SERVICE ENGINEER

PHILIPS 577A SUPER-INDUCTANCE RECEIVER

CIRCUIT.—Signals are fed to the first H.F. valve, V1, an H.F. pentode, via a band-pass filter which uses tapped inductance and direct capacitative coupling. An inductively coupled H.F. coil feeds the grid of the second H.F. pentode, V2, which is coupled to the detector, V3, by a tuned H.F. coil.

V3 is coupled through a resistance capacity network to a pentode L.F. amplifier, V4, which is linked to the pentode output valve, V5, by a further resistance capacity network. V5 is tone controlled by C33, R28, and a variable resistance R23.

A.V.C. is applied to the grid of V1 through a decoupling circuit consisting of R16, C9 and R13, variations of potentials being obtained across R17.

Mains equipment consists of: Transformer, full-wave 1821 directly heated rectifier, electrolytic condensers, and a choke in the negative H.T. line.

Special Notes.—The external speaker is connected on the high-resistance side of the transformer, and should be of high impedance.

Pilot lamps can be removed by undoing the knurled knob and lifting out paxolin strip.

The pilot lamps are 6 volt .5 amp. types.

Quick Tests.—In this receiver there are no suitable easily accessible points at which "Quick Test" readings may be taken. It is advisable, therefore, to proceed at once with valve tests.

Removing Chassis. — Remove the knobs (grub screws). Note that the centre switching knob has two grub screws. Undo four fixing bolts which will be found on the underside of the cabinet.

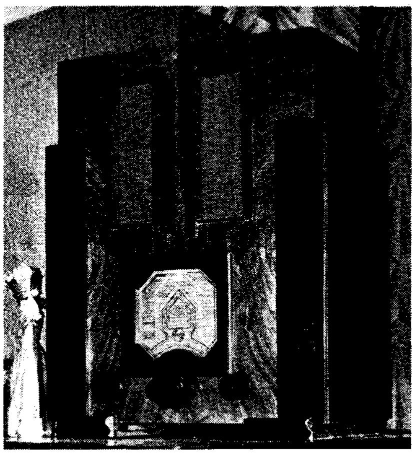
The chassis will then slip out far enough for the usual inspection without unsoldering leads to speaker.

Care should be taken, when replacing chassis, to see that the rubber mounting washers are correctly in place.

VALVE READINGS

No signal. Tone and volume controls turned fully clockwise.

V.	Type.	Electrode.	Volts	M.a.
	(All Mullard except rectifier)			
1	VP4A met. (5)	Anode ..	250	.75
		Aux. grid	95	.5
2	VP4A met. (5)	Anode ..	230	.75
		Aux. grid	95	.55
3	2D4A met. (5)	Diode ..	—	—
4	SP4 met. (5)	Anode ..	150	.24
		Aux. grid	32	.1
5	Pen.4VA (7)..	Anode ..	225	35.5
		Aux. grid	250	3.75
6	1821 (4) .. (Philips)	Filament	260	—



A "straight" circuit utilising high-efficiency tuned circuits is employed in the Philips Model 577A Super-inductance receiver. It incorporates five valves and a rectifier.

ALIGNMENT

Preliminary Procedure.—Switch to medium-wave band, connect output meter across speaker and modulated oscillator across aerial and earth.

Medium-wave Band.—Set modulated oscillator to 225 m. and tune in the signal. If the pointer is incorrect it can be adjusted by means of the driving plate, which is the plate holding the scale assembly to the chassis. This is adjustable by loosening four screws.

Tune for maximum response on the output meter by means of C39, C15, C16 and C17.

Set modulated oscillator to 500 m. and check the pointer again. Re-check the pointer at 225 m. and 350 m. Adjust driving plate to get the correct scale reading. Repeat 225 m. and 350 m. and check again at 500 m.

Check all the above settings, and then tighten the four screws.

Long-wave Band.—Change over to long-wave band and adjust both receiver and oscillator to 1,000 m. Trim, by means of C18, C19, C20 and C21, for maximum response on the output meter.

Re-seal trimming condensers with sealing wax.

(For circuit and layouts, see next page.)

Taking Valve Characteristics

IF the anode current at the correct grid voltage appears correct and a valve still fails to give the presumed amplification, the slope and amplification factor can be roughly checked in the following manner.

The slope is the relationship of the change in anode current with respect to grid voltage. For example, a slope of 3 m.a./v. means a change of 3 m.a. for change of 1 grid volt. Most manufacturers rate their valves at zero grid bias, and 100 volts on the anode.

