'TRADER' SERVICE SHEETS

BURNDEPT 229

A.C./D.C. TRANSPORTABLE

THE Burndept 229 A.C./D.C. superhet is a transportable model, with a self-contained frame aerial. Sockets are also provided for an external aerial and earth.

There is a signal frequency stage prior to the frequency changer, which is an octode. An interesting point is that, while second detection is carried out by an H.F. pentode, A.V.C. is provided by a Westector metal rectifier.

CIRCUIT DESCRIPTION

Tuned frame aerial input (**L1, L2, C23**) to variable-mu pentode signal frequency amplifier (**V1, Mullard metallised VP13A**).

Tuned-secondary transformer coupling by **L3, L4, L5, L6** and **C25** to octode (**V2, Mullard metallised FC13**) operating as frequency changer with electron coupling. Oscillator grid coils **L7, L8** tuned by **C27**; anode reaction coils **L9, L10**; tracking by pre-set condensers **C29** (L.W.) and **C30** (M.W.).

No valve amplification other than that obtained from the frequency changer is used in the intermediate frequency stage. A single tuned-primary tuned-secondary transformer **L11, L12** couples **V2** to the second detector, an H.F. pentode (**V3, Mullard metallised SP13**) operating on grid leak system with **C8** and **R7**.

Intermediate frequency 130 KC/S.

A half-wave metal rectifier (**MR1, Westinghouse type W6 Westector**) is fed from the detector anode and provides D.C. potential, developed across load resistance **R14,** which is fed back through decoupling circuits as G.B. to H.F. and F.C. valves, giving automatic volume control. Delay voltage is obtained from **V4** G.B. resistance.

I.F. filtering in **V3** anode circuit by choke **L13,** stopper resistance **R13** and by-pass condensers **C12, C13.** Resistance-capacity coupling by **R12, C14** and manual volume control **R15** to output pentode (**V4, Mullard Pen 36C** or **Mazda Pen 3520**). Fixed tone compensation in anode circuit by condenser **C16.**

