

GENERAL ELECTRIC

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

August, 1926



GEA-504

ELECTRIFICATION OF THE DETROIT TUNNEL LINES OF THE MICHIGAN CENTRAL RAILROAD



ONE OF THE 1100-TON LOCOMOTIVES WITH PASSENGER TRAIN IN DETROIT TERMINAL

The Michigan Central Railroad tunnels under the Detroit river between Detroit and Windsor were placed in operation in October, 1910. The electric zone includes all of the trackage between the two passenger stations in Detroit and Windsor. The total length of route is about $4\frac{1}{2}$ miles and at the present time includes $28\frac{1}{2}$ miles of track, all of which is equipped with 600-volt underrunning third rail. This mileage includes not only the station and tunnel lines but also an extensive yard trackage for making up trains.

In addition to the substation supplying power to the third rail, there are also facilities at the Detroit end for shop repairs and

inspection and a small inspection shed on the Canadian side. Circuit breakers for control and sectionalizing the third rail feeders are installed in the signal towers. The capacity of the tunnel as now operated is estimated at 247,000 tons per day. During the year 1925, the ten locomotives then in service were credited with 319,012 miles. The annual freight movement in both directions through this tunnel approximates 58,000,000 ton miles. The annual passenger traffic approximates 320,000 car miles.

Westbound freight trains are made up with a maximum of 2000 to 2100 tons and are handled up a 2 per cent grade. The eastbound

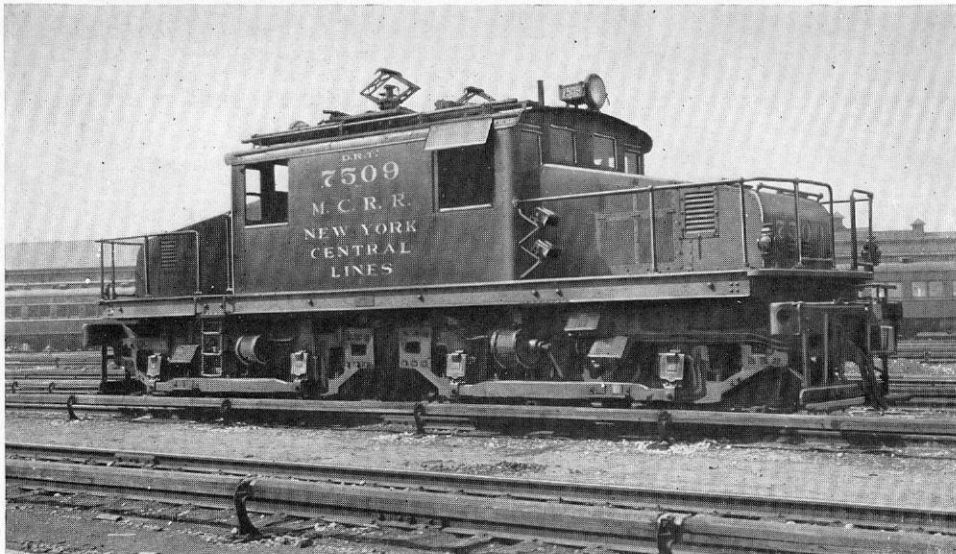
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ONE OF THE ORIGINAL 100-TON LOCOMOTIVES PLACED IN SERVICE IN 1910
HANDLING FREIGHT TRAIN IN DETROIT YARDS