A valve test circuit should be arranged, and the change in anode current noted while the grid bias is increased to, say, minus 1.5. By simple proportion the change in anode current for 1 volt can be calculated.

Measurements should not be taken at zero grid volts on power valves, since the total filament emission may be greater than the maximum for which the valve is rated. The measurements should be made at a higher anode voltage with the requisite grid bias as shown by the maker's chart.

The amplification factor is the ratio of the voltage produced in the anode circuit to the applied grid voltage. The anode current at a given high-tension voltage is noted at a given grid bias value. The grid bias is then increased by a few volts, for example, 3 volts, when, of course, the anode current falls. Extra voltage is then added to the high-tension circuit until the former value of anode current is again reached. The extra voltage which has been added is noted and this is divided by the change in grid voltage which was applied to the valve. If 15 volts were added, then the amplification factor of the valve would be 5.

From these two values we can calculate the impedance of a valve. It is only necessary to divide the amplification factor by the slope and multiply the result by 1,000. For example, a valve with an amplification factor of 14 and a slope of 2 would have an impedance of 7,000 ohms.

(The above notes are extracted from the section on valves contained in the 1936 "BROADCASTER Radio and Gramophone Trade Annual").

PHILIPS MODEL 577A (Continued)

RESISTANCES

R.	Purpose.	Ohms.
1	Constant gain control ..	680
2	V1 and V2 bias ptr. ..	160
3	V1 and V2 bias ptr. ..	32,000
4	V4 screen decoupling ..	64,000
5	V1 screen decoupling ..	1,000
6	V2 anode decoupling ..	1,000
7	V4 screen decoupling ..	1 meg.
8	V4 anode decoupling ptr. ..	.1 meg.
9	V1 cathode bias	500
10	V2 cathode bias	500
11	A.V.C. decoupling	32,000
12	A.V.C. decoupling	32,000
13	V1 grid leak	1 meg.
14	V2 grid leak	1.6 meg.
15	V3 anode decoupling ..	.32 meg.
16	V1 A.V.C. decoupling ..	1 meg.
17	Volume control	.5 meg.
18	V4 grid decoupling	1 meg.
19	V4 cathode bias	4,000
20	V4 anode decoupling ptr. ..	.32 meg.
21	V5 grid bias	.5 meg.
22	V5 L.F. coupling	.1 meg.
23	Tone control	50,000
24	Coil shunt	.32 meg.
25	V5 grid bias	16,000
26	V5 grid bias	64,000
27	V5 grid decoupling	1,000
28	Part tone control circuit ..	100

CONDENSERS

C.	Purpose.	Mfd.
1	H.T. smoothing	32
2	H.T. smoothing	32
3	V1 screen by-pass	.1
4	V2 anode by-pass	.1
5	V1 anode by-pass	.1
6	V4 screen by-pass	.1
7	V1 cathode by-pass... ..	.05
8	V2 cathode by-pass.. ..	.05
9	V1 A.V.C. decoupling ..	.1
10	V5 bias by-pass	25
11	Aerial tuning..	.00043
12	1st H.F. tuning	.00043
13	2nd H.F. tuning	.00043
14	3rd H.F. tuning	.00043
15	1st H.F. trimming	.000027
16	2nd H.F. trimming	.000027
17	3rd H.F. trimming	.000027
18	Long wave padding.. ..	.000027
19	Long wave padding.. ..	.000027
20	Long wave padding.. ..	.000027
21	Long wave padding.. ..	.000027
22	A.V.C. decoupling	.00008
23	Band-pass filter coupling ..	.025
24	Band-pass filter coupling ..	.032
25	V1 grid decoupling	.000025
26	V2 grid decoupling	.000025
27	V3 anode decoupling ..	.000007
28	L.F. coupling	.01

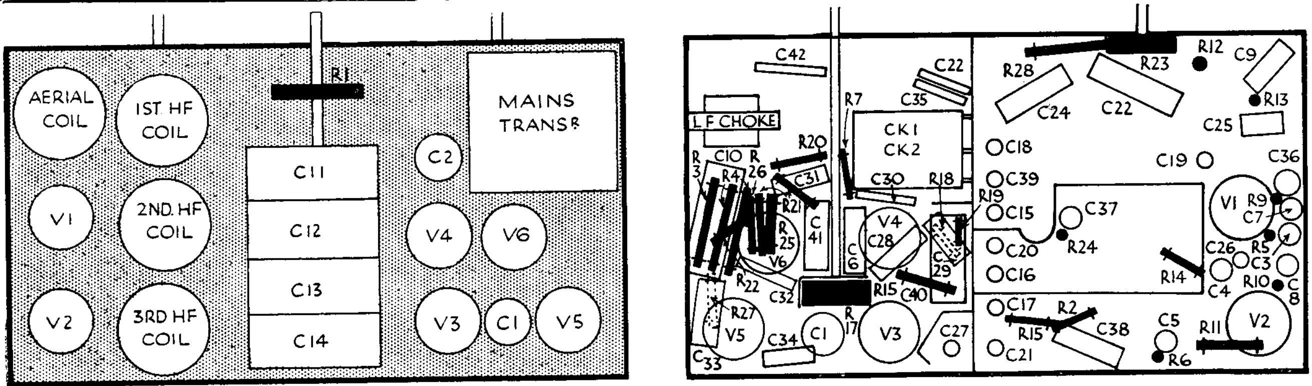
(*Continued in next column*).

