

535 WOOD STREET, PITTSBURG, PA.



**CLASSIFIED DIRECTORY**

OF

*Manufacturers, Manufacturers' Agents, Engineers, Contractors, Bankers, Brokers, Etc., Etc.*

NOTE - For reference to the advertisements, see alphabetical index on pages 9-13.

\* Indicates advertisements appearing only in International Edition and in copies of American Edition circulating outside of the United States.

**Accountants and Auditors**

The Audit Co. of Illinois.

**Accumulators**

(See Batteries, Storage.)

**Advertising, Street Car**Kissam, George & Co.  
Mulford & Petry Co.**Air-Brakes**Christensen Engineering Co.  
Standard Traction Brake Co.  
Westinghouse Air Brake Co.**Aluminum**

Pittsburgh Reduction Co.

**Ambroin Insulation**

\*Ambroin-Werke.

\* Estler Bros.

**Amusement Attractions**Armitage-Herschell Co.  
Boyton, Capt. Paul.  
Dentzel, G. A.  
Electric Fountain Co. of America.  
Electric Launch Co.  
Gillie Engine & Machine Co.  
Herschell, Spillman & Co.  
McCormick Mfg. Co.  
Miniature Ry. Co.  
Roovers Manufacturing Co.**Armature Lifts**Ohio Brass Co.  
Van Dorn & Dutton Co.**Babbitt Metal**

(See Bearings.)

**Badges**Mayer & Englund Co.  
New Haven Car Register Co.  
Woodman, R., Mfg. & Supply Co.**Band Saws**

Woods, S. A., Machine Co.

**Bankers and Brokers**Bonner & Co.  
Devitt, Tremble & Co.  
Dumee, Son & Co.  
Farson, Leach & Co.  
Harris, N. W., & Co.  
Hayes, W. J., & Sons.  
Jones, Edward C., Co.  
Lindsay, J. D.  
Moore, Baker & Co.  
Perry, Coffin & Burr.  
Ristine & Conklin.  
Thompson, Tenney & Crawford.  
Trask, Spencer & Co.**Batteries, Storage**\*Chloride Electrical Storage Syndicate, Ltd.  
\*Electrical Power Storage Co., Ltd.  
Electric Storage Battery Co.  
Gould Storage Battery Co.  
Willard Storage Battery Co.**Bearings**Brady Brass Co.  
Brill, J. G., Co.  
Finn, John, Metal Works.  
\*Glacier Anti-Friction Metal Co.  
Lumen Bearing Co.  
Mayer & Englund Co.  
McGuire Manufacturing Co.  
Nuttall, R. D., Co.  
Ohio Brass Co.  
Phosphor Bronze Smelting Co.  
Porter & Berg.  
Ridlon, Frank, Co.  
Simonds Manufacturing Co.  
Stuart-Howland Co.  
Van Dorn & Dutton Co.  
Wendell & MacDuffie.  
Western Electrical Supply Co.**Bell Cord**

(See Cord, Bell and Trolley.)

**Bells and Gongs**Brill, J. G., Co.  
Cheswick Mfg. Co.  
Harrington, C. J.  
Hubbard, Hall & Co.  
Mayer & Englund Co.  
Ohio Brass Co.  
Porter & Berg.  
Ridlon, Frank, Co.  
Stuart-Howland Co.  
Wendell & MacDuffie.  
Western Electrical Supply Co.**Blinds, Car**Brill, J. G., Co.  
Sjoberg, J. P., & Co.  
Trolley Vestibule Shade Co.**Blowers**American Blower Co.  
Sturtevant, B. F., Co.**Boiler & Pipe Coverings**H. W. Johns-Manville Co.  
Keasbey, Robert A.**Boiler Cleaners (Mechanical)**Gem Mfg. Co.  
Lagonda Mfg. Co.  
Liberty Mfg. Co.**Boiler Cleaning Compounds**Dearborn Drug & Chemical Wks.  
The Ironsides Co.  
Wadhams Oil & Grease Co.**Boilers**Allis-Chalmers Co.  
Babcock & Wilcox Co.  
\*Babcock & Wilcox, Ltd.  
Cooper, C. & G., Co.  
Edge Moor Iron Co.  
Harrisburg Foundry & Machine Works.  
Harrison Safety Boiler Works.  
Heine Safety Boiler Co.  
\*Maguire & Baucus.  
\*Musgrave & Sons, Ltd.  
Phoenix Iron Works Co.  
Pierce, Frank M., Eng. Co.  
\*Robb Engineering Co., Ltd.  
\*Rowland, B. R., & Co., Ltd.  
Stirling Co., The  
\*Wallend Slipway & Engineering Co., Ltd.  
Westinghouse, Church, Kerr & Co.  
Wetherill, Robert, & Co.**Bonds, Rail**American Electrical Works.  
American Steel & Wire Co.  
Anderson, A. & J. M., Mfg. Co.  
Brown, Harold P.  
Central Electric Co.  
Chase-Shawmut Co.  
\*Estler Brothers.  
Falk Co.\*Forest City Electric Co.  
General Electric Co.  
Harrington, C. J.Mayer & Englund Co.  
Morris Electric Co.  
Ohio Brass Co.  
Porter & Berg.  
Ridlon, Frank, Co.  
Roebing's, John A., Sons Co.  
Stuart-Howland Co.  
Wendell & MacDuffie.  
Western Electrical Supply Co.**Brackets and Cross Arms**Anderson, A. & J. M., Mfg. Co.  
Central Electric Co.  
Creaghead Engineering Co.  
Electric Ry. Equip. Co., Cincinnati.  
Harrington, C. J.  
Mayer & Englund Co.  
Ohio Brass Co.  
Porter & Berg.  
Ridlon, Frank, Co.  
Standard Pole & Tie Co.  
Stuart-Howland Co.  
Walworth Mfg. Co.  
Wendell & MacDuffie.  
Western Electrical Supply Co.**OILING SYSTEM  
SATISFACTION**

is made a certainty when the equipment includes the

**CROSS OIL FILTER.**

We've made oiling systems a study—equipped a number of the largest power houses in the country, so it's altogether probable that we can be of valuable help in the planning.

We will be pleased to send catalog and blue prints and quote prices for any desired capacity.

**The Burt Mfg. Co.**

Akron, Ohio, U. S. A.

Largest Manufacturers of  
Oil Filters in the World.

Sole Agents for Great Britain:

SHELBY &amp; CO.

66 Leonard St., London, E. C. 4

**ALBERGER COOLING TOWERS**IMPROVED CONDENSING APPARATUS  
VACUUM PUMPING MACHINERY  
Send for Illustrated Catalogue**ALBERGER CONDENSER COMPANY**

95 LIBERTY STREET, NEW YORK

**BADGES**L & M. R. R.  
96• **MOTORMAN** •of every  
design and  
description  
in Imitation  
Gold, Nickel  
and German  
Silver.

Send for descriptive circular and price list of our

**Railway Supplies****R. WOODMAN MFG. & SUPPLY CO.**

63 Oliver St., BOSTON, Mass., U. S. A.

**MICA  
MICANITE  
EMPIRE** CLOTH AND PAPER  
**M. I. C. COMPOUND**QUALITY THE BEST  
PROMPT SHIPMENTS  
LOW PRICES  
LARGE STOCK

AWARDED GOLD MEDAL, PARIS, 1900

**EUGENE MUNSELL & CO. MICA INSULATOR CO.**

FIRST HANDS

ORIGINATORS

**CHICAGO AND NEW YORK**

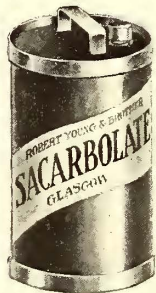
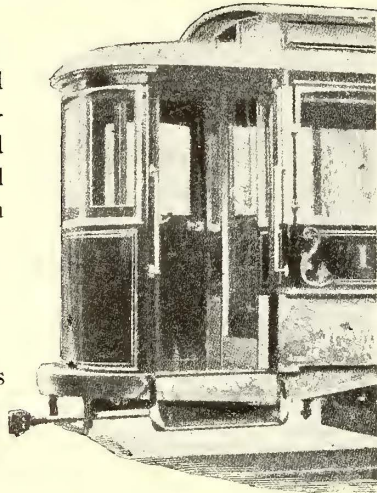


# IF YOU HAVE A DIRTY CAR

One that is dingy,  
the paint faded and  
the varnish lustre-  
less, grease and oil  
bespattered, or foul  
smelling and germ  
breeding

## LIKE THIS

a few applications  
externally and  
internally of



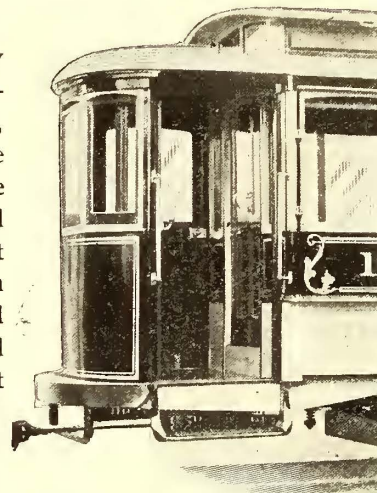
# "SACARBOLATE"

(REGISTERED)

## THE PERFECT CLEANSER

will immediately  
restore the bril-  
liancy to the colors,  
the lustre to the  
varnish, remove  
grease, oil and  
grime and free it  
thoroughly from  
disease germs and  
all foul odors and  
make it present  
an appearance

## LIKE THIS



USED BY THE FOLLOWING TRAMWAY UNDERTAKINGS:

Dublin United	Glasgow Corporation	Leeds
Edinburgh District	Manchester	Sheffield
Newcastle	British Elec. Traction Co.	London Central Ry.

and many others throughout the United Kingdom

SOLE MAKERS

# ROBERT YOUNG & CO.

38 Elliott Street, Glasgow

Sole Selling Agents in the United States

# FRANK S. DE RONDE CO.

46 Cliff Street, New York, U. S. A.

### CLASSIFIED DIRECTORY—Continued.

#### Brake Handles

Brill, J. G., Co.  
McGuire Manufacturing Co.  
Ohio Brass Co.  
Porter & Berg.  
Ridlon, Frank, Co.  
Stuart-Howland Co.  
Wendell & MacDuffie.  
Western Electrical Supply Co.

#### Brake Shoes

Allston Foundry Co.  
American Brake-Shoe Co.  
Barbour-Stockwell Co.  
Brill, J. G., Co.  
Car Wheel Trueing Brake-Shoe Co.  
Crescent Brake-Shoe Co.  
McGuire Manufacturing Co.  
Porter & Berg.  
Stuart-Howland Co.  
Wendell & MacDuffie.  
Western Electrical Supply Co.  
Wheel Trueing Brake-Shoe Co.

#### Brakes, Car

Brill, J. G., Co.  
Christensen Engineering Co.  
General Electric Co.  
\*International Elec. Engineer'g Co.  
McGuire Manufacturing Co.  
Peckham Manufacturing Co.  
Standard Traction Brake Co.  
Sterling-Meaker Co.  
U. S. Steel Co.  
Van Dorn & Dutton Co.  
Westinghouse Air Brake Co.

#### Bridges and Buildings

Indianapolis Switch & Frog Co.  
Pennsylvania Steel Co.  
Scherzer Rolling Lift Bridge Co.

#### Brooms, Track

Brill, J. G., Co.  
Central Electric Co.  
Consolidated Car Fender Co.  
McGuire Manufacturing Co.  
Mayer & Englund Co.  
Ohio Brass Co.  
Porter & Berg.  
Stuart-Howland Co.  
Wendell & MacDuffie.  
Western Electrical Supply Co.

#### Brushes, Motor and Dynamo

Central Electric Co.  
General Electric Co.  
Harrington, C. J.  
LeValley Vitæ Carbon Brush Co.  
Mayer & Englund Co.  
\*Newton Electrical Works, Ltd.  
Ohio Brass Co.  
Porter & Berg.  
Ridlon, Frank, Co.  
Spec Carbon Co.  
Stuart-Howland Co.  
Wendell & MacDuffie.

#### Cable and Rope Filler

The Ironsides Co.

#### Cables

(See Wires and Cables.)

#### Car Curtains and Shades

(See Curtains and Curtain Fixtures)

#### Car House Doors

Kinnear Mfg. Co.

#### Car Shop Wood Working Machinery

Woods, S. A., Machine Co.

#### Cars

Brill, J. G., Co.  
\*British Electric Car Co., Ltd.  
\*Brush Electrical Engineering Co.  
\*Electric Railway & Tramway Carriage Works, Ltd.  
Hammond, J., & Co.  
Jewett Car Co.  
Jones, J. M., Sons.  
Koppel, Arthur.  
Kuhlman, G. C., Car Co.  
Laclede Car Co.  
Laconia Car Co. Works.  
\*Milnes, Geo. F., & Co.  
Niles Car & Manufacturing Co.  
St. Louis Car Co.  
Stephenson, John, Co.

#### Cast Welded Joints

Falk Co.  
Harrington, C. J.  
Heil Rail-Joint Welding Co.  
Lorain Steel Co.  
Wendell & MacDuffie.  
Wharton, Wm., Jr., & Co.

#### Castings

Atha, Benj., & Co.  
Christensen Engineering Co.  
Falk Co.  
Laconia Car Co. Works.  
Lorain Steel Co.  
McGuire Manufacturing Co.  
New York Switch & Crossing Co.  
Ohio Brass Co.  
Phosphor Bronze Smelt'g Co., Ltd.  
Star Brass Works.  
U. S. Steel Co.  
Wendell & MacDuffie.  
Wharton, Wm., Jr., & Co.

#### Chains (Standard and Special)

Aultman Co.  
Jeffrey Mfg. Co.

#### Chemists (Manufacturing and Analytical)

Dearborn Drug & Chemical Wks.

#### Circuit Breakers

\*British Thomson-Houston Co.  
Central Electric Co.  
Condit, S. B., Jr., & Co.  
Cutter Co.  
Electric Ry. Equip't. Co., Cincinnati.  
\*Ferranti, Ltd.  
General Electric Co.  
Garton-Daniels Co.  
Harrington, C. J.  
H. W. Joans-Manville Co.  
\*International Elec. Engineer'g Co.  
\*Kelvin & James White, Ltd.  
Mayer & Englund Co.  
\*Nalder Bros. & Thompson.  
Ohio Brass Co.  
Porter & Berg.  
Stuart-Howland Co.  
Ward-Leonard Electric Co.  
Western Electrical Supply Co.

#### Circular Loom

American Circular Loom Co.

#### Cleaner, Car

De Ronde, F. S., Co.  
Young, Robert, & Co.

#### Clutches

Allston Foundry Co.

#### Coal Handling Machinery

(See Conveyors.)

#### Commutators and Commutator Bars

Central Electric Co.  
Columbia Machine Works.  
\*Forest City Electric Co.  
General Electric Co.  
Harrington, C. J.  
Mayer & Englund Co.  
Morris Electric Co.  
Ohio Brass Co.  
Penn. Elec'l & Ry. Supply Co.  
Porter & Berg.  
Ridlon, Frank, Co.  
Simonds Mfg. Co.  
Stuart-Howland Co.  
Van Dorn-Elliott Electric Co.  
Wendell & MacDuffie.  
Western Electrical Supply Co.

#### Compressed Air Motors

Compressed Air Co.

#### Condensers

Alberger Condenser Co.  
Alus-Chalmers Co.  
Bulkley, Henry W.  
Conover Mfg. Co.  
Goubert Mtr. Co.  
\*Merrills-Watson Co., Ltd.  
Taunton Locomotive Mfg. Co.  
Westinghouse, Church, Kerr & Co.  
Wheeler Condenser & Eng. Co.  
\*Worthington Pumping Eng. Co.

#### Conduits

American Vitrified Conduit Co.  
Harrington, C. J.  
\*Maguire & Baucus.  
National Conduit & Cable Co.  
Seranton Fire Brick & Conduit Co.

#### Contractors

Arnold Elec. Power Station Co.  
\*British Electric Traction Co., Ltd.  
\*Blackwell, Robt. W., & Co., Ltd.  
\*British Thomson-Houston Co.  
Columbia Construction Co.  
Creaghead Engineering Co.  
Cullen, Wm. A.  
\*Dica, Kerr & Co., Ltd.  
Electrical Engineering & Development Co.  
Electrical Installation Co.  
Falk Co.  
\*Ferranti, Ltd.  
Gest, Guy M.  
\*International Electrical Eng. Co.  
Kohler Brothers.  
Ley, Fred T., & Co.  
MacAfee, John Blair.  
\*Macartney, McElroy & Co., Ltd.  
\*Maschinenfabrik Oerlikon.  
Morris Electric Co.  
Pepper & Register.  
Pierce, Frank M., Eng. Co.  
Railways & Light Co. of America.  
Sanderson & Porter.  
Sargent & Lundy.  
Saxton, E.  
\*Scott, Ernest, & Mountain, Ltd.  
Serrell, Lemuel W.  
Sheaff & Jaastad.  
\*Siemens Bros. & Co.  
Smethurst & Allen.  
Townsend, Reed & Co.  
Upton, W. B., & Co.  
Walworth Mfg. Co.  
Wendell & MacDuffie.  
Weston Brothers.  
Wharton, Wm., Jr., & Co.  
White, J. G., & Co.  
\*White, J. G., & Co., Ltd.



## CLASSIFIED DIRECTORY—Continued.

**Controllers**

- \*British Thomson-Houston Co. General Electric Co.
- \*International Electrical Eng. Co. Lorain Steel Co.
- \*Maschinenfabrik Oerlikon.
- Westinghouse Electric & Mfg. Co.
- \*Witting Bros., Ltd.

**Controller Parts**

H. W. Johns-Manville Co.

**Conveyors, Coal & Ashes**

- Aultman Co.
- Brown Hoisting Machinery Co.
- Exeter Machine Works.
- Jeffrey Mfg. Co.
- Koppel, Arthur
- Mirrlees-Watson Co., Ltd.
- Robins Conveying Belt Co.
- Steel Cable Engineering Co.

**Cooling Towers**

- Alberger Condenser Co.
- Stocker, George J.
- Wheeler Condenser & Engineering Co.
- \*Worthington Pumping Eng. Co.

**Cord, Bell and Trolley**

- Brill, J. G., Co.
- Central Electric Co.
- Harrington, C. J.
- Mayer & Englund Co.
- New Haven Car Register Co.
- Ohio Brass Co.
- Porter & Berg.
- Ridlon, Frank, Co.
- Samson Cordage Works.
- Silver Lake Co.
- Stuart-Howland Co.
- Wendell & MacDuffie.

**Correspondence Schools**

International Cor. Schools.

**Cotton Duck**

Boyle, John, &amp; Co.

**Couplers, Car**

- McLaughlin Car Coupler Co.
- St. Louis Car Co.
- Van Dorn, W. T., Co.

**Cranes, Traveling**

- Brown Hoisting Machinery Co.
- \*International Elec'l Engineering Co.
- Niles Tool Works Co.

**Cross Arms**

(See Brackets.)

**Cross-Overs, Portable**

- Pennsylvania Steel Co.
- Wharton, Wm., Jr., & Co.

**Crossings, Frogs and Switches (Track)**

- American Frog & Switch Co.
- American Electric Switch Co.
- Barbour-Stockwell Co.
- Elliot Frog & Switch Co.
- Isk Co.
- Indianapolis Switch & Frog Co.
- Koppel, Arthur.
- Lorain Steel Co.
- Morden Frog & Crossing Works.
- New York Switch & Crossing Co.
- Paige Iron Works.
- Pennsylvania Steel Co.
- Weir Frog Co.
- Wharton, Wm., Jr., & Co.

**Curtains and Curtain Fixtures**

- Brill, J. G., Co.
- Curtain Supply Co.
- Hale & Kilburn Mfg. Co.
- Jackson & Sharp Co.
- Pantasote Co.
- Trolley Vestibule Shade Co.

**Derailing Devices**

- American Frog & Switch Co.
- Ohio Brass Co.

**Detective Service**

Drummond's Detective Agency.

**Doors, Car**

- Brill, J. G., Co.
- Sjoberg, J. P., & Co.

**Doors, Steel Rolling**

Kinnear Mfg. Co.

**Drills, Track**

- \*Estier Bros.
- Michigan Mfg. Co.
- Ridlon, Frank, Co.
- Stow Mfg. Co.

**Dynamos**

(See Generators.)

**Economizers**

- Broomell, Schmidt & Steacy Co.
- Green Fuel Economizer Co.
- Westinghouse Machine Co.

**Electric Brakes**

General Electric Co.

**Elevating Machinery**

(See Conveyors.)

**Engineers (Consulting)**

- Baker, W. E., & Co.
- Barstow, W. S.
- Blood & Hale.
- Breed, George.
- Burch, Edw. P.
- Chapman, C. A.
- Electrical Engineering & Development Co.
- Engstrom, Axel H.
- Ford, Bacon & Davis.
- Frink, E. A.
- Green, Samuel M.
- Humphrey, Henry H.
- Kitfield, E. H.
- Lundie, John.
- Pierce, Richardson & Neiler.
- Roberts, E. P., & Co.
- Sargent & Lundy.
- Sheaff & Jaasted.
- Tingley, R. H., Co.
- Upton, W. B., & Co.
- Weston Brothers.
- White J. G., & Co.

**Engineers, Contracting**

(See Contractors.)

**Engines, Gas**

- \*British Westinghouse Elec. & Mfg. Co., Ltd.
- Westinghouse Machine Co.

**Engines, Steam**

- \*Allen, W. H. Son, & Co.
- Allis-Chalmers Co.
- American Blower Co.
- Baker Engine & Machine Co.
- Ball & Wood Co.
- \*Blackwell, Robt. W., & Co., Ltd.
- \*British Westinghouse Elec. & Mfg. Co., Ltd.
- Brown, C. H., & Co.
- Brown-Corliss Engine Co.
- \*Brush Electrical Engineering Co.
- Cooper, C. & G., Co.
- \*Ferranti, Ltd.
- Harrisburg Foundry & Machine Works.
- Hooven, Owens, Rentschler Co.
- International Power Co.
- \*Maschinenfabrik Oerlikon.
- McIntosh, Seymour & Co.
- \*Musgrave & Sons, Ltd.
- Phoenix Iron Works Co.
- Pierce, Frank M., Eng. Co.
- Providence Engineering Works.
- Quincy Engine Works.
- \*Robb Engineering Co., Ltd.
- \*Robey & Co., Ltd.
- Russell Engine Co.
- St. Louis Iron & Machine Wks.
- Sturtevant, B. F., Co.
- Tosi, Franco.
- \*Wallsend Slipway & Engineering Co., Ltd.
- Westinghouse Machine Co.
- Wetherill, Robert, & Co.
- \*Willans & Robinson, Ltd.
- \*Yates & Thom.

**Engine Stops**

- Consolidated Engine Stop Co.
- Niles Tool Works Co.

**Exhaust Heads**

- Burt Mfg. Co.
- Sturtevant, B. F., Co.

**Fans, Steam and Electric**

- American Blower Co.
- Sprague Electric Co.
- Sturtevant, B. F., Co.

**Fare Registers**

(See Registers, Fare.)

**Feedwater Heaters**

(See Heaters, Feed-water.)

**Fenders and Guards**

- Baltimore Car Wheel Co.
- Brill, J. G., Co.
- Consolidated Car Fender Co.
- Harrington, C. J.
- Hunter Automatic Fender Co.
- \*Imperial Electric Supplies, Ltd.

# PERMANENT INSULATION

is assured when you use a

**TAPE**

AS GOOD AS

**P&B**

Always Pliable, Adhesive and Insulative. Water- and Temperature-proof. Will not Vulcanize or dry out. The same lasting Quality is found in P & B Electrical Compounds and P & B Armature and Field Coil Varnish. 17 Years' Standard

## THE STANDARD PAINT COMPANY

100 WILLIAM STREET

NEW YORK

Dept. H.

188-190 MADISON STREET

CHICAGO

FOR HIGH GRADE  
**INSULATING  
VARNISHES**

ADDRESS  
**Standard  
Varnish  
NEW YORK  
LONDON CHICAGO Works**

## Sterling Extra Insulating Varnish

STERLING EXTRA BLACK FINISHING VARNISH  
STERLING BLACK AIR DRYING VARNISH  
STERLING BLACK CORE PLATE VARNISH

THE STERLING VARNISH CO., Pittsburgh, Pa., U.S.A.

## STUART-HOWLAND CO.

**RAILWAY SUPPLIES**  
279-287 Devonshire St.,  
TEL. BRANCH EX., BOSTON 4144

Special rollers for street and steam railway cars. Brackets suitable for all classes of fittings. Used all over the world wherever cars are run.

**STEWART HARTSHORN CO.**

NEW YORK, 486 Broadway.  
CHICAGO 255-257 Wabash Ave.

Office and Factory,  
E. NEWARK, N. J.



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



## THE GREAT LABOR SAVER...

You Can Save Time and Money and Get Far Better Results with the Trenton Trolley Wagon

For convenience, ease of operation, safety, durability and high grade construction it has no equal.

Write us about it.

Circulars and Prices on Application.



Derselbe Trolley-Wagon ist bereits auf allen Haupt-Strassenbahnsystemen Amerikas eingeführt.

Este Wagon ha sido adaptado por las principales lineas en America.

### J. R. McCARDELL & CO.,

Patentees and Sole Manufacturers, TRENTON, N. J.  
European Agent, Robert W. Blackwell, 59 City Road, London, E.C., and 50, Boulevard Haussman, Paris.

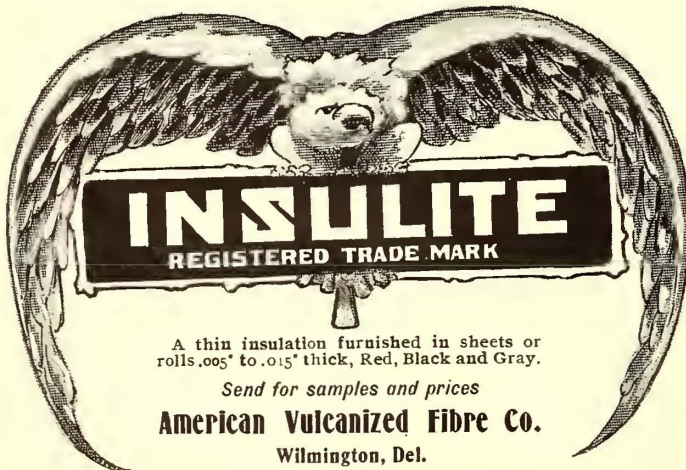
## CLASSIFIED DIRECTORY—Continued

- Mayer & Englund Co.  
McGuire Manufacturing Co.  
Parmenter, George A.  
Peckham Mfg. Co.  
Western Electrical Supply Co.
- Filters**  
American Oil Filter Co.  
Burt Mfg. Co.
- Fireproof Doors and Shutters**  
Kinnear Mfg. Co.
- Fireproof Paint**  
Wadhams Oil & Grease Co.  
Wisconsin Graphite Co.
- Forges**  
Sturtevant, B. F., Co.
- Fountains, Electric**  
Electric Fountain Co. of America.
- Frogs**  
(See Crossings, Frogs & Switches.)
- Frogs, Car Replacing**  
Ohio Brass Co.
- Fuses**  
Central Electric Co.  
Chase-Shawmut Co.  
D. & W. Fuse Co.  
H. W. Johns-Manville Co.  
Mayer & Englund Co.
- Gaskets**  
McCord & Co.  
Peerless Rubber Mfg. Co.
- Gates, Car**  
Bliss, R., Mfg. Co.  
Brill, J. G., Co.
- Gates, Railway Crossing**  
Buda Fdy. & Mfg. Co.
- Gears and Pinions**  
\*Blackwell, Robt. W., & Co., Ltd.  
Central Electric Co.  
Falk Co.  
General Electric Co.  
Harrington, C. J.  
Horsburgh & Scott.  
Lorain Steel Co.  
Mayer & Englund Co.  
Morris Electric Co.  
New Process Raw Hide Co.  
Nuttall, R. D., Co.  
Ohio Brass Co.  
Porter & Berg.  
Ridlon, Frank, Co.  
Simonds Mfg. Co.  
Stuart-Howland Co.  
U. S. Projectile Co.  
Van Dorn & Dutton Co.  
Wendell & MacDuffie.  
Western Electrical Supply Co.
- Generators**  
\*Blackwell, Robt. W., & Co., Ltd.  
\*British Westinghouse Elec. & Mfg. Co., Ltd.  
\*British Thomson-Houston Co.  
\*Brush Electrical Engineering Co.  
Bullock Electric Mfg. Co.  
Crocker-Wheeler Co.  
\*Dick, Kerr & Co., Ltd.  
\*Electric Construction Co., Ltd.  
\*Ferranti, Ltd.  
General Electric Co.  
\*International Elec. Eng. Co., Ltd.  
\*Newton Electrical Works, Ltd.  
\*Scott, Ernest, & Mountain, Ltd.  
Sturtevant, B. F., Co.  
Westinghouse Electric & Mfg. Co.  
\*Witting Bros., Ltd.
- Gongs, Car**  
(See Bells and Gongs.)
- Governors, Water Wheel**  
Lombard Governor Co.
- Grates**  
Green Engineering Co.
- Grease Cups**  
Crane Co.  
Wadhams Oil & Grease Co.
- Grease and Oils**  
(See Lubricants.)
- Headlights**  
Brill, J. G., Co.  
Crouse-Hinds Electric Co.  
Dressel Railway Lamp Works.  
St. Louis Car Co.
- Heaters, Car**  
Baker, Wm. C.  
Bay State Elec., Heat & Light Co.  
Brill, J. G., Co.  
Consolidated Car Heating Co.  
Gold Street Car Heating Co.  
Harrington, C. J.  
H. W. Johns-Manville Co.  
McGuire Mfg. Co.  
New Century Car Heater Co.  
Safety Car Heating & Lighting Co.  
Simplex Electrical Co.  
Smith, Peter, Heater Co.
- Heaters and Purifiers, Feedwater**  
Allis-Chalmers Co.  
Automatic Water Purifying Co.  
\*Babcock & Wilcox, Ltd.  
Broomell, Schmidt & Steacy Co.  
Green Fuel Economizer Co.  
Goubert Manufacturing Co., The  
Harrison Safety Boiler Works.  
Hoppes Manufacturing Co.  
Stilwell-Bierce & Smith-Vaile Co.  
Taunton Locomotive Mfg. Co.  
Wheeler Condenser & Eng. Co.  
\*Worthington Pumping Eng. Co.
- Heating and Ventilating Apparatus**  
American Blower Co.  
Sturtevant, B. F., Co.  
Weoster, Warren, & Co.
- Hose Bridges**  
Ohio Brass Co.
- Instruments, Measuring and Testing**  
Bristol Co.  
Central Electric Co.  
Cutter Co.  
\*Elliott Bros.  
General Electric Co.  
Harrington, C. J.  
H. W. Johns-Manville Co.  
\*Kelvin & James White, Ltd.  
Keystone Electrical Instrument Co.  
\*Nalder Bros. & Thompson.  
Westinghouse Electric & Mfg. Co.  
Weston Electric Instrument Co.
- Insulating Compounds**  
American Vulcanized Fibre Co.  
Conner, Jas. G., & Co.  
Pittsburgh Insulating Co.  
Standard Paint Co.  
Standard Varnish Works.  
Sterling Varnish Co.
- Insulators, Third Rail**  
Reconstructed Granite Co.
- Insulators, Trolley**  
(See Line Material.)
- Jacks, Car Replacing**  
Duff Manufacturing Co.  
Ohio Brass Co.  
Watson-Stillman Co.
- Joints, Rail**  
Atlas Railway Supply Co.  
Continuous Rail-Joint Co. of America.  
Harrington, C. J.  
Pennsylvania Steel Co.  
Weber Railway Joint Mfg. Co.  
Wendell & MacDuffie.  
Wharton, Wm., Jr., & Co.
- Lamps, Arc and Incandescent**  
Anderson, A. & J. M., Mfg. Co.  
Central Electric Co.  
General Electric Co.  
\*International Elec'l Engineer'g' Co.  
Mayer & Englund Co.  
Porter & Berg.  
Stuart-Howland Co.  
Wendell & MacDuffie.  
Western Electrical Supply Co.
- Launches**  
Electric Launch Co.
- Lighting, Car**  
Consolidated Car Heating Co.  
Safety Car Heating & Lighting Co.
- Lightning Arresters**  
\*British Thomson-Houston Co.  
\*Estler Brothers.  
General Electric Co.  
Mayer & Englund Co.  
Ohio Brass Co.  
Porter & Berg.  
Ridlon, Frank, Co.  
Shaw, H. M., & Co.



SILVER LAKE WATERPROOFED CORD FOR ARC LIGHT AND TROLLEY CORD.

SILVER LAKE CO., Boston, Mass.



# THE WILLARD STORAGE BATTERY

USED BY PROMINENT ROADS—INVESTIGATE BEFORE BUYING ELSEWHERE

MANUFACTURED BY THE WILLARD STORAGE BATTERY COMPANY

49 WOOD STREET, CLEVELAND, OHIO



## CLASSIFIED DIRECTORY—Continued

Stuart-Howland Co.  
Wendell & MacDuffie.  
Western Electrical Supply Co.  
Westinghouse Electric & Mfg. Co.

## Line Material

\*Ambroin-Werke.  
Anderson, A. & J. M., Mfg. Co.  
Billings & Spencer Co.  
\*Blackwell, Robt. W., & Co., Ltd.  
\*British Thomson-Houston Co.  
Central Electric Co.  
Creaghead Engineering Co.  
\*Dick, Kerr & Co., Ltd.  
\*Diener, Alf., & Co.  
Electric Ry. Equip't. Co., Cincinnati.  
\*Electric Tramway Equipment Co.  
\*Estler Brothers.  
General Electric Co.  
Harrington, C. J.  
H. W. Johns-Manville Co.  
\*Imperial Electric Supplies, Ltd.  
Mayer & Englund Co.  
Morris Electric Co.  
Ohio Brass Co.  
Porter & Berg.  
Shaw, H. M., & Co.  
Stuart-Howland Co.  
Wendell & MacDuffie.  
Western Electrical Supply Co.  
\*Witting Bros., Ltd.

## Lockers

Merritt & Co.

## Lock Nuts

Columbia Lock Nut Co.  
National Elastic Nut Co.  
Spiral Nut Lock Co.  
Weber Railway Joint Mfg. Co.  
Wharton, Wm., Jr., & Co.

## Locomotives, Electric

Baldwin Locomotive Works.  
\*British Thomson-Houston Co.  
Brill, J. G., Co.  
General Electric Co.  
\*International Elec. Eng. Co., Ltd.  
Jeffrey Mfg. Co.  
Koppel, Arthur.  
Westinghouse Electric & Mfg. Co.

## Lubricators

Crane Co.  
Siegrist Lubricator Co.  
Standard Automatic Lubricator Co.  
Swain Lubricator Co.

## Lubricants

Harrington, C. J.  
The Ironsides Co.  
Wadhams Oil & Grease Co.  
Wisconsin Graphite Co.

## "Lythite"

De Ronde, F. S., Co.

## Lubricant Cabinets

S. F. Bowser & Co.

## Machinery and Machine Tools

Watson-Stillman Co.  
Wendell & MacDuffie.  
Woods, S. A., Machine Co.

## Magnesia Sections

Keasbey, Robert A.

## Mechanical Draft

American Blower Co.  
Sturtevant, B. F., Co.

## Merry-Go-Rounds

Armitage-Herschell Co.  
Dentzel, G. A.  
Gillie Engine & Machine Co.  
Herschell, Spillman & Co.

## Metal, Anti-Friction

(See Bearings.)

## Metallic Paint

Wisconsin Graphite Co.

## Mica

Munsell, Eugene, & Co.  
Sills-Eddy Mica Co.

## Micanite

Mica Insulator Co.

## Miniature Railways

Armitage-Herschell Co.  
Miniature Railway Co.

## Mixers, Concrete, Mortar, Etc.

Fisher & Saxton Co.

## Motors, Compressed Air

Compressed Air Co.

## Motors, Electric

\*British Thomson-Houston Co.  
\*British Westinghouse Elec. & Mfg. Co., Ltd.  
\*Brush Electrical Engineering Co.  
Bullock Electric Mfg. Co.  
Crocker-Wheeler Co.  
\*Dick, Kerr & Co., Ltd.  
\*Electric Construction Co., Ltd.  
General Electric Co.  
\*International Electrical Eng. Co.  
Lorain Steel Co.

\*Maschinenfabrik Oerlikon.  
\*Scott, Ernest, & Mountain, Lt.  
Sprague Electric Co.  
Sturtevant, B. F., Co.  
Westinghouse Electric & Mfg. Co.  
\*Witting Bros., Ltd.

## Motors, Multi-Speed

Stow Mfg. Co.

## Multiple Unit System

Sprague Electric Co.

## Name Plate Machines

Roovers Manufacturing Co.

## Oiling System

Siegrist Lubricator Co.  
\*Wallsend Slipway & Engineering Co., Ltd.

## Oil Cabinets

S. F. Bowser & Co.

## Overhead Trolley Equipments

(See Line Material.)

## Packing

Bestosking Pack'g & Supply Co.  
Peerless Rubber Mfg. Co.  
Penn. Elec'l & Ry. Supply Co.  
Swain Lubricator Co.

## Paints, Insulating

Conner, James G., & Co.  
H. W. Johns-Manville Co.  
Standard Paint Co.  
Sterling Varnish Co.

## Paints, Preservative

De Ronde, F. S., Co.  
Dixon, Joseph, Crucible Co.  
New Jersey Zinc Co.  
Wisconsin Graphite Co.

## Paints and Varnishes

Conklin, H.  
Masury, John W., & Son.  
Moser, Chas., Co.  
Forest City Paint & Varnish Co.  
Standard Paint Co.

## Pantasote

Pantasote Co.

## Panels

Brill, J. G., Co.  
Sjoberg, J. P., & Co.

## Patent Attorneys

Rosenbaum, Wm. A.

## Phosphor Bronze

Elec. Ry. Equip't Co., Cincinnati.  
Phosphor Bronze Smelting Co.

## Pipe Joint Paste

Wisconsin Graphite Co.

## Pipe, Wrought Iron and Steel

\*Aiton & Co.  
Clow, James B., & Son.  
Crane Co.  
Walworth Mfg. Co.

## Platforms, Car

Brill, J. G., Co.  
Sjoberg, J. P., & Co.

## Pole Paints

Forest City Paint & Varnish Co.

## Poles, Metal

Elec. Ry. Equip't Co., Cincinnati.  
Walworth Mfg. Co.

## Poles and Ties, Wooden

Beidler, Francis, & Co.  
Eccleston Lumber Co.  
Fowler, John H.  
Holcomb-Lobb Co.  
Hurd, Jos. A., & Co.  
Kellogg Switchb'd & Supply Co.  
McCaffrey, Thos.  
Maltby Lumber Co.  
Maus, H. H., & Co.  
Monarch Lumber Co.  
Porter & Berg.  
Standard Pole & Tie Co.  
Strock, S. C.  
Valentine-Clark Co.

## Poles, Trolley

(See Trolley Poles.)

## Polish, Metal

Hoffman, G. W.  
Wadhams Oil & Grease Co.

## Power Transmission Machinery

Aultman Co.  
Jeffrey Mfg. Co.

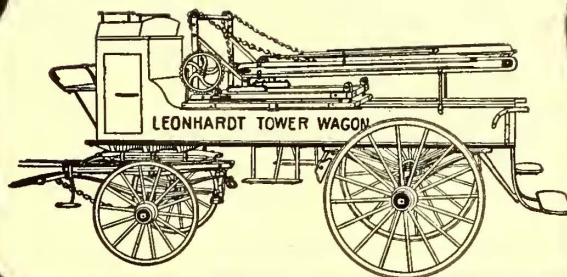
## Presses, Hydraulic Wheel

Pond Machine Tool Co.  
Watson-Stillman Co.

## Pulleys

Allston Foundry Co.

You Will Never Regret  
BUYING A  
**LEONHARDT**  
REVOLVING TOWER WAGON,  
IS THE MOST **ECONOMICAL.**  
**RELIABLE.**  
**QUICKLY OPERATED.**  
INSULATION ALWAYS PERFECT.  
SEE TOOL COMPARTMENTS.



PATENTED AND BUILT BY

**LEONHARDT WAGON MFG. CO.**  
BALTIMORE, - MD., - U.S.A.

*The handiest  
you ever saw*

That's the Clow Catalogue. It leads all trade classifications of Steam, Water, Gas, Heating and Plumbing Goods. It is clear, complete and arranged for your convenience. Only good goods found in it.

Put in your application now  
for the new edition  
CATALOGUE "S"  
soon to be issued

STEAM PIPE · VALVES · FITTINGS  
CAST IRON PIPE · HEAVY CASTINGS  
HYDRANTS · FINE PLUMBING GOODS  
RADIATORS · TOOLS

**JAMES B. CLOW & SONS**

FRANKLIN AND HARRISON STS., CHICAGO



# POLE PAINT



**O**UR Forest City Pole Paint is the best Preservative for Poles made.—It not only improves the appearance but adds considerably to the life of the pole. Color Cards furnished. Correspondence solicited. . . . .

... THE ...

**Forest City Paint and Varnish Co.**  
CLEVELAND, OHIO

**PITTSBURG INSULATING COMPANY**  
Manufacturers of INSULATED PAPER, LINEN, SILK, TAPE, Etc.

SOLE LICENSEES TO USE  
**STERLING EXTRA INSULATING VARNISH**  
In the Manufacture of Insulated Paper and Cloths  
Pittsburg, Pa., U. S. A. 95 Colmore Row, Birmingham, Eng.

## White Finish on Metal

Is generally unsatisfactory unless the right pigment is used. The only suitable pigment for painting on metal in white or tints is

## Zinc White

Whether the priming coat be red lead or oxides, Zinc White gives a more durable coating with more lasting lustre and color than any other white pigment.

**The New Jersey Zinc Co.**

Free: Our practical pamphlets,  
"The Paint Question."  
"Paints in Architecture."  
"House Paints: A Common Sense Talk About Them."

11 Broadway  
NEW YORK

CLASSIFIED DIRECTORY—Continued.

**Pumps**

- Alberger Condenser Co.
- \*Internation'l Elec. Engineer'g Co.
- \*Scott, Ernest, & Mountain, Ltd.
- Stilwell-Bierce & Smith-Vaile Co.
- \*Weir, G. & J.
- \*Worthington Pumping Eng. Co.

**Punches, Ticket**

- \*Bell Punch & Printing Co.
- New Haven Car Register Co.
- Sayre, L. A., & Co.
- Woodman, R., Mfg. & Supply Co.

**Purifiers, Feedwater**

- (See also Heaters and Purifiers.)
- Automatic Water Purifying Co.
- Kennicott Water Softener Co.

**Purifiers, Oil**

- American Oil Filter Co.
- Burt Mfg. Co.
- Harrison Safety Boiler Works.

**Rail Bonds**

(See Bonds, Rail.)

**Rail Joint Testing Instrument**

- \*Kelvin & Jas. White, Ltd.
- Mayer & Englund Co.

**Rail Joints**

(See Joints, Rail.)

**Rails**

- Barbour-Stockwell Co.
- \*Dick, Kerr & Co.
- \*Hadfield's Steel Foundry Co.
- Koppel, Arthur.
- Lorain Steel Co.
- Pennsylvania Steel Co.
- Steel Rail Supply Co.
- Wharton, Wm., Jr., & Co.

**Rails, Second Hand**

(See pages 103-107.)

**Rattan for Sweepers**

- Amer. Rattan & Reed Mfg. Co.
- Brill, J. G., Co.
- Consolidated Car Fender Co.
- Hale & Kilburn Mfg. Co.
- Harrington, C. J.
- Heywood Bros. & Wakefield Co.
- Mayer & Englund Co.
- McGuire Manufacturing Co.
- Ohio Brass Co.
- Stuart-Howland Co.
- Wendell & MacDuffie.

**Reconstructed Granite**

Reconstructed Granite Co.

**Registers, Fare**

- \*Bell Punch & Printing Co.
- International Register Co.
- Mayer & Englund Co.
- Morris Electric Co.
- New Haven Car Register Co.
- Ohmer Car Register Co.
- Railway Register Mfg. Co.
- Sterling-Meaker Co.

**Repair Work**

- Doubleday-Hill Elec. Co.
- \*Penn. Elec. & Ry. Supply Co.
- Rossiter, MacGovern & Co.
- Van Dorn-Elliott Elec. Co.

**Resistances**

- \*Ferranti, Ltd.
- \*Internation'l Elec. Engineer'g Co.

**Rolling Doors and Shutters**

Kinnear Mfg. Co.

**Roofing, Car**

- H. W. Johns-Manville Co.
- Sjoberg, J. P., & Co.

**Roofing Paint**

Wisconsin Graphite Co.

**Rope, Wire**

(See Cables.)

**"Sacarbolate"**

- De Ronde, Frank S., Co.
- Young, Robert, & Co.

**Safes**

Morris-Ireland Safe Co.

**Sand Boxes**

- Brill, J. G., Co.
- DeWitt Sand Box Co.
- Ham Sand Box Co.
- Peckham Manufacturing Co.
- Ridlon, Frank, Co.

**Sash Cord**

- Samson Cordage Works.
- Silver Lake Co.

**Sashes, Car**

- Brill, J. G., Co.
- Sjoberg, J. P., & Co.

**Seating, Car**

- Amer. Rattan & Reed Mfg. Co.
- Hale & Kilburn Mfg. Co.
- Heywood Bros. & Wakefield Co.
- Pantasote Co.
- Sjoberg, J. P., & Co.

**Second-Hand Apparatus**

(See pages 103-107.)

**Separators**

- Goubert Mfg. Co. (Stratton Sep.)
- Harrison Safety Boiler Works.
- Hoppes Mfg. Co.
- Phoenix Iron Works Co.
- Westinghouse, Church, Kerr & Co.

**Settees**

- McCormick Mfg. Co.

**Shades, Car**

- Brill, J. G., Co.
- Curtain Supply Co.
- Pantasote Co.
- Trolley Vestibule Shade Co.

**Shade Rollers**

- Hartshorn, Stewart, Co.

**Shoot-the-Chutes**

- Boyton, Capt. Paul.

**Shutters**

- Kinnear Mfg. Co.

**Signals**

- U. S. Electric Signal Co.

**Signs, Street Car**

- Brill, J. G., Co.
- Columbia Machine Works.
- Hunter Illuminated Car Sign Co.
- U. S. Electric Signal Co.

**Snow Plows and Sweepers**

- Brill, J. G., Co.
- General Electric Co.
- McGuire Manufacturing Co.
- Peckham Manufacturing Co.
- Taunton Locomotive Mfg. Co.
- Van Dorn & Dutton Co.
- Wendell & MacDuffie.
- Western Electrical Supply Co.

**Special Work**

(See Crossings, Frogs & Switches.)

**Sprinklers, Track and Road**

- Brill, J. G., Co.
- McGuire Manufacturing Co.
- Studebaker Bros. Mfg. Co.
- Taunton Locomotive Mfg. Co.
- Wendell & MacDuffie.

**Springs**

- Brill, J. G., Co.
- McGuire Manufacturing Co.
- Peckham Manufacturing Co.
- Van Dorn & Dutton Co.

**Springs, Sash and Blind**

- Brill, J. G., Co.
- Sjoberg, J. P., & Co.

**Steam Traps**

- American Blower Co.
- Crane Co.
- Sturtevant B. F., Co.

**Steel Rolling Doors and Shutters**

- Kinnear Mfg. Co.

**Step Lifters**

- Consolidated Car Fender Co.

**Stokers, Mechanical**

- Green Engineering Co.
- Westinghouse Machine Co.
- Wilkinson Mfg. Co.

NEW YORK CINCINNATI  
**THE CHAS. MOSER CO.**  
MANUFACTURERS  
**HIGH-GRADE PAINTS**  
FOR RAILWAY USES  
H. CONKLIN, 74 & 76 Murray St., New York

*Bestosoking  
Packing  
Have no Equal and one test  
will cause you to become  
a permanent customer.  
The roughest conditions are overcome  
by this wonderful packing.*

**BESTOSOKING PACKING AND SUPPLY CO.** U. S. AGENTS FOR TURNER BROS., ROCHESTER, ENG.  
170 Summer St., Boston, Mass.



## CLASSIFIED DIRECTORY—Continued.

**Stoves, Car**

(See Heaters, Car.)

**Switches and Switchboards**

Anderson, A. & J. M., Mfg. Co.  
 \*British Thomson-Houston Co.  
 \*Brush Electrical Engineering Co.  
 Central Electric Co.  
 Crouse-Hinds Electric Co.  
 Cutter Elec. & Mfg. Co.  
 \*Ferranti, Ltd.  
 \*International Elec. Eng. Co., Ltd.  
 \*Kelvin & Jas. White, Ltd.  
 Mayer & Englund Co.  
 \*Nalder Bros. & Thompson.  
 Stuart-Howland Co.  
 Ward-Leonard Electric Co.  
 Western Electrical Supply Co.

**Switches, Track**

(See Crossings, Frogs. &amp; Switches.)

**Tape, Insulating**

Central Electric Co.  
 Harrington, C. J.  
 Hope Webbing Co.  
 H. W. Johns-Manville Co.  
 Mayer & Englund Co.  
 Okonite Co., Ltd., The  
 Porter & Berg.  
 Ridlon, Frank, Co.  
 Stuart-Howland Co.  
 Wendell & MacDuffie.

**Third Rail Systems**

General Electric Co.  
 \*Maschinenfabrik Oerlikon.

**Tickets and Transfers**

\*Bell Punch & Printing Co.  
 \*Glasgow Numerical Printing Co.  
 Keller Printing Co.

**Ties**

(See Poles and Ties.)

**Tower Wagons**

\*Blackwell, Robt. W., & Co., Ltd.  
 \*Estler Brothers.  
 Leonhardt Wagon Mfg. Co.  
 McCardell, J. R., Co.  
 Western Electrical Supply Co.

**Track Cleaners**

Brill, J. G., Co.  
 Ohio Brass Co.  
 Root Track Scraper Co.  
 Van Dorn & Dutton Co.

**Track Drills**

(See Drills, Track.)

**Track Equipment**

(See Rails, Joints, Crossings, etc.)

**Transfer and Turn-Tables**

Barbour-Stockwell Co.  
 Brill, J. G., Co.  
 Koppel, Arthur.  
 Taunton Locomotive Mfg. Co.  
 Van Dorn & Dutton Co.  
 Wendell & MacDuffie.  
 Wharton, Wm. Jr., & Co.

**Treads, Car**

Universal Safety Tread Co.

**Trolley Cord**

(See Cord, Bell and Trolley.)

**Trolley Pole Catchers**

Ham Sand Box Co.  
 New Haven Car Register Co.  
 Ridlon, Frank, Co.  
 Wendell & MacDuffie  
 \*Wilson & Co.

**Trolley Poles and Wheels**

Anderson, A. & J. M., Mfg. Co.  
 Central Electric Co.  
 Craghead Engineering Co.  
 Elec. Ry. Equip't Co., Cincinnati.  
 \*Estler Brothers.  
 General Electric Co.  
 Harrington, C. J.  
 \*International Elec. Eng. Co., Ltd.  
 Lumen Bearing Co.  
 Mayer & Englund Co.  
 Morris Electric Co.  
 New Haven Car Register Co.  
 Nuttall, R. D., Co.  
 Ohio Brass Co.  
 Penn. Elec'l & Ry. Supply Co.  
 Porter & Berg.  
 Ridlon, Frank, Co.  
 \*Siemens Bros. & Co.  
 Simonds Manufacturing Co.  
 Star Brass Works.  
 Stuart-Howland Co.  
 Wendell & MacDuffie.  
 Western Electrical Supply Co.

**Trust Companies**

Equitable Trust Co.  
 Maryland Trust Co.  
 U. S. Mortgage & Trust Co.

**Trucks**

Baltimore Car Wheel Co.  
 Brill, J. G., Co.  
 Chicago Truck Co.  
 Jackson & Sharp Co.  
 Laclède Car Co.  
 Laconia Car Co. Works.  
 Lorain Steel Co.  
 \*Maguire & Baucus.  
 McGuire Mfg. Co.  
 Peckham Manufacturing Co.  
 St. Louis Car Co.  
 Stephenson, John, Co.  
 Taylor Electric Truck Co.  
 \*Witting Bros., Ltd.

**Turbines**

Stilwell-Bierce &amp; Smith-Vaile Co.

**Turbines, Steam**

Westinghouse Machine Co.

**Valves and Gates**

Clow, James B., & Son.  
 Crane Co.  
 Phoenix Iron Works Co.  
 Walworth Mfg. Co.

**Varnishes**

Forest City Paint & Varnish Co.  
 Masury, John W., & Son.  
 Standard Varnish Works.  
 Sterling Varnish Co.

**Ventilators**

Electric Motor &amp; Generator Ventilating Co.

**Vestibules**

Brill, J. G., Co.  
 Sjöberg, J. P., & Co.

**Vulcabeston**

H. W. Johns-Manville Co.

**Wagons, Trolley**

(See Tower Wagons.)

**Water Softener**

Automatic Water Purifying Co.  
 Kennicott Water Softener Co.

**Webbing**

Hope Webbing Co.

**Wheels and Axles**

Baltimore Car Wheel Co.  
 Brill, J. G., Co.  
 Lehigh Car, Wheel & Axle Wks.  
 Lobdell Car Wheel Co.  
 \*Miller & Co.  
 Peckham Manufacturing Co.  
 St. Louis Car Wheel Co.  
 Standard Car Wheel Co.

**Wheel Grinders**

Car Wheel Trueing Brake-Shoe Co.  
 Wheel Trueing Brake-Shoe Co.

**Wheel Presses**

Watson-Stillman Co.

**Whistles, Conductors' and Starters'**

Woodman, R., Mfg. &amp; Supply Co.

**Wires and Cables**

American Electrical Works  
 American Steel & Wire Co.  
 Bridgeport Brass Co.  
 \*British Insulated Wire Co.  
 Central Electric Co.  
 Craghead Engineering Co.  
 \*Diener, Alf., & Co.  
 \*Estler Brothers.  
 General Electric Co.  
 Harrington, C. J.  
 Hazard Manufacturing Co.  
 \*Maguire & Baucus.  
 Mayer & Englund Co.  
 Morris Electric Co.  
 National Conduit & Cable Co.  
 Nuttall, R. D., Co.  
 Okonite Co., Ltd., The  
 Phillips, Eugene F.  
 Pittsburgh Reduction Co.  
 Porter & Berg.  
 Roebling's, John A., Sons Co.  
 \*Smith, Fred'k, & Co., Ltd.  
 Stuart-Howland Co.  
 Wendell & MacDuffie.  
 Western Electrical Supply Co.

**Woodwork, Car**

Brill, J. G., Co.  
 Sjöberg, J. P., & Co.

**Wood Working Machinery**

Woods, S. A. Machine Co.

**Zinc White**

New Jersey Zinc Co.



THE searcher for a lubricant is quite likely to buy at a friend's advice. We would be friends with you.

Our success depends on how we please you.

We must make a greater success for you, to reap a benefit for ourselves.

Let us advise you.

For all powerful machinery, power and lighting plants, trolley cars, and everywhere where high speed is developed, buy and use WISCONSIN GRAPHITE FLAKE LUBRICANT.

It is without an equal.

It is without grit.

It is absolutely smooth.

It obviates all friction.

These are some statements we can prove and some advice that will cost you nothing. Don't make disappointing experiments with doubtful materials. Buy the best.

A sample will be sent free on application.

WISCONSIN GRAPHITE CO.,

BOX No. 22,

North Side, Pittsburg, Pa.

**SUPERFINE  
 COLORS & VARNISHES  
 .. FOR ..  
 RAILWAY CARS  
 MANUFACTURED BY  
 JOHN W. MASURY & SON  
 NEW YORK and CHICAGO**

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.  
 3 oz. box, 10c. 5 lb. pail, \$1. Geo. W. Hoffman, Mfr., 295 E. Washington St., Indianapolis, Ind.

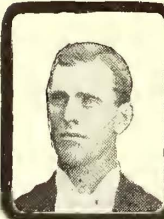


# What's Your Salary



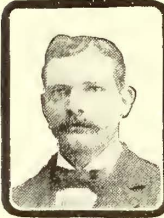
**Conductor to Head Barnman**

JOHN HENRY O'NEILL, Ogdensburg, N. Y., was a conductor. Through our plan he was promoted to head barnman for the Ogdensburg Street Railway Company, with a much better salary.



**Raised His Salary**

MARTIN PLUNKETT, San Antonio, Texas, was a motorman. Through our training he became Motor Inspector and later Transportation Dispatcher for the San Antonio (Texas) Railway Company, with a 50% increase in salary.



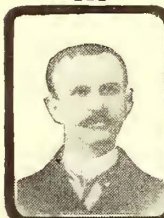
**Motorman to Electrician**

FRANK G. GREULICH, Columbia, Pa., was a motorman. Through our training he has been promoted to the position of Electrician with a good increase in salary.



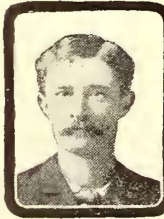
**Conductor to Electrician**

J. H. SWEETMAN, Guelph, Ont., was a conductor. We trained him in eight months for the position of Chief Electrician with a big increase in salary.



**Chief Engineer to Superintendent**

F. H. LELAND, 944 West 11th St., Erie, Pa., was a steam engineer. Through our training he became superintendent of the Erie Electric Motor Company at a big increase in salary.



**Motorman to Electrician**

W. T. SMITH, Bonham, Texas, was a motorman. Through our training he became electrician in charge of the Central Station and lines of the Bonham Electric Light and Power Company.

No matter what it is, we can train you to earn more. For the past ten years we have been training people for better positions and salaries—right in your own line, too. Their enthusiastic endorsements make

## A Chain of Evidence

that cannot fail to convince you that *you* can succeed by our method. Mark **X**, in the coupon below, before the position you want, fill in the blanks, and send to us. We will explain how we can train you for the position of your choice, and then help you get it.

International Correspondence Schools,  
Box 908, SCRANTON, PA.

Please explain how I can qualify for the position marked **X** below

<input type="checkbox"/> Steam-Elec. Engineer <input type="checkbox"/> Electric Lighting Supt. <input type="checkbox"/> Electric Railway Supt. <input type="checkbox"/> Electrical Engineer <input type="checkbox"/> Electric Machine Designer <input type="checkbox"/> Electrician <input type="checkbox"/> Telephone Engineer <input type="checkbox"/> Telegraph Engineer <input type="checkbox"/> Wireman <input type="checkbox"/> Dynamo Tender <input type="checkbox"/> Motorman <input type="checkbox"/> Steam Engineer <input type="checkbox"/> Marine Engineer <input type="checkbox"/> Mechanical Engineer <input type="checkbox"/> Machine Designer <input type="checkbox"/> Mechanical Draftsman <input type="checkbox"/> Foreman Machinist <input type="checkbox"/> Foreman Toolmaker <input type="checkbox"/> Foreman Patternmaker <input type="checkbox"/> Foreman Blacksmith <input type="checkbox"/> Foreman Molder <input type="checkbox"/> Refrigeration Engineer	<input type="checkbox"/> Civil Engineer <input type="checkbox"/> Hydraulic Engineer <input type="checkbox"/> Municipal Engineer <input type="checkbox"/> Bridge Engineer <input type="checkbox"/> Railroad Engineer <input type="checkbox"/> Surveyor <input type="checkbox"/> Mining Engineer <input type="checkbox"/> Mine Foreman <input type="checkbox"/> Sanitary Engineer <input type="checkbox"/> Architect <input type="checkbox"/> Contractor and Builder <input type="checkbox"/> Architectural Draftsman <input type="checkbox"/> Sign Painter <input type="checkbox"/> Analytical Chemist <input type="checkbox"/> Sheet-Metal Draftsman <input type="checkbox"/> Navigator <input type="checkbox"/> Bookkeeper <input type="checkbox"/> Stenographer <input type="checkbox"/> Teacher <input type="checkbox"/> To Speak French <input type="checkbox"/> To Speak German <input type="checkbox"/> To Speak Spanish
--	---

Occupation \_\_\_\_\_ Age \_\_\_\_\_

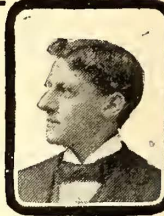
Name \_\_\_\_\_

Street and No. \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

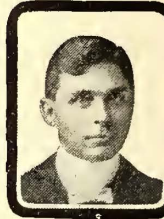
**Doubled His Salary**

B. M. SWITZER, Putney, Vt., is Engineer in Charge with Pierce & Company. Through our training he was enabled to effect a saving of 25% of fuel in his plant. His salary was raised 100%.



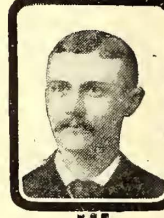
**Fireman to Chief Engineer**

LEWIS QWIMBY, Dallas, Texas, was a fireman. Through our training he became Chief Engineer with the Texas Portland Cement Co., at more than double his former salary.



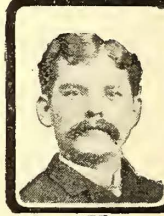
**Becomes Chief Engineer**

L. C. JACKSON, Rockland, Maine, is Chief Engineer of the Rockland Electric Power Station. He writes that our training qualified him for the position.



**Fireman Becomes Chief Engineer**

C. V. GAMBS, San Antonio, Texas, was a fireman. Through our training he became Chief Engineer of the Lone Star Brewing Company.



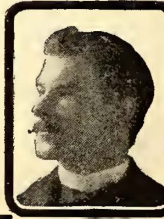
**Fireman to First-Class Engineer**

F. H. KIMBALL, Boston, Mass., was a fireman. Through our training he secured a first-class unlimited engineer's license, more than doubled his salary, and is now Chief Engineer of a 6,000-horsepower electric station.



**Salary Increased 200 Per Cent.**

J. A. DORN, Newark, N. J., had charge of a small steam plant. Through our training he rose to the position of Chief Engineer of the Grasselli Chemical Company's plant at three times the salary he received before.



**SEND IN THE COUPON TODAY**





Our  
Guarantees on  
Railway Lamps  
exceed the guarantees  
of other makers

And we offer Photo-  
meters at cost to  
probe the guarantees

Bryan-Marsh Company,  
Incandescent Lamp Makers  
New York



# Roovers Name Plate Machine

THE GREATEST NICKEL-IN-THE-SLOT MACHINE EVER INVENTED \* \* \* \* \* BIGGEST MONEY MAKER FOR

## TRACTION PARKS

Twenty-one machines at the PAN-AMERICAN EXPOSITION took in \$1,584.00 in one week \* \* \* \* \* Four machines at EARL'S COURT, LONDON, took in 12,000 English coins in 4½ days \* \* \* \* \* Receipts elsewhere in the same generous proportions \* \* \* \* \* Height of machine, 4½ feet; weight, 135 lbs.; floor space covered, 14 inches square. Cost less than \$4.00 to fill; yields an average of \$70.00 for each filling \* \* \* \* \* Price complete, with numbers, including roll, \$153.00; terms, C. O. D.

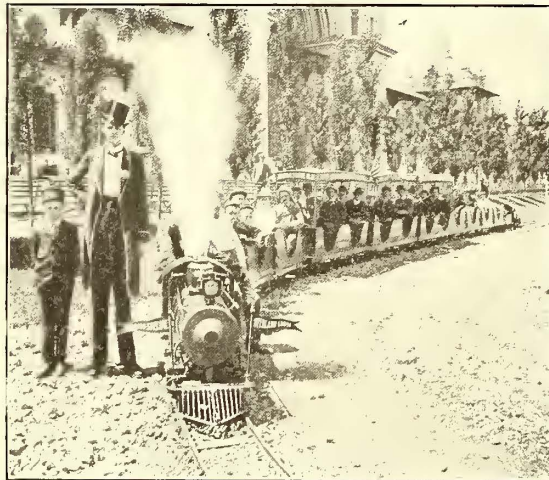
**ROOVERS MANUFACTURING COMPANY**

London Offices:  
5 Warwick Court, High Holborn

10 West 23d St., New York City



Highest Award  
Pan-American Exposition



# MINIATURE RAILWAYS

FOR

## Street Railway Parks

Operated by Steam. Carries 24 Adults or 36 Children

—THEY PAY DIVIDENDS—

LET US TELL YOU HOW IT'S DONE

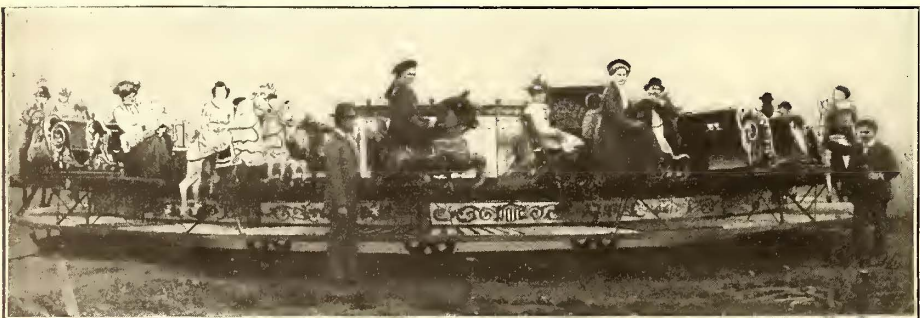
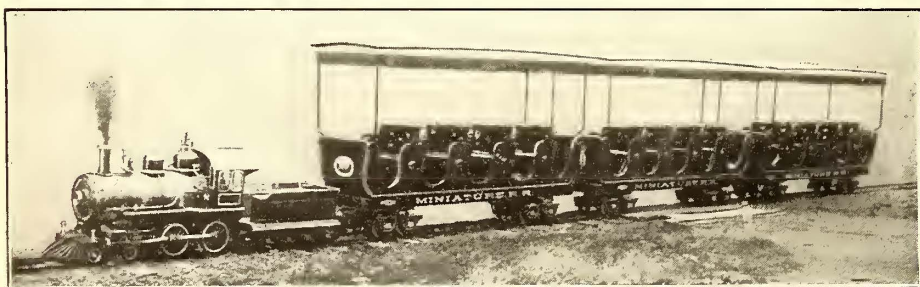
**MINIATURE RAILWAY CO.**

**CAGNEY BROTHERS**

301 BROADWAY

NEW YORK, U. S. A.

# Why not make your Park self-supporting?



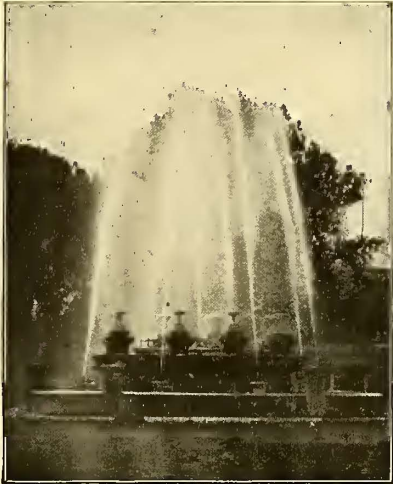
The increased summer traffic produced by your park will be almost clear profit, if the park itself is not an item of expense. \* \* \* \* \*

The Armitage-Herschell Riding Galleries and Miniature Railways are excellent sources of revenue in themselves. They will also help to draw bigger crowds to your park. Let us send you full particulars.

**ARMITAGE-HERSCHELL CO.,**

NORTH TONAWANDA  
NEW YORK, U. S. A.





# ELECTRIC FOUNTAINS

**A SYMPHONY IN COLORS  
AND CHANGING DISPLAYS**

Always novel, pleasing and entertaining to all.  
Suitable for parks, hotels or residences.  
We make a miniature fountain especially for use on banquet  
tables or other temporary occasions.

Write for Particulars and Prices

**Electric Fountain Company of America**

Real Estate Trust Building, PHILADELPHIA, PA.

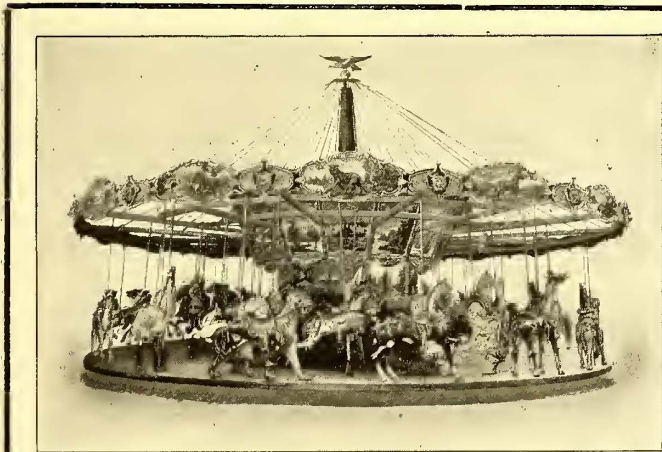


## OCEAN WAVE RIDING GALLERY

The Very Latest NOVELTY. Thoroughly Tested.  
The Most DURABLE, CONVENIENT, FINEST FINISHED  
ATTRACTION FOR RAILWAY PARKS.

**HERSCHELL, SPILLMAN & CO.** NORTH TONAWANDA,  
N. Y., U. S. A.

CAN BE OPERATED BY STEAM OR ELECTRICITY.



**THIS ILLUSTRATION** shows one of the most unique, attractive and durable Merry-go-rounds (Carousels) on the market. A great attraction for the public and a money-maker for the owners.

## Before Buying

let us quote you prices and send you one of our new illustrated catalogues

**G. A. DENTZEL** Office and Works, 3641 Germantown Ave  
PHILADELPHIA, PA., U. S. A.



## “AS GOOD AS EVER MADE”

That's how we characterize our productions. We aim to make our

## RIDING GALLERIES

the BEST on the market, and are always on the alert to introduce new ideas to make MORE attractive our already very attractive apparatus. We have added to our Riding Galleries

### A GRAND MAGNIFIED WHIRLING PANORAMA

that has proven itself a wonderful medium through which great crowds have been drawn to

## RAILWAY PARKS

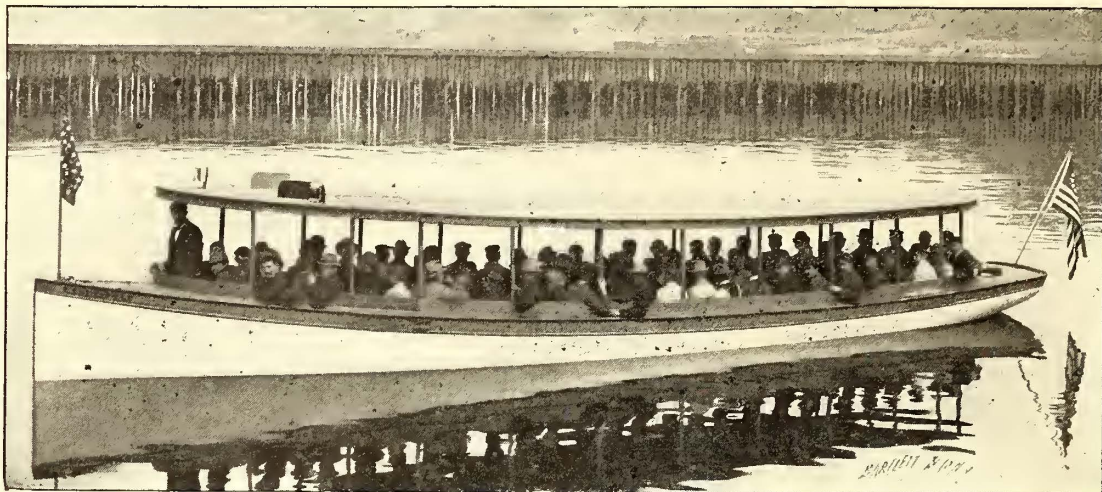
For full information regarding our Riding Galleries, write,

**Gillie Engine & Machine Co.** TONAWANDA,  
N. Y., U. S. A.



**ELECTRIC LAUNCHES FOR PARKS AND PLEASURE RESORTS**

STORAGE BATTERY POWER



42-FT. LAUNCH, Capacity 69 Adults, BUILT 1901, OMAHA & COUNCIL BLUFFS RY.—Duplicate order just received

A Paying Investment and Traffic Promoters

Safe, Simple, Reliable. No Heat, No Smoke, No Smell. Fully Guaranteed

Will run from 50 to 125 miles on one charging, at an expense of about 2 cents per mile.

**NEW LIGHT-WEIGHT BATTERY**

REVISED PRICES

30-ft. and 36-ft. Passenger Launches

both new and second-hand, ready for immediate delivery

—at—  
Most Favorable Prices

**THE ELECTRIC LAUNCH CO. 171 Avenue A Bayonne City, N. J.**

**Capt. PAUL BOYTON SEA LION PARK CONEY ISLAND, N. Y.**

Inventor, Patentee and General Agent for all kinds of High-Class Amusement Devices

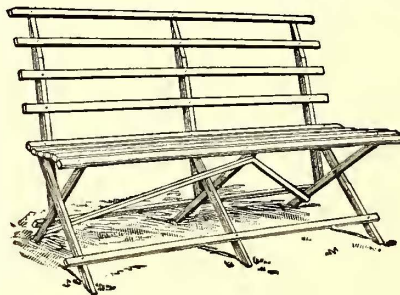
Sea Lion Park (formerly the Chutes) is the birthplace of all great successful Amusements such as: "Shooting the Chutes," "The River" or "Old Mill," "The Flip-Flap Railway" or "Loop the Loop," etc., etc.

New plans and specifications for the King of all Amusements "Shooting the Chutes," now ready

We will have ready for May delivery a limited number of choice Sea Lions. You can get nothing more attractive for any park. They are easily tamed and will come over the water like torpedo boats when called by their keeper.

Many new inventions will be tried out in Sea Lion Park this season. When you want anything new for your park write PAUL BOYTON, Sea Lion Park, Coney Island, N. Y.

MADE OF SEASONED OAK



3, 4 and 6 ft. lengths. Curved Seats and Backs

WE make a specialty of seatings for parks and summer theatres. Our settees are extra strong, durable and comfortable. Will last for years. 4,500 in use at Omaha Exposition. 6,000 in use at Buffalo Exposition. Write for our prices. You will find them cheap.

**McCORMICK MFG. CO.,** DES MOINES, IOWA

**GEORGE KISSAM & CO., Largest Street Car Advertising Concern in the World.**

We are prepared to negotiate for Long Time Leases with First Class Roads in any part of the United States.

BRANCH OFFICES IN LEADING CITIES.

GENERAL OFFICES, 253 BROADWAY, NEW YORK.

**THE NILES CAR and MFG CO.**

NILES, OHIO

W. C. ALLISON, Gen'l Mgr. GEO. E. PRATT, Ass't Gen'l Mgr. and Cont'g Agt. Manufacturers of

**Electric, Elevated, Suburban and Steam Passenger Cars**

Specifications furnished either by this company to a customer, or by the customer to this company under which cars are to be constructed will be strictly adhered to, and contracts once made will be honestly and faithfully executed. The character and quality of the materials specified by either party to a contract will be furnished, and no inferior quality substituted

**JAMES G. CONNER & CO.**

SOLE MANUFACTURERS

**"Battery Black Paint"**

(TRADE

MARK)

IT INSULATES AND PREVENTS CORROSION

PHILADELPHIA NEW YORK BOSTON PITTSBURG

**WHEN WRITING TO ADVERTISERS** in the STREET RAILWAY JOURNAL you will confer a favor on both publisher and advertiser by mentioning this paper.