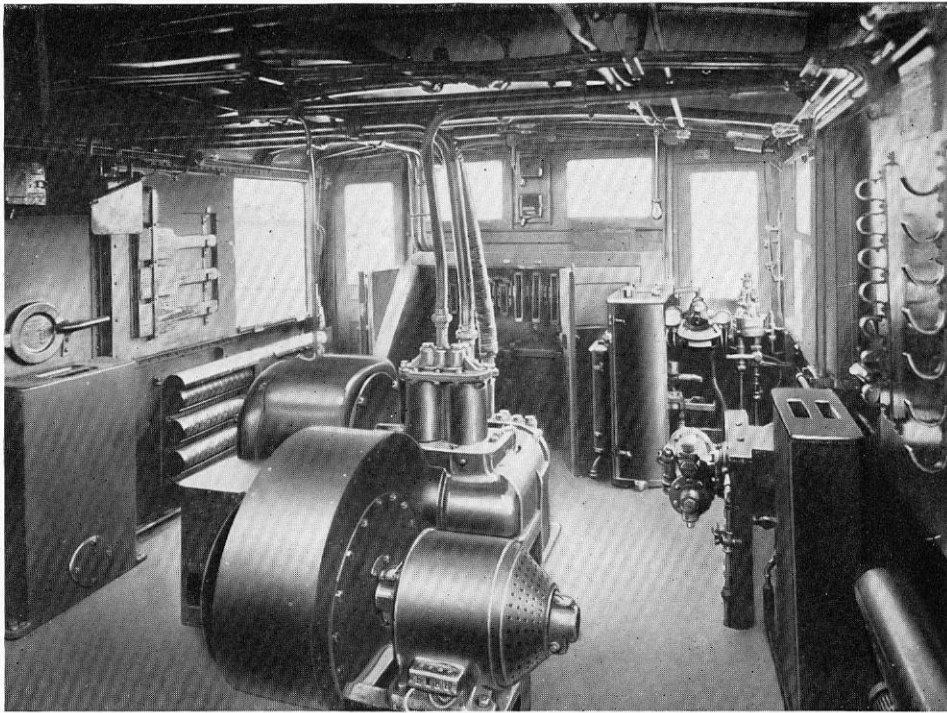
trains weigh approximately 2500 tons and are handled up a $1\frac{1}{2}$ per cent grade. The heavier movement of freight is eastbound. The heaviest trains require three locomotives

operated one in front and two as pushers. The passenger trains are hauled a distance of 2.8 miles per trip, while the freight trains are handled over a distance of 3.6 miles per trip.



ONE OF THE FOUR 120-TON LOCOMOTIVES FURNISHED DURING 1914

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INTERIOR OF ONE OF THE EARLIER 120-TON LOCOMOTIVES SHOWING AIR-COMPRESSOR, ENGINEER'S POSITION, AND CONTROL EQUIPMENT



LATEST TYPE 120-TON UNIT DELIVERED IN 1926

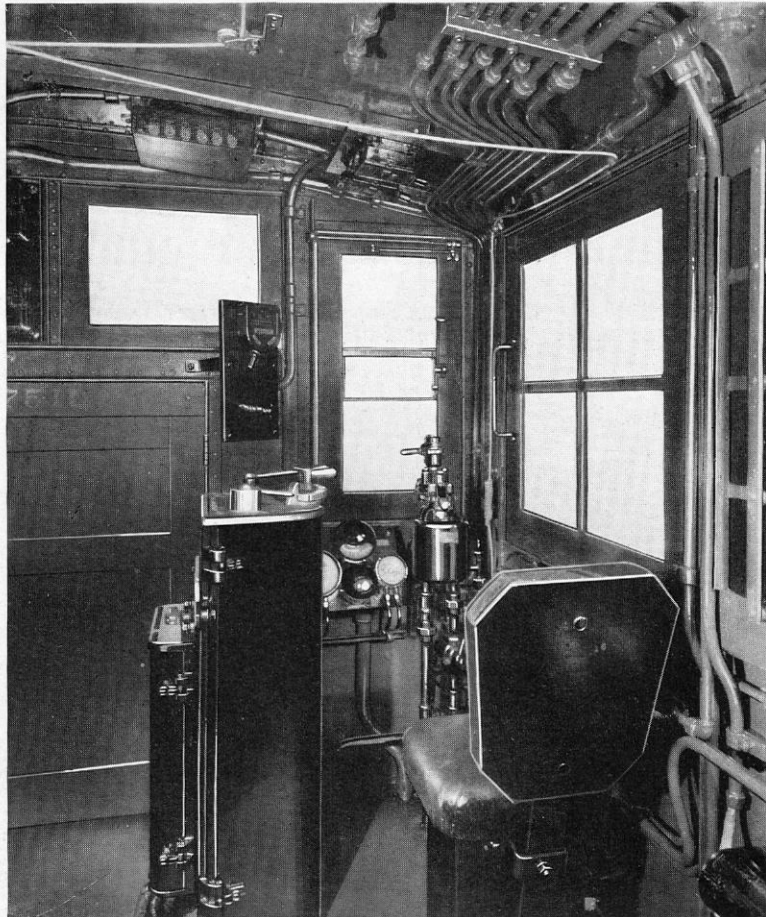
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SUBSTATIONS

