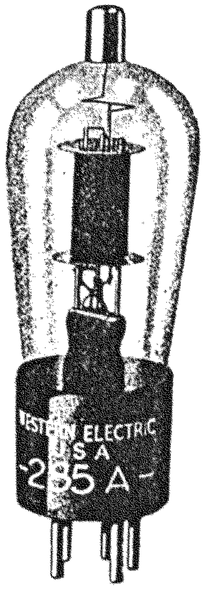
Western Electric

285A Vacuum Tube



Classification—Low-power, suppressor-grid pentode with indirectly heated cathode

The suppressor-grid of the 285A tube is permanently connected to the cathode within the bulb.

Application—Audio-frequency amplifier where power outputs of approximately one watt or less are required.

Dimensions—Dimensions, outline diagrams of the tube and base, and the arrangement of the electrode connections to the base terminals are shown in Figures 1 and 2.

Base—Medium, five-pin base with bayonet pin. Small, metal cap control-grid terminal at the top of the bulb.

Socket—Standard, five-contact type, such as the Western Electric 141A socket.

Mounting Positions—The 285A tube may be mounted in any position.

Average Direct Interelectrode Capacitances

Control grid to plate	0.5 $\mu\mu$f.
Control grid to heater, cathode, screen-grid and suppressor grid	4.2 $\mu\mu$f.
Plate to heater, cathode, screen-grid and suppressor grid	7.6 $\mu\mu$f.

Heater Rating

Heater voltage .... 2.0 volts, a.c. or d.c.
Nominal heater current .... 1.60 amperes

The heater element of this tube is designed to operate on a voltage basis and should be operated at as near the rated voltage as is practicable.

Cathode Connection—Preferably direct to the heater. If voltage must be applied between the cathode and heater, it should be kept as low as possible and should never exceed 90 volts.

Characteristics—Plate-current and screen-grid current characteristics for a typical 285A tube are shown in Figures 3 and 4, respectively, as functions of control-grid voltage for a plate voltage of 180 volts and several values of screen-grid voltage. Plate-current and screen-grid current characteristics are shown as functions of plate voltage in Figures 5 and 6, respectively, for a screen-grid voltage of 150 volts. Corresponding amplification-factor, plate-resistance, and transconductance characteristics are shown in Figures 7, 8 and 9, respectively.

Limiting Conditions for Safe Operation

Maximum plate voltage .... 250 volts
Maximum screen-grid voltage .... 200 volts
Maximum plate current .... 12.5 milliamperes
Maximum screen-grid dissipation .... 1 watt

Operating Conditions and Power Output—Permissible operating screen-grid and control-grid voltages are included within the area, ABCD, in Figure 3. Values of amplification factor, plate resistance, and transconductance, and typical performance data are given in the table below for recommended and maximum operating conditions represented by selected points within this area. Recommended conditions or others of no greater severity should be selected in preference to maximum conditions wherever possible. The life of the tube at maximum operating conditions may be shorter than at the recommended conditions. The performance data include the fundamental power output in watts and the maximum level of any harmonic in db below the fundamental, for the indicated values of load resistance and input voltage. The input has been so chosen that its peak value is numerically equal to the control-grid bias, and the load resistance has been so chosen that for the range of inputs from zero to this maximum value, the maximum levels of the second and third harmonics are equal.

	Plate Voltage	Screen-Grid Voltage	Control-Grid Bias	Plate Current	Screen-Grid Current	Amplification Factor	Plate Resistance	Transconductance	Load Resistance	Input Voltage	Power Output	Max. Harmonic Level
	Volts	Volts	Volts	Milliamperes	Milliamperes		Ohms	Micromhos	Ohms	Peak Volts	Watts	db
Recommended	135	135	−10.5	7.5	1.6	120	140000	860	16000	10.5	0.38	25.0
	180	150	−12.0	8.8	1.7	135	153000	880	19000	12.0	0.65	24.5
Maximum	250	200	−16.5	12.4	2.2	140	137000	1020	17000	16.5	1.35	23.0

Curves showing the variation of power output and second and third harmonic levels with input voltage for several values of load resistance are shown in Figures 10, 11, and 12, respectively, for a typical operating condition. Figures 13, 14 and 15 extend the data given in the last four columns of the table to other maximum harmonic levels. Each ordinate in Figure 13 gives the maximum power output obtainable from the tube at the indicated operating condition, where both the second and third harmonics are limited to the level given by the corresponding abscissa. The values of input voltage and load resistance which are required at each point are given in Figures 14 and 15, respectively.

