MULLARD "M.B. THREE" RECEIVER (Cont.)

CONDENSERS

C	Purpose.	Mfd.
3	V1 grid decoupling (for V.C.) ...	.1
4	V1 grid	.0001
5	Across G.B. battery	.1
9	V2 grid	.0001
10	V2 aux. grid	.5
11	H.F. filter in V2 anode circuit	.0005
12	" " "	.0002
13	L.F. coupling V2 to V3... " ...	.0016
14	H.F. by-pass	.00005
15	Tone compensating circuit, anode V3	.002
16	Across H.T.	2

RESISTANCES

R	Purpose.	Megohms*
1	V1 grid leak	5
2	Volume control	.01
3	Stabiliser in V2 grid	100 ohms.
4	V2 grid leak	2
5	Voltage dropping to V2 aux. grid	.16
6	V2 anode coupling	.1
7	H.F. stopper and grid stabiliser	.1
8	" " " ...	.1
9	V3 grid leak ... "	2
10	Tone compensating circuit, anode V3	.01

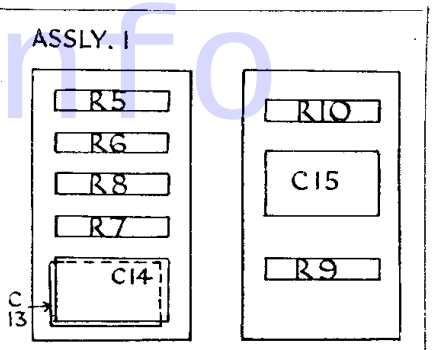
* Values are given in megohms as the resistances have these values stamped on them.

VALVE READINGS

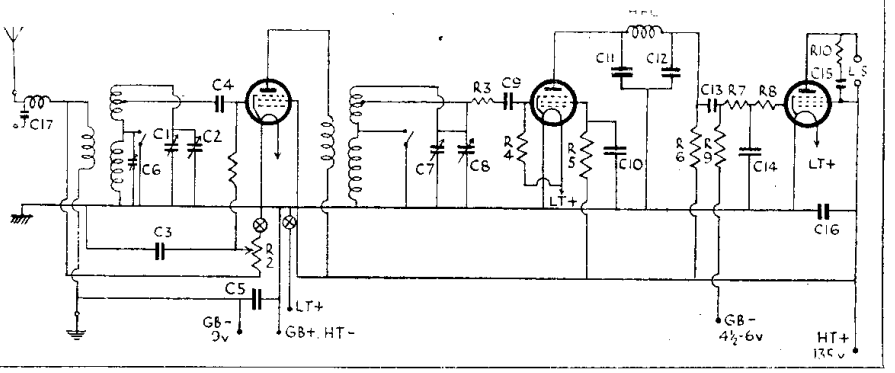
Volume Control at Maximum.

Valve.	Type.	Electrode.	Volts.	M.a.
1	VP2 ...	anode ...	135	2.7
		aux. grid ..	135	
2	SP2 ...	anode ...	30*	1
		aux. grid ...	65*	
3	PM22A ...	anode ...	130	3.8
		aux. grid ...	135	.8

* High values of resistances cause misleading voltage readings.



Top right are detail diagrams of the two assemblies mounted under the Mullard "M.B.3" chassis. Below is the circuit of the set.



"A.V.C. 5" BY G.E.C.

Circuit.—The first detector oscillator, X30 (V1), is a heptode following a band-pass aerial coupling and having a special suppressor circuit in the cathode lead.

Oscillation is obtained in the triode section by straight reaction coupling with the tuning in the grid circuit. Coupling to the I.F. valve is by band-pass I.F. transformer (frequency 125 K.C.). Bias is applied from the A.V.C. line.

