General Electric Company

Schenectady, N.Y.

SUPPLY DEPARTMENT

February, 1914 **Bulletin No. 4888A*

CR-9145 CAST GRID RHEOSTATS, TYPE RG

The CR 9145 Type RG rheostat is the latest type of rheostat manufactured by the General Electric Company for railway motor service. It is built to supersede the Type CG rheostat and possesses the following improvements in design and operating characteristics:

Reduced breakage of grids.

Ease of grid replacement.

Protected insulation of supporting rods.

Reliability of operation.

Less sagging and warping from overload.

Although this rheostat (Fig. 2) was designed primarily for railway service, its substantial construction and flexibility of operation adapt it to heavy industrial motor service. When so employed these rheostats are supplied with special end frames (Fig. 3) which allow them to be installed one above the other, thereby materially reducing the amount of floor space required.

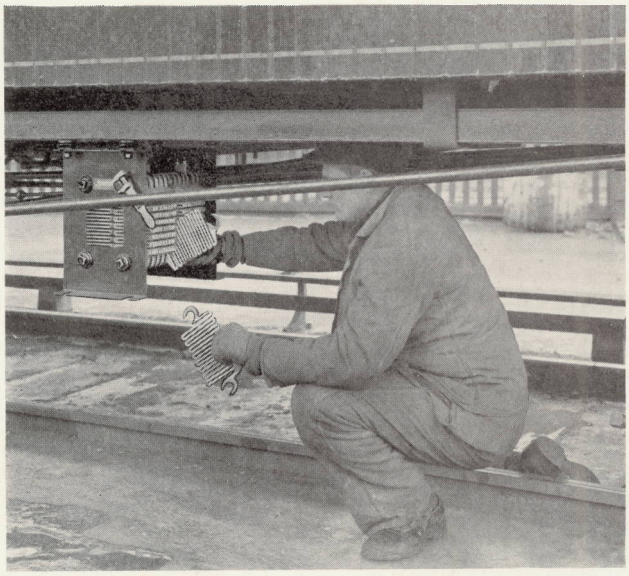


Fig. 1
REPLACEMENT OF A DAMAGED GRID

The principal improvement in design lies in the grids and their arrangement in the box. In the RG type of rheostat the grids are provided with slotted lugs at top and bottom and are hung by these lugs, in two parallel rows, on insulated metal tie-rods. This arrangement permits of a rapid and inexpensive renewal of a damaged grid. Furthermore,

* *Supersedes No. 4499A.*

the convolution length of the grids has been shortened and the area of cross section slightly increased, these features correspondingly increasing the flexibility of the

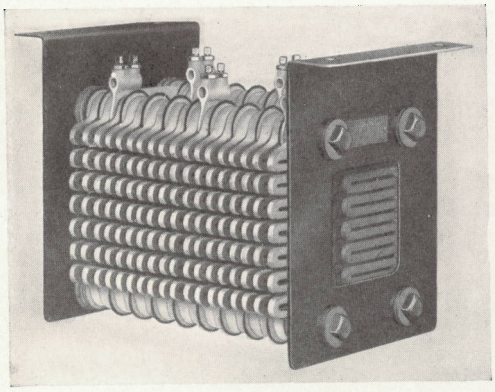


Fig. 2
TYPE RG FORM A RHEOSTAT

rheostat. Pressed steel end frames are employed in place of cast iron.

RELIABILITY

The improvements which have been effected in design have also materially increased

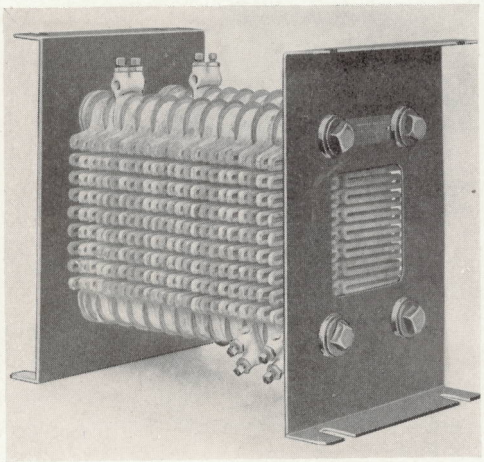


Fig. 3
TYPE RG FORM C RHEOSTAT

the reliability of the new rheostat. The danger of grids becoming broken, by flying stone, short circuited by vibrations, or grounded or burned out through sudden changes in temperature or heavy current overloads—conditions to which rheostats employed for railway service are subjected—has been reduced to a minimum. The best