Power is purchased from the Detroit Edison Company at 4600 volts, 3-phase. Current at this voltage is fed directly to the motor-generator sets. The transforming equipment consists of two 1000-kw. motor-generator sets and two 2000-kw. motor-generator sets, all of which are arranged for manual control. One of the 2000-kw. sets also has equipment which permits of automatic control, if desired. The direct-current machines are shunt wound and the bus voltage is held at 650 volts for supplying the several feeders.

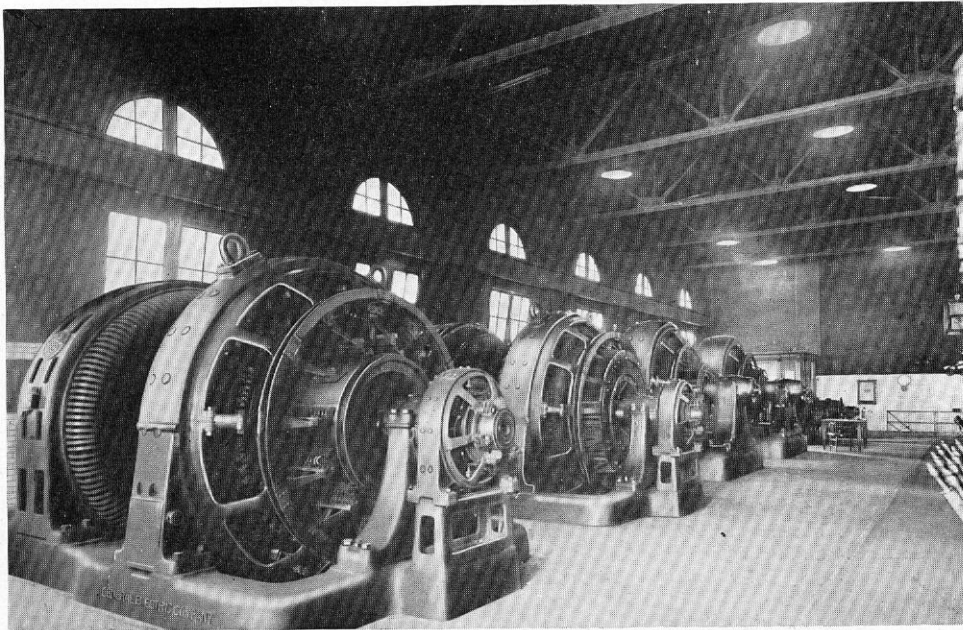
THIRD RAIL

The contact rail is of the underrunning, fully protected type identical with that also used on the New York terminal. The rail itself is of the bullhead type, weighing 70 lb. to the yard. The rail is located on tangent tracks and on curves of over 800 ft. radius at a distance of 2 ft. 4 $\frac{1}{4}$ in. from the gauge line to the nearest track rail and at a height of 2 $\frac{3}{4}$ in. above the top of the running rail. Power is supplied through four feeders, two in each direction, with a high-speed reclosing circuit breaker in each feeder.