# Complete Equipment for Electric Railways

We carry a complete  
line of everything  
pertaining to the  
operation, maintenance or equipment  
of electric railways

Overhead Material

Trolley Wire

Rail Bonds

Gears and Pinions } U. S. Projectile Company

Union Grease for Motors and Car Axles

Fenders

Brake Shoes

Trolley Poles

Headlights

Rattan Car Seating

Longitudinal Seating Cars

Peckham Trucks

Sterling Insulating Varnishes

Armature and Field Coils

Fare Registers

Construction Tools of every description.

Write To-Day for Catalogs and Prices

## Western Electrical Supply Company

ST. LOUIS, - - - - U. S. A.



# COMPRESSED AIR COMPANY

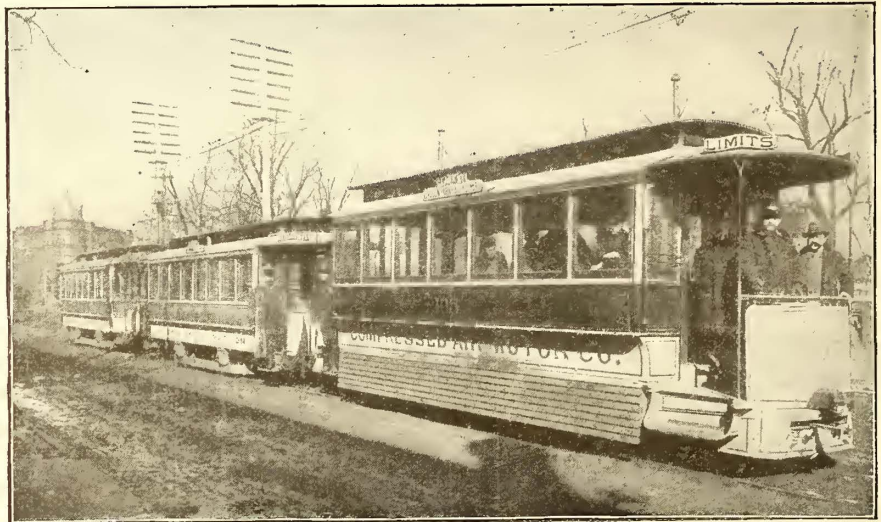
...MANUFACTURERS OF...

## Air Motors for Street Railways

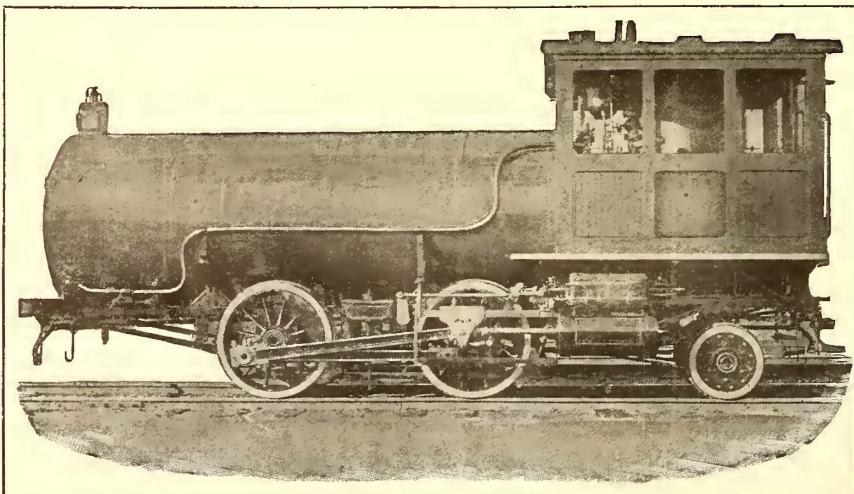
This illustration shows a Compressed Air Motor Car hauling two trail cars on North Clark Street, Chicago.

On some occasions there have been as many as 300 people carried on the three cars on a single trip.

Since this service commenced—May 31st, 1899—there have been no interruptions or breakdowns, and the service has proved to be uniformly satisfactory to the Railroad Company and the public. Motors of this description are now performing the entire street railway service in Rome, New York.



## Locomotives for Suburban Railways



Cylinder, 13 in. x 20 in.

Total weight, 55,000 lbs.

Weight on drivers, 40,000 lbs.

Will haul 150 tons gross load ten miles at a speed of 40 miles per hour.

Drivers, 42 in. diameter

General Offices, 24 State Street, New York



# THE CONSOLIDATED CAR FENDER CO.

FACTORY  
PROVIDENCE, R. I.

NEW YORK OFFICE  
39-41 CORTLANDT STREET

PARIS OFFICE  
6 RUE BOUDREAU

MANUFACTURERS OF

THE "PROVIDENCE" CAR FENDER

THE "MILLEN" CAR STEP LIFTER

THE "CAMPBELL" ROTARY SNOW BROOM



THIS CUT SHOWS CAR EQUIPPED WITH A PROVIDENCE CAR FENDER

The following sixteen pages are devoted to the products of the CONSOLIDATED CAR FENDER COMPANY. It will interest you to look them over. ❁ ❁ ❁



# THE CONSOLIDATED CAR FENDER CO.

FACTORY  
PROVIDENCE, R. I.

NEW YORK OFFICE  
39-41 CORTLANDT STREET

PARIS OFFICE  
6 RUE BOUDREAU

More than ten thousand (10,000) Cars in  
the United States are equipped with the

## “PROVIDENCE” FENDER



FRONT VIEW OF CAR EQUIPPED WITH MODEL “A” CAR FENDER

Used on a medium high car, where the upper crossbars can be adjusted to a position  
20 to 22 inches above the track. ❁ ❁ ❁ ❁ ❁ ❁ ❁ ❁ ❁ ❁ ❁



# THE CONSOLIDATED CAR FENDER CO.

FACTORY  
PROVIDENCE, R. I.

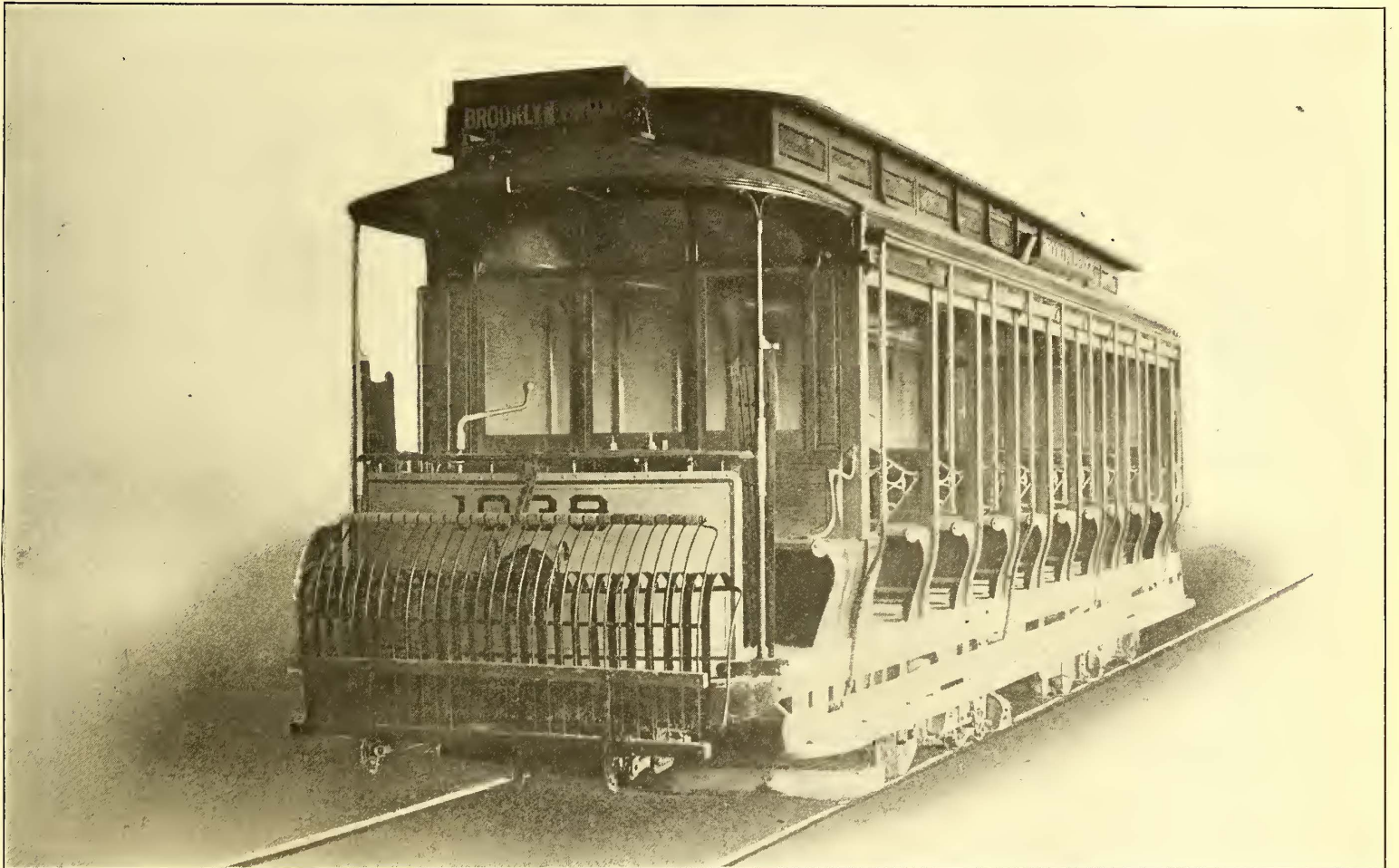
NEW YORK OFFICE  
39-41 CORTLANDT STREET

PARIS OFFICE  
6 RUE BOUDREAU

All of the \_\_\_\_\_

## “PROVIDENCE” FENDERS

are made on the same lines, that is to say, Models “A,” “B,” “C” and “D” Fenders, are made of curved steel fingers, tempered to a point, where they will bend just before the breaking point is reached. . . .



Rear View of Car equipped with Model “A” Fender, showing fender turned up to and fastened to the Dash Board. . . .



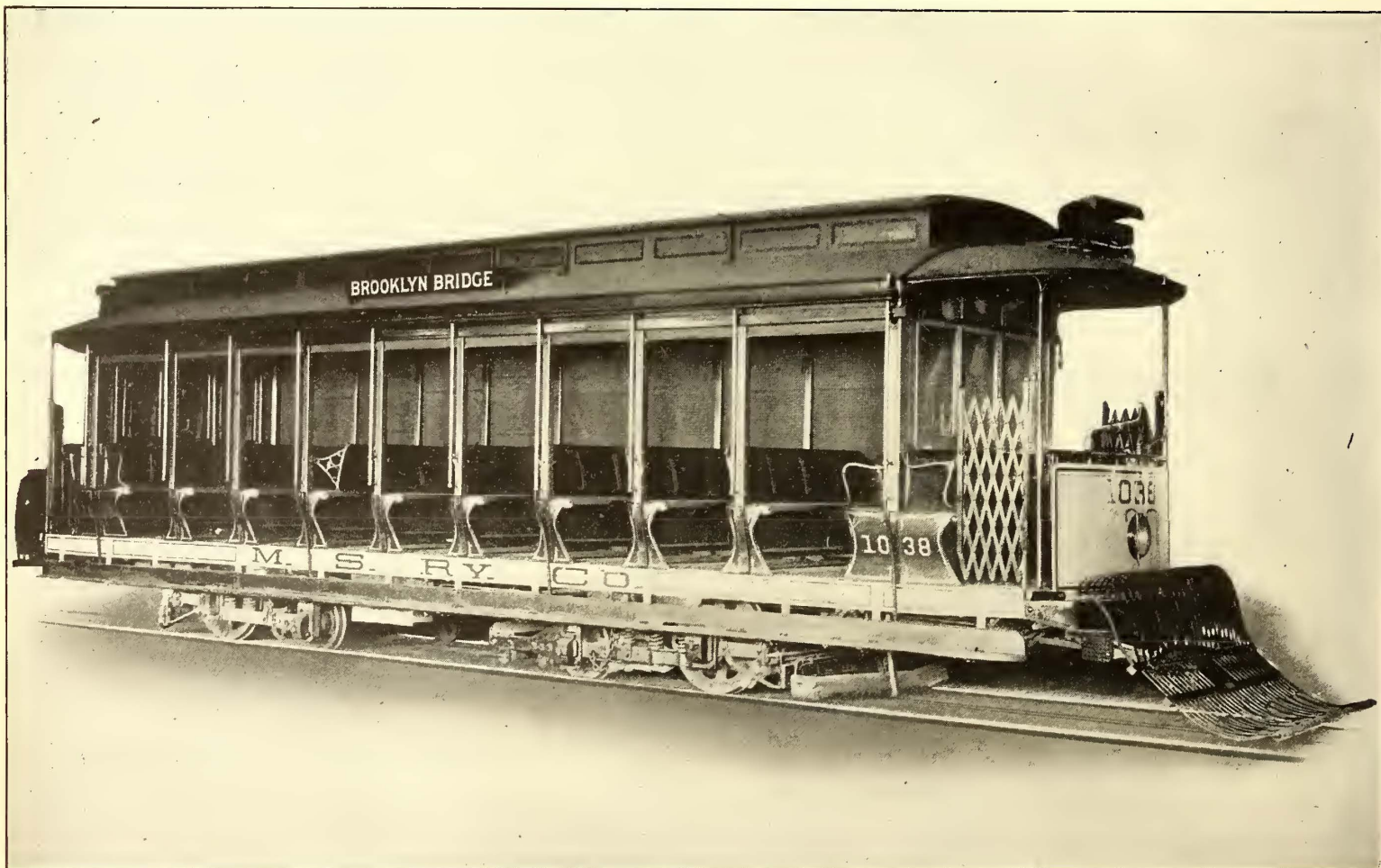
# THE CONSOLIDATED CAR FENDER CO.

FACTORY  
PROVIDENCE, R. I.

NEW YORK OFFICE  
39-41 CORTLANDT STREET

PARIS OFFICE  
6 RUE BOUDREAU

All fenders and parts are interchangeable, and the fenders can be transferred from one end of a car to the other, or from one car to another, in less than one minute



CUT SHOWING CAR EQUIPPED AT BOTH ENDS  
WITH A MODEL "A" CAR FENDER . . . . .

4



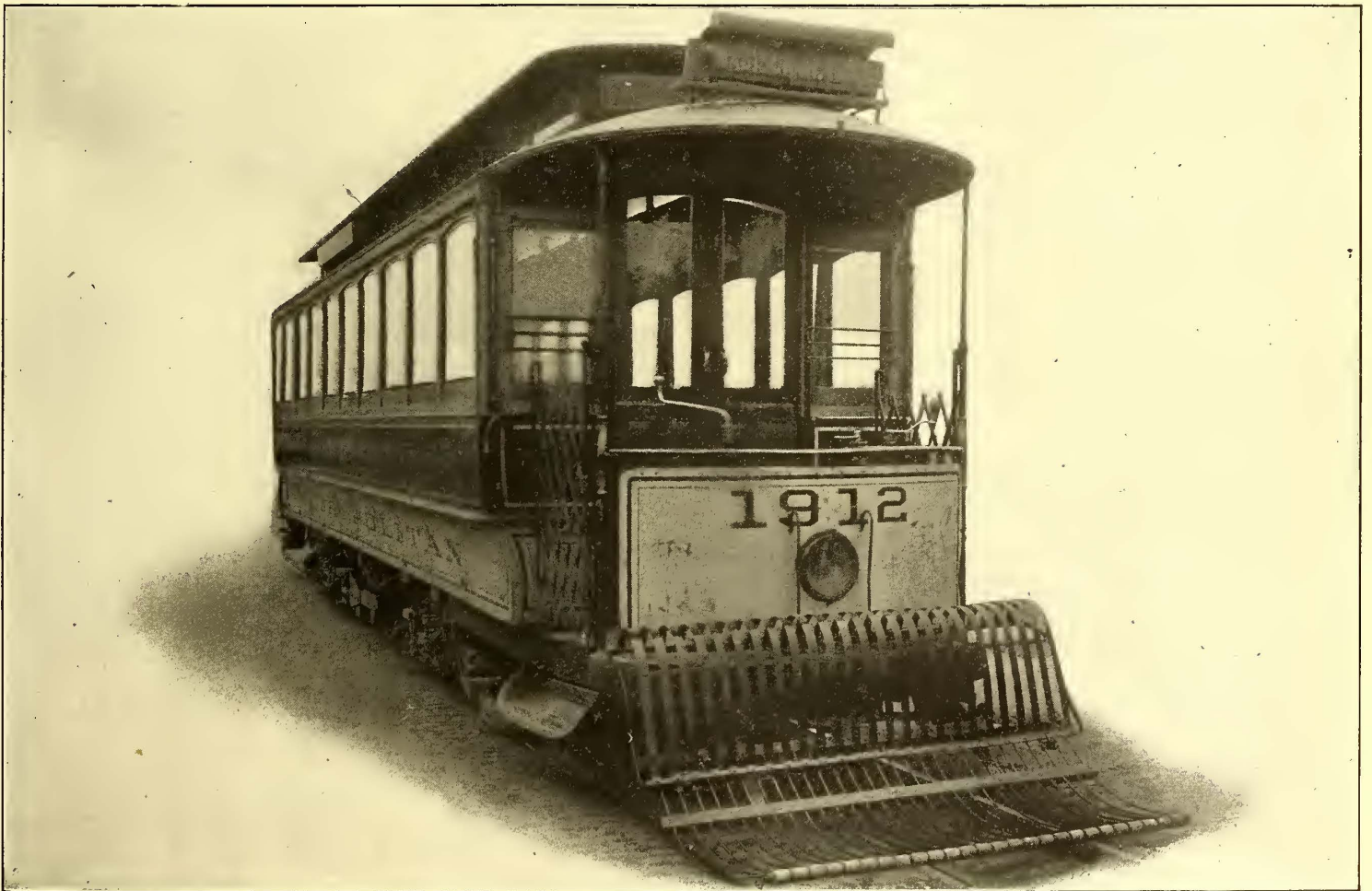
# THE CONSOLIDATED CAR FENDER CO.

FACTORY  
PROVIDENCE, R. I.

NEW YORK OFFICE  
39-41 CORTLANDT STREET

PARIS OFFICE  
6 RUE BOUDREAU

Four different equipments of the "Providence" Fender are made, in order to get a perfect adjustment, on cars of different heights, widths and lengths ❁ ❁ ❁



5

Cut showing Model "B" Fender attached to the FRONT END of a car. Used on a low car, where the Upper Cross Bar can be adjusted to a position 15 to 18 inches above the track ❁ ❁ ❁ ❁



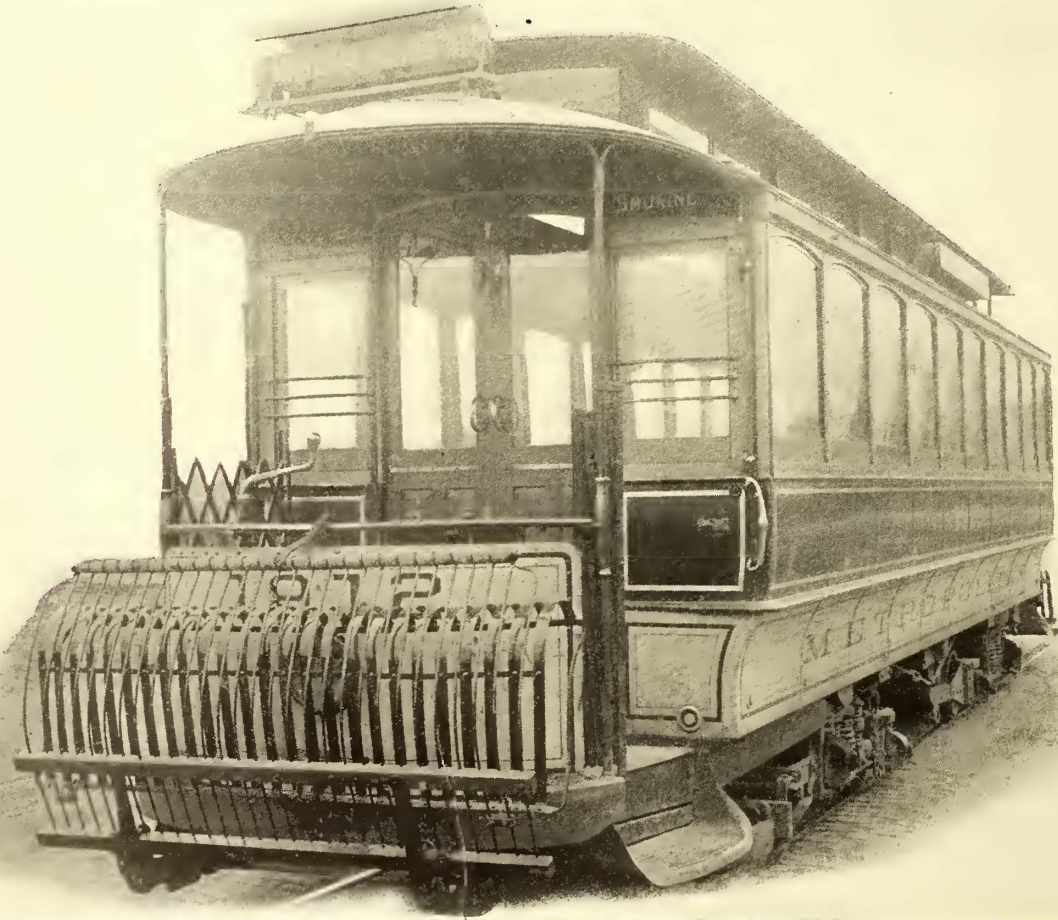
# THE CONSOLIDATED CAR FENDER CO.

FACTORY  
PROVIDENCE, R. I.

NEW YORK OFFICE  
39-41 CORTLANDT STREET

PARIS OFFICE  
6 RUE BOUDREAU

When it is necessary to pull or push a car, the fender can be turned up and fastened to the Dash Board, out of the way. When so turned up they do not extend more than 12 inches from the buffer



CUT SHOWING REAR END OF CAR EQUIPPED  
WITH A MODEL "B" FENDER. . . . .

6



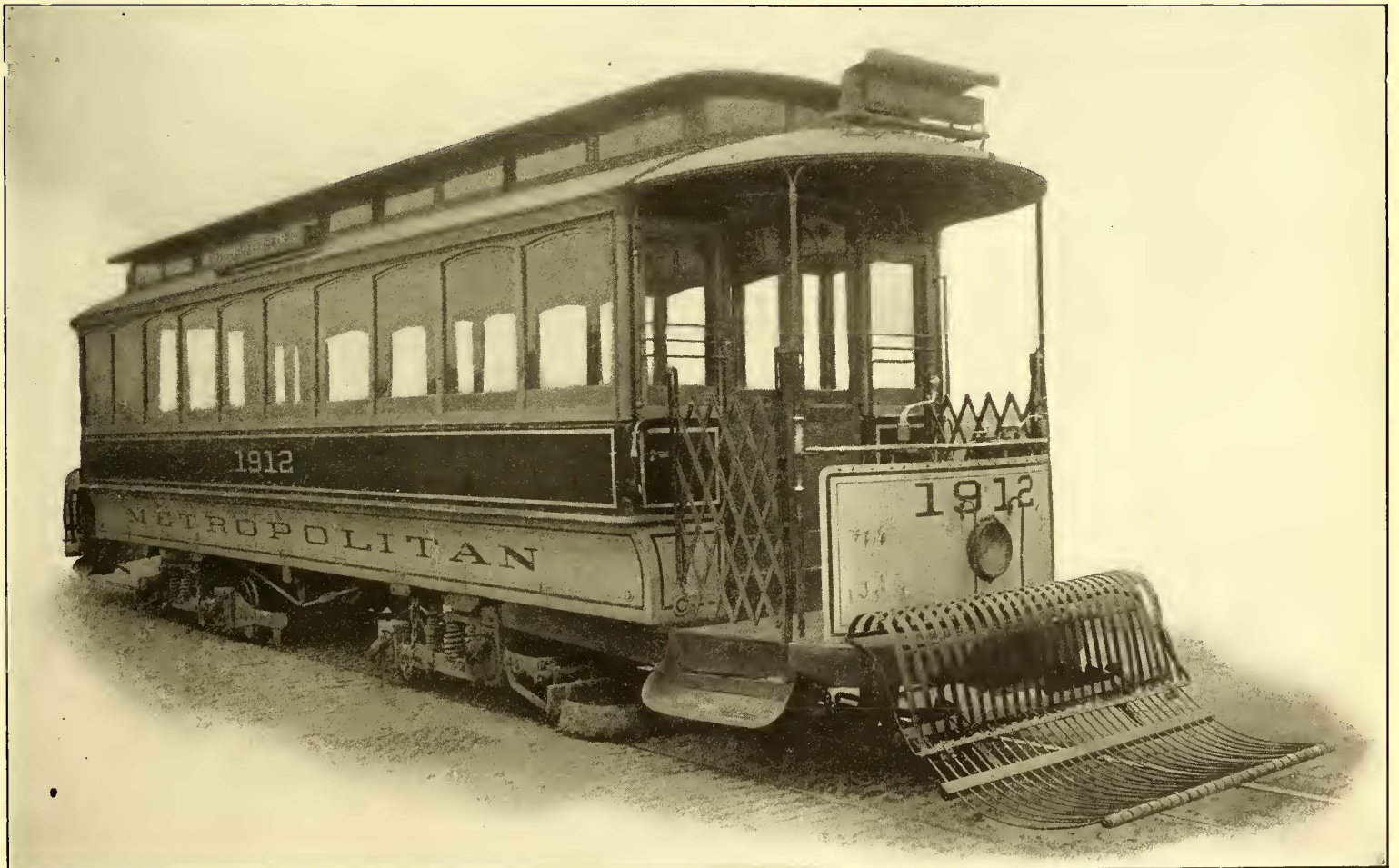
# THE CONSOLIDATED CAR FENDER CO.

FACTORY  
PROVIDENCE, R. I.

NEW YORK OFFICE  
39-41 CORTLANDT STREET

PARIS OFFICE  
6 RUE BOUDREAU

A Double Equipment consists of Two Fenders,  
two cushions, and two sets of attachments,  
one each of which is attached to each end of a car



Cut showing car equipped at FRONT END, with Model "B" Fender, in position for use, and at REAR END, with fender turned up and fastened to the dash board out of the way



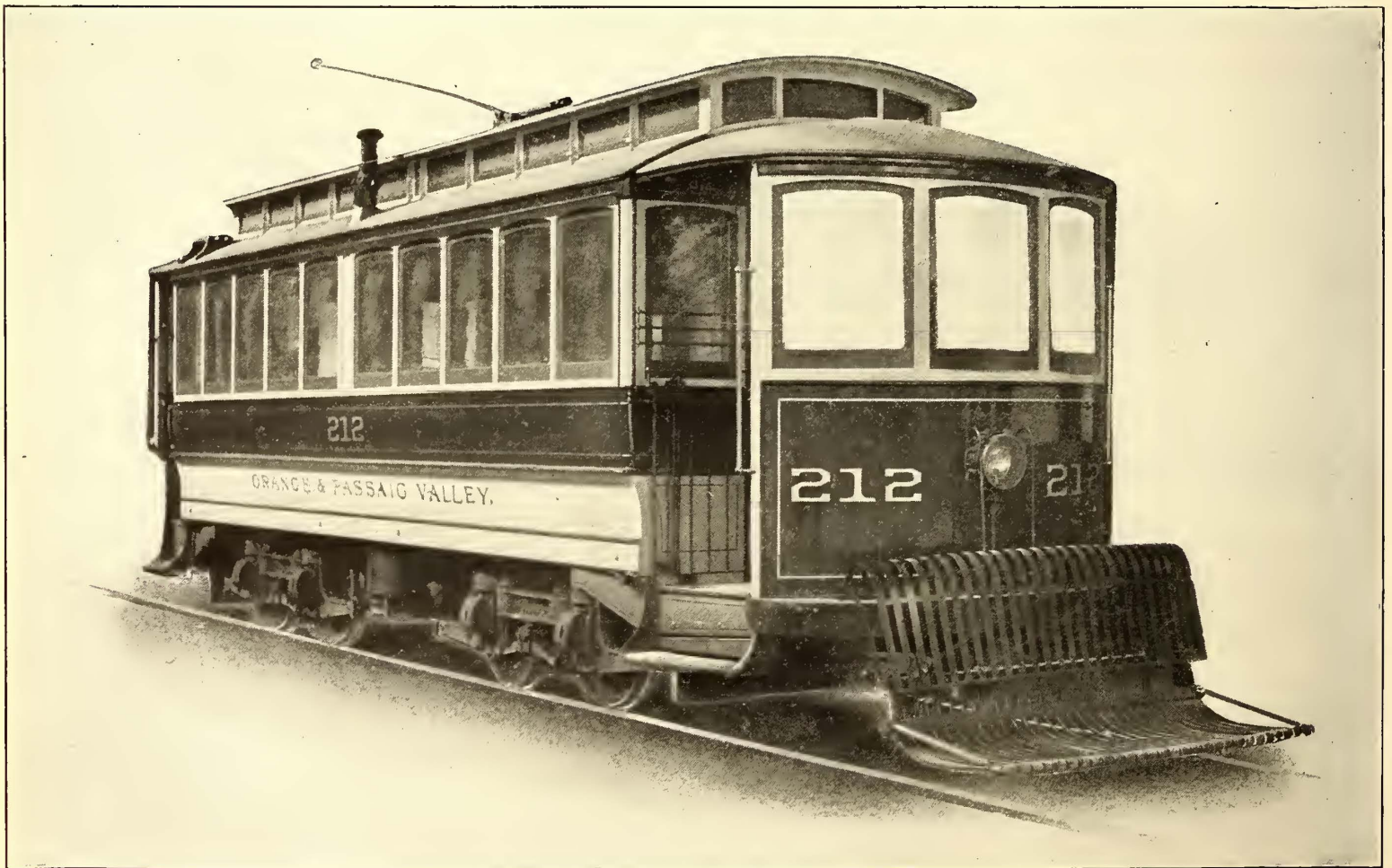
# THE CONSOLIDATED CAR FENDER CO.

FACTORY  
PROVIDENCE, R. I.

NEW YORK OFFICE  
39-41 CORTLANDT STREET

PARIS OFFICE  
6 RUE BOUDREAU

Our new Model "C" Fender is used on either a HIGH or LOW car, and is considered by competent Railroad Managers to be the best Life Saving Device ever attached to an Electric Car



CUT SHOWING CAR EQUIPPED AT FRONT END  
WITH MODEL "C" CAR FENDER . . . . .

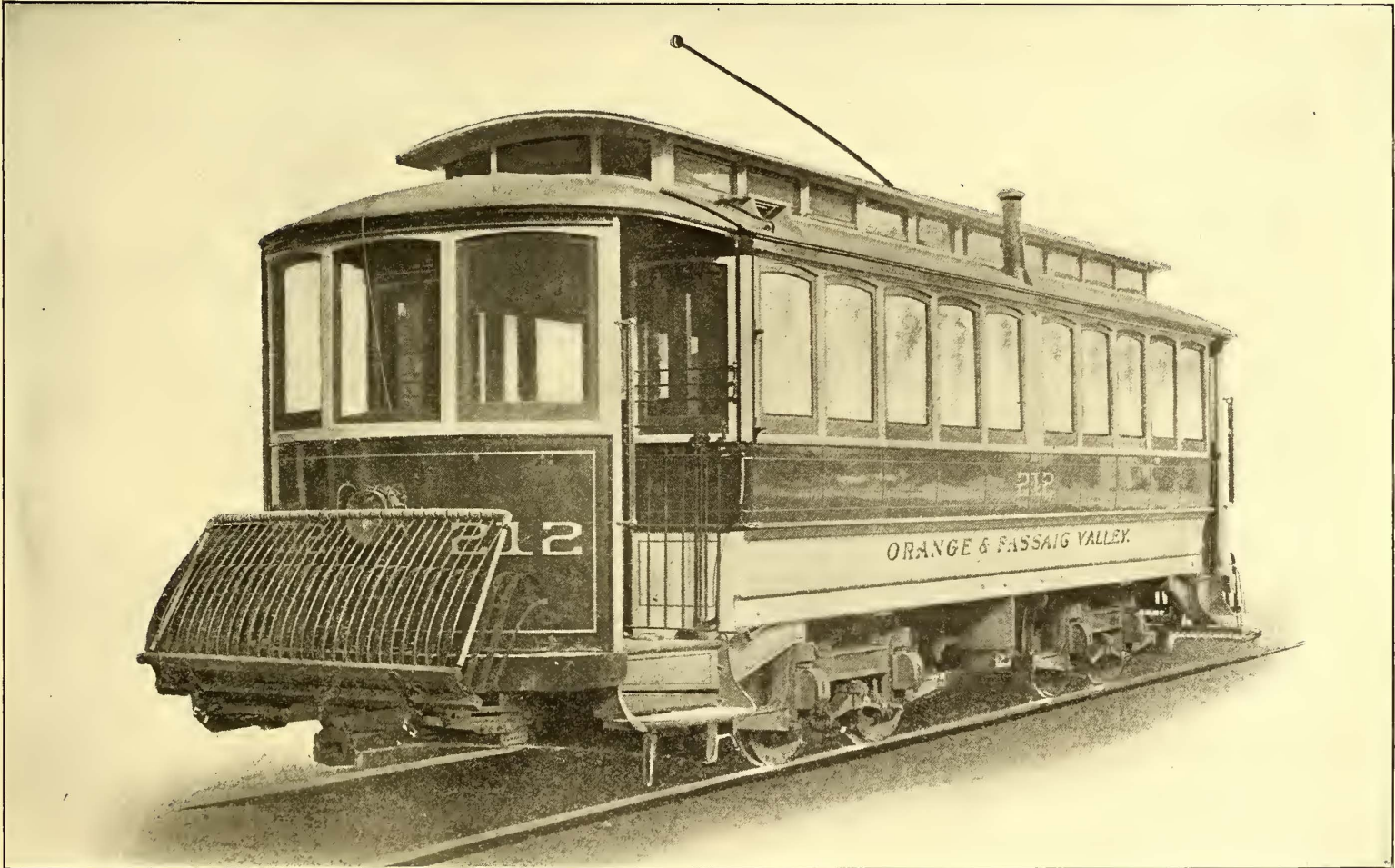
8



# THE CONSOLIDATED CAR FENDER CO.

FACTORY PROVIDENCE, R. I.      NEW YORK OFFICE 39-41 CORTLANDT STREET      PARIS OFFICE 6 RUE BOUDREAU

A Single Car Fender Equipment consists of One Fender, One Cushion, and Two Sets of Attachments, one Set of Attachments being placed at each end of a car, and the fender and cushion transferred from one end of the car to the other, at the ends of the line.



9

CUT SHOWING REAR END OF CAR EQUIPPED WITH MODEL "C" CAR FENDER. . . . .



# THE CONSOLIDATED CAR FENDER CO.

FACTORY  
PROVIDENCE, R. I.

NEW YORK OFFICE  
39-41 CORTLANDT STREET

PARIS OFFICE  
6 RUE BOUDREAU

A One End Car Fender Equipment consists of One Fender, One Cushion, and One Set of Attachments, all of which are attached to one end of a car. This Equipment is used where THE SAME END OF THE CAR runs "head on" all the time



Cut showing Car installed with a full Double Equipment of Model "C" Fender. This Fender has a record of saving 100 per cent. of all lives placed in jeopardy from FRONT END accidents



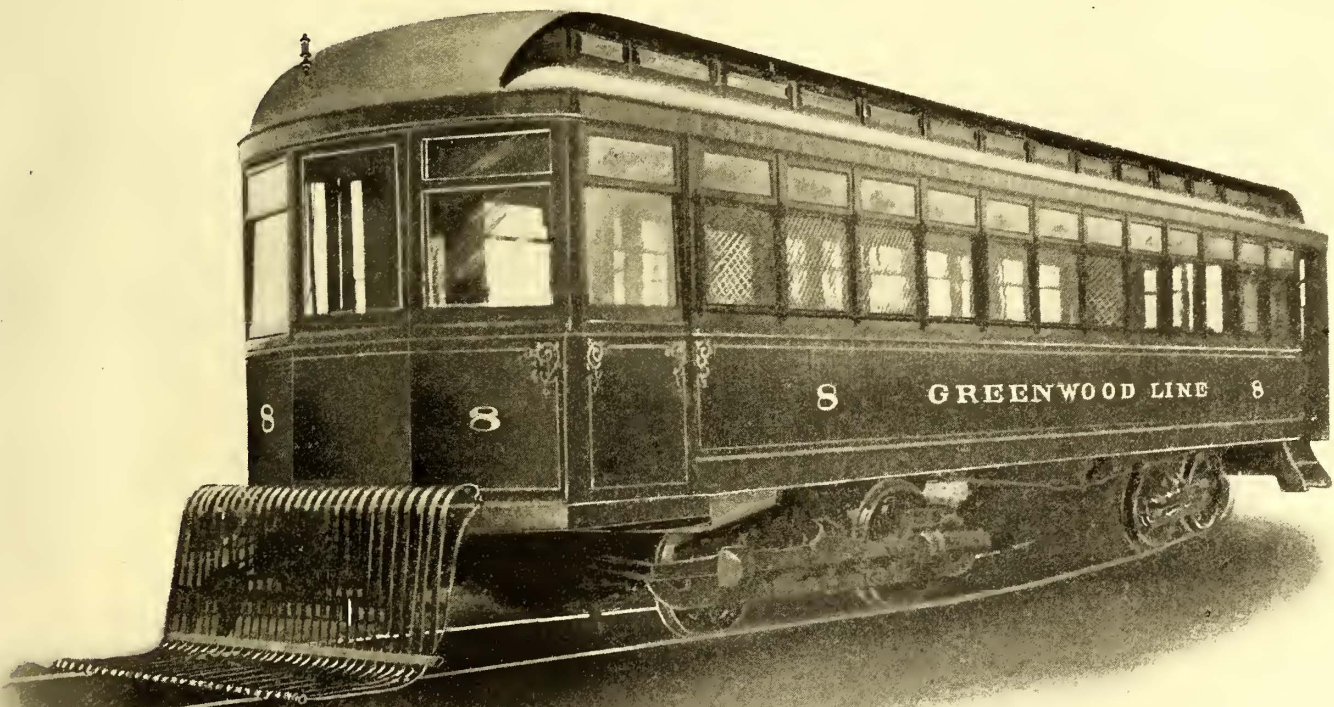
# THE CONSOLIDATED CAR FENDER CO.

FACTORY  
PROVIDENCE, R. I.

NEW YORK OFFICE  
39-41 CORTLANDT STREET

PARIS OFFICE  
6 RUE BOUDREAU

Our Model "D" or Interurban Car Fender is made especially for large Interurban or Suburban Cars. It is large and strong enough to pick up a horse and carry it until the car comes to a standstill. This is the only fender ever attached to a Suburban or Interurban Car, that will PICK UP the object struck when the car is running at a high rate of speed.



CUT SHOWING FRONT END OF CAR INSTALLED  
WITH MODEL "D" OR INTERURBAN FENDER . .

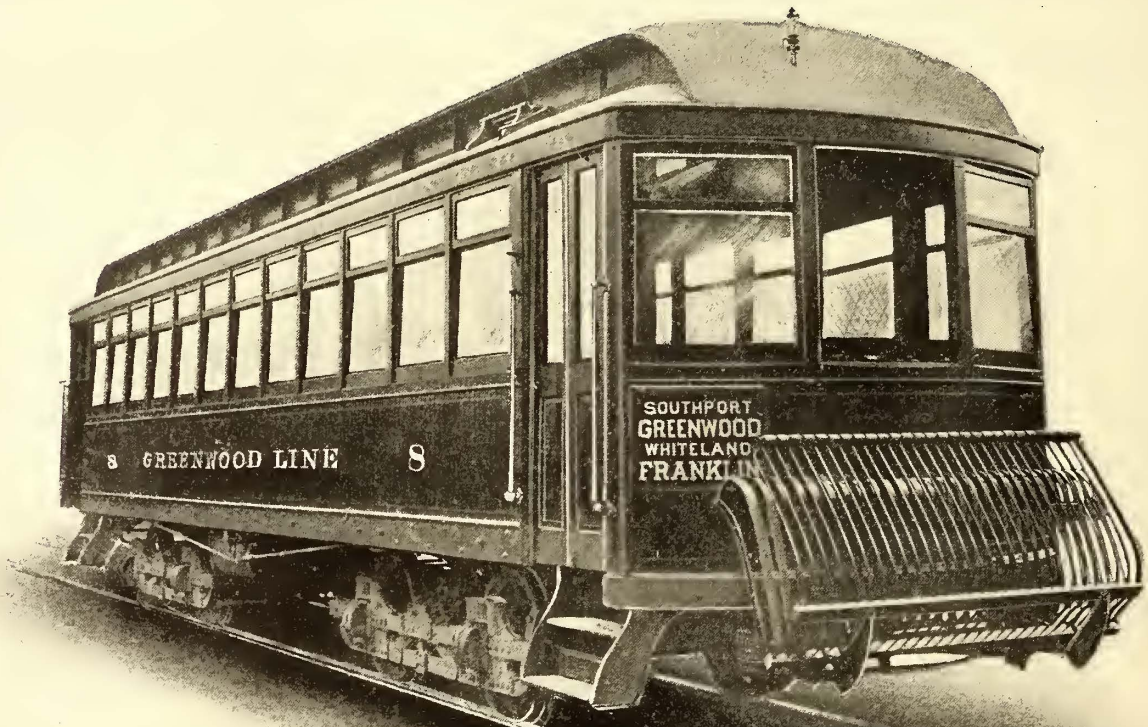


# THE CONSOLIDATED CAR FENDER CO.

FACTORY PROVIDENCE, R. I.      NEW YORK OFFICE 39-41 CORTLANDT STREET      PARIS OFFICE 6 RUE BOUDREAU

Our Model "D" Car Fender has been thoroughly tested, in practical use, and has many times prevented serious accidents by picking up and carrying the animal struck until the car could be stopped.    ❁   ❁   ❁   ❁   ❁   ❁   ❁   ❁   ❁   ❁   ❁   ❁   ❁

Practically all danger of derailing of car is removed when the car is equipped with this fender.



CUT SHOWING REAR END OF LARGE INTERURBAN CAR, EQUIPPED WITH A MODEL "D" CAR FENDER. . . . .

12



# THE CONSOLIDATED CAR FENDER CO.

FACTORY  
PROVIDENCE, R. I.

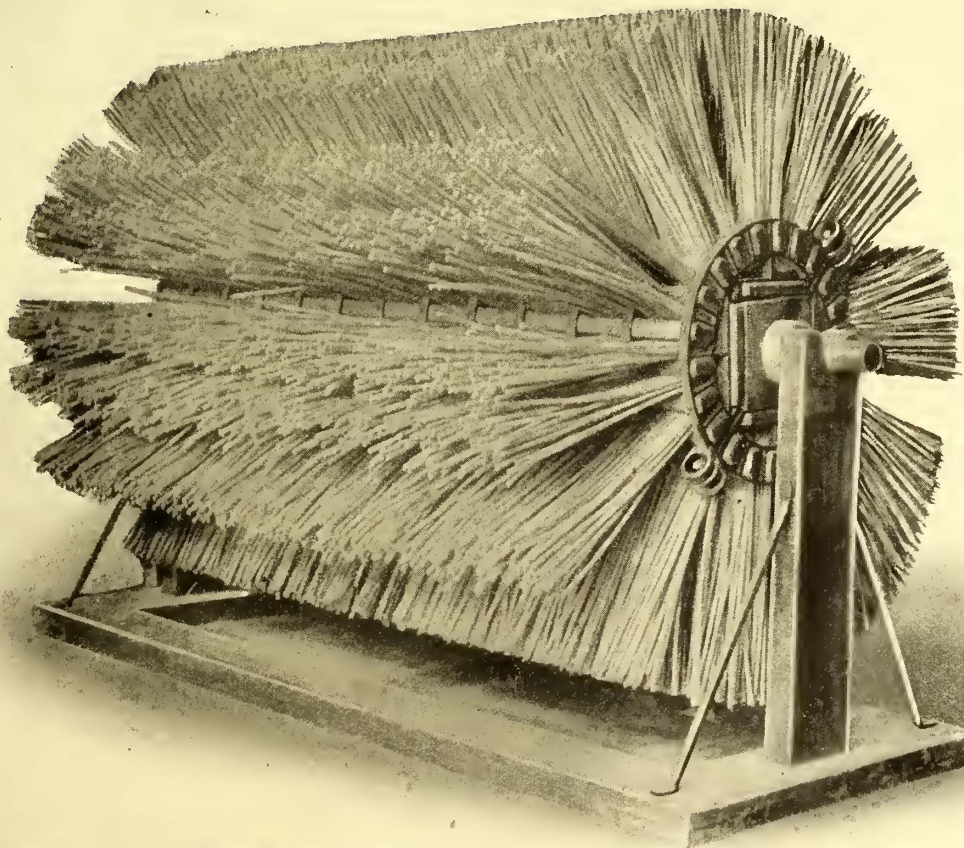
NEW YORK OFFICE  
39-41 CORTLANDT STREET

PARIS OFFICE  
6 RUE BOUDREAU

The "Campbell" Rotary Snow Broom, owned and manufactured by the CONSOLIDATED CAR FENDER CO., has been thoroughly tested by some of the largest Electric Roads in the United States.

The "Broom Head" is made in sections of Malleable Iron, and will last for many years, in fact, not one has ever yet been broken, although subjected to the hardest possible usage.

The whole expense of keeping this Rotary Broom in repair is refitting the "Head" with rattan.



This cut shows a Three-Quarter View of the "Campbell" Rotary Snow Broom, all ready to be attached to the axle of a car.

The Malleable Iron sections are placed about four inches apart, and the length of the Broom is determined by the number of sections used.

THE CONSOLIDATED CAR FENDER CO. will furnish, without cost, malleable iron sections to replace any that are broken when in actual service sweeping snow from the track.



# THE CONSOLIDATED CAR FENDER CO.

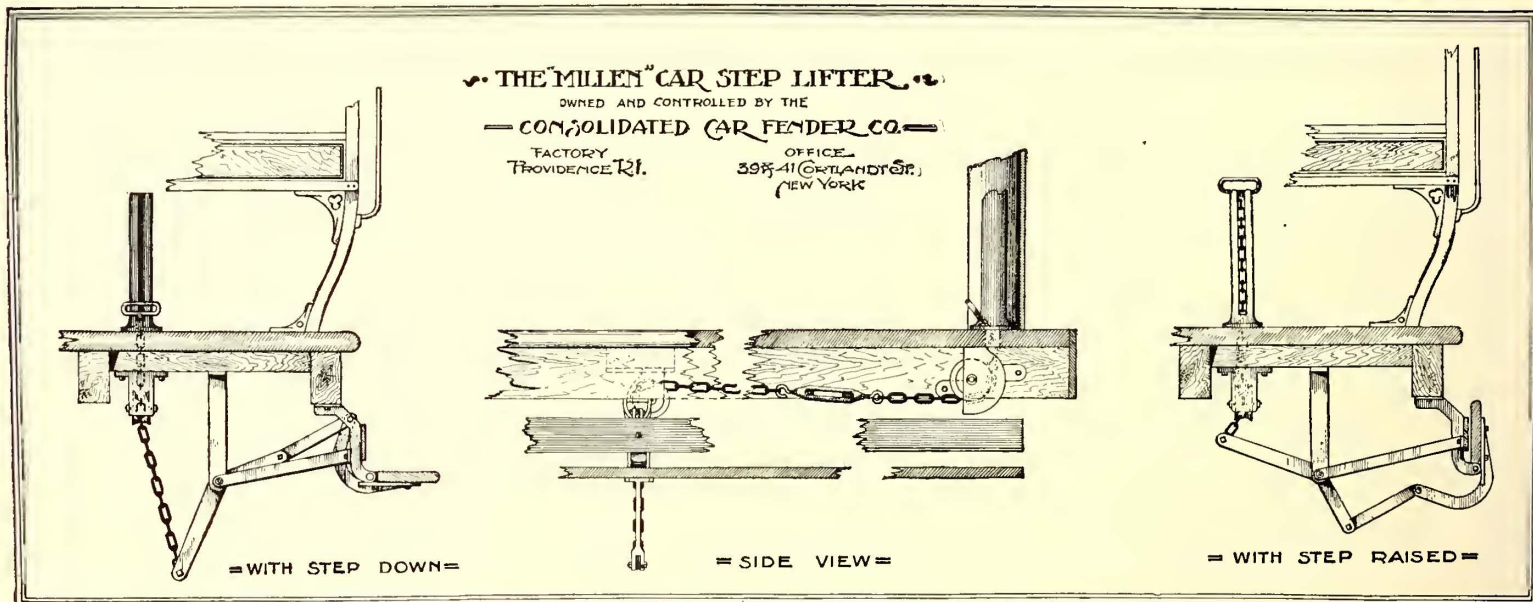
FACTORY  
PROVIDENCE, R. I.

NEW YORK OFFICE  
39-41 CORTLANDT STREET

PARIS OFFICE  
6 RUE BOUDREAU

This is a lifting device, attached to the under side of a car and connected with both platforms of the same, so that the motorman or conductor, by lifting up a handle, can turn up the long step of an open car and fasten it up, and also let it down again, without leaving the platform.

It has been the custom heretofore to fold up the steps by hand and fasten them with a hook or chain, it being necessary to have the step on the inside of the car, that is, the side which is next to opposite going car, folded up out of the way so as to give more space between two passing cars, and also to prevent passengers from entering or leaving the car from the "off side." It is also necessary at times, when passing trucks or wagons in crowded streets, to lift up the outside steps until the vehicle or obstacle is passed and then lower it down again. All of this may now be done without stopping the car or leaving the platform.



The "Millen" Car Step Lifter, owned and manufactured by the CONSOLIDATED CAR FENDER CO., was designed and perfected by the General Master Mechanic of the largest Electric Road in the World.

A large number of cars on said Road are equipped with this lifting device, and while not expensive to make, it saves valuable time, of both the motorman and conductor, in being able to operate it, at either end of the car, without leaving the platform.



# LIST OF

## ONE HUNDRED AND FIFTY-EIGHT ELECTRIC ROADS

### USING

# THE "PROVIDENCE" CAR FENDER

- Albany Railway, Albany, N. Y.  
 Albany & Hudson Railway & Power Co., Hudson, N. Y.  
 Allentown & Lehigh Valley Traction Co., Allentown, Pa.  
 Alton Railway & Illuminating Co., Alton, Ill.  
 Altoona & Logan Valley Electric Railway Co., Altoona, Pa.  
 Amsterdam Street Railway Co., Amsterdam, N. Y.  
 Atlantic Highlands, Red Bank & Long Branch Electric Railway, Red Bank, N. J.  
 Auburn City Railway Co., Auburn, N. Y.  
 Auburn Interurban Electric Railroad Co., Syracuse, N. Y.  
 Bellows Falls & Sexton's River Railway Co., Bellows Falls, Vt.  
 Bennington & Hoosick Valley Railway Co., Hoosick Falls, N. Y.  
 Bergen Turnpike Co., Jersey City, N. J.  
 Binghamton Railroad Co., Binghamton, N. Y.  
 Bradford Electric Street Railway Co., Bradford, Pa.  
 Brantford Street Railway Co., Brantford, Ont.  
 Bridgeport Traction Co., Bridgeport, Conn.  
 Berkshire Street Railway Co., Pittsfield, Mass.  
 Cairo Electric Railway Co., Cairo, Ill.  
 Carbon County Electric Railway Co., Mauch Chunk, Pa.  
 Central Railway & Electric Co., New Britain, Conn.  
 Cincinnati, Lawrenceburg & Aurora Street Railway Co., Cincinnati, O.  
 Cincinnati & Hamilton Electric Railway Co., Cincinnati, O.  
 Citizens' Rapid Transit Railway Co., Nashville, Tenn.  
 Citizens' Street Railway Co., Fishkill-on-Hudson, N. Y.  
 City Electric Railway Co., Port Huron, Mich.  
 City Passenger Railway Co., Altoona, Pa.  
 City Street Car Co., Staunton, Va.  
 Cleveland, Berea, Elyria & Oberlin Railway Co., Cleveland, O.  
 Cleveland Electric Railway Co., Cleveland, O.  
 Cleveland City Railway Co., Cleveland, O.  
 Cleveland, Painesville & Eastern Railroad Co., Cleveland, O.  
 Cleveland & Chagrin Falls Electric Railway Co., Cleveland, O.  
 Cleveland & Eastern Railway Co., Cleveland, O.  
 Columbus, Buckeye Lake & Newark Railway Co., Columbus, O.  
 Columbus, Grove City & Southwestern Railway, Columbus, O.  
 Columbus, London & Springfield Railway Co., Columbus, O.  
 Connecticut Lighting & Power Co., Bridgeport, Conn.  
 Connecticut Lighting & Power Co., Norwalk, Conn.  
 Consolidated Street Railway Co., Grand Rapids, Mich.  
 Consolidated Traction Co., Jersey City and Newark, N. J.  
 Dayton, Springfield & Urbana Electric Railway Co., Dayton, O.  
 Dayton & Western Railway Co., Dayton, O.  
 Derby Street Railway Co., Derby, Conn.  
 Des Moines City Railway Co., Des Moines, Ia.  
 Electric Construction Co., Portsmouth, Va.  
 Electric Construction Co., Richmond, Va.  
 Elizabeth City Horse Railroad Co., Elizabethport, N. J.  
 Elizabeth City Railroad Co., Elizabeth, N. J.  
 Fair Haven & Westville Railroad Co., New Haven, Conn.  
 Fall River Street Railway Co., Fall River, Mass.  
 Farmington Street Railway Co., Hartford, Conn.  
 Fitchburg & Leominster Street Railway Co., Fitchburg, Mass.  
 Fonda, Johnstown & Gloversville Railroad Co., Gloversville, N. Y.  
 Fort Wayne Traction Co., Fort Wayne, Ind.  
 Greenwich & Schuylerville Electric Railway Co., Greenwich, N. Y.  
 Hartford Street Railway Co., Hartford, Conn.  
 Hartford & West Hartford H. Railroad Co., Hartford, Conn.  
 Herkimer, Mohawk, Ilion & Frankfort Electric Ry. Co., Mohawk, N. Y.  
 Hornellsville Electric Railway Co., Hornellsville, N. Y.  
 Hull Electric Co., Hull, Quebec.  
 Indianapolis, Greenwood & Franklin T. R. Co., Greenwood, Ind.  
 Interstate Consolidated Street Railway Co., North Attleboro, Mass.  
 Interurban Construction Co., Alliance, O.  
 Jackson Street Railway Co., Jackson, Mich.  
 Jersey City, Hoboken & Paterson Street Ry. Co., West Hoboken, N. J.  
 Lake Ontario & Riverside Railway Co., Oswego, N. Y.  
 Linwood Street Railway Co., Whitinsville, Mass.  
 Lorain & Cleveland Railway Co., Cleveland, O.  
 Little Miami Traction Co., Springfield, O.  
 Maple Avenue Railroad Co., Elmira, N. Y.  
 Meriden Electric Railroad Co., Meriden, Conn.  
 Meriden, Southington & Compoene Tramway Co., Meriden, Conn.  
 Metropolitan Street Railway Co., New York City.  
 Mauch Chunk, Lehigh & Slatington St. Ry. Co., Mauch Chunk, Pa.  
 Miamisburg & Germantown Traction Co., Miamisburg, O.  
 Middlesex & Somerset Traction Co., New Brunswick, N. J.  
 Middletown-Goshen Traction Co., Middletown, N. Y.  
 Montoursville Passenger Railway Co., Montoursville, Pa.  
 Montoursville Railway Co., Montoursville, Pa.  
 Newburgh Electric Co., Newburgh, N. Y.  
 New Jersey Electric Railway Co., Hoboken, N. J.  
 New Haven & Centerville Street Railway Co., New Haven, Conn.  
 New Haven Street Railway Co., New Haven, Conn.  
 Niagara Falls, Westley Park & Clifton Tramway Co., St. Catharines, Ont.  
 Norfolk Railway & Light Co., Norfolk, Va.  
 Northern Ohio Traction Co., Akron, O.  
 Northern Texas Traction Co., El Paso, Tex.  
 North Hudson County Railway Co., Hoboken, N. J.  
 North Jersey Street Railway Co., Jersey City, N. J.  
 Norwalk Tramway Co., South Norwalk, Conn.  
 Ohio Central Traction Co., Galion, O.  
 Olympia Light & Power Co., Olympia, Wash.  
 Omaha Street Railway Co., Omaha, Neb.  
 Omaha & Council Bluffs Railway & Bridge Co., Council Bluffs, Ia.  
 Orange & Passaic Valley Railway Co., Orange, N. J.  
 Ottawa Street Railway Co., Ottawa, Ont.  
 Passaic & Newark Electric Traction Co., Passaic, N. J.  
 Paterson Railway Co., Paterson, N. J.  
 Peekskill Traction Co., Peekskill, N. Y.  
 Pennsylvania & Ohio Railway Co., Conneaut, O.  
 Pennsylvania & Ohio Traction Co., Ashtabula, O.  
 Perth Amboy Railroad Co., Perth Amboy, N. J.  
 Plainfield Street Railway Co., Plainfield, N. J.  
 Port Dalhousie, St. Catharines & Thorold Electric Street Ry. Co., Ltd., St. Catharines, Ont.  
 Port Norfolk Electric Railway Co., Portsmouth, Va.  
 Raritan Traction Co., Perth Amboy, N. J.  
 Richmond & Petersburg Railway Co., Richmond, Va.  
 Richmond Traction Co., Richmond, Va.  
 Richmond Railway & Electric Co., Richmond, Va.  
 Rutland Street Railway Co., Rutland, Vt.  
 Rochester & Sodus Bay Railway Co., Rochester, N. Y.  
 Rochester & Suburban Railway Co., Rochester, N. Y.  
 Sandusky & Interurban Electric Railway Co., Sandusky, O.  
 Schenectady Railway Co., Schenectady, N. Y.  
 South Chicago City Railway Co., South Chicago, Ill.  
 Southern Ohio Traction Co., Hamilton, O.  
 Springfield Electric Railway Co., Springfield, Vt.  
 Staten Island Electric Railroad Co., New Brighton, N. Y.  
 Staten Island Midland Railroad Co., Stapleton, N. Y.  
 St. Louis & East St. Louis Electric Railway Co., East St. Louis, Ill.  
 Suburban Traction Co., Orange, N. J.  
 Superior Rapid Transit Co., West Superior, Wis.  
 Syracuse, Lakeside & Baldwinsville Railway Co., Syracuse, N. Y.  
 Syracuse Rapid Transit Railway Co., Syracuse, N. Y.  
 Syracuse & East Side Railway Co., Syracuse, N. Y.  
 The Toledo & Maumee Valley Railway Co., Toledo, O.  
 Toledo, Fostoria & Findlay Railway Co., Toledo, O.  
 Toledo & Western Railway Co., Toledo, O.  
 Toronto Suburban Railway, Toronto, Ont.  
 Tri-City Railway Co., Davenport, Ia.  
 Troy City Railway Co., Troy, N. Y.  
 Utica Belt Line Street Railroad Co., Utica, N. Y.  
 Utica & Mohawk Street Railway Co., Utica, N. Y.  
 Union Traction Co. of Indiana, Anderson, Ind.  
 Van Brunt Street & Erie Basin Railway Co., Brooklyn, N. Y.  
 Wabash River Traction Co., Wabash, Ind.  
 Waterbury Traction Co., Waterbury, Conn.  
 Westhampton Park Railroad Co., Richmond, Va.  
 Webster & Dudley Street Railway Co., Webster, Mass.  
 Western Ohio Railway Co., Lima, O.  
 Westfield & Elizabeth Street Railway Co., Plainfield, N. J.  
 West Side Street Railway Co., Elmira, N. Y.  
 Winchester Avenue Street Railway Co., West Haven, Conn.  
 Wisconsin Construction Co., Beloit, Wis.  
 Yonkers Street Railroad Co., Yonkers, N. Y.  
 Compania de Ferrocarriles del Distrito Federal, City of Mexico, Mex.  
 Compania de Transvias de Lerdo, a Torreón Gomez Palacio, Durango, Mexico.  
 Compania de Tramvias Railway Co., Durango, Mex.  
 Buenos Aires & Belgrano Tramway Co., Buenos Aires, Argentina.  
 Buenos Aires Electric Tramway Co., Buenos Aires, Argentina.  
 Imperial Electric Supplies Co., Ltd., London, England.  
 La Capital Tramways Co., Buenos Aires, Argentina.  
 Costa Rica Electric Light & Transportation Co., San Jose, Costa Rica.  
 Sao Paulo Railway, Light & Power Co., Sao Paulo, Brazil.  
 Colombo Tramway Co., Colombo, Ceylon.  
 West India Electric Co., Kingston, Jamaica.  
 Montreal Street Railway Co., Montreal, Canada.  
 And all Electric Roads in Lisbon, Portugal.



# THE CONSOLIDATED CAR FENDER CO.

FACTORY  
PROVIDENCE, R. I.

NEW YORK OFFICE  
39-41 CORTLANDT STREET

PARIS OFFICE  
6 RUE BOUDREAU

We have endeavored, in this 16-page advertisement, to show our friends, who are now using some one of our Life Saving Devices, exclusively, on One Hundred and Fifty-eight (158) Electric Roads, that we are alive to the requirements of their various Roads, so far as they apply to the attachments for Electric Cars manufactured by us.

To the Managers of Electric Roads who have not yet equipped their cars with a real Life Saving Device we respectfully ask the following questions:

**Have you caught on** to the fact that the "PROVIDENCE" FENDER is a fender and *the* fender that really fends?

**Have you caught on** to the fact that the "PROVIDENCE" FENDER has saved lives in the past—thousands of them?

**Have you caught on** to the fact that the "PROVIDENCE" FENDER is saving lives this very day—many of them?

**Have you caught on** to the fact that the "PROVIDENCE" FENDER will save lives in the future—thousands of them?

**Have you caught on** to the fact that many of the brightest Electric and Cable Railroad Managers in the world acknowledge this fact by equipping their cars with the "PROVIDENCE" FENDER, and the "PROVIDENCE" FENDER *only*, and will not allow any other fender used on their cars?

**Have you caught on** to the fact that by preventing accidents, loss of life and consequent damages, the "PROVIDENCE" FENDER has saved for the Electric and Cable roads using it hundreds of thousands of dollars, which hundreds of thousands of dollars have been available for dividends for stockholders, and permitted Railroad Managers to make a far better showing than they otherwise could have done?

**Have you caught on** to the fact that 95% of all the car fenders used in the world, other than those made by the Electric Roads themselves, are "PROVIDENCE" FENDERS?

**Have you caught on** to the fact that no expense, time, money or material is ever allowed to stand in the way of making and keeping the "PROVIDENCE" FENDER what it always has been—immeasurably ahead of any other so-called fender in the world?

**Have you caught on** to the fact that when properly used with full equipment, the "PROVIDENCE" FENDER has saved 100% of the lives in jeopardy?

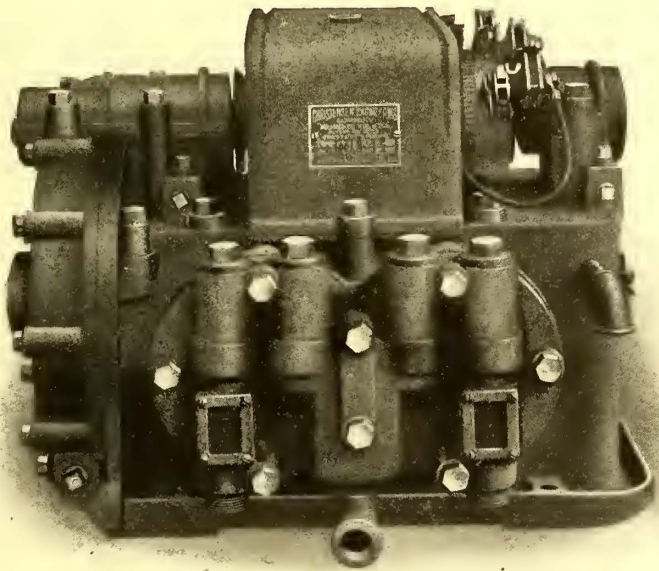
**Have you caught on** to the fact that Ten Thousand (10,000) cars, on One Hundred and Fifty-Eight (158) Electric and Cable Roads in the United States, South America and Europe, are equipped with the "PROVIDENCE" FENDER?

**Have you caught on** to the fact that, putting aside the personal responsibility for human lives—if it is possible for the moment to put this consideration aside—as a commercial proposition, as a money maker, or, more properly, a money saver, no Electric or Cable Road can AFFORD to do without it?



The cars of more than two hundred and forty electric railways  
are equipped with

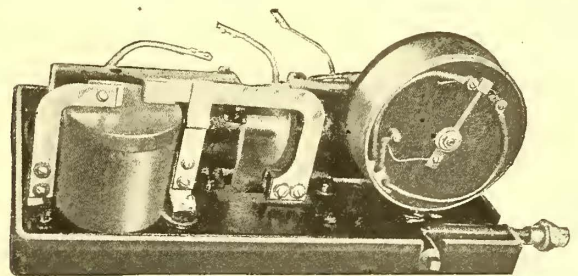
# CHRISTENSEN AIR BRAKES



This is the motor driven air compressor used with our air brake equipment. Note the compact design, accurate construction, easy accessibility of parts and general mechanical construction. :: ::

The results are:

Quick Stops,  
Perfect Safety,  
Instantaneous Release,  
Increased Schedule Speeds,  
Increased Economy in Operation,  
and Increased Life of Cars,  
Wheels and Brake Shoes.



This is our automatic governor which starts and stops the motor at the desired minimum and maximum air pressures. It is simple, compact, durable and absolutely reliable.

More than 6000 equipments in use.

## Christensen Engineering Co.

Manufacturers of Air Brakes

### Milwaukee

New York Office: 135 Broadway.  
R. W. Blackwell & Co., London, Brussels and Paris.  
Milwaukee Cable address: "Ceco"

Henry Pels & Co., Berlin.

London Office: 59 City Road  
Edge & Edge, Sydney

London Cable address: "Fanabitis"



# A Prophecy

There will be

## No More Air Brakes

put on electric cars after the  
Neal Duplex Brake is a little  
better understood by the  
street railway world

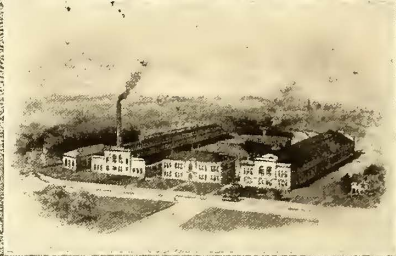
Send for Catalogue

### UNITED STATES STEEL CO.

BRAKE DEPARTMENT

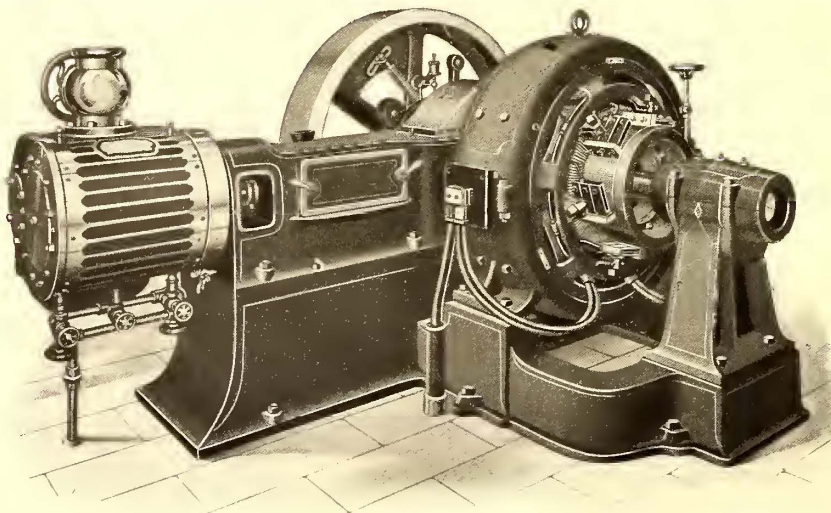
145 Oliver Street, Boston, Mass.

**BULLOCK**  
**DYNAMOS & MOTORS**  
Are built in the most modern  
works in the world. For their



superior qualities  
they were awarded  
**The Gold Medal at Paris, 1900.**  
We build electric machinery  
of the highest order only.  
**BULLOCK ELECTRIC MFG. CO.,**  
Cincinnati, O., U. S. A.

# DIRECT CURRENT RAILWAY GENERATORS



**NON-SPARKING  
HIGH EFFICIENCY  
GREAT DURABILITY  
UNEQUALED SERVICE**



**BEST POSSIBLE  
COMMERCIAL VALUE**



**SEND FOR DESCRIPTIVE  
BULLETIN No. 7102**

# SPRAGUE ELECTRIC COMPANY

GENERAL OFFICES: 527-531 West 34th Street, NEW YORK

BRANCH OFFICES:

Chicago, Fisher Bldg.

Boston, Weld Bldg.

St. Louis, Security Bldg.

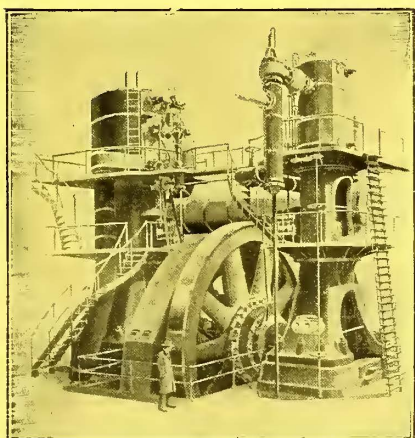
Baltimore, Maryland Trust Bldg.



# The Westinghouse Machine Co.

Pittsburg and Chicago

Has designed, and built during the last year a number of very large steam engines of three different types for driving electric generators.



Westinghouse-Corliss 5,000 H.P. Steam Engine

One of the types is a vertical Westinghouse-Corliss, two-cylinder, cross-compound, fitted with Corliss valves on the low pressure, and with poppet valves on the high pressure cylinder for superheated steam. These engines are in service carrying a heavy and fluctuating railway load.

Also manufacturers Westinghouse Junior, Standard and Compound steam engines, and engines of other types; Steam Turbines, Gas Engines and Roney Mechanical Stokers.

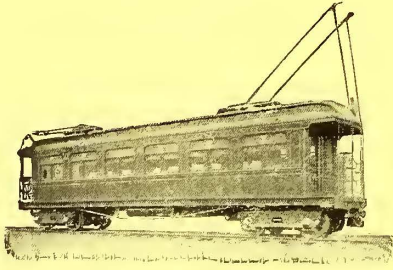
For complete information regarding these machines and equipments, as well as the installation of the steam loop and Holly gravity return systems, and the *designing and building of complete power plants of every description, address*

## Westinghouse, Church, Kerr & Co.

New York, Boston, Philadelphia—**Engineers**—Pittsburg, Chicago, Detroit



# Baldwin=Westinghouse Electric Locomotives



for Railway  
Passenger and  
Freight Service

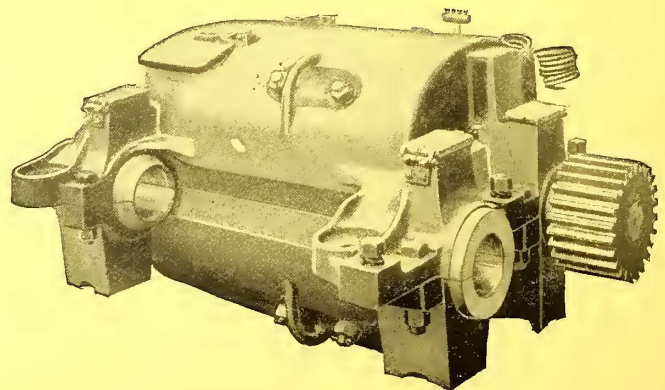
**Baldwin Locomotive Works**  
Philadelphia, Pa.

**Westinghouse Electric  
& Mfg. Co., Pittsburg, Pa.**

Write nearest office of either Company

## Westinghouse Railway Motors

Mechanically Simple,  
Strong and of Superior  
Construction Throughout.



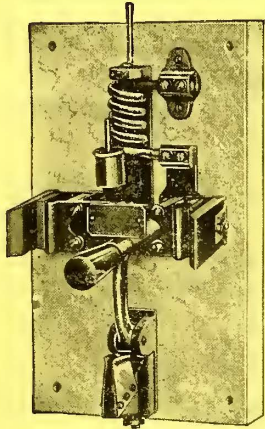
**Westinghouse Electric  
& Mfg. Co., Pittsburg, Pa.**

Sales Offices in All Large Cities



# Westinghouse Circuit-Breakers

## For Railway Circuits



Westinghouse Type "A"  
Circuit Breaker

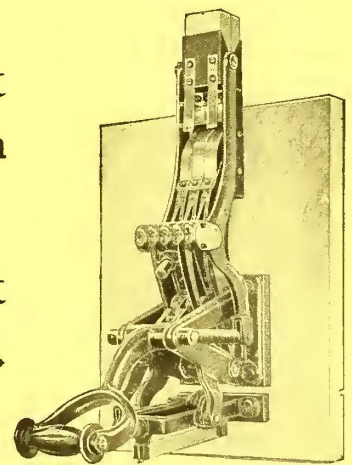
*are as accurate as Ammeters throughout their entire range and positive in action.*

Numerous competitive trials have established these facts and give assurance of the safety of the apparatus they protect.

The illustrations show our two types of Direct-Current Breaker, each adapted for circuits up to 750 volts.

The Westinghouse Type "A" Circuit Breaker of the Adjustable Jaw Type is built in capacities of 15 to 2,000 amperes.

The Westinghouse Type "C" Circuit Breaker was the first of its kind upon the market. It is built in sizes of 200 to 10,000 amperes.



Westinghouse Type "C"  
Circuit Breaker.