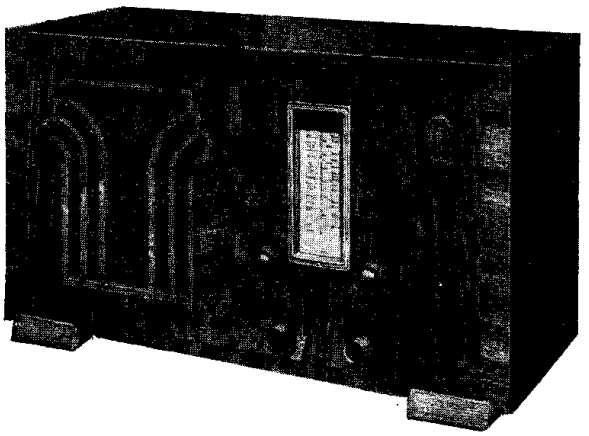
The I.F. valve, W30/MK. (V2), a metallised Catkin, is also biased from the A.V.C. line and is coupled to the second detector by another band-pass I.F. transformer with a tapped secondary.

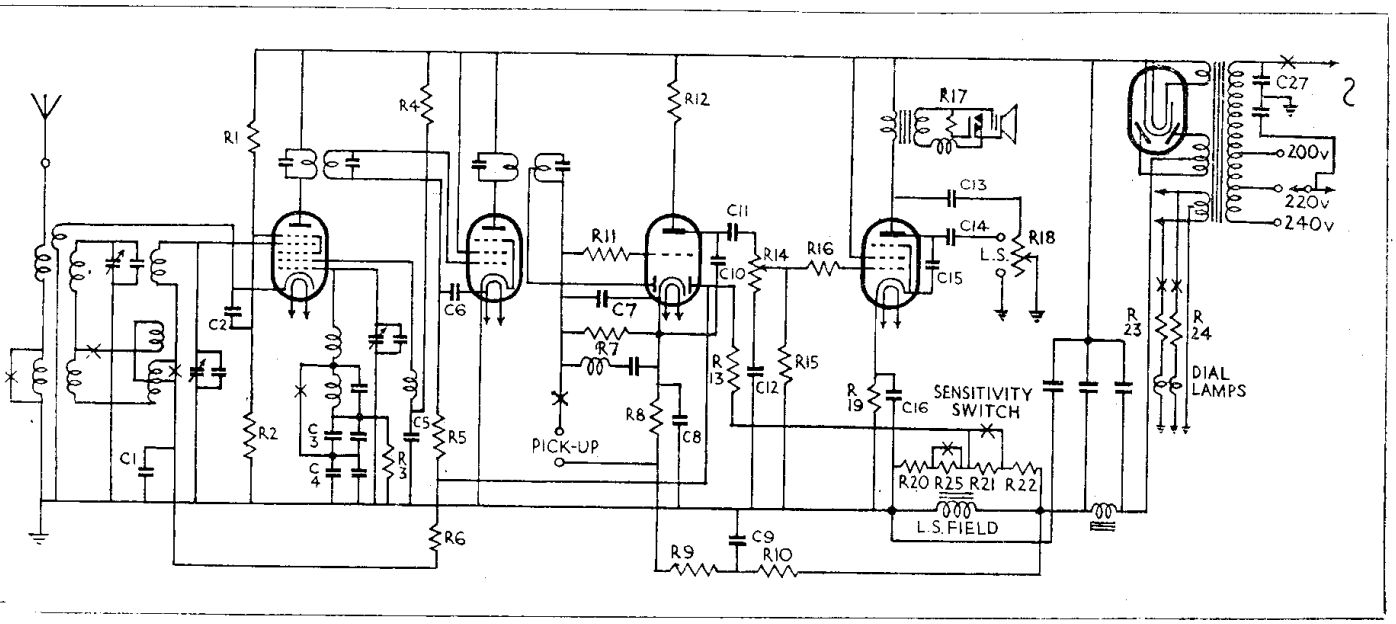
The second detector and L.F. amplifier, DH30 (V3), is a double diode triode. The I.F. signal is fed to one diode from the tapping on the I.F. T2 secondary. The L.F.

(*Continued on next page.*)

The "A.V.C.5," made by the General Electric Co., Ltd., is a thoroughly modern set in a horizontal type cabinet.

Heptode, H.F. pentode. double - diode - triode and output pentode valves — all 13 volt types—are employed in the "A.V.C.5." A sensitivity switch is one point of interest in the circuit given below.





GENERAL ELECTRIC CO.'s "A.V.C. 5" (Cont.)

impulses are fed direct to the grid of the triode section through an H.F. stopping resistance. (See the article on A.V.C. in this issue.)