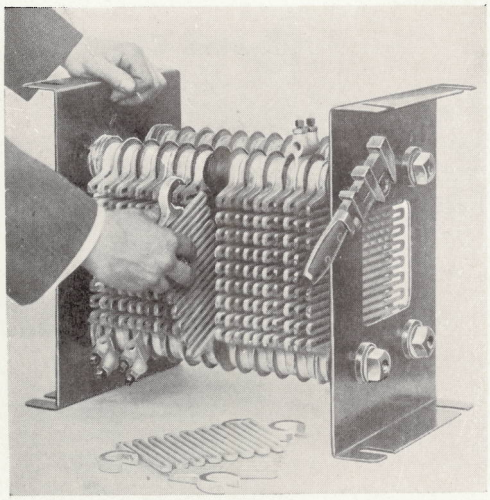


Fig. 4

grade of cast iron, coated with a special compound to prevent rusting, is employed

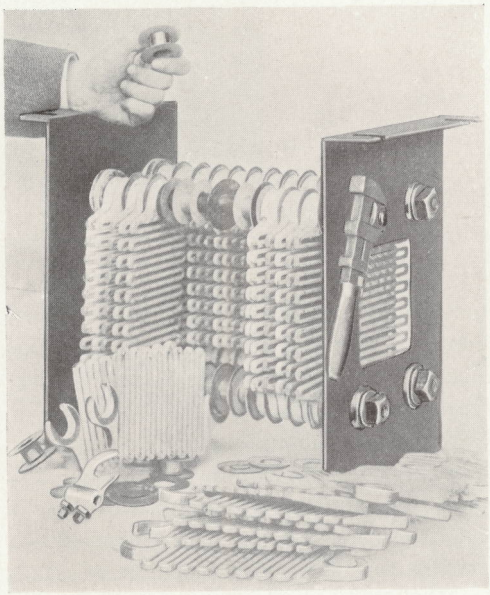


Fig. 5

exclusively for the grids as it offers maximum strength and elasticity.

The grids are shaped to offer the most serviceable operation and at the same time facilitate rapid renewal. Short convolution length and large area of cross section render them extremely rigid and obviate the possibility of short circuits or breakage due to vibration. Furthermore, these features secure for them flexible operation and a grid not affected by sudden changes of temperature.

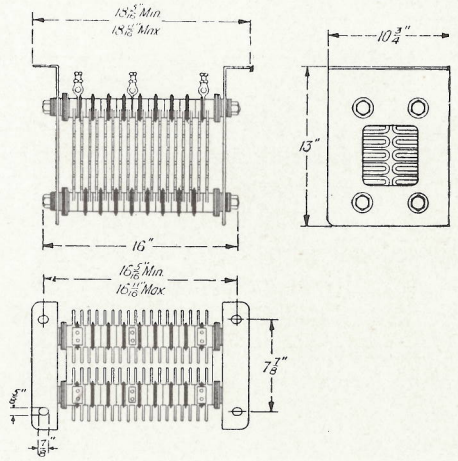
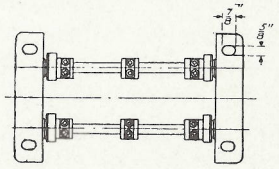


Fig. 6
DIMENSIONS TYPE RG FORM A RHEOSTAT



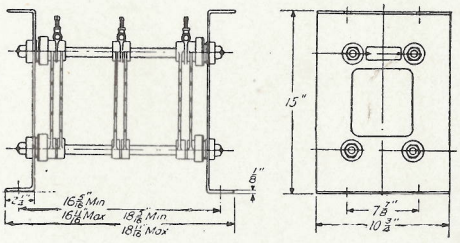


Fig. 7
DIMENSIONS TYPE RG FORM C RHEOSTAT

INSULATION

The best insulating material with the greatest permissible creepage surface is employed to insulate the grids from the supporting framework. The two row arrangement assures a low potential difference between adjacent grids on the same rod. While the insulation in the rheostat is sufficient to withstand all conditions of heat and weather generally met with in railway service it is essential that the rheostats be located under the car in a position reasonably free from wheel wash, which when combined with brakeshoe dust, tends to reduce the factor of safety of the insulation.