Write for illustrated folders

# Westinghouse Electric

## & Mfg. Co., Pittsburg, Pa.

Sales Offices in All Large Cities



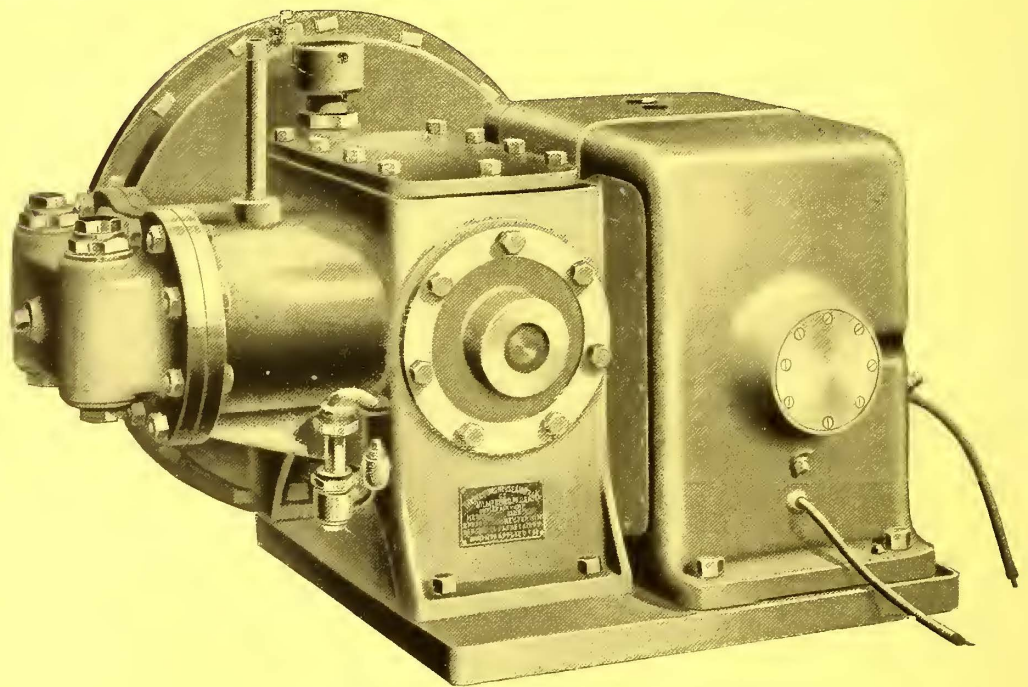
# Westinghouse Air Brakes

## For Traction Service

of either the straight or automatic type are manufactured by the

**Westinghouse  
Air Brake Co.**

Also Axle - Driven  
and Motor - Driven  
Air Compressors;  
also Air Storage  
Equipments



Westinghouse Motor-Driven Air Compressor

We are prepared to solve any engineering  
problem that Traction Brake Service presents.

# Standard Traction Brake Co.

26 Cortlandt Street, New York

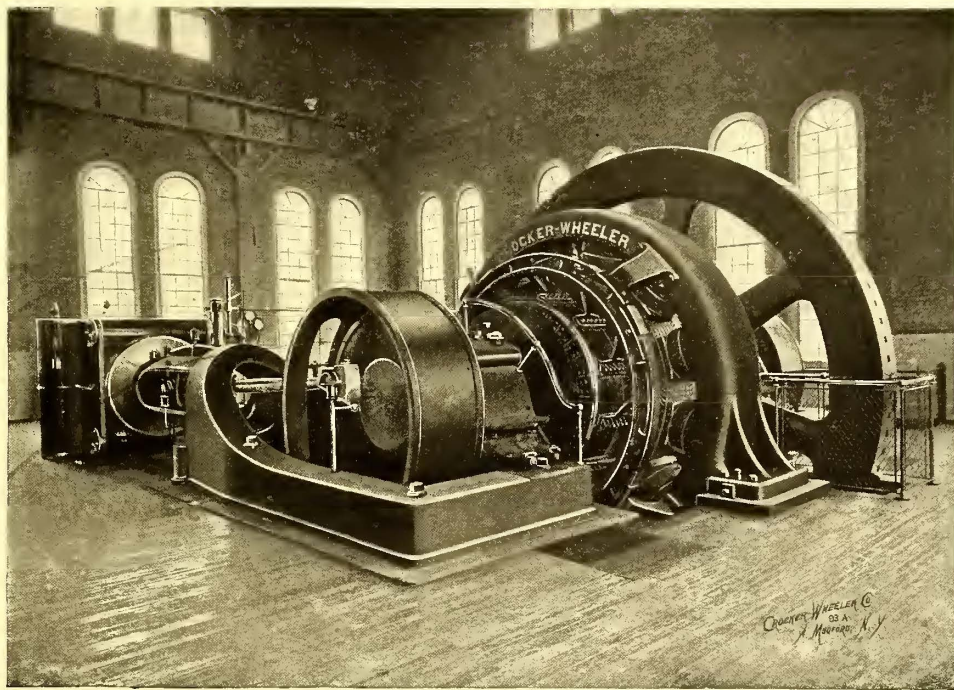
Sales Offices: Boston, 53 State St.; Buffalo, 778 Ellicott Square Bldg.; Chicago, 711 Rookery; Cincinnati, 711 News Bldg.; Pittsburg, Wilmerding Works of The Westinghouse Air Brake Co.; St. Louis, American Central Bldg.



# CROCKER-WHEELER COMPANY

Manufacturers and Electrical Engineers

## Railway Generators and Boosters



Our machines are carefully designed, the best materials are used and great care is given their construction. Characteristic features of the design are:

Generous proportions to all current-carrying parts.

Individual adjustment of brush-holder arms, giving perfect electrical balance.

The internally flanged frame, giving rigidity and protection to field coils.

The parallel movement brush-holders, maintaining constant radial pressure.

The use of a large air gap, preventing field distortion and tendency to spark under heavy load.

Buyers of electrical railway machinery will do well to investigate the strong points of our apparatus which have rendered our installations successful.

Main Office and Works, - AMPERE, N. J., U. S. A.

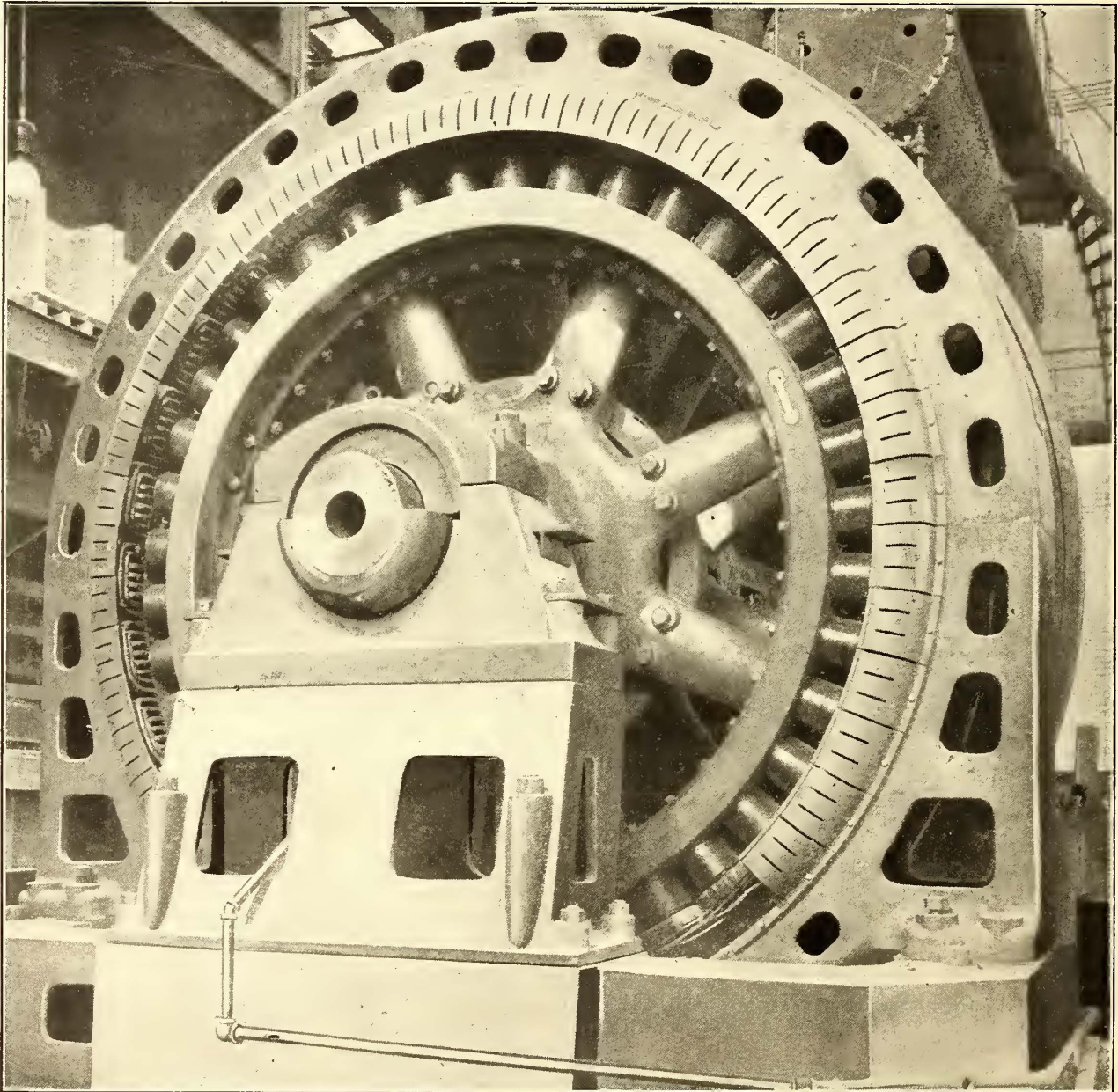
Branch Offices in All Principal Cities of the World.

London Representative,

- GENERAL ELECTRIC CO. Ltd. (1900), 67 Queen Victoria St.



THE  
**GENERAL ELECTRIC COMPANY'S**  
**GENERATORS**



3,500 K.W. Alternating Current Generator Installed for New York Edison Company

**For General Railway, Lighting and Power Work**

---

**General Office: SCHENECTADY, N. Y.**

New York Office, 44 Broad Street

Sales Offices in all large cities



## CONSTRUCTION NOTES

TUSCALOOSA, ALA.—The plan for building an electric railway between Tuscaloosa and Birmingham is again being revived. North River, 6 miles north of Tuscaloosa, could be harnessed.

OAKLAND, CAL.—The railroad committee of the City Council has voted to recommend the granting of a number of franchises for connecting links in the Oakland Consolidated Company's system. The new pieces of road covered by the franchises include on Twelfth Street from Broadway to Oak; on Shattuck Avenue, from Forty-Seventh Street to Telegraph Avenue; on Adeline Street, from Berkeley town line to Emeryville town line; on Kirkham Street, from Twelfth to Thirteenth Street; thence to Center and along Center to Twelfth Street. The franchises are for forty years.

HARTFORD, CONN.—A meeting of those interested in the plan to build an electric railway from Hartford to Rockville, Springfield and Broad Brook was held in Broad Brook a few days ago, but nothing official was given out after the meeting. However, it is understood that Boston financial interests have been induced to become interested in the enterprise, and the prospects for building the road are now said to be very bright. H. S. Wells, of Scantic, and John T. McKnight, of Ellington, are among those promoting the new road.

JACKSONVILLE, FLA.—The City Council has under consideration the applications of G. W. Shook, D. W. Escridge and R. R. Robinson for franchises to build electric railways in this city. The plan of Mr. Shook and his associates is to build a line within the city limits, but Messrs. Escridge and Robinson plan to build to Moncrief Springs.

CHICAGO, ILL.—It is rumored that the Northwestern Elevated Railroad will extend its line to Ravenswood next year.

GALESBURG, ILL.—The Secretary of State has granted a charter to the Galesburg & Kewanee Electric Railway Company, which is, as previously stated, to construct an electric railway between Galesburg and Kewanee. The company has a capitalization of \$600,000. The incorporators and members of the first board of directors are: H. W. Crane and W. D. Patty, of Oneida; S. E. Robb, of Kewanee; A. N. Lindsay and F. W. Emery, of Knoxville; H. C. Lucas and William D. Godfrey, of Galesburg.

MURPHYSBORO, ILL.—Work has been begun on the new electric railway that is to run between Murphysboro and Carbondale. The company will also have a belt line around these two cities.

CHICAGO, ILL.—It is expected that the Aurora, Elgin & Chicago Railway will be placed in operation by July 1. There will be a train between Chicago and Wheaton every half hour, the running time being forty-six minutes. The running time between Aurora and Chicago will be one hour and six minutes.

BROOKLYN, ILL.—The Venice, Granite City & St. Louis Electric Railway has purchased a direct right of way through Brooklyn to East St. Louis, and the tracks are being straightened to avoid the many curves and railroad crossings. The new route will make a difference in the time schedule from the junction in Venice to East St. Louis of nearly twenty minutes on each trip.

FORT WAYNE, IND.—H. P. Eells, E. H. Bourne and H. P. McIntosh, Cleveland bankers, who own the controlling interest in the Fort Wayne Traction Company, are understood to be offering their holdings to Eastern capitalists.

ELKHART, IND.—The Michigan Hydraulic & Electric Company has been granted a franchise by the City Council. The plan of the company is to build an electric railway from Elkhart to Kalamazoo, Mich. The ordinance calls for a bond of \$2,000 to insure the beginning of work within six months. The road must be completed within two years. The life of the franchise has been fixed at twenty-five years.

MOORESVILLE, IND.—The Charles Finley Smith Company, which is building an electric railway from Indianapolis to Martinsville, has a large force preparing the road between Mooresville and Martinsville. Rails have been laid 1 mile beyond Mooresville and the line is expected to be in operation in a few months.

KOKOMO, IND.—The Kokomo Street Railway & Traction Company has been reorganized. W. P. Stevens and other Detroit capitalists have retired from the company. The new officers chosen are: George J. Marott, president; L. J. Kirkpatrick, vice-president; T. C. McReynolds, secretary and general manager. The lines in the city are being double tracked.

RICHMOND, IND.—The Richmond & Northwestern Traction Company is now a reality. The company has perfected its organization, and articles of incorporation were filed with the Secretary of State on May 26. The capital of the company is \$50,000, and the officers are: G. M. Hodges, of Dayton, Ohio, president; Thomas Millikan, of New Castle, vice-president; William Jessup, of Richmond, secretary.

ANDERSON, IND.—The Union Traction Company is acquiring the right of way for its proposed line between Delphi and Logansport. The road will parallel the Wabash River and follow the old canal tow path for a considerable distance.

# United States Mortgage and Trust Company,

59 CEDAR STREET, NEW YORK



CAPITAL, - - \$2,000,000  
SURPLUS, - - - 2,750,000



**Trust Department** acts as Executor, Trustee, Administrator, Guardian, Transfer Agent, and in all Trust Capacities.

**Banking Department** receives Deposits subject to Check or on Certificate. Checks pass through New York Clearing House. Allows Interest on Deposits. Acts as Fiscal Agent for Municipalities and Corporations. Pays Coupons. Loans on Securities.

**Real Estate Department** takes entire charge of Real Estate, Collecting Rents, Paying Taxes and Insurance, Making Repairs, etc. Competent Superintendent and Architect in charge.

**Foreign Exchange Department** has Correspondents in England and on the Continent. Buys and sells Foreign Exchange.

**Municipal Bond Department** prepares and certifies as to genuineness of municipal bonds for the better protection of such securities. Pays Coupons.

**Corporation Bond Department** undertakes the preparation of corporation bonds for which the company acts as Trustee. Pays Coupons.



## OFFICERS

GEORGE W. YJUNG, PRESIDENT	WILLIAM P. ELLIOTT, SECRETARY
LUTHER KOUNTZE, VICE-PRESIDENT	EDWARD T. PERINE, COMPTROLLER
JAMES TIMPSON, 2D VICE-PRESIDENT	RICHARD M. HURD, ASST. SECRETARY
ARTHUR TURNBULL, 3D VICE PRESIDENT	CALVERT BREWER, ASST. TREASURER
CLARK WILLIAMS, TREASURER	ALEXANDER PHILLIPS, MANAGER FOREIGN DEP'T

## EXECUTIVE COMMITTEE

DUMONT CLARKE	
CHARLES D. DICKEY	LUTHER KOUNTZE
CHARLES R. HENDERSON	RICHARD A. MCCURDY
GUSTAV E. KISSEL	JAMES TIMPSON
GEORGE W. YOUNG	

## DIRECTORS

SAMUEL D. BABCOCK	
W. H. BALDWIN, JR.	LUTHER KOUNTZE
FREDERICK O. BARTON	WILLIAM B. LEEDS
C. LEDYARD BLAIR	CHARLTON T. LEWIS
DUMONT CLARKE	RICHARD A. MCCURDY
C. C. CUYLER	ROBERT OLYPHANT
CHARLES D. DICKEY	CHARLES M. PRATT
WILLIAM P. DIXON	MORTIMER L. SCHIFF
ROBERT A. GRANNISS	EBEN B. THOMAS
GEORGE G. HAVEN, JR.	JAMES TIMPSON
CHARLES R. HENDERSON	CORNELIUS VANDERBILT
GUSTAV E. KISSEL	GEORGE W. YOUNG







NEW YORK, N. Y.—The resolution of Alderman Harburger making it mandatory on the surface railroad companies to place cuspidors in all smoking cars has been approved by the Board of Railroad Commissioners.

SYRACUSE, N. Y.—Louis L. Waters has applied to the Common Council for a franchise for a street railway system to connect with the Syracuse & Suburban Railway. Three lines of track are covered in the application. The principal one is from the southwestern boundary to the center of the city, and with the Suburban Line constitutes a line across the city from east to west. The other lines of track are short and will form a common center in Montgomery, East Onondaga, East Fayette and South State Streets. There is considerable opposition to the franchise.

BUFFALO, N. Y.—A meeting of those interested in the proposed Buffalo-Erie Electric Railway was held at Dunkirk a few days ago. It is understood that the plan for building the line were gone over thoroughly, but nothing official was given out after the meeting. S. Fred Nixon, of Westfield; William J. Connors, of Buffalo; Frederick Greene, of Fredonia; Daniel F. Toomey, of Dunkirk, are interested.

NEW YORK, N. Y.—The New York & New Jersey Railroad Company, which is to complete the old Hudson River Tunnel from Fifteenth Street, Jersey City, to Morton Street, New York, has made formal application to the New York Rapid Transit Commissioners for a franchise for the New York end of the railroad. The application has been referred to a sub-committee of the Rapid Transit Commission, and it is expected that they will report some time this month. The tunnel, as is well known, is to be used for electric railway purposes, and is to form a connecting link between the lines of the North Jersey Street Railway Company and Paterson Street Railway Company, and the Bergen Turnpike Company, on the New Jersey side, and the Metropolitan Street Railway Company's lines on the New York side. The cars of the street railway companies will run up to the tunnel and the passengers will then be transferred to the electric cars that will operate through the tunnel.

PORT CHESTER, N. Y.—The New York & Port Chester Railway Company, which plans to build a four-track, third-rail electric railway from the terminus of the lines of the New York Rapid Transit Railway to Port Chester, has been granted permission to build through Port Chester.

UPPER SANDUSKY, OHIO.—The promoters of the Bucyrus, Upper Sandusky & Lima Electric Railway are figuring with C. W. Foot, a Cleveland contractor, relative to the building of the road.

CLEVELAND, OHIO.—George T. Bishop, president of the Northern Texas Traction Company, states that the road will be opened for business about June 10. Several very fine interurban open and closed cars are being built for the company by the G. C. Kuhlman Car Company, of Cleveland.

CINCINNATI, OHIO.—The Miami & Erie Canal Transportation Company has bought the business and equipment of the Hamilton Canal Boat Company, which operates twelve canal boats. The "electric mule" company in this manner secures boats and gets rid of a competitor.

CANTON, OHIO.—The Council has refused to grant the Stark Railway Company an independent entrance into Canton, and suggests that an arbitration committee be appointed to decide on terms of a traffic agreement between the company and the Canton-Akron Railway Company for joint use of the latter's tracks. The Stark Company declines to make traffic arrangements, and says it will stop its cars at the city limits if not other entrance is granted.

SPRINGFIELD, OHIO.—With the aid of 275 men and 18 teams M. C. Canfield, of the Cleveland Construction Company, put in a night's work recently and succeeded in completing the Springfield & Xenia Road through several of the principal streets of the city before an injunction could be secured. A portion of the track has been completed for a year, and operations have been held up by disgruntled property owners. The road will be placed in operation as soon as possible.

CINCINNATI, OHIO.—The Cincinnati Traction Company had delays on several of its lines from a rather unusual cause May 20. An enormous rainfall caused the washing down of several steep hillsides over the streets and tracks.

HAMILTON, OHIO.—Interests identified with the Southern Ohio Traction Company have signified their intention of organizing the Cincinnati, Hamilton & Indiana Traction Company to build an electric railway to Oxford and College Corner. It is expected that the road will be completed by Jan. 1, 1903.

FOSTORIA, OHIO.—Work has been started on the Ohio Northwestern Electric Railway, which is to run from Fostoria to Jerry City, to connect with the Toledo, Bowling Green & Southern Railway for Toledo.

OREGON CITY, ORE.—The County Commissioners have granted a franchise to the Oregon City & Suburban Railway Company to build railroads, telephone, telegraph and power lines upon the Abernethy Road and the Oregon City and Oswego Road. According to the terms of the franchise the road is to begin at the intersection of an extension of the center line of Seventh Street, in Oregon City, on the west side of the Willamette River.

PHILADELPHIA, PA.—The Philadelphia & West Chester Traction Company, lessee of the Ardmore & Llanerch Street Railway Company, has opened the electric railway between Ardmore and Llanerch. New cars have been constructed for the service. The roadbed is laid on easy curves and grades and is rock ballasted from end to end. The highways have been avoided as far as possible and the private right of way is fenced in on both sides, thus permitting high-speed service.

## Spencer Trask & Co.

### BANKERS

27 and 29 Pine Street, NEW YORK.

Members New York Stock Exchange.

BRANCH OFFICE: 67 State Street, Albany.

Transact a general banking business; act as Fiscal Agents for corporations, and negotiate security issues of railroads and other companies. Execute commission orders and deal in

INVESTMENT  
SECURITIES.

## PERRY, COFFIN & BURR

60 STATE STREET - - BOSTON, MASS.

WE PURCHASE TOTAL ISSUES OF  
STREET RAILWAY AND ELECTRIC LIGHTING BONDS

## N. W. HARRIS & CO.,

### BANKERS,

Marquette Building, 31 Nassau Street, 67 Milk Street,  
Chicago. New York. Boston

WE PURCHASE TOTAL ISSUES OF

STREET RAILWAY BONDS On Properties in the  
Larger Cities.

## STREET RAILROADS AND FRANCHISES IN UNITED STATES AND CANADA

Bought and Sold Railroad Securities Negotiated

## DUMEE, SON & COMPANY

105 & 107 SO. THIRD ST., PHILADELPHIA, PA.

## CAPITAL SECURED

Electric and Steam Railroads Gas Properties and Water Works

FINANCED

Municipal Bonds Bought and Sold

Correspondence Solicited

J. D. LINDSAY, = 63-65 Wall St., New York

## RISTINE & CONKLIN

### BONDS

Mariner and Merchant Building

Chestnut and Third Sts. - Philadelphia, Pa.

## Devitt, Tremble & Co.

First National Bank Bldg., Chicago, Ill.

WE PURCHASE TOTAL ISSUES OF

Street Railway, Gas and Electric Bonds

**Electric Railway Bonds.**

We deal in and have special facilities for handling total issues

**Electric Railway Bonds**

**BONNER & CO., Bankers,**

SPITZER ARCADE TOLEDO, O.



POTTSTOWN, PA.—The Pottstown & West Chester Electric Railway Company, 27 miles, is about to commence construction, and is in need of 56-lb. or 58-lb. T-rail. The company is planning to use a 35-ft. double-truck, semi-convertible type of car, equipped with air brakes and whistles. Address T. P. Turner, general manager, 629 Bourse Building, Philadelphia.

PITTSBURGH, PA.—The Rapid Transit Commission appointed to consider the traction question and the necessary remedies for solving the congested condition in this city has appointed Emil Swensson, C. E., 925 Frick Building, consulting engineer.

BROWNSVILLE, PA.—The West Brownsville Junction & California Street Railway Company has been incorporated, with a capital stock of \$24,000, to build a 4-mile electric railway here. M. V. Winans, of Brownsville, is president of the company, and the directors of the company are: W. H. Fisher, George M. Rathwell, W. A. Eddison, of Brownsville; Thomas A. Axton, of West Brownsville.

WESTERLY, R. I.—The Council has granted the Westerly & Hopkinton Railway Company a franchise for the construction of an electric railway through Westerly.

DICKSON, TENN.—Plans are being discussed for the construction of an electric railway to connect Dickson, Charlotte and Cumberland Furnace. Harry L. Burns and W. T. Kanard, of Dickson, are interested in the proposed line.

CORSICANA, TEX.—The Corsicana Transit Company is making the final arrangements for constructing its proposed line here, and it is expected that work will be begun by June 15. The company will be capitalized at \$75,000. Allison Templeton, Stephen Smith, Aaron Ferguson, W. F. Little, A. B. M. Long, F. N. Stormant and R. W. Wortham are the directors of the company.

BEAUMONT, TEX.—The work of grading on the Beaumont, Port Arthur & Port Neches Electric Railway is progressing rapidly. Eighteen miles of the work have been completed and the graders are nearing Port Arthur. The road is to run from Beaumont to Port Neches and Port Arthur with several branch lines, one being to the oil fields, another to the big McFaddin rice canal, another passing Nederland, and possibly others.

WACO, TEX.—The Citizens' Street Railway Company has in contemplation the extension of its lines to East Waco.

WAXAHACIE, TEX.—Surveys are now being made for the proposed electric railway from Waxahacie to Ennis. The road will extend through Boyce and Garrett. This is the line in which A. F. Byars, who was granted a franchise in Waxahacie last February, is interested.

**NEWS NOTES**

CHICAGO, ILL.—The consideration of street railway franchises will be made a special order of business by the Chicago City Council on June 11, and the street railway companies are invited to submit propositions at that time.

CHICAGO, ILL.—Nearly one hundred passengers on a Northwestern Elevated Railroad train were thrown into a panic May 30 when a car of the train was discovered to be on fire. The blaze was quickly extinguished by a chemical engine.

BOSTON, MASS.—At a recent hearing on the Washington Street Subway, held in Boston, before the legislative committee on metropolitan affairs, the Boston Elevated Railway Company stated its willingness to have arbitrated the questions of rental and tenure of the new tunnel by the Massachusetts Railroad Commission, and gave its consent to municipal ownership of the subway. Mayor Collins, however, remains firm in his position that twenty-five years at 4½ per cent rental is the limit of maximum time and minimum rate which the city will accept, and states that the people want a comprehensive plan irrespective of the cost, with four tracks if necessary, and advises that the questions of tenure and rental be decided at the State House, as the tax would be, leaving the engineering questions for the Railroad Commission or Transit Board. The Elevated Company feels, on the contrary, that a two-track subway will take care of its business for fifteen years, and is willing to submit to a referendum.

BOSTON, MASS.—Two more propositions in regard to the Washington Street Subway in Boston were made on May 27 before the sub-committee on metropolitan affairs of the Legislature. It is proposed that the bill shall provide for immediate construction by the city of a two-track subway, but that within two or three years after the completion of the tunnel the Boston Transit Commission shall determine whether or not the public convenience requires the construction of a second subway to accommodate two more tracks; whether this shall be in the form of a lateral extension to the new subway or a new tunnel above or below it is left to the judgment of the board. This plan is largely that of the Matthews bill, which provided for the construction of a deep tunnel to contain two tracks for elevated trains, and the building of a second tunnel for surface cars within ten years. The present plan includes an appeal from the Transit Commission in case there is general dissatisfaction with the former board's decision. The second important new compromise suggested in the committee is that to the people of Boston, at the municipal election, shall be referred the two questions whether the lease of the new subway to the elevated shall be for twenty-five years, as desired by Mayor Collins, or for thirty years, as desired by the company, the rental to be paid to be decided by the Railroad Commission. It is argued that this method would avoid a reference of the franchise principle to any board, but that as the amount of the rental is dependent in large measure upon the length of the lease, there can be no objection to referring it to the Railroad Commission. It is hoped that a favorable report on the bill will be returned this week.

**The Audit Company of Illinois**  
 NEW YORK LIFE BUILDING  
 CHICAGO  
**PUBLIC ACCOUNTANTS AND AUDITORS**  
 OFFICERS:  
**L. A. WALTON, PRESIDENT**      **F. W. LITTLE, VICE-PRESIDENT**  
**C. D. ORGAN, SECRETARY AND TREASURER**  
**H. J. D. WODRICH, MANAGER**  
 (MEMBER ILLINOIS ASSOCIATION OF PUBLIC ACCOUNTANTS)  
 DIRECTORS:  
**A. G. BECKER, A. G. BECKER & CO., CHICAGO**  
**F. W. LITTLE, VICE-PRES. PEORIA GAS & ELECTRIC CO., PEORIA**  
**G. A. RYHER, CASHIER NATIONAL LIVE STOCK BANK, CHICAGO**  
**J. R. WALSH, PRESIDENT CHICAGO NATIONAL BANK, CHICAGO**  
**L. A. WALTON, VICE-PRES. THE EQUITABLE TRUST CO., CHICAGO**  
**TELEPHONE CENTRAL 3544.**

**EDWARD C. JONES & CO.,**  
 1 Nassau Street, New York      112 South Fourth St., Philadelphia.  
 ISSUES OF  
**Eastern Street Railway Bonds Bought— Advances Made.**

**STREET RAILROAD BONDS**  
 WE BUY TOTAL ISSUES OF STREET RAILWAY BONDS ON PROPERTIES ISSUED IN THE LARGER CITIES . . . . .  
**W. J. HAYES AND SONS**  
 BANKERS  
 Cincinnati      CLEVELAND, OHIO      Boston

**E. P. ROBERTS, M. E.**      **I. H. SHERWOOD, E. E.**  
**E. P. ROBERTS & CO., Consulting Engineers,**  
 602-605 ELECTRIC BUILDING,      CLEVELAND, OHIO.

**EDWARD P. BURCH, Consulting Engineer.**  
 Specialist on Heavy Electric Railways  
 1210 Guaranty Loan Building,      MINNEAPOLIS, MINN.

**THE R. H. TINGLEY CO., - - Consulting Engineers**  
**EXPERT STREET RAILWAY ENGINEERS**  
 PROVIDENCE OFFICE,      NEW YORK OFFICE,  
 75 Westminster Street      29 Broadway

**CHARLES A. CHAPMAN,**  
**CONSULTING ENGINEER**  
 1148-50 204 Dearborn Street, Chicago.

**AXEL H. ENGSTROM,**  
**Consulting and Designing Engineer.**  
 SPECIALTY: Light and heavy electric traction, water powers and long distance transmissions.  
 Plans and Specifications furnished for Power Plants.  
 572 Bullitt Building, Philadelphia, Pa.

**BLOOD & HALE,**  
**CONSULTING AND DESIGNING ENGINEERS.**  
 Experts on Elevated and Heavy Electric Traction.  
 Complete designs furnished for electrical and mechanical apparatus.  
 Plans and Specifications furnished for power plants.  
 10 Post Office Square, - - - - Boston.



KANSAS CITY, MO.—The Metropolitan Street Railway Company has abolished all passes. Heretofore the company has issued pass-books containing one hundred tickets, new books being given on presentation of stubs of the old book. Employees will ride on punch tickets, instead of the pass-book which they used previous to the new order.

KANSAS CITY, MO.—The question of 4-cent fares is being agitated here. The Mayor wants the company to sell six tickets for 25 cents or twenty-five for \$1.

ST. LOUIS, MO.—The chairman of the City Council committee on railroads has introduced ordinances in the Council to regulate local street railway service. The measures were prepared by the associate City Counselor, under instructions from the Mayor. The first bill establishes a certain district where the speed of cars is limited to 10 miles an hour. In other parts of the city the limit of speed is 15 miles an hour. Intervals between cars in the central district are fixed at three minutes, and in outer territory at four minutes for daylight service, excepting Sundays and holidays. All cars, excepting extras to particular points, must run to the end of the lines, and motormen must stop for all passengers when signaled. The license of \$25 for each car is revoked and a tax of 1 mill on each fare substituted. This will give the city an annual revenue of \$130,000 in lieu of \$21,000 a year heretofore collected. The ordinances also create the office of City Supervisor of Street Car Service and fix the salary at \$1,800. This officer is to see that the companies comply with all the provisions of the new ordinances. The City Comptroller is also empowered to provide temporary inspectors at \$3 per day to assist the Supervisor. The ordinances contain clauses requiring all street cars to be equipped with safety brakes.

POUGHKEEPSIE, N. Y.—Thirty persons were injured in a head-on collision between an open car of the New Paltz & Poughkeepsie Traction Company and a coupled freight and passenger car near Pratt's Mills on May 30.

NEW YORK, N. Y.—John B. McDonald, contractor for the Rapid Transit Tunnel, announced Wednesday, May 28, that the difficulties between the ironworkers, who are members of the Housemiths' and Bridgemen's Union, and the sub-contractors of the Rapid Transit Railroad, had been satisfactorily adjusted at a conference held that day. As a result of this conference all the ironworkers on the Rapid Transit Railroad went to work on Thursday, May 29, under an agreement lasting until May 1, 1903.

PHILADELPHIA, PA.—The Philadelphia Rapid Transit Company, whose lease of the Union Traction property will go into effect July 1, has elected the following directors: For four years, John M. Mack and Michael Murphy; for three years, William L. Elkins and P. A. B. Widener; for two years, J. J. Sullivan and W. H. Shelmerdine; for one year, John B. Parsons and George D. Widener. Mr. Parsons has been elected president; George D. Widener, vice-president; Charles O. Kruger, secretary and treasurer, and John B. Peddie, assistant secretary and treasurer.

PITTSBURGH, PA.—Judge Shafer, in dismissing the bill of Alexander Demster asking that the United Traction Company be restrained from building a line in North Versailles Township over a road along which the plaintiff owns property, holds that townships of the first-class have the same control over their streets as boroughs.

## FINANCIAL NOTES

MONTGOMERY, ALA.—Richard Tillis and W. C. O'Neal are reported to have secured control of the Montgomery Street Railway through the purchase of the interests of J. W. Dimmick, president of the company.

JACKSON, MISS.—N. F. Thompson & Son, of Sheffield, Ala., have closed an agreement with the stockholders of the Jackson Electric Light, Power & Street Railway Company and also with the stockholders of the gas company, for the purchase of both the railway and gas plant. An extension of 5 miles to the railway lines is contemplated, while improvements will be made in the gas plant.

ST. LOUIS, MO.—A mortgage of the property of the St. Louis, St. Charles & Western Railway Company, securing a bond issue of \$600,000, has been filed at Clayton. The bonds are for thirty years, bearing 5 per cent interest, and were issued through the Colonial Trust Company, of St. Louis. The mortgage covers all the property of the company in the county, including the road and roadway franchises, contracts with the St. Louis Transit Company and all buildings and rolling stock. The bond issue was authorized at a meeting of the executive board of the railroad company held at the company's office in Wellston Feb. 4 last. The money is to be used in erecting the highway bridge across the Missouri River at St. Charles, work on which is to be begun as soon as the stage of water will permit. A part is to be used in equipping the road with better facilities for handling the traffic. The bonds are made payable at the office of the Colonial Trust Company March 1, 1932.

BIDDEFORD, MAINE.—The directors of the Biddeford & Saco Railroad Company, in compliance with a stock vote of last fall, have decided to issue 200 new shares of stock, increasing the capital of the company from \$40,000 to \$50,000. The new shares will be offered to present stockholders in amount proportionate to their present holdings.

HAVERHILL, MASS.—Stone & Webster, of Boston, the owners of the Houghton County Street Railway, have purchased the Peninsula Electric Light & Power Company, of Houghton.

DALLAS, TEX.—The North Dallas Circuit Railway, which was purchased at foreclosure sale in January, 1902, by P. S. du Pont, has been transferred to the Dallas Consolidated Electric Street Railway Company.

## Ford, Bacon & Davis, Engineers,

149 BROADWAY, - - - - - NEW YORK.  
Liverpool & London & Globe Building, - - - - - New Orleans, La.  
2104 First Avenue, - - - - - Birmingham, Ala.

## W. S. BARSTOW

Consulting Electrical and Mechanical Engineer  
11 BROADWAY, - NEW YORK

Plans and Supervision of Installation of complete Lighting, Power  
and Railway Plants. Special Reports on Electrical Properties  
TELEPHONE, 4671 BROAD

## JOHN LUNDIE,

Consulting Engineer,

No. 52 BROADWAY, NEW YORK CITY.

W. E. BAKER

H. R. BISHOP, Jr.

W. E. BAKER & CO.  
ENGINEERS

170 BROADWAY

NEW YORK

R. H. PIERCE.

R. E. RICHARDSON.  
Telephone, Harrison 592.

S. G. NEILER.

PIERCE, RICHARDSON & NEILER, Engineers.

1405-1412 Manhattan Building,

CHICAGO, ILL.

FREDERICK SARGENT.

A. D. LUNDY.

SARGENT & LUNDY,  
ENGINEERS

46 East Van Buren St.

CHICAGO, ILL.

E. A. FRINK, M. Am. Soc. C. E., Consulting Engineer  
Designs and Estimates for Steel or Concrete Structures  
Manufacturing Buildings and Electric R. R. Viaducts a specialty  
508 Union Trust Bldg., BALTIMORE, MD. Tel—St Paul, 3117 M

HENRY H. HUMPHREY,  
CONSULTING ELECTRICAL AND MECHANICAL ENGINEER  
SUITE 1305 CHEMICAL BUILDING. ST. LOUIS.

SAMUEL M. GREEN, HOLYOKE, MASS.  
CONSULTING ENGINEER  
Power Plant Construction and Electrical Transmission. Hydraulic Engineering.

A. U. JAASTAD.

P. J. HARLEMAN.

F. E. GREENWOOD.

SHEAFF & JAASTAD, Engineers,

Cushing Building,

85 Water Street,

BOSTON, MASS.

EDWARD H. KITFIELD, MECHANICAL ENGINEER,  
53 STATE STREET, BOSTON  
Electric Lighting and Street Railway Power Stations and Buildings

GEORGE BREED, Consulting Engineer  
Electric Railways Transmission Plants, Buildings and Bridges.  
Examinations and Reports on Railway and Lighting Properties  
Real Estate Trust Building - - - - - PHILADELPHIA



ALBANY, N. Y.—The report of the Metropolitan Street Railway Company for the quarter ended March 31, just made to the State Railroad Commission, shows phenomenal results in operating the system, in that its operating cost was less than half its earnings for the quarter, and with the taxes on all its property used in operating the road and on earnings and capital stock, but 4½ per cent above half the earnings.

	1902	1901
Gross earnings .....	\$3,415,388	\$3,283,208
Operating expenses .....	1,636,805	1,681,403
Other income .....	126,933	203,676
Fixed charges .....	1,171,968	1,128,967
Net income for March quarter.....	733,548	676,513
Net income for three quarters ended March 31.....	2,548,712	2,764,683
Operating cost per cent of earnings.....	47.91	51.21
Operating cost (including all taxes) per cent of earnings	54.55	57.27

The balance sheet, whose total is \$94,417,448, has a profit and loss surplus of \$5,342,451. The capital is \$51,995,200, the funded debt \$21,750,000, the bonds' proceeds to the credit of the Metropolitan Street Railway, lessee of the Third Avenue Railroad, construction cost \$4,304,655, and the bills payable \$9,250,000.

PITTSBURGH, PA.—The Philadelphia Company reports earnings as follows:

	1902	1901
April		
Gross receipts .....	\$1,114,509	\$989,521
Operating expenses .....	615,639	435,418
Earnings from operation .....	\$498,870	\$454,103
Receipts from other sources.....	101,433	29,821
Gross receipts .....	\$600,304	\$483,924
Deductions from income .....	81,940	41,027
Net earnings .....	\$518,363	\$442,896
Fixed charges .....	324,425	264,254
Surplus .....	\$193,938	\$178,641
Gross receipts, four months.....	\$4,650,204	\$4,116,321
Operating expenses .....	2,357,095	2,042,322
Earnings from operation, four months.....	\$2,293,109	\$2,073,999
Receipts from other sources.....	693,737	292,232
Gross receipts .....	\$2,986,846	\$2,366,231
Deductions from income .....	300,657	150,004
Net earnings .....	\$2,686,189	\$2,216,227
Fixed charges .....	1,421,111	1,056,529
Surplus .....	\$1,265,078	\$1,159,698

### AMONG THE MANUFACTURERS

THE ELECTRIC STORAGE BATTERY COMPANY has completed the installation of the storage battery station for the Mahoning Valley Railway Company. It consists of 264 cells and will operate the Youngstown system for one hour.

THE HUNTER ILLUMINATED CAR SIGN COMPANY, of Cincinnati, Ohio, reports that recently it received an order for 520 of its well-known changeable illuminated signs from Pittsburgh, and also orders for 225 signs for the City of Mexico.

THE UNIVERSAL ELECTRIC COMPANY has recently been incorporated under the laws of the State of New Jersey, with a capital of \$10,000. This company will manufacture and place on the market the well-known Shaw non-arching lightning arrester. The offices of this company are at 115 Broadway, New York. H. M. Shaw is president and general manager.

WOODWORKING MACHINERY IN RAILWAY SHOPS.—The mill of the Chicago, Rock Island & Pacific Railroad at Horton, Kansas, which was destroyed by fire about three months ago, has been rebuilt by working on it night and day. The machinery was entirely destroyed, and the S. A. Woods Machine Company are equipping the shop with a full line of its machines.

THE CHICAGO PNEUMATIC TOOL COMPANY, Chicago, has been awarded contracts for three of its large "Franklin" air compressors for the Philadelphia & Reading Railway; two compound air compressors of 2000 cu. ft. capacity for the new car shops of the New York, New Haven & Hartford Railway, at Readville, Massachusetts, and one for the Atchison, Topeka & Santa Fe Railway.

BOOK TYPEWRITERS FOR ABROAD.—The Elliott & Hatch Book Typewriter Company, 256 Broadway, New York City, has within the last few days received contracts for book typewriting machines to be forwarded to Germany for use in the government railway offices, to the Philippines, for the military authorities, and to Mexico for utilization in the various departments of the government of the Southern republic. The company also reports receipt of substantial orders from Canadian sources and from the Illinois Central, the Michigan Central and the Pennsylvania Railroad companies.

## LEMUEL WM. SERRELL, M. E.

Contracting Engineer

Approved securities  
accepted or negotiated.  
Examinations and reports.

Railways, Lighting, Power and  
Transmission Plants.

99 CEDAR STREET, N. Y.

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

## PEPPER & REGISTER, - - General Contractors.

Electric Street Railways a Specialty.

112-116 No. Broad Street, . . . PHILADELPHIA, PA.

## E. SAXTON, STREET RAILWAY CONTRACTOR,

See Page 103.

123 G STREET N. E., Washington, D. C.

## WM. A. CULLEN, - - - General Contractor,

Steam and Street Railways. Electric Track and Overhead Construction  
A Specialty.

828 Broad Street. - - - - NEWARK, N. J.

## W. B. UPTON CO. (Inc.) ENGINEERS

Designing and Contracting

Electric Railways, Power Plants, Car Houses, Repair Shops

Underground Conduit Electric Railways

Plans, Specifications, Estimates and Supervision

WASHINGTON LOAN & TRUST BLDG., - WASHINGTON, D. C.

## CONTRACTOR FOR COMPLETE CONDUIT SYSTEMS

## G. M. GEST

277 Broadway  
New York

Union Trust Bldg.  
Cincinnati, Ohio

## WILLIAM A. ROSENBAUM

Electrical Expert and  
Patent Solicitor

Nassau-Beekman Building,

NEW YORK CITY.

J. WM. MIDDENDORF, Pres. A. H. RUTHERFOORD, Treas.  
R. LANCASTER WILLIAMS Vice-Pres. HOWARD P. PAGE, Sec'y and Auditor  
E. C. HATHAWAY, Gen'l Manager

## Railways and Light Co.

of America

EXECUTIVE OFFICES, CONTINENTAL TRUST BUILDING  
BALTIMORE, MD.

Finances—Builds—Purchases

Electric Railways, Electric Lighting Properties, Water  
Works, Ice Plants, etc.

Examinations made and reports furnished on all classes  
of industrial properties. Correspondence solicited.



THE WHEEL TRUING BRAKE-SHOE COMPANY, Detroit, Mich., has issued a very handsome reminder of the work it did last winter with its well-known remedy for flat wheels and long flanges. The manner in which it is calling the attention of railway managers to its work is by a handsome mailing card containing views of the wheel truing brake-shoe, and in a few statements of what it can do.

THE Q. & C. COMPANY will, after June 1, have its principal offices in the Western Union Building, Chicago, and its New York office in the new Engineering Building, 114-118 Liberty Street. The general sales department will be located at the company's shops at Chicago Heights. The company will operate under its own name and continue to manufacture railway specialties, machinery, pneumatic tools, etc.

AMONG THE RECENT ORDERS secured by the Apex Equipment Company, of New York, is one for a locomotive from Fred T. Ley & Company, of Springfield, Mass., to be used for construction work at Pittsfield, Mass. Several dump cars have also been sold to the Schenectady Railway Company. This firm can supply its customers with anything they want for construction work, as well as all kinds of second-hand equipments.

THE BRAY MANUFACTURING COMPANY, of Newark, N. J., has been incorporated under the laws of the State of New Jersey. This company will take over the business of the old Bray Manufacturing Company and manufacture the well-known "B. B." adjustable lifting jack for street cars, automobiles and carriage purposes. H. M. Shaw is secretary and treasurer of the new company, with offices at 115 Broadway, New York.

THE WALLACE SUPPLY COMPANY, of New York and Chicago, with London offices at 53 Victoria Street, S. W., will have an extensive exhibit in Agricultural Hall at the coming convention in London of the International Street Railway Association. The Wallace Company's space will be in charge of John Baynes, M. I. Mech. E., and the firm will represent the McLaughlin Car Coupler Company, the Cheswick Manufacturing Company and the Hale & Kilburn Company.

THE NIAGARA FALLS ACETYLENE GAS MACHINE COMPANY has recently received some good reports from a number of its acetylene headlights which were sent out for trial some months ago. Captain R. H. Carter, the inventor of this headlight, states that he is willing to guarantee these lights to run absolutely without attention under all conditions of weather and service. He is willing to take the failure of all other acetylene headlight experimenters on his shoulders and demonstrate that he has a light which works.

THE HAM SAND BOX COMPANY, of Troy, N. Y., has recently shipped a large order of sand boxes to the Brooklyn Rapid Transit Company. This makes a total of 2060 Ham sand boxes now in use on this system. Among other large users of Ham sand boxes are the Cleveland City Railway, where 1168 are in use, and the Glasgow Corporation Tramways, Glasgow, Scotland, where a total of 1804 are in service. The Electric Tramway & Carriage Works, of Preston, England, has placed in service a total of 5100 Ham sand boxes. Besides these large users, the Ham sand box is to be found on nearly every electric railway in this country, as well as abroad.

THE BROWN CAR WHEEL WORKS, of Buffalo, N. Y., are making extensive preparations to enter the street railway field. Their long experience in the manufacture of wheels for steam railroad service will be of inestimable advantage to them, as electric street railways are fast approaching the standard of steam roads in their equipment. The modern interurban car requires car bodies, trucks and wheels as heavy as that in use on many steam roads. These facts have recently set many manufacturers who have been doing business exclusively with steam roads to thinking of the immense possibilities there are in the electric railway field for the extension and increase of their business.

THE HUNTER AUTOMATIC FENDER COMPANY, of Cincinnati, Ohio, has been awarded the contract for equipping the cars of the St. Louis Transit Company and the St. Louis & Suburban Railway Company, of St. Louis, Mo., with 2686 fenders. The City Council of St. Louis recently appointed a committee to investigate the various types of fenders in use in that city, and to report upon some improvement in the safety devices formerly in use. The Hunter Automatic Fender Company exhibited its fenders in operation, picking up dummies from the track and being thoroughly tested as to its efficiency and durability. The approval of the committee has resulted in the order above mentioned.

WALTER A. ZELNICKER, of St. Louis, is manufacturing a line of brooms that is particularly adapted to cleaning street railway tracks. These brooms are made from special Japanese fibre and rattan, and are constructed in such a compact manner that they are practically indestructible in ordinary service. They are much stronger and better than the average broom placed on the market, and, as they are impervious to water and will not curl up and get lop-sided, they have been adopted by many street railway companies, and are now extensively used throughout the country. The handle of the broom, if so desired, may be fitted with a forged steel chisel to enable the track cleaner to clear out the dirt which collects at switches and frogs.

THE RAILWAY & ELECTRICAL SUPPLY COMPANY has been incorporated under the laws of the State of New York, with a capital stock of \$50,000. This company will take over the stock, orders on hand, good will and business of E. M. Shaw & Company. The directors of the new company are: H. M. Shaw, Edward E. Shaw, George C. Moon, Hon. William J. Patterson and Joseph M. Cronly. H. M. Shaw will be president and general manager of the new company. Extensive and pleasant offices have been fitted up in the same building in which the old company was located,

## J. G. WHITE & COMPANY

INCORPORATED,

**Engineers, Contractors,**

**29 BROADWAY, NEW YORK, N. Y.**

LONDON CORRESPONDENT:

**J. G. White & Company, Limited**  
22a College Hill, Cannon St.

## SANDERSON & PORTER

ENGINEERS AND  
CONTRACTORS

ELECTRIC RAILWAYS,  
LIGHT, POWER AND  
HYDRAULIC PLANTS.

31 NASSAU STREET  
NEW YORK

GEO. WESTON

CHAS. V. WESTON  
Mem. A. Soc. C. E.

## WESTON BROTHERS

Consulting and Contracting  
..Engineers..

Steam, Electric and Elevated  
Railways, Bridges,  
Buildings, Foundations, etc.

Examinations and Reports  
on  
Railways and other Properties

Surveys, Estimates, Plans and Specifications.

711 MERCHANTS LOAN & TRUST BLDG.

Telephone, Central 90

CHICAGO, ILL.

## ARNOLD ELECTRIC POWER STATION CO.

Engineers, Contractors,

Designers and Builders of Electric Railways,  
Power Plants and Complete Electric Systems.

✻ ✻ ✻

Transit Bldg., New York.

Suite 1539 Marquette Bldg., Chicago.



115 Broadway, New York. The new company will handle a full line of street railway, lighting and telephone supplies. Many of the specialties handled by this concern are manufactured by the company itself.

C. J. HARRINGTON, New York, has received a contract for 250,000 ft. of conduit to be shipped to Seattle for Stone & Webster, Boston, Mass. This is a heavy order, and there are other large contracts in view. This firm, which has but recently taken up the management of the sales for the Scranton Fire Brick & Conduit Company, Scranton, Pa., is doing an unusually large business in this line, and the indications are that it will be one of the largest dealers in conduit in the country. The inquiries have come in so fast that it has been almost impossible to give them the proper attention, but the concern is now ready to furnish conduit very promptly and at low prices. The conduit, it is reported, has been tested by one of the most expert electrical engineers in New York, and pronounced to be of the best quality that he ever saw.

THE LE VALLEY VITAE CARBON BRUSH COMPANY, of New York, is now shipping its well-known carbon brushes in large quantities to all parts of the world. If a customer once uses these brushes duplicate orders are almost invariably received. The firm's customers include street railway companies, the large motor and manufacturing plants, central stations and isolated plants. In case of the electrical manufacturing concerns brushes are bought by them direct and furnished with their dynamos and motors to the users of electrical machinery. Testimonial letters are daily received expressing great satisfaction by users of the Le Valley Vitae brushes. The points of advantage claimed by this company for its brushes are: Absolutely no sparking; never cut the commutator; very long life, commutators last much longer with these brushes; perfect lubrication, and high conductivity.

THE OLD THIRD AVENUE EQUIPMENT, which is now being replaced by the standard equipment of the Metropolitan Street Railway Company, New York, is fast being sold. Giles S. Allison, who has charge of the sales of the entire equipment, reports that there is no trouble to sell the cars, but it is a different thing to get them delivered. Most of the railroads entering Greater New York have all the business they can attend to, and when flat cars are wanted they take their time in furnishing them. This occasions unavoidable delays. Mr. Allison is doing all in his power, however, to give prompt deliveries, and asks his customers to be patient. Complaining the other day in his droll way at the importunities of the purchasers, he remarked: "As soon as a car is sold the customer expects me to pick it up on my back and put on my seven league-boots and start cross country to deliver it."

THE TAYLOR ELECTRIC TRUCK COMPANY, Troy, N. Y., reports among the recent orders shipped from its works the following: Ten single trucks and four sets of double trucks, to the Binghamton Railroad Company, Binghamton, N. Y.; twenty-four sets of double trucks to New Orleans City Railroad Company, New Orleans, La., especially constructed for 5-ft. 2½-in. gage; fourteen sets of double trucks to Lexington & Boston Street Railway Company, Boston, Mass.; eight single trucks, to Augusta, Hallowell & Gardiner Railroad Company, Augusta, Maine; ten sets of double trucks, to the Des Moines City Railway Company, Des Moines Ia. A number of double and single trucks have also been shipped to the Ottawa Electric Railway Company, Ottawa, Ont. The Taylor Electric Truck Company is now able to turn out easily thirty trucks a week, and with its extensive facilities this amount can be increased considerably when special orders are received.

WESTINGHOUSE MOTORS UNDER HARD SERVICE CONDITIONS.—The Boston & Montana Consolidated Copper & Silver Mining Company is making considerable additions to the electrical equipment of its smelters and refineries at Great Falls, Mont., having recently purchased eleven 15-hp and three 40-hp Westinghouse 500-volt, shunt-wound, direct-current motors. About four years ago this company installed a number of Westinghouse 180-volt electrolytic generators and at the same time put in a large number of Westinghouse and other motors for driving ventilating fans and other machinery about the smelters. Although the filters are filled with sulphur dust and are extremely dirty, the Westinghouse motors have given excellent satisfaction, while others have burned out repeatedly. The Boston & Montana Company states that the commutators of the Westinghouse motors are the only ones which are sufficiently insulated between bars to prevent bad grounds.

THE IDEAL TROLLEY WHEEL manufactured by the Lumen Bearing Company, of Buffalo, N. Y., is meeting with successful sales all over the country. This wheel is constructed on mathematical lines, embodying a maximum of strength and a minimum of weight. The flanges are made of dead soft, cold rolled and pickled steel, strong enough to resist any usage to which a trolley wheel may be subjected, yet the metal is not hard enough to injure the trolley wire. The contact rings are made of pure lake copper, cast and hammered, having the highest conductivity. This is an important factor in the mileage which the wheel gives. The flanges and contact ring are securely held together by Lumen bronze. The bronze is cast around the flanges, forming the strongest possible construction for a composite trolley wheel. The Ideal trolley wheel is equipped with graphite bushings, and is adapted to fit the standard harp. The Lumen Bearing Company is also doing a splendid business in its chief products, Lumen truck bearings, Alpha check plates, Lotus lining metal and Lumen motor bearings.

THE CHASE-SHAWMUT COMPANY, Boston, reports a large demand for its flexible rail-bonds, which has necessitated an extension of its factory to accommodate the orders now in hand. The high efficiency and economy of this bond have never been questioned, the only adverse criticism, on the part of some, being based on a theory that a copper bond soldered to a rail would not maintain good and enduring contact. Practical experience, how-

**CIVIL, MECHANICAL and ELECTRICAL  
ENGINEERS and  
GENERAL CONTRACTORS**

For the complete design, construction and equipment of  
**ELECTRIC RAILWAYS**

Special attention given to  
**INTERURBAN RAILWAY PROJECTS.**

Securities Accepted and Negotiated. Examinations, Reports, Estimates, Plans, Specifications and Supervision,

**ELECTRICAL INSTALLATION CO.**  
INCORPORATED 1893. Monadnock Bldg., CHICAGO.

**JOHN BLAIR MACAFEE**

Harrison Building, Market and 15th Sts.  
PHILADELPHIA, PA.

**Building and Equipment  
of Electric Railways.**



**Installation of Electric  
Light and Power Plants.**

H. S. COOPER  
President.

B. Y. FROST,  
Vice-President

W. S. GURNEE, 3RD  
Sec'y & Treas.

**The Electrical Engineering  
and Development Company**

ADVISORY, CONSTRUCTING, RECONSTRUCTING,  
SUPERVISING AND OPERATING  
ENGINEERING

Electric Railways, Lighting and Power Plants

29 BROADWAY.

NEW YORK

ESTABLISHED 1893

**FRED. T. LEY & CO.**  
**...CONTRACTORS...**

Phoenix Building

SPRINGFIELD, MASS.



Electric Railways Built and Financed  
Franchises Purchased



ever, covering a period of several years, has proved conclusively that the methods employed by the Chase-Shawmut Company in soldering its bonds to the rails insures a perfect and enduring contact, which would seem to be limited only by the life of the rails. Recent tests have been made of bonds put on several years ago which show them to be in rigid contact with the rails, with no deterioration or loss in conductivity. The electrical engineers, who appreciate the far-reaching economic importance of efficient rail-bonding, have not been slow to discover the merits of the Chase-Shawmut bond as shown by the rapidly increasing orders which the company is receiving for many of the best constructed electric railways in the country.

NEEMES BROTHERS, of Troy, N. Y., report the following installations of their well-known grate bars in street railway power houses: Thirteen sets for the Coney Island & Brooklyn Railroad Company, Brooklyn, N. Y.; six sets, Denver City Tramway Company, Denver, Col.; thirteen sets, Syracuse Rapid Transit Railway Company, Syracuse, N. Y.; four sets, Marion Street Railway Company, Marion, Ohio; one set, Connecticut Railway & Lighting Company, Waterbury, Conn.; three sets, Scranton Railway Company, Scranton, Pa.; three sets, Elmira Water, Light & Railroad Company, Elmira, N. Y.; two sets, Pittsfield Electric Street Railroad Company, Pittsfield, Mass. Besides these, hundreds of installations have been made in other industries using steam power. The special advantage of the Neemes patent grates are their extreme simplicity and durability. They are ready to dump and clean and retain the fuel until it is entirely consumed without letting small particles of coal through before it is burned to ashes.

THE DOBBIE FOUNDRY & MACHINE COMPANY, of Niagara Falls, N. Y., has recently made arrangement with the Allston Foundry Company, of Boston, Mass., to manufacture and sell the "Compo" brake-shoe in a specified territory. This territory includes New York State east as far as Syracuse, and the western part of Pennsylvania, exclusive of the Pittsburgh district. This territory is about as extensive a field as it is profitable for one foundry to handle brake-shoes in, and it includes a very fertile field. When the through roads between Buffalo and Syracuse which are now building are placed in operation the territory allotted to this company will operate as many trolley cars as any section of equal area in the country. The Dobbie Foundry & Machine Company has splendid facilities for turning out this kind of work expeditiously. The plant, covering considerably over an acre of floor space, is equipped with all the modern appliances known to the best foundry practice. This fact, together with the well-known qualities of the "Compo" brake-shoe, ought to secure for the company a considerable portion of the brake-shoe business in the company's district.

THE NIAGARA CAR WHEEL WORKS RESUME.—When the Niagara Car Wheel Works sold out its business to the American Car & Foundry Company, at the organization of the latter, they reserved the right of entering into the manufacture of car wheels independently should they so desire. Subsequently they leased the old Lake Shore Railroad shops at the corner of Larkin and Scott Streets, in Buffalo, and again launched into business for themselves. This plant is peculiarly well adapted for foundry purposes, having large floor space, giving plenty of room for molds and blast furnaces. Shipping and receiving facilities are unexampled, as the foundry is within easy and immediate reach of almost every railroad entering Buffalo. A large number of the employees of the old concern have gone over to the new company. Among them are the most skilled and experienced foundry men in the country. Although it was the intention of the company to supply car wheels for steam road service only, within the past six months they have done considerable work for electric railways. They have now determined to push extensively for electric railway business, and are prepared to bid for contracts for supplying entire systems.

THE NEW STERLING REGISTER.—This machine, which will be known as the "Sterling No. 5," resembles in external appearance the old standard Meaker register, of which many thousands are in service. In form and size it is nearly the same, being about 9 ins. square, and, another good feature, the inch-long figures in both trip and totalizer, easily readable from all parts of the largest car, are wisely retained. But the interior mechanism embodies so many improvements as to be almost a new creation. Every element in fare recording necessities has been subjected to new and careful study, and all needless machinery has been eliminated. Complexity and multitude of parts have thus been avoided. Ingenuity, guided by the light of register experience, has been sought to simplify and strengthen, to secure absolute accuracy in all parts and such a perfect adjustment as to prevent wear and insure smoothness of operation. A new back has been made for this register, with a self-locking device. The No. 5 has been tested on a number of roads, which have promptly placed orders for it. United States and foreign patents have been applied for. The Sterling-Meaker Company, Newark, N. J., is the manufacturer, and will supply further information on request.

FRED M. LOCKE, of Victor, N. Y., has recently turned his business into a stock corporation capitalized at \$100,000. The new plant recently erected, machinery, stock on hand, real estate, patents, bank account and all assets have been turned over to the new company. Mr. Locke will be president of the new company, and, at the request of the new stockholders, will control a majority of the stock. It is the intention of Mr. Locke to make the new company a co-operative one. Stock will be sold at par to all the employees of the company who show a disposition and a tendency to take an interest in the welfare and success of the business. Mr. Locke believes that if his employees are treated fairly better service, better results and consequently bigger dividends can be paid. The new plan will also relieve Mr. Locke of the immense responsibility he has had on his shoulders for the past ten years and give him more time for original investigation in the field of high potential insulation. It is the intention of the new company to double the

## KOHLER BROTHERS,

Engineers and Contractors  
for Complete Steam and  
Electric Railways. ❁ ❁

Write us when contemplating the building of new lines, or improvements to existing properties.

1804-1806-1808-1810-1812

Fisher Building,  
Chicago, Ill.

## COLUMBIA CONSTRUCTION CO.

INCORPORATED

Engineers and  
General Contractors

### ELECTRIC RAILWAYS

REPORTS ON PROPERTIES

WESTERN and SOUTHWESTERN BUSINESS A SPECIALTY

PRINCIPAL OFFICE

Colby and Abbott Bldg. - MILWAUKEE, WIS.

## TOWNSEND, REED & CO.,

(INCORPORATED.)

### Engineers and Contractors

For Steam and Electric Railways.

Roads Built and Financed.

CHICAGO, = = = = ILLINOIS

INDIANAPOLIS, = = = INDIANA

## The Practical Electric Railway Hand Book

By ALBERT B. HERRICK

An exceedingly valuable compilation of engineering facts, figures and dimensions which are directly applicable in the construction, testing and operation of electric railway systems. Three Dollars per copy, postpaid.

STREET RAILWAY JOURNAL  
114 LIBERTY STREET, NEW YORK



capacity of the plant during the summer. Land adjacent to the present plant has already been purchased, and plans are being drawn for the building of the new extension. The capacity of the present plant is 30,000 insulators per day. In doubling the capacity the new company will be able to keep a large stock on hand for immediate shipments. Heretofore enough orders have always been on hand to more than keep the plant in constant operation.

THE CONSOLIDATED ENGINE STOP COMPANY, of New York, has made arrangements with Drake & Gorham, Ltd., 66 Victoria Street, London, England, to represent it in England. To show the importance which prominent railway engineers attach to the Monarch engine-stop and speed-limit system it may be interesting to note the following installations where this system is in use: Terre Haute Street Railway Company, Terre Haute, Ind.; Chippewa Valley Electric Railway Company, Chippewa Falls, Wis.; Charleston Consolidated Railway, Gas & Electric Company, Charleston, S. C.; Union Traction Company, Philadelphia, Pa.; Dayton, Springfield & Urbana Street Railway Company, Medway, Ohio; Providence & Danielson Street Railway Company, Providence, R. I.; Union Railway Company, New York, N. Y.; Troy City Railway Company, Troy, N. Y.; Albany Street Railway Company, Albany, N. Y.; Lynn & Boston Street Railway Company, Lynn, Mass.; Brockton Street Railway Company, Brockton, Quincy, Montello, Taunton, Mass.; Brockton & Plymouth Street Railway Company, Plymouth, Mass.; Boston & Northern Street Railway Company, Lawrence, Mass.; Boston Elevated Railway Company, Boston, Mass.; Blue Hill Street Railway Company, Canton, Ohio; Los Angeles Railway Company, Los Angeles, Cal.; Denver Tramway Company, Denver, Col.; West Jersey & Seashore Electric Railway Company, Atlantic City, N. J.; Houghton County Street Railway Company, Hancock, Mich.; Templeton Street Railway Company, East Templeton, Mass.; Springfield & Eastern Street Railway Company, Palmer, Mass.; South Middlesex Street Railway Company, South Framingham, Mass.; Lowell & Suburban Street Railway Company, Lowell, Mass.

THE AMERICAN CAR SEAT COMPANY, of Brooklyn, N. Y., is preparing to erect an extensive plant there. Within the past two years the business of this concern has increased to such an extent that the present factory has been found entirely inadequate. The new plant will occupy an entire city block. It will be equipped with the best machinery that is at present known to the art for the manufacture of rattan seating. By years of experience and a thorough knowledge of this line of work this company has designed, patented and manufactured several special machines for its own use. Most of these machines are labor-saving devices which not only lessen the cost of production, but turn out better, stronger and more uniform goods than could possibly be produced by any other means. The new plant will have several times the capacity of the old. The company will then be able to take care of the domestic as well as the foreign trade, the export business of the firm expanding yearly. It has established agencies and has representatives in almost every country in Europe and the Far East, and will have an extensive exhibit in London at the coming street railway convention there in the latter part of June and first of July. The British Electric Car Company is the company's representative in England, and will have charge of this exhibit at the Agricultural Hall. This company manufactures seating in all its forms, from sheets in any width, length or size to the finished seats for longitudinal or cross-seat cars. Only uniformly strong and substantial rattan is used. After the rattan is woven it is lined with thick canvass, thus making the finished product practically indestructible so far as wear and service is concerned. From the close business connection with the American Rattan & Reed Manufacturing Company, one of the largest dealers in raw rattan in the country, the American Car Seat Company secures its raw product at the lowest prices possible. This fact, together with a new plant, the best modern machinery and labor-saving devices mentioned above, will enable it to produce seating for electric railway service at the minimum cost and maximum strength, durability and service.


W. E. BAKER & COMPANY.—The following announcement has been sent out to those interested in financial and other ways with lighting and railway properties: "We take pleasure in announcing that we have formed a copartnership, under the firm name of W. E. Baker & Company, 170 Broadway, N. Y., for the purpose of carrying on a general engineering business. We are prepared to furnish plans and specifications for power plants, for electric lighting plants, for the complete equipment of electric railways and to superintend their construction. We are prepared to contract for the construction of complete plants. We are prepared to report on projected properties and on existing properties, and to suggest and design improvements. We will undertake the periodical examination of operating reports of electric railways and suggest methods for increasing the net earnings. We have special information and facilities for designing equipments for interurban third-rail electric railroads and the equipment of existing steam railroads or branches with the third-rail electric system. We are prepared to accept or negotiate approved securities. Mr. Baker has had a railroad experience extending over a period of twenty-five years. Graduating from Lafayette College in 1877, he was for some years connected with the early surveys of the Northwestern transcontinental roads, and was for several years chief engineer of the International & Great Northern Railroad, of Texas. He had charge of the original installation of electricity on the West End Street Railroad, of Boston, now the Boston Elevated, the Intramural Railway at the World's Fair in 1893 (the first electric railway to use the third rail), and the Metropolitan West Side Elevated Railway, of Chicago, the first permanent heavy electric railroad, and has lately completed designs for the electrical equipment of the Manhattan Railway, of New York. Mr. Bishop graduated from Harvard in 1891, and has been connected with the General Electric Company in the commercial and executive departments for a number of years, both at its works in Schenectady and at its New York and Boston offices. If you are interested in any work we are prepared to undertake we trust we may be of service to you." The announcement is signed by the two members of the firm, W. E. Baker and H. R. Bishop, Jr.

**COAT YOUR WIRE ROPES**  
WITH  
**IRONSIDES WIRE ROPE SHIELD**  
WATERPROOF  
ROPE AND GEAR LUBRICANTS  
IRONSIDES MANILA ROPES. PAINTS  
Get Catalogue "Z."




**THE IRONSIDES COMPANY, Columbus, Ohio, U. S. A.**

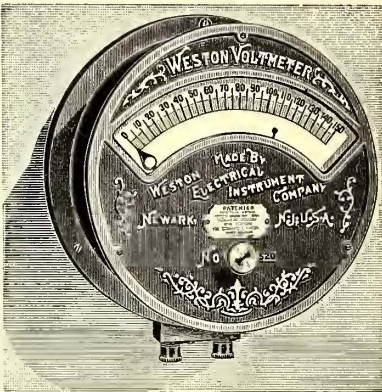
**Recording Volt, Ampere and Watt Meters.**  
Make Continuous Record Day and Night. Send for Catalogue.  
Recording Pressure Gauges. Recording Thermometers.  
Every Instrument Fully Guaranteed.  
**SILVER MEDAL PARIS EXPOSITION.**  
**THE BRISTOL CO., Waterbury, Conn.**



**WESTON**  
"ROUND PATTERN"  
**Voltmeter Type F.**

A cheap but excellent Switch-board Instrument for Direct Current Circuits.  
Particularly suited for Isolated Plants and Feeder Circuits in Railway and Power Plants.  
Voltmeters in ranges from 3 to 750 volts. Ammeters in ranges from 1 to 2,500 amp.  
All Weston Instruments are unsurpassed in excellence of workmanship, in accuracy and economy of operation.

**Weston Electrical Instrument Co.,**  
Waverly Park, Newark, N. J.  
BERLIN—European Weston Electrical Instrument Co., Ritterstrasse, No. 88  
LONDON—Elliott Bros., 101 St. Martin's Lane.  
PARIS, FRANCE—E. H. Cadot, 12 Rue St. Georges.



**THE ONLY RELIABLE STREET CAR PUSH-BUTTON**  
MADE



A new design, easily seen, cannot get out of order, cannot be stolen from the car.  
Positive contact.

**HUBBARD, HALL & CO.**  
Manufacturers' Agents and Jobbers of  
**Electrical Supplies**  
213 West Fourth St., CINCINNATI, O.



# THE PUBLISHERS' PAGE



A few  
words to  
our readers  
regarding  
the Street  
Railway  
Journal's  
Advertising  
Department



## Advertisements as News

In the "Publishers' Page" last month, especial attention was called to the value of the STREET RAILWAY JOURNAL'S *Advertising Department* as the standard *buyers' directory* of the electric railway and tramway industry. A few words regarding the *news* value of these pages may now be of interest.

Improved apparatus and appliances of interest to every enterprising street railway official and engineer are constantly being placed on the market. The manufacturers know that the STREET RAILWAY JOURNAL is the medium through which they can best talk to their possible customers. In fact, it is almost literally true that *every* new device which is worth the serious consideration of our readers is brought to their attention through the Journal's advertising columns.

Many of our regular advertisers present new matter every issue, and this, coupled with the constant accession of new announcements, makes the advertising pages not only valuable, but *interesting* as well. In the present issue, for example, there are nearly 100 advertisements which differ, in matter or form, from any which have heretofore appeared in this or any other publication.

No company can reach its maximum earning power whose equipment is not that which—cost and value considered—is best adapted to local conditions and requirements. To purchase wisely, a knowledge is necessary, not only of the various types of apparatus on the market, but also of the arguments presented by manufacturers for the superiority of their products. This knowledge can best be obtained from the advertising pages of the STREET RAILWAY JOURNAL. It is believed that a careful perusal of every issue will contribute, in no small measure, to economical construction and successful operation.



# Directory of Street Railway Associations

## American Street Railway Association.

President, H. H. VREELAND, New York.  
 First Vice-President, C. W. WASON, Cleveland, O.  
 Second Vice-President, E. C. FOSTER, Boston, Mass.  
 Third Vice-President, H. M. SLOAN, Chicago, Ill.  
 Secretary and Treasurer, T. C. PENINGTON, 2020 State St., Chicago, Ill.  
 Executive Committee: President, Vice-Presidents and WALTON H. HOLMES, Kansas City, Mo.; JOHN A. RIGG, Reading, Pa.; D. B. DYER, Augusta, Ga.; T. J. NICOLL, Rochester, N. Y.; G. W. DICKINSON, Seattle, Wash.  
 Chairman Committee on Exhibits, JOHN H. FRY, 12 Woodward Ave., Detroit, Mich.  
 Next meeting, Detroit, Mich., October 8, 9 and 10, 1902.

## Street Railway Accountants' Association of America.

President, H. C. MACKAY, Milwaukee, Wis.  
 First Vice-President, C. L. S. TINGLEY, Philadelphia, Pa.  
 Second Vice-President, W. B. LONGYEAR, Brooklyn, N. Y.  
 Third Vice-President, S. C. COOPER, Cincinnati, O.  
 Secretary and Treasurer, W. B. BROCKWAY, New Orleans, La.  
 Executive Committee: W. F. HAM, Washington, D. C.; F. L. HENRY, St. Louis, Mo.; IRWIN FULLERTON, Detroit, Mich.; D. D. BARTLETT, Boston, Mass.  
 Next meeting, Detroit, Mich., Oct., 1902.

## The California Street Railway Association.

President, CHAS. F. CROCKER, San Francisco.  
 Vice-President, S. B. MCLENEGAN, San Francisco.  
 Secretary and Treasurer, J. E. MORRIS, Oakland.  
 Executive Committee: E. P. VINING, San Francisco; F. W. WOOD, Los Angeles; L. WHEELER, Alameda.

## Connecticut State Street Railway Association.

President, H. S. PARMELEE, New Haven.  
 Vice-President, A. M. YOUNG, Waterbury.  
 Secretary, A. E. POND, New Haven.  
 Treasurer, E. S. GOODRICH, Hartford.  
 Executive Committee: The above officers and A. M. YOUNG, Waterbury; C. S. TREADWAY, Bristol; E. H. MATHUR, New Britain.  
 Next annual meeting, November, 1902.

## The Maine Street Railway Association.

President, W. R. WOOD, Portland.  
 Secretary and Treasurer, E. A. NEWMAN, 471 Congress St., Portland.  
 Executive Committee: WILLIAM R. WOOD, Portland; AMOS F. GERALD, Waterville; J. MANCHESTER HAINES, Augusta; G. E. MACOMBER, Rockland.

## Massachusetts Street Railway Association.

President, ELWIN C. FOSTER, Lynn.  
 First Vice-President, EDWARD P. SHAW, Newburyport.  
 Second Vice-President, FRANCIS H. DEWEY, Worcester.  
 Secretary, CHARLES S. CLARK, 70 Kilby St., Boston.  
 Treasurer, FRED H. SMITH, Quincy.  
 Executive Committee: President, Vice-Presidents and JOHN R. GRAHAM, Quincy; P. F. SULLIVAN, Lowell; H. H. CRAPO, New Bedford; WILLIAM S. LOOMIS, Holyoke; ROBERT S. GOFF, Fall River, and W. W. SARGENT, Fitchburg.  
 Auditing Committee: HORACE B. PARKER, Newton; GEO. W. COOK, Springfield.  
 Monthly meetings second Wednesday of each month excepting July and August.  
 Next annual meeting Sept. 10, 1902.

## Michigan Interurban and Street Railway Association.

President, J. D. HAWKS, Detroit.  
 Vice-President, W. L. JENKS, Port Huron.  
 Secretary and Treasurer, BENJAMIN S. HANCHETT, Jr., Grand Rapids.  
 Executive Committee: Officers of the Association and STRATHEARN HENDRIE and JOHN WINTER, Detroit.  
 Next meeting to be held subject to call of president.

## New England Street Railway Club.

President, EDWARD C. SPRING, Newtonville, Mass.  
 Vice-President, E. E. POTTER, New Bedford, Mass.  
 Vice-Presidents for States, C. A. BODWELL, Sanford, Me.; H. A. ALBIN, Concord, N. H.; A. J. CROSBY, Springfield, Vt.; W. D. WRIGHT, Providence, R. I.; J. S. THORNTON, Putnam, Conn.  
 Secretary and Treasurer, J. H. NEAL, of the Boston Elevated Railway Company, 101 Milk St., Boston, Mass.  
 Executive Committee: President, Vice-Presidents, Secretary and Treasurer and H. E. FARRINGTON, Chelsea, Mass.; E. J. RAUCH, Brockton, Mass.; A. J. PURINGTON, Palmer, Mass.; W. F. ELLIS, Boston, Mass.; F. J. STONE, Boston, Mass.  
 Finance Committee: J. F. WATTLES, Boston, Mass.; W. PESTELL, Worcester, Mass.; PAUL WINSOR, Boston, Mass.  
 Meetings are held the last Thursday of every month at various points in New England.