Coupling to the output valve is by a resistance capacity filter with one modification. The volume control potentiometer, R14, is connected to chassis through a condenser, C12, and the output valve has a separate grid leak.

The output pentode, N30 (V4), is the indirectly heated type and uses cathode bias. Tone control is provided by a condenser, C13, in series with a variable resistance.

As usual, the speaker has a switch for disconnecting the internal speaker when an external one is required. The switch automatically connects an artificial load across the output transformer secondary.

Mains equipment consists of transformer, full wave I.D.H. rectifier (an M.U.14), and both a choke and the L.S. field are included in the negative lead for smoothing, with three 6 mfd. electrolytic condensers.

Special Notes.—The valves used in the set are the 13-volt .3-amp type, except the M.U.14, which has the usual rectifier rating of 4 volts 2.5 amp.

(*Continued on next page.*)

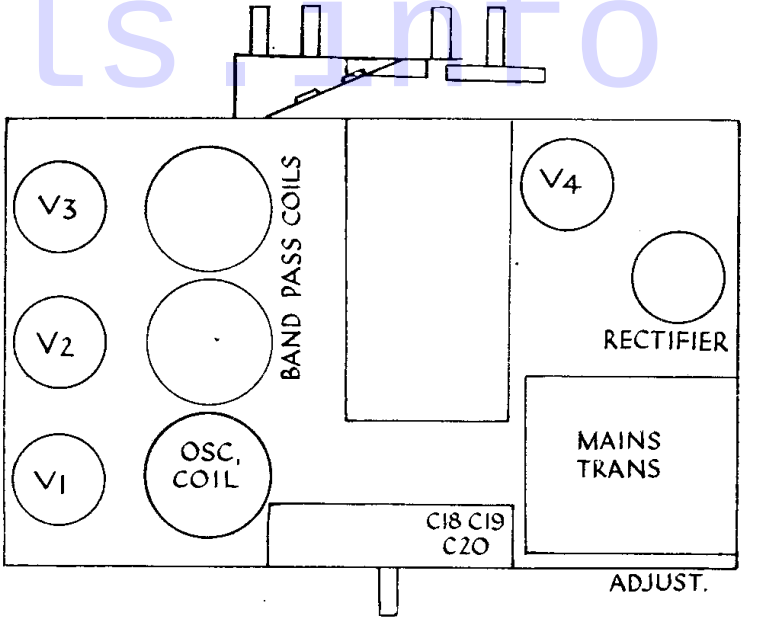
CONDENSERS

C.	Purpose.	Mfd.
1	Decoupling A.V.C. to V1	.05
2	V1 screen	.05
3	L.W. tracking of oscillator	.0005
4	Osc. tracking	.0015
5	Decoupling osc. anode	.1*
6	Decoupling A.V.C. to V2	.05
7	Diode anode by-pass	.0003
8	V3 cathode	.5*
9	Decoupling V3 cathode bias	.5*
10	V3 anode by-pass	.002
11	L.F. coupling V3 to V4	.02
12	Low A.C. potential end of V.C. ptr.	.1
13	V4 Tone control circuit	.02
14	L.F. feed to extra L.S.	.2*
15	Tone compensating anode V4	.001
16	V4 cathode	20 el.
17	H.F. by-pass from mains	.01 + .01
18	H.T. smoothing	6 el.**
19	H.T. smoothing	6 el.**
20	H.T. smoothing	6 el.**