The rheostat boxes may be easily insulated from the car either by mounting them on wooden beams or employing insulated bolts for their support.

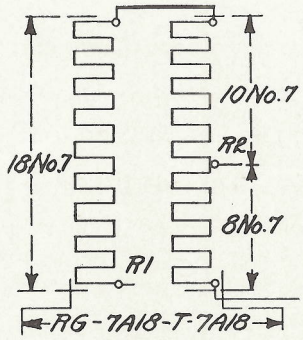


Fig. 8

The mica insulation is protected from mechanical abrasion either during replacement or from vibration by metal spools over the bodies and between the flanges of which the slotted lugs of the grids are designed to be installed (Fig. 5). It is evident that even a frequent renewal of grids can in no way injure this insulation.

REPLACEMENT OF GRIDS

As has been previously mentioned, the design and construction of the Type RG rheostat provides a convenient and rapid method of grid replacement. The ease with which a grid may be replaced is illustrated by Fig. 4. The grids are supported at top and bottom by means of slotted lugs cast at a slight angle to prevent them from falling from the box when the nuts on the ends

of the supporting rods are loosened. To replace a grid it is only necessary to loosen the nuts of the supporting rods, lift out the damaged grid, substitute a new one and tighten the nuts. The rheostat is then ready for service. Grid renewal may be effected without removing the rheostat from the car or the car from service, as shown by Fig. 1. This results in a saving in the time required by other rheostats to dismount, disassemble, assemble and remount.

WEIGHT AND DIMENSIONS

The total weight and drilling dimensions of the new type of rheostat are the same as for the old and since the steps of resistance may be made the same, the two types are interchangeable.

NOMENCLATURE

Each rheostat has a significant rating depending on the size, number and connections of its grids.

Each rheostat is designated by the symbol CR 9145, Type RG followed by a group or groups of symbols separated by dashes, the symbols in each group consisting of three parts, viz:

(1) A figure indicating the size and capacity of the grids in the group.

(2) A letter indicating the way in which the grids are connected within the group; "A" indicating that the grids are connected in series; "B" that two grids are connected in multiple, the sets in series; "C" indicating three grids in multiple, the sets in series.

(3) A figure indicating the number of grids in the group.

Illustrating the above, CR 9145-RG-7A 18-T-7A 18, is a rheostat containing thirty-six No. 7 grids, all connected in series.

CR 9145-RG-7B 18-T-7B 18 is rheostat composed entirely of No. 7 grids connected two in multiple and containing thirty-six grids. CR 9145-RG-7C 18-T-7C 18 indicates that the same grids are used, but that they are connected three in multiple and the sets in series.

In the rheostat illustrated by Fig. 2, looking at the name plate end there are eighteen No. 7 grids on the left-hand side of the box and eighteen No. 7 grids on the right-hand side. Referring to the example of ratings given above, the "T" indicates that connection is made at the top of the box between the left- and right-hand groups of grids. If connection is made at the bottom of the box the letter "T" is replaced by "Y."