## New York State Street Railway Association.

President, G. TRACY ROGERS, Binghamton.  
 First Vice-President, E. G. CONNETTE, Syracuse.  
 Second Vice-President, A. B. COLVIN, Glens Falls.  
 Secretary and Treasurer, H. A. ROBINSON, 621 Broadway, New York.  
 Executive Committee: G. TRACY ROGERS, Binghamton; T. J. NICHOLL, Rochester; W. CARYLY, Buffalo; H. H. VREELAND, New York; J. L. GREATSINGER, Brooklyn.  
 Next meeting at Caldwell (Lake George), N. Y., September 9 and 10, 1902.

## Ohio Street Railway Association.

President, S. L. NELSON, Springfield.  
 Vice-President, JOHN F. FLOOD, Steubenville.  
 Secretary and Treasurer, CHAS. CURRIE, Akron.  
 Executive Committee: A. A. ANDERSON, Youngstown; W. A. LYNCH, Canton.  
 Next annual meeting, June, 1902.

## Pennsylvania State Street Railway Association.

President, JOHN A. RIGG, Philadelphia.  
 First Vice-President, E. H. DAVIS, Williamsport.  
 Second Vice-President, A. L. JOHNSON, Allentown.  
 Secretary, S. P. LIGHT, Lebanon.  
 Treasurer, W. H. LANIUS, York.  
 Executive Committee: The President, Secretary, Treasurer and B. F. MEYERS, Harrisburg; WILLIAM B. GIVEN, Lancaster.

## South Western Gas, Electric and Street Railway Association.

President, H. F. MACGREGOR, Houston, Tex.  
 First Vice-President, E. H. JENKINS, San Antonio, Tex.  
 Second Vice-President, C. F. YEAGER, Laredo, Tex.  
 Third Vice-President, JOHN R. CULLINANE, Denison, Tex.  
 Secretary, T. H. STUART, Waco, Tex.  
 Treasurer, THOMAS D. MILLER, Dallas, Tex.  
 Directors: The above and J. F. STRICKLAND, Waxahachie, Tex.; E. DYSTREUD, Monterey, Mexico; J. B. WARD, Beaumont, Tex.; F. R. STARR, Gonzales, Tex.; A. E. JUDGE, Tyler, Tex.; R. B. BAER, Galveston, Tex.

## Tennessee-Street Railway Association.

President, C. C. HOWELL, Knoxville.  
 Vice-President, E. J. JONES, Memphis.

## Toronto, Canada, Roadmasters' Association.

President, E. WHITAKER, Toronto.  
 Vice-President, GEORGE A. GREENE, Toronto.  
 Secretary and Treasurer, JOHN F. ARGUE, Room 52, James Building, King and Young Sts., Toronto.  
 Executive Committee: F. M. BLIGHT, D. KEARNEY and LOUIS WHEELER.  
 Executive Committee meets the first of each month.

## Virginia Street Railway and Electric Association.

President, R. D. APPERSON, Lynchburg.  
 Vice-President, E. R. WILLIAMS, Richmond.  
 Executive Committee: The above and R. L. WILLIAMS, Norfolk, and E. L. TRAFFORD.

## Union Internationale Permanente de Tramways (Brussels).

President, LEON JANSSEN, Gen. Mgr. Société des Tramways Bruxellois, 6, Impasse du Parc, Brussels.  
 Vice-President, JOHANNES RÖHL, Mgr. Strassenbahngesellschaft of Hamburg.  
 Secretary, M. T'SERSTEVENS, 6, Impasse du Parc, Brussels.  
 Treasurer, F. NONNENBERG, Chief Engineer of the Compagnie des Chemins de fer Secondaires, Brussels.  
 Executive Committee: Officers and Messrs. BROCA, Paris; GERON, Cologne; KESSELS, Brussels; KÖHLER, Berlin; LAVALARD, Paris; ZIFFER, Vienna.  
 Next meeting, London, July 1 to 4, 1902.

## Freie Vereinigung der Strassenbahn-Betriebsleiter Rheinlands, Westfalens und der Benachbarten Bezirke (Germany).

## Tramways and Light Railway Association (London, England).

President, SIR CHARLES RIVERS WILSON, G. C. M. G., C. B., Dashwood House, London, E. C.  
 Vice-President, L. A. ATHERLEY JONES, K. C., M. P., 4 Paper Buildings Temple, London.  
 Secretary, ERNEST BENEDICT, M. Inst. C. E.; Clun House, Surrey Street, Strand, London, W. C.

## Verein Deutscher Strassenbahn und Kleinbahn-Verwaltungen (Hamburg).

President, JOHANNES KOHL, Mgr. Strassenbahngesellschaft, of Hanover.  
 Secretary and Treasurer, HEINRICH VELLGUTH, Hamburg.  
 Next meeting at Düsseldorf, September, 1902.

## Verein für die Förderung des Local- und Strassenbahnwesens (Vienna, Austria).

(Office, I Elizabethstrasse 2.)  
 President, E. A. ZIFFER, Vienna.  
 Vice-President, W. HALLAMA, Vienna.  
 Treasurer, J. M. WOLFFBAUER, Vienna.  
 Secretary, DR. ISADOR BING, Vienna.  
 Executive Committee: S. VON HAHN, A. MAYER, C. SCHLENK, R. VON T. STUMMER, N. MESSING, Vienna.  
 Association holds two meetings each month from October to May, inclusive.

**The MULFORD & PETRY COMPANY**  
**Street Car Advertising Contractors**

Will be pleased to submit their proposition for advertising space in cars of electric roads.  
 Eastern Offices, St. Paul Bldg., NEW YORK.  
 Executive " Puritan Bldg., DETROIT.  
 Also offices at Chicago, Indianapolis, Toledo, etc.

**MOTOR BEARINGS For Electric Cars**

We have patterns for every style in use in this country to-day, thus insuring prompt deliveries. Send for our quotations

**BRADY BRASS COMPANY**

200-208 Tenth Street, JERSEY CITY, N. J.

BRASS CASTINGS, JOURNAL BEARINGS, TROLLEY WHEELS, BABBITT METALS AND SOLDER

**Drummond's Detective Agency**  
 RAILWAY WORK A SPECIALTY

A. L. DRUMMOND, General Manager,  
 Ex-Chief U. S. Secret Service  
 Park Row and Ann St., New York





# E. SAXTON Street Railway Contractor

WASHINGTON, D. C.

BUILDER OF

Cable Railways  
Conduit Electric Railways  
Trolley Lines  
City and Suburban

Office: 123 G Street Northeast

Long Distance Telephone,  
Main 1040, Washington.



READY TO LOAD

LOADED

DUMPING

DUMPED

CLOSING

## DROMEDARY MIXERS FOR CONCRETE, MORTAR, ETC.

TRADE MARK

# FISHER & SAXTON CO.

123 G STREET N. E., - - - - - WASHINGTON, D. C.

# Charles E. Dustin Company

ELECTRICAL AND STEAM MACHINERY.

**WE ADVERTISE ONLY WHAT WE HAVE.**

### FULLY GUARANTEED RAILWAY GENERATORS.

- One 270 K. W. M. P. 4 G. E. Generator, - - 500 volts
- Three 200 K. W. General Electric Generators, - - 500 volts
- Two 175 K. W. Edison Bipolar Generators, - - 500 volts
- Two 110 K. W. Eddy Generators, - - 500 volts
- One 100 K. W. Walker Generator, - - 500 volts
- Two 100 K. W. General Electric Generators, - - 500 volts
- One 100 K. W. Edison Bipolar Generator, - - 500 volts
- Two 80 K. W. Detroit Bipolar Generators, - - 500 volts
- One 100 K. W. Mather Generator, - - 500 volts
- Four D62 Thompson-Houston Generators, - - 500 volts

*Extra Armatures for most of the above Machines.*

### ALTERNATING GENERATORS.

- One 150 K. W. Stanley, 1000-2000 volts, - - Two phase
- One 120 K. W. General Electric, 1070-volt, - Single phase
- Two 120 K. W. General Electric, 2000-volt, - Single phase
- One 100 K. W. General Electric, 1070-volt, - Single phase
- One A60 General Electric, 1100-volt, - Single phase
- Two A35 Thomson-Houston, 1100-volt, - Single phase

### ENGINES.

- 36 x 60 Hamilton-Corliss
- 22 x 40 x 48 Harris-Corliss Tandem Compound
- 22 x 48 Harris-Corliss
- 18 x 48 Geo. H. Corliss
- 18 x 42 Allis-Corliss
- 16 x 42 Greene
- 15½ x 15 Armington & Sims
- 13 x 12 Armington & Sims
- 13 x 12 Buffalo Forge, brand new
- 12 x 20 x 12 Westinghouse Compound
- 14 x 23 x 20 McEwen Tandem Compound
- 12 x 23 x 18 McEwen Tandem Compound
- 10 x 18 x 20 Payne Tandem Compound, with Condenser
- 18 x 16 Ball

### BOILERS.

- Three, 500 H. P. each, Heine, new
- One 250 H. P. Heine
- One 400 H. P. Babcock & Wilcox
- Two, 175 H. P. each, Babcock & Wilcox
- One 110 H. P. Babcock & Wilcox
- Two 350 H. P. National
- One 100 H. P. Horizontal Tubular
- One 250 H. P. Abendroth & Root

**A NUMBER OF SMALL DIRECT CONNECTED LIGHTING UNITS.**

All Ready for Immediate Delivery.

... WRITE FOR PRICES.

**11 Broadway, New York.**



## SECOND HAND EQUIPMENT

**LARGEST STOCK OF ENGINES, BOILERS, DYNAMOES AND GENERAL MACHINERY. REBUILT AND GUARANTEED. Immediate delivery**

### ENGINES

- |   |   |
|---|---|
| One 26 in. by 48 in. Greene Automatic.                    | Two 12 inch by 24 inch Buckeye Automatic.                   |
| One 16 1/4 - 33 inch by 36 inch Cross Compound Fitchburg. | Two 13 inch by 12 inch Ball Automatic.                      |
| One 24 inch by 48 inch Putman Automatic.                  | One 12 inch by 12 inch New York Safety Automatic.           |
| One Twin 20 inch by 42 inch Greene-Corliss.               | Two 12 inch by 18 inch Russell Automatic.                   |
| One Twin 18 inch by 32 inch Buckeye Automatic.            | One 13 inch by 12 inch Fitchburg Automatic.                 |
| One Twin 16 inch by 36 inch Hewes & Phillips Corliss.     | One 9 1/2 inch by 10 inch Armington & Sims.                 |
| One 20 inch by 42 inch Rickards Corliss.                  | One 8 in. by 12 in. Ide Automatic.                          |
| One 22 inch by 32 inch Watertown Slow Speed Automatic.    | One 6 inch by 10 inch Armington & Sims.                     |
| One 16 inch by 24 inch Buckeye Automatic.                 | Two 85 H. P. Westinghouse Compound.                         |
| One 15 in. by 42 in. Harris-Corliss.                      | Three 75 H.P. Westinghouse Automatic.                       |
| Two 15 1/2 inch by 15 inch Armington & Sims.              | Two 10-18 inch by 10 inch Westinghouse Compound.            |
| One 15 inch by 18 inch Beck Automatic.                    | Also a great many others, all types. Send for Special List. |
| Two 14 1/2 inch by 18 inch Beck Automatic.                |   |
| One 14 - 24 inch by 14 inch Westinghouse Compound.        |   |

### BOILERS

- One 300 H. P. A. & R. Water Tube Boiler, 165 lbs. steam pressure.  
 One 200 H.P. Vertical Boiler, 150 lbs. steam pressure.  
 Two 100 H.P. Babcock & Wilcox Water Tube Boilers, 150 lbs. steam pressure.  
 Two 100 H.P. National Water Tube Boilers.  
 One 75 H. P. Babcock & Wilcox Water Tube Boiler.  
 Five 66 inch by 18 ft. Horizontal Return Tubular Boilers, 125 lbs. steam pressure.  
 Three 66 inch by 18 feet Horizontal Tubular Boilers, fitted with Hawley Down Draft.  
 Three 66 inch by 16 feet Horizontal Tubular Boilers, 125 lbs. steam pressure.  
 Two 66 inch by 16 feet Horizontal Tubular Boilers, 100 lbs. steam pressure.  
 Four 54 inch by 16 feet Horizontal Tubular Boilers, 100 lbs. steam pressure.  
 Two 48 inch by 14 feet Horizontal Tubular Boilers, 100 lbs. steam pressure.

**FRANK TOOMEY, 127-131 N. Third St., Phila.**

Long Distance 'phone, 261-262.



### TROLLEY TIES AND POLES

PROMPT SHIPMENTS

Cross Arms, Brackets and Pins

**H. H. MAUS & CO.**

420 Walnut St., PHILADELPHIA PA.

### WANTED.

Two 75 K.W. 125-volt Compound Wound Generators.

F. M. HICKS,  
285 Dearborn St., Chicago.

### WANTED

For Immediate Delivery.

12-A equipments complete.  
 G. E. 52 equipments, complete.  
 200-500 K W. railway generators.  
 Type K and K-2 controllers.

Address, "R. R.," care of Street Railway Journal.

### WANTED.

Two interurban combination freight and passenger coaches about thirty-eight feet long, with two 50 H. P. motors and two controllers; also two open trailers.

**DeKalb, Sycamore Electric Co.,**  
DEKALB, ILL.

### FOR SALE CHEAP.

Any part of fourteen hundred feet of steel elevated railway structure, in first-class condition, suitable for permanent street railway bridges. Full particulars, with blue print, furnished on application.

**SIoux CITY TRACTION CO.,**  
SIoux CITY, IOWA.

### Iron Poles For Sale

We have for immediate delivery, at 3 1/2 cents per lb., 400 tubular iron poles, standard 3, 4 and 5 inch sections, approximate weight 370 lbs. each, f.o.b. Jersey City.

**Wendell & MacDuffie**

26 Cortlandt Street, - New York

### POSITIONS WANTED

YOUNG man, sober, industrious, is desirous of obtaining a position as manager or master mechanic of electrical railway. Have had ten years' practical experience and at present hold a position of trust and responsibility with a large corporation. Understand thoroughly the various requirements, electrical and mechanical, of street railway operation, and am well versed in transportation end of the work. Address "E. H.," care of STREET RAILWAY JOURNAL, New York.

A GRADUATE engineer with over 10 years' experience building, operating and managing electric railroads and power plants, familiar with modern alternating current practice, now in charge of 7,000 horse power plant, is open for engagement. New construction preferred or absolute charge of existing plant. Address "L. C. F.," care STREET RAILWAY JOURNAL, New York.

WANTED—Position as Manager or Superintendent of Electric Rail Road, by a man who has had twenty-two years' Steam and Electric Rail Road experience. Fifteen years as Superintendent, showing a practical, thorough and economical management. A good disciplinarian. Now holding position as Superintendent of Eastern Road but desires to make a change to larger field where hard, conscientious work will be appreciated. Highest references from present and former employers. Address "J. R. P.," care STREET RAILWAY JOURNAL.

### New Steel Rails

FOR SALE.

10,000 tons 60-lb. T Rails  
 10,000 tons 70-lb. T Rails

with complete joints. Shipment from Pittsburg during July, August and September. Will not sell less than 5,000 tons of this lot. Also same weights in foreign rails for delivery Atlantic, Pacific and Gulf ports.

**A. E. ROSENTHAL**

22-1c 740 Marquette Bldg., CHICAGO

### Notice to Contractors

Tenders will be received by the undersigned up to noon, June 13th, for the work of clearing, grading and concrete on line from South Glens Falls, N. Y. to Saratoga, N. Y. Plans, specifications and forms of tender can be seen at Engineer's office, Glens Falls, N. Y., on and after May 26th, 1902.

**The Crescent Construction Co.**

## SECOND-HAND BRIDGES

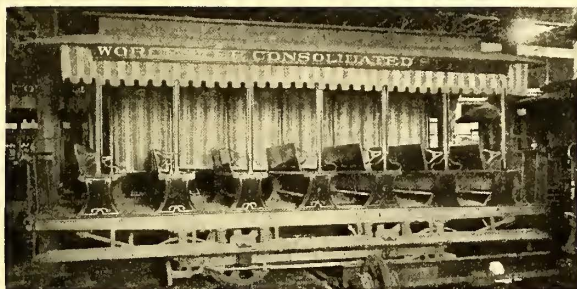
**FOR SALE.**

IN GOOD CONDITION FOR RE-ERECTION.

We offer the Double-Track Wrought Iron Bridge formerly used by the Penna. R. R. over the Susquehanna River, near Harrisburg, 21 spans, each span about 157 ft. long and weighing approximately 150 net tons. Can be converted into single track bridge.

For Details apply to **HENRY LEVIS & CO., Philadelphia.**





**Electric Railway Equipment Company**

OFFICE AND WORKS... 31st and Chestnut Sts., Phila., Pa.

**For Sale**

Some very good Six and Seven Bench Open Cars in perfect physical condition. Have been used very little. Mounted on Brill No. 21 Trucks 4 ft. 8½ in. gauge. Send for description and prices. Other cars, too.

A Lot of Westinghouse No. 3 Motors, 30 H.P. with new Fields and Armature Coils, good as new; K Controllers, Generators and Engines, everything in good condition.

**CARS** Dump Cars That Dump.  
Light Steel RAILS In Stock.  
OF ALL KINDS. Locomotives, Switches, Turntables, Etc.

**MINE EQUIPMENT FOR SALE**

90 1-ton 36-in. gauge Mine Cars  
7,000 feet 1-in. and 1½-in. New and Old Wire Rope.

**APEX EQUIPMENT CO.**

11 BROADWAY, NEW YORK.

**FOR SALE.**

- 25 Open Motor Cars, fully equipped with G. E. No. 800 Motors, K. 2 Controllers, Brill 21 E Trucks.
- 12 Equipments, complete G. E. No. 800 Motors, K. 2 Controllers.
- 14 Westinghouse No. 68 Motors.
- 20 K 2 Controllers, 40 K Controllers.
- 10 Westinghouse No. 28 Controllers.
- 8 Sets Brill No. 27 Trucks.
- 3 Sets Bemis No. 30 Double Trucks.

**W. R. KERSCHNER, Allentown, Pa.**

**CARS FOR SALE**

Four (4) brand new double truck closed cars, 22 ft. inside, 33 ft. over all, Bemis trucks, 30-in. wheels, 4-in. axles, Sterling brakes. Cars were built by the Wason Company, Springfield, Mass., and have never been in service. Have no lettering and will need no repair or painting of any kind. Address W. A. GIBBS, care Zanesville Electric Railway Company, Zanesville, Ohio.

**FOR SALE**

**15,000 Trolley Ties**

7 FEET LONG

If you want a bargain, write or telegraph promptly :: ::

**GARRISON BROS. BERWICK, PA.**

**RAILS FOR SALE** Immediate Shipment

- 400 tons of 40-lb. Steel Relayers with angle splices, Central Pa. delivery.
- 12 miles of 40-lb. Steel Relayers, with angle splices, Ohio delivery.
- 200 tons of 40-lb. Steel Relayers, with angle splices, Pa. delivery.
- 60 tons of New 20-lb. rails, Central Pa. delivery.

**HYDE BROS. & CO.**  
902 and 903 Lewis Building, Pittsburg, Pa.

**Relaying Rails For Sale**

IMMEDIATE DELIVERY

- 250 tons 52-lb. Steel Tee Rails with Angle Plates
- 1000 tons 58-lb. Steel Tee Rails with Angle Plates, Maine Delivery

**George H. Carey, 1 Broadway New York**

**ONE 850 K. W. RAILWAY UNIT**

DIRECT CONNECTED

GENERATOR . . . . Type M. P. 12-850-80 R. P. M. 575 Volts. General Electric  
ENGINE . . . . 28 in. and 52 in. x 48 in. Cross Compound. Penn. Iron Works Co.

**READY FOR PROMPT SHIPMENT**

**ROSSITER, MACGOVERN & CO.**

Principal Offices 141 BROADWAY, N. Y. Works JERSEY CITY, N. J.

WE DO ELECTRICAL REPAIR WORK OF EVERY DESCRIPTION



**FOR SALE****EQUIPMENTS**

- 47 Equipments, Westinghouse 38's, K-8 Controllers  
 28 Equipments, Westinghouse 12-A's, with K-2 Controllers  
 18 Equipments, G. E. 800's, with K-2 Controllers  
 22 Equipments, Westinghouse 3's, with K-2 Controllers  
 18 Equipments, W. P. 30's, with K-2 Controllers

**RAILWAY GENERATORS**

- Two 500 K. W. G. E. M. P. Railway Generators.  
 One 200 K. W. G. E. M. P. Railway Generator  
 Eight 100 K. W. G. E. M. P. Railway Generators  
 Four 100 K. W. Edison Bipolar Railway Generators  
 One 75 K. W. Westinghouse M. P. Railway Generator  
 Two 75 K. W. Mather M. P. Railway Generators

**ENGINES**

- One 30 x 48 x 48 Cross Compound Allis  
 One 28 x 48 x 60 Cooper Corliss Engine  
 Two 15 x 25 x 14 Ball Cross Compound  
 Two 13 x 23 x 17 McIntosh & Seymour Tandem Compound  
 One 13 x 24 x 18 Armington & Sims Compound Condensing  
 One 14 x 28 x 20 Cross Compound Phoenix  
 One 28 x 60 Brown Corliss  
 One 40 x 48 Weatherill Corliss  
 One 18 x 18 Armington & Sims  
 One 16 x 16 Ball Automatic  
 One 14 x 14 Armington & Sims  
 Two 13 x 12 New York Safety

**BOILERS**

- Four, 375 H. P. each, National Watertube, 150 lbs.  
 Two, 136 H. P. each, Babcock & Wilcox Watertube, 150 lbs.  
 Four 100 H. P. Return Tubular, 100 lbs.

**CARS**

- 6 and 8 Bench Open Cars, G. E. 800 Motors, K Controllers  
 Trail Cars, open or closed, standard gauge  
 Combination Open and Closed Cars  
 Peckham's Nos. 5 and 6 Trucks, standard gauge

**THOMPSON, SON & CO.**

114-118 LIBERTY STREET, N. Y.

**New York Elevated Railroad  
Passenger Cars and Locomotives**

This equipment is offered for sale, as a part of the road has been equipped with electricity.

Cars, desirable for Suburban Roads, and Trolley Trailers.

Locomotives are desirable for Suburban Roads, Construction work, and Contractors generally.

For Detail Specifications, Photographs and Prices, address

**BENJAMIN WATSON**

66-70 Beaver Street, - - NEW YORK  
 Coffee Exchange Building

New and Second-Hand Steel Rails, Locomotives, Cars, General Railroad and Contractors' Equipment.

OFFICES:  
 Saginaw, Mich.  
 Pittsburg, Pa.  
 Chicago, Ill.  
 New York, N. Y.

**WICKES BROS.**  
**PITTSBURG, PA.**  
 45TH ST. AND A. V. RY.

WAREHOUSES:  
 Saginaw, Mich.  
 Pittsburg, Pa.  
 Jersey City, N. J.

**Second-Hand Corliss Engines**

- 38 x 72 in. R. H. Geo. H. Corliss.  
 38 x 72 in. L. H. Geo. H. Corliss.  
 30 x 72 in. R. H. Geo. H. Corliss.  
 30 x 60 in. R. H. Hamilton-Corliss.  
 24 x 36 x 48 in. Philadelphia tandem compound.  
 23 x 60 in. L. H. Geo. H. Corliss.  
 23 x 60 in. R. H. Geo. H. Corliss.  
 20 x 32 x 32 in. Allis cross compound Corliss.  
 20 x 30 x 32 in. All's cross compound Corliss.  
 20 x 48 in. L. H. Watts Campbell-Corliss.  
 20 x 48 in. R. H. Watts Campbell-Corliss.  
 20 x 48 in. Cooper-Corliss.  
 16 x 36 in. L. H. Whitehill-Corliss.

**Automatics**

- 20 x 36 x 36 in. L. H. McIntosh & Seymour tandem.  
 20 x 20 in. R. H. Green automatic.  
 16½ x 18 in. Buckeye automatic.  
 16 x 16 in. Green center crank automatic.  
 16 x 20 in. R. H. Jackson & Church automatic.  
 13½ x 18½ x 15 in. Armington & Sims cross compound automatic.  
 14 x 18 in. L. H. Shapely & Wells automatic.  
 14 x 16 in. R. H. Green automatic.  
 12 x 16 in. Bass center crank automatic.  
 12 x 12 in. Phoenix center crank automatic.  
 11½ x 18½ x 13 in. Armington & Sims cross compound.  
 10 x 12 in. Russell automatic.  
 9 x 12 in. Phoenix automatic.

Write us  
 if you have  
 anything  
 to sell

**WICKES BROS.**  
**PITTSBURG, PA.**  
 45TH ST. AND A. V. RY.

Our complete  
 stock list mailed  
 upon  
 application

**Quick Shipment Bargains****"STANDARD GAUGE"**

- 6 30-ft. Closed Cars, St. Louis vestibuled platforms, Peckham's trucks, 8-ft. wheel base, 33 in. wheels.  
 20 25-ft. Open Cars, eight-bench, stationary Brill's and Peckham's trucks, double plate spoke wheels, 33-in., 6 ft. 6-in. wheel base; two Westinghouse No. 3 motors.  
 25 24 ft. Closed Car Bodies, Brill.  
 1 Baggage or Freight Car Body.  
 1 Sixteen-bench Open Double Truck Car, steam road type.  
 2 42-ft. Closed Cars, Walk-over seats, light steam road style.  
 3 Ten-bench Open Trail Cars.  
 6 Eight-bench Open Trail Cars.  
 2 Nine-bench Gilbert Open Cars, Peckham's trucks.  
 Inspection, Hand and Construction Cars. More to follow. Write us.

**TRUCKS AND MOTORS**

- 10 Brill No. 21 E Trucks; 7-ft. wheel base.  
 20 Assorted Brill's No. 21 and Peckham's No. 6 4-ft. 8½-in. gauge trucks, double plate spoke wheel, 6-ft. 6-in. wheel base, equipped with two motors.  
 65 Westinghouse No. 3 Motors, complete with gear, gear case and pinion.  
 2 G. E. 1,200 Motor Equipments, K2 controllers.  
 20 Westinghouse 38B Motors.  
 12 G. E. 800 Motor Equipments, K controllers.  
 16 50-H. P. Walker Motors.  
 24 W. P. 50 Motors.  
 12 W. P. 30 Motors.

**GENERATORS**

- 3 100-K. W. G. E. M. P.  
 1 100-K. W. Card M. P.  
 2 100-K. W. Edison.  
 2 175-K. W. Edison.  
 4 60-K. W. Edison.  
 2 150-K. W. 6-Pole, New.  
 2 200-K. W. 6-Pole, New.  
 1 225-K. W. 6-Pole, New.  
 1 300-K. W. 6-Pole, New.  
 2 500-K. W. G. E.  
 1 60-K. W. Direct Connected.  
 2 75-K. W. M. P. T. H.  
 3 D67-K. W. B. P. T. H.

**ENGINES**

- 1 1,200-H. P. Cooper-Corliss Tandem Compound.  
 1 13 x 23 x 17 Tandem Compound, McIntosh & Seymour.  
 1 11 x 19 x 15 Tandem Compound, McIntosh & Seymour.  
 1 9 x 16 x 12 Tandem Compound, Erie Ball.  
 3 15 x 25 x 14 Cross Compound, Erie Ball.  
 1 16 x 24 Brownell.  
 1 26 x 48 Dickson-Corliss.  
 1 26 x 48 Slater, Tange Bed.

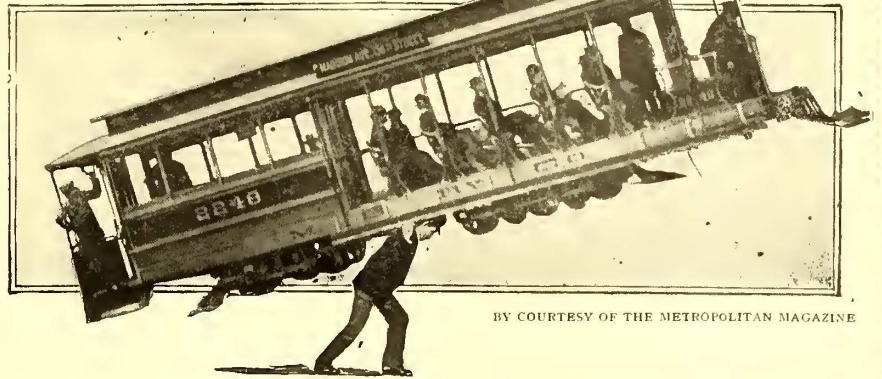
EXTRA ARMATURES, TRUCKS, REPAIRS, MACHINE AND SHOP TOOLS. STOCK CHANGING CONSTANTLY

**A. G. SCHOONMAKER & CO.** 126 LIBERTY ST. NEW YORK



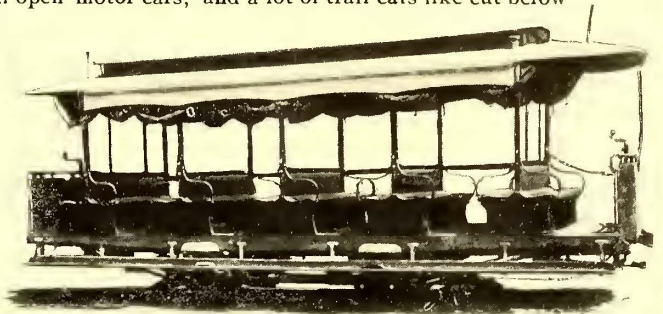
Of Course  
I Am Still Selling Cars  
and I Am Always  
Willing to Accommodate  
My Customers

It seems, however, in some instances, that I am expected to accomplish the feat illustrated in the cut below



BY COURTESY OF THE METROPOLITAN MAGAZINE

I still have a lot of large interurban cars for sale; also a lot of half-open and half-closed cars; eight and nine bench open motor cars; and a lot of trail cars like cut below



Can furnish Westinghouse 3's, 12A's and 38's; W. P. 50's, G. E. 52's, 1,000's, K 2 and K 8 controllers. Facilities for inspection and full particulars furnished on application to

**GILES S. ALLISON, 57 Broadway, New York**

FOR SALE  
**STEEL RAILS** All Weights

TRACK FASTENINGS AND SPIKES  
FOR PROMPT DELIVERY . . . . .

Relaying and Scrap Rails Bought and Sold

**The Steel Rail Supply Company**

100 Broadway

Successors to  
HUMPHREYS & SAYCE

New York City

FOR SALE.  
About 190 tons new  
80-lb. T rails A. S.  
C. E. Section, in  
40-ft. lengths, with  
joints, for immediate  
shipment from  
stock.

**HENRY LEVIS & CO.,**  
PHILADELPHIA.

Francis Beidler & Co.  
Chicago  
Ill.  
**POLES**  
LIVE  
PEELED  
WHITE CEDAR

**RAILS**

BOUGHT FOR CASH,  
SOLD FOR CASH AND ON TIME.  
Track Bolts and Track Tools  
WALTER A. ZELNICKER, in St. Louis

**Second-Hand Locomotives  
and Steam Shovels.**

WRITE FOR OUR 1902 CATALOG.  
**M. Mitshkun Co.** DETROIT,  
MICH.

TWENTY  
**Cars For Sale**  
CHEAP

Double trucks, 22-ft. body  
5 ft. 2½ ins. gauge  
Westinghouse No. 3 Motors

Many inquiries coming in. If you  
want them, come quick. Changing  
equipment and making cars uni-  
form only reason for selling.  
Write to

JOHN MURPHY  
General Supt.

**Pittsburg Railways Co.**  
Pittsburg, Pa.

**Hydraulic  
Wheel Presses**

For Quick Shipment.

Four 38-inch 150-Ton, New  
One 46-inch 150-Ton, New  
Two 54-inch 150-Ton, New  
One 66-inch 250-Ton, New

Heavy, strong, generously built,  
many improvements. Prices  
right All kinds of Shop Tools.

**A. G. SCHOONMAKER CO.**  
126 LIBERTY ST., NEW YORK

For the Construction and Repair  
of Dynamos, Motors, etc., only  
the Best Tapes and Webbing should  
be used. The best is always  
assured if you purchase Hope  
Tapes and Webbing.


Write for Samples and Prices.

**HOPE  
TAPES  
AND WEBBINGS**

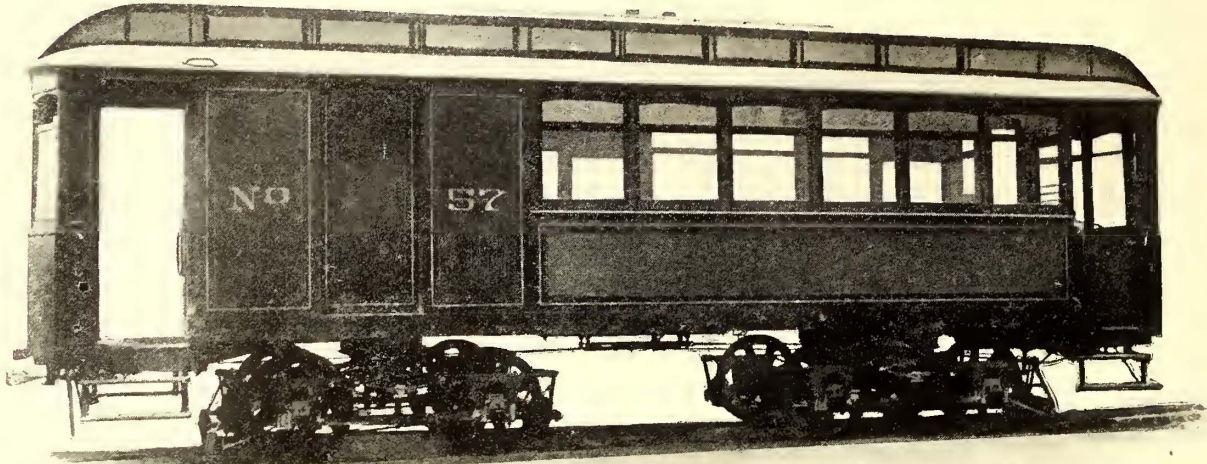
Hope Webbing Co.

Providence,  
R. I.



**For Sale** We are in the Market to Buy or to Sell   
Open and Closed Cars, Motors, Generators, Relaying Rails, Etc.

One Closed Car. One Combination Baggage and Passenger Coach, 25 feet,  
but little used, first-class.



## FOR SALE

Seven 8-bench Open Cars. Can be altered at small cost to 10-bench. Several with full electrical equipments. All first-class, ready for the street at a moment's notice. Nothing needed. Also Ten Good 7-bench Trailers. Very Cheap. A Great Bargain. **SPECIAL IN TRUCKS:** 8 sets Brill 21E Maximum Traction Trucks. 6 McGuire and 4 Peckham Single Trucks; good condition; very cheap. A few G. E. 800 (new) Extra Armatures. 100 Mud Scrapers; have seen but little service; 50% never installed on cars.

One M. P. 45 kw., 220 v., G. E. over compounded to 300 v. Trade designation 4-45-925, Form A. Pulley dimensions 13" x 24". As a motor, should develop 50 horse-power.

This machine cannot be classed as second-hand, as it is in perfect condition, in every way, even to paint and varnish, never injured, commutator bright, smooth, and unworn. But for polish on driving pulley, would be exceedingly difficult to detect that it had ever been used.

One G. E. M. P. 4-100-650-500 to 550 v. railway generator, complete.

One 80 kw., B. P., 500-v. armature for Detroit generator.

Two 80 kw., B. P., 500-v. Detroit generators.

One Westinghouse No. 3 equipment, thoroughly overhauled, cheap.


A number of closed cars, 21-ft. bodies, 27 feet over all.

150 tons New 60-lb. steel rails with angle bars. Central location. Same price as relayers. Ready to ship in lots to suit.

## WANTED

Ten G. E. 1000 Equipments Complete. Good Relayers, 1000 Tons, anywhere near 60 lbs. Westinghouse 12 A, 30, 49 and 38 B Motors and complete Equipment.

**DALLETT & COMPANY**  
201 WALNUT PLACE, PHILADELPHIA.

Established 1875.  
  
Long Distance Telephone.



# WENDELL & MacDUFFIE

26 CORTLANDT ST., NEW YORK, U. S. A.

Cable Address: Wenmac, Lieber and Premier Codes

European Representative: VICTOR DOURIN, Paris and Brussels  
LONG DISTANCE TELEPHONES, 2015 and 2016 CORTLANDT.

## Electric Locomotives. Taunton Sprinklers.

SNOW  
PLOW

SPRINK-  
LERS

TOWER  
WAGONS

TROLLEY  
POLES

WHEELS  
and  
AXLES

CAST  
WELDED  
RAIL  
JOINTS

TROLLEY  
and  
FEEDER  
WIRE

TRANSFER  
TABLES

GEARS  
and  
PINIONS

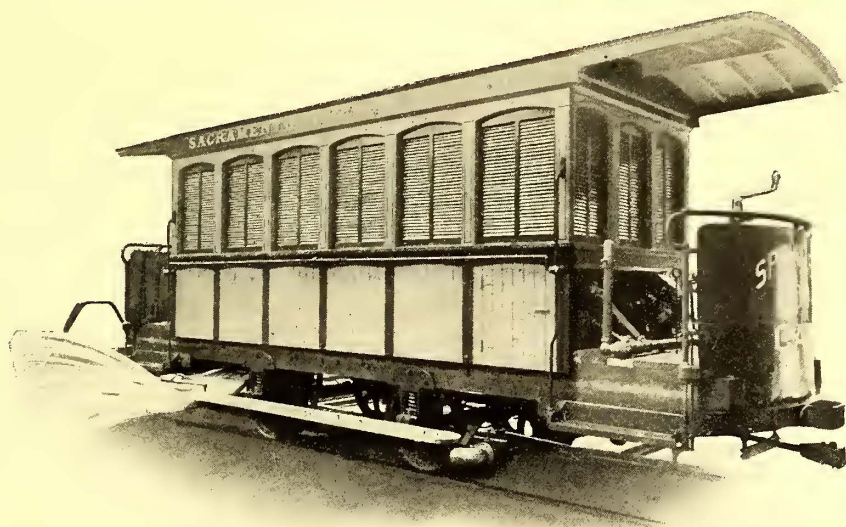
RAIL  
BONDS

LINE  
MATERIAL

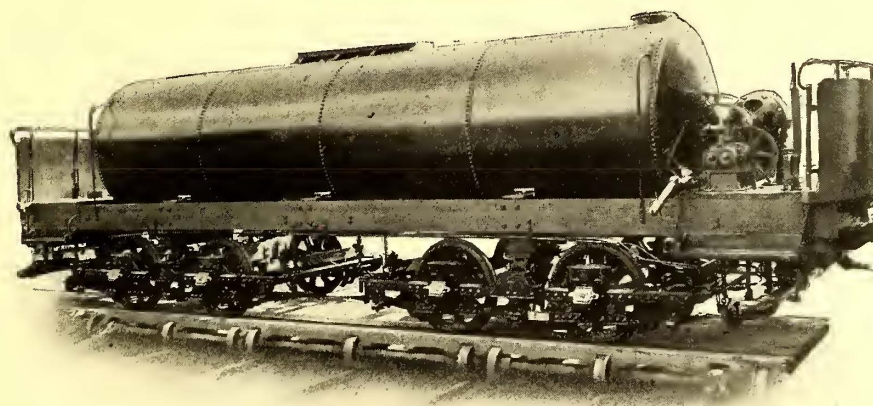
POLES  
and  
BRACKETS

COMMU-  
TATORS

STEAM  
RAILROAD  
SPECIAL-  
TIES



Steel or Cypress Tank—Capacity, 2,500 gallons; total length, 25 feet; weight, empty, 6 to 7 tons. With or without auxiliary pump and motor.



Steel Tank—64 inches diameter; capacity, 4,000 gallons; total length, 33 feet; weight, empty, 9 tons. Rotary pump and independent motor on platform for broad street sprinkling.

### Everything for Electric Railways

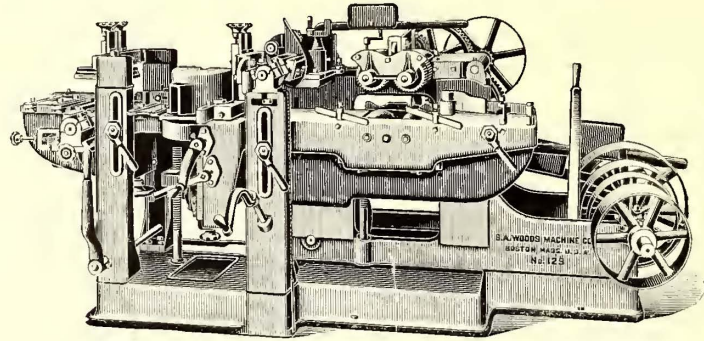
Purchasing Agents, Contractors, Engineers, Fiscal Agents and Exporters.



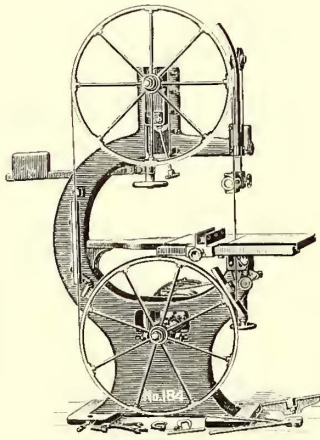
# WOOD WORKING MACHINERY

FOR  
ELECTRIC RAILWAYS AND TRACTION COMPANIES

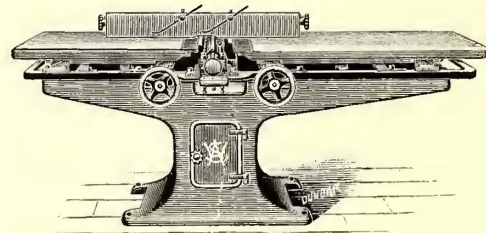
EQUIPMENT BUILT FOR DIRECT MOTOR DRIVE



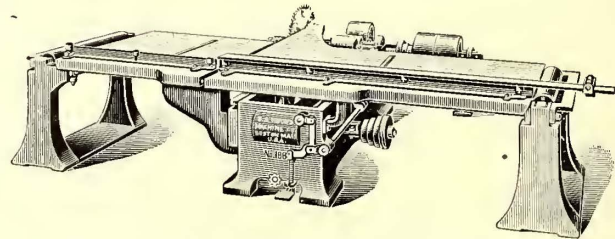
No 129—OUTSIDE MOULDER



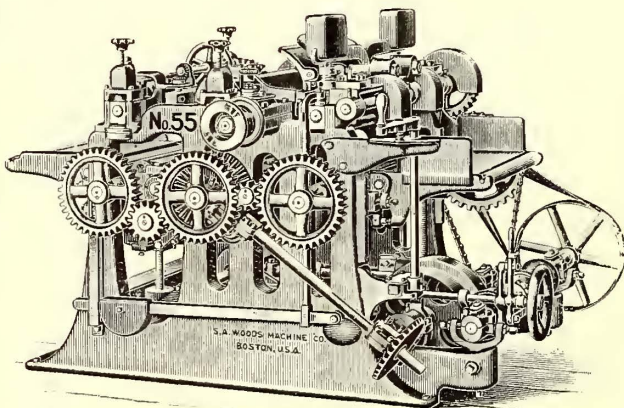
No. 184—36-INCH BAND SAW



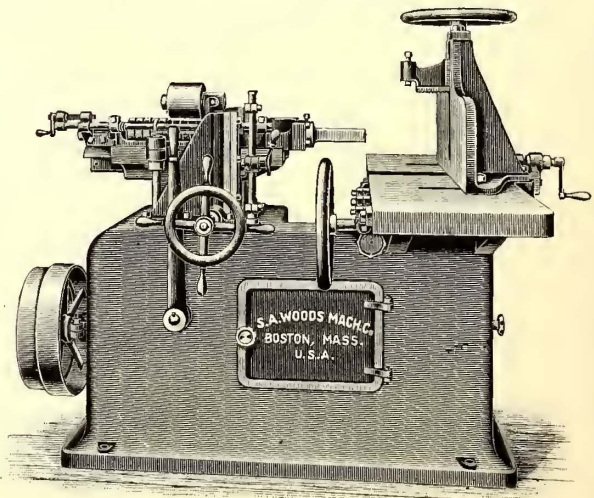
No. 98—BUZZ PLANER



No. 188—AUTOMATIC POWER-FEED RAILWAY CUT-OFF SAW



No. 55—SIX-ROLL DOUBLE SURFACE PLANER



No. 6—HORIZONTAL HOLLOW CHISEL MORTISER

A PART OF AN OUTFIT OF MACHINES RECENTLY FURNISHED THE

RHODE ISLAND SUBURBAN RAILWAY CO.

PROVIDENCE, R. I.

BY

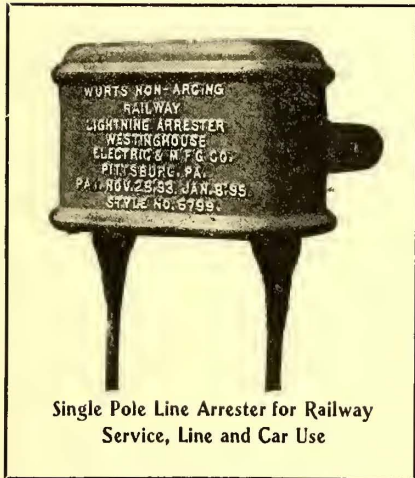
**S. A. WOODS MACHINE CO., BOSTON, MASS.**

ESTABLISHED IN 1854



# YOUR STATION

## IS THE VITAL POINT OF YOUR SYSTEM



**Good Lightning Arresters  
Properly Installed are a  
Sure Protection** ❁ ❁ ❁

SEND FOR PAMPHLET GIVING FULL DESCRIPTION



# Central Electric Company



264, 266, 268, 270 Fifth Avenue, Chicago

GEO. C. EWING, President

ELMER P. MORRIS, Treasurer

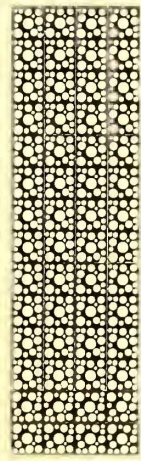
H. F. SANVILLE, Secretary

# MORRIS ELECTRIC CO.

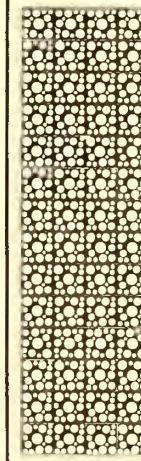
15 CORTLANDT STREET, NEW YORK CITY

Manufacturers, Dealers and Exporters

## Electric Railway Equipment



“Morris” Rail Bonds.  
 “Monarch” Fare Registers.  
 Cutter Circuit Breakers.  
 Keystone Electrical Instruments.  
 Monarch Insulating Paint.  
 Hunter Illuminated Car Signs.  
 Globe Electric Head Lights.  
 Gears, Pinions and Bearings.  
 Overhead Line Material, Iron Poles and  
 Miscellaneous Supplies.



CHICAGO AGENTS:  
Standard Railway Material Company,  
Fisher Building.

BOSTON AGENT:  
Percy Hodges,  
60 State Street.

PITTSBURG AGENT:  
W. L. Elkins,  
Times Building

CLEVELAND AGENTS:  
Ludlow Supply Company,  
Electric Building.



## Ninth Annual Edition Now Ready

---

THE  
STREET RAILWAY  
"RED BOOK"

# American Street Railway Investments

PUBLISHED  
BY THE  
STREET RAILWAY  
PUBLISHING COMPANY

114 LIBERTY STREET  
NEW YORK

---

Price, \$5.00 Per Copy, Postpaid

## ITS IMPORTANCE

The value of a complete and reliable reference book of street railway statistics is greater at the present time than ever before. This is due, not only to the remarkable growth of the industry and the extent of recent consolidations but also to the constantly increasing attention paid to traction securities in the financial markets of the world.

AMERICAN STREET RAILWAY INVESTMENTS is the publication which most thoroughly covers this field. It is believed that in its Ninth Annual Edition, the "Red Book" will prove even more indispensable than heretofore to street railway officials, manufacturers, contractors, bankers, capitalists and others interested in the construction or management of electric railway properties.

## ITS CONTENTS

The reports in the "Red Book" are arranged in a form which is exceedingly convenient for ready reference.

The full reports include: History of organization; exact financial description of securities issued, including dates of issue and maturity, interest and dividends paid, trustees, etc.; four and five year comparisons of operating receipts and expenses, fixed charges, surplus, dividends, assets and liabilities; a description of plant and equipment; names of officers and directors; maps of important systems, and references to descriptive articles in the STREET RAILWAY JOURNAL.

## ITS ACCURACY

The intimate relations which have always existed between the STREET RAILWAY JOURNAL and its clientele have led to the hearty co-operation of street railway officials, as well as of bankers and brokers interested in street railway properties, in making the "Red Book" as complete and reliable as possible.

Great care is taken to bring each individual report strictly up to date and to make it absolutely accurate. Every edition for the last eight years has contained detailed financial and statistical information impossible to find in any other publication.



# ALUMINUM RAILWAY FEEDERS

Aluminum feeders are less than one-half the weight of copper feeders and are of equal conductivity and strength.

Joints of aluminum feeders can be easily, cheaply and satisfactorily made.

If wire or cable is required to be insulated, high grade insulation is guaranteed.

Price-list with full information furnished on application.

## THE PITTSBURGH REDUCTION CO. PITTSBURGH, PA.

OFFICES

PRINCIPAL OFFICE, PITTSBURGH, PA.  
NEW YORK OFFICE 99 John St., Phelps-Dodge Bldg.  
CHICAGO OFFICE 190 E. Monroe Street.

SALES AGENTS

CLEVELAND, O., Jas. A. Rutherford, Garfield Building.  
PHILADELPHIA, PA., Electric R'y Equipment Co., Real Estate Trust Building.  
BOSTON, MASS., Percy Hodges, 60 State Street.  
SAN FRANCISCO, CAL., Jno. Martin & Co., 31 New Montgomery Street.  
SEATTLE, WASH., Jno. Martin & Co., Pioneer Building.

## The National Conduit and Cable Co.

MANUFACTURERS OF

BARE COPPER WIRE and CABLE  
PAPER INSULATED CABLES

For Telephone, Telegraph, Electric Light and Power

CEMENT LINED PIPE FOR CONDUITS

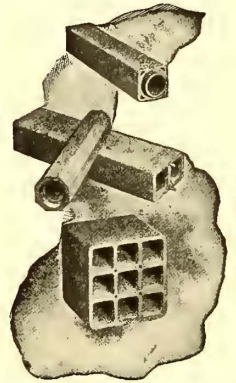
Executive Offices, Times Building, NEW YORK, N. Y.

## American Vitrified Conduit Company

MANUFACTURERS OF

Vitrified Glazed Conduits

Contractors for Installation  
of Underground Conduits



GENERAL OFFICE: 39 CORTLANDT ST., NEW YORK

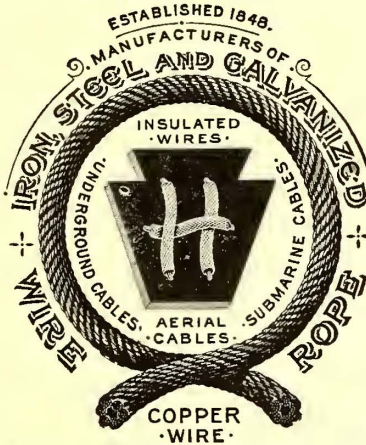
## Hazard Manufacturing Company.

GENERAL OFFICE AND WORKS:

WILKES-BARRE, PA.

NEW YORK OFFICE: 50 DEY STREET.

CHICAGO OFFICE: 1201-2 MARQUETTE BUILDING.



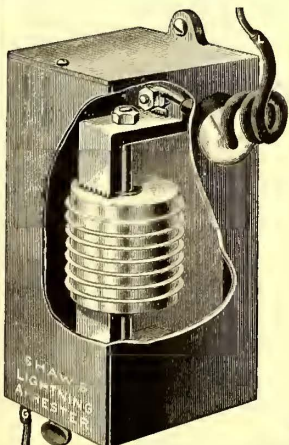
## INSULATED WIRES and CABLES.

Iron, Steel and Galvanized

## WIRE ROPE.

COPPER WIRE,

HARD AND SOFT DRAWN.



## H. M. SHAW & CO.

115 BROADWAY  
NEW YORK

Manufacturers of  
Railway Tools and Fittings

Shaw's Non-Arcing Lightning Arresters



International Car Heaters

Ajax Channel Steel Bracket





NEW EAST RIVER BRIDGE

Extreme Length of Bridge between Terminals, 7,200 feet  
 Length of River Span 1,600 feet  
 Extreme width of Bridge, 118 feet

Height of centre of Cable at top of Tower above high water, 333 feet  
 Main Cables, 19 in. dia.  
 Weight of Main Cables 4,400 tons  
 Number of Wires in each Cable, 8,000

Illustration shows temporary Foot Bridge on which Main Cables are made

Dia. of Cables supporting Foot Bridge, 2 1/4 in.

ALL WIRE CABLES TO BE FURNISHED BY ...

# JOHN A. ROEBLING'S SONS CO.

NEW YORK

CHICAGO

TRENTON, N. J.

CLEVELAND

SAN FRANCISCO

# American Steel & Wire Co.

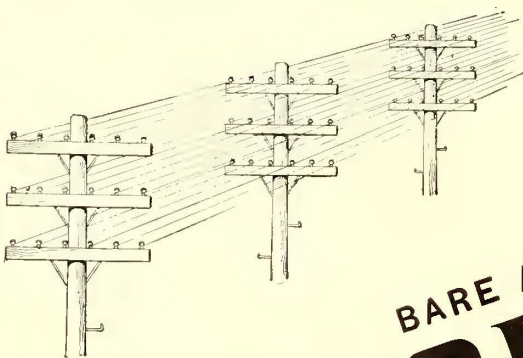
CHICAGO

NEW YORK

WORCESTER

DENVER

SAN FRANCISCO



BARE AND INSULATED  
**ELECTRICAL WIRES**  
**SPRINGS**  
 OF EVERY DESCRIPTION

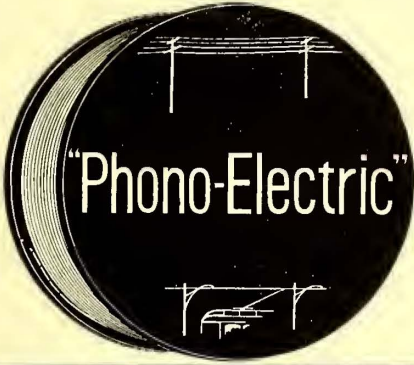


CATALOGUE ON APPLICATION



# "PHONO-ELECTRIC" WIRE

"IT'S TOUGH."



Combines high tensile strength, high elastic limit, and great toughness with remarkable wearing qualities. This Wire cannot be equalled where safe, durable and permanent construction is required.

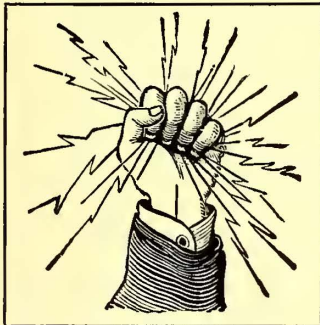
Do You Want Our "Red" Wire Booklet? Sent Free.

MILLS: **BRIDGEPORT BRASS COMPANY**  
BRIDGEPORT, CONN. 19 MURRAY STREET, NEW YORK

## AMERICAN ELECTRICAL WORKS

PROVIDENCE, R. I.

### WIRES <sup>AND</sup> CABLES



Bare and Insulated Electric Wire. Railway Feeder and Trolley Wire.  
Electric Light Line Wire. Incandescent and Flexible Cords.  
Americinite, Magnet, Office and Annunciator Wires.  
Cables for Aerial and Underground Use.

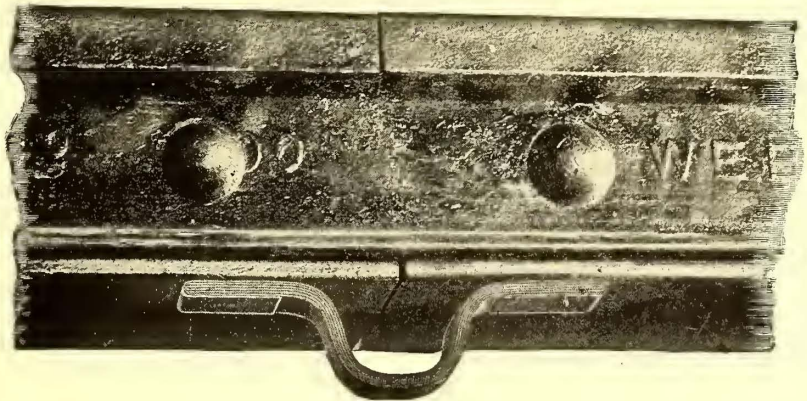
F. N. PHILLIPS, President.  
E. R. PHILLIPS, Vice-Pres.  
C. H. WAGENSEIL, Treas.  
C. R. REMINGTON, Jr., Sec.  
E. F. PHILLIPS, Genl. Mgr.

N. Y. Office, 26 Cortlandt St.  
Chicago Store, 82 Lake St.

MONTEAL BRANCH  
EUGENE F. PHILLIPS  
ELECTRICAL WORKS

## The Rail Bond You Are Looking For

has perfect contact—enduring life—no compressed heads to become loose—no loss of current to cause electrolysis—no deterioration ::



PATENTED

WRITE FOR BULLETIN No. 17

... The ...

## Chase - Shawmut Flexible Rail Bond

meets all these requirements as they have never been met before :: :: ::

## CHASE-SHAWMUT CO.

SOLE MANUFACTURERS

390 ATLANTIC AVE., BOSTON, MASS.



# AMERICAN STEEL

EXPORT OFFICES

NEW YORK: 71 Broadway      LONDON: 29 Great St. Helens, E. C.

## RAIL BONDS

"CROWN"                      "CHICAGO"                      "UNITED STATES"

### TO MEET ALL CONDITIONS OF RAIL BONDING

Each type combines all the essential elements of a first-class bond

Highest Grade of Material

Superior Workmanship

Correct principles of construction and application

All parts of these bonds are made of Drawn Copper, carefully annealed, and of 98 per cent. conductivity.

"Crown" and "Chicago" solid bonds are made from a single length of copper wire. The heads are formed by upsetting the ends of the wire—they are one-piece bonds. Terminals and connecting strands of "Crown" Flexible Bonds are perfectly welded together, and form a homogeneous mass of the highest grade copper.

"Crown" and "Chicago" Bonds are applied more easily and economically than any other type. The terminals are **EXPANDED IN THE RAILS WITH A STEEL DRIFT PIN.**

No special tools required; a heavy hammer does the work.

### SLIP THE BOND INTO PLACE IN THE RAIL AND DRIVE THE PIN

The copper of the terminal is expanded radially into the closest possible contact with the steel of the rail. No wrenching will loosen it. Absolutely moisture-proof contact—no loss through leakage.

# & WIRE COMPANY

ALSO SOLD BY

ROBERT W. BLACKWELL & CO., Ltd., 59 City Road, London, E. C.

Our "United States" Bond, for application with a compressor. Solid terminals connected by flat copper wires. Can be used inside splice-bar of rail joint when the plate is only one-quarter inch from web of rail.

TERMINALS ARE OF DRAWN WIRE, WELDED (NOT CAST) TO THE FLAT COPPER STRIPS.

Terminals of "Crown," "Chicago" and "United States" Bonds are enlarged to a size which secures the full electrical carrying capacity of the bond.

Our rights as sole manufacturers of these three types of rail bonds are fully protected by Letters Patent.

WRITE FOR OUR SPECIAL RAIL BOND CATALOGUE

## WIRES AND CABLES OF ALL KINDS

FOR

ELECTRIC STREET RAILWAY AND LIGHTING SYSTEMS

TROLLEY WIRE, Round, "Figure 8" or other Special Shapes

WEATHERPROOF INSULATED FEEDER WIRES AND CABLES, "CROWN" RUBBER COVERED STRANDED CAR CABLE, INCANDESCENT LAMP CORD

Span Wire, Stranded and Heavily Galvanized  
Galvanized Guy and Guard Wires

GALVANIZED TELEGRAPH AND TELEPHONE WIRES



**STOP****STOP**

**S**TOP the waste of power through flexible copper rail bonds with their rusting contacts and breaking strands.

**PLASTIC BONDS** of the proper type to fit your rails and meet your requirements are cheaper in first cost and will reduce running expenses.

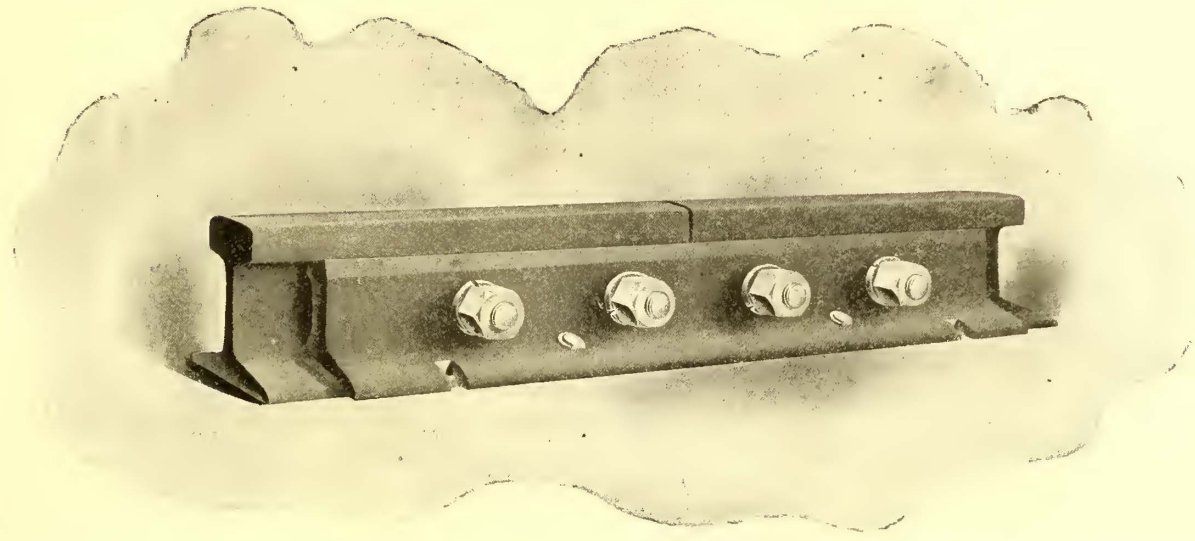
## HAROLD P. BROWN

120 LIBERTY ST.  
NEW YORK

59 CITY ROAD  
LONDON, E. C.

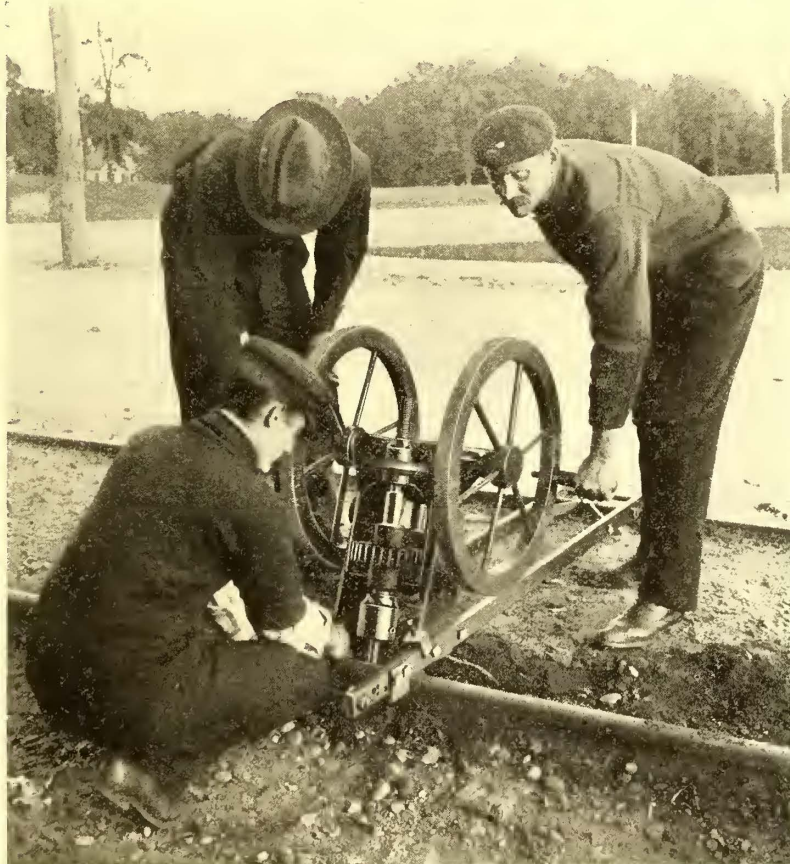


# THE PLASTIC PLUG BOND



Which Defeated the Best Types of Flexible Copper Bonds under the Severest Service on Earth.

Easily  
Applied  
Cheap  
Durable  
Effective



Especially  
Adapted for  
Re-Bonding  
—  
See Samples  
at London  
Tramway  
Exhibition

## HAROLD P. BROWN

THE PLASTIC RAIL BOND

THE PLASTIC SOCKET RAIL BOND

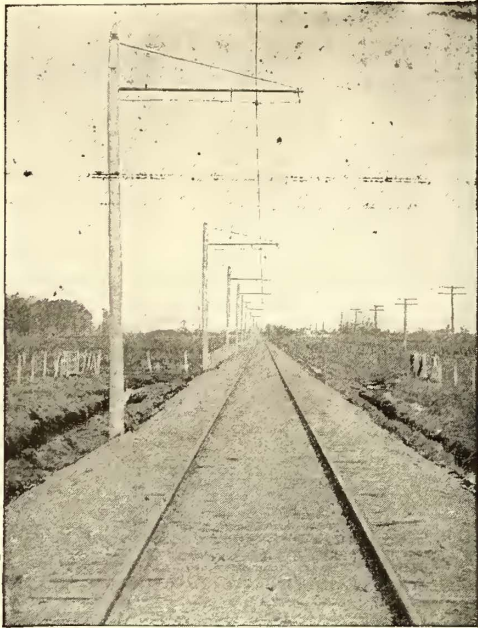
THE PLASTIC PLUG RAIL BOND

THE SOLID COPPER RAIL BOND

120 Liberty Street, New York

59 City Road, London, E. C.





BRACKET No. 190

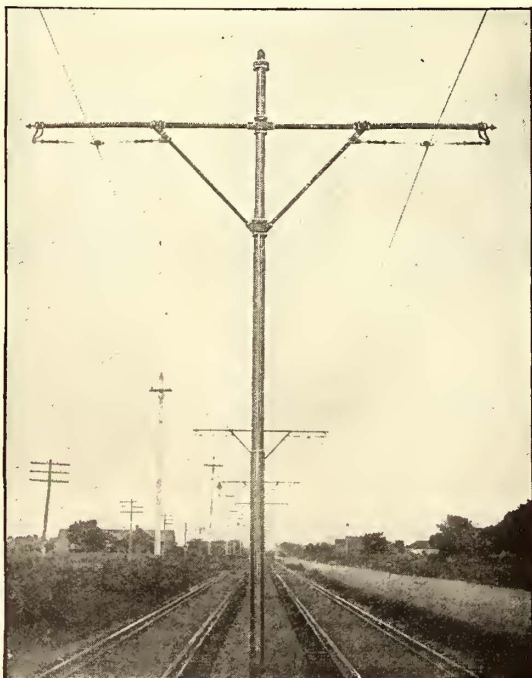
**Creaghead Flexible Brackets** ARE STANDARD  
Nearly 100 Different Styles

## Line Material Pole Fittings

Complete Equipment for  
Overhead Construction

Write for Catalogue

**The Creaghead** Manufacturers  
**Engineering Co.** Eighth and Plum Sts.  
CINCINNATI, O.



DOUBLE BRACKET No. 1249

"The Sphinx of the Twentieth Century."

## ASIA AND THE CHINESE EMPIRE.

Comparatively few people are familiar with the Chinese Empire as it exists to-day. In view of the constantly growing Oriental commerce of the United States, everyone should become familiar with the Chinese Empire. The

### NEW YORK CENTRAL'S

"Four-Track Series" No. 28 gives valuable statistics and information regarding the Flowery Kingdom, and contains a new and accurate map in colors.

A copy of No. 28, "A New Map of Asia and the Chinese Empire," sent free, postpaid, on receipt of five cents in stamps, by George H. Daniels, General Passenger Agent, New York Central Railroad, Grand Central Station, New York.



"Deservedly the  
favorite route  
for through  
travel."

"A trip from the East to Chicago without going over the Lake Shore means missing the acme of perfection in American railway travel."

"Of all the great trunk lines of the country, there is probably none that has been so thoroughly well managed during all its career in the interest of making it what it is now—an ideal route."

"Everything in connection with the Lake Shore is the very best in every sense of the word. It has ever been prominent in this respect and never did it stand forth so strongly in all its history as now."

"We were much impressed two years ago in Colorado to hear a gentleman, an utter stranger to ourselves, speaking of travel, make the remark that the best line in the East by all odds is the Lake Shore & Michigan Southern."

For "Book of Trains" and any information about its famous through trains between Chicago, Cleveland, Buffalo, New York and Boston, write to A. J. SMITH, G. P. & T. A., Cleveland, Ohio.



# POLES! POLES!! POLES!!!

For Electric Railway, Electric Light, Telephone and Telegraph Construction

We probably have the largest stock of carefully selected Juniper—Southern White Cedar—poles (of all sizes) that can be found in all the South. These are the best, most durable, and therefore most economical poles on the market. We can make immediate shipments just as fast as cars are placed on the siding. Write for particulars to

**STANDARD POLE AND TIE CO., 44 Broad St., New York**

# TIES TROLLEY AND STEAM POLES OCTAGONAL AND ROUND

**Yellow Pine Cross Arms.**

PROMPT DELIVERIES FROM STOCK  
NEW YORK CITY YARD OR  
DIRECT FROM MILLS.

MANUFACTURED BY  
**ECCLESTON LUMBER CO.,**  
29 BROADWAY, NEW YORK.

**PRODUCERS NOT JOBBERS**  
**CEDAR POLES**  
LOWEST PRICES IN  
CARLOAD LOTS.  
**KELLOGG SWITCHBOARD & SUPPLY CO.**  
235 50. GREEN ST. CHICAGO.

**S. C. STROCK, 11 Broadway, New York**

**POLES, TIES  
AND TIMBER**

Octagonal and Square Sawn Tapering Poles, Round Poles, Ties, Switch Sets and other Dimension Stock for Electric, Steam and Traction Railroads; Telephone, Telegraph and Electric Light Companies.

**Monarch Lumber Co.**

1104 THE TEMPLE, CHICAGO.

White Oak and Yellow Pine Timbers, Oak and Cedar Piling, Poles, Bridge and Switch Ties.

## The Street Railway Roadbed...

By MASON D. PRATT  
.....and C. A. ALDEN

An essential feature of a well-equipped street railway is a good track, and in this book are brought together and illustrated the various modern types of track material and methods of construction, with their good and bad features indicated. The authors are engineers of the Pennsylvania Steel Company, one of the largest manufacturers of rails and "special work" in America, and are therefore particularly well equipped to treat of the subjects of which they write. All the various features of street railway roadbed construction are carefully described, with illustrations where necessary, the latter including sections of rail, of roadbed, views of special joints, diagrams, etc. Rules and tables are also given for running curves, laying out crossings, turnouts, etc.

135 Pages, 157 Illustrations. Price, \$2.00.

PUBLISHED BY THE

**Street Railway Publishing Company, 114 LIBERTY ST., New York.**

# CEDAR POLES

FOR TRACTION PURPOSES

**THE VALENTINE-CLARK COMPANY**

234 La-Salle Street, CHICAGO, ILL.

WHEN WRITING TO ADVERTISERS in the STREET RAILWAY JOURNAL you will confer a favor on both publisher and advertiser by mentioning this paper.

**THE HOLCOMB-LOBB COMPANY**  
**CEDAR PILES, POLES & POSTS**  
204 DEARBORN ST. CHICAGO ILL.

**TIES**

Yellow Pine  
Oak or Chestnut  
in Cargo Lots

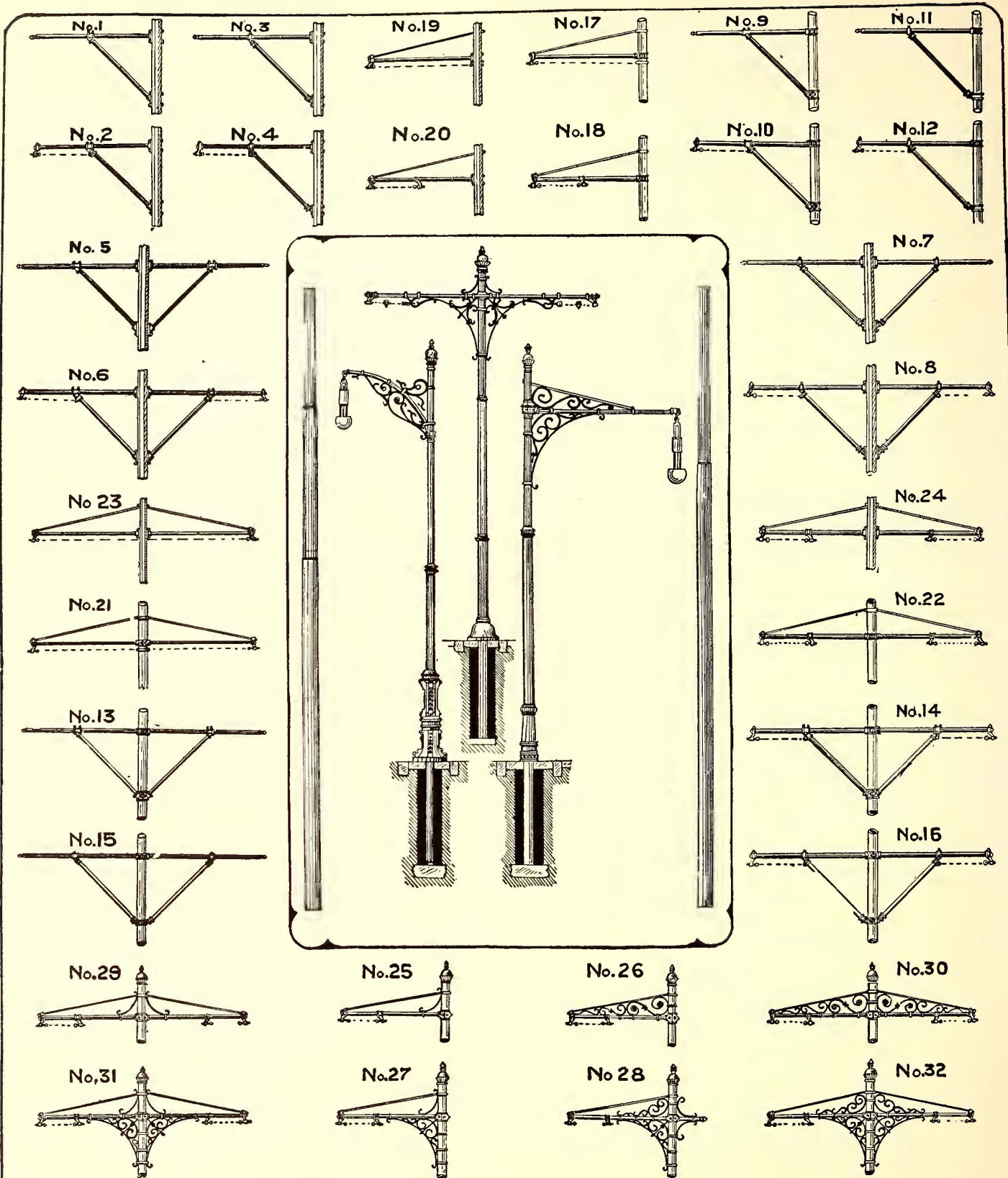
Cross-Arms, Pins and Braces  
**D. W. PHELAN**  
277 BROADWAY, NEW YORK.

