AERODYNE "SILVER WING" (Cont.)

and the additional trimmers shown in the lay-out diagram.

Quick Tests.—Between the terminals on the speaker transformer and chassis :—
Top.—(1) Black, H.T., unsmoothed, 325 volts.
(2) Blue, V4 anode, 227 volts.
(3) and (4) Red, H.T. smoothed, 240 volts.

(1) and (4) are speaker field; (2) and (3) are primary of output transformer.

Removing Chassis.—Undo two wood screws holding the dial frame to the cabinet. Pull off the knobs and remove the four holding screws from underneath.

General Notes.—In a few models R17 was omitted, and some of the components may have slightly different values from those given in the table :—
R4, 20,000 ohm; R7, 140 ohm; R10, 100,000 ohm or .5 megohm; R13, 140 ohm; R16, .25 megohm; R17, .25 megohm; and C20, .0012 mfd.

VALVE READINGS

Valve.	Type.	Electrode.	Volts.	M.A.
1	FC4 met (7) ..	anode ..	240	1.5
		aux. grid	97	
		osc. anode	131	4.7
2	VP4 met (7) ..	anode ..	240	6
		aux. grid	97	
3	2D4A met. ..	cathode*	16.5	
4	Pen 4 VB (7) ..	anode ..	227	27
		aux. grid	240	5.

* This represents voltage drop across R 13, R 18 and R 12.

Whenever a replacement for one of these is required, the new type should be of the same value as is given in the table.

The condenser C13 is mounted behind the condenser and resistance panel, and the L.F. coupling condenser C12 may either be mounted behind the panel or suspended in the wiring between the panel and the volume control.

The two 8-mfd. electrolytic condensers are in one block. The leads are : C17, yellow; C18, red. The common negative is black.

Replacing Chassis.—Lay the chassis inside the cabinet, replace holding screws and knobs, and insert the two wood screws in the corners of the dial frame.

MARCONIPHONE 223 UNIVERSAL SUPERHET "THREE"

Circuit.—The first detector-oscillator, X30 met. (V1), is preceded by a single tuned aerial circuit which incorporates a special "damping" circuit L1, TC6, R6, to provide local-distance variation.

Oscillator tuning is in the grid circuit and bias is by cathode resistance and A.V.C. Coupling to the next valve is by band pass I.F. transformer (frequency 456 k.c.). (See special note on trimmers.)

The second valve is a double-diode-H.F.-pentode, WD30 met. The I.F. is fed to the grid which is biased by A.V.C. only. The pentode section is followed by a second band-pass I.F. transformer, which is connected to the one diode anode that is used. The other diode anode is connected to cathode.

The L.F. signal is returned through the A.V.C. line, the H.F. stopper R11 and the secondary of I.F.T.1, to the grid of the pentode section of V2. There it is amplified and coupled to the next valve by R9 and C13, C12 acting as I.F. by-pass condenser with R9 as I.F. decoupler.

The output valve, an N30 Cat. (V3), is a pentode, of which the grid leak forms the volume control. In the output circuit a muting switch is connected across the secondary of the transformer to short-circuit the speaker when the wavelength is being changed.

Mains equipment consists of an H.F. filter in the mains leads, a voltage adjustment resistance, a double rectifier used in a half-wave circuit with smoothing effected by a choke in the positive H.T. lead used in conjunction with electrolytic condensers. The field coil is connected across the H.T.

Special Notes.—The H.F. filter and voltage adjustment resistance are mounted on the aluminium plate near the top of the cabinet.

The I.F. trimmers are the new type, in which a central screw tunes the primary

VALVE READINGS

Valve	Type.	Electrode.	Volts.	M.a.
1	X30 met. (7)	anode ..	200	.5 to 1.3*
		screen ..	56	2.8
		osc. anode	70	
2	W.D. 30 met. (7)	anode ..	65	3
		aux. grid	50	1.8
3	N.30 cat (7) ..	anode ..	180	24
		aux. grid.	145	4.6

*Varies with position of L.D. switch.