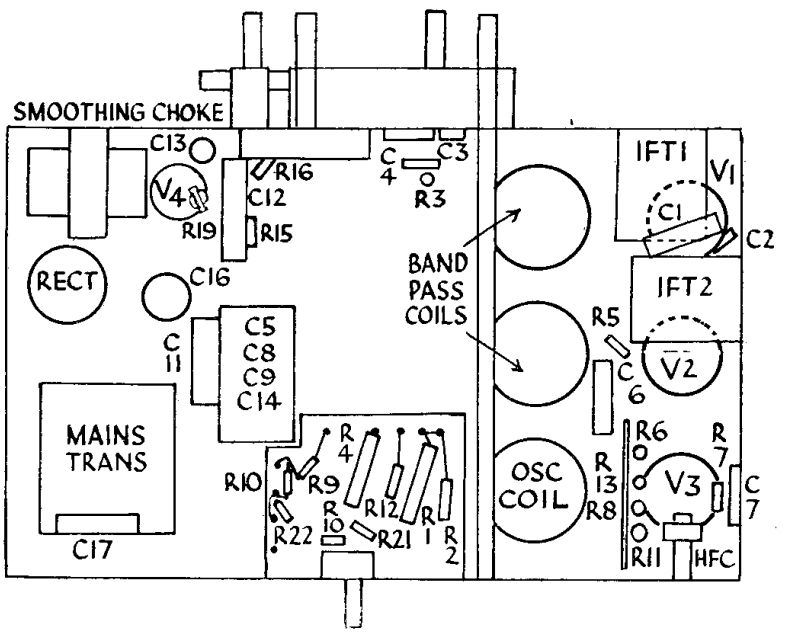
*In small condenser block
**In large condenser block.

RESISTANCES

R.	Purpose.	Ohms.
1	Top part of V1 screen ptr.	50,000
2	Lower part of V1 screen ptr.	44,000
3	Osc grid decoupling	99,000
4	Osc anode decoupling	22,000
5	V2 grid decoupling from A.V.C.	1 meg.
6	V1 grid decoupling from A.V.C.	1 meg.
7	Diode load	.5 meg.
8	V3 cathode bias on gram.	990
9	Voltage dropping for Amplified A.V.C.	25,000
10	Voltage dropping for Amplified A.V.C.	25,000
11	V3 grid H.F. stopper	220,000
12	V3 anode L.F. coupling	77,000
13	Decoupling delay bias for A.V.C.	.5 meg.
14	Volume control ptr.	.5 meg.
15	V4 grid leak	330,000
16	V4 grid stabiliser	99,000
17	Artificial load when switching L.S.	8
18	Tone control	50,000
19	V4 cathode bias	350
20	Part of bias ptr. across L.S. field	5,000
21	Part of bias ptr. across L.S. field	66,000
22	Part of bias ptr. across L.S. field	66,000
23	Voltage dropping to pilot lamp	20
24	Voltage dropping to pilot lamp	20
25	Part of ptr. across L.S. field	25,000
	Smoothing choke	400
	L.S. field	1,300
	P. of output transformer	300



Although the A.C. model of the A.V.C.5 is for A.C. mains only, it employs universal valves. The mains transformer therefore has a 13 volt L.T. winding.



How the components are situated underneath the chassis of the G.E.C. model A.V.C.5.

VALVE READINGS

No signal.

Valve	Type.	Electrode.	Volts.	Ma.
1	X.30	anode	260	2
		screen	75	
		osc. anode	160	3
2	W.30	anode	260	7
		screen	260	
3	D.H.30	anode	105	2
4	N.30	anode	235	32
		aux. grid	250	

PHILIPS MODEL 834 B

On page 109 in the circuit details and on page 110 in the "valve readings" of the Philips 834B receiver, V3 should be PM1HL, and V5 PM2DX.

Though the interchanging of these valves does not affect the performance to any appreciable extent, dealers should see that the valves are in the correct positions.

Cure for Instability

Engineers are sometimes puzzled to find that a set is unstable at certain parts of the dial after a condenser in the H.F. or I.F. section has been replaced.

This may be due to one of two causes: either the original condenser was of the non-inductive type and the replacement is one of the type in which the layers are wound in a roll, or the outer layer of the condenser may accidentally have been connected to a point at high H.F. or I.F. potential and may be causing incidental reaction.

In the former case there is no alternative but to fit a non-inductive type; but in the second, all that is necessary is to turn the condenser round so that the outer layer of foil is at the low H.F. potential end of the circuit (usually H.T.+, or chassis).

As condensers are not marked, the experiment has to be tried to find out which side is actually the outer.

GENERAL ELECTRIC CO.'s "A.V.C.5" (Cont.)

The pilot lamps (3.5-volt .3-amp type) are connected in series with a 20 ohm resistance, one across each side of the 13-volt heater winding.

The sensitivity switch operates by decreasing the delay bias on the A.V.C. diode anode by means of short circuiting the resistances R21 and R25. As the delay bias decreases the sensitivity increases.