Octagonal or Round  
Yellow Pine, Chestnut  
or Southern Cedar ...

**POLES**

A ready market for second-hand apparatus can frequently be secured through an advertisement on the "For Sale" page of the STREET RAILWAY JOURNAL. Rates on application.





**ELECTRIC RAILWAY EQUIPMENT CO. MANUFACTURERS** CINCINNATI, OHIO, U.S.A.

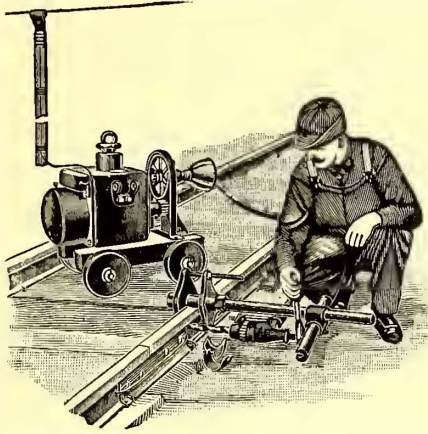
**IRON AND STEEL TUBULAR POLES AND BRACKET ARMS**

**FOR ELECTRIC RAILWAYS, LIGHTING AND TELEGRAPH SERVICE.**

ASK FOR OUR NEW CATALOGUE No. 10.

Mendenhall, Cin.





## ELECTRIC STREET RAILROAD TRACK DRILL

IS IT

wise economy to go on drilling by hand with a Trolley Wire just above you?

**LOOK UP!**

AND WRITE US FOR CATALOGUE AND PRICES.

Our **NEW MULTI-SPEED MOTOR** is built with special reference to the exacting requirements of a grounded circuit.

We make an **AUTOMATIC DRILL** (with Clamp) which can be adjusted to and detached from the rail in a moment.

**STOW MFG. CO., BINGHAMTON, N. Y.** Established 1875.

Inventors of the **STOW FLEXIBLE SHAFT** and **IRONCLAD MULTI-SPEED MOTOR**

General European Agents, **SELIG SONNENTHAL & CO., 85 Queen Victoria St., LONDON, ENG.**

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

**MORDEN FROG AND CROSSING WORKS.**

MANUFACTURERS RAILWAY SPECIAL TRACK WORK.

WORKS: SOUTH CHICAGO.

SALES OFFICES: 818 "ROOKERY," CHICAGO.

## Pneumatic Railway Crossing Gates

(BOGUE & MILLS SYSTEM)

**Buda Foundry & Mfg. Co.,** Makers **HARVEY, ILL.**

OFFICE: 917 Monadnock Block, CHICAGO, ILL.

**ELLIOT FROG AND SWITCH CO.**

East St. Louis, Illinois.



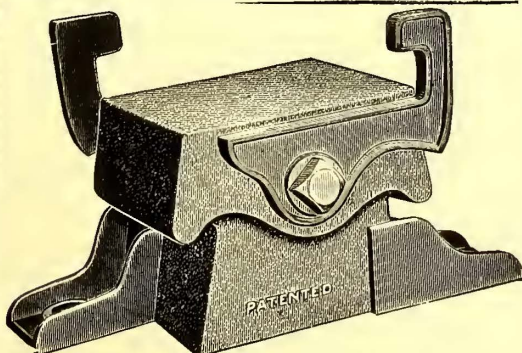
Electric Railway Work

Our Catalogue of  
**Street Railway and  
Electrical Books**

is yours for the asking.

STREET RAILWAY JOURNAL,  
114 Liberty St., N. Y.

**PAIGE IRON WORKS, CHICAGO.**  
**SPECIAL TRACK WORK**



**100,000**

RECONSTRUCTED GRANITE

**Third-Rail Insulators**

NOW IN USE

**RECONSTRUCTED GRANITE CO., 14 Dey Street, NEW YORK**



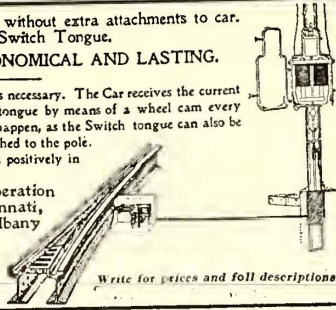
## Automatic Electric Track Switch

Operated and Controlled by the Motorman without extra attachments to car.  
Can be adjusted to any Switch Tongue.  
**GUARANTEED SAFE, SURE, ECONOMICAL AND LASTING.**

With this device no insulated section of track is necessary. The Car receives the current through a solenoid coil which throws the Switch tongue by means of a wheel cam every time power is applied. No blocking of cars can happen, as the Switch tongue can also be thrown either with a switch iron or a lever attached to the pole. The mechanism is thoroughly protected and works positively in all kinds of weather.

Our Automatic Switches are in operation or being installed in Pittsburgh, Cincinnati, Boston, Indianapolis, Brooklyn, Albany and other cities.

We are Manufacturers and Dealers in Automatic, Electric and Mechanical Switches and Street Railway Supplies of all kinds.



Write for prices and full description.

## American Electric Switch Company,

1511-1515 Liberty Ave., Pittsburgh, Pa., U. S. A.



**ELECTRIC  
RAILWAY  
SPECIAL  
WORK,**

Frogs, Switches, Curves,  
Crossings, Rail Braces, Etc.

**THE WEIR FROG CO.,**  
CINCINNATI, OHIO.

## Money Will Not Buy Health

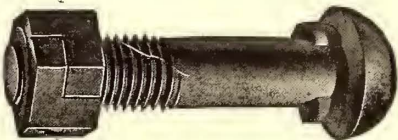
But if properly expended will preserve it.  
There is no better place for recreation of mind and body than at the resorts of Michigan and the Great Lakes. A postal card will bring you descriptive literature telling you Where and How to Go.



**"The way to Michigan"**

Address: Summer Tour Dept., C., H. & D. Ry., Cincinnati, O.

## The Elastic Nut Track-Bolt



makes the best and cheapest rail-fastening. **NUTS NEVER WORK LOOSE.** Requires no nut-lock. Our Elastic Self-Locking Steel Nut always stays, and is superior for use on Cars, Track, Bridges, Machinery etc. Write us for prices on Sq. and Hex. Nuts, (Elastic or Common) Machine Bolts, Track Bolts, Rivets, etc.  
**NATIONAL ELASTIC NUT CO.,**  
MILWAUKEE, WIS.

## Valuable Books On Electric Railway Practice

### Practical Electric Railway Handbook

By Albert B. Herrick.—Contains valuable data, including tables, diagrams, illustrations, etc., covering every department of electric railway construction, testing and operation, with full descriptions of appliances, methods, etc.; bound in leather, with flap; 407 pages; 344 illustrations. Price, \$3.

### American Street Railway Investments

The "STREET RAILWAY RED BOOK": being complete statistical and financial data from official reports of street railway properties in the United States and Canada, with numerous maps; published annually. 1902 edition will be ready May 1; size of page, 13 x 9 1/2 inches. Price, \$5.

### Electric Street Railways

By E. J. Houston, Ph. D., and A. E. Kennedy, Sc. D.—History of the electric railway and description of the machinery and equipment employed for the generation, transmission and utilization of the electric current for street transportation; 367 pages; 158 illustrations. Price, \$1. New edition in press.

### Modern Electric Railway Motors

By George T. Hanchett, M. E.—A thorough study of the subject; each organ of an electric railway motor is described and illustrated by examples of present and past practice, and its operation carefully explained; 200 pages; 140 illustrations. Price, \$2.

### Power Distribution for Electric Railways

By Louis Bell, Ph. D.—(New edition, revised and enlarged)—Review of the latest practice of the leading engineers in America and Europe; invaluable for information on modern methods of power transmission for electric railways; 312 pages; 138 illustrations and diagrams. Price, \$2.50.

### Street Railway Roadbed

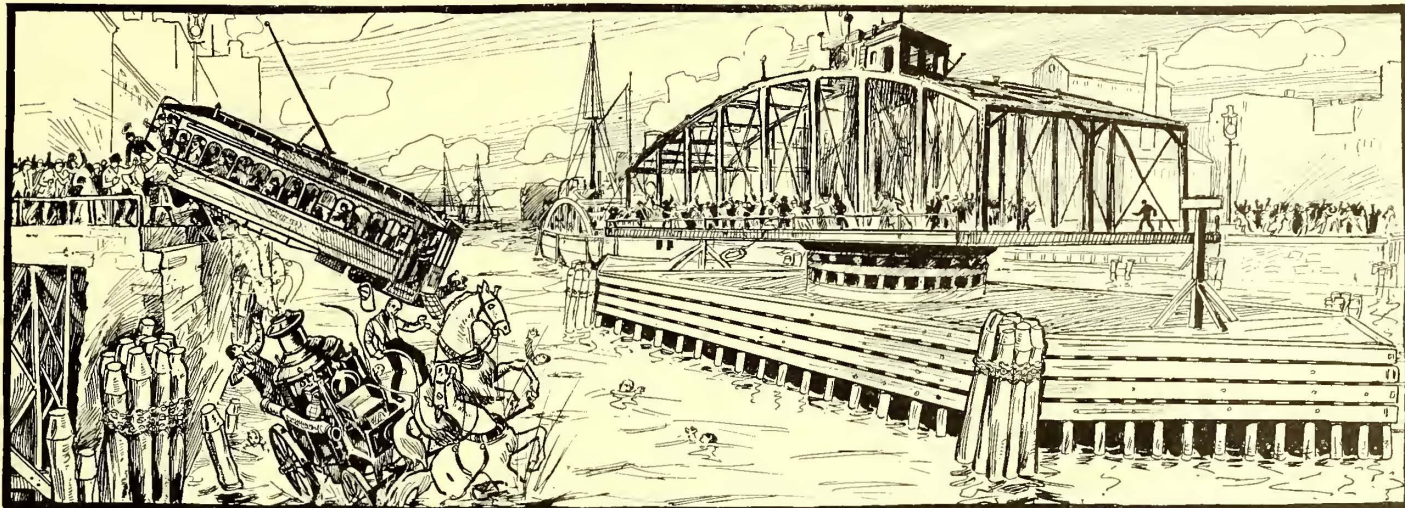
By M. D. Pratt and C. A. Alden.—Discussion of the best methods of to-day in street railway track construction; with descriptions of track material; of great value to street railway superintendents, engineers and trackmen; 135 pages; 157 illustrations. Price, \$2.

## Street Railway Publishing Co.

114 LIBERTY STREET, NEW YORK

Catalogue of other electrical and street railway books sent on application

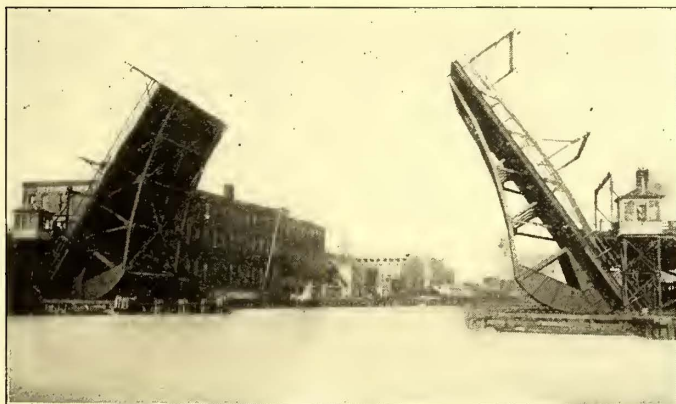




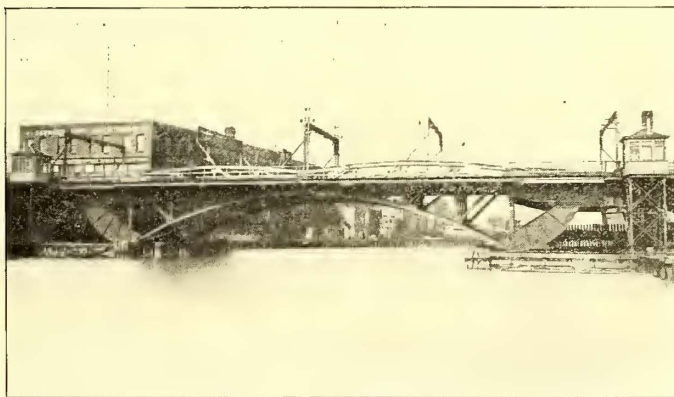
This illustration is typical of the CENTER-PIER SWING TYPE OF BRIDGE, showing the obsolete and destructive character of this method of crossing a waterway.

# The Scherzer Rolling Lift Bridge

when open for the passage of vessels acts as a barrier, closing the roadway, and thus absolutely preventing the many disastrous accidents common to swing bridges when open; without additional cost the bridge itself forms the most perfect, substantial and successful **Bridge Gate and Signal** ever invented.



View of Scherzer Rolling Lift Bridge at North Halsted Street, Chicago, open for the passage of vessels, showing the barrier formed by the bridge itself to prevent traffic running into the open draw.



View of Scherzer Rolling Lift Bridge at North Halsted Street, Chicago, closed for the accommodation of street car and highway traffic; also showing trolley wire support.

## ECONOMY

in construction and operation is effected by the Scherzer Rolling Lift Bridge, as it is not necessary to bridge two channels where only one channel is required—as is the case with the swing bridge—thus greatly reducing the length of bridge required. Because of the ease with which the Scherzer Rolling Lift Bridge is opened and closed, the cost of operation is so slight as to be virtually NIL.

The Scherzer Rolling Lift Bridge is the safest, simplest, most rigid, rapidly operated, efficient, durable, economical and artistic movable bridge ever constructed for **Street Car, Highway and Railroad Traffic**, and is rapidly replacing the swing bridge and all other old types of movable bridges.

Preliminary sketches and estimates furnished to responsible parties upon request accompanied by the necessary data.

**The Scherzer Rolling Lift Bridge Co.** MAIN OFFICES  
1616 MONADNOCK BLOCK  
CHICAGO, U. S. A.

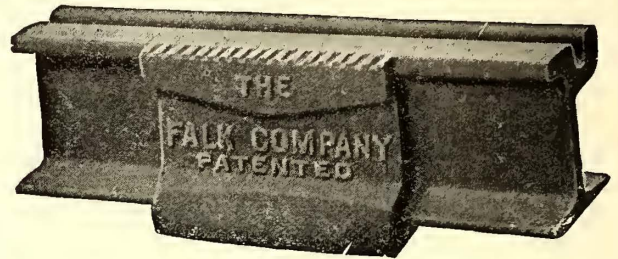


# Correct in Theory and Successful in Practice

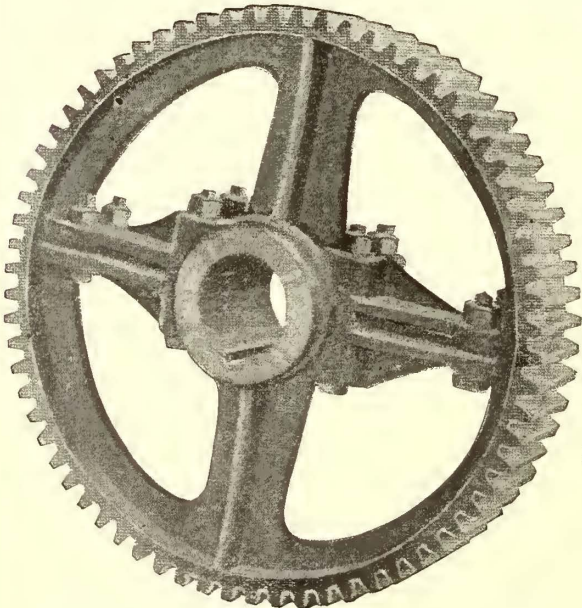
**A** SMOOTH, continuous rail is unquestionably the ideal track. It increases materially the life of the rail, avoids the necessity of expensive bonding, and reduces greatly the wear and tear of rolling stock, due to uneven and unsatisfactory rail joints. So much for theory, now for practice. The

## FALK

### Cast-Welded Rail Joint



is in almost universal use on the best equipped roads in the United States, and repeated orders give the best evidence of the satisfactory service rendered. This joint was invented, developed and patented by us, and every detail of the work, every machine and tool, is the result of constant study and the expenditure of money on our part, with a view to producing the best and most enduring results. Our catalogue will give you a partial list of users, and the testimony of representative managers and engineers.



But perhaps you are using Falk joints already, and know all about their advantages. If so, we merely wish to add that our

## Gears and Pinions

merit your consideration also. They are made of a uniform grade of hard, tough steel, and are unequalled as regards both quality of material and perfection of workmanship. Try them and be convinced.

Catalogue for the Asking.

# THE FALK COMPANY

MILWAUKEE, WIS., U. S. A.

#### SELLING AGENTS:

Wendell & MacDuffie, 26 Cortlandt Street, New York  
Robert W. Blackwell & Co., London, Eng.

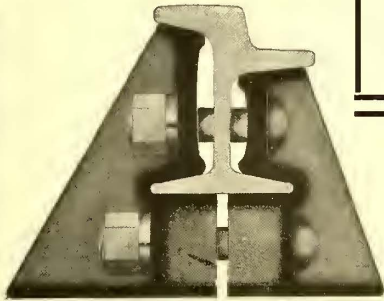
Oscar Frankenstein, Berlin, Germany

Ira Bishop, 23 Stevenson St., San Francisco  
Syndicat Ampere, Paris and Lyons, France

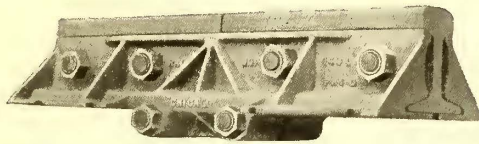


# ATLAS RAIL JOINTS FOR TEE OR GIRDER RAILS

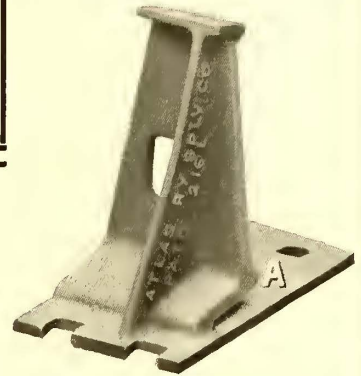
SUSPENDED OR SUPPORTED  
**GUARANTEED**



**Atlas Raised Joint.**  
Raises rail to any height, saving old low rail.



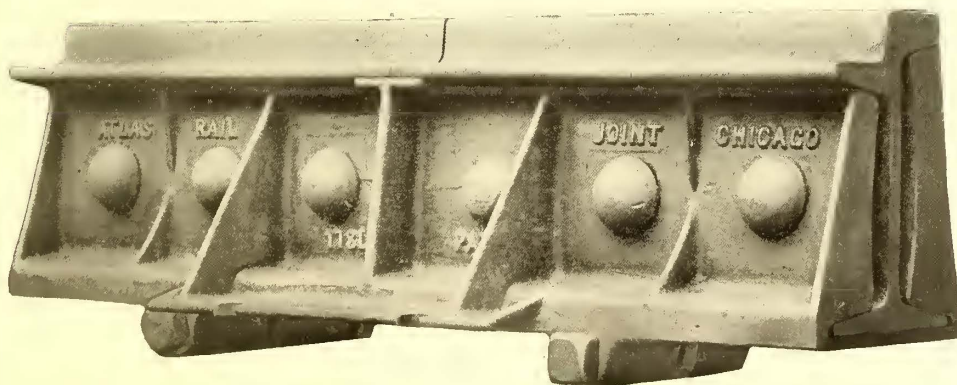
**Atlas Standard Suspended Joint for Tee Rails.**



**Atlas Standard Girder Brace.**



**Atlas Raised Step Joint for Girder Rails**  
Made to connect any combination of rails.



**Atlas Standard Supported Joint for Girder Rails**

**I-X-L  
Paints**  
For Wood  
and  
Iron Work

**Atlas  
Primer**  
Takes the  
place of oil  
or paste  
wood fillers

**Atlas  
Surfacers**  
Takes the  
place of lead  
and oil  
surfacers

**For  
Passenger  
Cars**

**Rail  
Braces**  
Of any  
Design



**Special  
Malleable  
Iron  
and  
Steel  
Castings**

L. Distance  
Phone—  
Harr. 2900

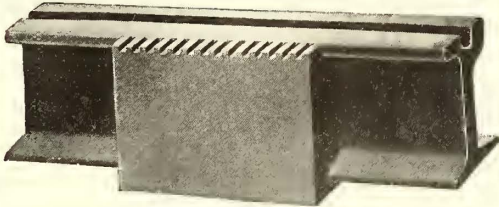
## Atlas Railway Supply Co.

1523 MANHATTAN BUILDING, CHICAGO, ILL.

Ask for  
1902  
Catalogue H



# Our Cast Welded Joint is the Cheapest and Most Durable in the Market



**W**E have perfected a cast welded rail joint which we guarantee to be a complete success on city or interurban railway lines. This Joint may be installed on any track with highly satisfactory results, and at a less cost than the ordinary fish-plate joint with bonding. Estimates and detailed information furnished on short notice.

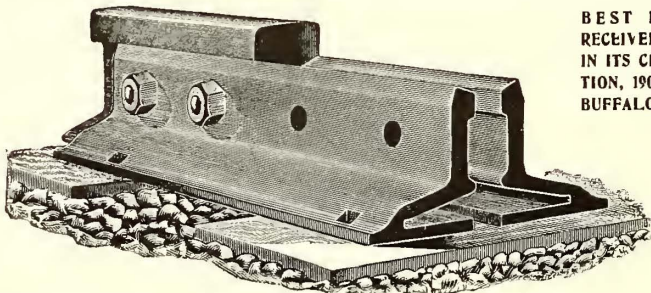
## HEIL RAIL JOINT WELDING COMPANY MILWAUKEE, WIS.

General Eastern Sales Agent  
C. J. HARRINGTON, 15 Cortlandt Street, New York

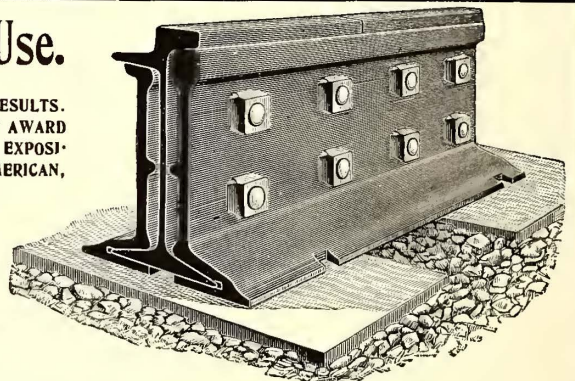
Southern and Western Representative  
WESTERN ELECTRICAL SUPPLY CO., St. Louis, Mo.

Agents for Western Europe  
E. H. CADOT & CO., Paris

Over Ten Thousand (10,000) Miles in Use.



BEST ECONOMICAL RESULTS.  
RECEIVED THE HIGHEST AWARD  
IN ITS CLASS AT PARIS EXPOSITION,  
1900, AND PAN-AMERICAN,  
BUFFALO, 1901.



Manufactured only by :: **CONTINUOUS RAIL JOINT CO. OF AMERICA**

General Offices  
CENTURY BUILDING, NEWARK, N. J.

Branch Agencies { Boston, Mass., John Hancock Bldg.  
Chicago, Ill., Monadnock Bldg.  
Montreal, Canada, Temple Bldg.

St. Louis, Mo., Security Bldg.  
San Francisco, Cal., Wells Fargo Bldg.  
St. Paul, Minn., Pioneer Press Bldg.

# THE WEBER RAILWAY JOINT MANUFACTURING CO.

EMPIRE BUILDING, NEW YORK

BRANCH OFFICES

BOSTON, 70 Kilby Street

CHICAGO, Old Colony Building

BALTIMORE, Continental Trust Co. Building

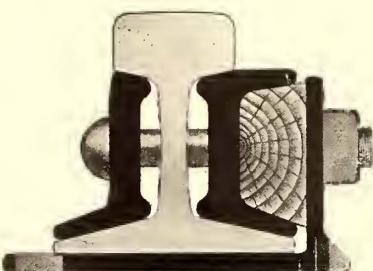
ST. LOUIS, Union Trust Building

SAN FRANCISCO, 91 Fremont Street

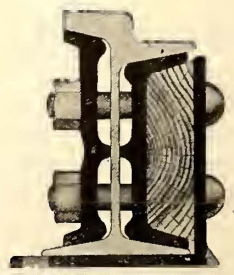
MONTREAL, 151 St. James Street

ST. PAUL, 109 Endicott Arcade

DENVER, Equitable Building



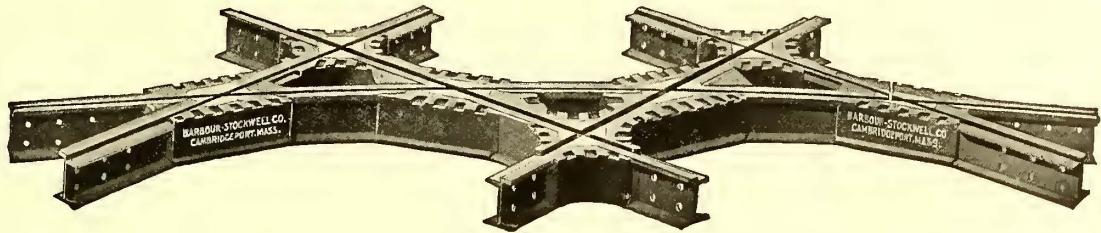
STANDARD "T" RAIL JOINT



GIRDER RAIL JOINT



**STEEL RAILS—OF ALL SECTIONS AND WEIGHTS.**  
**SPECIAL WORK—FOR STREET RAILWAYS.**



**OUR SWITCHES, MATES AND FROGS  
 HAVE HARD STEEL CENTERS  
 AND ARE PUT IN TO STAY.**

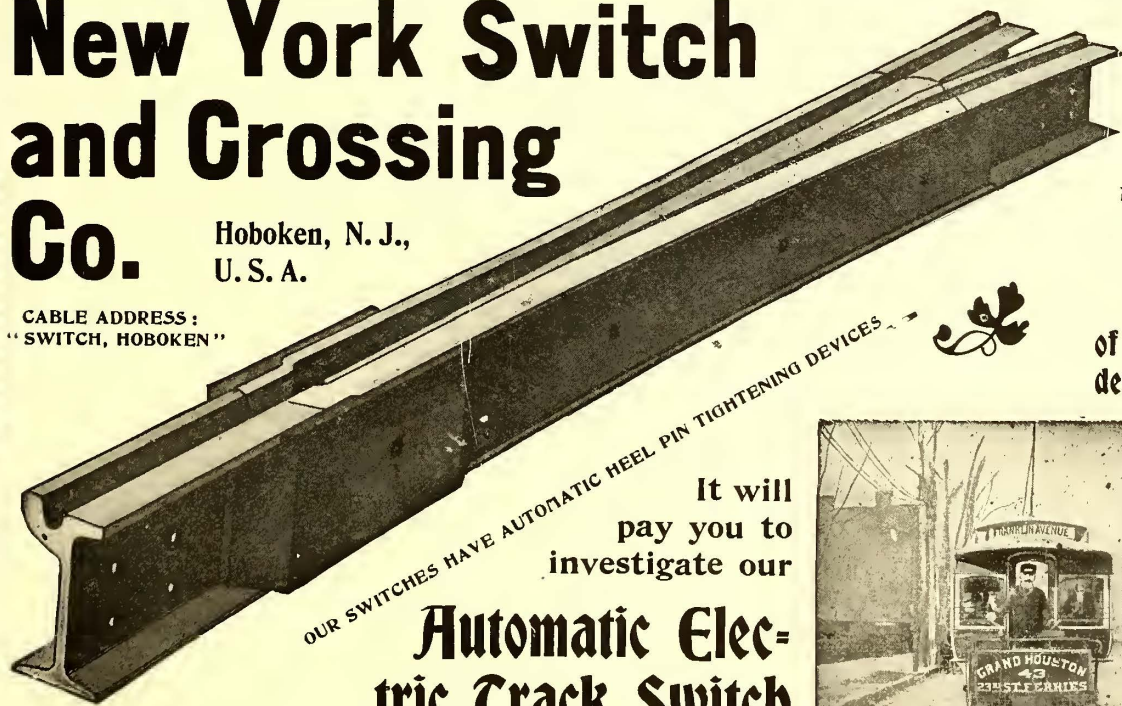
**205 BROADWAY,  
 CAMBRIDGEPORT, MASS.**

**BARBOUR-STOCKWELL CO.**

**New York Switch  
 and Crossing  
 Co.**

Hoboken, N. J.,  
 U. S. A.

CABLE ADDRESS:  
 "SWITCH, HOBOKEN"



OUR SWITCHES HAVE AUTOMATIC HEEL-PIN TIGHTENING DEVICES

**Frogs,  
 Switches,  
 Crossings  
 AND Special  
 Track  
 Work**

of every  
 description

It will  
 pay you to  
 investigate our

**Automatic Elec-  
 tric Track Switch**

It is simple and practical. Will work at all times and not get out of order. No appliance to put on cars. Is doing perfect work on some of the best roads in the country.

LET US FURNISH YOU ONE ON TRIAL





BUSINESS ESTABLISHED IN 1859

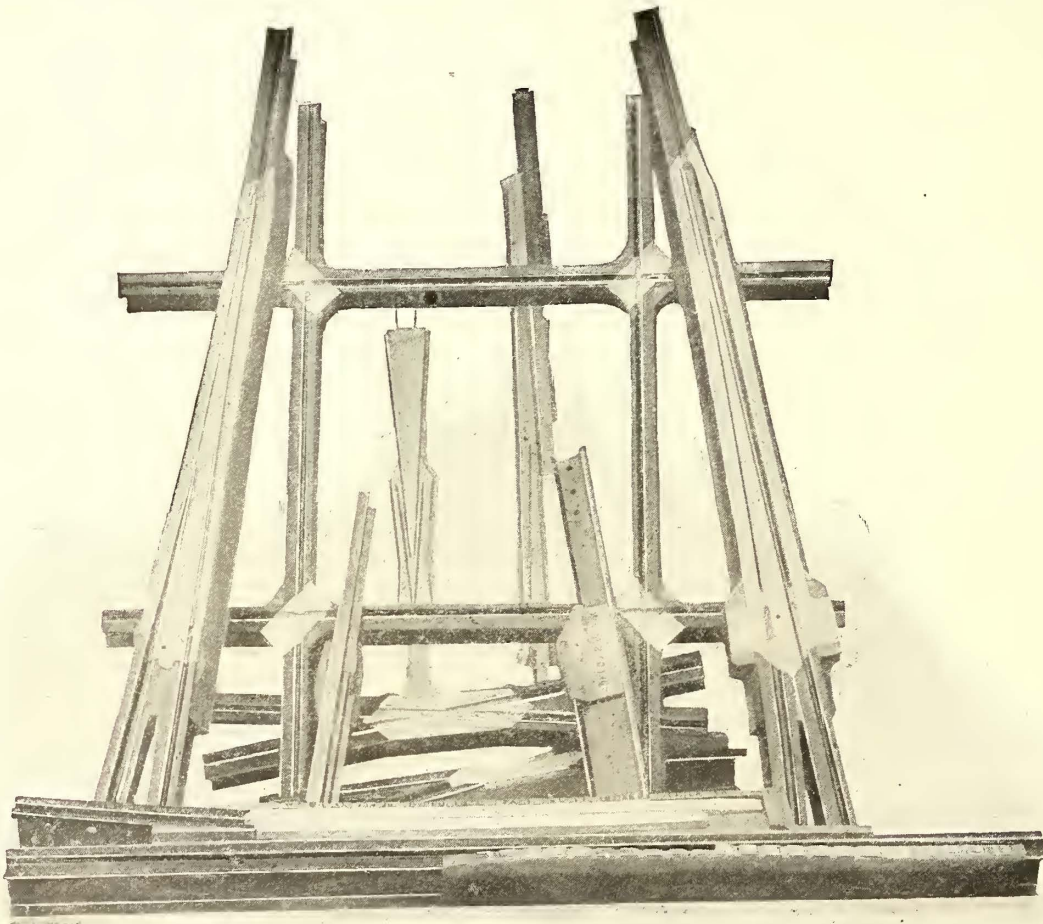
STILL LEADING.

# WM. WHARTON, JR. & CO.

PHILADELPHIA, PA.

INCORPORATED

**Girder Rails and Other Rails for Street Railways Complete with Fittings**



## MANGANESE STEEL SPECIAL WORK

ACKNOWLEDGED BY ALL WHO HAVE TRIED IT AT HOME AND ABROAD  
TO BE

### THE BEST AND LONGEST WEARING

WE HAVE THE SOLE RIGHT TO USE MANGANESE STEEL IN TRACK STRUCTURES

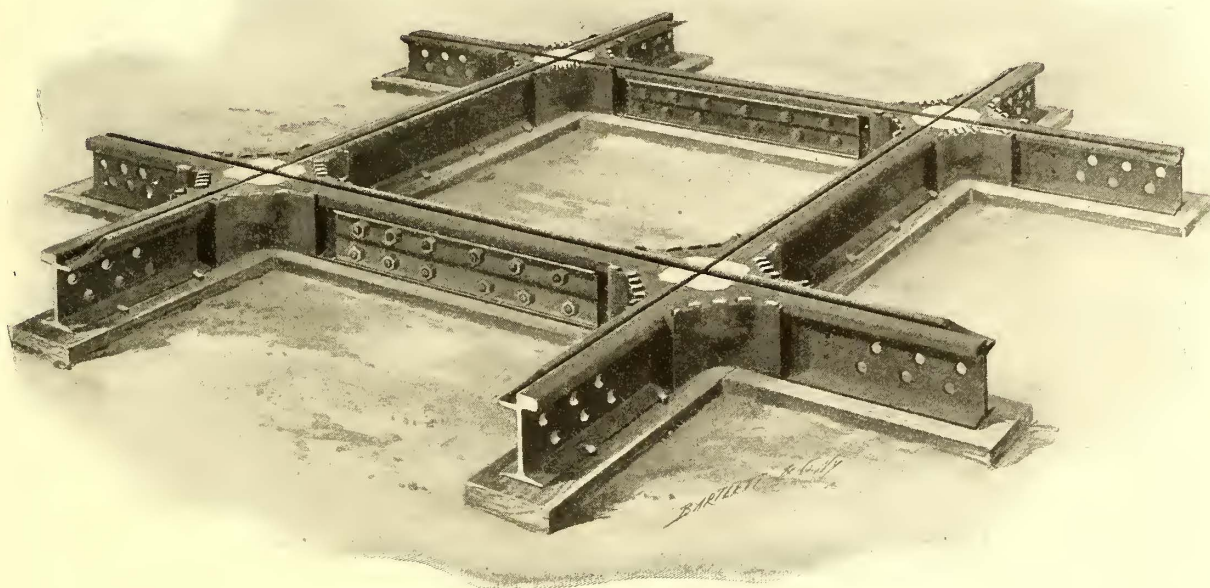
**Steam R. R. Special Work, Industrial Railways, Railway Castings  
Brake Shoes, Etc.**



# GUARANTEE SPECIAL WORK

Insured to Wear  
as Long as the  
Abutting Rails

Adjustable  
Without Disturbing  
the Pavement



Note  
Hardened Renewable  
Crossing Points

Guaranteed  
to Outlast Anything  
on the Market

## THE LORAIN STEEL COMPANY

London Office,  
29 Great St. Helen's, London, E. C. LORAIN, OHIO, and JOHNSTOWN, PA., U. S. A.



# THE PENNSYLVANIA STEEL CO.

MANUFACTURERS OF

**Steel Rails**

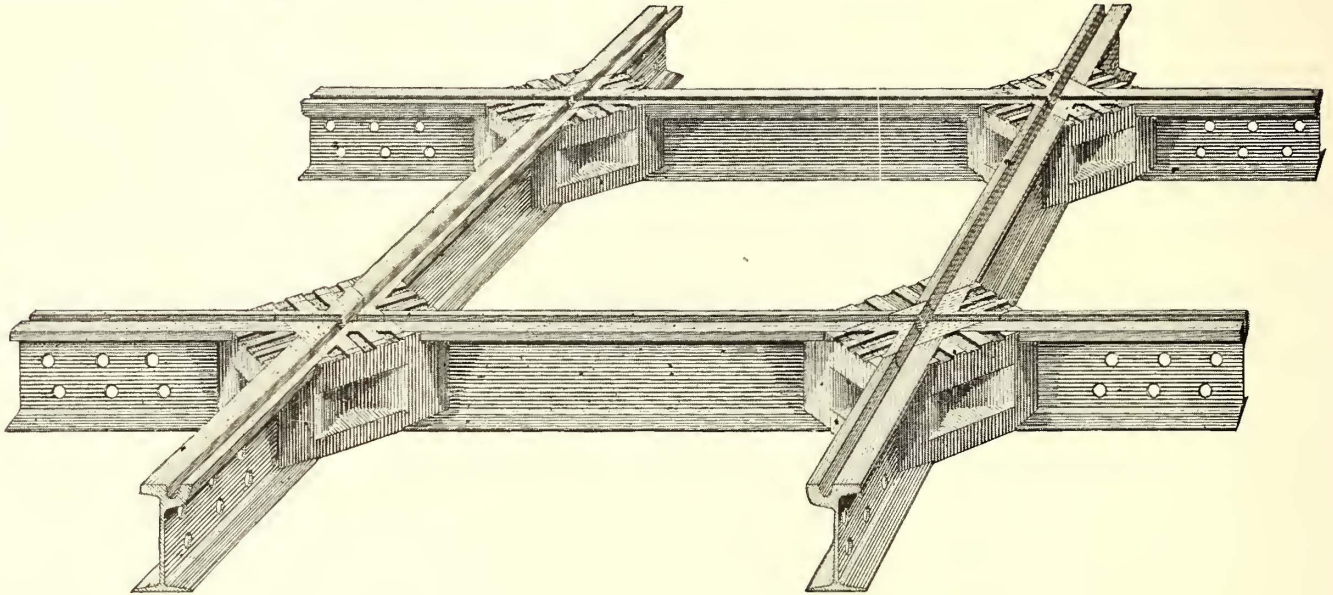
OF ALL SECTIONS AND WEIGHTS FOR BOTH  
STEAM AND ELECTRIC RAILWAYS.

**Frogs, Switches,**

AND CROSSINGS FOR STEAM RAILROADS.

**Special Work**

FOR STREET RAILWAYS.



**Bridges.**

WE CAN BUILD AND HAVE BUILT THE LARGEST AND HEAVIEST.

**Viaducts**

FOR STEAM RAILROADS AND ELEVATED RAILWAYS.

**Steel Buildings.**

WE CAN FURNISH ALL THE FRAME WORK.

**Steel Castings**

OF HIGHEST QUALITY.

**Special Steels**

FOR ALL PURPOSES.

CALL ON OR ADDRESS OUR NEAREST AGENT FOR INFORMATION  
AND PRICES.

**PHILADELPHIA OFFICE,**

Girard Bldg., Richard Peters, Jr., Sales Agt.

**BOSTON OFFICE,**

Rooms 11-12 Mason Bldg., Chas. S. Clark, Sales Agt.

**BALTIMORE AGENTS,**

R. C. Hoffman & Co., Continental Trust Building.

**ST. LOUIS AGENT,**

Joseph G. Miller, Security Building.

**NEW YORK OFFICE,**

Empire Building, S. W. Baldwin, Sales Agent.

**CHICAGO AGENTS,**

Railroad Supply Co., Bedford Building.

**SAN FRANCISCO AGENTS,**

George W. Gibbs Co., 33-39 Fremont Street.

**LONDON AGENTS—Sanders & Co., 110 Cannon St., E.C.**

Main Office, Mills, Shops and  
Foundries at

**STEELTON, PENNA.**

and SPARROW'S POINT, near Baltimore, Md.


CABLE ADDRESS:

For the Pennsylvania Steel Co., PENNSTEEL, HARRISBURG.

For the Maryland Steel Co., MARSTEEL, BALTIMORE.

USE "LIEBER'S," "A1," "A B C," or "WESTERN UNION" CODES.—LIEBER'S PREFERRED.






NEW YORK 114 BROADWAY  
CHICAGO 142 MADISON ST.  
DETROIT MICH.  
230 WEST BROAD ST.  
LONDON 112 CECILIA STREET

**"A. B. C."**  
**System of Mechanical Draft**  
Saves in Cost of Installation  
Saves in Fuel Expense

Send for Catalogue  
118 K



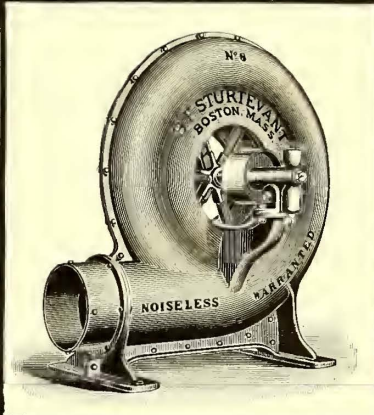
**American Blower Co.**  
Detroit, Mich.  
New York Chicago London

L. L. CLINE, Agt. Dist.

**STURTEVANT**

**BLOWERS**

*of every conceivable form for every conceivable purpose. Built for endurance.*



ALSO

- Exhausters
- Steam Fans
- Electric Fans
- Engines
- Electric Motors
- Generating Sets
- Forges
- Exhaust Heads
- Steam Traps
- Heating
- Ventilating and
- Drying Apparatus
- Mechanical Draft

154

**B. F. STURTEVANT & BOSTON**  
NEW YORK · PHILADELPHIA · CHICAGO · LONDON

TEMPERATURE AFTER LEAVING ECONOMIZER, 300 DEGREES.

**"AMERICAN" FUEL ECONOMIZER**  
(Bromell's Patents)  
(Burpees Patents)

Manufactured by  
**Bromell, Schmidt and Steacy Co.**  
York, Pa.

THE PROFITS ARE NOT ALL GOING OUT OF THIS STACK



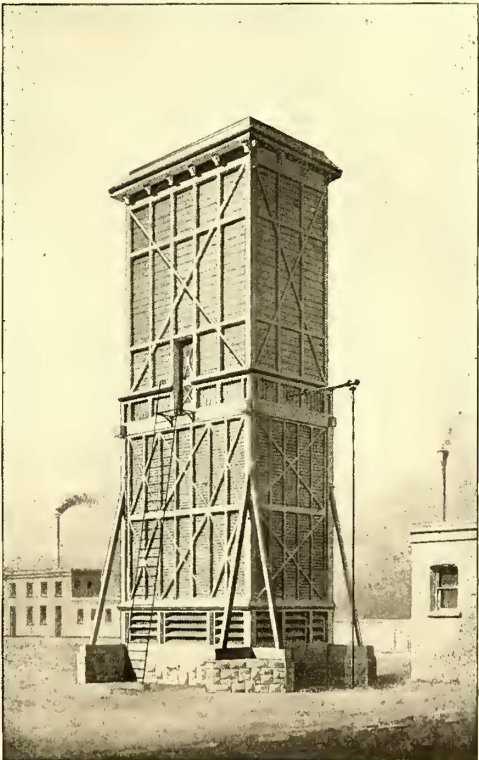
WATER ENTERING THE ECONOMIZER 150 DEGREES

WATER TO BOILERS 275 DEGREES

TEMPERATURE OF GASES FROM BOILERS 700 DEGREES

A large body of very hot water always ready for use is of great advantage in keeping regular steam pressure. Boilers are supplied with purified water, fewer boilers are required and much less repairs—all from waste heat.

**COOLING TOWERS** FAN DRAFT and NATURAL DRAFT



Save from 95 to 98 per cent. of Water

Reduction of temperature 50 to 70 degrees F. guaranteed.

References from leading firms all over the United States.

Payment in installments according to saving of fuel and water agreed to

NATURAL DRAFT TOWER

**GEO. J. STOCKER** Patentee and Manufacturer  
2833 So. Kingshighway Blvd.  
ST. LOUIS, MO.

Write for Catalogue



# CRANE VALVES

IN BRASS AND IRON, FOR 100 LBS., 250 LBS. AND 800 LBS. PRESSURES, IN GLOBE, ANGLE, GATE, ETC., PATTERNS. IRON GATE VALVES FOR 150 LBS. STEAM PRESSURE.

# CRANE FITTINGS

IN MALLEABLE AND CAST IRON, FOR ALL PRESSURES—FLANGED FITTINGS, LONG SWEEP FITTINGS, CAR HEATER, SPECIAL TESTED AIR BRAKE, AND BRASS FITTINGS.

CRANE STEAM SPECIALTIES. TOOLS. WROUGHT PIPE.

COMPLETE PIPING EQUIPMENTS FOR POWER PLANTS, FROM DRAWINGS, CUT, FITTED AND TESTED, READY FOR ERECTION, A SPECIALTY.

WRITE FOR CATALOGUE

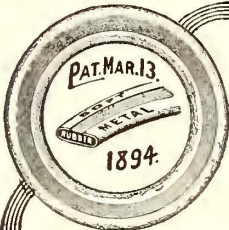
NEW YORK  
PHILADELPHIA  
CINCINNATI  
KANSAS CITY  
SIOUX CITY  
DULUTH  
OMAHA

## CRANE CO.

CHICAGO

ESTABLISHED 1855

ST. PAUL  
ST. LOUIS  
SEATTLE  
MINNEAPOLIS  
LOS ANGELES  
SAN FRANCISCO  
SALT LAKE CITY  
PORTLAND, ORE.



### The McKim Gasket

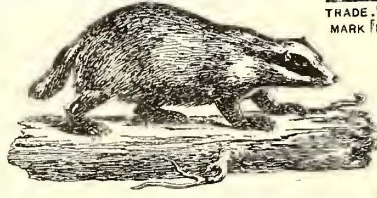
Made of packing incased in soft annealed copper  
Guaranteed to stand 450 lbs. steam pressure

Strength and elasticity perfect  
Can be reapplied indefinitely

All sizes for manhole, handhole and pipe fittings

WRITE FOR PRICES AND CATALOG

**McCord & Co.** 116 Broadway, NEW YORK  
1472 Old Colony Bldg., CHICAGO



TRADE MARK

### Badger Lubricant

Superior quality for grease cups and open boxes.

Compression Grease Cups.

All styles and sizes.

**600-K CYLINDER OIL** } For Compound and Triple  
**ROYAL DYNAMO OIL** } Expansion Engines of high steam pressure.

**Graphite Curve Grease**

Easily applied. Don't wash off. Best track grease.

WRITE FOR PRICES. **Ammonia Soap**

Nothing like it for greasy Engine Room Floors

WADHAMS OIL AND GREASE CO., Milwaukee, Wis.

## Results

If you think your feed water heater is not doing all that it should, send for our book. Send for it anyway. Maybe you don't know what a

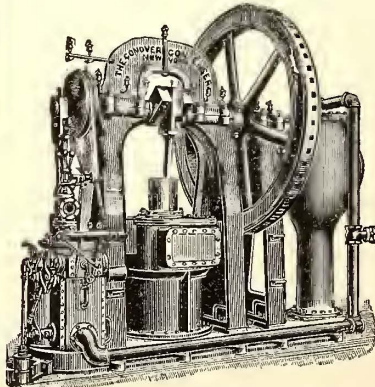
**Webster Feed-Water Heater and Purifier**  
can do.

**Warren Webster & Company**  
Camden, New Jersey

## CONOVER CONDENSERS

The Only Condensers sold under a

### Duty Guarantee



Driven by Compound Corliss Condensing Engine, twelve expansions of steam, vertical air pumps, all brass lined. Also Combined Air and Circulating Pumps for surface Condensers. Send for catalogue.

**THE CONOVER MFG. CO.**  
Office and Works  
PRINCETON AVENUE  
JERSEY CITY, N. J.



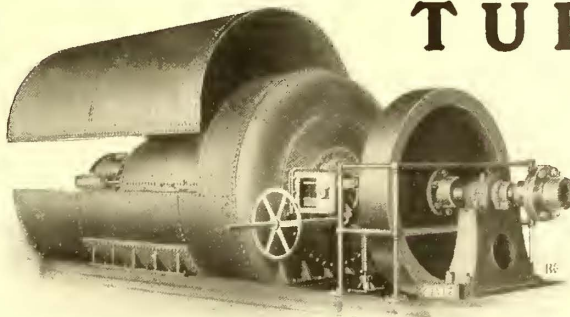
# VICTOR

For use in  
Electric Power Plants.

**SPECIAL FEATURES**

High speed and efficiency; great power and strength; easy working gate and fine regulation.

Write for further particulars.

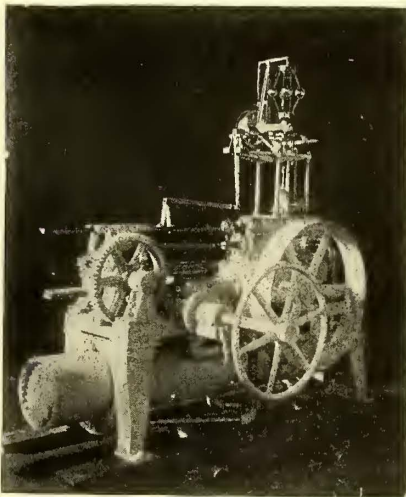


# TURBINES

WE ALSO MAKE  
Steam and Power Pumping Machinery,  
Jet and Surface Condensers,  
Air Compressors,  
Oil Mill Machinery,  
and Filter Presses.

P. O. BOX 282

The Stilwell-Bierce & Smith-Vaile Co. Dayton, Ohio, U. S. A.



## LOMBARD GOVERNORS

Our 1902 Catalogue of 100 pages is now ready for distribution. It contains all available information on governing water wheels. If you are interested, write for it \* \* \*

## THE LOMBARD GOVERNOR CO.

36 WHITTIER STREET, (Roxbury)

BOSTON, = = = = MASS.

STRAIGHT TUBES CURVED TUBE PLATES FREE EXHAUST

THE GOUBERT WATER FEED HEATER

USED IN MOST OF THE LARGEST STREET RAILWAYS SIZES 50 TO 6000

EASILY CLEANED AND ELECTRIC PLANTS IN THE COUNTRY HORSE POWER DURABLE

THE GOUBERT MFG. CO. 85 LIBERTY ST. NEW YORK

TO OBTAIN DRY STEAM

USE STRATTON IN YOUR STEAM SEPARATOR PIPE

THE GOUBERT MFG. CO. 85 LIBERTY ST. NEW YORK



# TAUNTON LOCOMOTIVE MFG. CO.

TAUNTON, MASS., U. S. A.

MAKERS OF

## WAINWRIGHT STEAM APPLIANCES

FEED WATER HEATERS  
SURFACE CONDENSERS  
EXPANSION JOINTS

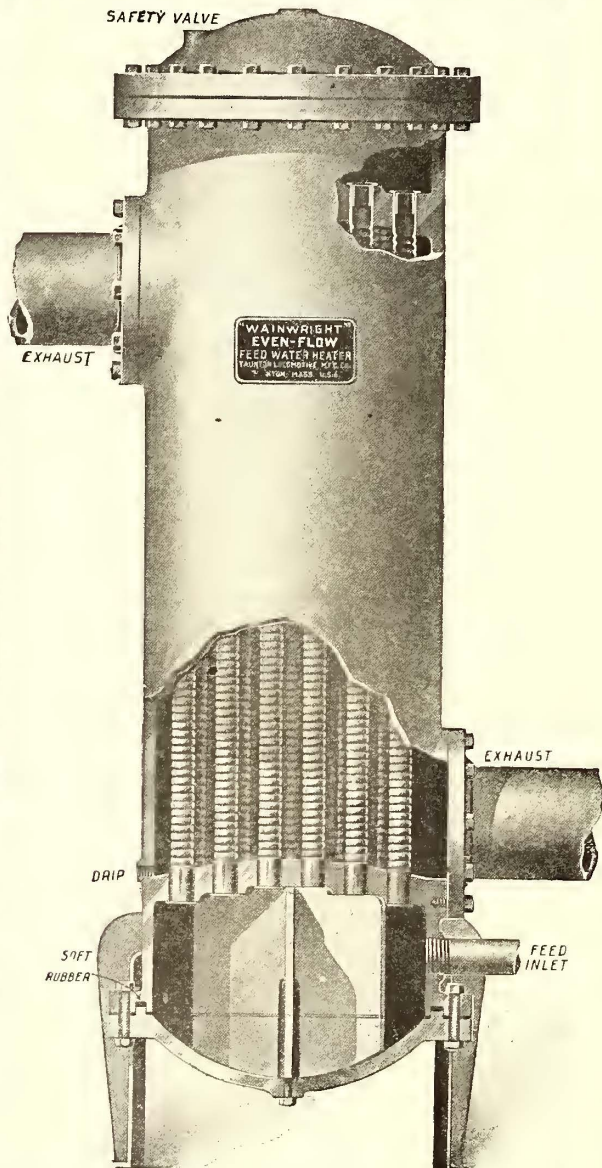


### THE WAINWRIGHT EVEN-FLOW FEED WATER HEATER

Is built of high-grade cast iron  
and has pure copper tubes,

**CORRUGATED**

These tubes will transmit 100 per cent. more  
heat per square foot than smooth tubes under  
same conditions. The feed water circulates so  
as to use all the heating surface uniformly.



100,000 H. P. at WATERSIDE STATION, 39th Street and East River, N. Y.

50,000 H. P. for new Power House, Brooklyn Rapid Transit.

8,000 H. P., Citizens' Light and Power Co., Rochester, N. Y.

---

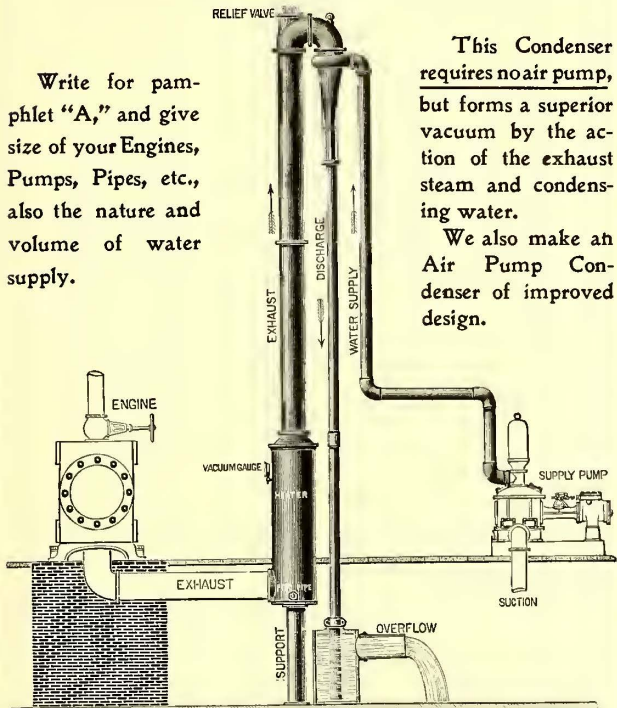
H. M. FIFE, Holland Building, St. Louis

CHARLES H. PAINE, 85 Liberty Street, 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,**

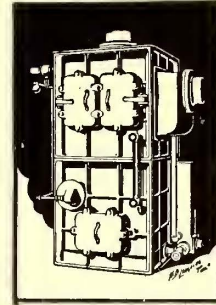
New York Office,  
145 Broadway.

**Orange, N. J.**

## What Kind of a Feed-Water Heater Do You Use? "COCHRANE"?

If so, you are well fixed, and if you should say "No," then the fault is probably ours, because we did not look you up when you were in the market, or because we did not present the facts about our "Cochranes" as they deserve to be told.

They heat water as hot as the exhaust steam can make it, and do this always—no deterioration in heating efficiency because of age, or because someone has forgotten to clean them.



Then they give all the purification obtainable with exhaust steam, saving the exhaust condensed in doing the heating, saving the returns and live steam drips, and giving purification in other ways.

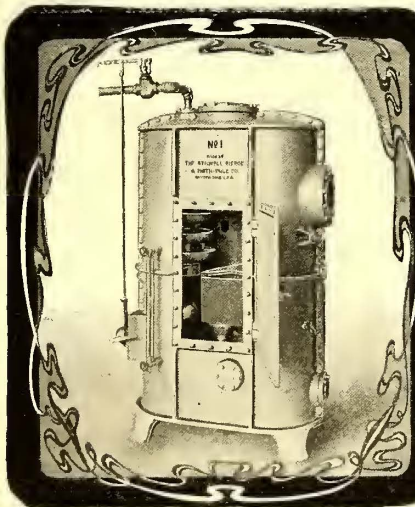
With one pound of exhaust steam they will heat six pounds of cold water to practically the boiling point, giving you seven pounds of hot water for your boilers where, under the same conditions it would take (if you used a closed heater) one and one-sixth pounds of exhaust and seven pounds

of cold water to get seven pounds of hot water—perhaps not so hot.

A dozen other advantages. We tell you about each of them in our Catalogue "20 H." So if you are looking into the heater question, please remember to investigate the "Cochrane."

**HARRISON SAFETY BOILER WORKS,**

N. 17th and Lippincott Sts., PHILADELPHIA, PA.



### A MATTER OF CHOICE

LOTS OF FUEL,  
LITTLE STEAM,  
MUCH WASTE AND  
DIRTY BOILERS

OR

LITTLE FUEL,  
LOTS OF STEAM,  
NO WASTE AND  
CLEAN BOILERS

ITS UP TO YOU. THE LATTER IS ATTAINED BY THE USE OF STILWELL'S FEED WATER HEATER.

WRITE FOR INFORMATION

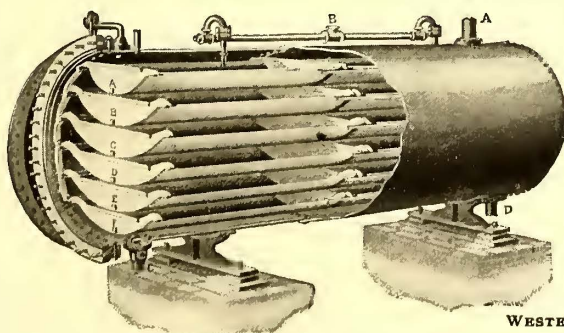
**THE STILWELL-BIERCE & SMITH-VAILE CO.**

M.O.B. 282 DAYTON, OHIO.

DURRELL & FOWLER CLEV.

## HOPPES

Live Steam Feed-Water PURIFIERS  
Exhaust Steam Feed-Water HEATERS



Live Steam Feed-Water Purifier

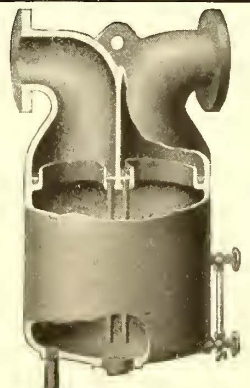
Our Purifiers are guaranteed to keep boilers clean, using any kind of water. The Heaters will heat feed-water to 210° and catch all solids liberated.

Hoppes Steam Separators and Oil Eliminators are the largest made, and separate without friction.

**The Hoppes Mfg. Co.**

51 Belmont Avenue, Springfield, O.

WESTERN OFFICE: Security Building, St. Louis. EASTERN OFFICE: Girard Building, Philadelphia.  
FOREIGN OFFICES: 59 City Road, London, E. C., England.



Horizontal Separator



# Wheeler Condenser & Engineering Co.



OFFICES:

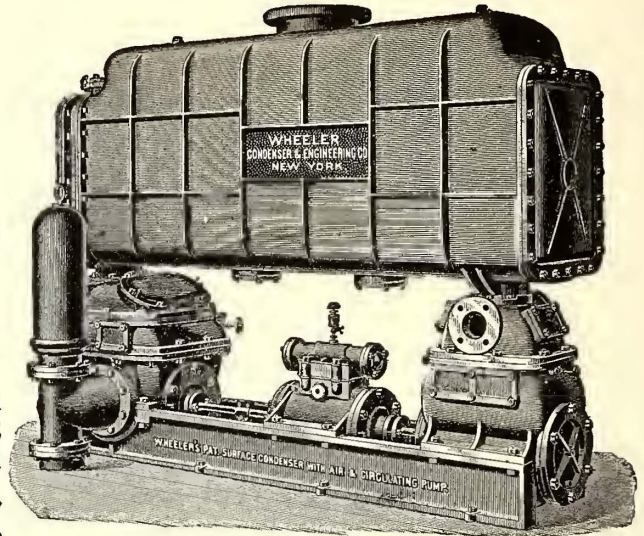
120 LIBERTY ST., NEW YORK.

1642 MONADNOCK BLOCK, CHICAGO.

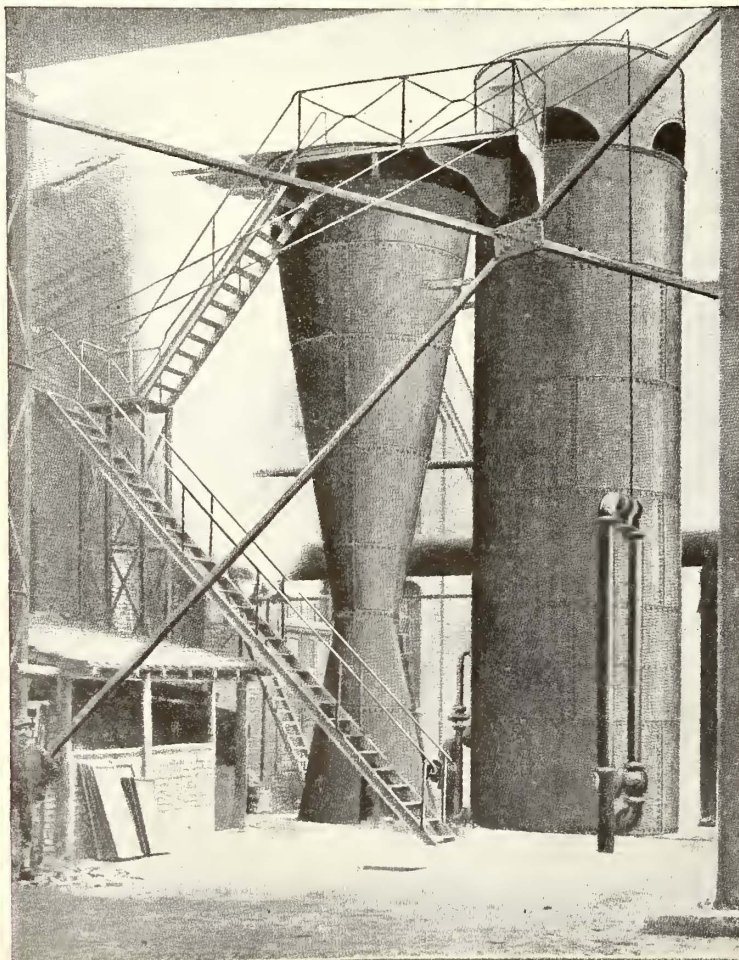
179 QUEEN VICTORIA ST., LONDON. E. C.

Water Cooling Towers  
 Wheeler  
 Surface Condensers  
 Feed Water Heaters  
 Steam and Electric Pumps  
 Evaporators  
 and Sugar Machinery

COMPLETE COOLING TOWER  
 AND CONDENSING PLANTS  
 FOR ELECTRIC LIGHT, RAIL-  
 WAY AND POWER PLANTS,  
 MILLS, MINES, ETC. . . . .



For the benefit of those contemplating the Installation or Altera-  
 tion of steam plants, we shall be pleased to give advice  
 and prepare plans and specifications.



## Over 3,000 Plants in Operation.

OVER 100,000,000 GALLONS OF WATER PURIFIED  
 DAILY FOR BOILER USE ALONE.

Automatic Apparatus for Purifying, Softening  
 and Filtering Hot or Cold Water Before Entering  
 Boilers.

Positively Preventing Incrustation, Corroding  
 and Foaming.

Operated Without Power, Steam or Mechanical  
 Agitators.

Simple and Durable in its Construction.

Cost Low and Very Economical in Maintenance.

No Waste of Lime or Soda Reagents.

No Renewal of Filtering Material Necessary.

We Guarantee our Plants to do the Work Claimed.

Some of the Big European Plants Using our Purifiers.

Allgemeine Elektrizitäts-Gesellschaft, Berlin, 330,000  
 gallons per day.

Union Elektrizitäts Gesellschaft, 348,000 gallons per  
 day.

Siemens & Halske, 951,000 gallons per day.

Schuckert & Co., 1,173,000 gallons per day.

Gans & Co., 798,000 gallons per day.

Sociétés des Tramways d'Ixelles-Boendal, 300,000  
 gallons per day.

Tramways de Fontainebleau, 30,000 gallons per day.

SEND FOR CATALOGUE.

## Automatic Water Purifying Co.,

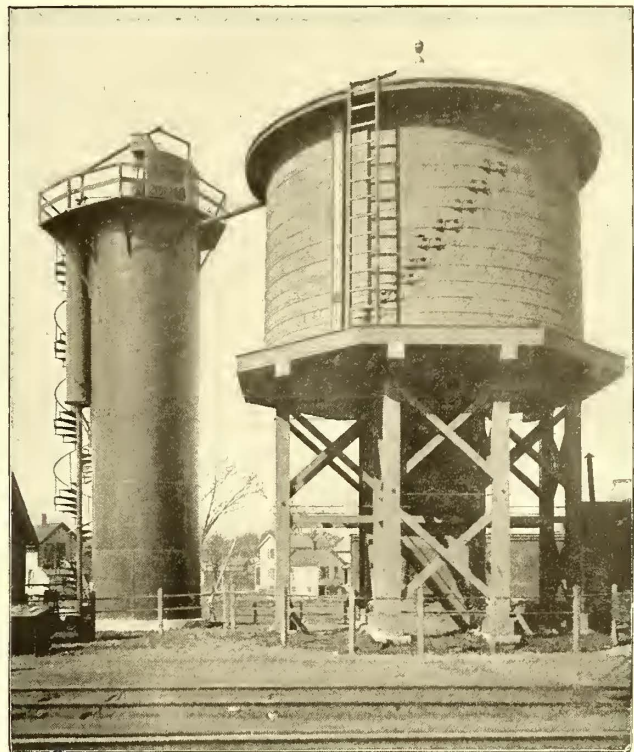
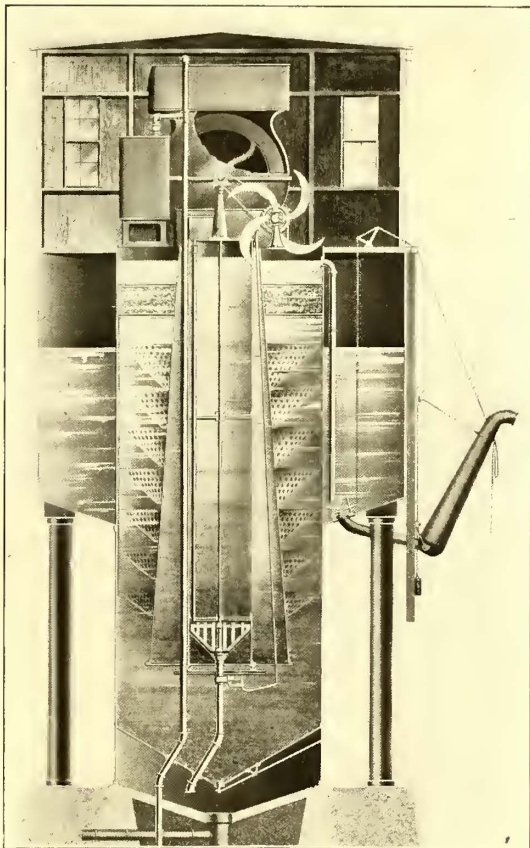
45 Broadway, New York.

Agents—F. T. Day, N. Y. Life Building, Chicago. Goff, Horner  
 & Co., Pittsburg, Pa. Jewett Allin, Chattanooga, Tenn.



# SOFT FEED WATER

## KENNICOTT WATER SOFTENING MACHINE



SECTIONAL VIEW—CAN BE ORDERED WITH OR WITHOUT SURROUNDING SOFT WATER STORAGE TANK

EXTERIOR VIEW OF KENNICOTT WATER SOFTENING MACHINE AS USED ON RAILWAYS

**MAKES WATER SOFT BEFORE IT ENTERS BOILERS**

**AN EFFICIENT MECHANICAL AGITATOR IS USED, INSURING UNIFORM STRENGTH OF LIME WATER**

**WE GUARANTEE RESULTS—AND OUR GUARANTEE MEANS SOMETHING**

# KENNICOTT WATER SOFTENER CO.

3581 BUTLER STREET, CHICAGO

CHAUNCEY J. BLAIR  
President

CASS L. KENNICOTT  
Vice-Prest. and Gen'l Mgr.

WALTER H. GREEN  
Secretary

JOHN BENHAM  
Treasurer



## 200 STREET RAILWAYS IN THE UNITED STATES

ARE  
USERS OF **Dearborn Vegetable Feed Water Treatment**  
FOR BOILERS

DEARBORN High Pressure Cylinder Oils are being generally adopted by the large Street Railway and Lighting Plants because of highest efficiency and economy.

WATERS ANALYZED FOR STEAM USERS FREE

**DEARBORN DRUG & CHEMICAL WORKS**

OFFICES AND LABORATORIES:

W. H. EDGAR, President

29, 30, 31, 32 & 33 RIALTO BLDG. CHICAGO

### ASK THE ENGINEER, HE KNOWS.

THE ENGINEER KNOWS WHAT?  
HE KNOWS WHY YOUR OIL BILLS ARE SO BIG.

**ASK HIM** IF ANY OIL IS LOST FROM LEAKY BARRELS IN WHICH THE OIL LAYS AFIER RECEIPT BECAUSE YOU HAVE NO PLACE TO STORE IT. IT'S TEN DOLLARS TO "A BRICK WATCH" THAT HE WILL SAY "YES," AND ESTIMATE THE LOSS AT SEVERAL GALLONS PER BARREL. WHEN THE OIL GETS WARM THE BARRELS OPEN UP LIKE A POOR MAN'S POCKET AND THE OIL STREAMS OUT, AND IT IS A DEAD LOSS TO THE OWNER.

**ASK THE ENGINEER** IF THERE IS ANY LOSS IN HANDLING OILS, BY DRAWING FROM THE SPIGOT, OR PUMPING FROM A "SLOPPY" OLD STYLE TANK; HE WILL CONFESS SUCH LOSS UPON EACH BARREL HANDLED. FIGURE THE COST OF THE OIL PER GALLON AND THE NUMBER OF GALLONS LOST PER BARREL AND MULTIPLY BY THE NUMBER OF BARRELS PURCHASED LAST YEAR AND THEN

**ASK YOURSELF** IF YOURS IS NOT A PRETTY EXPENSIVE PLAN AND IF THIS LOSS WERE NOT A LOSS BUT WERE TURNED INTO PROFIT INSTEAD, IF IT WOULD NOT RETURN A HANDSOME DIVIDEND UPON THE AMOUNT NECESSARY TO INVEST TO EQUIP YOUR PLANT WITH AN ECONOMICAL UP-TO-NOW OIL SAVING SYSTEM, ENABLING YOU TO STORE YOUR OILS IMMEDIATELY UPON RECEIPT. THEN SIT DOWN AND WRITE US A LETTER STATING YOUR NEEDS AND CIRCUMSTANCES SURROUNDING AND

**ASK US** WHAT SUCH A SYSTEM WILL COST.

**YOU WILL GET** A PROMPT REPLY (SURELY).

**WE WILL GET** YOUR ORDER (MAYBE), AND

**THE ENGINEER**—WELL, HE'LL BE TICKLED TO DEATH—

**ASK HIM TO-DAY.**

**S. F. BOWSER & CO. INC. FORT WAYNE, IND.**

## Let it Alone!



That's all the "AMERICAN" Oil Filter needs—to be let alone.

It uses no filtering material, and it requires no changing, no care, no attention.

Simply pour in your waste oil—water, grit, dirt and all. The filter automatically gives you back your oil—all of it—filtered, purified, and as good as new, while the dirty water and grit are automatically carried off. No other filter does this.

Thirty days on free trial; return it if not satisfied at our expense. Write for booklet.

**American Oil Filter Co.**

120 REAL ESTATE TRUST BUILDING,  
PHILADELPHIA, PA., U. S. A.

EE

# SIEGRIST SYSTEM,

AUTOMATIC LUBRICATION----PATENTED.

THE GREAT OIL AND LABOR SAVER. PAYS A BIG INTEREST ON THE INVESTMENT. NOT AFFECTED BY HEAT OR COLD. PLENTY OF OIL UNDER ALL CONDITIONS.

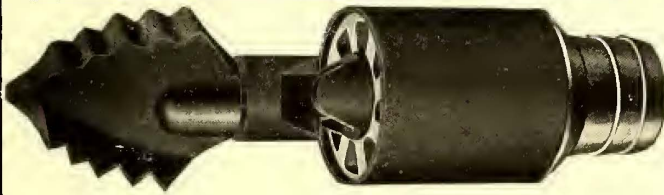
OWNERS AND CONSULTING ENGINEERS ARE INSTALLING IT ALL OVER THE WORLD.

A LIST OF USERS FURNISHED  
BY ADDRESSING

**SIEGRIST LUBRICATOR CO. ST. LOUIS, MO., U. S. A.**



**Over 4,000 Turbine Cleaners**



sold to the Largest Companies in America and Europe, who have found this Cleaner the only one they can afford to use or buy. Sent on Trial.

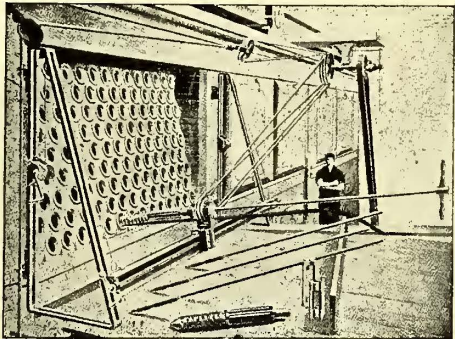
**Better Results**

are obtained from low-grade oils with this Filter than from the most expensive oils with any other apparatus.



Write for Booklets.

