R.I. RITZ, AIRFLO, DUOTONE AND MODERNE CHASSIS

Circuit.—The combined detector oscillator valve A.C./TP. met. (V.1) is a triode-pentode. The pentode mixer is preceded by a bandpass aerial circuit with capacitative coupling. Bias for this section is obtained by cathode resistance and from the A.V.C. line.

The oscillator triode section has reaction applied by coupling between the tuned anode coil and a cathode coil, and harmonics are suppressed by a resistance directly in the grid lead. Coupling to the next valve is by band-pass I.F. transformer (frequency 118 k.c.).

The I.F. valve A.C./VP1 met. (V.2) is provided with a variable cathode biassing resistance to vary the sensitivity for inter-station noise suppression (see special notes), and is coupled to the next valve by a second band-pass I.F. transformer.

The second detector and L.F. amplifier, A.C./HL/DDD met. (V.3), is a treble diode triode. One diode anode is used for L.F. purposes, a second for A.V.C., and the third for delay control.

The L.F. diode load is in the form of a potentiometer volume control and is coupled to the triode grid by resistance capacity filter (C17, R10), with R19 as the grid leak and R16 as an H.F. stopper. Another resistance capacity filter couples the triode section to the output valve.

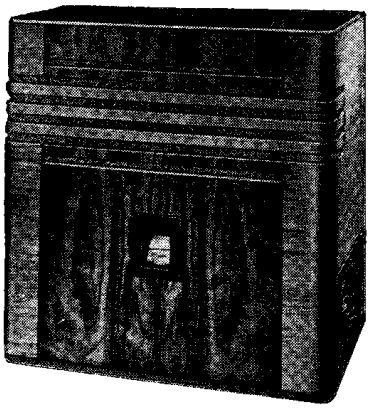
An A.C./Pen. output valve has both grid and anode stabilising resistances and is provided with tone-control by a condenser in series with a variable resistance between the anode and H.T. +.

Mains equipment consists of :—transformer, indirectly heated IW3 full-wave rectifier, and two large-capacity electrolytic condensers used with the L.S. field in the negative H.T. lead for smoothing. An artificial centre tapping of the set heater winding is provided by a tapped resistance.

Special Notes.—The working of the noise suppression with aerial tuning is as follows :—

The A.C./HL/DDD (V.3) uses D1 for signal rectification for L.F. purposes. Bias for the triode section is provided by the load resistance R17 of diode 2; this method is used with the usual coupling for providing amplified A.V.C. by neutralising the voltage drop across the L.S. field by that across the resistances R13 and R14 as far as V.3 is concerned.

Diode 2 is connected to the primary of IFT2, giving a broader tuning curve than that for the Diode 1. As both H.F. and



This is the Airflo, one of the four Radio Instruments receivers using the five-valve superhet chassis described here.

VALVE READINGS

No signal and static control turned fully anti-clockwise.

V.	Type.	Electrode.	Volts.	M.a.
1	AC/TP met. (9) ..	anode ..	162	6.2
		aux. grid		2
		osc. anode	100	2
2	AC/VP1 met (7) ..	anode* ..	220	11
		aux. grid*	190	
3	AC/HL/DDD met (9).	anode ..	200	2.6
4	AC/Pen (7) ..	anode ..	245	34
		aux. grid	255	5.5