Quick Tests.—Between the following terminals on the L.S. transformer and chassis (note the polarity), counting from left to right of the leads to chassis :—

(1) Black, chassis.
(2) Orange, V4 anode, 245 volts.
(3) Red (to switch), 0 v. } L.S. transformer
(4) Grey (to switch), 0 v. } secondary.
(5) Black (to switch), 0 v. }
(6) Red, H.T.+ smoothed, 260 volts.
(7) Grey, H.T.−, 75 volts.

Removing Chassis.—Pull off the knobs, remove four screws underneath and lift chassis out.

General Notes.—To reach the components beside the first detector and I.F. valve-holders, the screen should be removed by undoing two screws at the end and one at each side of the chassis. In replacing the screws the two short ones should be at the end.

Switch contacts are towards the outside, and should be cleaned with a duster.

Replacing Chassis.—Lay chassis inside cabinet, replace holding screws and press the knobs on to the spindles.

PHILIPS 588A SIX-VALVE SUPERHET

Circuit.—The combined first detector oscillator FC4 (V1) is an octode. The aerial circuit consists of a band-pass aerial coupling with a special I.F. filter between the aerial and the first band-pass coil.

In the oscillator section the grid circuit is tuned. Coupling to the next valve is by band-pass I.F. transformer (frequency 115 K.C.). Bias is by cathode resistance and A.V.C.

The I.F. valve VP4A (V2) also employs cathode and A.V.C. bias, and is coupled to the next valve by a second band-pass I.F. transformer.

The second detector valve, 2D4 (V3) is a double diode valve without a triode section. L.F. impulses are taken from the low H.F. potential end of the secondary of IFT2 through an H.F. stopping resistance to the diode load potentiometer, which forms the volume control. The feed to the grid of the L.F. valve is through a condenser C29 with an additional H.F. by-pass condenser, C30.

In the first L.F. stage a SP4 (V4), H.F. pentode operating with fixed bias is employed. It is coupled to the output valve by a resistance capacity filter.

The A.V.C. line is also taken from the low potential end of the IFT2 secondary.

The output valve, PM24M (V5) is provided with tone compensation by fixed condenser and by a condenser in series with a variable resistance to form a tone control. The speaker is a Philips' permanent magnet type.

Mains equipment consists of transformer, full-wave 1821 rectifier, with a smoothing choke in the positive H.T. lead in conjunction with two 32-mfd. electrolytic condensers.

(*Continued on opposite page.*)

CONDENSERS

C.	Purpose.	Mfd.
1	H.T. smoothing	32 el.
2	H.T. smoothing	32 el.
3	By-pass from R4	.5
4	H.T. smoothing	1
5	V1 cathode	.05
6	V4 cathode	25 el.
7	Across V5 bias resistance	25 el.
8	Aerial series condenser	.000025
15	L.W. tracking on osc.	.00093
16	M.W. tracking on osc.	.00181
18	Band-pass coupling	.025
19	Band-pass coupling	.025
26	Decoupling A.V.C. line	.1
27	L.F. coupling V4 to V5	.01
28	Tone compensating V5 anode	.002
29	L.F. coupling V3 to V4	.01
30	H.F. by-pass	.0002
31	Diode condenser	.0001
32	V2 cathode	.1
34	Tone control circuit	.032