Microphonic Noise—With an operating plate voltage of 180 volts, a screen-grid voltage of 150 volts, a control-grid bias of −12 volts, and a load resistance of 100,000 ohms, the mean microphonic noise output level of the 285A tube, measured in a laboratory reference test set, is 20 db below 1 volt. The range of levels of individual tubes extends from 2 to 32 db below 1 volt. Since microphonic noise depends on the type and intensity of the mechanical disturbance which produces it, the values given here are useful chiefly for comparison with the levels of other types of tubes which have been tested in the same way.

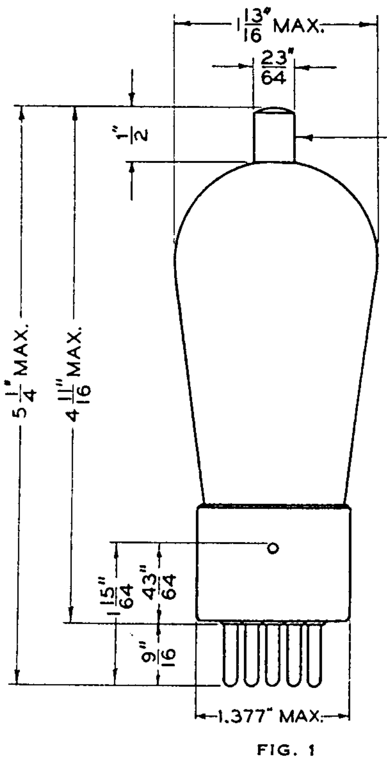


FIG. 1

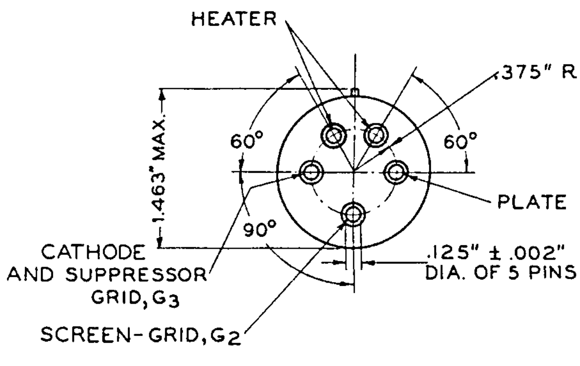


FIG. 2

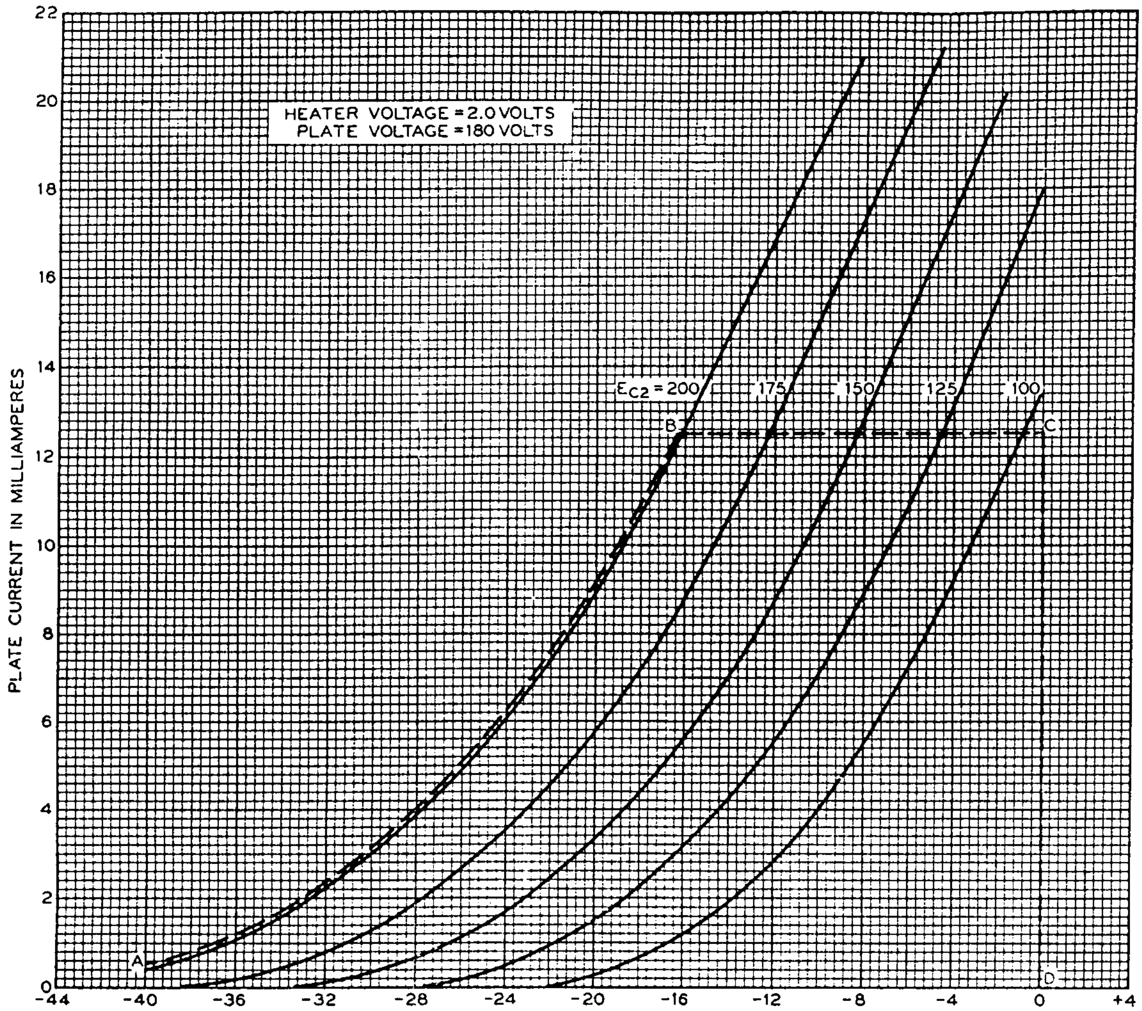

HEATER VOLTAGE = 2.0 VOLTS
PLATE VOLTAGE = 180 VOLTS
PLATE CURRENT IN MILLIAMPERES
E_{C2} = 200
175
150
125
100
A
B
C
D
0
2
4
6
8
10
12
14
16
18
20
22
-44
-40
-36
-32
-28
-24
-20
-16
-12
-8
-4
0
+4

FIG. 3

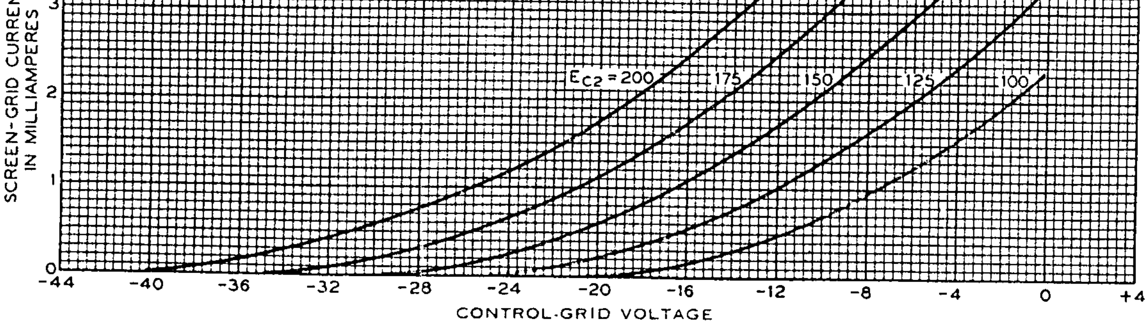

SCREEN-GRID CURRENT IN MILLIAMPERES
E_{C2} = 200
175
150
125
100
0
1
2
3
4
-44
-40
-36
-32
-28
-24
-20
-16
-12
-8
-4
0
+4
CONTROL-GRID VOLTAGE

