

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 bypassed 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 (V3), 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

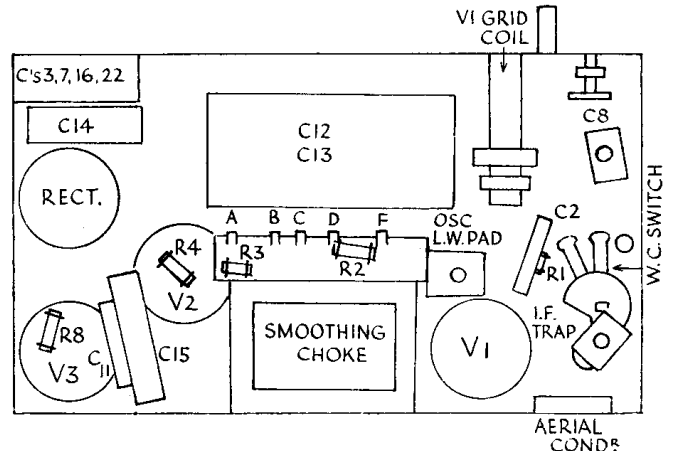
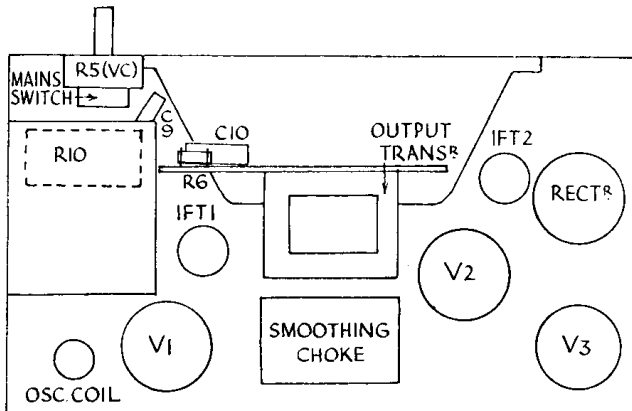
providing voltage adjustment for the heater supply, double 1D.5 rectifier with anodes and cathodes strapped to act as a half-wave rectifier on A.C. and a pure resistance on D.C. The smoothing choke is in the positive H.T. lead with electrolytic smoothing condensers, while the L.S. field is connected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

**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-

(Continued on next page.)

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	



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.

### SUNBEAM "22" A.C.-D.C. SUPERHET (Cont.)

hand (looking from the back) terminal on the L.S. transformer panel.

Voltages between this terminal (1) and the remainder are :—

- (2) H.T. smoothed, 208 volts.
  - (3) Zero.
  - (4) V3 anode, 195 volts.
  - (5) H.T. unsmoothed, 230 volts.
- (2) and (4) are primary of output transformer, (3) and (5) are L.S. field.

**Removing Chassis.**—To test V3 it is necessary to remove the chassis.

Undo the control knobs (grub screw), unscrew the wave-change switch lever and remove the three holding screws from below.

**General Notes.**—The terminal strip on the smoothing choke has five tags shown in the lay-out diagram. The connections are :—

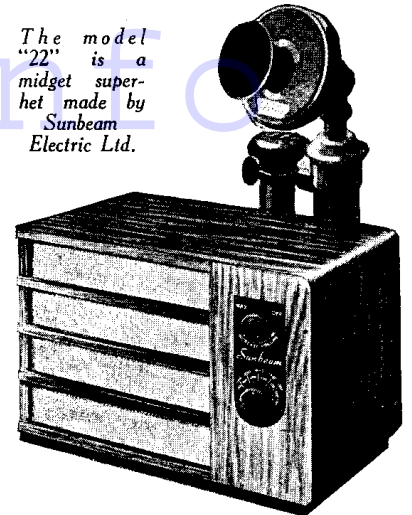
- A, V1 aux. grid.
  - B, H.T.+ smoothed.
  - C, H.T.+ unsmoothed.
  - D, I.F.T.1 secondary.
  - F, I.F.T.2 secondary.
- R3 is connected between D and F.

In handling this set, take care that the trimming condensers are not damaged.

Switch contacts are of the wiping type, and if these have to be cleaned the best method is to rotate the switch, wiping each end stud as it is revealed.

**Replacing Chassis.**—Replace the valves first, and then lay chassis inside cabinet. Replace holding screws, knobs and switch.