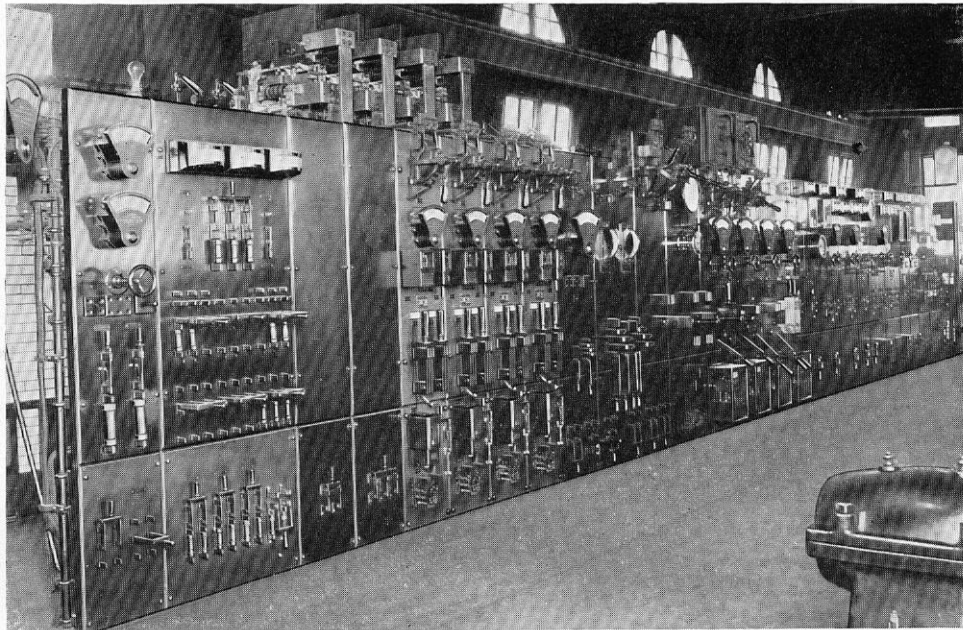


ENGINEER'S POSITION IN LATEST TYPE 120-TON LOCOMOTIVE

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GENERAL VIEW IN SUBSTATION SHOWING FIVE MOTOR-GENERATOR SETS
SUPPLYING POWER TO THE DETROIT RIVER TUNNEL



GENERAL VIEW IN SUBSTATION SHOWING SWITCHBOARD PANELS CONTROLLING BOTH
MANUALLY-OPERATED AND REMOTE-CONTROLLED MOTOR-GENERATOR SETS

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LOCOMOTIVES

Of the twelve electric locomotives now in operation, six are of the 100-ton type purchased in 1910; four purchased in 1914 are similarly equipped, but weigh 120 tons. The last two locomotives, delivered in 1926, are practically duplicates of the previous 120-ton units. The weights, dimensions, ratings, and other data are included in the following tables. These locomotives have had an unusually low maintenance record from the date of

their installation. The repair costs on ten locomotives from 1916 to 1924, during which period being compiled on a calendar year basis, have averaged less than 9 cents per locomotive mile. During this period, they have averaged over 26,000 miles each per year.

These ratings for both hourly and continuous loading are based on the G-E standard of 120-deg. C. temperature rise by resistance measurement for electric locomotive motors using Class B insulation.

LOCOMOTIVE DATA

	Six of 1910	Four of 1914	Two of 1925
Tractive effort cont. 600 V.....	15750 lb.	15850 lb.	15850 lb.
Tractive effort 1 hr. blown.....	39500 lb.	39100 lb.	39100 lb.
Total H.p. Continuous.....	618	630	630
Total H.p. 1 Hr.....	1220	1250	1250
Speed continuous.....	14.7	14.9	14.9
Speed 1 Hr.....	11.6	12.0	12.0
Number of motors.....	4	4	4
Gear ratio.....	83:19	83:19	83:19

MECHANICAL DATA

Track gauge.....	4 ft. 8½ in.	4 ft. 8½ in.	4 ft. 8½ in.
Length.....	39 ft. 6 in.	39 ft. 6 in.	42 ft. 2 in.
Max. rigid wheel base.....	9 ft. 6 in.	9 ft. 6 in.	9 ft. 6 in.
Diameter of drivers.....	48 in.	48 in.	48 in.
Total wheel base.....	27 ft. 6 in.	27 ft. 6 in.	28 ft. 0 in.
No. of driving axles.....	4	4	4
Height over trolley locked down.....	14 ft. 6 in.	14 ft. 6 in.	14 ft. 6 in.