TYPE RG RHEOSTATS FOR GENERAL ELECTRIC TWO-MOTOR EQUIPMENTS

Type of Controllers	MOTOR					Total Tractive Effort	Weight of Car in Tons Light	RHEOSTATS			
	Type	Volts	H.P.	Gears	Gear Ratio			Total Resistance	Connections D.S.	No.	Total Weight
K	GE-800-3-T	500	27	67/14	4.78	1280	9	7.20	17751	2	150
K	800-4-T	500	27	67/14	4.78	1580	11	7.20	17751	3	150
K-2	800-3-T	500	27	67/14	4.78	1400	10	7.20	17378	2	150
K-2	800-4-T	500	27	67/14	4.78	1800	13	7.20	17378	2	150
K-2	1000-3-T	500	35	69/15	4.6	1280	9	7.20	17378	2	150
K-2	1000-4-T	500	35	69/15	4.6	1640	12	7.20	17378	2	150
K-10	52	500	25	67/14	4.78	1460	10½	6.60	19286	2	157
K-10	54	500	25	67/14	4.78	1740	12½	6.60	19286	2	157
K-10	60-4-T	500	25	67/14	4.78	1440	10	6.60	19286	2	157
K-10	800-3-T	500	27	67/14	4.78	1580	11	6.60	19286	2	157
K-10	800-4-T	500	27	67/14	4.78	2000	14	6.60	19286	2	157
K-10	1000-3-T	500	35	69/15	4.6	1640	12	6.60	19286	2	157
K-10	1000-3-T	500	35	67/17	3.94	1460	10½	5.50	22669	2	146
K-10	1000-4-T	500	35	69/15	4.6	1760	12½	6.60	19286	2	157
K-10	1000-4-T	500	35	67/17	3.94	1840	13	5.50	22669	2	146
K-10	58-4-T	500	37	69/15	4.6	1800	13	6.60	19286	2	157
K-10	58-4-T	500	37	67/17	3.94	1880	13½	5.50	22669	2	146
K-10	67-3-T	500	40	69/15	4.6	1880	13½	6.60	19286	2	157
K-10	67-3-T	500	40	67/17	3.94	1960	14	5.50	22669	2	146
K-10	70	500	40	71/15	4.73	1640	12	6.60	19286	2	157
K-10	70	500	40	64/22	2.91	1420	10	5.50	22669	2	146
K-10	80	500	40	71/15	4.73	1940	14	6.60	19286	2	157
K-10	80	500	40	71/15	4.73	2380	17	5.50	22669	2	146
K-10	88	500	40	64/22	2.91	1520	11	5.50	22669	2	146
K-11	57-2-T	500	50	69/16	4.31	1980	14	5.50	22669	2	146
K-11	57-2-T	500	50	65/22	2.95	2100	15	3.50	22693	2	164
K-11	57-3-T	500	50	66/19	3.47	1800	13	5.50	22669	2	146
K-11	57-3-T	500	50	66/19	3.47	2900	20½	3.50	22693	2	164
K-11	90	500	50	70/16	4.375	1960	14	5.50	22669	2	146
K-11	90	500	50	70/16	4.375	3400	24	3.50	22693	2	164
K-11	87	500	60	71/16	4.43	2300	16½	5.50	22669	2	146
K-11	87	500	60	66/21	3.14	1970	14	3.50	22693	2	164
K-35	204	600	75	58/19	3.05	3120	22½	3.03	19538	3	242
K-35	214	600	75	57/20	2.85	3440	24½	3.03	19538	3	242

TYPE RG RHEOSTATS FOR GENERAL ELECTRIC FOUR-MOTOR EQUIPMENTS

K-6	GE-1000-3-T	500	35	69/15	4.6	2720	20	3.47	19285	3	239
K-6	1000-4-T	500	35	67/17	3.94	2960	22	3.47	19285	3	239
K-6	58-4-T	500	37	67/17	3.94	3120	23	3.47	19285	3	239
K-6	67-3-T	500	40	67/17	3.94	3000	22	3.47	19285	3	239
K-6	70	500	40	69/17	4.02	3160	23½	3.47	19285	3	239
K-6	80	500	40	71/15	4.73	3600	26½	3.47	19285	3	239
K-12	52	500	25	67/14	4.78	1700	12½	5.50	22669	2	146
K-12	54	500	25	67/14	4.78	1960	14½	5.50	22669	2	146
K-12	800-3-T	500	27	67/14	4.78	1720	13	5.50	22669	2	146
K-12	800-4-T	500	27	67/14	4.78	1960	14½	5.50	22669	2	146
K-12	60-4-T	500	27	67/14	4.78	1520	11½	5.50	22669	2	146
K-14	57-2-T	500	50	69/16	4.31	2840	21	3.50	19288	4	341
K-14	57-2-T	500	50	64/21	3.05	3120	23¼	2.55	19284	4	362
K-14	57-3-T	500	50	69/16	4.31	3240	24	3.50	19288	4	341
K-14	57-3-T	500	50	59/26	2.27	2520	18¾	2.55	19284	4	362
K-14	90	500	50	70/16	4.375	2840	21	3.50	19288	4	341
K-14	90	500	50	67/19	3.52	3540	26¼	2.55	19284	4	362
K-28	GE -1000-3-T	500	35	69/15	4.6	2320	17¼	4.04	23258	3	230
K-28	1000-3-T	500	35	69/15	4.6	3200	23¾	2.98	19289	3	242
K-28	1000-4-T	500	35	67/17	3.94	2480	18½	4.04	23258	3	230
K-28	1000-4-T	500	35	67/17	3.94	3400	25¼	2.98	19289	3	242
K-28	58-4-T	500	37	67/17	3.94	2560	19	4.04	23258	3	230
K-28	58-4-T	500	37	65/19	3.42	3120	23¼	2.98	19289	3	242
K-28	67-3-T	500	40	69/15	4.66	3160	23½	4.04	23258	3	230