FIG. 4

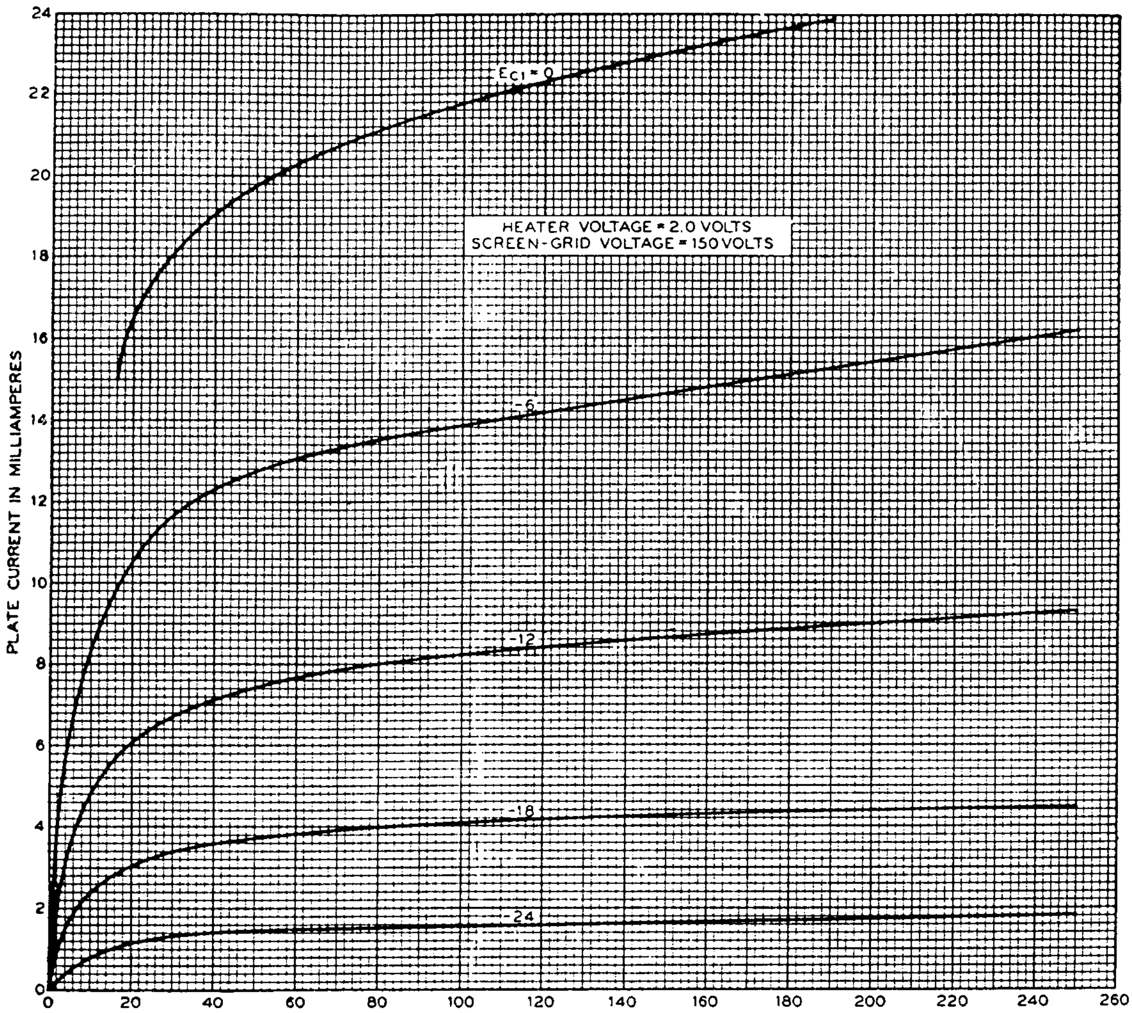
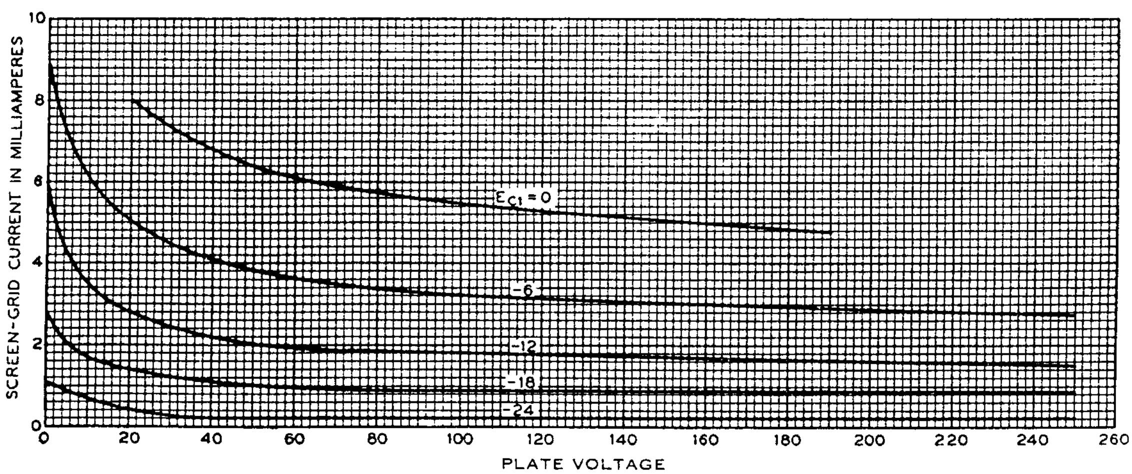