**LIBERTY MANUFACTURING CO. PITTSBURG, PA.**



**This is an Age of Specialties**

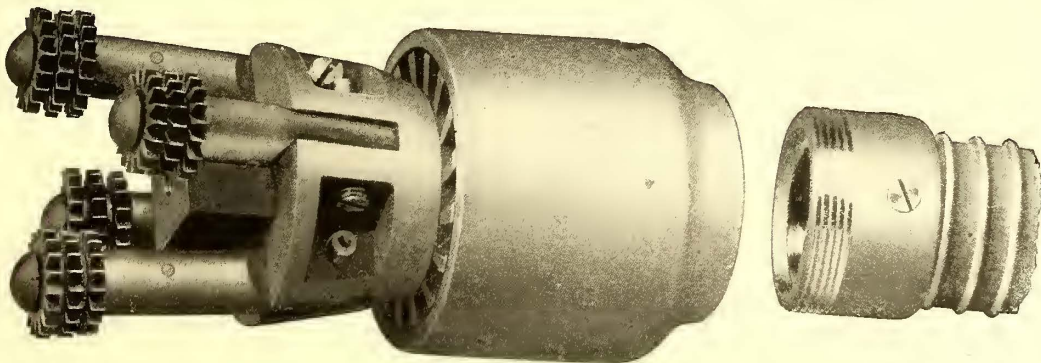
Ours are boiler tube cleaning devices for cleaning all water tube boilers mechanically. They are not experiments, but the oldest on the market.

**The Gem Manufacturing Co.**

Spruce, near Thirty-third Street, Pittsburg, Pa.

**THE WEINLAND Tube Cleaner CLEANS TUBES CLEAN.**

It is the machine for you, if *effective work, strength and minimum cost of operating* count for anything.



**SAVES TUBES, TIME, COAL, LABOR AND INCREASES DIVIDENDS.**

**The Patent Coupling**

Write us about Boiler Cleaning. We're experts in that line, have had 20 years' practical experience and "know how." Many sizes and styles for all kinds of tubes.

shown above is worth your consideration. One goes with every cleaner. Hose can't pull out. Saves lots of time, worry and "cuss-words."

**The Lagonda M'f'g Co.,** 17 West Washington Street, SPRINGFIELD, OHIO, U. S. A.



**EDGE MOOR IRON CO.**  
**EDGE MOOR BOILERS DELAWARE**  
 WATER-TUBE SUPER-HEATING

TELEPHONE CALL, 1515 CORTLANDT.

Buffalo Office 13 TERRACE. TELEPHONE CALL SENEGA 1394.

**ROBERT A. KEASBEY.**  
**K & M. MAGNESIA & MAGNABESTOS SECTIONAL COVERINGS.**

HEADQUARTERS FOR HAIR FELT, MINERAL WOOL, ASBESTOS PAPERS BRINE PIPE COVERINGS, ETC

83 WARREN ST. New York City.

ESTIMATES FURNISHED AND CONTRACTS EXECUTED.

**WATER TUBE STEAM BOILERS**

MANUFACTURED BY  
**HEINE SAFETY BOILER CO.**  
 421 Olive St., St. Louis, U. S. A.  
 ARE  
**ECONOMICAL, SAFE AND DURABLE**

E. A. MARSHALL ADV. ST. LOUIS

THE ADVERTISEMENTS OF  
**Steam Plant**  
**Equipment**

IN THE  
**STREET RAILWAY JOURNAL**  
 INCLUDE

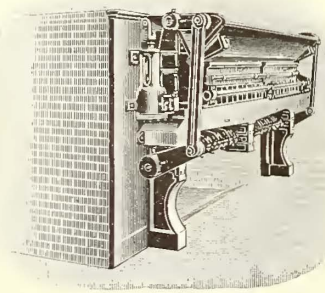
- Engines,  
 Boilers,  
 Pumps,  
 Condensers,  
 Heaters and Purifiers,  
 Separators,  
 Automatic Stokers,  
 Grates,  
 Coal Conveyors,  
 Cooling Towers,  
 Fuel Economizers,  
 Mechanical Drafts,  
 Oil Filters,  
 Boiler Cleaners,  
 Water Softeners,  
 Piping,  
 Pipe Coverings,  
 Valves,  
 Engine Stops,  
 Packing,  
 Lubricators,  
 Oil Cabinets,  
 Oils and Greases,  
 Etc., Etc.

When in the market for any of the above apparatus, it will pay you to consult these pages.

**The Wilkinson Stoker**

**OVER 3,000 MACHINES**  
**IN SUCCESSFUL OPERATION**

Their use insures the highest degree of economy in Burning any kind of Fuel . . . . . Mechanical Feeding . . Automatic Stoking



SEND FOR CATALOGUE

BRANCH OFFICES  
 NEW YORK  
 PHILADELPHIA, PA.  
 HARRISBURG, PA.  
 COLUMBUS, O.

**THE WILKINSON MANUFACTURING CO.**  
 BRIDGEPORT, MONTGOMERY COUNTY, PA.



# THE BABCOCK & WILCOX Co.

85 LIBERTY ST.  
NEW YORK  
CABLE ADDRESS  
NEW YORK  
"GLOVEBOXES"  
ALL FOREIGN OFFICES  
"BABCOCK"

## STEAM

SEND FOR OUR BOOK "STEAM"

**BOSTON**  
36 FEDERAL ST.  
**PHILADELPHIA**  
NORTH AMERICAN BLDG.  
**SAN FRANCISCO**  
32 FIRST ST.

**BRANCH OFFICES**

**CHICAGO** NEW ORLEANS  
MARQUETTE BLDG. 339 CARONDELET ST.  
**PITTSBURGH**  
EMPIRE BLDG.

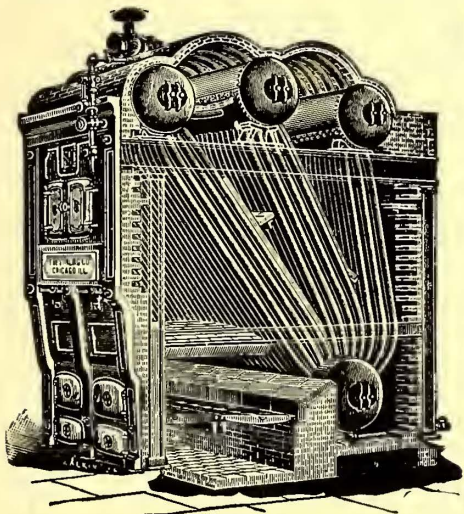
**ATLANTA, GA.**  
EQUITABLE BLDG.  
**MEXICO CITY**  
7 AVENIDA JUAREZ  
**HAVANA, CUBA**  
1105 CALLE DE LA HAVANA

**Partial List of BABCOCK & WILCOX BOILERS Sold for Electric and Cable Railways.**

		H.P.			H.P.
Metropolitan St. Ry. Co., New York.....	12 orders,	'94-'00.. 59,100	Market St. Cable Ry. Co., San Francisco, Cal.....	3 orders..	2,208
Manhattan Elevated Ry. Co., New York .....	2 orders,	'09.. 33,500	Virginia Ry. & Dev. Co., Richmond, Va.....	1 order,	'00.. 2,080
Boston Elevated R. R. Co., Boston, Mass.....	12 orders,	'89-'09.. 22,500	St. Joseph Ry. Light, Heating & Power Co., St. Joseph, Mo.....	3 orders,	'98-'99.. 2,057
Union Traction Co., Philadelphia, Pa.....	9 orders,	'93-'95.. 21,675	Union R. R. Co., Providence, R. I.....	2 orders,	'02-'03.. 2,000
Brooklyn Rapid Transit Co., Brooklyn, N. Y.....	13 orders,	'91-'97.. 20,000	United Traction Co., Albany, N. Y.....	5 orders,	'80-'99.. 2,000
Union Elevated R. R. Co., Chicago, Ill.....	1 order,	'06.. 6,400	Springfield St. Ry. Co., Springfield, Mass.....	4 orders,	'94-'00.. 2,000
Northwestern Elevated R. R. Co., Chicago, Ill.....	1 order,	'96.. 6,400	Columbus St. Ry. Co., Columbus, O.....	4 orders,	'90-'93.. 1,807
Metropolitan West Side Elevated R. R. Co., Chicago, Ill.....	2 orders,	'94-'98.. 6,000	Charleston Consolidated Ry., Gas & Elec. Co., Charleston, S. C.....	3 orders,	'97-'00.. 1,800
Consolidated Traction Co., Pittsburg, Pa.....	2 orders,	'07-'09.. 6,000	N. Y. & Brooklyn Bridge, Brooklyn, N. Y.....	5 orders,	'92-'96.. 1,786
North Jersey St. Ry. Co., Jersey City, N. J.....	6 orders,	'03-'09.. 6,000	Dayton, Springfield & Urbana St. Ry. Co., Dayton, O.....	2 orders,	'99.. 1,702
South Side Elevated R. R. Co., Chicago, Ill.....	2 orders,	'07-'08.. 4,800	Florence & Cripple Creek Ry. Co., Goldfield, Col.....	1 order,	'98.. 1,584
Metropolitan St. Ry. Co., Kansas City, Mo.....	6 orders,	'86-'96.. 4,696	Duluth St. Ry. Co., Duluth, Minn.....	4 orders,	'90-'93.. 1,312
Buffalo St. Ry. Co., Buffalo, N. Y.....	3 orders,	'90-'93.. 4,500	Richmond Passenger & Power Co., Richmond, Va.....	2 orders,	'90-'00.. 1,339
Louisville Ry. Co., Louisville, Ky.....	3 orders,	'96-'00.. 4,062	Detroit, Ypsilanti & Ann Arbor St. Ry. Co., Ypsilanti, Mich.....	2 orders,	'98.. 1,380
United Rys. & Elec. Co., Baltimore, Md.....	1 order,	'09.. 4,000	Pittsburg & Birmingham Traction Co., Pittsburg, Pa.....	2 orders,	'90-'00.. 1,528
Lynn & Boston R. R. Boston, Mass.....	3 orders,	'09-'02.. 4,000	Rochester St. Ry. Co., Rochester, N. Y.....	3 orders,	'91-'94.. 1,143
Cincinnati St. Ry. Co., Cincinnati, O.....	5 orders,	'90-'93.. 3,300	Atlanta Ry. & Power Co.....	2 orders,	'00.. 2,400
Citizens St. Ry. Co., Detroit, Mich.....	3 orders,	'05.. 3,500	Union R. R. Co., New York.....	2 orders,	'91-'92.. 1,500
Denver City Tramway Co., Denver, Colo.....	3 orders,	'89-'91.. 2,686			
United Traction Co., Pittsburg, Pa.....	2 orders,	'09.. 2,436			
Union Traction Co., Anderson, Ind.....	2 orders,	'98-'99.. 2,400			
Cleveland Elec. Ry. Co., Cleveland, O.....	2 orders,	'98-'99.. 2,378			

Note the number and size of the renewal orders.

**BABCOCK & WILCOX Boilers sold for Street Railway Purposes amount in the aggregate to over 400,000 H.P.**



## THE STIRLING WATER TUBE SAFETY BOILER

**STILL LEADS ALL COMPETITORS**

Over One Million H.P. in Use

## THE STIRLING COMPANY

General Offices, - - - Pullman Building, CHICAGO

BRANCHES IN ALL PRINCIPAL CITIES

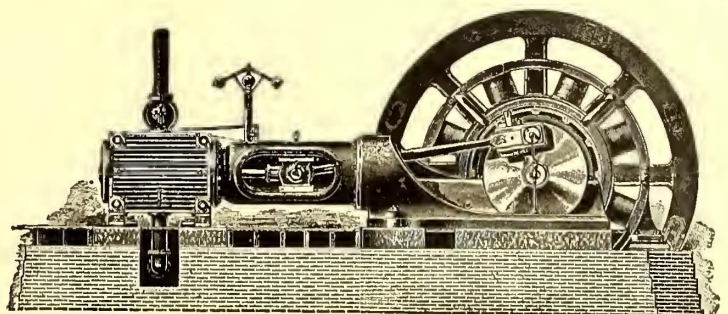
*Robt. Wetherill & Co., Chester, Penna.,* Office and Works,

*Electric Railway  
Power Plants...*

Power Machinery,

*Corliss*  
**ENGINES.**

*Berry Safety*  
**BOILERS.**

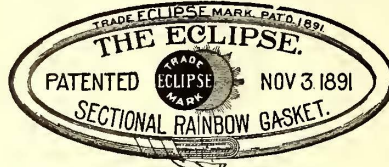




**THE ECLIPSE SECTIONAL RAINBOW GASKET.**

3/8 in. }  
1/2 in. } for Hand Holes.  
5/8 in. }

3/4 in. }  
7/8 in. } for Extra Large Joints.  
1 in. }



The Eclipse Gasket is red in color, and composed of the celebrated Rainbow Packing Compound. It will not harden under any degree of heat, or blow out under the highest pressure, and can be taken out and repeatedly replaced. Joints can be made in from three to five minutes.

PATENTED AND MANUFACTURED EXCLUSIVELY BY

**THE PEERLESS RUBBER MANUFACTURING CO.,**

16-24 Woodward Ave., Detroit, Mich. 16 WARREN STREET, NEW YORK. 202-210 S. Water Street, Chicago, Ill.  
17-23 Beale Street, and 18-24 Main Street, San Francisco, California.

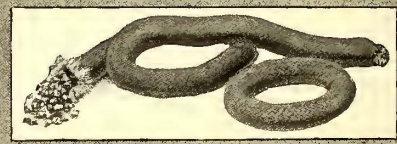
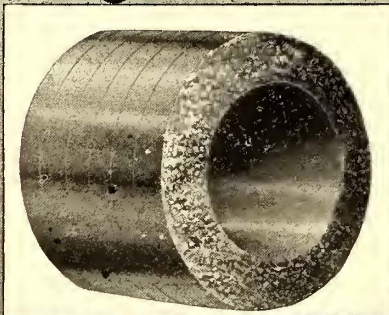
**A COMPLETE REPAIR SHOP FOR EVERYTHING ELECTRICAL.**

NEVER  
MELTS, BURNS  
OR  
DISINTEGRATES

**LARKIN'S METALLIC  
PACKING  
STANDS THE TEST**

REDUCES  
FRICITION

PROTECTS MACHINERY



① SAVES OIL

① SAVES MONEY



HOLDS NO MOISTURE  
FOR STUFFING BOXES OF



PISTON RODS, VALVE RODS, PLUNGERS AND ALL OTHER RECIPROCATING OR ROTATING PARTS OF MACHINERY WHICH REQUIRE PACKING.

WE CONTRACT TO OVERHAUL EQUIPMENTS.

SEND FOR DESCRIPTIVE CIRCULAR

WE MAKE GENERATOR REPAIRS A SPECIALTY.

— PROMPTNESS —

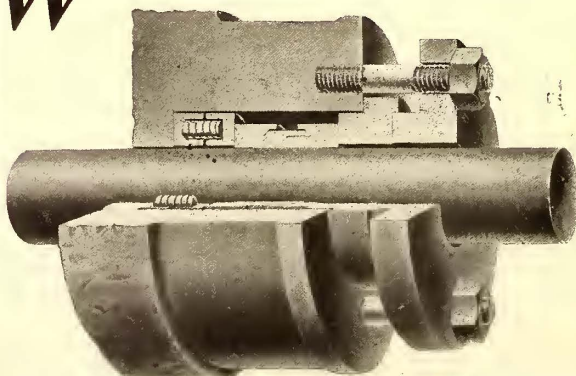
— RELIABILITY —

**PENNSYLVANIA ELECTRICAL RAILWAY SUPPLY COMPANY.**

① PENN AVE. 4th THIRD STREET, PITTSBURG, PENNA., U.S.A. ①

SOLE ENGRAVING CO. PITTSBURG

**WHY USE THE SWAIN METALLIC PACKING?**



**FIRST**, because a perfect METALLIC packing is absolutely necessary if reliability, safety and economy with uninterrupted service and low cost of maintenance are desired.

**SECOND**, because the SWAIN Metallic Packing best fulfills these requirements, possesses the greatest longevity, forms a perfect joint with the least friction, and when adjusted to a good rod is perfectly steam and water tight. Our catalogue will tell you more about it.

**SWAIN LUBRICATOR CO.** 250 Lake Street CHICAGO

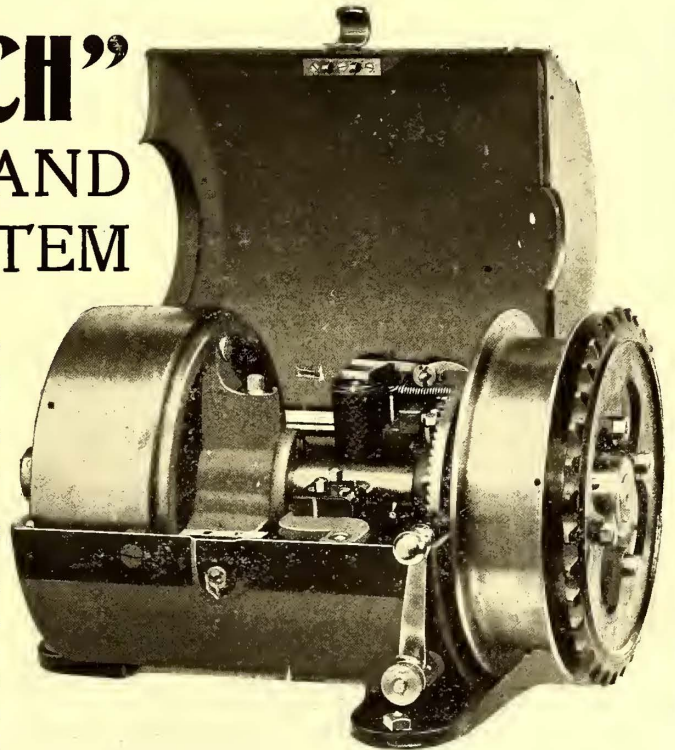


# ACCIDENT PREVENTION IS BETTER THAN ACCIDENT INSURANCE

The chief advantage of an accident insurance policy is a cash indemnity for loss of life or limb which no amount of money can restore. We offer you a means for *preventing* the worst accidents that can happen in your engine room—a device that will keep watch over your engine at all times and avoid the fatal complications so often resulting from a racing engine.

## THE "MONARCH" ENGINE-STOP AND SPEED LIMIT SYSTEM

Is a safeguard and means of protection for life and property entirely independent of any mechanism connected with the engine for that purpose. ❀ ❀ ❀ ❀ ❀ ❀



The Monarch System is applicable to every type of stationary engines manufactured. It is quick in action and cannot injure the valve as its operation prevents the valve from being forced too hard upon its seat. The STOP is directly connected to the throttle, and by means of electric wires and push-buttons is accessible in all parts of the building. As the engineer almost universally uses one of the buttons in the engine room when closing down, the system is always in order. The SPEED LIMIT is directly connected to the main or flywheel shaft and can be adjusted at will to any number of revolutions of the engine above normal and operates only in case of increased speed above that point. In case of breakage of the regular governor, or it fails to operate for any reason, the SPEED LIMIT acts.

*The best American device for preventing engine room accidents deserves the careful consideration of European engineers. We have excellent facilities for handling export orders.*

# CONSOLIDATED ENGINE-STOP CO.

100  
BROADWAY  
NEW YORK

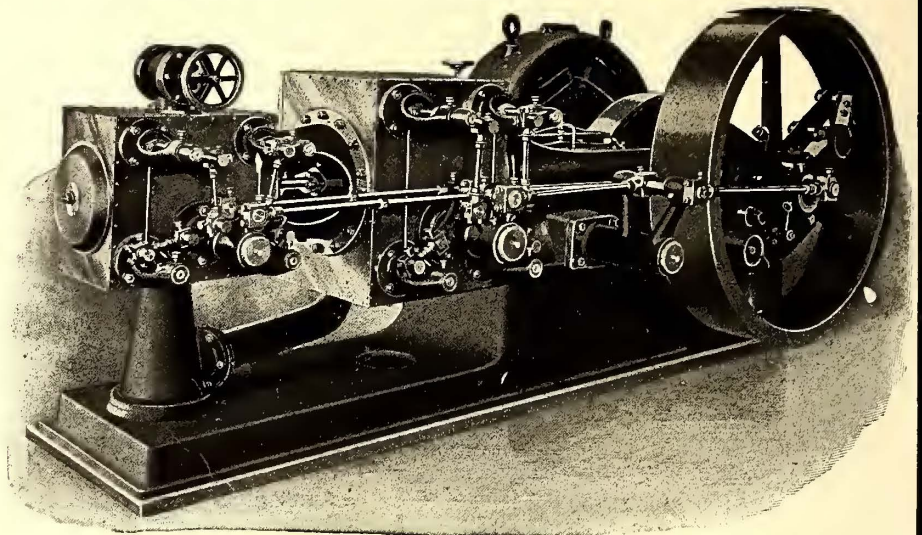
London Representatives: DRAKE & GORHAM, Limited, 62 Victoria Street



## AUTOMATIC CUT-OFF STEAM ENGINES

ESPECIALLY DESIGNED FOR RAILWAY AND LIGHTING SERVICE  
ALL SIZES AND TYPES

We guarantee that the regulation of all Ball & Wood engines, as the result of the new principle embodied in the governor, shall be better than has been realized by any other system of governing



# The Ball & Wood Co

120 LIBERTY ST.  
NEW YORK

London Office  
97 Queen Victoria Street

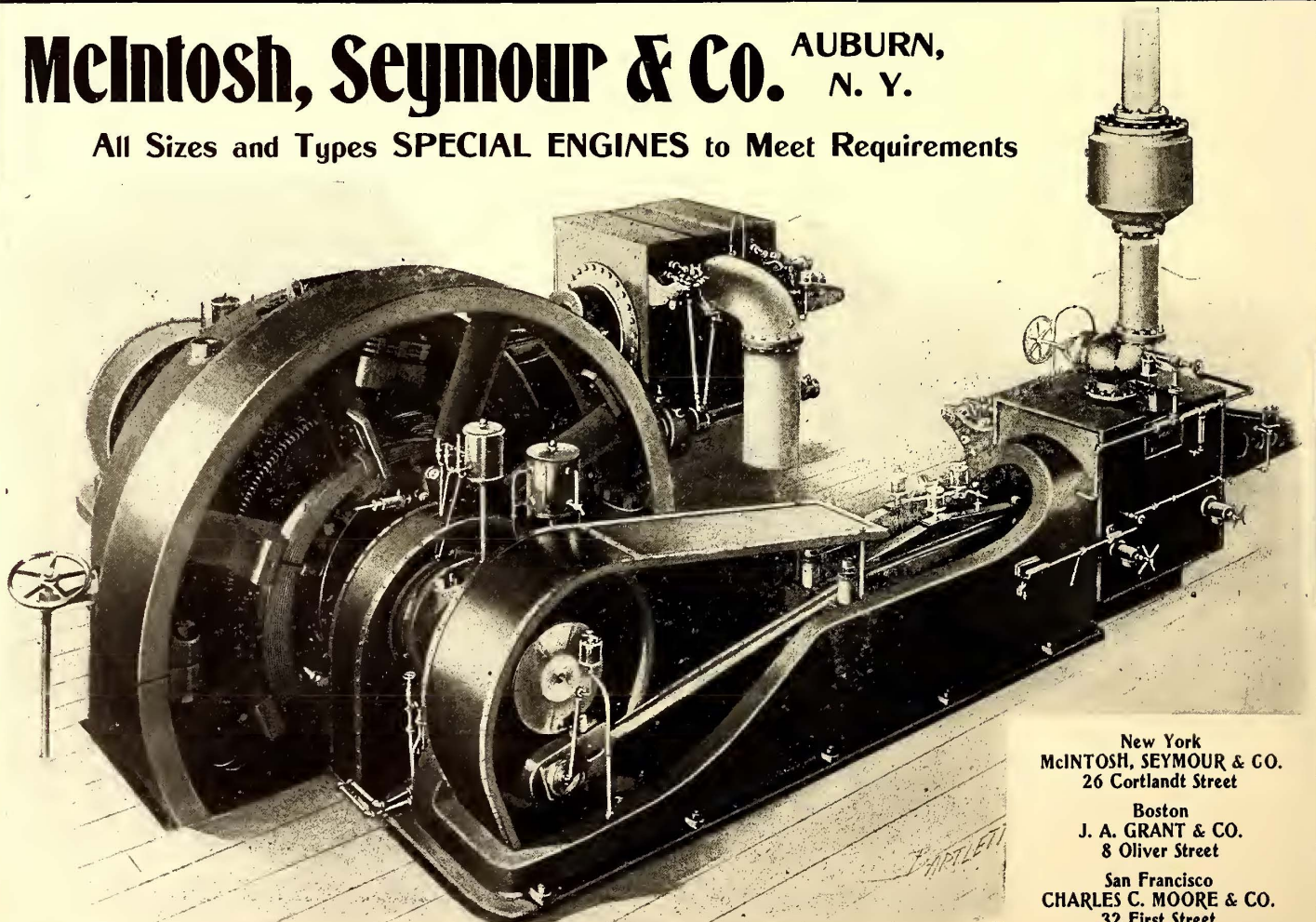


Cable Address  
Ballwood, New York

# McIntosh, Seymour & Co.

AUBURN,  
N. Y.

All Sizes and Types SPECIAL ENGINES to Meet Requirements



New York  
McINTOSH, SEYMOUR & CO.  
26 Cortlandt Street

Boston  
J. A. GRANT & CO.  
8 Oliver Street

San Francisco  
CHARLES C. MOORE & CO.  
32 First Street



**ORIGINAL GEO. H. CORLISS,**  
IMITATED BY ALL THE WORLD,  
BUT NOT EXCELLED.

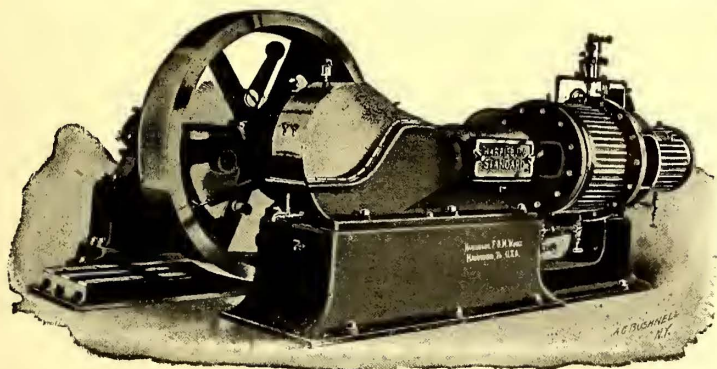
**GREENE-WHEELOCK,**  
HOLDING WORLD'S RECORD  
FOR PRACTICAL ECONOMY.

# STEAM ENGINES

**INTERNATIONAL POWER COMPANY,**

OPERATING CORLISS STEAM ENGINE COMPANY.

**PROVIDENCE, R. I., U. S. A.**



HARRISBURG STANDARD TANDEM COMPOUND ENGINE  
DIRECT CONNECTED STYLE

## Harrisburg Engines

6 TO 3,000 HORSE POWER HIGH SPEED  
MEDIUM SPEED AND CORLISS

Harrisburg Foundry and Machine Works  
HARRISBURG, PA., U. S. A.

# BROWN CORLISS ENGINE CO.

MILWAUKEE, WIS.

(Works at Corliss, Wis., 23 miles South of Milwaukee, on the main line of the C. M. & St. P. Ry.)

— BUILDERS OF —

## HEAVY DUTY CORLISS ENGINES

BOTH HORIZONTAL AND VERTICAL TYPE, FOR ALL  
PURPOSES AND POWERS UP TO 8,000 HORSE POWER,  
REVOLUTIONS FROM 60 TO 150 PER MINUTE. . . .

**CORRESPONDENCE SOLICITED**

Eastern Direct Representatives  
**WOOLSTON & BREW**  
39 Cortlandt Street, New York  
608 Exchange Bldg., Boston, Mass.

Pittsburg Direct Representatives  
**PITTSBURG GAGE AND SUPPLY CO.**  
Pittsburg, Pa.



# ALLIS-CHALMERS CO.

SUCCESSOR TO

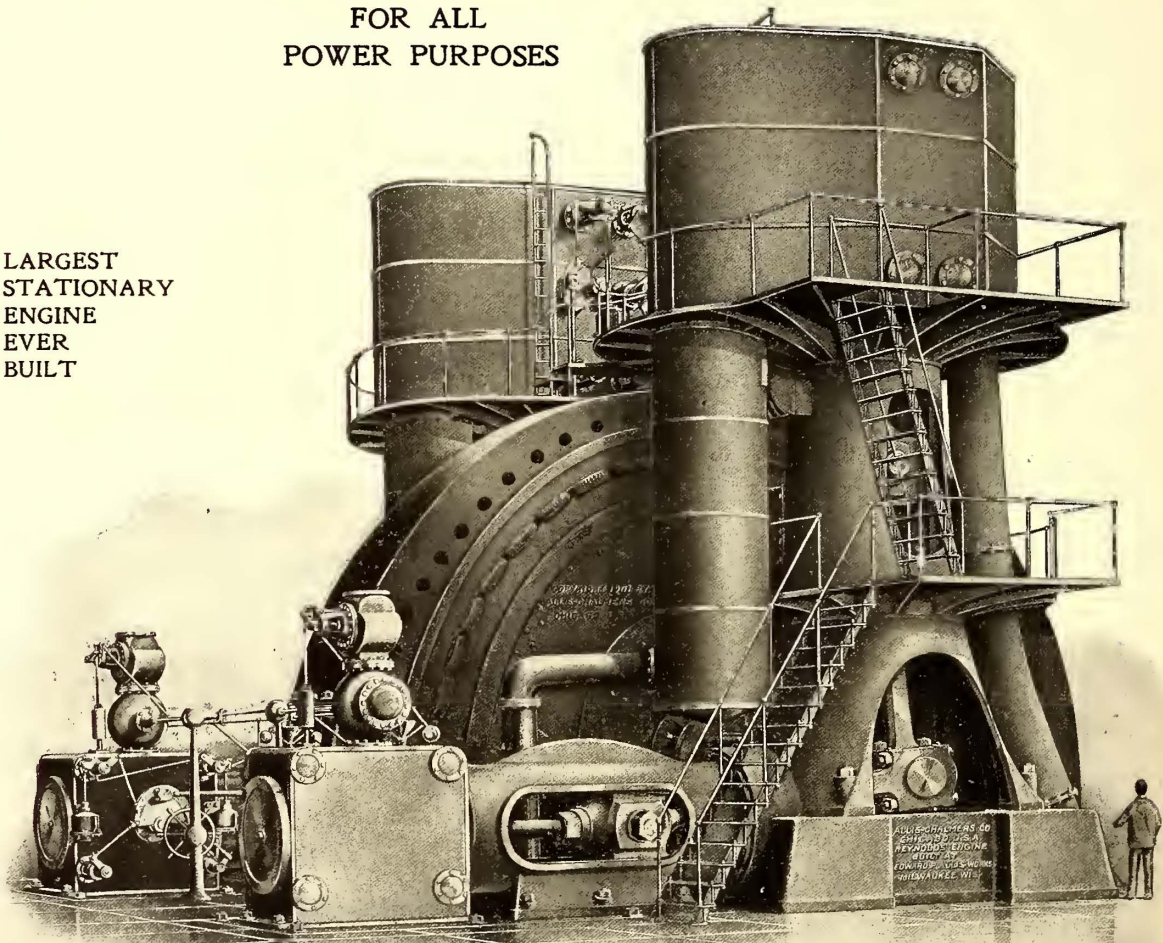
THE EDWARD P. ALLIS CO. MILWAUKEE, WIS. FRASER & CHALMERS, CHICAGO, ILL. GATES IRON WORKS, CHICAGO, ILL. DICKSON MFG. CO. SCRANTON, PA.

SOLE BUILDERS OF

## REYNOLDS CORLISS ENGINES

FOR ALL  
POWER PURPOSES

LARGEST  
STATIONARY  
ENGINE  
EVER  
BUILT



The above cut is an illustration of a "REYNOLDS' ENGINE" built for the Manhattan Railway Co., New York, also for the New York Rapid Transit R. R. (The Subway) There are to be eight of these engines in each of the power houses. Each engine is rated at 8,000 H. P. for its most efficient load, and is to be capable of operating continuously under a load of 12,000 H. P.

SPECIAL ENGINES FOR STREET RAILWAY AND ELECTRIC LIGHT PURPOSES.

**BRANCH OFFICES:**

NEW YORK, Broad Exchange Bldg.  
PITTSBURG, 305 Ger. Nat. Bank Bldg.  
MINNEAPOLIS, 418 Corn Exchange Bldg.  
DENVER, 1649 Tremont St.  
SALT LAKE CITY, Dooly Block.

**GENERAL OFFICE:**

CHICAGO, ILL., U.S.A.



HOME INSURANCE BUILDING.

**BRANCH OFFICES:**

SPOKANE, 512 First Ave.  
SAN FRANCISCO, 137 Montgomery St.  
CITY OF MEXICO, 8 Calle Gante.  
LONDON, ENG., 160 Dashwood House.



# ALLIS-CHALMERS CO.

SUCCESSOR TO

THE EDWARD P. ALLIS CO. FRASER & CHALMERS. GATES IRON WORKS. DICKSON MFG. CO.  
 Milwaukee, Wis. Chicago, Ill. Chicago, Ill. Scranton, Pa.

**A**LLIS-CHALMERS COMPANY ENGINES furnish power in every large city in the United States, also in most large cities in foreign countries. Our Engines may be seen running in

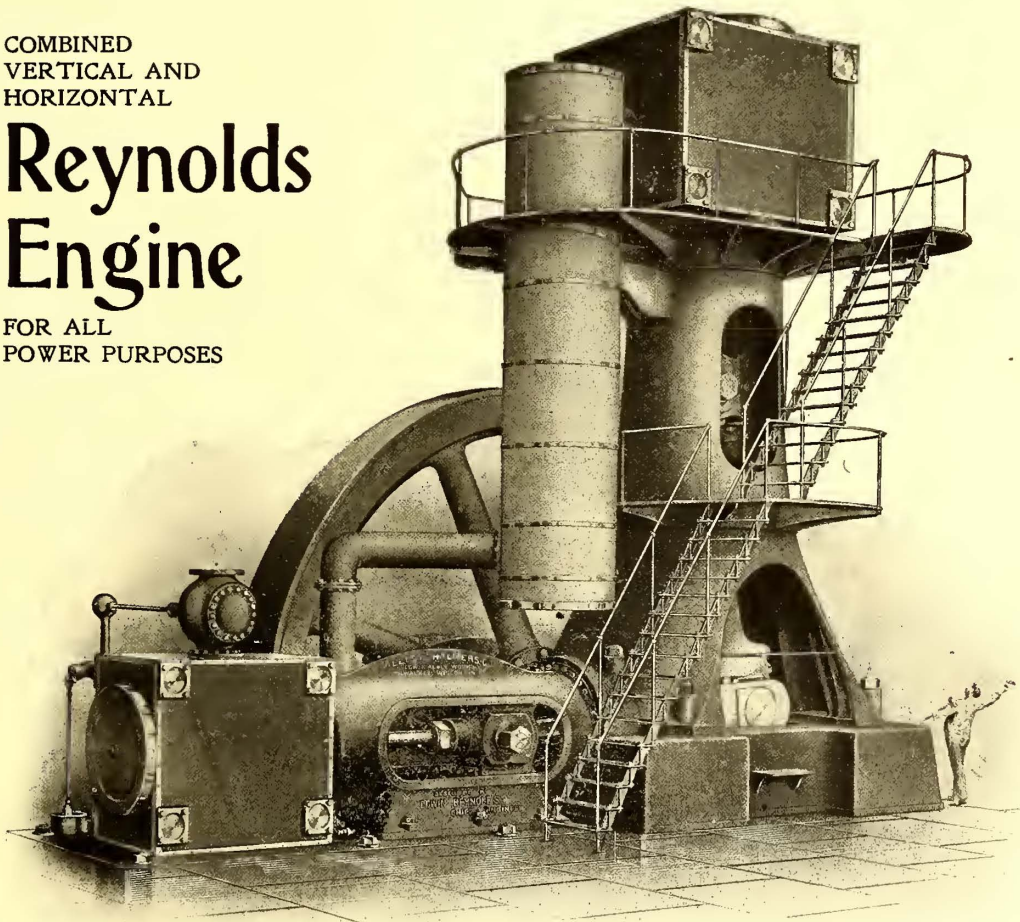
The City of Glasgow Station, . . . . Glasgow, Scotland  
 City of London Electric Lighting Co., . . . . London  
 Central London Underground Railway, . . . . London  
 London United Tramways, . . . . London  
 Bristol United Tramways, . . . . Bristol, England  
 Dublin United Tramways, . . . . Dublin, Ireland

City Road Station, . . . . . London  
 Middlesborough Tramways, . . Middlesborough, England  
 Cork Tramways, . . . . . Cork, Ireland  
 Isle of Tenath Railway, . . . . Isle of Tenath, England  
 Sheffield Co-operative Tramways, . Sheffield, England  
 and many other cities in England.

COMBINED  
 VERTICAL AND  
 HORIZONTAL

## Reynolds Engine

FOR ALL  
 POWER PURPOSES



BUILDERS OF HIGHEST TYPES OF

## Pumping Engines and Air Compressors

**BRANCH OFFICES:**

NEW YORK, - Broad Exchange Bldg.  
 PITTSBURG, 305 Ger. Nat. Bank Bldg.  
 MINNEAPOLIS, 416 Corn Exchange Bldg.  
 DENVER, 1649 Tremont St.  
 SALT LAKE CITY, Dooly Block.

**GENERAL OFFICE:**

CHICAGO,  ILL., U.S.A.

HOME INSURANCE BUILDING.

**BRANCH OFFICES:**

SPOKANE, 512 First Ave.  
 SAN FRANCISCO, 137 Montgomery St.  
 CITY OF MEXICO, 8 Calle Gante.  
 LONDON, ENG., 160 Dashwood House.

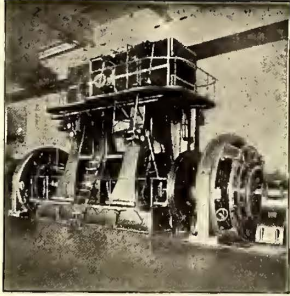


QUINCY ENGINE  
**Q**  
WORKS

QUINCY ENGINE  
**Q**  
WORKS

QUINCY ENGINE  
**Q**  
WORKS

QUINCY ENGINE  
**Q**  
WORKS



**WILLIAMS VERTICAL**

QUINCY ENGINE  
**Q**  
WORKS

QUINCY ENGINE  
**Q**  
WORKS

QUINCY ENGINE  
**Q**  
WORKS

QUINCY ENGINE  
**Q**  
WORKS

**COMPOUND ENGINES**

For **ELECTRIC LIGHT**  
and **POWER SERVICE**

400 to 2,500 H. P.

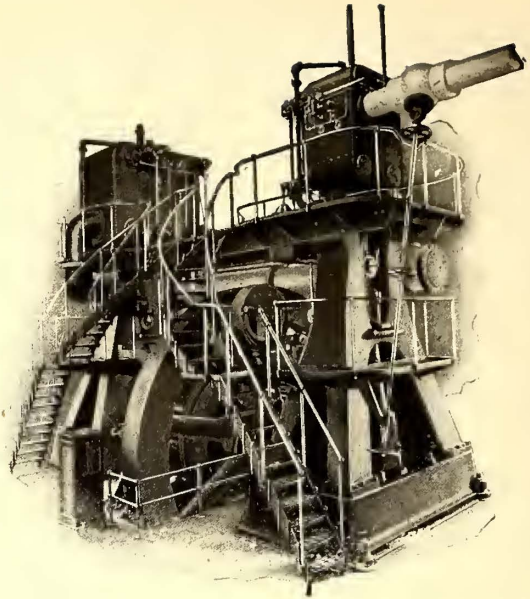
Strike the keynote of high efficiency and superior construction. Made in an entirely new plant, newly equipped with up-to-date machinery. A strong point made of **PROMPT DELIVERIES**

Don't hesitate to write us for any particulars

**QUINCY ENGINE WORKS**

2906 Spruce St., Quincy, Ill.

Cable Address, "Engine Quincy." Lieber's Code



**RICE & SARGENT AND IMPROVED GREENE ENGINES**

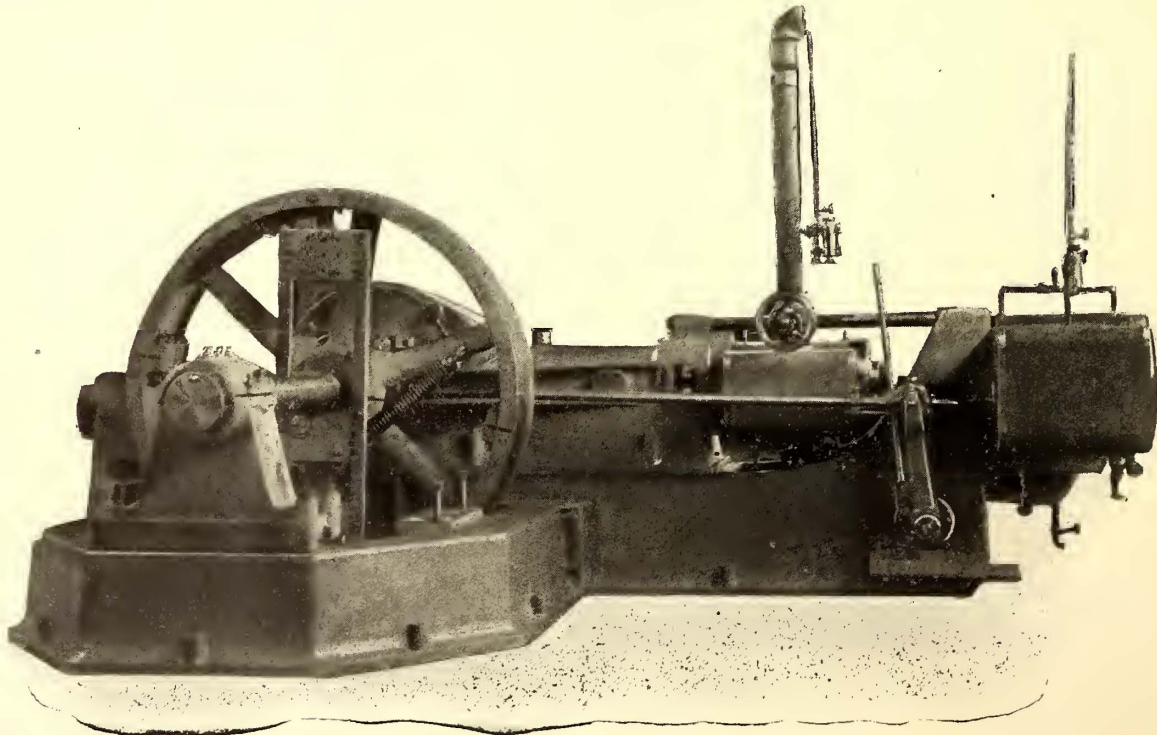
**LEAD** in results obtained on railway and electric light work.  
**EXCEL** in the operation of direct and alternating current generators in parallel.  
**GUARANTEE** unequalled speed regulation for textile and other plants. Revolutions from 80 to 150 per minute.

**PROVIDENCE ENGINEERING WORKS**  
**PROVIDENCE, R. I.**

American Licensees for Schmidt System of Superheated Steam.  
 Great Economies Guaranteed.

**PHOENIX IRON WORKS COMPANY**

**BUILDERS "Dick & Church" Automatic Cut-Off Engines**



**Complete Power Plants a Specialty**

MAIN OFFICE AND WORKS: **MEADVILLE, PENN.**

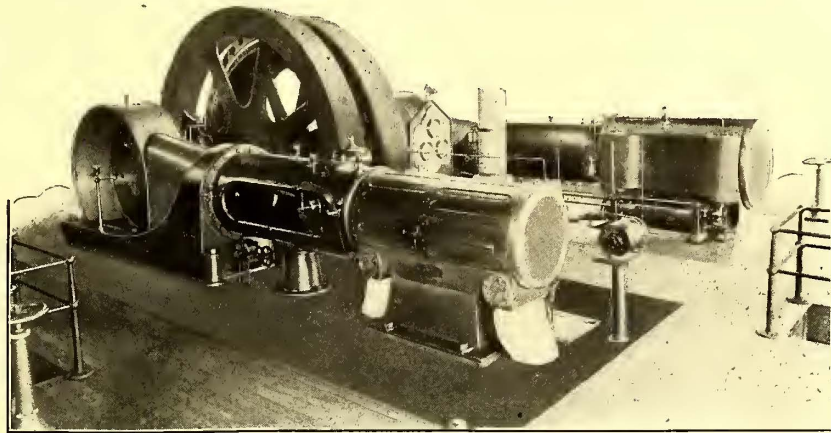
NEW YORK: 15 Cortlandt St. CHICAGO: 1409 Fisher Bldg. Baltimore: 103 E. Lombard St. PITTSBURG: 401 Furguson Bldg PHILADELPHIA: 631 Arch St.



# THE NEW "BROWN"

UNEXCELLED IN DESIGN AND WORKMANSHIP

Simple,  
Condensing  
and  
Compound



For  
Any  
High-Grade  
Service

HEAVY PATTERNS FOR ELECTRIC RAILWAY WORK

Built only  
by . . . . .

**C. H. BROWN & CO.**

16 MAIN STREET  
FITCHBURG, MASS.

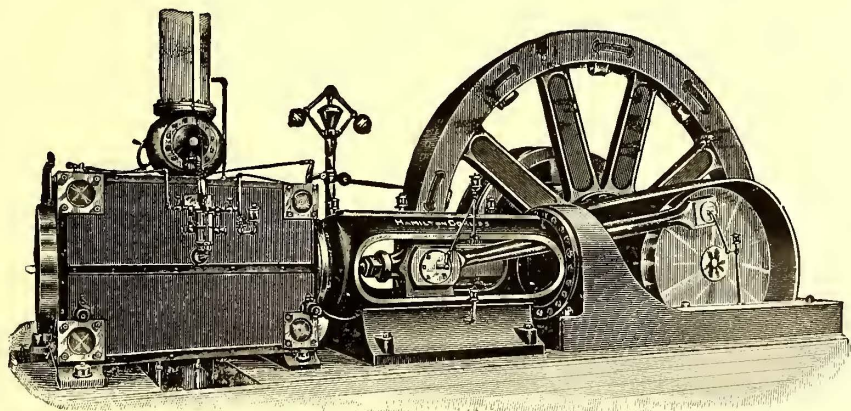
BOSTON OFFICE, 3 COURT STREET—LEE W. WOOLSTON, MANAGER

# Hamilton Corliss Engines

OVER 2,000 IN  
DAILY USE



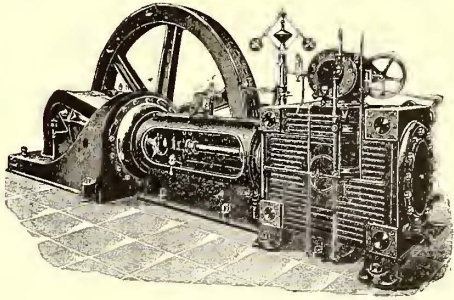
OVER 500 IN  
STREET RAIL-  
WAY SERVICE



**THE HOOVEN, OWENS, RENTSCHLER CO.** HAMILTON  
...OHIO...



# ST. LOUIS CORLISS ENGINE



Special Heavy Duty Engines for Electric Railways,  
Rolling Mills, etc.

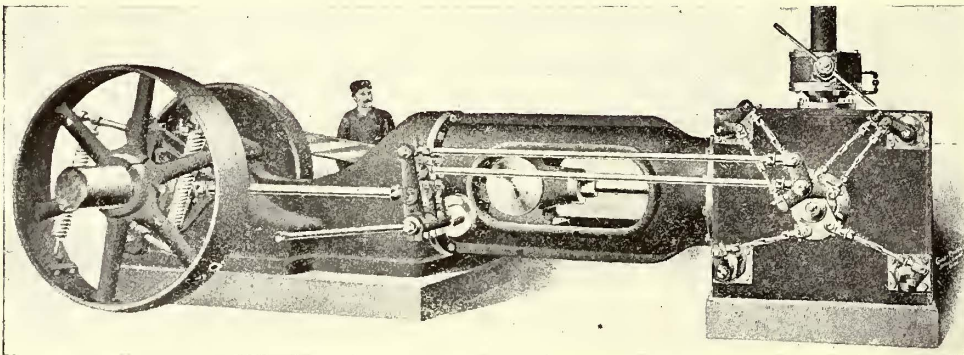
*For Direct Connecting or Belting, Simple or Compound*  
**COMPLETE PLANTS DESIGNED, BUILT AND INSTALLED**  
Builders

**St. Louis Iron and Machine Works, St. Louis, Mo.**

EASTERN AND FOREIGN SALES DEPARTMENT

**Frank M. Pierce Engineering Co.**  
135 BROADWAY, NEW YORK.

## COMPLETE POWER PLANTS FOR ELECTRIC ROADS

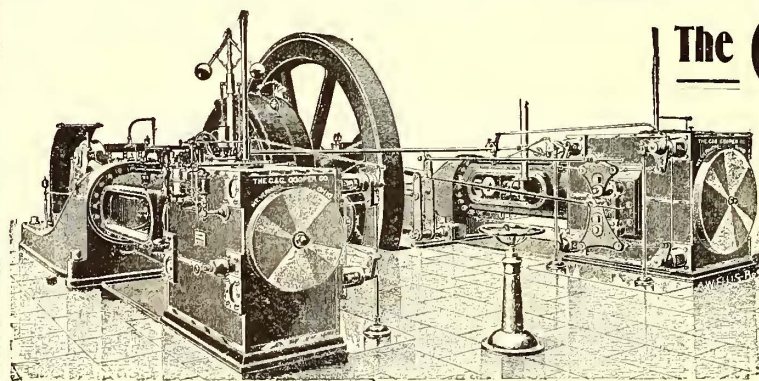


Simple and Compound  
Engines, Boilers,  
Heaters, Pumps, Etc.

Estimates Furnished on Application

**Baker Engine  
& Machine Co.**

114 North 3d St., Philadelphia



CROSS COMPOUND CONDENSING FOR ELECTRIC RAILWAY WORK

## The C. & G. COOPER CO.

MOUNT VERNON, OHIO

BUILDERS OF ...

### Copliiss Engines

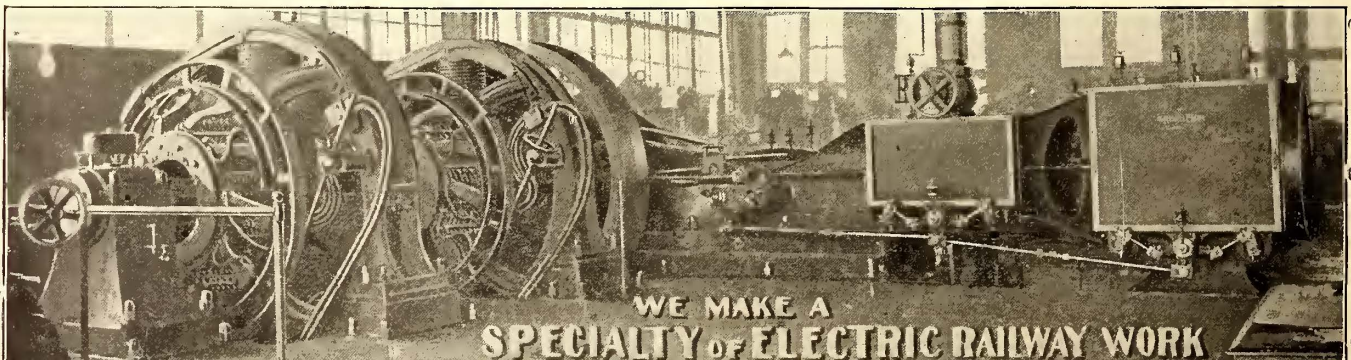
COMPOUND, CONDENSING  
AND HIGH PRESSURE....

From 50 to 3,000 H.P. with Girder or Semi-Tangye Frames

New York Office  
1022 HAVEMEYER BLDG.

F. W. IREDELL  
Manager

## THE RUSSELL ENGINE CO., Massillon, Ohio, U. S. A.



WE MAKE A  
SPECIALTY OF ELECTRIC RAILWAY WORK

Simple and Compound.

BUILDERS OF ENGINES OF THE SINGLE AND FOUR VALVE PATTERNS.

Belted and Direct Connected.





## COAL AND ASH HANDLING EQUIPMENT FOR POWER STATIONS

SEND SKETCH OF THE AVAILABLE SPACE,  
WITH THE CAPACITY REQUIRED, FOR  
DESIGN AND ESTIMATE. . . . .

### Steel Cable Engineering Company

Manufacturers of Conveying and Elevating Machinery, Etc.

General Office and Works, BOSTON, MASS.

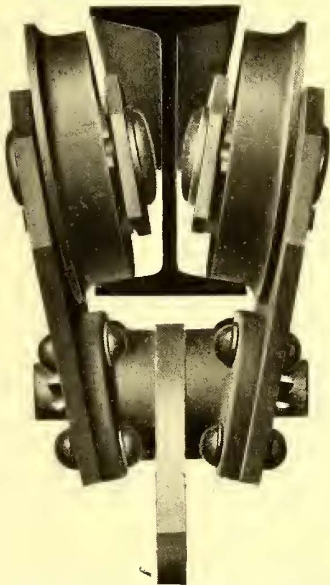
NEW YORK, 120 Liberty St.

CHICAGO, 1233 Monadnock Building

## "BROWNHOIST" Steel Plate Trolleys

are the easiest running Trolleys built

Extensively used in Dynamo Rooms of Power Plants



The wheels of our "Brownhoist" Trolleys are secured to steel pins revolving in adjustable bronze bearings, which give an inside as well as outside support and materially reduce the resistance to movement along overhead beam

Our "Brownhoist" Trolley Circular contains much valuable information

### The Brown Hoisting Machinery Co.

Works, Cleveland, Ohio, U. S. A.

NEW YORK

PITTSBURG

LONDON

**JEFFREY  
COAL-ASHES HANDLING  
MACHINERY.** SEND FOR  
CATALOGUE.  
**THE JEFFREY MFG. CO. Columbus, O.**

## Coal and Ash Handling Machinery

NEW CATALOGUE JUST ISSUED

**Robins Conveying Belt Company**

**17-21 PARK ROW = = = NEW YORK**

## The Street Railway Roadbed....

By MASON D. PRATT  
.....and C. A. ALDEN

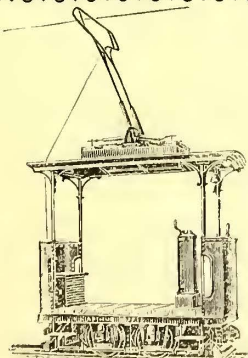
An essential feature of a well-equipped street railway is a good track, and in this book are brought together and illustrated the various modern types of track material and methods of construction, with their good and bad features indicated. The authors are engineers of the Pennsylvania Steel Company, one of the largest manufacturers of rails and "special work" in America, and are therefore particularly well equipped to treat of the subjects of which they write. All the various features of street railway roadbed construction are carefully described, with illustrations where necessary, the latter including sections of rail, of roadbed, views of special joints, diagrams, etc. Rules and tables are also given for running curves, laying out crossings, turnouts, etc.

135 Pages, 157 Illustrations. Price, \$2.00.

—PUBLISHED BY THE—

**Street Railway Publishing Company, 114 LIBERTY ST., New York.**

Electric  
Locomotive  
of improved  
construction  
for hauling  
coal, ashes,  
etc.



## WE BUILD AND EQUIP ELECTRIC RAILWAYS

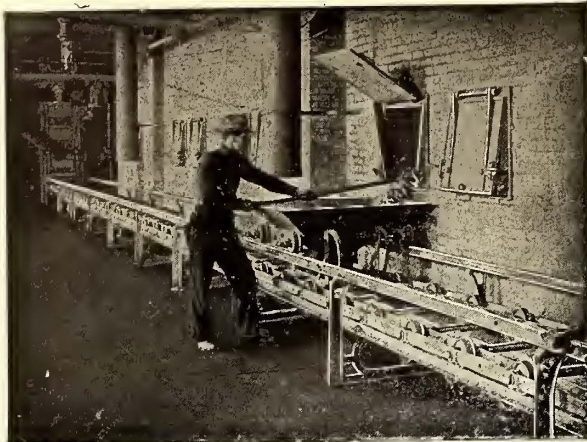
FOR AUXILIARY PURPOSES OF STREET RAILWAY SYSTEMS

CARS for Coal and Ashes  
CARS for Construction Purposes  
CARS of Every Description for All Purposes  
RAILS and PORTABLE TRACK  
A Large Stock Always On Hand

**ARTHUR KOPPEL, Dept. R**  
66-68 Broad Street, NEW YORK

Write for  
Catalogue No. 32  
Specifications, etc.





## JOHN A. MEAD MFG. CO.

9 BROADWAY, N. Y. CITY

### COAL HANDLING MACHINERY

## MCCASLIN OVERLAPPING GRAVITY BUCKET CONVEYOR

Has been installed by us in many of the new power stations, including METROPOLITAN ST. RY. CO. N. Y. CITY, EASTERN POWER STATION BROOKLYN HEIGHTS R. R., and ST. LOUIS, CINCINNATI, MILWAUKEE, WASHINGTON, CHICAGO and TOLEDO POWER STATIONS.

THE ENTIRE COAL AND ASH HANDLING EQUIPMENT OF THE NEW POWER STATION OF THE

MANHATTAN ELEVATED RY. CO., N. Y. CITY

WILL BE FURNISHED AND INSTALLED BY US

## AMERICAN STREET RAILWAY INVESTMENTS

"The Street Railway Red Book." . .

The Standard Manual of Street Railway Statistics. . . . .

**PRICE, \$5.00.**

STREET RAILWAY PUBLISHING CO.,  
114 LIBERTY STREET, NEW YORK.

## AULTMAN

### Economical Coal Handling in a Power House.



THE use of "AULTMAN" labor-saving appliances reduces the cost of handling material in any form to a very low figure. We build Elevating and Conveying machinery for this purpose, at a low price, that will doubly decrease the cost of handling.

Catalogue "D" will explain more fully. Send for it.

The Aultman Company, Canton, O.

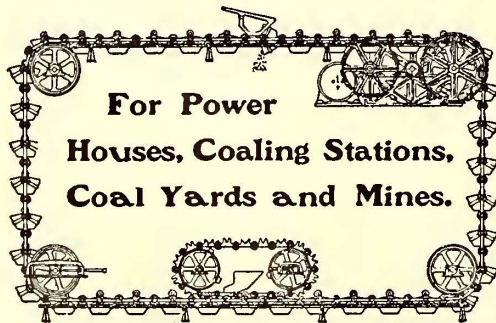
Eastern Office—PHILADELPHIA, PA.

## THE EXETER MACHINE WORKS, PITTSTON, PA.

New York Office, 120 Liberty Street.  
Chicago Office, Monadnock Block.  
St. Louis Office, 710 Lincoln Trust Bldg.

WRITE FOR NEW CATALOGUE "C."

### Coal, Ash and Ore Handling Machinery



For Power Houses, Coaling Stations, Coal Yards and Mines.

Manufacturers of

**HOISTING ENGINES**  
for Contractors, Mines and Quarries.

## GREEN ENGINEERING COMPANY

400 Western Union Bldg. CHICAGO, ILL.

MANUFACTURERS OF

## GREEN Travelling Link GRATES

Absolutely Self-Cleaning and Automatic.

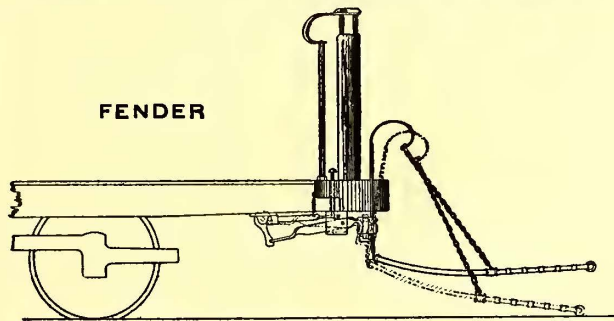
### SOME OF OUR CUSTOMERS

- Chicago Union Traction Co.
- St. Louis Transit Co.
- Metropolitan St. Ry. Co.
- E. St. Louis & Suburban Ry. Co.
- Cleveland City Ry. Co.
- Steubenville Traction Co.
- Danville Street Ry. Co.
- Grand Rapids, Holl & L. M. Ry. Co.
- C. & N. W. Ry. Co.
- Michigan Central Ry. Co.
- La Belle Iron Works.
- National Cash Register Co.
- Waukesha Sheet Steel Co.
- Pope Tin Plate Co.
- Armour Packing Co.
- Cudahy Packing Co.
- S. & S. Packing Co.
- Anglo-American Packing & Prov. Co.
- St. Louis Refrigerator & Cold Storage Co.
- United States Glue Co.
- American Tin Plate Co.
- Union Steel Co.
- Cleveland Elec. Illuminating Co.
- and many others.



# PARMENTER FENDERS AND WHEEL GUARDS

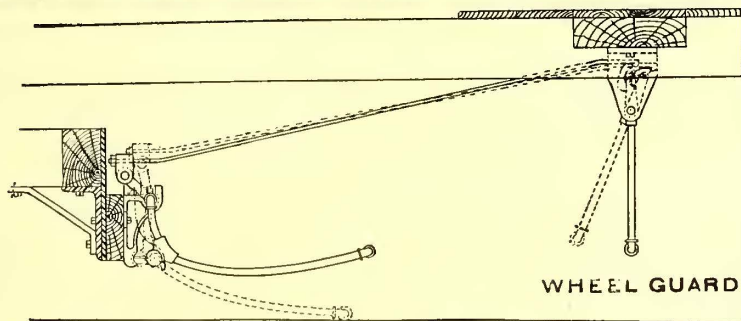
ARE LIFE SAVING DEVICES NEVER KNOWN TO FAIL



Can be dropped to the roadbed at the will of the motor-man either by foot or knee as desired; readily folded or transferred from one end of the car to the other :: ::



The Wheel Guard can be used in connection with Fenders, or independently. Both are made entirely of metal and built for strength. A full investigation earnestly solicited :: ::



**GEO. A. PARMENTER,**

**CAMBRIDGEPORT,  
MASS.**



# THE HUNTER AUTOMATIC FENDER

## ITS VICTORY

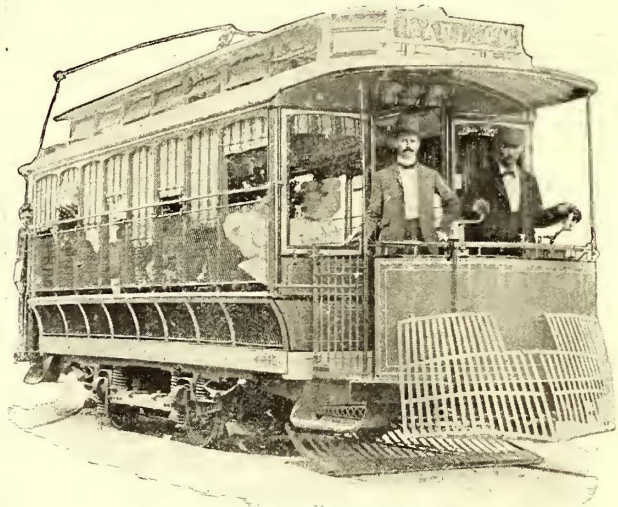
OVER 103 FENDERS TESTED AT ST. LOUIS. MO.

**I**N January, 1896, the nine systems of street railways operating in St. Louis equipped their roads with various protruding fenders, in accordance with the then existing law.

In 1900 these roads were consolidated. In January, 1902, the City Council appointed a committee to investigate why so many deaths had occurred since the fenders adopted in 1896 had been in use. The Committee reported these fenders to be unreliable and inefficient.

As a result of this report, the Council passed an ordinance abolishing all fenders then in use in the City, and requiring the street railways to re-equip their cars with an efficient device.

THE HUNTER AUTOMATIC FENDER COMPANY presented its record of 1,300 fenders in use in the City of Cincinnati, in which it showed that 256 lives had been saved since January, 1896.



SHOWING FENDER IN ACTION

The Fender Committee appointed by the Council invited all the fender makers of the country to compete in public tests. These tests were made by placing dummies on the track in front of cars provided with the various type of fenders, and the device which proved itself the most efficient in saving life and limb was

### THE HUNTER..... AUTOMATIC FENDER

It has therefore been adopted by the St. Louis Transit Company and the St. Louis & Suburban Company which roads are now equipping their cars with 2,686 of these fenders.

The Hunter Fender works AUTOMATICALLY, without the aid of the motorman, saves life and limb, without failure, of both children and adults. It costs less than any other fender to maintain. Colliding with heavy wagons injures the front guard but little, while other fenders are mashed to pieces, and new ones must take the place of the old.

The great advantage of this fender over others is that the buffer extends but little in front of the car and is not liable to trip a person while the car is rounding a curve. At the same time it is ornamental and adds greatly to the appearance of the car. It is constructed in sections, and can be quickly removed to allow coupling.

---

## THE HUNTER AUTOMATIC FENDER COMPANY

CINCINNATI, O.

LYTLE J. HUNTER, General Sales Agent



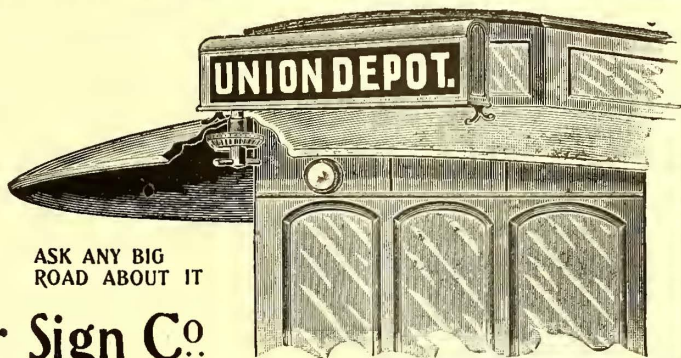
# THE ONLY PERFECT CAR SIGN

*Equally useful day and night*

When ordering cars don't fail to specify The Hunter Sign

## The Hunter Illuminated Car Sign Co.

Commercial Tribune Bldg., CINCINNATI, OHIO :: Lytle J. Hunter, Secy.



ASK ANY BIG ROAD ABOUT IT

EASTERN REPRESENTATIVES :  
MORRIS ELECTRIC CO., 15 Cortlandt St., N. Y.  
WESTERN REPRESENTATIVES :  
PORTER & BERG, 309 Dearborn St., Chicago

# AN IMPORTANT ADVANTAGE OF THE MILLEN ILLUMINATED CAR SIGN

is that the lamps are entirely independent of the revolving part of the sign. The light is thrown down on the lettering from a reflector above, making it as visible by night as by day.



In use on all the cars of the Metropolitan and Union Street Railway Companies of New York, as well as many other street railways.

## Columbia Machine Works

18 FULTON STREET, BROOKLYN, N. Y.

We Manufacture all kinds of Street Railway Supplies and have extensive facilities for the filling of export orders promptly.

# COTTON DUCK and CURTAIN STRIPES

## JOHN BOYLE & CO.

199-207 Fulton St., NEW YORK and 1016 Penn Ave., PITTSBURGH  
*Samples and Prices on Application*

# Practical Electric Railway Hand Book

Save valuable time every day by carrying the

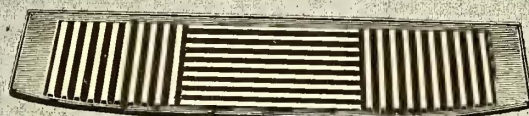
in your pocket.

PRICE \$3.00

STREET RAILWAY PUBLISHING CO., 120 Liberty Street, New York

# YOU NEED THE Universal Safety Tread

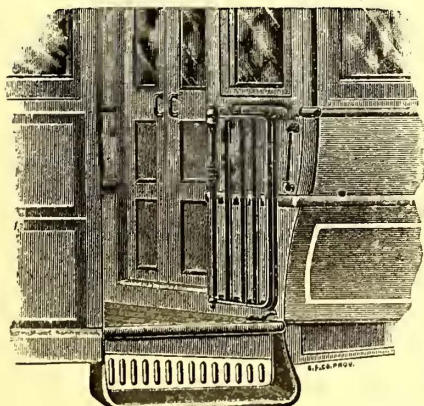
On Your Car Steps, Platforms and Floors.



Clean, Safe, Durable. Outwears all other forms of Tread.

Samples and Price List Furnished.

Universal Safety Tread Co., 45 BROADWAY, NEW YORK, N. Y.



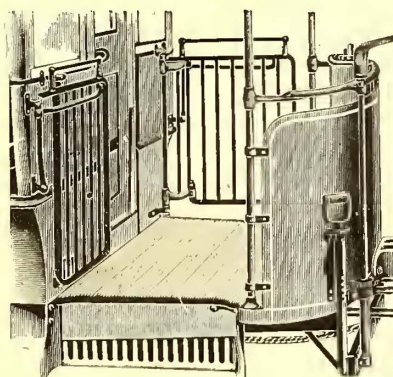
Folding Gate for Double-Door Cars

# SPECIFY Wood's Gates

FOR ALL NEW CARS AND PROTECT YOUR PATRONS BY EQUIPPING YOUR OLD CARS . . . . .

12,500 CARS EQUIPPED SEND FOR PRICES

The R. Bliss M'f'g Co. PAWTUCKET, RHODE ISLAND



Standard Gate for Single-Door Cars



**THE ONLY PERFECT SUBSTITUTE FOR LEATHER.**

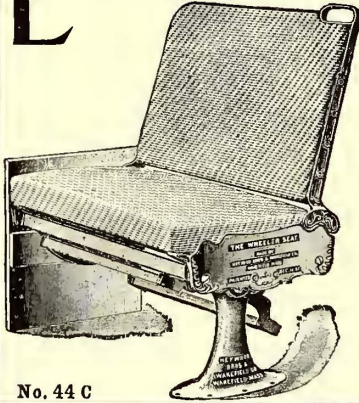
# PANTASOTE

**Awarded the GOLD MEDAL at Buffalo.**

FOR CAR SEATS and CAR CURTAINS this material is unequalled. Unlike its cellulose imitations, Pantasote will not burn. It is Fireproof as well as Waterproof, Greaseproof and Stainproof, and can be cleansed with soap and water. Looks exactly like morocco, wears better, costs half will not rot, crack or stiffen, and is not affected by heat, cold or weather. Tested ten years by leading railways. Made in plain leather grains or richly embossed patterns, all standard colors. Genuine has "Pantasote" stamped on goods. Samples and prices on request.

**PANTASOTE COMPANY, 11 Broadway, New York City.**

**LOOK AT THESE SEATS, THEN LOOK AT OTHERS**




**We give you more advantages than you can get in any other make. Our seats will prove it.**

**OUR No. 44 C "WAKEFIELD"** leads them all for a first-class seat. We invite the closest inspection as to its good qualities.

**Our No. 97 B Double Revolving Seat** fills the long-felt want for an individual seat that requires less space than the ordinary cross seat. The seats can be placed in a staggered position or straight across the car. No other seat made like it.

We furnish spring seating for street and electric cars of all kinds. Write for catalog and further information.

**HEYWOOD BROTHERS AND WAKEFIELD COMPANY**  
WAKEFIELD, MASS., U. S. A.



No. 44 C No. 97 B

**THE CURTAIN SUPPLY CO.**  
85-93 OHIO ST.  
**CHICAGO**

CAR CURTAINS  
CURTAIN FIXTURES  
CURTAIN MATERIALS


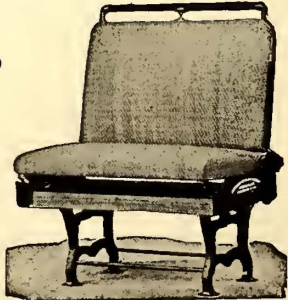
OWNERS FOUNDATION CURTAIN FIXTURE PATENTS

## American Car Seat Co.

MANUFACTURERS OF

**Pushover Car Seats and Longitudinal Seating in Rattan, Plush, Leather, Etc.**

QUALITY HIGH ——— PRICES LOW

WESTERN AGENTS  
**Western Electrical Supply Co.**  
ST. LOUIS, MO.

OFFICE AND WORKS  
18-30 Guernsey St.  
BROOKLYN, N. Y., U. S. A.



# THE HALE & KILBURN "WALKOVER" CAR SEATS ALWAYS IN ADVANCE

OUR SEATS IN USE  
 ON RAILWAYS IN THE  
 FOLLOWING COUNTRIES.

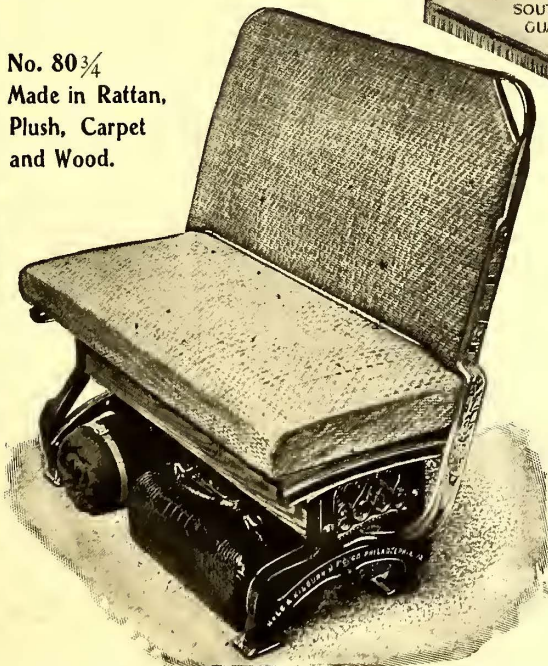
- CUBA
- HAWAIIAN ISLANDS
- CANADA
- ENGLAND
- SCOTLAND
- BELGIUM
- GERMANY
- SWEDEN
- JAPAN
- CHINA
- AUSTRALIA
- ARGENTINE
- BRAZIL
- VENEZUELA
- NICARAGUA
- CAPE TOWN
- COLUMBIA
- MEXICO
- SOUTH AFRICA
- GUATEMALA

**ADVANTAGES OVER ALL OTHERS.**

- Two inches more sitting space.
- Free Space for Luggage.
- Best Corner Grip Handle.
- Unequaled Spring Construction.

Photographs, Prices and all  
 information on application

No. 80<sup>3</sup>/<sub>4</sub>  
 Made in Rattan,  
 Plush, Carpet  
 and Wood.



No. 99.A.

Also Makers of the Best  
 Longitudinal Spring  
 Seating, either Spring Edge or Non-Spring  
 Edge, Covered in Rattan, Plush or Carpet.

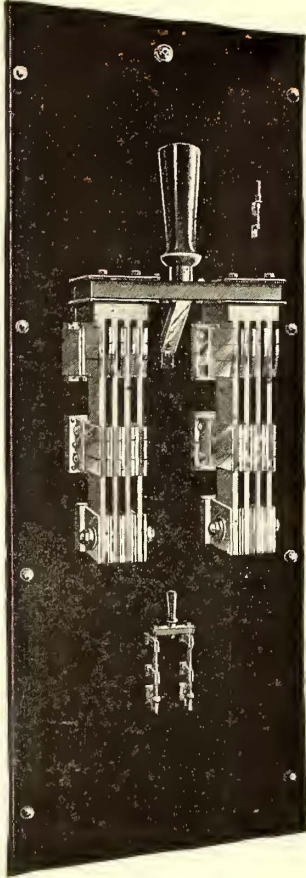
MOST DURABLE IN EXISTENCE.