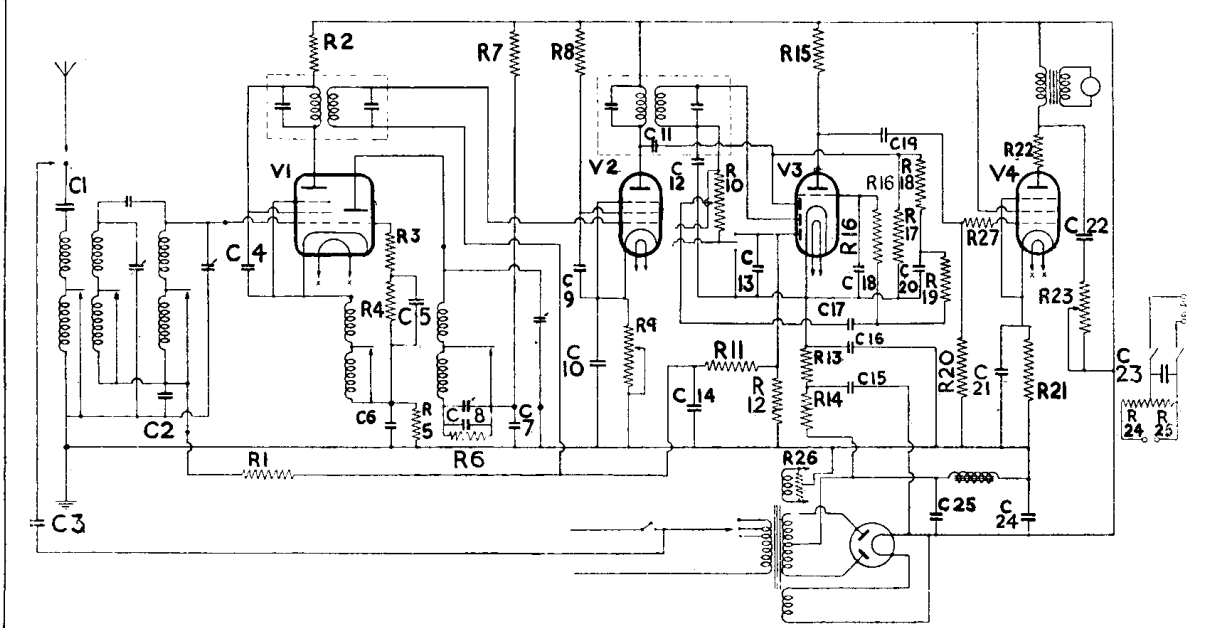
* Turn static control till switch is "on" for these readings.

CONDENSERS

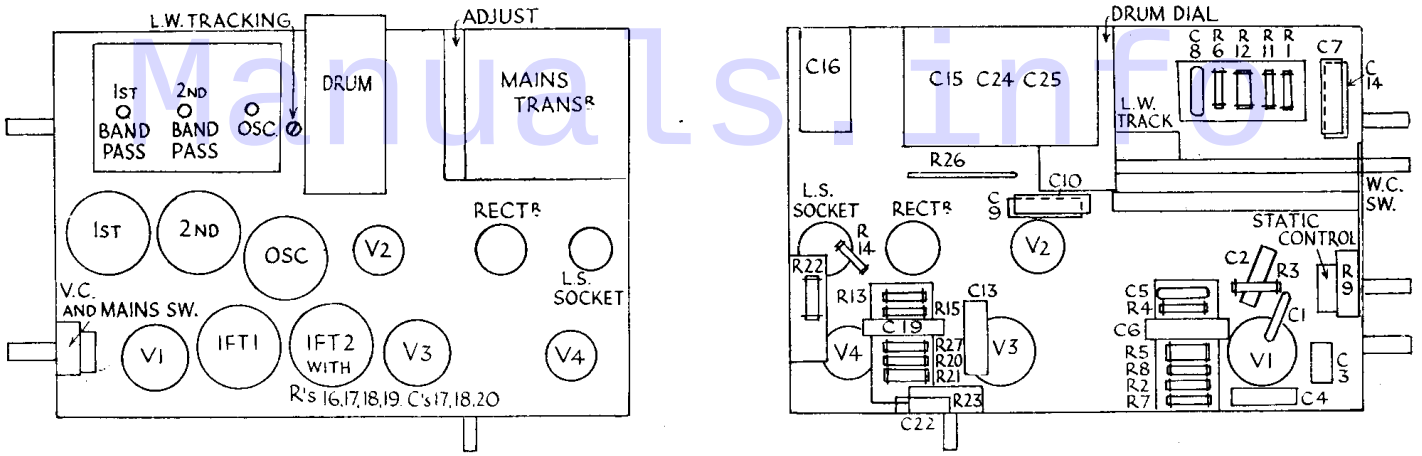
C.	Purpose.	Mfd.
1	Series aerial	.0002
2	V1 grid decoupling	.05
3	Mains aerial	.0002
4	V1 aux. grid	.1
5	V1 osc. grid	.0003
6	V1 cathode	.1
7	V1 osc. anode decoupling ..	.1
8	Fixed part of L.W. pad. ..	.0005
9	V2 aux. grid	.1
10	V2 cathode	.1
11	Feed to A.V.C. diode anode ..	.0002
12	H.F. by-pass from diode ..	.0002
13	L.F. by-pass from No. 3 diode anode.	.1
14	Decoupling A.V.C.	.1
15	H.T. smoothing for delay bias ..	4
16	V3 cathode	2
17	L.F. coupling diode to V3 grid	.01
18	H.F. by-pass from V3 grid ..	.0001
19	L.F. coupling V3 to V4	.01
20	Decoupling control diode circuit	.1
21	V4 cathode	50 el.
22	Tone compensating circuit ..	.02
24	H.T. smoothing	8 el.
25	H.T. smoothing	12 el.