WEIGHT

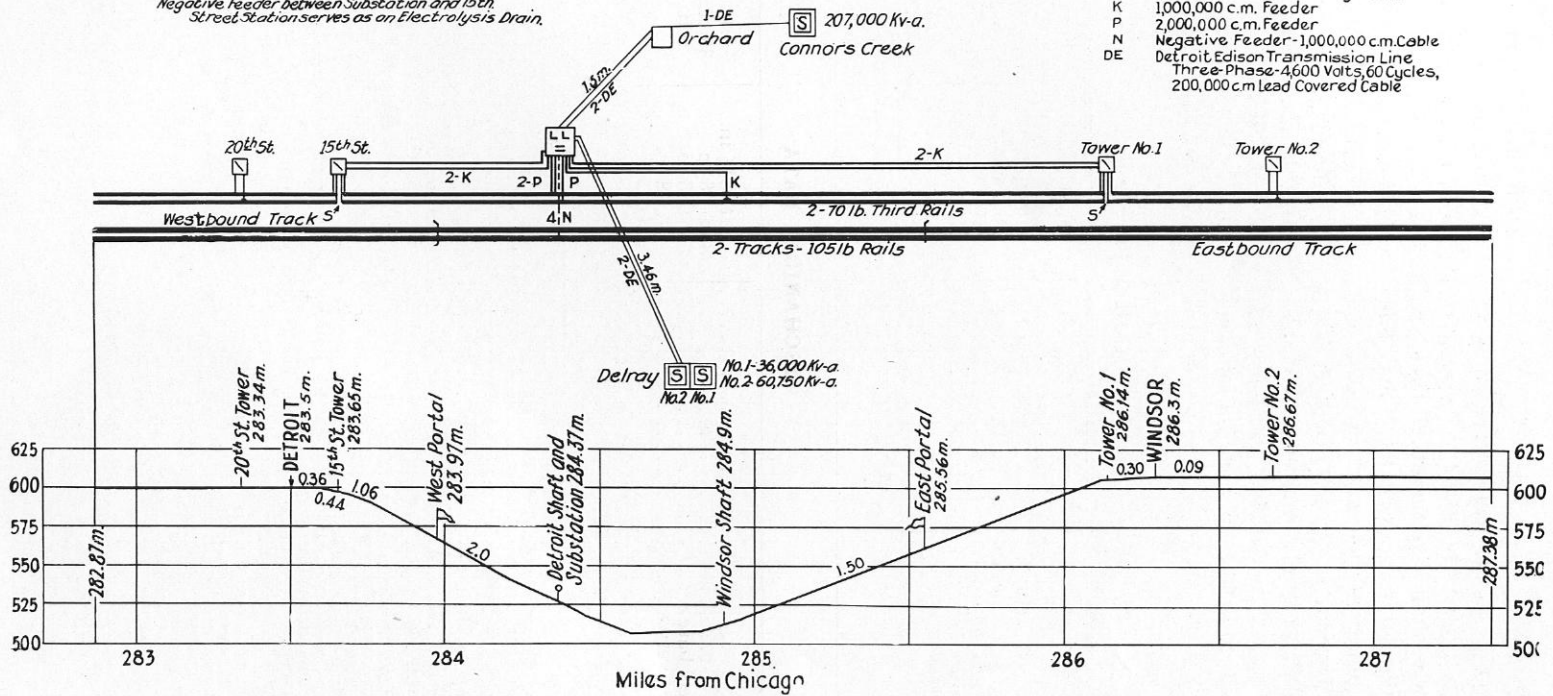
On drivers total.....	200,000 lb.	240,000 lb.	240,000 lb.
Per driving axle.....	50,000 lb.	60,000 lb.	60,000 lb.
Electrical equipment.....	62,100 lb.	62,100 lb.	62,100 lb.
Mechanical equipment.....	137,900 lb.	177,900 lb.	177,900 lb.

Notes:-

Circuit Breaker Houses are located in Switching Towers.
 Running Rail Bonding, 2-4¢ per joint, welded.
 Third Rail Bonding, One 300,000 or 400,000 c.m. per joint.
 Third Rail Under-running.
 Electrified Route, Miles 4.51 - Single Track Miles - 26.
 Track Gauge, Standard 4ft. 8½ in.
 Orchard Substation served by 24,000 Volt Transmission Lines from Delray and Connors Creek Power Houses.
 Negative Feeder between Substation and 15th Street Station serves as an Electrolysis Drain.

- ☐ Steam Generating Station - Power Co.
- ☐ Substations - Power Co.
- ☐ Substation - Railway
- ⌋ Tunnel Portal
- ☐ Circuit Breaker Houses
- I 1000 Kw. M-G. Set
- S 2000 Kw. M-G. Set
- S Third Rail Sectionalizing Point
- K 1,000,000 c.m. Feeder
- P 2,000,000 c.m. Feeder
- N Negative Feeder - 1,000,000 c.m. Cable
- DE Detroit Edison Transmission Line Three-Phase - 4600 Volts, 60 Cycles, 200,000 c.m. Lead Covered Cable

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SCHEMATIC DIAGRAM AND PROFILE OF ELECTRIFIED LINES, MICHIGAN CENTRAL RAILROAD

GENERAL ELECTRIC COMPANY

GENERAL OFFICE: SCHENECTADY, N. Y.