4888A–6 CR 9145 Cast Grid Rheostats, Type RG

TYPE RG RHEOSTATS FOR GENERAL ELECTRIC FOUR-MOTOR EQUIPMENTS

Type of Controllers	MOTOR					Total Tractive Effort	Weight of Car in Tons Light	RHEOSTATS			
	Type	Volts	H.P.	Gears	Gear Ratio			Total Resistance	Connections D.S.	No.	Total Weight
K-28	67-3-T	500	40	67/17	3.94	3600	26	2.98	19289	3	242
K-28	70	500	40	69/17	4.02	2520	18¾	4.04	23258	3	230
K-28	70	500	40	67/17	3.94	3720	27	2.98	19289	3	242
K-28	80	500	40	71/15	4.73	2980	22	4.04	23258	3	230
K-28	88	500	40	71/15	4.73	3040	22½	4.04	23258	3	230
K-28	88	500	40	67/19	3.52	3280	24¼	2.98	19289	3	242
K-34	87	500	60	71/16	4.45	5440	40	2.43	19714	5	484
K-34	87	500	60	71/16	4.45	3440	25½	3.41	22257	5	366
K-34	74	500	65	70/19	3.68	4080	30¼	2.43	19714	5	484
K-34	74	500	65	73/16	4.56	3120	23¼	3.41	22257	5	366
K-34	73	500	75	68/21	3.24	3800	28¼	2.43	19714	5	484
K-34	73	500	75	56/19	2.95	4400	32½	1.94	22256	5	413
K-34	210	600	70	63/24	2.625	4800	30¼	2.43	19714	5	484
K-34	210	600	70	69/16	4.31	4400	32½	3.41	22257	5	366
K-34	204	600	75	58/19	3.05	3680	27¼	2.43	19714	5	484
K-34	204	600	75	56/21	2.66	4240	32	1.94	22256	5	413
K-34	214	600	75	57/20	2.85	4040	30	2.43	19714	5	484
K-34	214	600	75	54/23	2.35	4800	35½	1.94	22256	5	413
K-35	67-3-T	500	40	62/22	2.82	3220	24½	2.32	22255	4	339
K-35	67-3-T	500	40	67/17	3.94	3120	23¼	3.35	19715	4	338
K-35	67-3-T	500	40	67/17	3.94	3760	28	2.87	22258	4	317
K-35	70	500	40	62/22	2.82	3400	25¼	2.32	22255	4	339
K-35	70	500	40	69/17	4.02	3200	23¾	3.35	19715	4	338
K-35	70	500	40	69/17	4.02	3920	29	2.87	22258	4	317
K-35	80	500	40	71/15	4.75	3760	27¾	3.35	19715	4	338
K-35	80	500	40	69/17	4.02	4460	33	2.87	22258	4	317
K-35	88	500	40	71/15	4.73	3840	28½	3.35	19715	4	338
K-35	57-2-T	500	50	64/21	3.05	3440	25½	2.32	22255	4	339
K-35	57-2-T	500	50	69/16	4.31	3120	23	3.35	19715	4	338
K-35	57-2-T	500	50	69/16	4.31	3480	26	2.87	22258	4	317
K-35	57-3-T	500	50	59/26	2.27	2800	20¾	2.32	22255	4	339
K-35	57-3-T	500	50	69/16	4.31	3400	25¼	3.35	19715	4	338
K-35	57-3-T	500	50	69/16	4.31	4200	31	2.87	22258	4	317
K-35	90	500	50	67/19	3.53	3880	28¾	2.32	22255	4	339
K-35	90	500	50	70/16	4.375	3040	22½	3.35	19715	4	338
K-35	90	500	50	70/16	4.375	3760	28	2.87	22258	4	317
K-35	202	600	50	71/15	4.73	4040	30	3.35	19715	4	338
K-35	202	600	50	69/17	4.02	4200	31	2.87	22258	4	317
K-35	213	600	50	71/15	4.73	3840	28½	3.35	19715	4	338
K-35	216	600	50	69/17	4.02	3420	25½	3.35	19715	4	338
K-35	216	600	50	69/17	4.02	4200	31	2.87	22258	4	317
K-35	219	600	50	69/17	4.02	3600	26¾	3.35	19715	4	338
K-35	219	600	50	67/22	3.045	4040	30	2.32	22255	4	339
K-35	219	600	50	67/19	3.53	3760	28	2.87	22258	4	317