RESISTANCES

R.	Purpose.	Ohms.
1	Decoupling AVC to V1 ..	5,000
2	Decoupling V1 anode	7,000
3	Harmonic suppressor V1 osc. grid	1,000
4	V1 osc. grid leak	50,000
5	V1 cathode bias	500
6	Across l.w. of osc. coil	50,000
7	Decoupling V1 osc anode ..	50,000
8	Decoupling V2 aux grid.. ..	10,000
9	V2 cathode bias for noise suppression (var)	10,000
10	Volume control, diode load ..	.5 meg.
11	Decoupling AVC	2 meg.
12	Diode 3 load	.5 meg.
13 } 14 }	Providing amplified AVC V3 cathode	25,000 10,000
15	V3 anode LF coupling	20,000
16	HF stopper in V3 grid	.2 meg.
17	AVC diode load	2 meg.
18	Decoupling V3 grid from AVC ..	1 meg.
19	V3 grid leak	1 meg.
20	V4 grid leak	.25 meg.
21	V4 cathode bias	400
22	V4 anode stabiliser	50
23	Var. tone control..	50,000
24 } 25 }	Ptr across PU	50,000 25,000
26	Ptr across set heaters	40
—	LS field	2,000



One of the most interesting features of the R.I. chassis is the triple diode-triode valve which provides second detection, A.V.C., inter-station noise suppression and L.F. amplification.



The design of the Ritz chassis is neat and a little unusual due to the controls being at the side.

L.F. are present across R17, these are by-passed by the condenser C20 and the supply decoupled by R18.

The diode D3 actually provides the A.V.C. bias by the voltage drop across R12, and as current will only flow through this load resistance when D3 is positive with regard to the cathode, and this can only happen when the signal develops sufficient power to counteract the initial cathode bias, the A.V.C. is dependent on the D.C. bias for V.3 grid supplied by D2.

So that the degree of control of the H.F. signal reaching the diode can be varied to suit local reception conditions, the sensitivity of the I.F. valve (V2) is controlled by the variable cathode bias resistance R9.

The diode 3 circuit is brought into action by a switch, ganged to R9 in such a way that the full negative bias (and consequently noise suppression power) is applied to diode 1 when the switch is turned upward in the diagram. When the switch is connected to cathode diode 1 operates with only the bias caused by the rectified carrier across R10.

Quick Tests.—Between the following terminals on L.S. transformer and chassis (note the polarity) :—

Top (1) red, 105 volts negative, H.T. –.
(2) white, 245 volts positive. V4 anode.
(3) white, 255 volts positive, H.T. smoothed.
(4) black, 0 volts, chassis negative.
(1) and (4) are L.S. field (2,000 ohms).
(2) and (3) are primary of output trans.

Removing Chassis.—Remove four holding screws and the knobs (grub screws). Pull out L.S. plug and, after moving chassis to the right to allow the spindles to clear the holes, lift the chassis out.

General Notes.—The following components are mounted inside the can containing IFT2 :—R16, R17, R18, R19, C17, C18 and C20.

The lay-out makes the components easily accessible, and the wiring is partly coded. Heaters are green and H.T. positive leads are red. The connections to C15, C24 and C25 are printed on the condenser case.

Replacing Chassis.—Lay chassis inside cabinet and slide it into position. Replace speaker plug, knobs and four holding screws.