SALES OFFICES (Address nearest Office)

Akron, Ohio.....	159 South Main Street	Louisville, Ky.....	455 South Fourth Street
Atlanta, Ga.....	123 Spring Street	Memphis, Tenn.....	130 Madison Avenue
Baltimore, Md.....	39 West Lexington Street	Milwaukee, Wis.....	425 East Water Street
Birmingham, Ala.....	602 North Eighteenth Street	Minneapolis, Minn.....	107 Fifth Street, South
Bluefield, W. Va.....	104 Federal Street	Nashville, Tenn.....	234 Third Avenue, North
Boston, Mass.....	84 State Street	Newark, N. J.....	20 Washington Place
Buffalo, N. Y.....	39 East Genesee Street	New Haven, Conn.....	129 Church Street
Butte, Mont.....	40 East Broadway	New Orleans, La.....	837 Gravier Street
Canton, Ohio.....	700 Tuscarawas Street West	New York, N. Y.....	120 Broadway
Charleston, W. Va.....	201 Capitol Street	Niagara Falls, N. Y.....	201 Falls Street
Charlotte, N. C.....	200 South Tryon Street	Oklahoma City, Okla.....	15 North Robinson Street
Chattanooga, Tenn.....	536 Market Street	Omaha, Neb.....	409 South Seventeenth Street
Chicago, Ill.....	230 South Clark Street	Philadelphia, Pa.....	1321 Walnut Street
Cincinnati, Ohio.....	215 West Third Street	Phoenix, Ariz.....	11 West Jefferson Street
Cleveland, Ohio.....	925 Euclid Avenue	Pittsburgh, Pa.....	535 Smithfield Street
Columbus, Ohio.....	17 South High Street	Portland, Ore.....	329 Alder Street
Dallas, Tex.....	1801 North Lamar Street	Providence, R. I.....	76 Westminster Street
Davenport, Iowa.....	111 East Third Street	Richmond, Va.....	700 East Franklin Street
Dayton, Ohio.....	25 North Main Street	Rochester, N. Y.....	89 East Avenue
Denver, Colo.....	819 Seventeenth Street	St. Louis, Mo.....	112 North Fourth Street
Des Moines, Iowa.....	418 Sixth Avenue	Salt Lake City, Utah.....	200 South Main Street
Detroit, Mich.....	700 Antoinette Street	San Antonio, Tex.....	601 Navarro Street
Duluth, Minn.....	14 West Superior Street	San Francisco, Cal.....	116 New Montgomery Street
Elmira, N. Y.....	342 East Water Street	Schenectady, N. Y.....	1 River Road
El Paso, Tex.....	109 North Oregon Street	Seattle, Wash.....	811 First Avenue
Erie, Pa.....	10 East Twelfth Street	Spokane, Wash.....	423 Riverside Avenue
Fort Wayne, Ind.....	1635 Broadway	Springfield, Mass.....	1387 Main Street
Grand Rapids, Mich.....	201 Monroe Avenue	Syracuse, N. Y.....	113 South Salina Street
Hartford, Conn.....	18 Asylum Street	Tacoma, Wash.....	950 Pacific Avenue
Houston, Tex.....	1016 Walker Avenue	Tampa, Fla.....	112 Cass Street
Indianapolis, Ind.....	106 North Illinois Street	Terre Haute, Ind.....	701 Wabash Avenue
Jackson, Mich.....	308 Francis Street	Tledo, Ohio.....	520 Madison Avenue
Jacksonville, Fla.....	108 West Forsyth Street	Tulsa, Okla.....	409 South Boston Street
Kansas City, Mo.....	1004 Baltimore Avenue	Utica, N. Y.....	239 Genesee Street
Knoxville, Tenn.....	602 South Gay Street	Washington, D. C.....	1405 G Street N. W.
Little Rock, Ark.....	223 West Second Street	Waterbury, Conn.....	195 Grand Street
Los Angeles, Cal.....	5201 Santa Fe Avenue	Worcester, Mass.....	340 Main Street
		Youngstown, Ohio.....	16 Central Square

Canada: Canadian General Electric Company, Ltd., Toronto

Hawaii: W. A. Ramsay, Ltd., Honolulu.