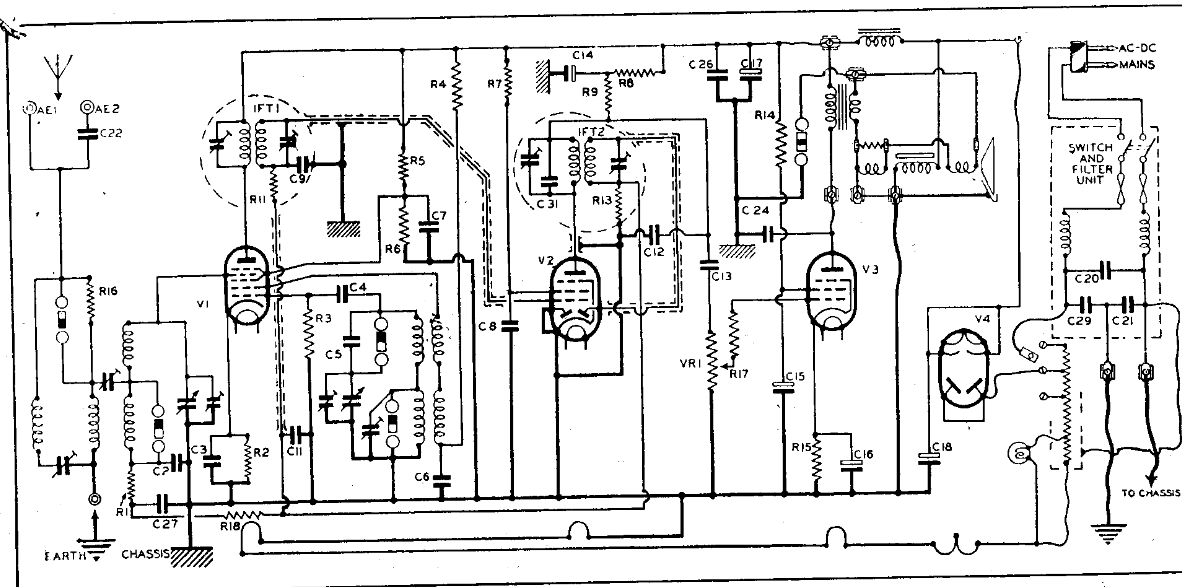
RESISTANCES

R.	Purpose.	Ohms.
1	Decoupling V1 grid	100,000 (1/8)
2	V1 cathode bias	230 (1/2)
3	V1 osc. grid-leak	50,000 (1/4)
4	V1 osc. anode decoupling ..	100,000 (1/2)
5	Top part of V1 screen ptr. ..	35,000 (1)
6	Lower part of V1 screen ptr...	50,000 (1/2)
7	Voltage dropping to V2 aux. grid.	75,000 (1/2)
8	V2 anode decoupling	5,000 (1/2)
9	V2 anode L.F. coupling ..	35,000 (1)
11	H.F. stopper in return L.F. lead to V2.	100,000 (1/4)
13	Diode load	.5 Meg. (1/8)
14	Voltage dropping to V3 aux. grid.	10,000 (1/2)
15	V3 cathode bias	230 (1/2)
16	In selectivity aerial circuit ..	100,000 (1/8)
17	V3 grid stabiliser	50,000 (1/8)
18	Decoupling A.V.C. to V1 ..	350,000 (1/4)
	L.S. field	5,000
	Smoothing choke	475