SUNBEAM "22" A.C.-D.C. SUPERHET

Circuit.—A combined frequency changer oscillator valve, S.P. 1320 met. (V1), follows a single tuned aerial circuit. The aerial coupling contains an I.F. trap and a small coupling coil is linked with the long-wave winding to act as an image rejector.

The valve is biased by grid condenser and leak, and is followed by a bandpass I.F. transformer (frequency 456 k.c.).

The I.F. valve, V.P. 1320 met. (V2), is biased by cathode resistance and A.V.C., and is coupled to the second detector by another band-pass I.F. transformer.

The combined second detector and output valve, Pen. D.D. 4020 (V9), has the diode anodes strapped together. The D.C. and L.F. impulses are taken from the low H.F. potential end of I.F.T.2 secondary, and the D.C. is utilised for A.V.C. on V2 through an L.F. decoupling resistance (R3), while the load resistance (R5) forms the volume-control potentiometer.

The feed to the pentode section is by resistance-capacity filter with an H.F. stopping resistance in the lead to the condenser. Tone compensation is provided by a condenser across the primary of the output transformer.

Mains equipment includes two resistances providing voltage adjustment for the heater supply, double 1D.5 rectifier with anodes and cathodes strapped to act as a half-wave rectifier on A.C. and a pure resistance on D.C. The smoothing choke is in the positive H.T. lead with electrolytic smoothing condensers, while the L.S. field is connected across the unsmoothed H.T.

VALVE READINGS

No signal voltages taken with 230 A.C. supply.

Valve	Type.	Electrode.	Volts.	M.a.
1	SP 1320 met (7)	anode ..	208	2.4
		aux. grid ..	72	
2	VP 1320 met (7)	anode ..	208	7.8
		aux. grid ..	208	
3	Pen.DD 4020	anode ..	195	34
		aux. grid ..	208	5.5

Special Notes.—The resistance R9 is actually inside the mains flex, and is wrapped in asbestos. R10 is in front of the voltage adjustment panel. The order of heater wiring from the resistance is V4, V2, V1, V3.

Quick Tests.—The chassis of this set is only connected to the set negative through a condenser C17, so that the most convenient point for voltage measurements is the left-

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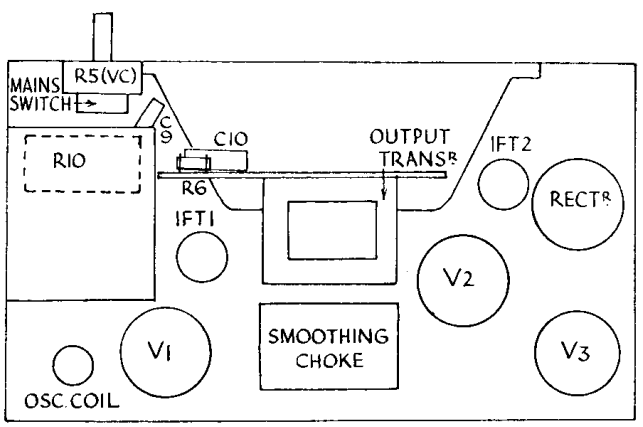

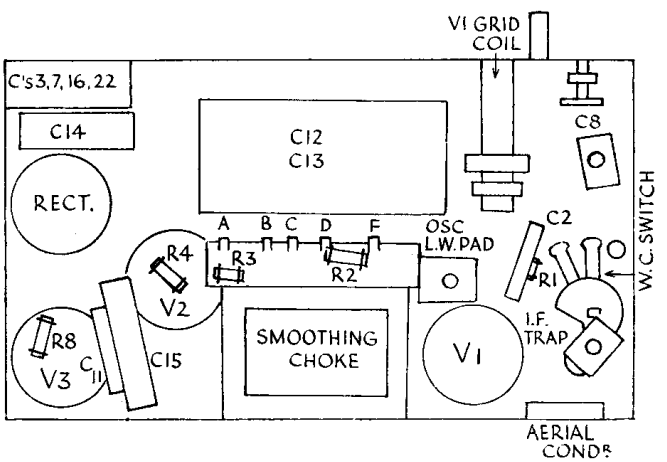

In the Sunbeam model "22" the chassis is connected to the set negative through a safety condenser and voltage measurements should be made to the left-hand tag on the speaker transformer.