TYPE RG RHEOSTATS FOR WESTINGHOUSE TWO-MOTOR EQUIPMENTS

Type of Controllers	MOTOR					Total Tractive Effort	Weight of Car in Tons Light	RHEOSTATS			
	Type	Volts	H.P.	Gears	Gear Ratio			Total Resistance	Connections D.S.	No.	Total Weight
K-10	12-A	500	25	68/14	4.85	1840	13.5	6.60	19286	2	157
K-10	12-A	500	30	68/14	4.85	1640	12	6.60	19286	2	157
K-10	69	500	30	68/14	4.85	1780	13	6.60	19286	2	157
K-10	92	500	35	69/15	4.60	1680	12.5	6.60	19286	2	157
K-10	92	500	35	66/18	3.67	1640	12	5.50	22669	2	146
K-11	93-A-2	500	60	68/19	3.58	1700	12.5	5.50	22669	2	146
K-11	93-A-2	500	60	68/19	3.58	2400	18	4.15	19287	2	150
K-36	101-B-2	500	40	66/18	3.67	2180	16	4.65	17807	3	261
K-36	56	500	50	64/18	3.56	2300	17	4.65	17807	3	261
K-36	306	500	50	69/15	4.60	2420	18	4.65	17807	3	261
K-36	93-A-2	500	60	68/19	3.58	2250	16.5	4.65	17807	3	261
K-36	305	500	60	69/18	3.84	2300	17	4.65	17807	3	261

TYPE RG RHEOSTATS FOR WESTINGHOUSE FOUR-MOTOR EQUIPMENTS

K-6	49	500	35	68/14	4.85	3280	24	3.47	19285	3	239
K-6	68-C	500	40	68/14	4.85	3200	24	3.47	19285	3	239
K-6	101-B-2	500	40	66/18	3.67	2700	20	3.47	19285	3	239
K-12	12-A	500	25	68/14	4.85	2000	15	5.50	22669	2	146
K-12	12-A	500	30	68/14	4.85	1800	14	5.50	22669	2	146
K-12	69	500	30	68/14	4.85	1960	15	5.50	22669	2	146
K-28	49	500	35	68/14	4.85	2800	21	4.04	23258	3	230
K-28	68-C	500	40	68/14	4.85	2400	18	4.04	23258	3	230
K-28	101-B-2	500	40	69/15	4.60	2800	21	4.04	23258	3	230
K-28	101-B-2	500	40	66/18	3.67	3300	24.5	2.98	19289	3	242
K-34	93-A-2	500	60	68/19	3.58	4200	31	2.43	19714	5	484
K-34	305	500	60	69/18	3.83	4400	32.5	2.43	19714	5	484
K-34	112-B	500	75	73/16	4.56	4360	32	2.43	19714	5	484
K-34	304	500	75	69/18	3.83	3500	26.5	2.43	19714	5	484
K-35	101-B-2	500	40	66/18	3.67	3200	23	2.87	22253	4	317
K-35	101-B-2	500	40	69/15	4.60	3620	27	3.35	19715	4	338
K-35	56	500	50	64/18	3.56	3680	27	2.87	22258	4	317
K-35	56	500	50	58/24	2.42	3200	23	2.32	22255	4	339
K-35	56	500	50	68/16	4.25	3720	27½	3.35	19715	4	338
K-35	306	500	50	69/15	4.60	3800	28	2.87	22250	4	317
K-35	306	500	50	66/18	3.67	3800	29	2.32	22255	4	339