PLATE CURRENT IN MILLIAMPERES
HEATER VOLTAGE = 2.0 VOLTS
SCREEN-GRID VOLTAGE = 150 VOLTS
E_{C1} = 0
-6
-12
-18
-24

FIG. 5



SCREEN-GRID CURRENT IN MILLIAMPERES
E_{C1} = 0
-6
-12
-18
-24
PLATE VOLTAGE

FIG. 6

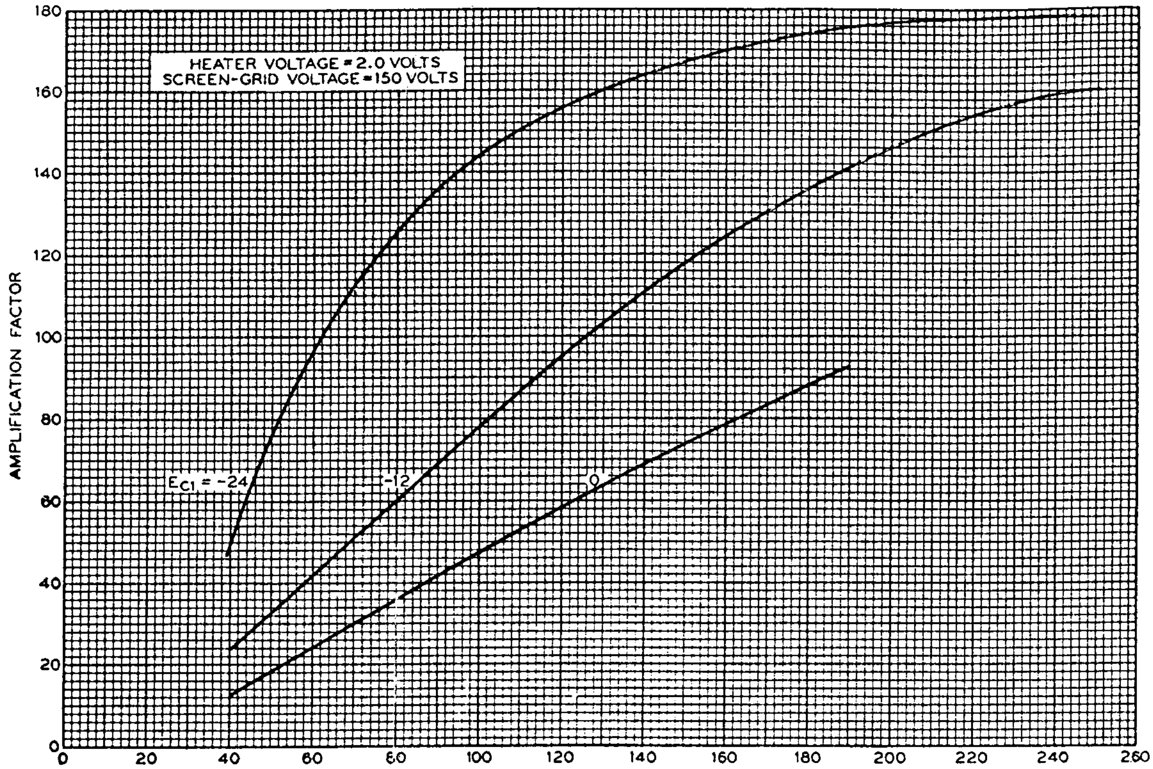


FIG. 7

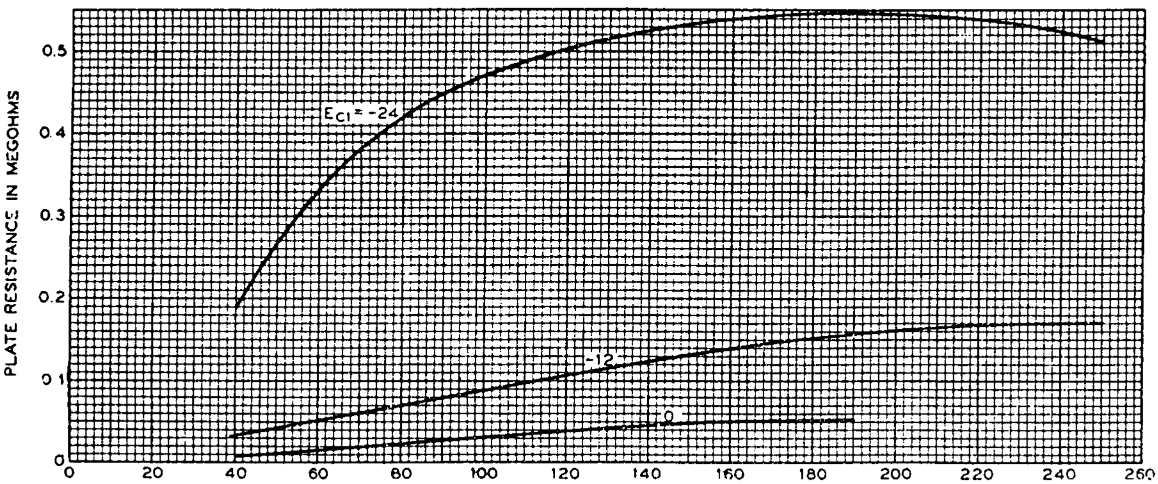


FIG. 8

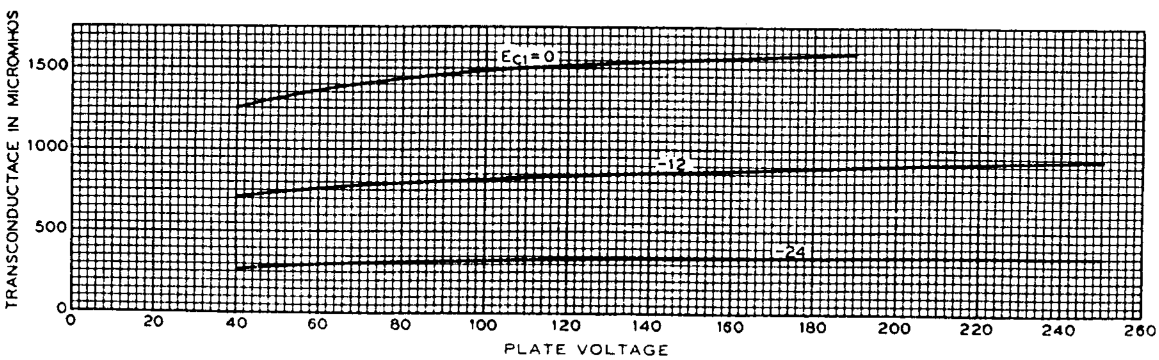


FIG. 9

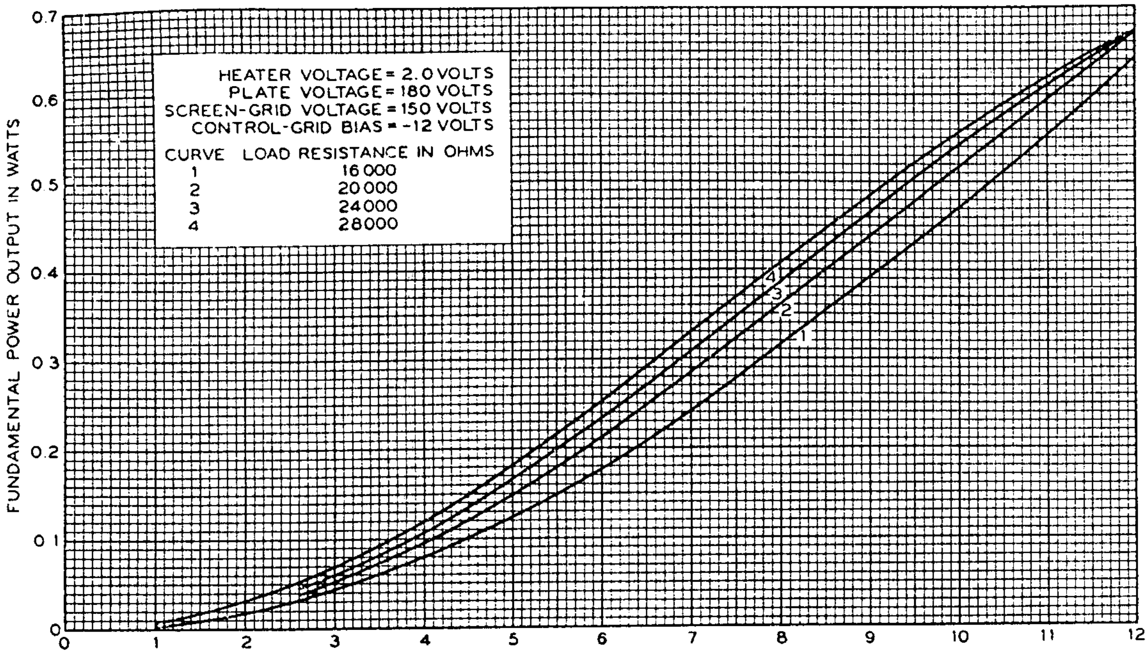


FIG. 10