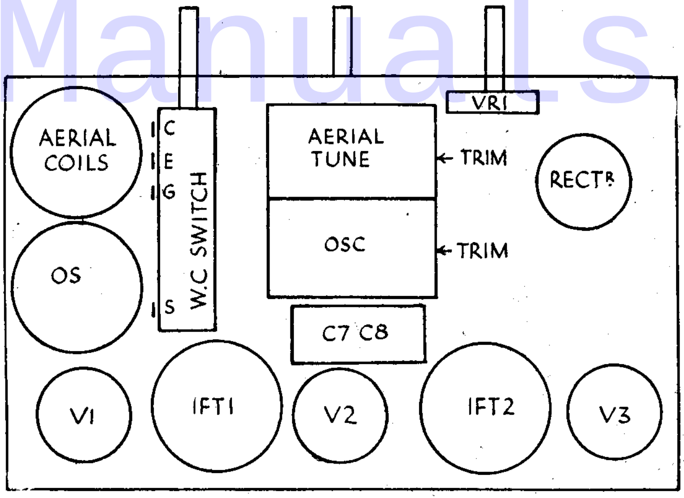
CONDENSERS

C.	Purpose.		Mfd.
2	V1 grid decoupling ..	..	.1
3	V1 cathode by-pass ..	..	.1
4	V1 osc. grid reservoir ..	..	.0001
5	L.W. osc. tracking ..	..	.0005
6	V1 osc. anode decoupling	..	.1
7	V1 screen by-pass ..	..	.5
8	V2 aux. grid by-pass ..	..	.5
9	L.F. return from V2 grid	..	.0005
11	Decoupling A.V.C. to V2	..	.002
12	I.F. by-pass from R9 ..	..	.0005
13	L.F. coupling V2 to V3	..	.1
14*	L.F. decoupling V2 anode	el	4
15*	V3 aux. grid by-pass ..	el	1
16	V3 cathode by-pass ..	el	50
17*	H.T. smoothing	el	12
18*	H.T. smoothing	el	12
20	H.F. by-pass across mains	..	.01
21	H.F. mains filter ..	..	.005
22	Series aerial	..	.0005
24	V3 anode, tone compensating	..	.002
26	Across C17	..	.1
27	A.V.C. to V1 grid decoupling	..	.01
29	H.F. mains filter ..	..	.005

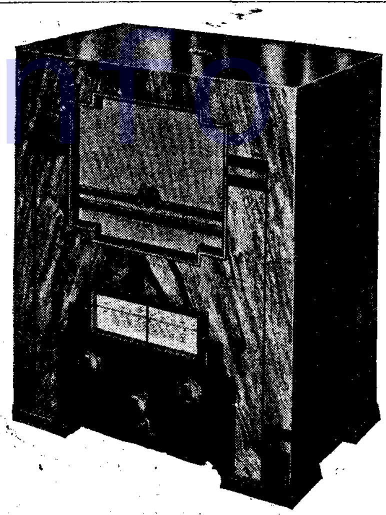
* In condenser block (Part No. 19851A).



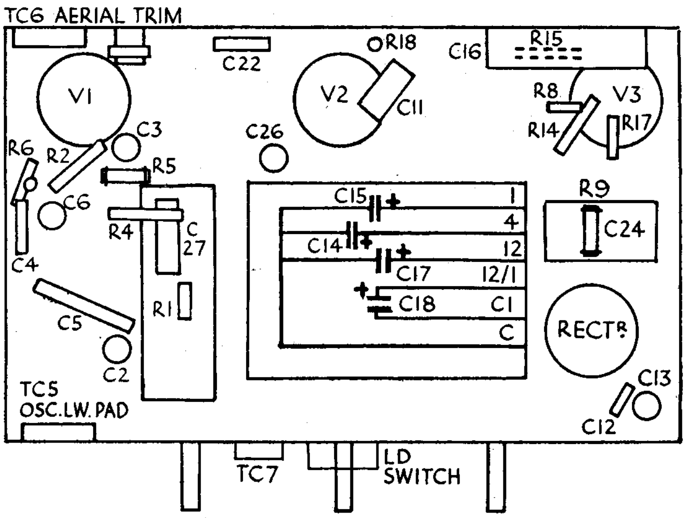
A valve—V2—which combines the duties of I.F. amplification, detection, A.V.C. and L.F. amplification is the outstanding feature of the model 223.



The intermediate frequency transformers used in the 223 have new type trimmers. Details are given under "Special Notes."



The Marconiphone mode 1223 employs only four valves including the rectifier.



Below deck the receiver is particularly tidy. The condenser block leads are marked as shown.

Removing Chassis.—Remove the wood blocks covering the holding screws underneath the cabinet. Remove the screws, knobs (grub screw), and release the cleat holding the cable to the right-hand side of the cabinet. Release the local-distance switch by unscrewing the circular escutcheon.