Motor Dealers and Lamp Agencies in all large cities and towns.

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Atlanta.....	91 Glenn Street	Los Angeles.....	5203 Santa Fe Avenue
Chicago.....	509 East Illinois Street	Minneapolis.....	410 Third Ave., North
Cincinnati.....	215 West Third Street	New York.....	627 Greenwich Street
Cleveland.....	1133 East 152nd Street	Philadelphia.....	1223 Washington Avenue
Dallas.....	1801 North Lamar Street	St. Louis.....	1009 Spruce Street
Detroit.....	700 Antoinette Street	Seattle.....	1509 Fourth Ave. S.
Kansas City.....	819 East Nineteenth Street		

Special service divisions are also maintained at the following works of the Company: Bloomfield, N. J.; Erie, Pa.; Ft. Wayne, Ind.; Oakland, Calif.; Pittsfield, Mass.; Schenectady, N. Y. and West Lynn, Mass.—River Works and West Lynn Works.

BROADCASTING STATIONS

WGY, Schenectady, N. Y. KOA, Denver, Colo. KGO, Oakland, Calif.

Distributors for the General Electric Company outside of the United States and Canada

INTERNATIONAL GENERAL ELECTRIC COMPANY, INC.

New York City, 120 Broadway

General Sales Offices, Schenectady, N. Y.

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ARGENTINA: General Electric, S. A., Buenos Aires
AUSTRALIA: Australian General Electric Company, Ltd., Sydney, Melbourne, Adelaide, Brisbane and Newcastle
BELGIUM AND COLONIES: Societe d'Electricite et de Mecanique (Procedes Thomson-Houston & Carels)
Societe Anonyme, Brussels, Belgium
BRAZIL: General Electric, S. A., Rio de Janeiro and Sao Paulo
CHILE: International Machinery Company, Santiago, Antofagasta and Valparaiso; Nitrate Agencies, Ltd., Iquique
CHINA: Andersen, Meyer & Company, Ltd., Shanghai. International General Electric Company (General Office for the Far East excluding Japan and China), Shanghai
COLOMBIA: Wesselhoef & Poor, Bogota, Barranquilla and Medellin
CUBA: General Electric Company of Cuba, Havana and Santiago
DUTCH EAST INDIES: International General Electric Company, Inc., Soerabaia, Java
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EGYPT: British Thomson-Houston Company, Ltd., Cairo
FRANCE AND COLONIES: Compagnie Francaise Thomson-Houston, Paris; International General Electric Co., Inc., Paris
GERMANY: International General Electric Co., Inc., Berlin
GREAT BRITAIN AND IRELAND: International General Electric Co., Inc., British Thomson-Houston Co., Ltd., London, W.C.2.; British Thomson-Houston Co., Ltd., Rugby, Coventry and Willesden; National Electrical & Engineering Co., Ltd., London, E.C. 4
GREECE AND COLONIES: Compagnie Francaise Thomson-Houston, Paris, France
HOLLAND: Mijnsen & Co., Amsterdam
INDIA: International General Electric Company, Inc., Calcutta, Bombay and Bangalore
ITALY AND COLONIES: Compagnia Generale Di Eletticit, Milan
JAPAN: Shibaura Engineering Works, Tokyo; Tokyo Electric Company, Ltd., Kawasaki, Kanagawa-Ken; International General Electric Co., Inc., Tokyo, Osaka
JAVA: International General Electric Co., Inc., Soerabaia
MANCHURIA: (See China)
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SOUTH AFRICA: South African General Electric Company, Ltd., Johannesburg and Capetown
SPAIN AND COLONIES: Sociedad Iberica de Construcciones Electricas, Madrid, Barcelona and Sevilla
SWITZERLAND: Trolliet Freres, Geneva
TASMANIA: Oliver & Oliver, Pty., Ltd., Hobart and Launceston
URUGUAY: General Electric, S. A., Montevideo
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