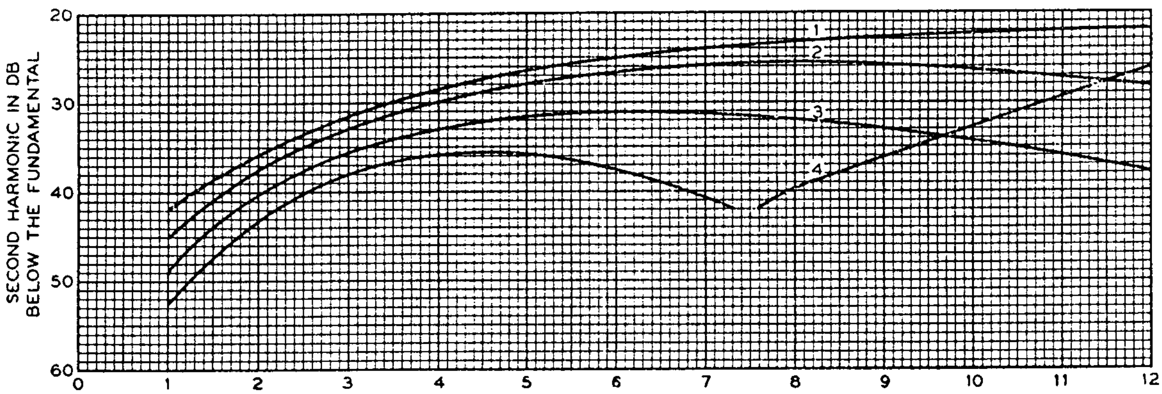


FIG. 11

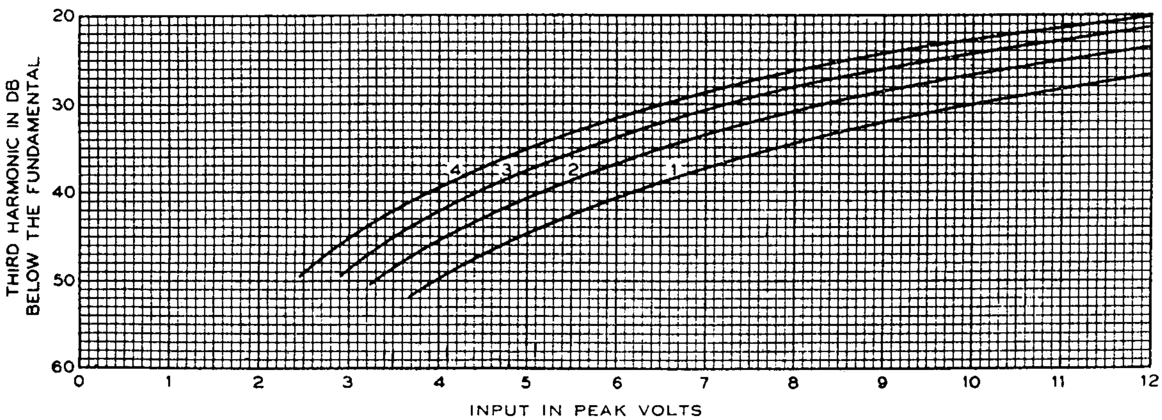


FIG. 12

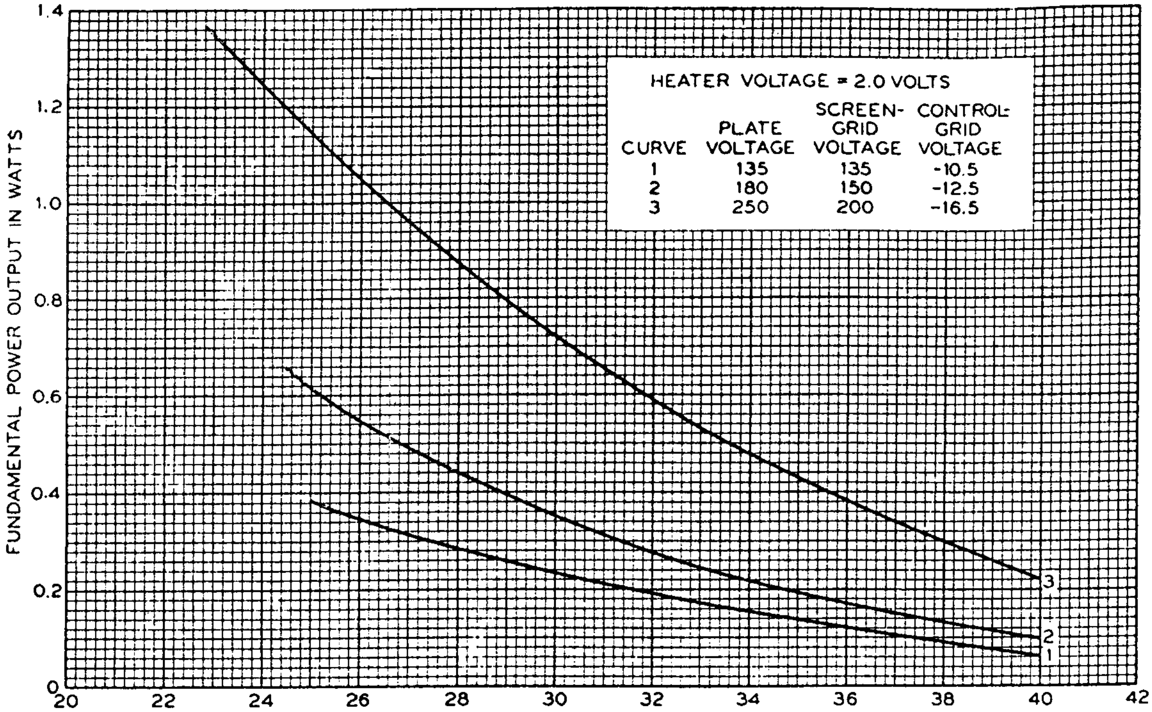


FIG. 13

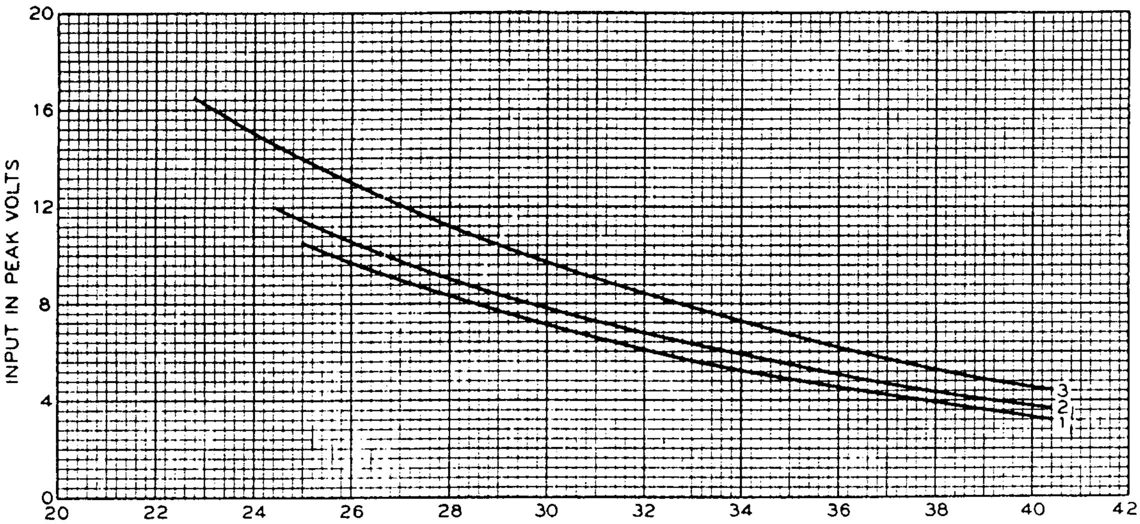


FIG. 14