**THE HALE & KILBURN MANUFACTURING CO.**  
 PHILADELPHIA, PENNSYLVANIA, U. S. A.



# "CROUSE-HINDS"

Designers and Manufacturers of High Grade



7500 AMPERE  
KNIFE SWITCH

"Operated Easily by One Man"

**Knife Switches** 15 STYLES  
10 AMPERES TO 10,000 AMPERES

**Radial Switches** VOLTMETER  
AMMETER  
END CELL BATTERY

**Panel and Distributing Boards**  
TO MEET ANY REQUIREMENTS

**Panel Board Cabinets**  
TO MATCH ANY SURROUNDINGS

**Switchboards** FOR POWER  
LIGHTING  
STORAGE BATTERY  
and SPECIAL SYSTEMS

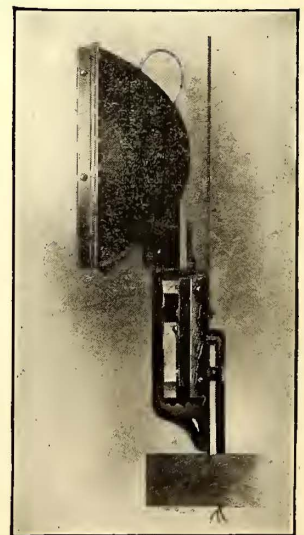
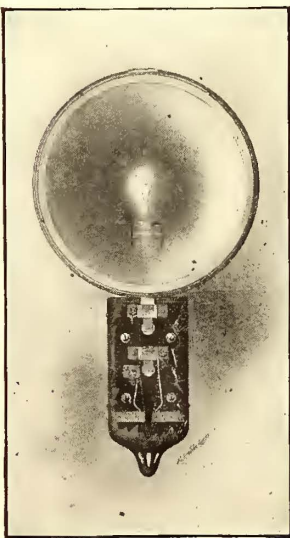
**Fire Alarm and Police  
Telegraph Switchboards**

Sole Owners and Manufacturers of

## The Syracuse Changeable Headlight

For Trolley Cars Changeable End to End  
Car to Car

**PROMPT DELIVERIES**



Western Union  
Wire  
in Syracuse  
Office

**Crouse-Hinds Electric Co.**

Main Office and Works

SYRACUSE, N. Y., U. S. A.

NEW YORK  
BOSTON

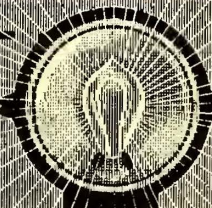
Sales Offices  
CINCINNATI

CHICAGO  
SAN FRANCISCO

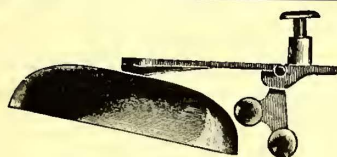
Long Distance  
Phones  
In  
All Offices



**THE DRESSER RAILWAY LAMP WORKS,**  
 3876 - 3878 PARK AVE., NEW YORK.  
**HEADLIGHTS of Every Description.**  
 SOUTHERN REPRESENTATIVES,  
 R.J. ROUSE & CO., RICHMOND, VIRGINIA  
 CHICAGO OFFICE,  
 934 THE MONADNOCK



**STREET CAR GONGS**



of our manufacture have always given satisfaction

**The Price is Right**

In general use by the leading street railway companies and car builders the world over

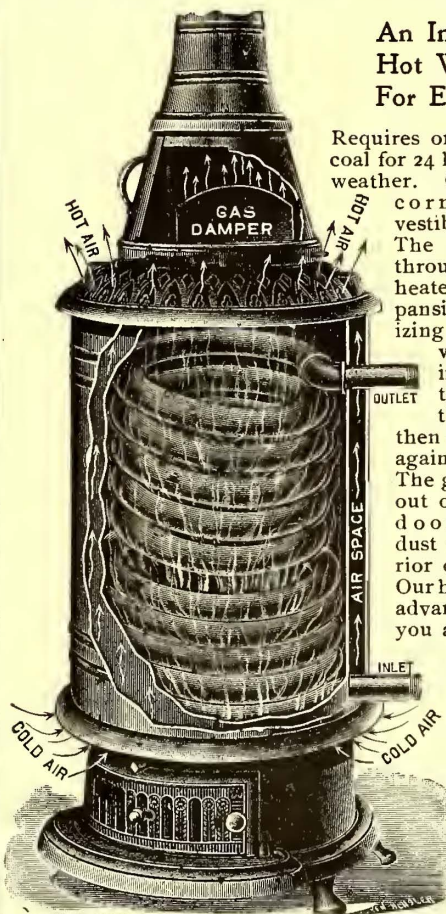
**BECAUSE**

They are made of the very best Crucible Steel  
 They are indestructible and not affected by the weather  
 Their tone is not equalled by any other gong

**CHESWICK MFG. CO., Cheswick, Pa**

**THE SIMPLEX ELECTRICAL COMPANY,**  
 MANUFACTURERS,  
 Under the patents of the American Electric Heating Corporation, of  
**ENAMEL CAR HEATERS AND COIL SPRING CAR HEATERS.**  
 A variety of designs to meet all requirements. Send for Catalogue.  
**The Simplex Electrical Company,**  
 Chicago Office: Cambridgeport, Mass.  
 Monadnock Block

**PETER SMITH HEATER**



An Improved Hot Water Heater For Electric Cars

Requires only about 75 lbs. of coal for 24 hours in the coldest weather. Can be carried in a corner of car or in vestibule.

The hot water passes through a coil tube in the heater, thence to an expansion tank for equalizing the pressure, from which point it travels in pipes throughout the car at the feet of the passengers and then returns to the heater again.

The grate is shaken without opening the ash pit door, thus preventing dust from flying in interior of car.

Our heater has many other advantages. Let us tell you about them.

**Peter Smith Heater Co.**  
 Detroit, Mich  
 U. S. A.

Send for Catalogue L.  
**THE WATSON-STILLMAN CO.**  
 204-210 EAST 43d ST., NEW YORK CITY.





Hydraulic Jacks Hydraulic Tools



**HYDRAULIC CAR WHEEL PRESSES, TRACK PUNCHES, RAIL BENDERS AND JACKS**





NO. 2 CAR JACK

**BARRETT JACKS**

Are the STANDARD Jacks for Railway Purposes. They are EASILY and QUICKLY Operated, DURABLE, POWERFUL, EFFICIENT. For Car, Car Barn and Construction Work, they are INDISPENSABLE and SAVE TIME, LABOR AND MONEY.

WRITE FOR CATALOG AND PRICES.

WORKS ALLEGHENY, PA. **THE DUFF MFG. CO.** OFFICE PITTSBURG, PA., U.S.A.



MANUFACTURERS OF  
**HENDERSON'S**  
CAR SIGN ILLUMINATORS

**UNITED STATES**  
**ELECTRIC SIGNAL CO**

20 WESTWOOD ST., WEST NEWTON MASS.

WRITE FOR  
CIRCULARS

REPRESENTED IN CHICAGO  
BY **PORTER & BERG**

**AUTOMATIC**  
**ELECTRIC**  
**SIGNALS**

FOR

**STREET**  
**RAILWAYS**

## THE PINTSCH GAS LIGHTING SYSTEM

Has been adopted as the **STANDARD LIGHT** by the Broadway and Third Avenue Cable Lines of New York; the North and West Chicago Cable Lines; the Columbus Central Electric Line of Columbus, O., and Denver City Cable Co.; also by one hundred and three of the most prominent railways and by the Pullman and Wagner Palace Car Companies in the United States.

It has been the standard lighting system in Europe for many years, and is applied to 85,000 cars, 3,100 locomotives and 800 buoys in Europe, the United States, South America, India and Australia. For particulars address

**THE SAFETY CAR HEATING AND LIGHTING CO.**  
160 Broadway, New York

## The Only Practical and Scientific Heater For Street Cars

A MINIATURE HOT-AIR FURNACE - - BURNS COAL



SECTIONAL VIEW OF CAR SHOWING NEW CENTURY CAR HEATER INSTALLED

The New Century Car Heater combines all the advantages of stoves, electric, hot water and steam heaters, and is still the most economical heater extant

For further particulars  
address . . . . .

**New Century Car Heater Co.**

Commercial Trust Co. Bldg.  
JERSEY CITY, N. J.

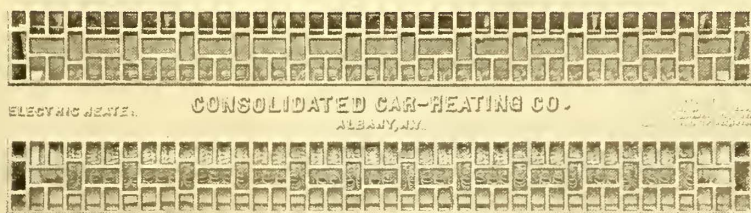
C. J. HARRINGTON, General Eastern Sales Agent, 15 Cortlandt St., N. Y. City



# Consolidated Car-Heating Company

## Electric Heaters

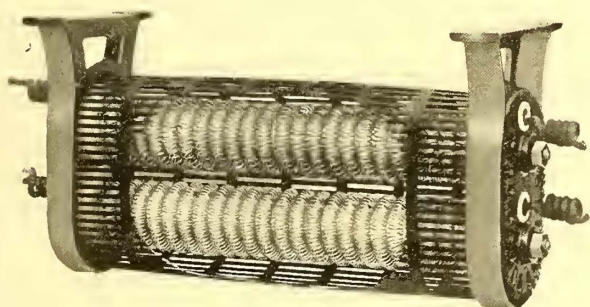
Theoretically  
and  
Mechanically  
Perfect



Unexcelled  
in  
Economy and  
Efficiency

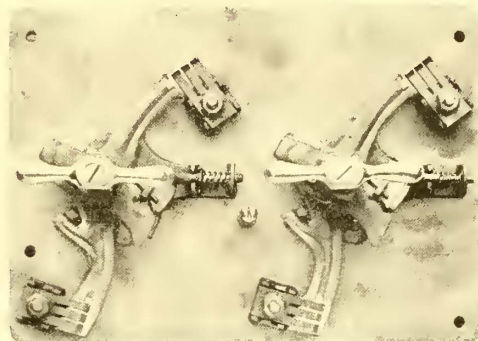
HEATERS FOR LONGITUDINAL SEATS WITH RISERS

### Sold Under A FIVE-YEAR GUARANTEE



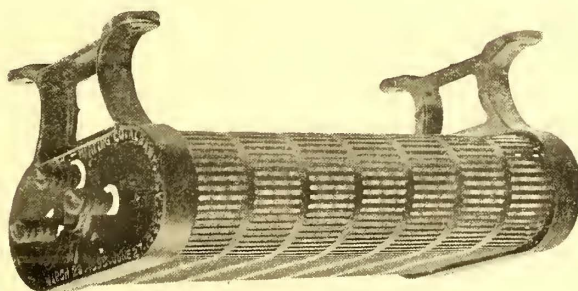
HEATERS FOR CROSS SEATS

Record:  
**TEN  
YEARS'**  
Actual  
Service

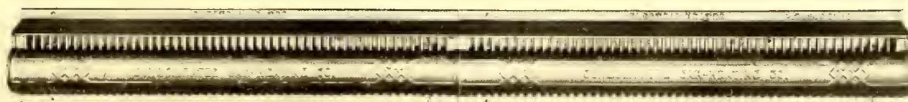


DOUBLE SNAP SWITCH

Heater Adopted  
by  
Manhattan  
Railway  
New York City



For  
**1,200 CARS**  
  
**21,600  
HEATERS**



HEATER FOR CHAIR CARS

R. W. BLACKWELL & CO.  
59 City Road, E. C.  
LONDON, ENG.

**Albany, N. Y.**  
U. S. A.

1207 Fisher Building  
CHICAGO, ILL.  
634 Park Row Building  
NEW YORK, N. Y.



# GOLD'S IMPROVED ELECTRIC HEATERS

excel all others in even graduation of temperature, uniform distribution of heat, low cost of original equipment and simple method of installation. We make heaters for cars of every style.

*Catalogues, circulars and other information cheerfully furnished*



Gold's Ideal Electric Heater, Three Degree Panel Type.

## GOLD STREET CAR HEATING COMPANY

Branch Office: 614 Rookery Building, Chicago, Ill.

Frankfort and Cliff Sts., New York

# BAKER HOT WATER HEATERS FOR ELECTRIC CARS.



Type of Baker Heater used in large Electric Cars.

Positively  
Non-Freezing.

Cheaper, More Constant,  
Satisfactory and Agreeable  
than Electricity.

Various Sizes.

Simple but Perfect  
in Operation.



Hot Water Pipes run around the car and at the feet of every passenger. The Heater proper may project half-way, or be placed entirely within the vestibule, and thus keep the motorman warm and his windows free from frost.

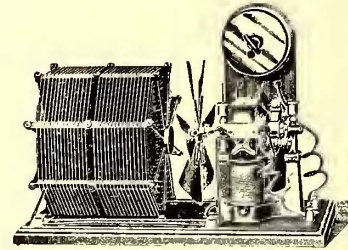
In use on the Detroit, Ypsilanti and Mt. Clemens Railway Co., Ann Arbor, Mich.; Detroit, Lake Shore and Mt. Clemens Railway Co., Detroit, Mich.; Twin City Rapid Transit Co., Minneapolis, Minn.; Milwaukee Electric Railway and Light Co., Milwaukee, Wis.; Waterloo and Cedar Falls Rapid Transit Co., and others.

Manufactured and  
Sold Only by

**William C. Baker,**

143 Liberty St.,  
NEW YORK, U. S. A.

Why Not Save 35 per cent.  
of the Power Consumed  
in Heating Your Cars ?



Electric Fan and Heating Web.

## BAY STATE ELECTRIC HEAT AND LIGHT COMPANY

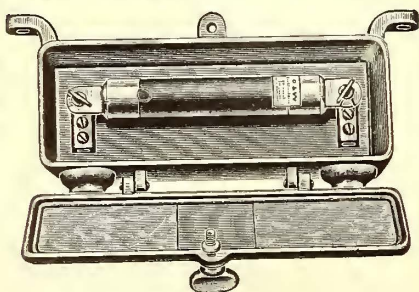
The only manufacturers in the United States of a Perfect Electric Car Heater, have removed their offices to . . .

89 STATE STREET, 5th FLOOR  
BOSTON, MASS.

CORRESPONDENCE  
INVITED

JOHN SHEPARD, President.  
CHARLES H. PINKHAM, General Manager.

# ELECTRIC CAR SERVICE



Type R Street Car Motor Cut-out.

Protect Your MOTORS By Using  
"D. & W." Enclosed Indicating Fuses




**D. & W. FUSE CO., Providence, R. I.**

**OFFICES**

BOSTON—Pettingell-Andrews Co. NEW YORK—Western Electric Co. PHILADELPHIA—Western Electric Co. CHICAGO—Central Electric Co.  
ST. LOUIS—Western Electric Co. SAN FRANCISCO—California Electrical Works. LONDON, ENG.—Imperial Electric Supplies, Ltd.





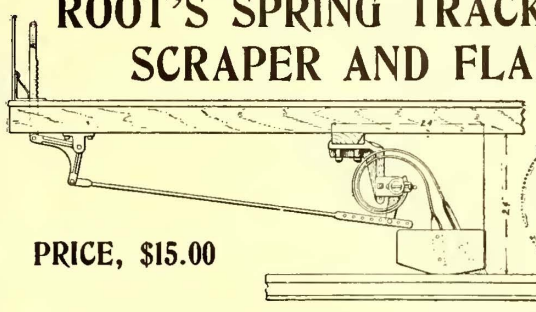
**DISTRACTED  
ATTENTION**

**N**O conductor can serve two masters.  
He can't chase fares to good advantage if he is tied down to the trolley pole. A trolley pole that leaves the wire, or even one that is liable to leave the wire, takes the conductor's mind more or less from his fares. The **WILSON TROLLEY POLE CATCHER** will obviate this. Put it on your cars and your conductors will ring up more fares on the register than they are doing now. Send for a little book telling all the important advantages.

**Frank Ridlon Company**  
200 Summer Street, Boston, Mass.

CHARLES AUSTIN BATES N. Y.

**ROOT'S SPRING TRACK  
SCRAPER AND FLANGER**

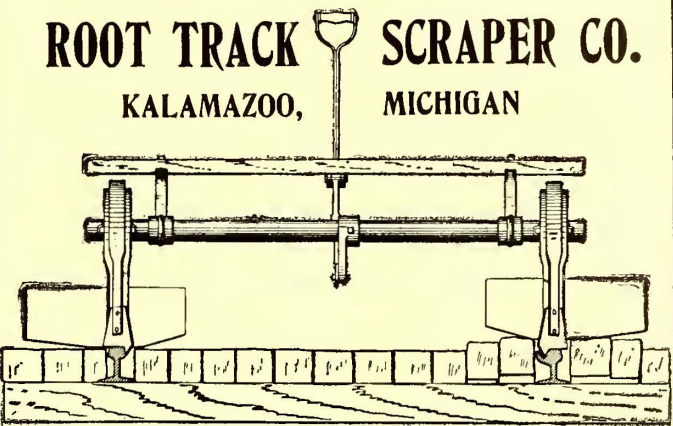


The only up-to-date device of its kind. Springs over all obstacles.

**PRICE, \$15.00**

A clean rail on all kinds of track, giving perfect contact. Guaranteed the best scraper on the market. Samples sent on approval. . . Send for Catalogue

**ROOT TRACK SCRAPER CO.**  
KALAMAZOO, MICHIGAN



**Lieber's Standard Code**

AN ENTIRELY ORIGINAL CODE.  
PRICE, \$10.00.

**SELECTED CODE WORDS** The Ciphers are selected from the "OFFICIAL VOCABULARY," care having been taken to omit such DANGEROUS ciphers as "cheap," "charge," "collect," "bimonthly," "eleventh," "eighteenth," "cargo," etc., which are found in other codes.

**CONTENTS** The Code contains 800 pages of 75,000 Ciphers; 65,000 have sentences, and 10,000 are blank, enabling the addition of private phrases under their proper headings.

**DIRECTORY OF USERS** LIEBER'S MANUAL, published every three months, contains a revised list of those using the code. NO OTHER CODE FURNISHES SUCH A LIST.

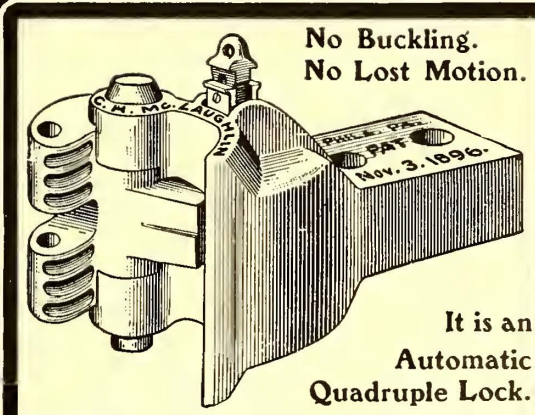
**BEST EXTANT** That LIEBER'S CODE is recognized as the best ever offered to the public is shown by the following houses, who have unqualifiedly endorsed it in preference to all others.

Albert & J. M. Anderson Mfg. Co. H. W. Johns Mfg. Co. Okonite Co. Bethlehem Iron Co. Eugene Munsell & Co. Garton-Daniels Electric Co. McCardell, West & Co. Robert W. Blackwell. Safety Third Rail Electric Co. Standard Air Brake Co. Dick, Kerr & Co. Risdon Iron Works. H. H. Cadot & Co. Lorain Steel Co. Westinghouse Electric & Mfg. Co. General Electric Co. Jackson & Sharp Co. Peckham Truck Co. Baltimore Car Wheel Co. American Metal Co.	Lewisohn Bros. Carnegie Steel Co. John Stephenson Co. Baldwin Locomotive Works. Brown Hoisting & Conveying Machine Co. J. G. Brill Co. Christensen Engineering Co. Berlin Iron Bridge Co. B. F. Sturtevant Co. Ritter-Conley Mfg. Co. Ball & Wood Co. A. L. Ide & Sons. Springfield Mfg. Co. Edwin Harrington Son & Co. J. A. Fay & Egan Co. Worthington Pump Co. Babcock & Wilcox Co. Westinghouse Air-Brake Co. Manning, Maxwell & Moore.
---	---

**LIEBER CODE CO.,**

2 and 4 STONE STREET NEW YORK.      20 BUCKLESBURY, LONDON, E. C.

**The McLAUGHLIN  
SAFETY CAR COUPLER**



No Buckling.  
No Lost Motion.

It is an  
Automatic  
Quadruple Lock.

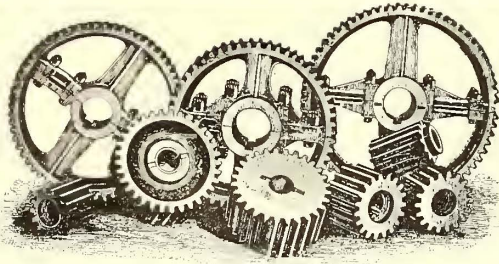
Is quicker of movement, in case of fire, than any other type used for Street Railways. It is an automatic quadruple lock; it has lock for lock. It covers all the requirements of the law. It is the style of coupler adopted by the Master Car Builders Association of the United States.

Write for prices.  
**McLAUGHLIN CAR COUPLER CO.,**  
1624 No. 9th St.,  
Philadelphia, Pa.



# THE VAN DORN & DUTTON CO.

CLEVELAND, OHIO, U. S. A.



Highest Quality. For all Types of Motors.

MANUFACTURERS OF

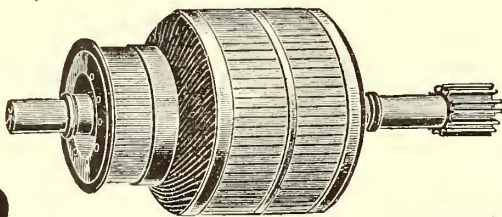
**OPEN HEARTH STEEL  
GEARS**

.. AND ..

**HAMMERED STEEL  
PINIONS**

# THE VAN DORN-ELLIOTT ELECTRIC CO.

CLEVELAND, OHIO, U. S. A.

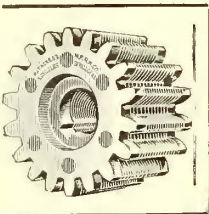


Armature Winding and Building.  
Commutator Filling and Building.  
Transformers and Fields of all  
types rewound.



**ARMATURE AND FIELD COILS**

## Noiseless Pinions



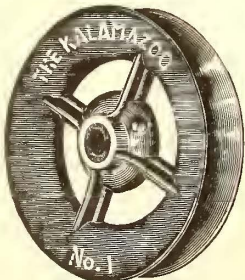
Make quiet running cars. Let us tell you where it is to your advantage to use New Process Pinions. Others are using them. Why be behind the times?

**The New Process Raw Hide Co.**  
SYRACUSE, N. Y.

Trolley Wheels, Trolley Poles, Trolley Rope,  
Graphite Bushings,  
Span Wire, Rubber Wire, Feeder Wire,  
Overhead Material,  
Pole Brackets, Rail Bonds, Carbon Brushes,  
Circuit Breakers, Car Shades, Electric Signals,  
Inc. Lamps, High Tension Feeder Supplies,  
Sand Boxes, Trolley Catchers.

WRITE US FOR PRICES

**PORTER & BERG**, 309 Dearborn St., Chicago, Ill.



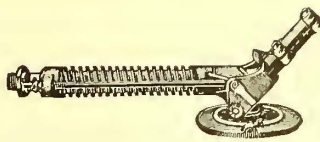
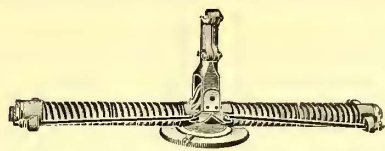
# KALAMAZOO TROLLEY WHEEL

Our new method of treating copper produces a metal unequalled for this purpose—soft and long-lived.

Will run in sleet longer than any other. Self-oiling, and therefore saves bushings. Actual service proves superiority. Will not injure wire. Better conductor and not complicated.

**THE STAR BRASS WORKS** (INCORPORATED), KALAMAZOO, MICH.



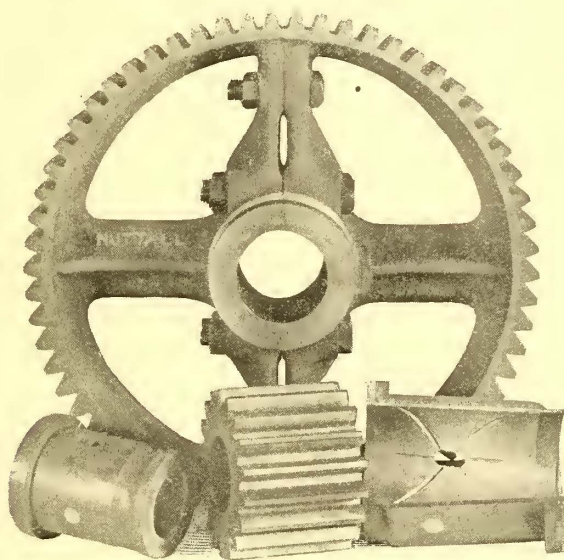


## Nuttall Street Railway Specialties

Les engrenages, ailerons, supports et trolleys de la "marque Nuttall" sont sur le marché depuis aussi longtemps que l'on vend des moteurs de tramways avec les garanties les plus complètes. Ils sont garantis pour leur exactitude, leur dessin, leur durée et leur matériel.

Nous fournissons engrenages, ailerons et trolleys aux plus grands fabricants de moteurs du monde, qui reconnaissent les nombreux avantages qu'il y a à équiper leurs moteurs avec le matériel Nuttall parfait et garanti.

Communiquez avec notre représentant le plus rapproché ou directement.



Nuttall Make Gears, Pinions, Bearings and Trolleys have been on the market ever since Street Railway Motors have been made and are sold on the broadest guarantee—are guaranteed for accuracy, design, durability and material, and used exclusively by some of the largest Motor Manufacturers in the world who recognize the many advantages of equipping motors with Nuttall perfect and guaranteed material. Communicate with nearest representative or direct.

# R. D. Nuttall Company

PITTSBURG, PA., U. S. A.

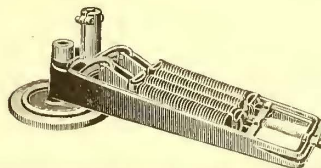
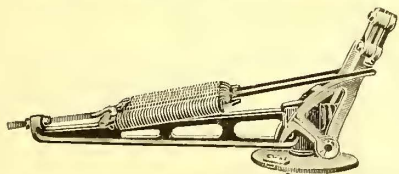
REPRESENTED IN EUROPE AT

Birmingham  
Paris

Brussels  
Milan

Hamburg  
Vienna

Prague  
Budapest





**HORSBURGH & SCOTT**  
 MANUFACTURERS OF  
**GEARS AND PINIONS**  
 CLEVELAND, O.

**ELECTRIC MOTOR AND GENERATOR VENTILATING CO.**  
 Drexel Bldg., Fifth & Chestnut Sts., Philadelphia.

Our new ventilator is a simple and efficient device for carrying cold air direct to the motor case, from the hood through hose under car, or from the funnel at top as may be preferred. Will ventilate from either end, according to direction of moving car.

**SOME POINTS OF MERIT.**  
 Keeps motors clean and cool; will break arcs on commutators; increases fully five times the life of armatures, commutators, field coils and brush holders; decreases labor in car house; takes no power to operate.

**WHY NOT GIVE IT A TRIAL?**

**Greatest Mileage at Least Cost**

Side View of Box.

Oil absolutely controlled.  
 Perfect lubrication.  
 No hot journals.  
 Immense saving in wear, time and oil.

**Standard Automatic Lubricator Co.**  
 PHILADELPHIA, PA.

**LUMEN | ALPHA | LOTUS | IDEAL | LUMEN**

TRUCK BEARINGS | CHECK PLATES | LINING METAL | TROLLEY WHEELS | MOTOR BEARINGS

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

**WHEN WRITING TO ADVERTISERS** in the STREET RAILWAY JOURNAL you will confer a favor on both publisher and advertiser by mentioning this paper.

**GEARS & PINIONS**  
 PROMPT SHIPMENTS

*The Simonds Mfg. Co.*

**PITTSBURG, PA.**  
 Prompt Attention Given to all Correspondence.







# The "New Haven" Fare Registers

SINGLE

DOUBLE

TRIPLE



ROUND DOUBLE.



SQUARE SINGLE.



SQUARE DOUBLE.

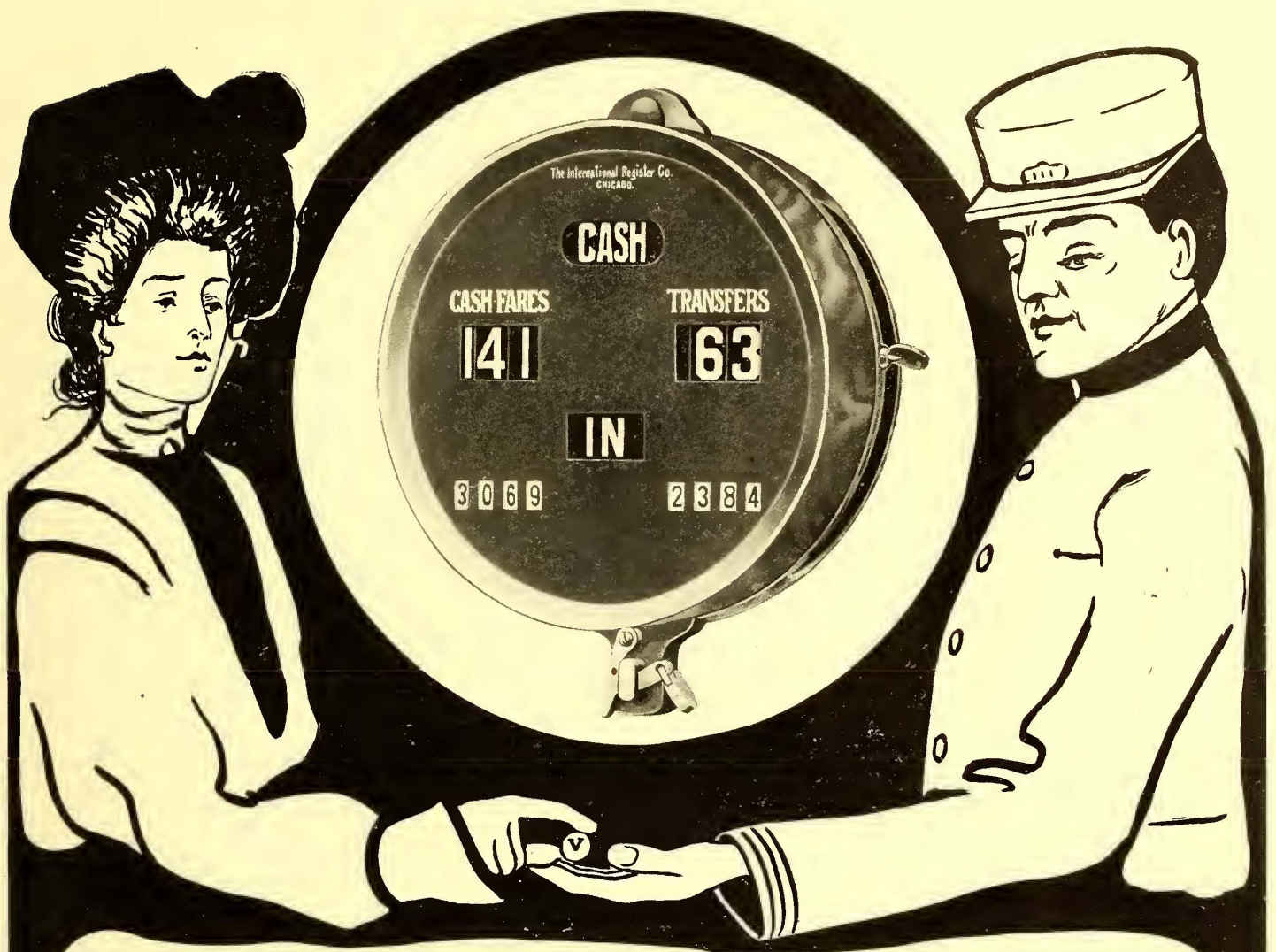


TRIPLE REGISTER.

Rushed with orders on all our types, especial'y the above.  
The Largest Sales to the Largest Street Railways in the World.

**THE NEW HAVEN CAR REGISTER CO.**  
...NEW HAVEN, CONN...





## IF HE GETS IT, YOU'LL GET IT

If your cars are equipped with

# The International Fare Register

The new *TYPE R 5* is everything that a fare register ought to be. It registers separately on both trip and totalizer, two kinds of fares. Trip figures are 1-4 larger than others and are printed on aluminum—no reflection.

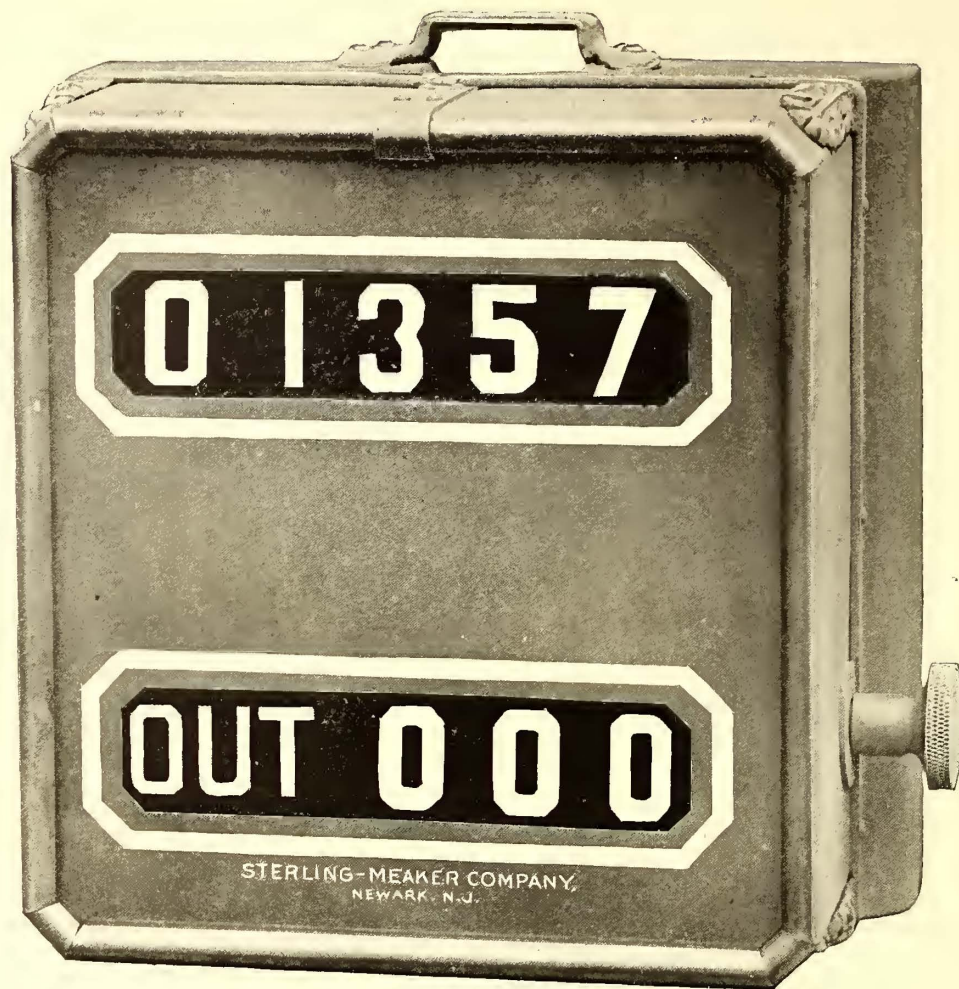
- Dials are ten-sided,—a little thing—a big advantage.
- Totalizers cannot be turned back, even if taken out.
- Register positively cannot be opened without detection.
- There are other advantages—Will you investigate?

**THE INTERNATIONAL REGISTER CO.**

118-132 West Jackson Blvd.,

**CHICAGO**





## THE STERLING No. 5 REGISTER.

This is a new machine.

Externally it is similar to the Meaker, with all figures an inch long.

The Mechanism is a new structure.

It embodies the sound principles of simplicity, strength and accuracy, thus ensuring ease of operation and durability.

Exhaustive tests show no faults in recording, nor signs of wear.

The "back," also, is new.

Rod or cord ringing device may be used.

---

# Sterling-Meaker Company

420-422 Ogden Street, NEWARK, N. J., U. S. A.



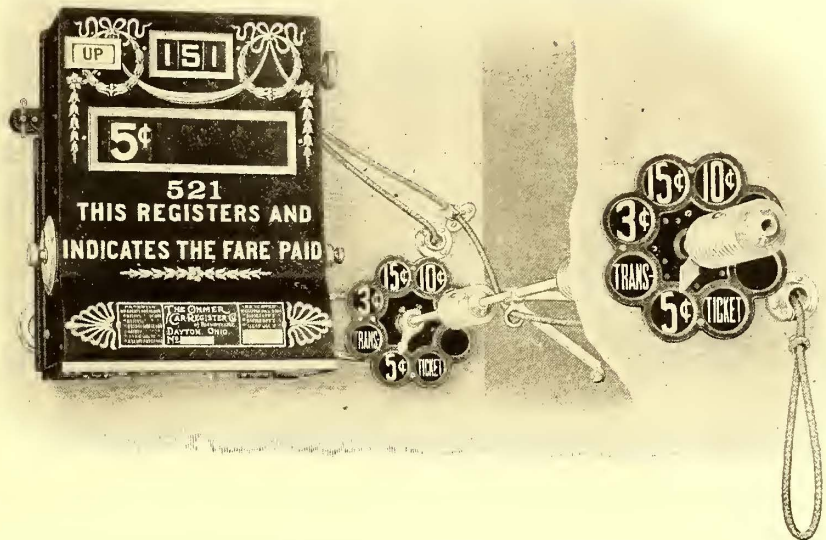
# A Little Money Talk...



Managers desiring to improve the fare-getting service are invited to confer with us for further particulars.

**T**HE difference between a bank teller and a street-car conductor is that the one receives large sums of money from comparatively few people while the other receives small sums of money from a large number of people.

But the **great** difference between the two is that the one leaves with the bank all he receives, while the other (with the ordinary register) is educated to leave with the company just what he makes a record of.



The Ohmer Registry System educates the conductor and compels him to leave with the company **all he receives**, and the operation of the Ohmer System is upon the same primary basic principle laid down for the bank teller, which compels him to leave with the bank all he receives and not just what he makes record of.

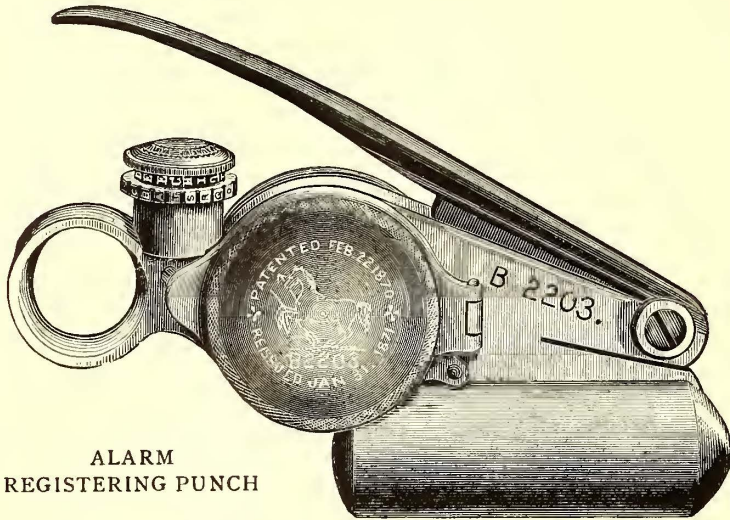
The Ohmer Registers are under contract and in operation on the North American contract from Richmond, Va., to Portland, Ore., and from the Michigan peninsula on the North to the city of Old Mexico.

## The Ohmer Car Register Co.,

DAYTON, OHIO.



# ALARM REGISTERING PUNCH



ALARM REGISTERING PUNCH

Clippings should agree. This system has been found very perfect by the roads using it, being some of the largest in this and foreign countries.

**T**HIS Register we claim to be the most perfect check yet devised for the collection and registration of fares on Street Railroads, especially where different rates of fares and tickets are to be collected.

The conductor is provided with Trip Slips of different colors for different rates of fare, on which he is obliged to punch out a number every time he receives a fare; there is a register in the Punch which records the number of times it is operated; the register and the receptacle for clippings are secured by a combination lock, which renders access to them impossible by any one unacquainted with the combination.

When the conductor renders his report to the office he returns his Trip Slips, Tickets and Punch; and the Register Totals, Slips, and

## RAILWAY REGISTER MANUFACTURING CO.

For further particulars, prices, etc., address all communications to  
EDWARD BEADLE, MANAGER, 1193 BROADWAY, NEW YORK, U. S. A.

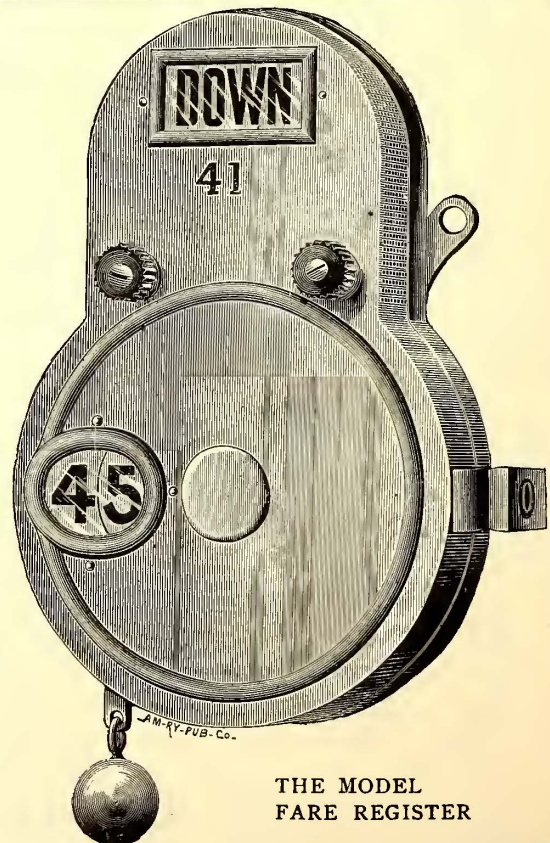
# MODEL REGISTER

**T**HIS portable Register is the best of its class yet introduced. Each time it is operated, the bell rings, the fare is recorded, and a corresponding figure is shown through the opening in front of the register in view of the passenger. It also has an indication plate showing the direction the car is going, and which the conductor is compelled to change at the end of the route.

It is also provided with a punch at side to cancel passes, tickets, transfers, etc., making, in all, a very perfect and handsome machine.

It has many advantages over the clock or stationary register, as conductors can collect their fares much more rapidly by thus doing away with reaching over the passengers' heads to operate the register rope or rod attachment. It also avoids the necessity of having some one to take off the state of the register each time a conductor changes his car, as with The Model he uses the same register during the entire day, and is solely responsible for it.

We can highly recommend this register to roads having one rate of Cash fare, Tickets, Transfers, etc.



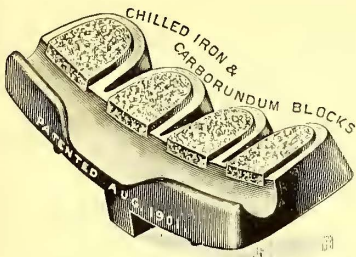
THE MODEL FARE REGISTER

SPECIAL ATTENTION PAID TO EXPORT ORDERS



# Flat Wheels Trued-up While Cars Run

## GREAT MONEY SAVER TO THE RAILWAY COMPANIES



Laying up cars and removing wheels to be trued-up now unnecessary. The work is done in ordinary brake-stops while the cars are in commission.

This shoe can be quickly substituted for the regular brake-shoe and quickly removed after the wheel is ground true.

The abrading blocks in this device are made of pure vitrified carborundum, and one pair of shoes, before worn-out, will true-up many flat wheels and true them to perfection.

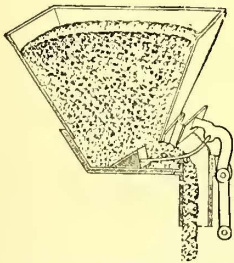
Already in use generally on large street railway systems throughout the States and Canada.

SEND FOR A TRIAL PAIR. IF THEY DO NOT GIVE SATISFACTION DON'T PAY FOR THEM

### THE CAR WHEEL TRUEING BRAKE SHOE CO.

Head Office, ELLICOTT SQUARE, BUFFALO, N. Y.

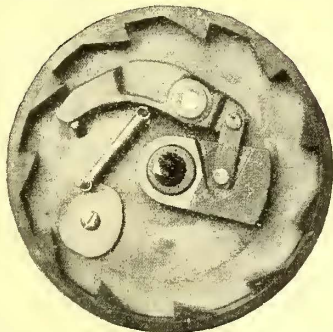
## Ham Sand Box



Standard on the Leading Street Railways in the United States and Europe . . . . .

## Ham Trolley Catcher

is following suit and is becoming part of the Standard Equipment . . . . .

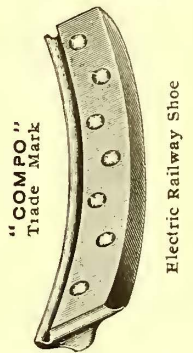


### HAM SAND BOX CO.,

TROY, N. Y.

## THE "COMPO" BRAKE SHOE

IS NO EXPERIMENT



It has been in use, particularly in street railway service, more largely than any other "Special" Shoe, and many railway officials give it preference over any other type. The effect of "Cork Inserts" is to take hold more quickly and to brake more uniformly throughout its contact, without the usual gripping effect of an all-metal shoe, thereby securing the smooth running of the cars. A want of uniformity in braking and sudden gripping, results in flat wheels. The elasticity of the cork prevents this gripping and overcomes *bucking*. This shoe has no straight or diagonal lines across the face, nor chilled or hard white iron cutting edges, *to shear and wear away the wheel*.

This invention avoids chilled and soft iron in the face of the same shoe. We prefer to use a fine grain, tough iron, of medium hardness, for mileage, and "CORK INSERTS" for braking. The Allston Foundry Co. will hereafter manufacture their Brake Shoes at their own foundry at Allston.

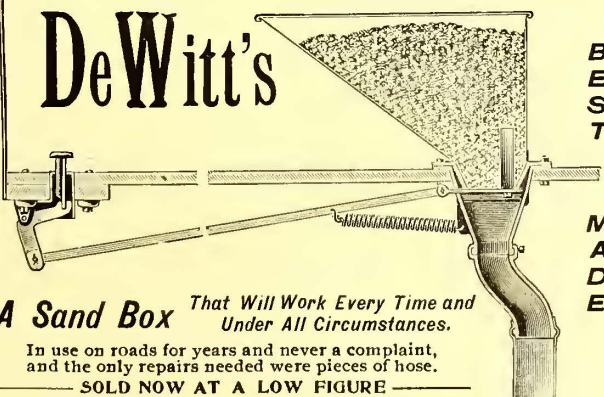
### ALLSTON FOUNDRY COMPANY

WM. W. WHITCOMB, President

620 Atlantic Avenue = = = Boston, Mass.

Direct all correspondence to Boston Office Telephone, "3997 Main"

## DeWitt's



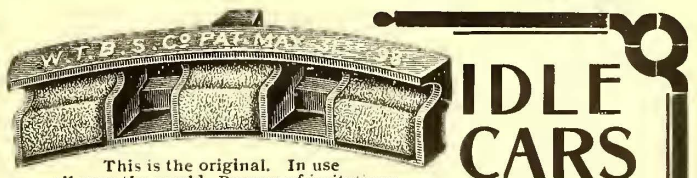
A Sand Box That Will Work Every Time and Under All Circumstances.

In use on roads for years and never a complaint, and the only repairs needed were pieces of hose.

SOLD NOW AT A LOW FIGURE

DeWitt Sand Box Company, 906 THIRD AVENUE TROY, N. Y.

Standard Railway Materials Co., Chicago, Ill., Western Agents



## IDLE CARS

This is the original. In use all over the world. Beware of imitations.

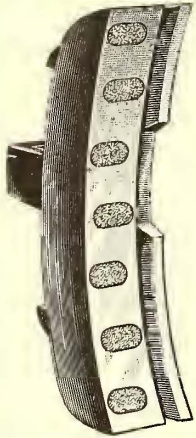
If you have flat wheels it is necessary to true them up. It is only good business for you to do this in the cheapest and best way provided.

### THE W.T.B. SHOE

will do it perfectly and at less cost than any other method, and at the same time prevent long flanges.

WHEEL TRUEING BRAKE SHOE CO., DETROIT, MICH.





# THE CRESCENT BRAKE SHOE

A SOFT IRON SHOE WITH SAND COMPOSITION INSERTS

UNEQUALLED FOR DURABILITY, EFFICIENCY AND ECONOMY IN WEAR ON WHEELS AND GEAR

TRIAL ORDERS SOLICITED UNDER GUARANTEE

**CRESCENT BRAKE SHOE CO.** 125 HUDSON STREET PHILADELPHIA, PA.

## Machine Moulded Steel Castings

10 lbs. to 500 lbs.

**BENJAMIN ATHA & CO.** ESTABLISHED 1864. NEWARK, N. J.

### Armature Bearings

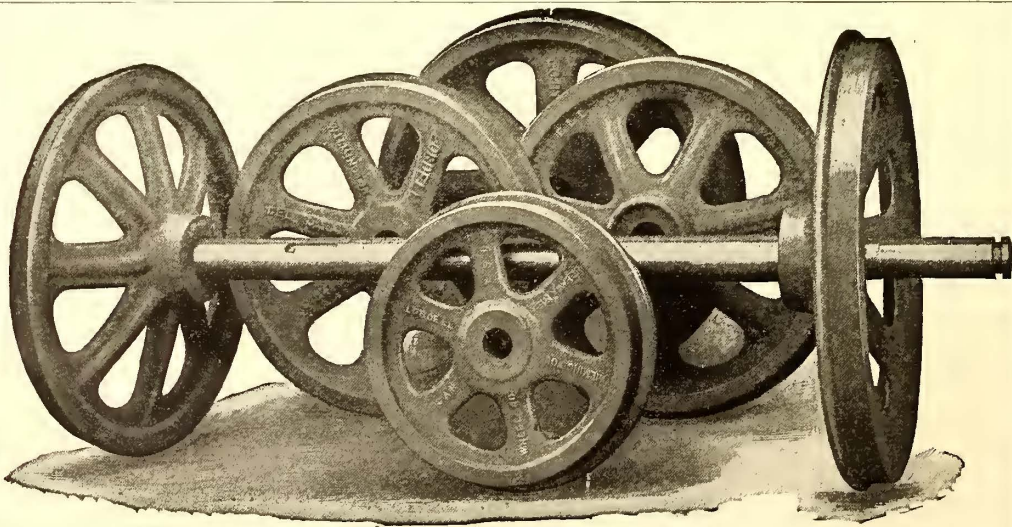
on the cars of the Market Street Railway Co.'s system, running 140 miles per day over steep grades, have an average life of ten months. ARMATURE METAL is used. Manufactured by

**JOHN FINN METAL WORKS,** 313-315 Howard Street, SAN FRANCISCO, CAL. 1255 First Avenue South, SEATTLE, WASH.

# LOBDELL CAR WHEEL COMPANY,

WILMINGTON, DEL., U. S. A.

The Largest and Oldest Car Wheel Establishment in the Country.



Capacity 800 Wheels Per Day.

MANUFACTURERS OF

## CAR WHEELS

OF ALL SIZES AND DESCRIPTIONS FOR

ELECTRIC AND CABLE CARS, SNOW PLOWS, SPRINKLERS, HORSE CARS, Etc.

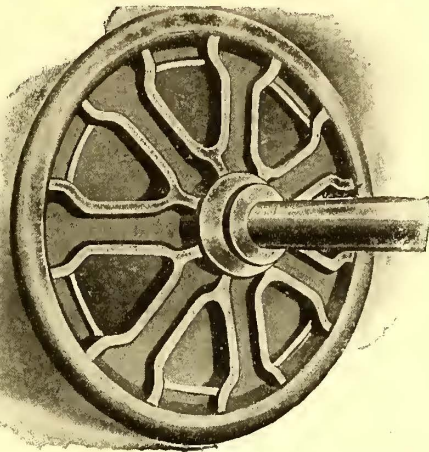
GROUND PERFECTLY TRUE ON TREADS.



# Re-enforced... Spoke Wheels For City Service

Stronger Spokes. Stronger Flange. **Deep, Even Chill.** Greater Mileage. **Absolute Safety.** A Sample Order will prove its superiority over the old style Spoke Wheel.

Write for Booklet on Wheels



## For Interurban 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**

**St. Louis Car Wheel Co.**

ST. LOUIS, MO.

# LEHIGH CAR, WHEEL & AXLE WORKS

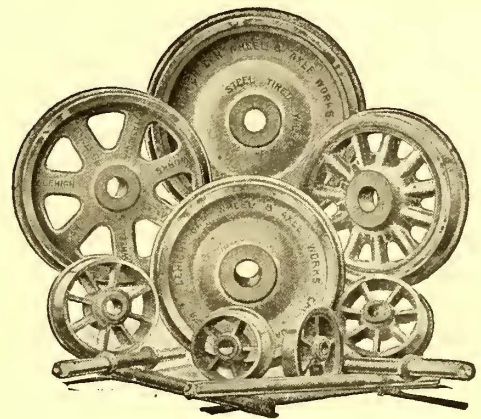
Successors to McKEE, FULLER & CO.

POST OFFICE ADDRESS

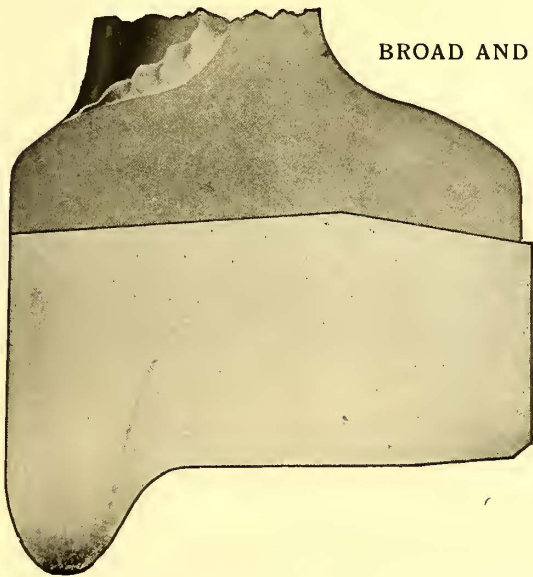
CATASAUQUA, PA., U. S. A.

Works at Fullerton, Pa.  
L. V. R. R.

Cable Code  
"Carwheel, Catasauqua"



BROAD AND NARROW GAUGE



## Freight and Coal Cars

OF EVERY DESCRIPTION

CHILLED AND STEEL TIERED

# CAR WHEELS

For Electric Railway and Steam Railroad Service

## Hammered Axles

AND OTHER FORGINGS

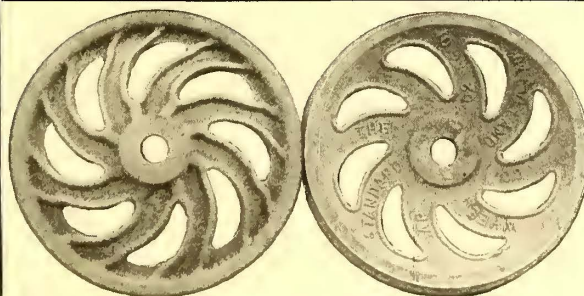
Capacity...  
20 Cars Per Day  
300 Wheels Per Day

Wheels fitted to Axles  
and prices furnished on  
application . . . .

# Electric Railway Department

of  
The Standard  
Car Wheel Company  
Cleveland, Ohio.

## ESSENTIAL POINTS



STRENGTH AND DEEP CHILL

# Manufacturers of ALL STYLES AND SIZES OF CHILLED WHEELS

For City and Suburban Lines

Axles Furnished  
and Wheels Fitted

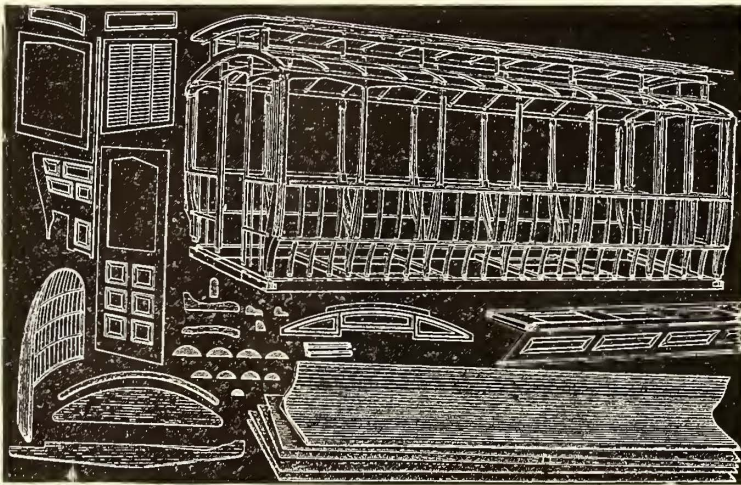
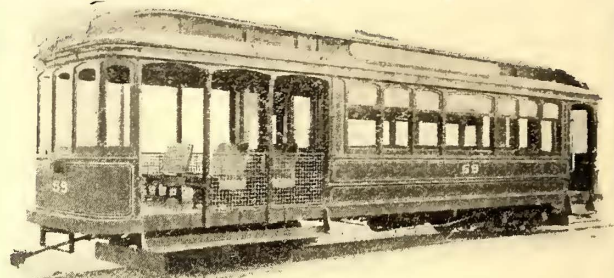
WRITE FOR PRICES.



# CALIFORNIA CAR WORKS

**J. HAMMOND & CO.**  
SAN FRANCISCO, CAL.

Manufacturers of Electric Cars  
Cable Cars and Trucks  
Horse and Freight Cars

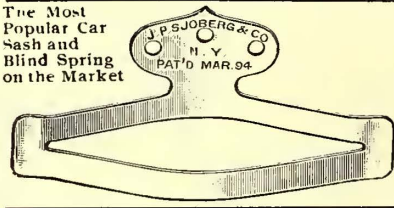


## J. P. SJOBERG & CO.

145 and 147 Eleventh Ave., NEW YORK,  
MANUFACTURERS OF

### STREET CAR WOOD WORK

The Most Popular Car  
Sash and  
Blind Spring  
on the Market



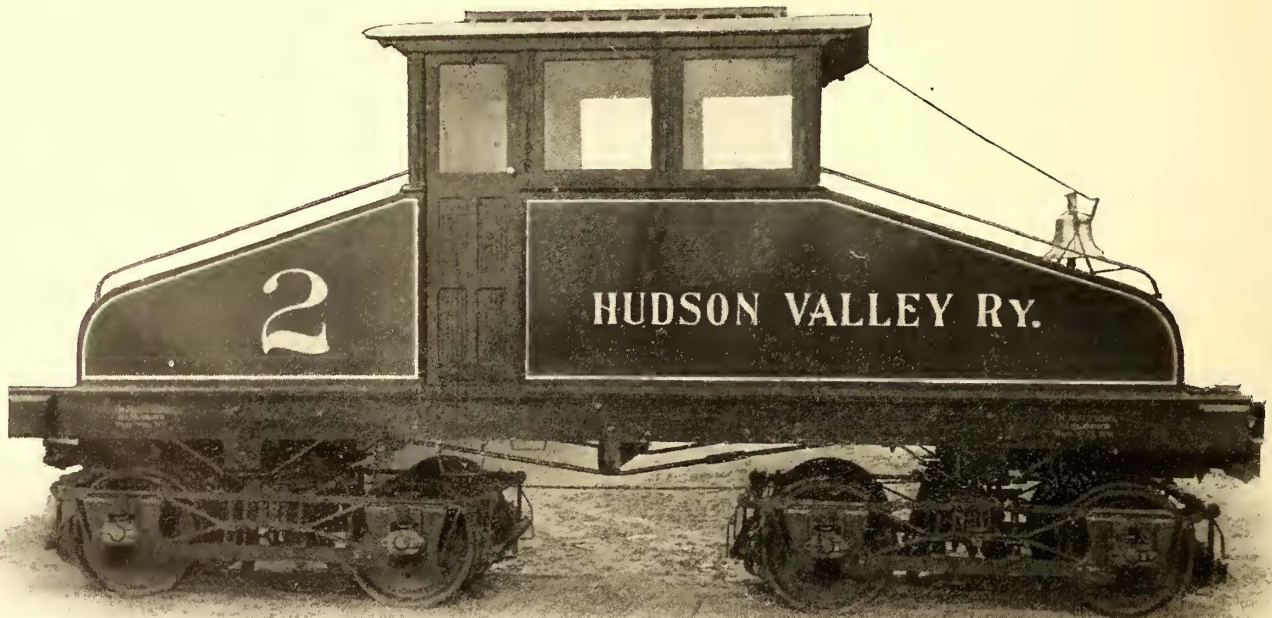
For  
Repairs  
Rebuilding  
and  
Stationary  
Vestibules

Also Portable Vestibule Fronts Complete

Established  
1839

# J. M. JONES' SONS

West Troy,  
N. Y.



Type of Electric Locomotive built by us for Freight Service.

BUILDERS  
OF . . . .

## HIGH-GRADE CARS FOR ELECTRIC RAILWAYS



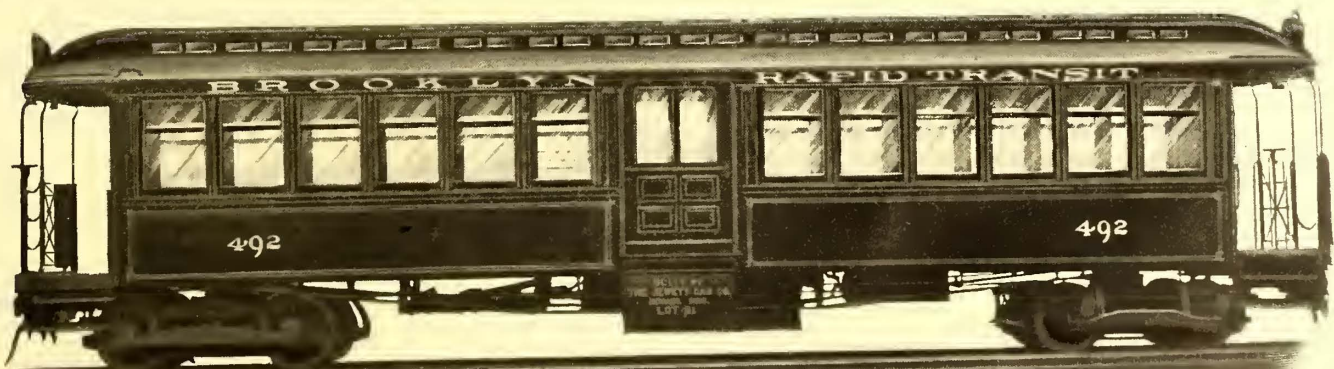


# THE JEWETT CAR CO.

Makes a Specialty of  
Suburban and Elevated Electric Coaches.

Office and Works,

## NEWARK, OHIO, U. S. A.



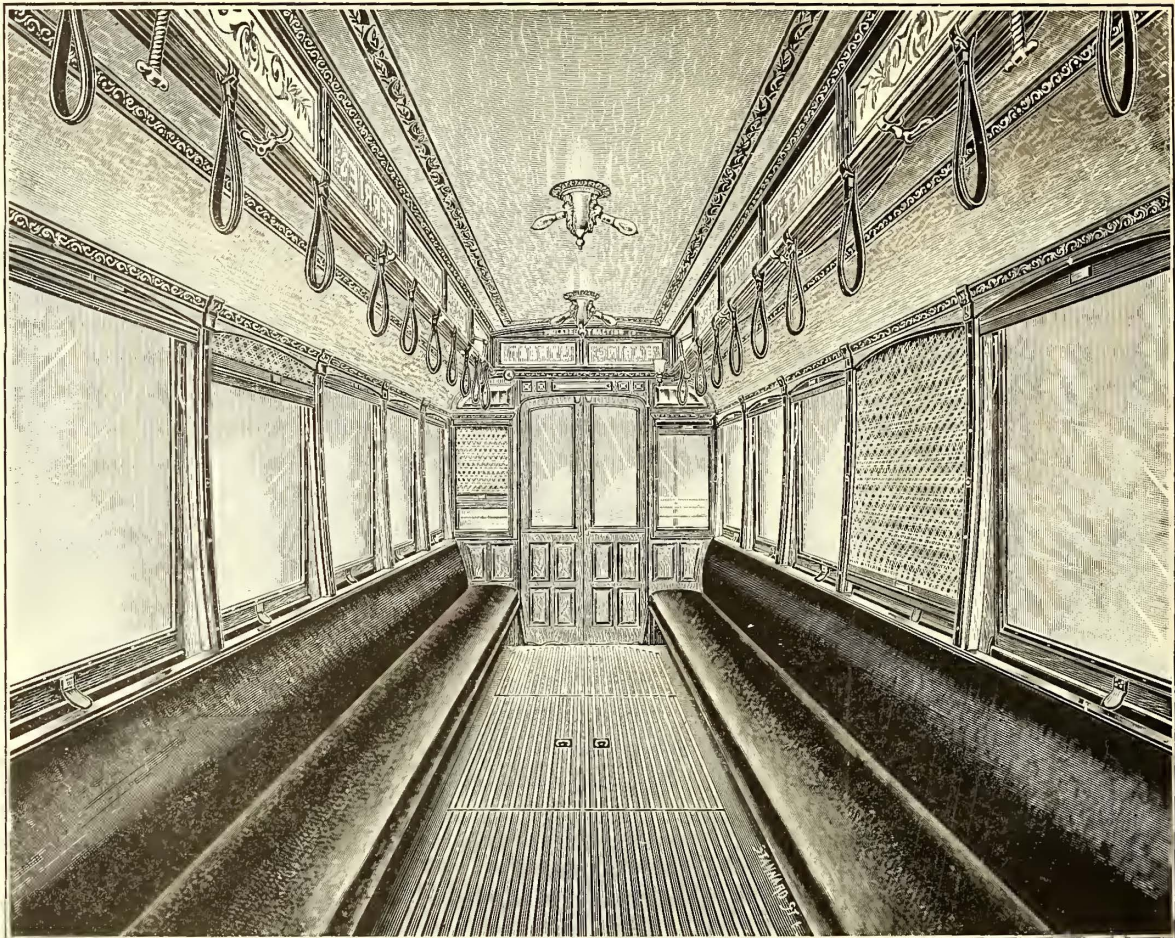


# LACLEDE CAR CO., ST. LOUIS, MO.

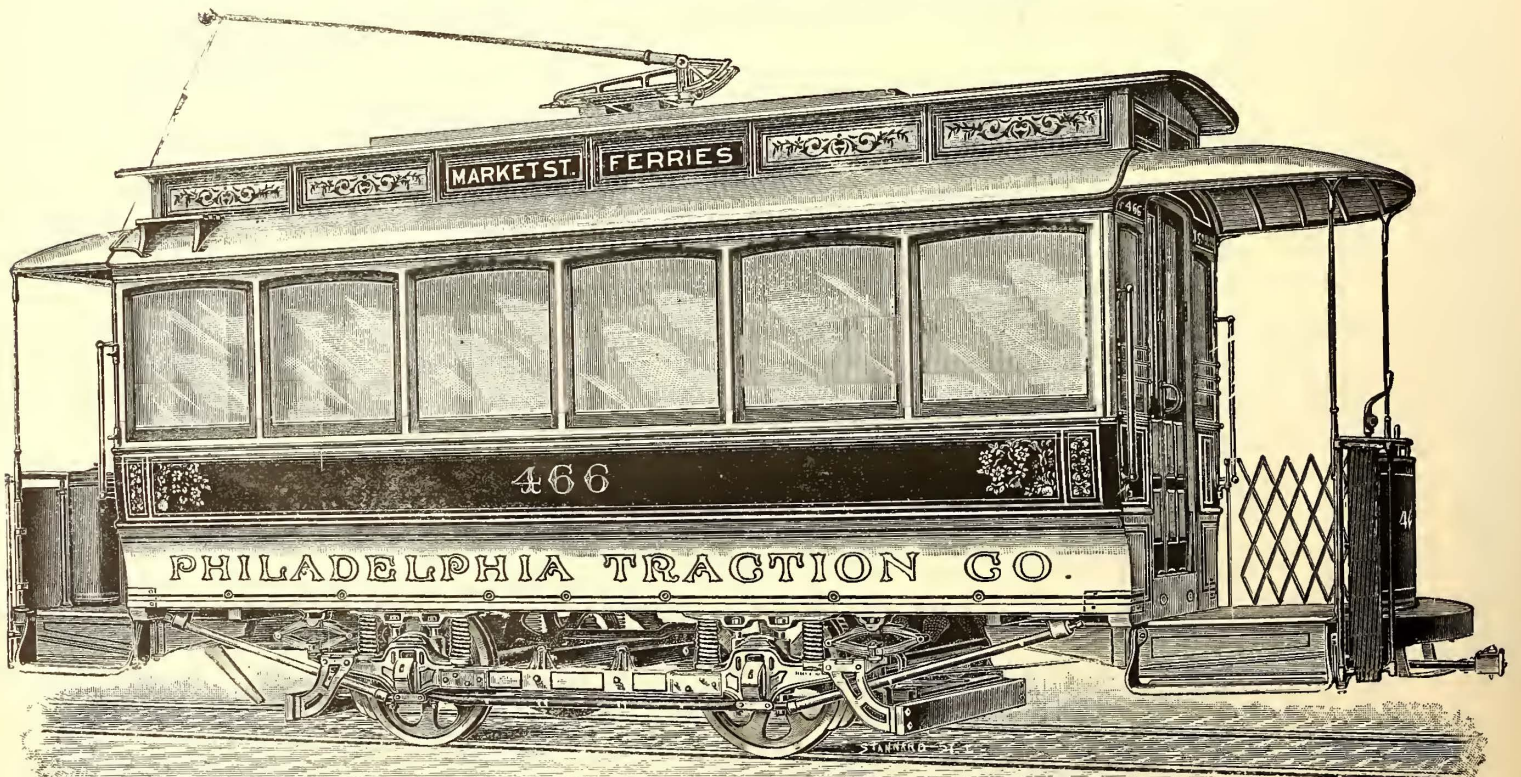
BUILDERS OF

ELECTRIC  
CARS

AND  
TRUCKS



INTERIOR OF PHILADELPHIA "MARKET STREET" CAR.



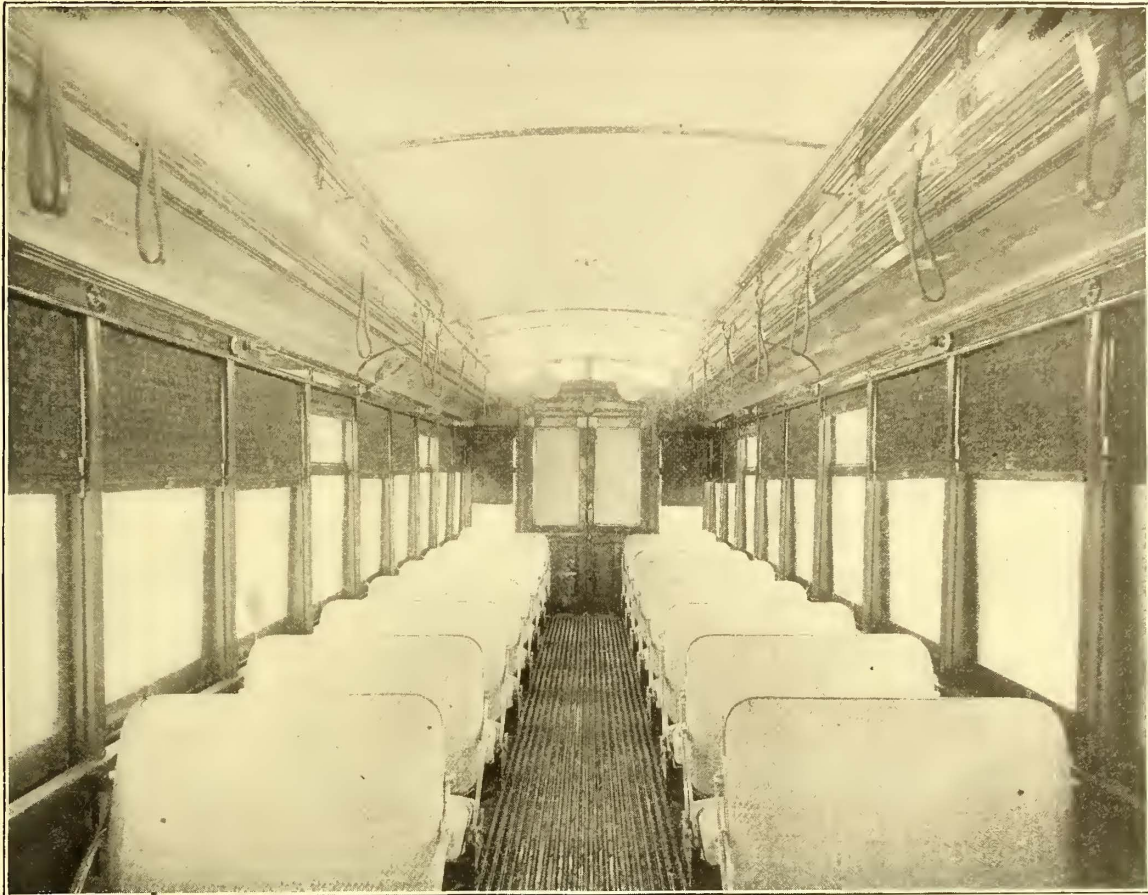
THIS CUT REPRESENTS ONE OF THE 1000 CARS BUILT FOR THE PHILADELPHIA TRACTION CO.  
ALL ORDERS PROMPTLY AND CAREFULLY EXECUTED.