To remove the resistance panel, undo the four wood screws from the ends.

General Notes.—In working with this set remember that both on A.C. and D.C. mains the chassis may be live to earth.

The wiring colour code is :—

H.T.+, red.

Anodes of valves when not direct to H.T.+, red-yellow.

Screens of valves when not direct to H.T.+, red-black.

Grids, green.

Mains, orange.

Heaters and cathodes, brown.

Other leads, yellow.

If hum is experienced on A.C. mains, reverse the plug in the socket.

Replacing Chassis.—Lay the chassis inside the cabinet, replace the L.D. switch escutcheon, and the knobs (re-waxing the grub screws).

Replace the holding screws, with the wooden blocks over them, and cleat the cable.

MARCONIPHONE 223 (Cont.)

(turning clockwise to reduce capacity), and the nut surrounding it tunes the secondary, turning anti-clockwise to reduce capacity.

The pilot lamp is a 5.2 v. .3 amp type. Undo the vertical screw to remove it.

DELAYED AND AMPLIFIED A.V.C.

(*Continued from page 57.*)

to be applied to the grid, A.V.C. circuits using double-diode triode valves are fundamentally the same.

As it is necessary when using A.V.C. on the H.F. or I.F. sections to have the volume control on the L.F. side, the most convenient method is to use the diode load in the form of a potentiometer. An alternative method is to use the grid leak of the triode section as a potentiometer volume control. As there is still a residue of I.F. at this point the circuit (Fig. 3) includes an H.F. stopping resistance R1 and I.F. by-pass condensers C2 and C3. The L.F. coupling condenser is C5.

The provision of an initial negative bias, for delay action, to the A.V.C. diode anode, D2, is easily obtained by connecting the A.V.C. load resistance to the chassis which is negative with relation to the cathode by the amount of bias developed across R4.

The next important development of A.V.C. is the provision of a voltage greater than that supplied by the rectification of the signal with the object of obtaining greater control of the H.F. or I.F. stages. Amplified A.V.C., as this is called, is effected by utilising the triode to amplify the rectified D.C. voltage by virtue of the voltage drop caused in a resistance connected in the anode-cathode circuit.

The D.C. developed across the diode D1 (Fig. 4) load is passed to the grid of the triode and provides the grid bias. The commonest circuit is shown in Fig. 4, in which R1 is an H.F. (or I.F.) stopping resistance, R2 is the diode load, R2 and R3 form the grid leak of the triode section and C5 is the L.F. coupling condenser.

As the D.C. potential provided by D1 varies with the strength of the H.F. signal, the bias on the grid of the triode section varies and, depending on the mutual conductance of the valve, the anode current also changes. This results in an amplified voltage being produced across R4 in the cathode lead.

As the bias on the triode grid becomes greater with an increase in the strength of the signal the anode-cathode current becomes less and the voltage drop across R4 is also less. This means that the cathode is less positive with relation to the point on the H.T. line to which R4 is connected, by the amount of the voltage drop across R4. To utilise this for negatively biasing the controlled stages the point chosen for the connection of R4 is one that is negative with relation to the cathode returns of the controlled valves. By including the resistance R9 in the H.T. negative lead, the difference in the voltages between E, H.T., H.T.— and C can be made to vary merely by changing the current through R4. Under ordinary circumstances the values of R4 and R9 are chosen so that with no signal the voltages across R4 and R9 are nearly equal. Then, as there is no difference of voltage between D2 and C, no voltage will be developed across R5.

But when E becomes positive with relation to C, D2 is positive to C and the potential difference is developed across R5 and is transferred to the controlled valves through the decoupling resistance R6.

This method of connecting the cathode of the diode valve to a point that is negative to the chassis is frequently employed by using the speaker field in the negative H.T. lead and connecting the cathode to the negative end or to a potentiometer across the field. In this case the field takes the place of the resistance R9, and as the current through the field is for the whole set the D.C. resistance need not be so great to give the same control as with the method shown, which utilises only the current to the H.F. and I.F. sections.