C.	Condensers (*Continued*).	Mfd.
29	V4 grid by-pass	.00032
30	V4 anode by-pass	.00025
31	V5 L.F. coupling	.01
32	V5 grid by-pass	.0001
33	Part tone control circuit ..	.032
34	Pentode compensating ..	.002
35	Series aerial	.0005
36	H.F. filter	.1
37	Long-wave padding	.025
38	Long-wave padding	.025
39	Aerial trimming	.000027
40	V4 cathode by-pass ..	25
41	Anode decoupling	.1
42	Mains aerial	.0005

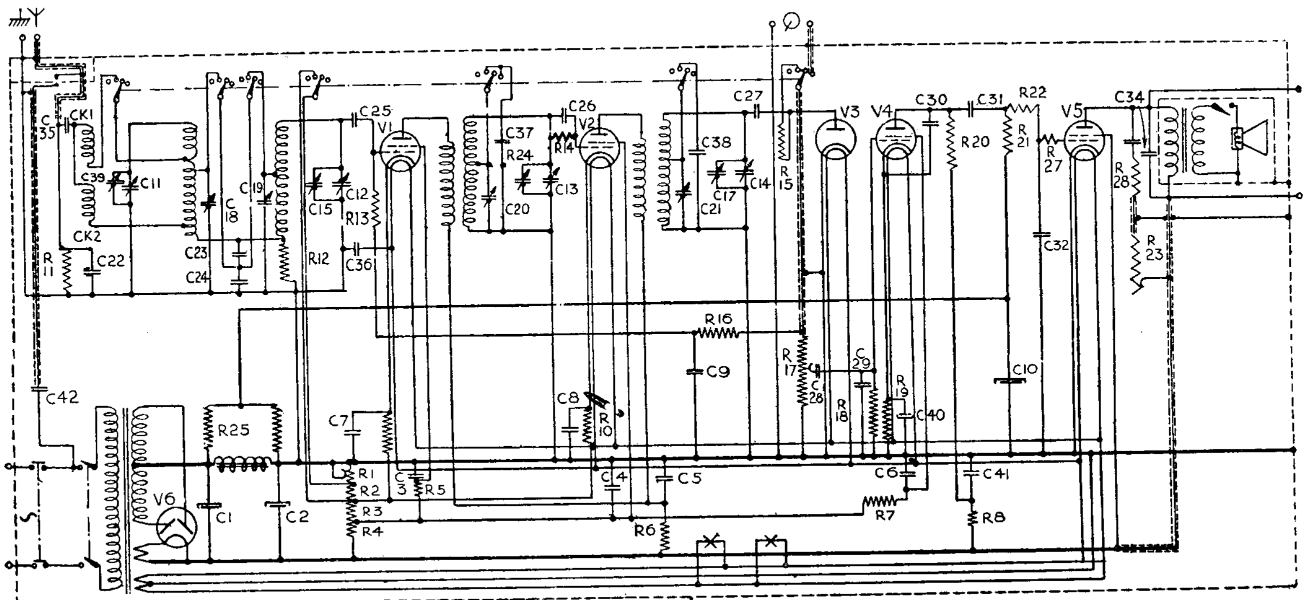
Mazda Valve Connection Chart

A wall chart, giving the base connections of Mazda valves, has been made available to retailers and service engineers. Measuring 15 in. by 22 in., it is designed for at-a-glance reference.

Applications for the chart should be made to Edison-Swan Electric Co., Ltd., at 155, Charing Cross Road, London, W.C.2, or to branches of the company.



These diagrams show the positions of components both on top of the Philips chassis (left) and underneath (right).



Two H.F. valves, a detector, an L.F. amplifier and an output pentode form the basis of the 577A circuit. Although "straight," the circuit incorporates A.V.C.