# LACLEDE CAR CO., ST. LOUIS, MO.

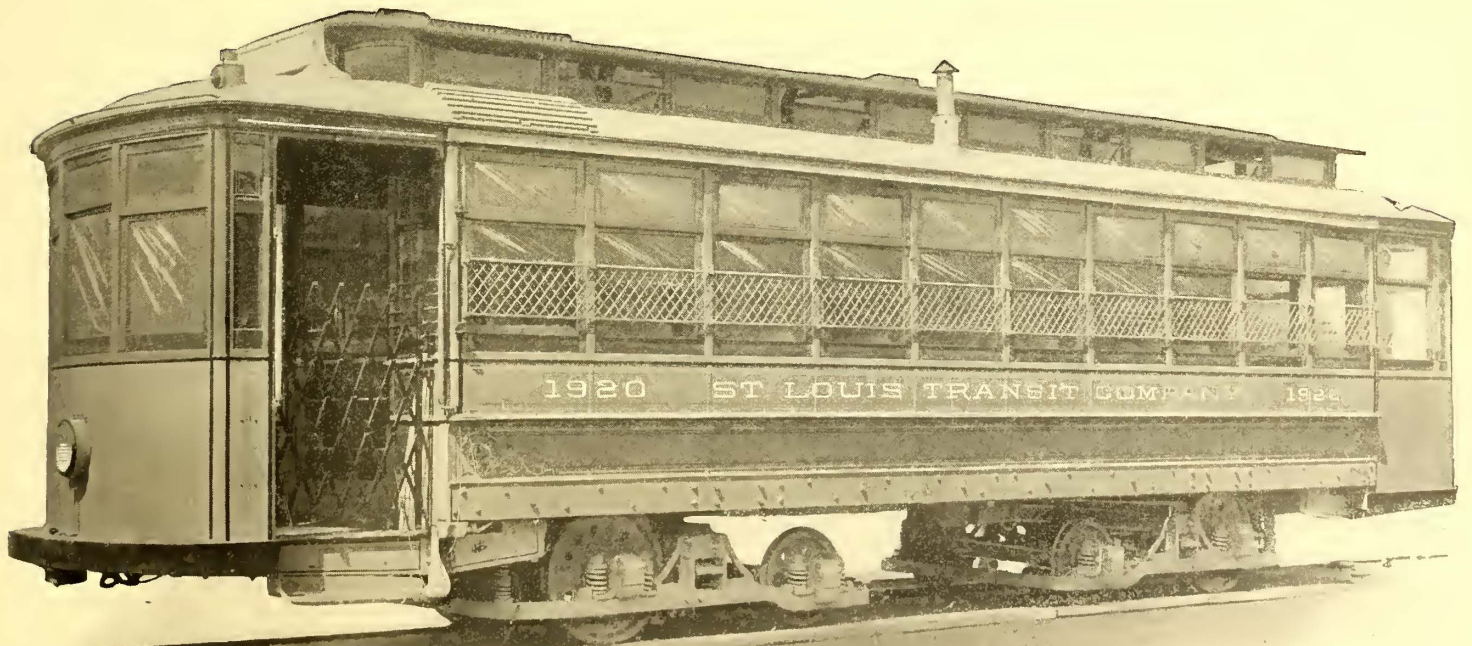
BUILDERS OF

**E  
L  
E  
C  
T  
R  
I  
C  
  
C  
A  
R  
S**



**A  
N  
D  
  
T  
R  
U  
C  
K  
S**

INTERIOR OF CARS BUILT FOR THE ST. LOUIS TRANSIT CO.



THIS CUT REPRESENTS ONE OF THE 70 CLOSED CARS BUILT FOR THE ST. LOUIS TRANSIT CO.

**WRITE FOR PRICES AND SPECIFICATIONS.**



# McGUIRE COMPRESSOR SPRINKLER

Steel Tank, capacity from 2000 to 5000 gallons. Equipped with air compressor. No long arms. Motor and sprinkler easily handled by one man. Can be adjusted to sprinkle any distance, from width of track only to a distance of fifty-five feet on each side of the track.



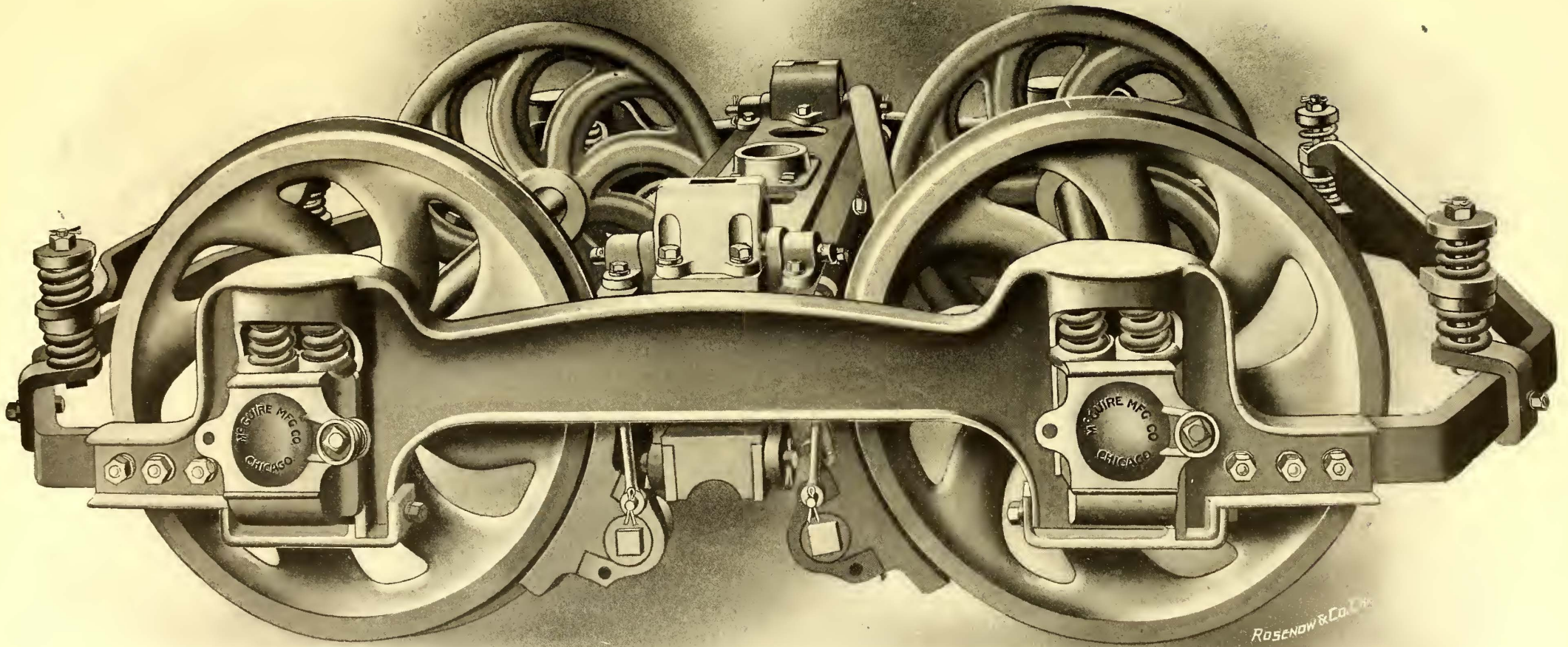
**MAIN OFFICE:**  
122 to 132 N. Sangamon St., Chicago.  
San Francisco Office: 13 Front Street.

**McGUIRE MANUFACTURING COMPANY**  
CHICAGO, ILL.

New York Office: 15 Cortlandt Street.  
London Office: 5 Warwick Court,  
HIGH HOLBORN, LONDON, W. C.

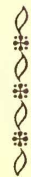


# No. 39-A. TRUCK



STREET RAILWAY JOURNAL.

Perfect spring distribution. No jolting or jarring on the frame. Short wheel base. Carries body as low as a single truck. Machine-fitted throughout, making it the strongest and most durable truck on the market. Has no weak points such as are occasioned by rivets or eye-bolt hangers.



SEND FOR BLUE PRINTS

**McGUIRE MANUFACTURING COMPANY**  
CHICAGO, ILL.

Chicago  
122 N. Sangamon St.

New York  
15 Cortlandt St.

San Francisco  
91 Fremont St.

London  
5 Warwick Court, High Holborn



In use on the lines of the Peoria & Pekin Terminal Railway, Peoria, Ill.; Indiana Railway, South Bend, Ind.; Chicago Union Traction Co., Chicago, Ill.; Los Angeles Pacific Railway Co., Los Angeles, Cal.; Norfolk Railway & Light Co., Norfolk, Va.; Toledo, Bowling Green & Fremont Railway, Toledo, Ohio; Norfolk & Atlantic Terminal Co., Norfolk, Va.; Wabash River Traction Co., Wabash, Ind.; Bay Shore Terminal Co., Norfolk, Va.; St. Louis, St. Charles & Western Railway, St. Louis, Mo.; San Francisco & San Mateo Railway Co., San Francisco, Cal.; and others.



# ST. LOUIS CAR CO.

## GENERAL OFFICES:

8000 N. Broadway, St. Louis, Mo., U. S. A.

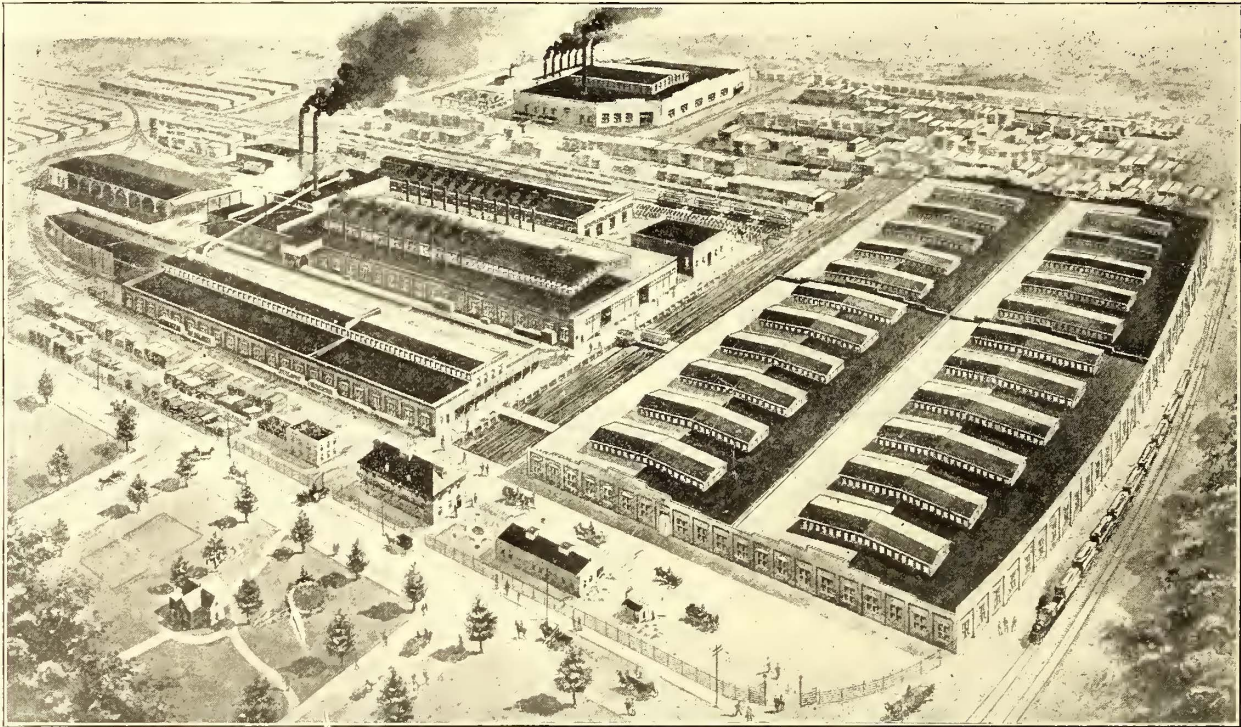
GEO. J. KOBUSCH, President and Treasurer.  
H. F. VOGEL, General Manager.  
CHAS. E. FRITSCHÉ, Secretary.  
WARNER S. McCALL, General Sales Agent.

## BRANCH OFFICES:

General Eastern Agent, F. E. Huntress, Boston.

BOSTON, 8 Oliver St. NEW YORK, 716 Broad Exchange Bldg.  
PHILADELPHIA, 836 Real Estate Trust Bldg.

General Mexican Agent, I. M. HUTCHISON, Apartado 2098,  
City of Mexico, Mex.



OUR WORKS.

## ANDERSON-SMITH ARC HEADLIGHT

The only complete and perfect Arc Headlight on the market to-day. It is perfectly simple and automatic and will burn with a drop in the voltage of 200 to 250 volts. Only requires one to one and a half amperes current.

### Offices Spiral Journal Department:

CHICAGO, E. R. & R. G. Hutchins, The Rookery.  
NEW YORK, Wm. F. Snow, 716 Broad Exchange Building.  
MEXICO, I. M. Hutchison, Apartado 2098.  
ST. LOUIS, J. H. Taylor, 519 Roe Building.

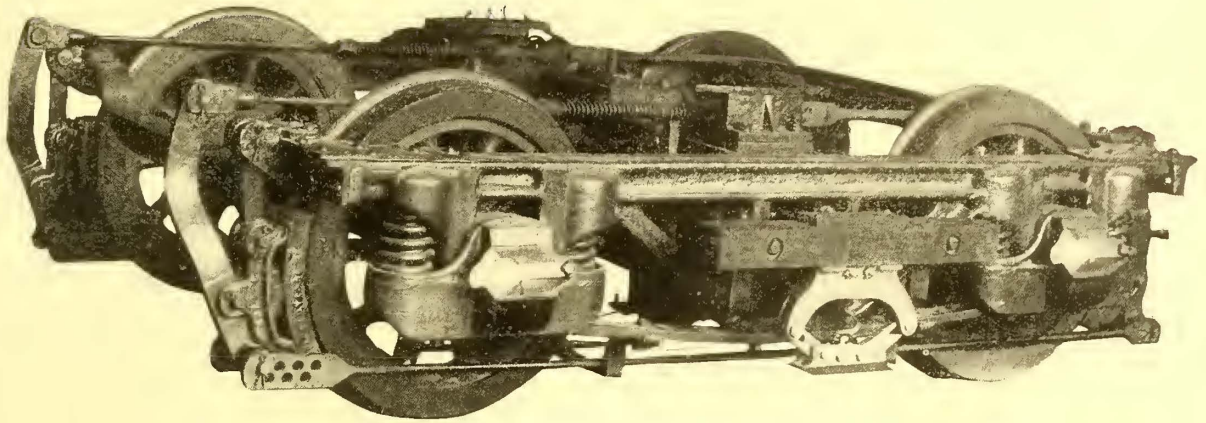
### FOREIGN OFFICES:

H. H. Boeker & Co., = = Berlin, Germany.  
M. Bramson, = = = Warschau, Russia.



# ST. LOUIS CAR CO.

ST. LOUIS, U. S. A.



St. Louis Car Company's Hendley Truck, for heavy high speed service.  
Adopted by the Northwestern Elevated Railroad, Chicago.

## Coach and Truck Builders



New Parlor Car for Union Traction Co. of Indiana.

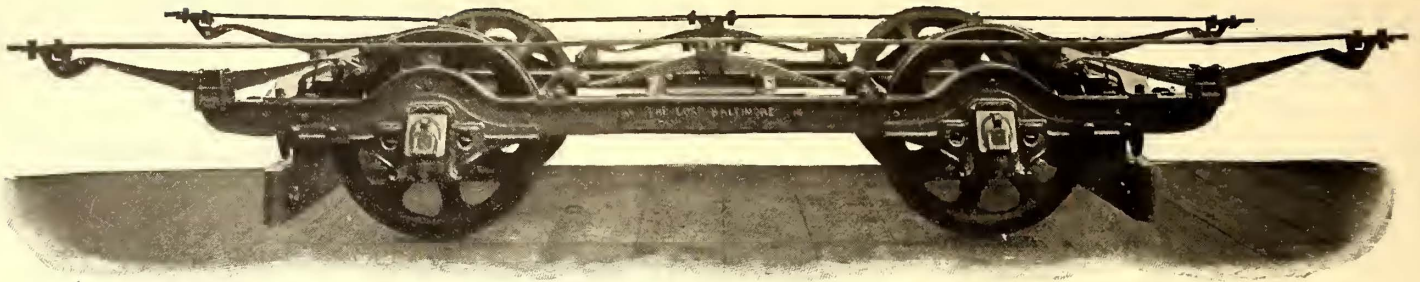
...ALSO MANUFACTURERS OF...

### SPIRAL JOURNAL BEARINGS

Especially Designed for Any Truck in the Market.  
Guaranteed to Outwear Any Phosphor Bronze Bearing.

CORRESPONDENCE SOLICITED.





**THE BALTIMORE CAR WHEEL COMPANY**

W. S. G. BAKER, *President and Treasurer*

BALTIMORE, MD., U. S. A.

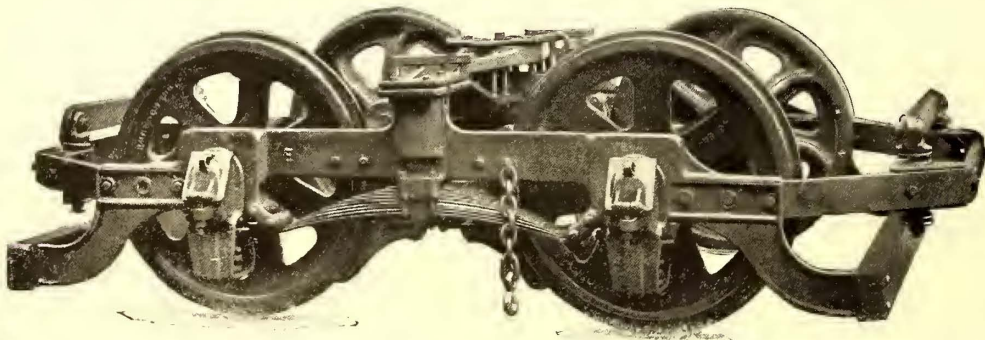
J. PAUL BAKER, *Secretary*

MANUFACTURERS OF

**THE LORD BALTIMORE**

4-WHEEL BOGIE AND MAXIMUM TRACTION

**ELECTRIC CAR TRUCKS**



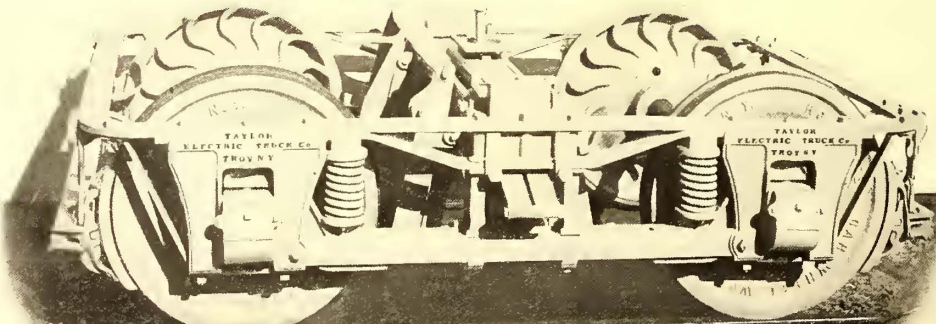
CHILLED WHEELS OF ALL PATTERNS AND SIZES FOR EVERY SERVICE, WITH OR WITHOUT AXLES

**TAYLOR EXTRA HEAVY DOUBLE TRUCK**

WITH SWING MOTION *and* EQUALIZING BAR

Especially designed for use under long cars in high-speed interurban service

Built on standard Master Car Builders' lines, incorporating the best principles known in steam railroad truck construction



The brakes and all wearing parts are made extra strong, allowing the attachment of air brakes if desired : : :

This truck combines strength and simplicity of construction, ease of riding and absolute safety at high rate of speed around curves as well as on straight track

**TAYLOR ELECTRIC TRUCK CO., Troy, N. Y., U.S.A.**

*Agents for Great Britain*

ESTLER BROTHERS, 25 Laurence Pountney Lane, Cannon St., London, E. C.

*Our Export Trade (outside of Great Britain) is Handled Exclusively by*

DUTILH-SMITH, McMILLAN & CO., Broad-Exchange Bldg., New York

*"Highest Grade Trucks for Electric Service"*



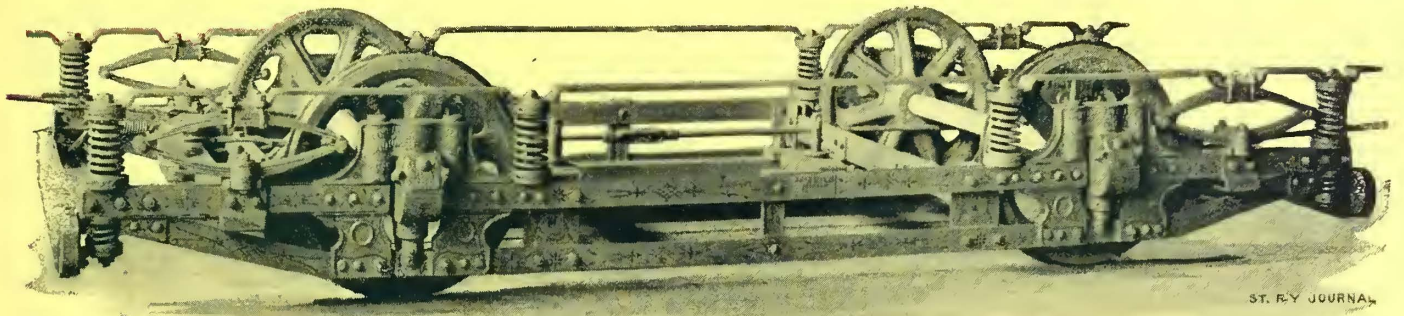
# PECKHAM'S

## Non-Oscillating Cantilever Extension Trucks

Designed expressly for light, medium and extra heavy single truck cars. Strictly non-oscillating.

### STANDARD.

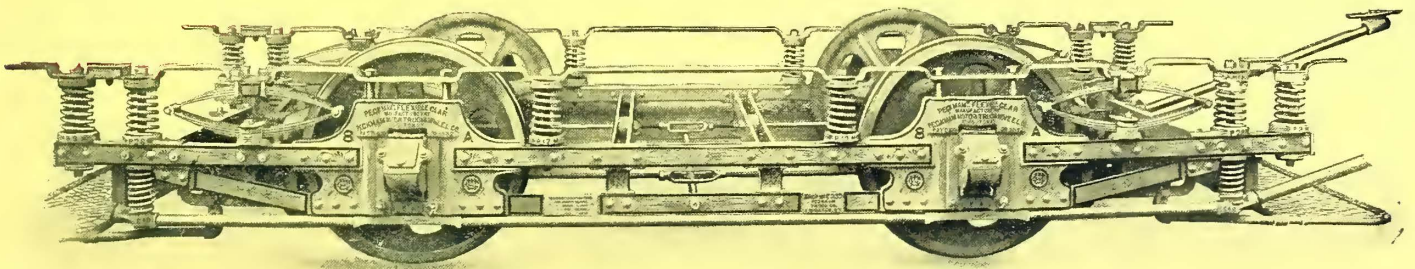
Designed for "High-Speed" 16 to 20 foot Closed and 26 to 30 foot Open Cars.



ST. RY JOURNAL

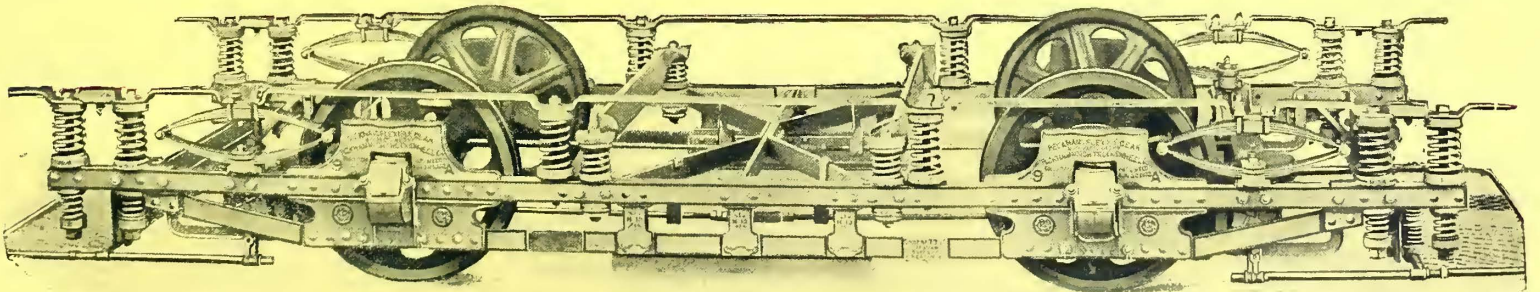
### EXTRA LONG.

Designed for "High-Speed" 18 to 22 foot Closed and 30 to 35 foot Open Cars.



### METROPOLITAN SPECIAL.

Designed for severe service and for extra heavy 20 to 24 foot Closed and 30 to 35 foot Open Cars.



Guaranteed to ride easily and prevent oscillation of cars. Adopted as Standard by the largest Electric Railways in the United States. Satisfaction Guaranteed.

**OVER 12,000 PECKHAM SINGLE TRUCKS IN USE.**

**THE PECKHAM MANUFACTURING COMPANY,**

Sales Offices, HAVEMEYER BUILDING, 26 CORTLANDT STREET, NEW YORK.

BOSTON, 53 State St.

PHILADELPHIA, North American Building.

CLEVELAND, Electric Building.

LONDON OFFICE, 59 City Road, E. C.

JAPAN, No. 12 Yokohama.

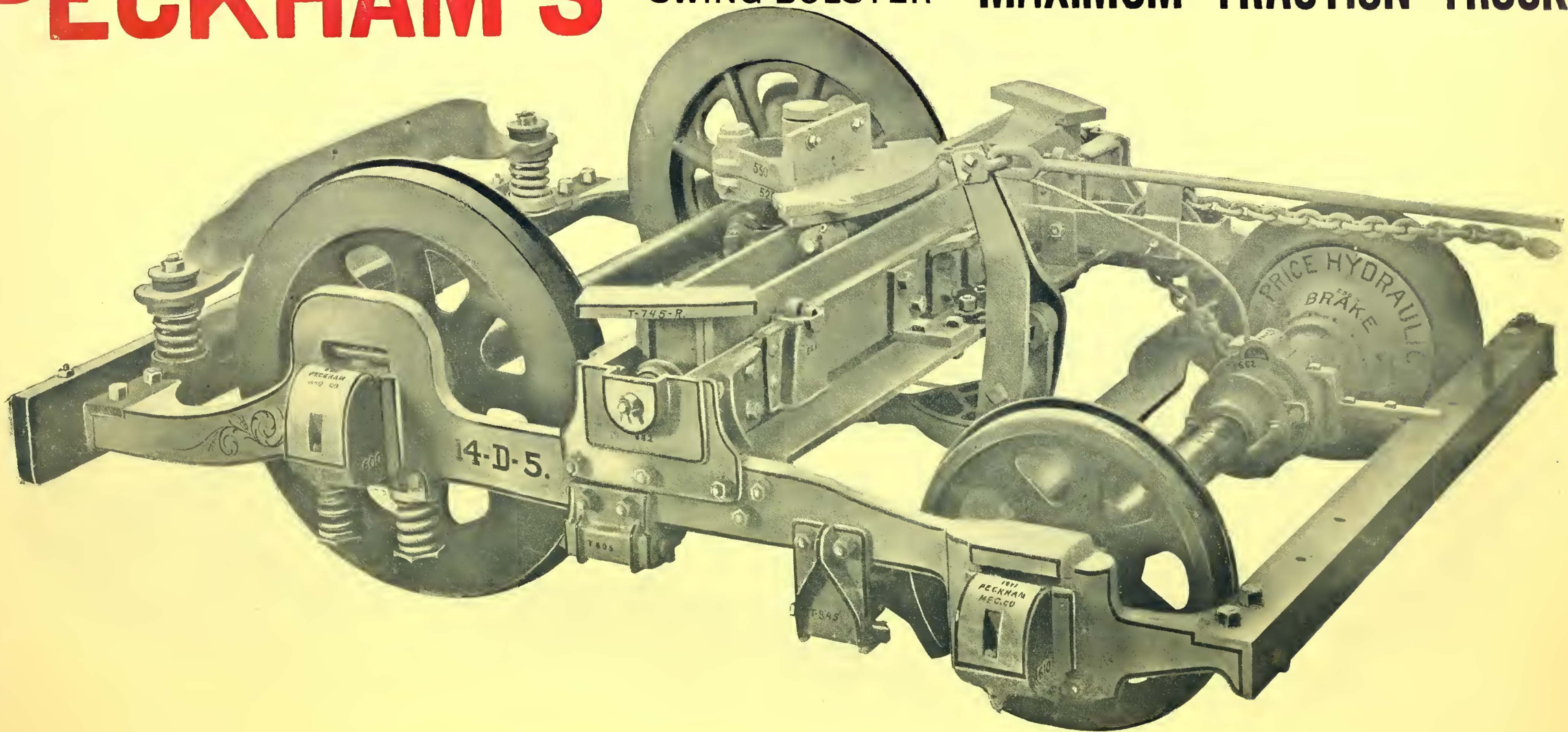
PARIS OFFICE, Bureau de Paris, 50 Boulevard Haussmann.

SAN FRANCISCO, 123 California St.

AUSTRALIA, Melbourne and Sydney.



# PECKHAM'S "CENTRE BEARING" "SWING BOLSTER" MAXIMUM TRACTION TRUCK



The strongest, easiest riding and most economically maintained Maximum Traction Truck in use.  
Prevents wrenching of car bodies, excessive wear on special work and breaking of wheel flanges.

## THE PECKHAM MANUFACTURING COMPANY

Sales Offices, HAVEMEYER BUILDING, 26 CORTLANDT STREET, NEW YORK.

BOSTON, 53 State St.

LONDON OFFICE, 59 City Road, E. C.

PHILADELPHIA, North American Bldg.

JAPAN, No. 12 Yokohama.

CLEVELAND, Electric Bldg.

PARIS OFFICE, Bureau de Paris, 50 Boulevard Haussmann.

SAN FRANCISCO, 123 California St.

AUSTRALIA, Melbourne and Sydney.

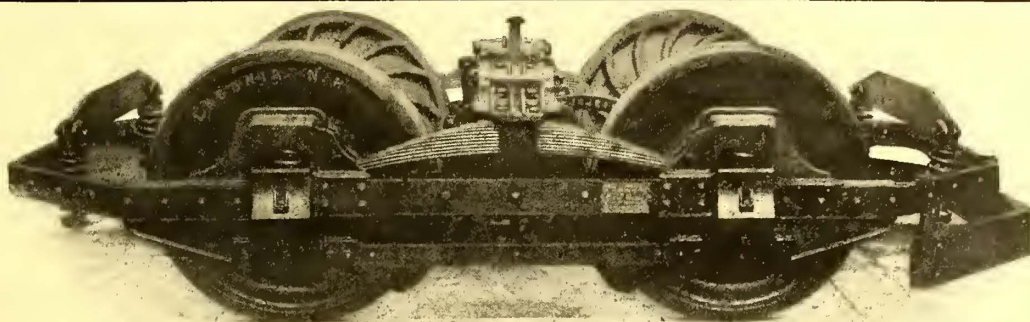


# THE LACONIA CAR COMPANY WORKS

FRANK JONES, President  
P. W. WHITEMORE, M'g'r and Treas.

50 STATE STREET, BOSTON, MASS.

WORKS:  
LACONIA, N. H.



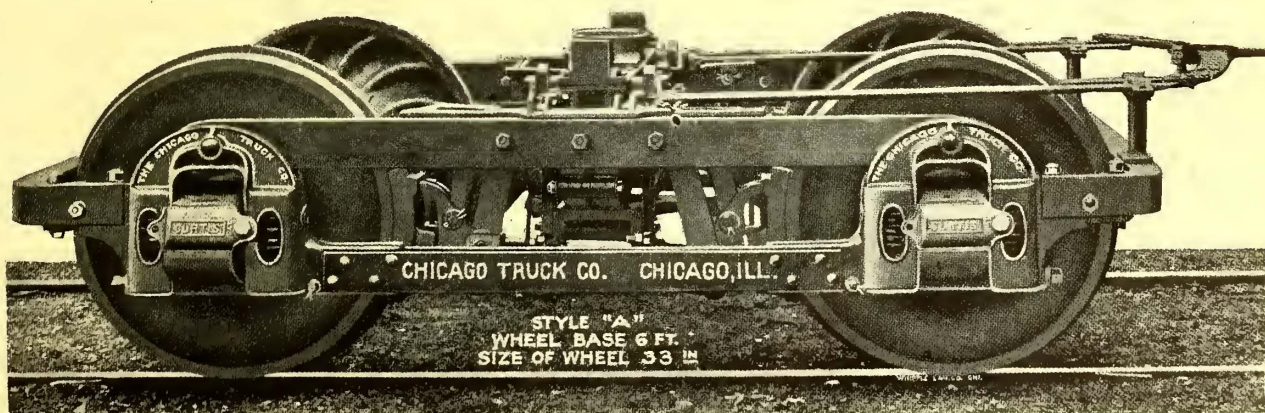
## BUILDERS OF ELECTRIC CARS AND TRUCKS

MALLEABLE IRON CASTINGS FOR ELECTRICAL WORK.

# CURTIS TRUCKS

## OUR TYPE "A" TRUCK

is designed expressly for severe high-speed service under heavy loads. It is a swing motion truck, pure and simple. The frame is made of soft steel with the exception of the pedestals, which are of malleable iron with a tensile strength of 77,000 lbs. to the square inch. Full elliptic springs are used under the truck bolster, and coil springs on each side of the journal box in the pedestals.



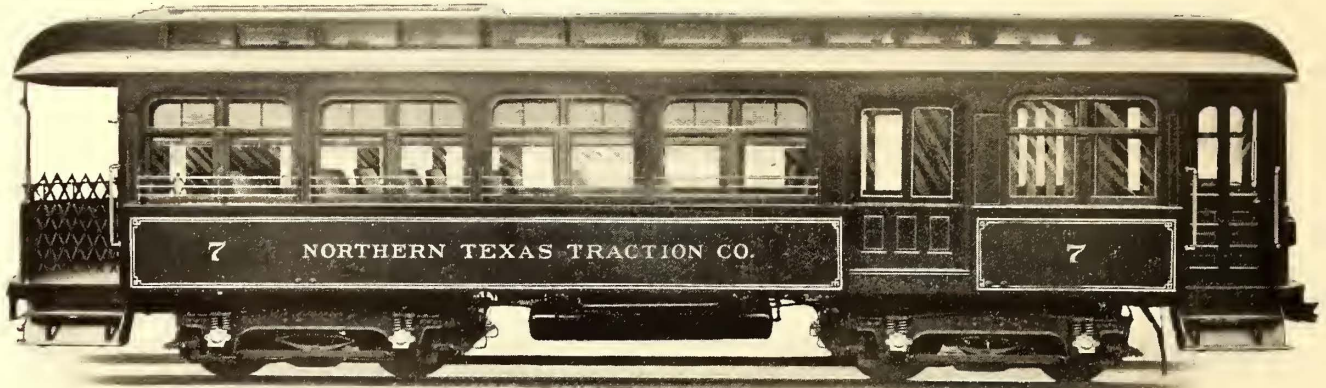
**GUARANTEE**—We guarantee perfect lateral, vertical and longitudinal ease; safety on curves at any rate of speed; a saving in wheel and tire wear and an increased life of roadbed. This truck will not get out of square, and will perform any work that is required of it. It is equipped with the Curtis patent inside hung brake without beams or cross-connections of any kind.

# CHICAGO TRUCK CO

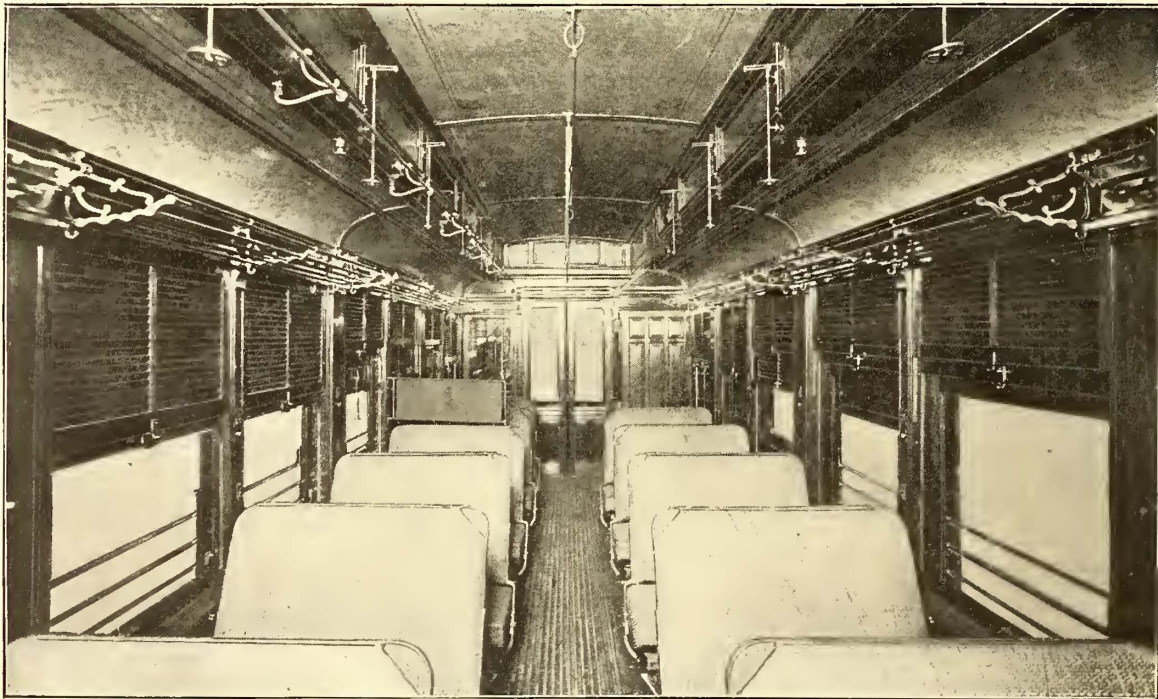
MONADNOCK BLOCK, CHICAGO, ILL.



## We Use the Very Best of Materials in Building Cars



The above car is 47 feet over buffers. It is a combination passenger and baggage car with a seating capacity of 30 passengers and a baggage compartment 10 feet 6 inches long, equipped with folding seats. It has shutters on the windows the same as used on steam railroad coaches.



The interior finish is cherry. It has rattan spring-edge walk-over seats with bronze grab handles and it is one of the finest cars ever built.

### *Some of the roads which are using our cars :*

CLEVELAND & BEREA RY. Co., Cleveland, O.  
 CLEVELAND CITY RY. Co., Cleveland, O.  
 CLEVELAND ELECTRIC RY. Co., Cleveland, O.  
 CLEVELAND & CHAGRIN FALLS RY. Co., Cleveland, O.  
 CLEVELAND, ELYRIA & WESTERN RY. Co., Cleveland, O.  
 NORTHERN OHIO TRACTION Co., Akron, O.  
 MUSCATINE RY. Co., Muscatine, Iowa.

TIFFIN, FOSTORIA & EASTERN RY. Co., Tiffin, O.  
 CINCINNATI & HAMILTON RY. Co., Hamilton, O.  
 TUSCARAWAS RY. Co., New Philadelphia, O.  
 RAPID RY. SYSTEM, Detroit, Michigan.  
 DETROIT & NORTHWESTERN RY. Co., Detroit, Michigan.  
 DETROIT RY. Co., Detroit, Michigan.  
 DETROIT & PONTIAC RY. Co., Birmingham, Michigan.

MANSFIELD & SHELBY RY. Co., Mansfield, O.

## THE G. C. KUHLMAN CAR COMPANY,

Factory and General Offices, COLLINWOOD, OHIO



## This is the kind of Car we can furnish you



The length of this car over the buffers is 49 feet 6 inches, and it has a seating capacity of 49 passengers



The inside finish of this car is Mexican Mahogany. It has frieze plush seats, spring edge cushions, bronze grab handles, extra high corrugated backs, Pantasote cushions and heavy polished plate glass windows throughout.

### *Some of the roads which are using our cars:*

WESTERN OHIO RY. Co., Lima, O.  
 LORAIN & ELYRIA RY. Co., Lorain, O.  
 COLUMBUS CENTRAL RY. Co., Columbus, O.  
 COLUMBUS, DELAWARE & MARION RY. Co.  
 DAYTON & XENIA RY. Co., Xenia, O.  
 DAYTON & WESTERN RY. Co., Dayton, O.  
 NORTHERN TEXAS TRACTION Co., Handley, Texas.  
 SAGINAW VALLEY TRACTION Co., Saginaw, Michigan.

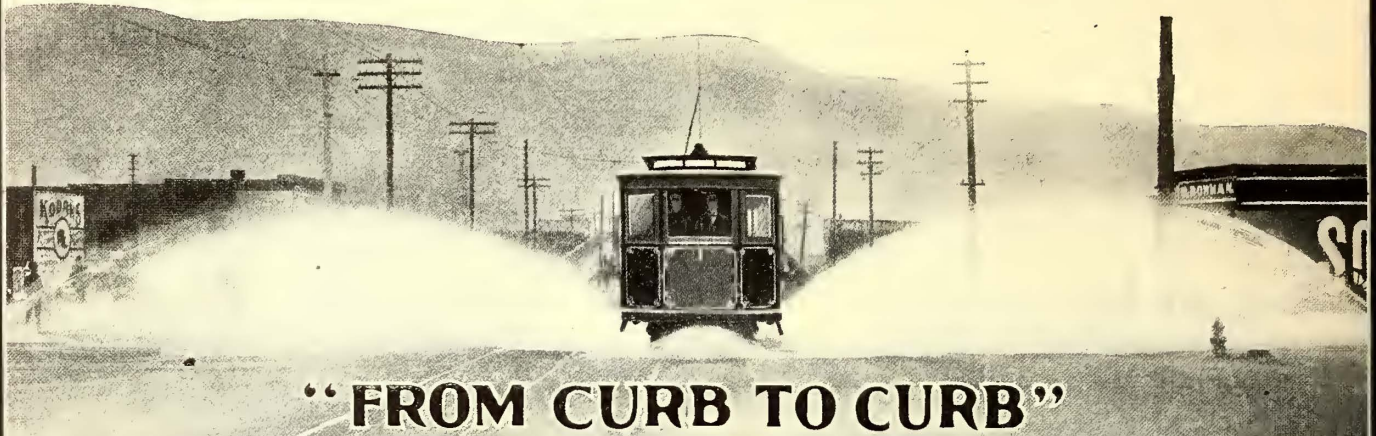
CLEVELAND, PAINESVILLE & EASTERN RY. Co., Cleveland, O.  
 SENATOR M. A. HANNA'S PRIVATE CAR, Cleveland, O.  
 CONNELLSVILLE ST. RY. Co., Conneltsville, Pa.  
 INDIANAPOLIS & GREENFIELD RY. Co., Indianapolis, Ind.  
 DETROIT, ROCHESTER & ROMEO RY. Co., Detroit, Mich.  
 DETROIT, GRAND RAPIDS & HOLLAND RY. Co., Detroit, Michigan.  
 KANSAS CITY & LEAVENWORTH RY. Co., Kansas City, Kans.

# THE G. C. KUHLMAN CAR COMPANY,

Factory and General Offices, COLLINWOOD, OHIO



# STUDEBAKER



“FROM CURB TO CURB”

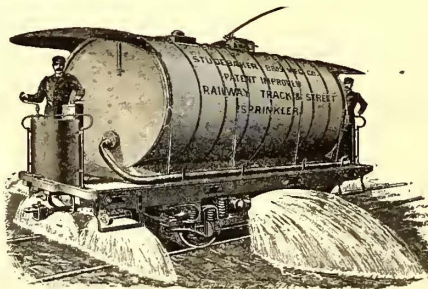
## Studebaker Wide-Spraying Electric Car

For the rapid, economical spraying of streets nothing can surpass this model of excellence. Railway managers should be quick to realize the convenience to themselves and the comfort it affords their patrons in abating the dust nuisance, and consequent saving in wear of journals, axles and motors. The above cut shows our sprinkler on the Colorado Springs & Suburban Railway, Denver, Col. ❀ ❀ ❀ The spray is thrown from two sprinkling heads, found on either side, about the center, near the trucks. The water is forced from these heads by two individual force pumps, run by a 30-horse power motor, and located at the end of the car. The amount of water thrown, together with the width of the spray, is governed by levers at either end. An emergency brake is also supplied for quick work in the passing of a moving vehicle or running at high speed. The sprinkling apparatus, as well as the car, can be operated at either end. A third sprinkling head is located in front of the center of gear for the flushing of the tracks or between them. ❀ ❀ ❀ In the test, with the car standing, a spray of water 78 feet in width from center of track was thrown with the use of one head, while with both sides open a distance of 120 feet was covered. A still further test was the run on Pike's Peak Avenue, when, at a speed of about ten miles an hour, this exceptionally wide avenue was satisfactorily covered. ❀ ❀ ❀ ❀ Tanks are of wood or steel, and any capacity desired. ❀ ❀ ❀ ❀ The machine will unquestionably meet all of its requirements.

We are also prepared to furnish

GRAVITY  
SPRINKLING  
CARS,

depending upon water pressure for width of spray, which flush the rails and from 12 to 15 feet on either side of the track.



We also make a specialty of

STREET  
SPRINKLERS,  
STREET  
SWEEPERS,  
DUMP WAGONS,  
CARTS and  
CONTRACTORS'  
WAGONS.

Write for Catalogue  
and Prices

# STUDEBAKER BROS MFG CO

CARRIAGES - WAGONS - HARNESS FOR EVERY PURPOSE.

## SOUTH BEND, INDIANA.

Branches: New York City, Boston, Chicago, Kansas City, San Francisco, Portland, Ore., Denver, Salt Lake City.



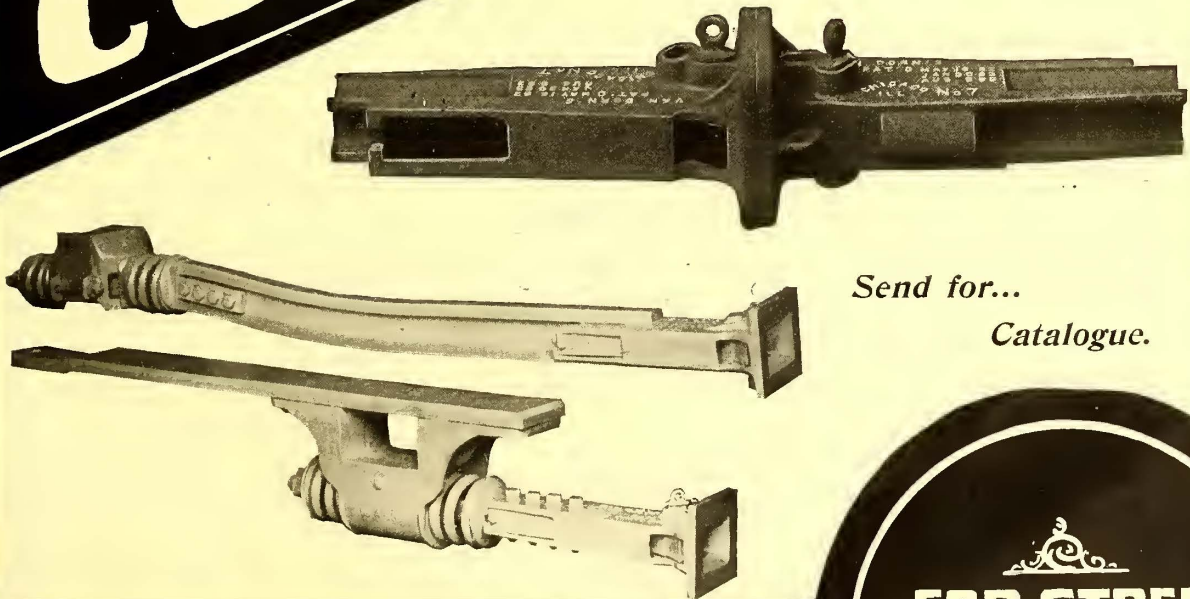
**FOR ELEVATED  
RAILWAYS**

**T**HE two cuts on this page show two sizes of the 16 styles of couplings we have in service. We have them from the smallest mining car size to the very heaviest couplings for elevated roads. Our couplings are now a standard on all the elevated roads of this country and this alone demonstrates their superiority over everything else offered, for they have to have the most perfect couplings it is possible to build. The draft rigging

furnished with the couplings is conceded by all companies to be superior in every detail to everything else that has ever been offered. :: ::

# VAN DORN COUPLERS

Be sure to specify  
Van Dorn Equipment  
on your new rolling stock.

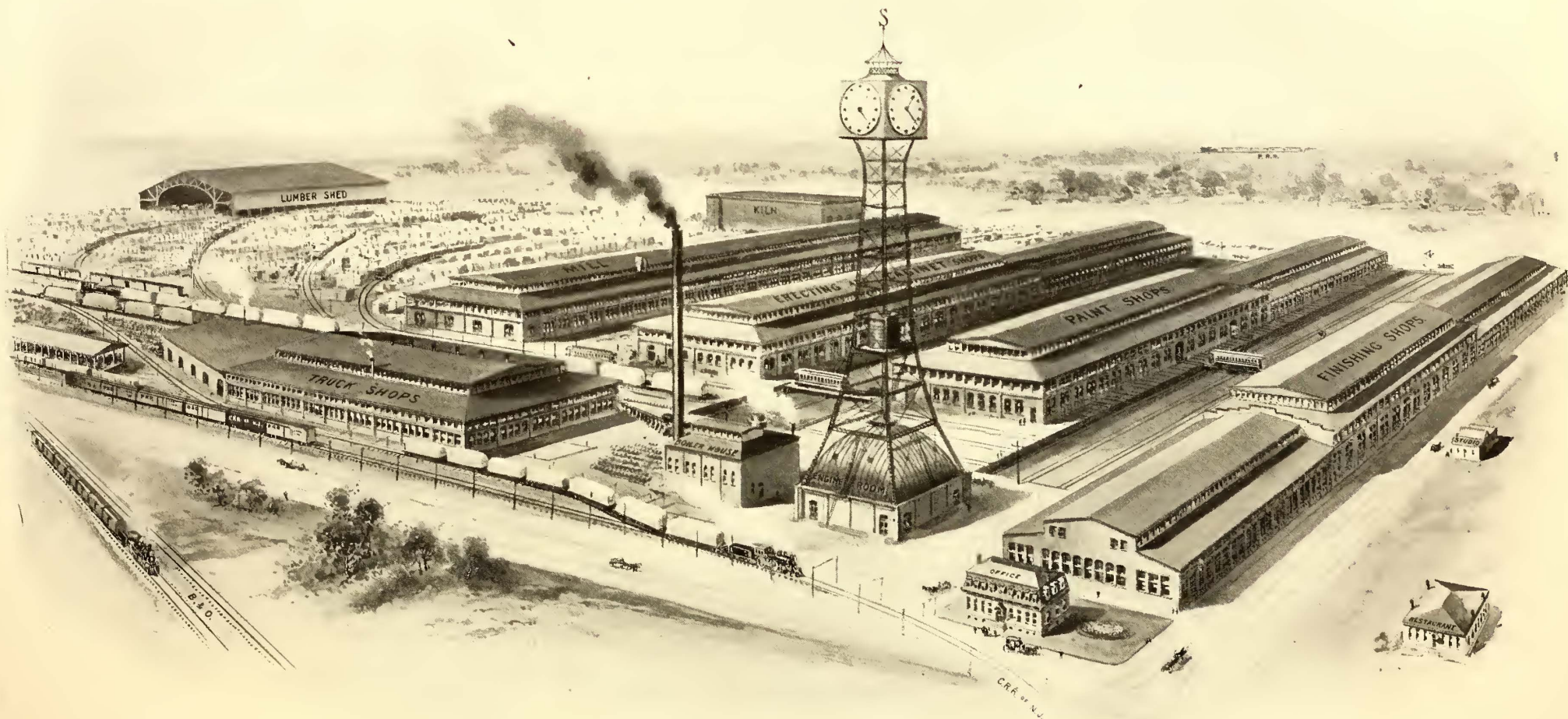


Send for...  
Catalogue.

**FOR STREET  
RAILWAYS**

**W.T. VAN DORN CO**  
MONADNOCK BLOCK CHICAGO





## ***The Carbuilding Plant of the* JOHN STEPHENSON COMPANY, Elizabeth, N. J.**

Street Cars for every possible service

Cars for Elevated or Underground Railways

Suburban Cars

Interurban Cars

Stephenson System of Trucks

Pivotal and Non-Pivotal Trucks

Master Car Builders' Lines closely followed

Steel and Wrought Frames

High Speed Trucks

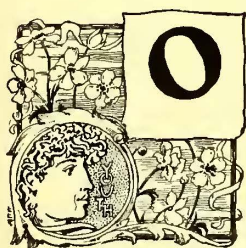
Six-Wheel Motor Trucks

Equalized Swing Motion Trucks



# A New and Instructive Car Plant

## WORKS OF THE JOHN STEPHENSON COMPANY AT ELIZABETH, N. J.



OUR establishment at Elizabeth, New Jersey, has attracted more attention in car building, street railway and manufacturing circles than any other in this country on account of the care bestowed on the selection of the site, the study devoted to the design, and for its manufacturing efficiency.

As the works were not completed when the original company went into liquidation, we were obliged to push them to their utmost capacity while making changes. Nearly every building required alterations, and all but two were materially enlarged. Several departments were added and space was found for a central Stock House. Store rooms had to be provided for each branch of the work. In spite of these difficulties we built a large number of cars during our first year.

When we took possession the plant covered 97,000 feet of floor space. We have enlarged this to 162,000 feet and have more than doubled the capacity. Extensions have been made to Mill, Erecting, Cabinet and Paint Shops. The Finishing Shop received additions at each end, while the present Truck Shop covers more than three times the space of the old Blacksmith Shop.

The plan is that of four parallel buildings, separated by 80-foot spaces. Truck Shop, Boiler House and Engine Room—seen in the foreground of the engraving—are at the eastern end. The spaces between the buildings are used for handling material and for the two electric transfer tables which connect the Erecting, Painting and Finishing Shops. Moving and loading of cars are accomplished, with little or no manual labor, by the electric winches on the transfer tables.

As the erecting tracks hold but two cars, each one always has a clear track to a transfer table. When ready, any individual car, without reference to the condition of others, and without disturbing them, can be taken from the dusty Erecting Shop, placed in the Paint Shop, or advanced to the Finishing Shop. This is a great advantage. Painting goes on away from dust and dirt. When painted the car can go at once to a clean shop for finishing. Those familiar with the shops having long building tracks will appreciate these points.

Second floors introduced into various buildings provide space for Cabinet Shops, Cabinet Varnishing work, Pattern Shop and several Store Rooms.

Our power transmission is electrical. Line shafting is only used in connection with small groups of machines too small to be driven by individual motors. Machines are placed with reference to convenience only. Power is distributed with ease to any location however remote, saving much hand labor.

Material starting from the three sources of supply, Lumber Yard, Blacksmith Shop and Stock Room, goes forward to the car in course of construction without interruption, the crossing of paths, or change of direction.

The plan of the works and the size of our property—83 acres—permits us to enlarge almost indefinitely, without change in this system of moving material.

Thoroughly air-seasoned lumber is essential to strong, durable street cars. It was always insisted on by the founder, the late John Stephenson, and is one of the traditions of the works. To secure seasoned lumber we have a yard of about 10 acres. This is also arranged so as to permit ample expansion without interfering with our system of handling. We began with a stock of 2,500,000 feet of air-seasoned lumber obtained from the original company. This we are steadily increasing by systematic purchasing. At present our stock is more than 4,000,000 feet.

The system of inspection introduced by our General Manager, Mr. Peter M. Kling, is especially effective. Every foreman is made accountable for all his own work. He must also inspect all work coming to him from other departments, because he is held personally responsible for all imperfections of workmanship or material which pass him. This results in making the men critical.

Our location is exceptionally favorable for manufacturing and distribution. We are just outside of the City of Elizabeth, New Jersey, within easy reach of its large population of skilled mechanics.

We are but 12 miles from City Hall, New York, and less than a mile from the boundary line of Greater New York.

We own an acre and a half of water front property, with riparian rights on Staten Island Sound, a division of New York Harbor. The Sound has a deep-water channel (at present 22 feet) to the New York wharves.

When our docks are completed we shall have peculiar advantages for delivering cars by lighters to foreign steamers, as well as in making local shipments. We own in fee simple a strip of land 80 feet wide, extending from the works to our dock property, with both railroad connections and cross-over rights.

This gives direct access to three trunk lines. Within a dozen miles there are also six other trunk railroad lines.

These rail connections enable us to deliver cars to all parts of the country with the least expense.

We are favorably situated in regard to electric car consumption, a greater number being operated within thirty miles than can be found in a similar space in the country.

Our plant has been pronounced, we think correctly, a model establishment in an ideal location for car building.



GRAND PRIX  
PARIS 1900  
FOR BRILL CON-  
VERTIBLE CAR.

GRAND PRIX  
PARIS 1900  
FOR BRILL SYSTEM  
OF ELECTRIC  
TRUCKS.

BRILL CARS &  
TRUCKS  
"HIGHEST IN QUALITY"

J. G. BRILL COMPANY  
PHILADELPHIA,  
U. S. A.  
Address Cablegrams:  
"BRILL,  
PHILADELPHIA."

110 Cannon St.,  
London, E. C., England.  
Telegraphic Address:  
"AXLES, LONDON."

# A New Semi-Convertible Car

The Semi-Convertible is a type which has been popular for years in spite of many grave objections

## We have Removed all Objections to the Type

It is one of the most popular types now in service

It is a very strong car



THE NEW BRILL SEMI-CONVERTIBLE CAR FOR HIGH SPEED SUBURBAN AND INTERURBAN SERVICE

## Safe at the Highest Speeds

Large windows safely, easily and quietly stored in the roof

Trunnion hung, they fit tightly in the roof pockets. No rattling. Easily handled

Six inches gain in width inside the car

A standard car either open or closed

Standard width ventilators. Change made without sending car to the barn

Suited to the season. Meet any change of temperature

No storage of panels or sash

No breakage in changing from open to closed. Change made in five minutes



Car and Truck Builders  
PHILADELPHIA, U. S. A.  
Address: "Brill" Philadelphia

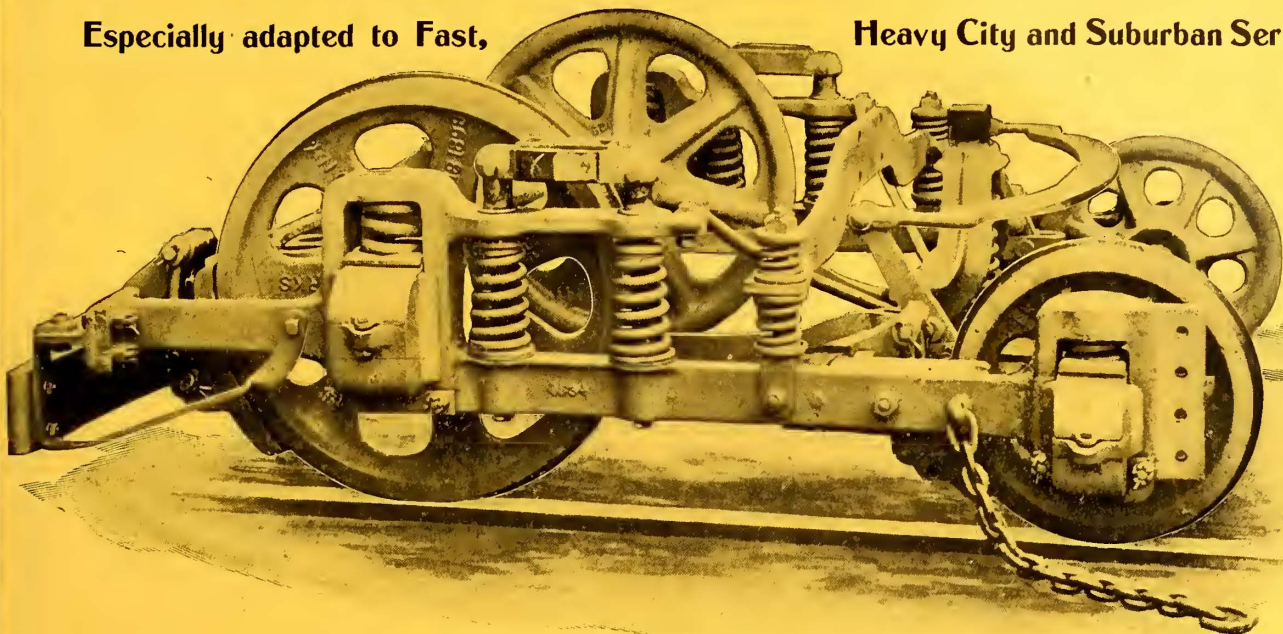
**J. G. BRILL COMPANY**

And 110 CANNON ST.  
LONDON, E. C., ENGLAND  
Telegrams: "Axles" London

## The "Eureka" Maximum-Traction Truck

Especially adapted to Fast,

Heavy City and Suburban Service



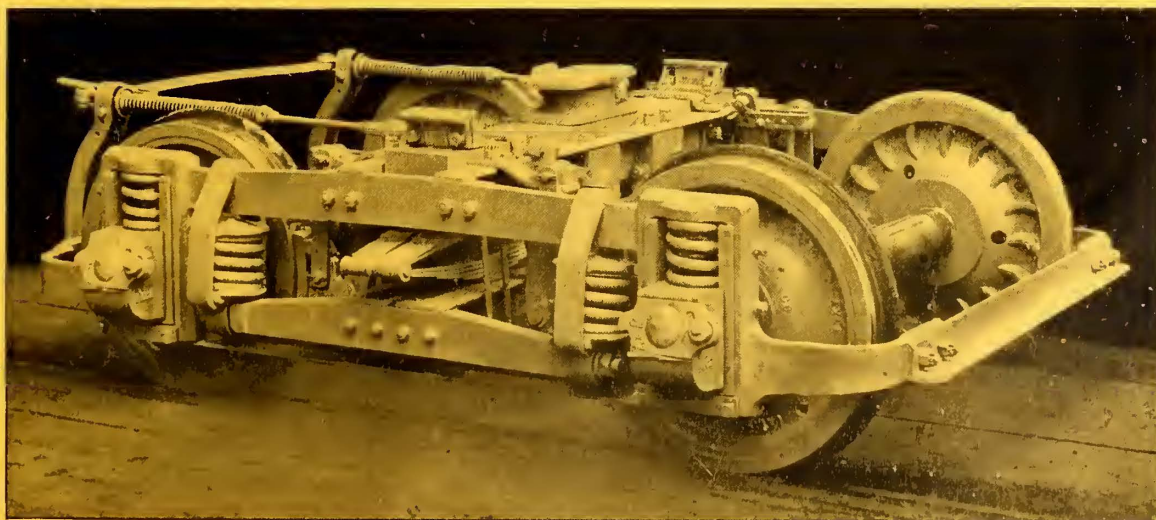
This is the standard steel side truck of the Metropolitan Street Railway of New York City. Upon the small end will be noticed the bracket upon which is bolted the frame for carrying the contact device. The truck was specially designed so as to carry an open car very low. The height is 33 inches from the head of the rail to the top of sill, practically the same as that of open cars on single trucks. The brakes are our regular form. The wheels are standard Metropolitan; 30 and 20 inches.

## The "No. 27" High Speed Truck

Solid Forged Side Frames

Three Sets of Springs Working in Series

Cushioned Side Swing



150 in operation on Brooklyn Elevated Railroad  
50 in operation on Boston Elevated Railroad



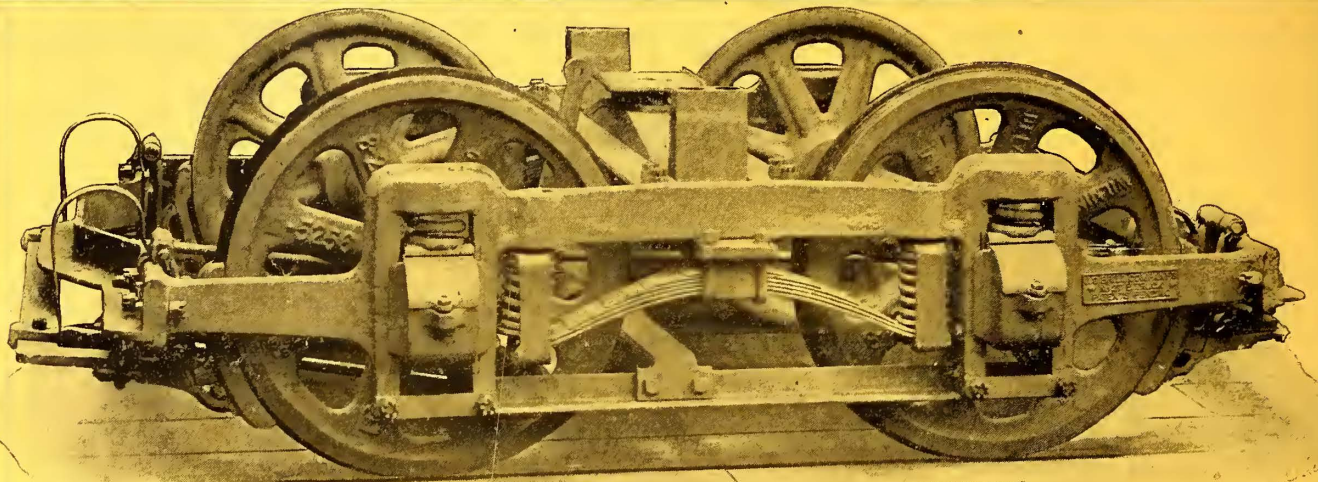
**GRAND PRIX**  
PARIS 1900  
FOR BRILL CON-  
VERTIBLE CAR.

---

**GRAND PRIX**  
PARIS 1900  
FOR BRILL SYSTEM  
OF ELECTRIC  
TRUCKS.

**BRILL CARS & TRUCKS**  
"HIGHEST IN QUALITY"

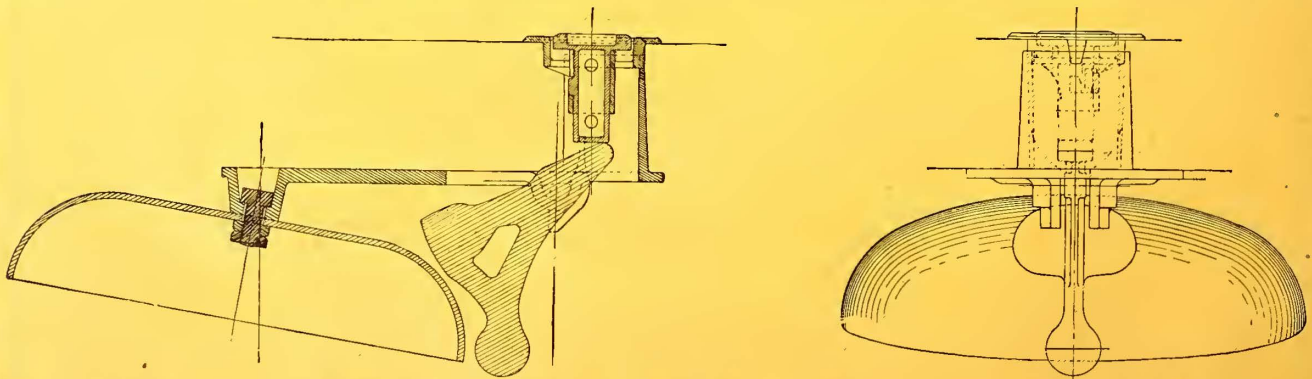
**J. G. BRILL COMPANY**  
PHILADELPHIA,  
U. S. A.  
Address Cablegrams:  
"BRILL,  
PHILADELPHIA."  
110 Canyon St.,  
London, E. C., England.  
Telegraphic Address:  
"AXLES, LONDON."



# No. 27-G TRUCK

## FOR FAST CITY AND SUBURBAN SERVICE

Can be used with one or two motors. Carries the car body low. The short wheel base, 4 feet, permits the truck to radiate between the sills of narrow car bodies. Easy side motion. Large tractive power.



# THE "DEDENDA" GONG

Simplest and most effective. Sound is always clear and strong, as the hammer disconnects from the pedal at the moment of striking. No weak or dead sound possible. In use in the largest systems of this country and abroad.



Car and Truck Builders  
 PHILADELPHIA, U. S. A.  
 Address: "Brill" Philadelphia

# J. G. BRILL COMPANY

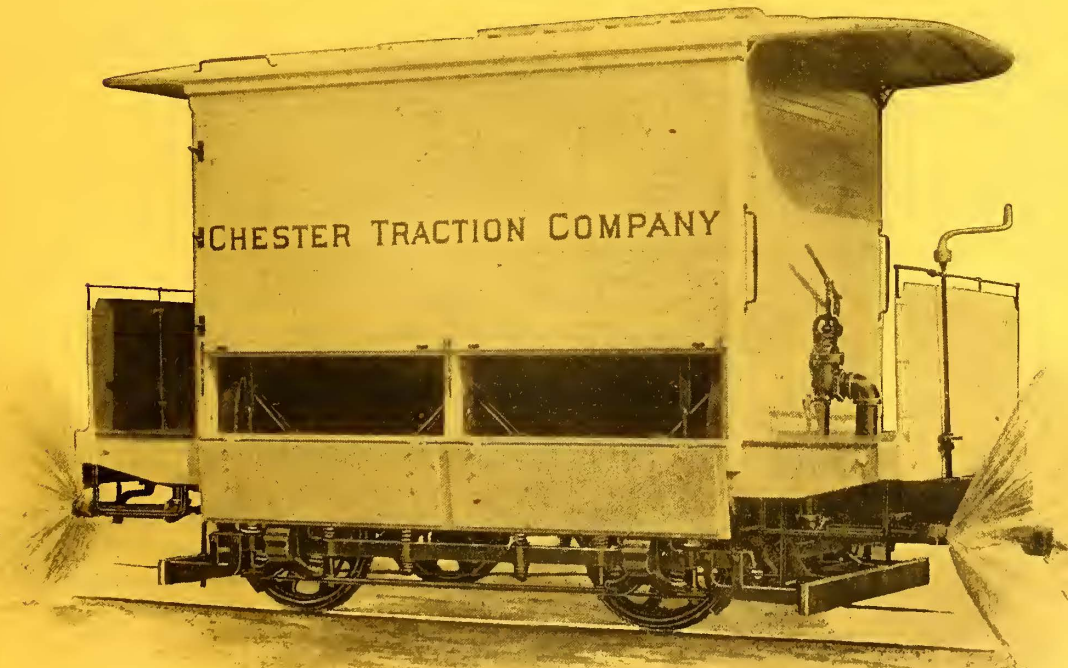
And 110 CANNON ST.  
 LONDON, E. C., ENGLAND  
 Telegrams: "Axles" London

## Electric Sprinkling Cars

Gravity and Power  
 Distribution of Water



The Brill Standard Sprinkling Car



Sprinkling Car with Completely Enclosed Tank

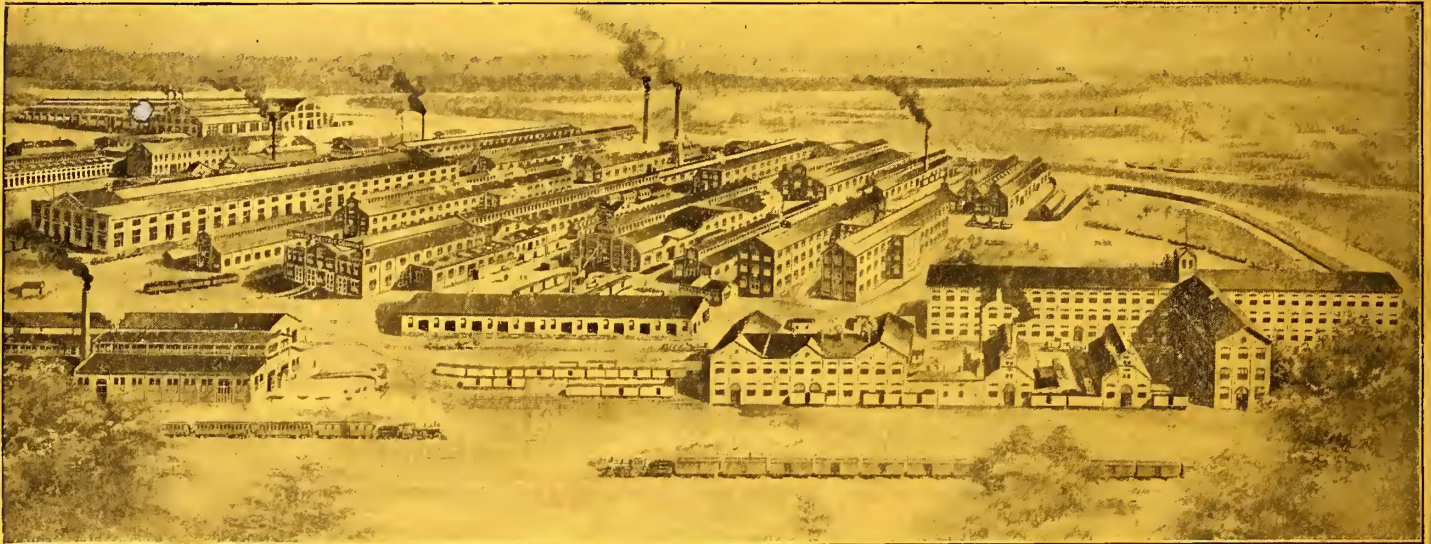
For city use we build sprinklers with enclosed tanks. The object of this is to make the sprinkler appear as much as possible like an ordinary car in order to avoid frightening horses. As will be seen, the closed body, like that of a box car, is put over the tank with hoods which extend over the platforms. Access to the interior is obtained by a pair of large doors 24 inches wide, which are hinged at the sills. These doors drop down when open, as is shown in the engraving. The tanks are fitted with the usual manhole at the top. When it is so desired we can put a canopy over the open sprinklers so as to protect the men from the sun. The dimensions of the Standard Sprinklers illustrated are as follows:

Length on end sills.....	16 feet	Height over highest point.....	11 feet
Wheel base.....	To meet any requirements	Weight, empty, without motors.....	12,600 pounds
Dimension of wheels.....	33 inches	Weight, with two motors and tank filled with water.....	32,000 pounds
Height to under side of sill.....	27 inches		



# THE GENERAL ELECTRIC COMPANY

OF NEW YORK, U. S. A.



View of the Schenectady Works

## Principal Offices: Schenectady, N. Y.

### SALES OFFICES:

BOSTON, MASS., 200 Summer Street.  
 NEW YORK, N. Y., 44 Broad Street.  
 Syracuse, N. Y., Sedgewick, Andrews & Kennedy Bldg.  
 Buffalo, N. Y., Ellicott Square Building.  
 PHILADELPHIA, PA., 214 South Eleventh Street.  
 Baltimore, Md., Continental Trust Building.  
 Pittsburgh, Pa., 502 Tradesmen's Bank Building.  
 ATLANTA, GA., Empire Building.  
 New Orleans, La., 917 Hennen Building.  
 CINCINNATI, OHIO, Perin Bldg., Fifth and Race Sts.  
 Cleveland, Ohio, 310 New England Building.  
 Columbus, Ohio, 14 North High Street.

Nashville, Tenn., Room 73, Cole Building.  
 CHICAGO, ILL., Monadnock Block.  
 Detroit, Mich., 704 Chamber of Commerce Building.  
 St. Louis, Mo., Wainwright Building.  
 Dallas, Texas, Scollard Building.  
 Butte, Mont., 47 East Broadway.  
 Minneapolis, Minn., Phoenix Building.  
 DENVER, COLO., Kittredge Building.  
 Salt Lake City, Utah, 25 E. First South Street.  
 SAN FRANCISCO, CAL., Claus Spreckels Bldg.  
 Los Angeles, Cal., Douglas Building.  
 Portland, Ore., Worcester Building.

### FOREIGN:

Foreign Dept., Schenectady, N. Y., and 44 Broad Street, New York, N. Y.

LONDON OFFICE: 83 CANNON STREET, E. C.

For all CANADIAN Business, Canadian General Electric Company, Ltd., Toronto, Ontario.