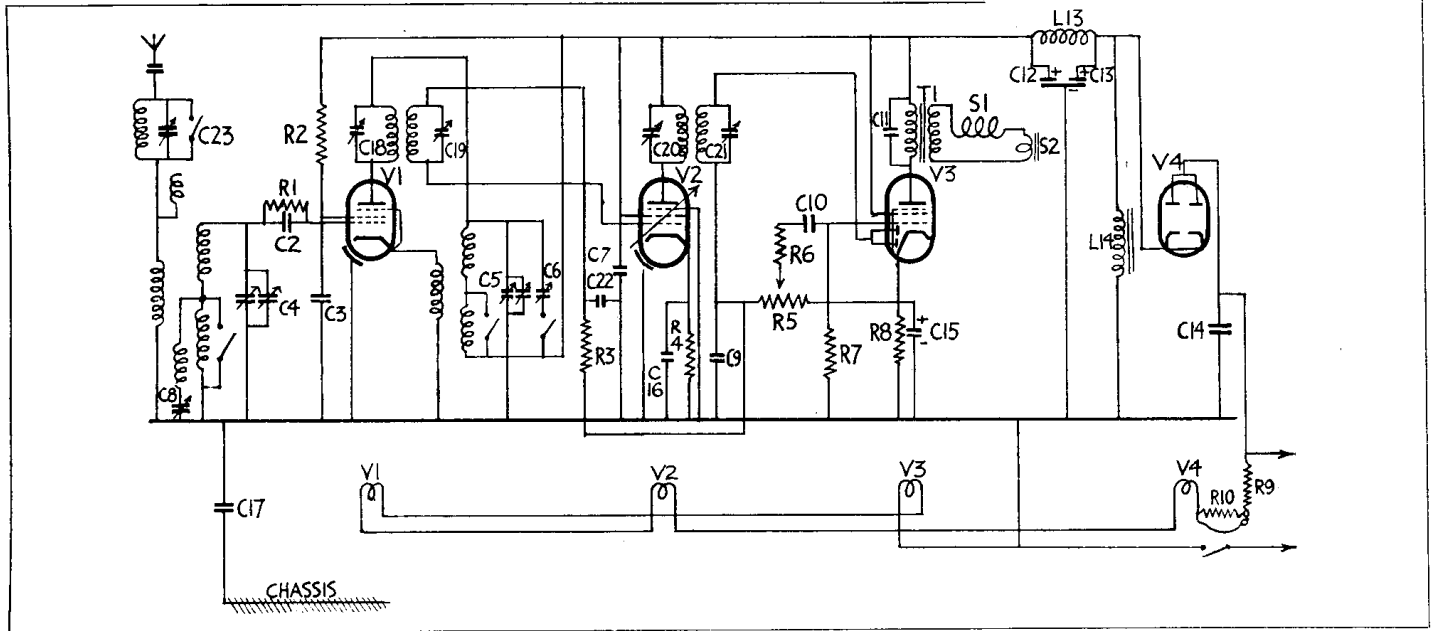
The model "22" is a midget super-het made by Sunbeam Electric Ltd.



Below is the three-valve plus rectifier super-heterodyne circuit utilised in the "22". Actually there are five stages.

RESISTANCES		
R.	Purpose.	Ohms.
1	V1 grid leak	2 meg.
2	Voltage dropping to V1 aux. grid	.25 meg.
3	Decoupling A.V.C. to V2	1 meg.
4	V2 cathode bias	700
5	Var. volume control	.25 meg.
6	H.F. stopper	50,000
7	V3 grid leak	1 meg.
8	V3 cathode bias	140
9	Voltage drop to heater supply	520
10	Voltage adjustment	150
	L.S. field	10,000
	Primary of L.S. transformer	500
	Smoothing choke	500

CONDENSERS		
C.	Purpose.	Mfd.
2	V1 grid reservoir	.00025
3	V1 aux. grid by-pass	.1
7	V2 aux. grid by-pass	.1
9	Diode reservoir	.001
10	L.F. coupling to V3 grid	.006
11	Tone compensating V3 anode	.01
12	H.T. smoothing	4 el.
13	H.T. smoothing	8 el.
14	Mains by-pass	.1
15	V3 cathode by-pass	5 el.
16	V2 cathode by-pass	.1
17	Between common neg. and chassis	.01
22	Decoupling A.V.C. to V2	.1



## TELSEN SIX-VALVE SUPERHET

**Circuit.**—The H.F. valve, AC/VP1 met. (V1) is preceded by a tuned secondary aerial transformer, which is iron cored. Bias is controlled from the full A.V.C. line and is limited by a cathode resistance. Coupling to the next valve is by a second iron-cored H.F. transformer, and tuning indication is effected by a meter in series with the anode lead.

The combined detector-oscillator valve, AC/TP met. (V2), is an H.F. pentode-triode and uses cathode injection. The coupling circuit is typical for this valve and includes a harmonic stopper (R7) in the grid circuit of the oscillator section.

This valve is also capable of superimposing the output from a gramophone pick-up on the I.F.

Coupling to the next valve is by band-pass I.F. transformer (I.F. 110 K.C.), and bias is by A.V.C. and cathode resistance.

The I.F. valve, AC/VP1 met. (V3), is

biased from a point of lower A.V.C. potential and by cathode resistance. It is followed by a second I.F. transformer.

A V914 (V4) high-voltage double-diode without a triode element is the detector. The A.V.C. diode is fed through a condenser from the anode of V3, and potentials are obtained from a load potentiometer consisting of R13, R14 and R15.

The L.F. diode anode is coupled to the output valve by a potentiometer volume control which forms the load, a condenser and a grid leak.

The output pentode, A.C.2 Pen (V5), has an H.F. stopper in the grid circuit. A tone compensating condenser is connected between grid and cathode, as well as a condenser between anode and cathode. Bias is obtained from a potentiometer (R23 and R24) in the cathode lead, the grid return being taken to the tapping. The full voltage drop across

R23 and R24 is the delay bias on the A.V.C. diode.

Mains equipment consists of transformer, full-wave R3 rectifier, with the L.S. field in the positive H.T. lead for smoothing with two 8-mfd. condensers.

**Special Notes.**—The pilot lamps can be removed by undoing the screw seen through the aperture in the bottom of the cabinet and lifting the bracket out complete.

**Quick Tests.**—Provided an H.F. signal is being applied to the set, the visual tuner always gives an indication as to whether or not the H.F., I.F. and detector stages are working. A defective output valve lowers the delay bias.

Voltages between the following terminals on the output transformer and chassis (no (Continued on page 156. For diagrams and component tables see opposite page.)