RESISTANCES

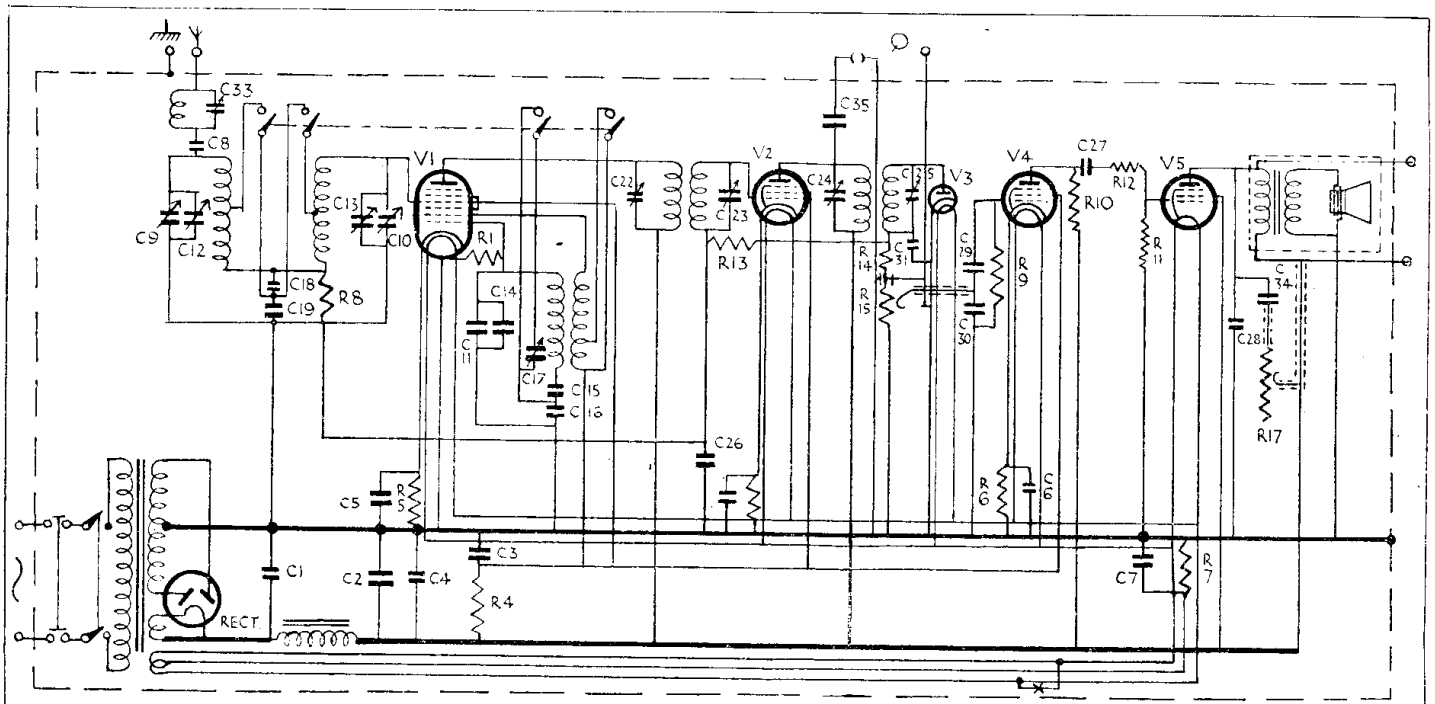
R.	Purpose.	Ohms.
1	Osc. grid leak	50,000
4	Voltage dropping to V1, V2 and V3 screens and Osc. anode	64,000+ 64,000
5	V1 cathode bias	200
6	V4 cathode bias	6,400
7	V5 bias resistance (see General Notes)	800
8	Decoupling V1 grid from A.V.C.	10,000
9	V4 grid leak	1 meg.
10	V4 anode coupling	.33 meg.
11	V5 grid leak	.5 meg.
12	H.F. stopper in V5 grid	.64 meg.
13	Decoupling A.V.C. line	1 meg.
14	H.F. stopper from diode	50,000
15	Diode load (V.C.)	.5 meg.
16	V2 cathode bias	640
17	Tone control (V5 anode circuit)	*50,000
	Smoothing choke	500
	Primary of output transformer	600
	*This may be 64,000 or 80,000	

VALVE READINGS

No signal.

Valve	Type.	Electrode.	Volts.	Ma.
1	F.C.4 (met)	anode	245	.35
		aux. grid	66	
		osc. anode	66	
2	V.P.4A	anode	245	1.3
		aux. grid	66	
3	2D4	Diode valve	No H.T. readings	
4	S.P.4	anode	*160	.325
		aux. grid	67	
5	P.M.24M	anode	220	22
		aux. grid	228	4.2

* A high value of anode resistance causes a misleading voltage reading. Anode current is the important factor.



The circuit of the Philips 588A comprises an octode frequency-changer, an H.F. pentode I.F. amplifier, a diode second detector an H.F. pentode L.F. amplifier, an output pentode and a rectifier valve.