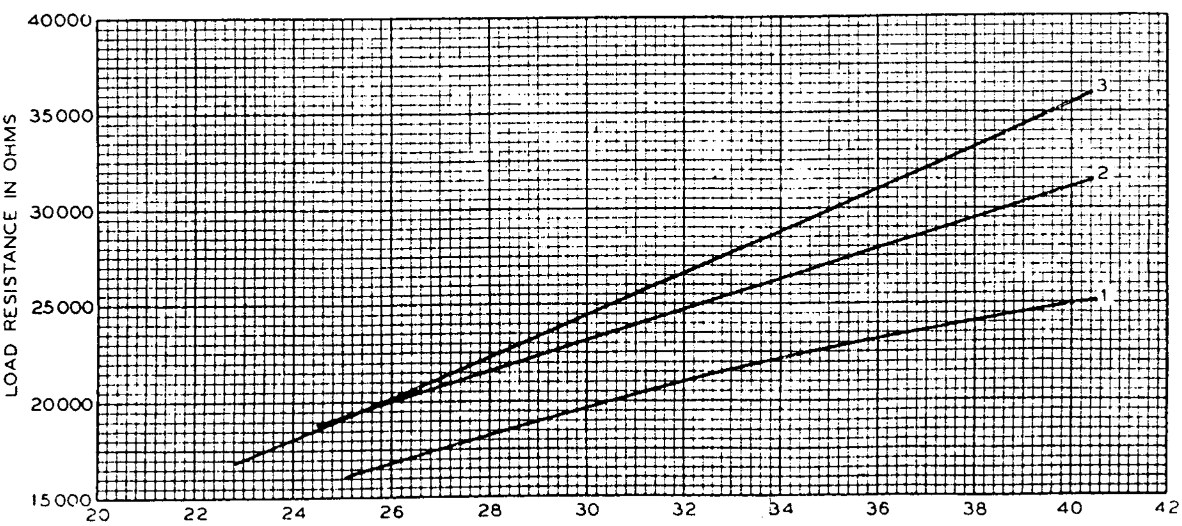


FIG. 15

A development of Bell Telephone Laboratories, Incorporated, the research laboratories of the American Telephone and Telegraph Company; and the Western Electric Company