GENERAL ELECTRIC COMPANY

PRINCIPAL OFFICES, SCHENECTADY, N. Y.

SALES OFFICES

(Address nearest office)

Atlanta, Ga.	Third National Bank Building
Baltimore, Md.	Electrical Building
Birmingham, Ala.	Brown-Marx Building
Boise, Idaho	Idaho Building
Boston, Mass.	84 State Street
Buffalo, N. Y.	Electric Building
Butte, Mont.	Electric Building
Charleston, W. Va.	Charleston National Bank Building
Charlotte, N. C.	Commercial National Bank Building
Chattanooga, Tenn.	James Building
Chicago, Ill.	Monadnock Building
Cincinnati, Ohio	Provident Bank Building
Cleveland, Ohio	Citizens Building
Columbus, Ohio	Columbus Savings & Trust Building
Davenport, Iowa	Security Building
Dayton, Ohio	Schwind Building
Denver, Colo.	First National Bank Building
Detroit, Mich.	Dime Savings Bank Bldg. (Office of Soliciting Agent)
Elmira, N. Y.	Hulett Building
Erie, Pa.	Marine National Bank Building
Fort Wayne, Ind.	Fort Wayne Electric Works
Hartford, Conn.	Hartford National Bank Building
Indianapolis, Ind.	Traction Terminal Building
Jacksonville, Fla.	Heard National Bank Building
Joplin, Mo.	Miners' Bank Building
Kansas City, Mo.	Dwight Building
Keokuk, Iowa	Monarch Building
Knoxville, Tenn.	Bank & Trust Building
Los Angeles, Cal.	124 West Fourth Street
Louisville, Ky.	Starks Building
Madison, Wis.	Fort Wayne Electric Works
Memphis, Tenn.	Randolph Building
Milwaukee, Wis.	Public Service Building
Minneapolis, Minn.	410 Third Ave., North
Nashville, Tenn.	Stahlman Building
New Haven, Conn.	Second National Bank Building
New Orleans, La.	Maison-Blanche Building
New York, N. Y.	30 Church Street
Niagara Falls, N. Y.	Gluck Building
Omaha, Neb.	Union Pacific Building
Philadelphia, Pa.	Witherspoon Building
Pittsburg, Pa.	Oliver Building
Portland, Ore.	Electric Building
Providence, R. I.	Turks Head Building
Richmond, Va.	Virginia Railway & Power Building
Rochester, N. Y.	Granite Building
St. Louis, Mo.	Pierce Building
Salt Lake City, Utah	Newhouse Building
San Francisco, Cal.	Rialto Building
Seattle, Wash.	Colman Building
Spokane, Wash.	Paulsen Building
Springfield, Mass.	Massachusetts Mutual Building
Syracuse, N. Y.	Onondaga County Savings Bank Building
Toledo, Ohio	Spitzer Building
Washington, D. C.	Evans Building
Youngstown, Ohio	Wick Building

For TEXAS, OKLAHOMA and ARIZONA Business refer to
Southwest General Electric Co. (Formerly Hobson Electric Co.)

Dallas, Tex.	1701 N. Market Street
El Paso, Tex.	500-2 San Francisco Street
Houston, Tex.	Third and Railroad Streets
Oklahoma City, Okla.	Insurance Building

FOREIGN SALES OFFICES: Schenectady, N. Y., Foreign Dept.; New York, N. Y., 30 Church Street; London, E. C., England, 83 Cannon Street

For all CANADIAN Business refer to
Canadian General Electric Co., Ltd., Toronto, Ont.