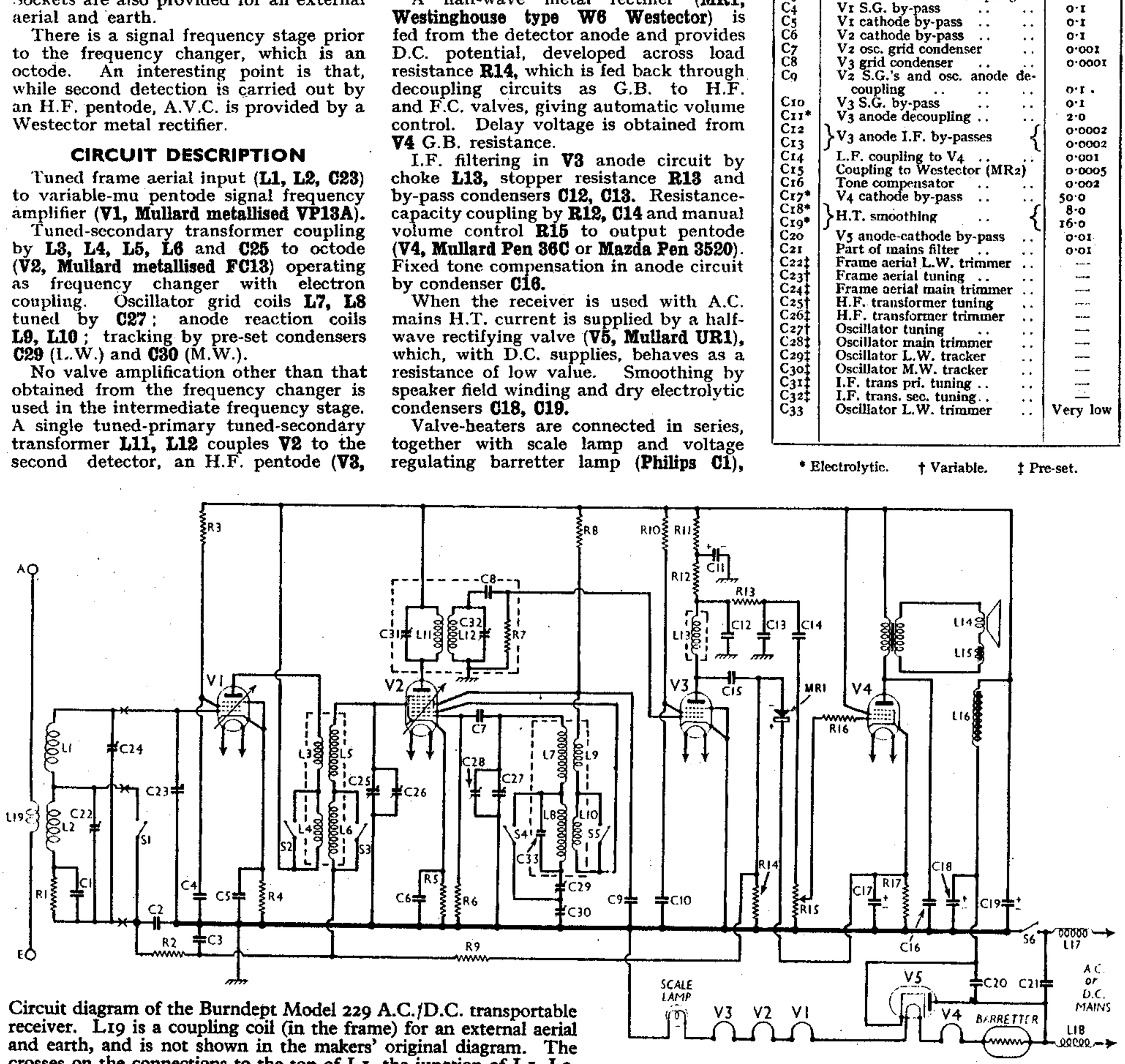
When the receiver is used with A.C. mains H.T. current is supplied by a half-wave rectifying valve (**V5, Mullard UR1**), which, with D.C. supplies, behaves as a resistance of low value. Smoothing by speaker field winding and dry electrolytic condensers **C18, C19.**

Valve-heaters are connected in series, together with scale lamp and voltage regulating barretter lamp (**Philips C1**), across mains supply. Chokes **L17, L18** and condenser **C21,** together form filter for suppression of mains-borne interference.

COMPONENTS AND VALUES

	Condensers	Values (μF)
C1	V1 cont. grid decoupling ..	0·02
C2	V1 A.V.C. line decoupling ..	0·1
C3	Main A.V.C. line decoupling ..	0·02
C4	V1 S.G. by-pass	0·1
C5	V1 cathode by-pass	0·1
C6	V2 cathode by-pass	0·1
C7	V2 osc. grid condenser ..	0·001
C8	V3 grid condenser	0·0001
C9	V2 S.G.'s and osc. anode decoupling	0·1
C10	V3 S.G. by-pass	0·1
C11*	V3 anode decoupling	2·0
C12	V3 anode I.F. by-passes	0·0002
C13	V3 anode I.F. by-passes	0·0002
C14	L.F. coupling to V4	0·001
C15	Coupling to Westector (MR2)	0·0005
C16	Tone compensator	0·002
C17*	V4 cathode by-pass	50·0
C18*	H.T. smoothing ..	8·0
C19*	H.T. smoothing ..	16·0
C20	V5 anode-cathode by-pass ..	0·01
C21	Part of mains filter	0·01
C22‡	Frame aerial L.W. trimmer ..	—
C23†	Frame aerial tuning	—
C24‡	Frame aerial main trimmer ..	—
C25†	H.F. transformer tuning ..	—
C26‡	H.F. transformer trimmer ..	—
C27†	Oscillator tuning	—
C28‡	Oscillator main trimmer ..	—
C29‡	Oscillator L.W. tracker ..	—
C30‡	Oscillator M.W. tracker ..	—
C31‡	I.F. trans pri. tuning	—
C32‡	I.F. trans. sec. tuning	—
C33	Oscillator L.W. trimmer ..	Very low

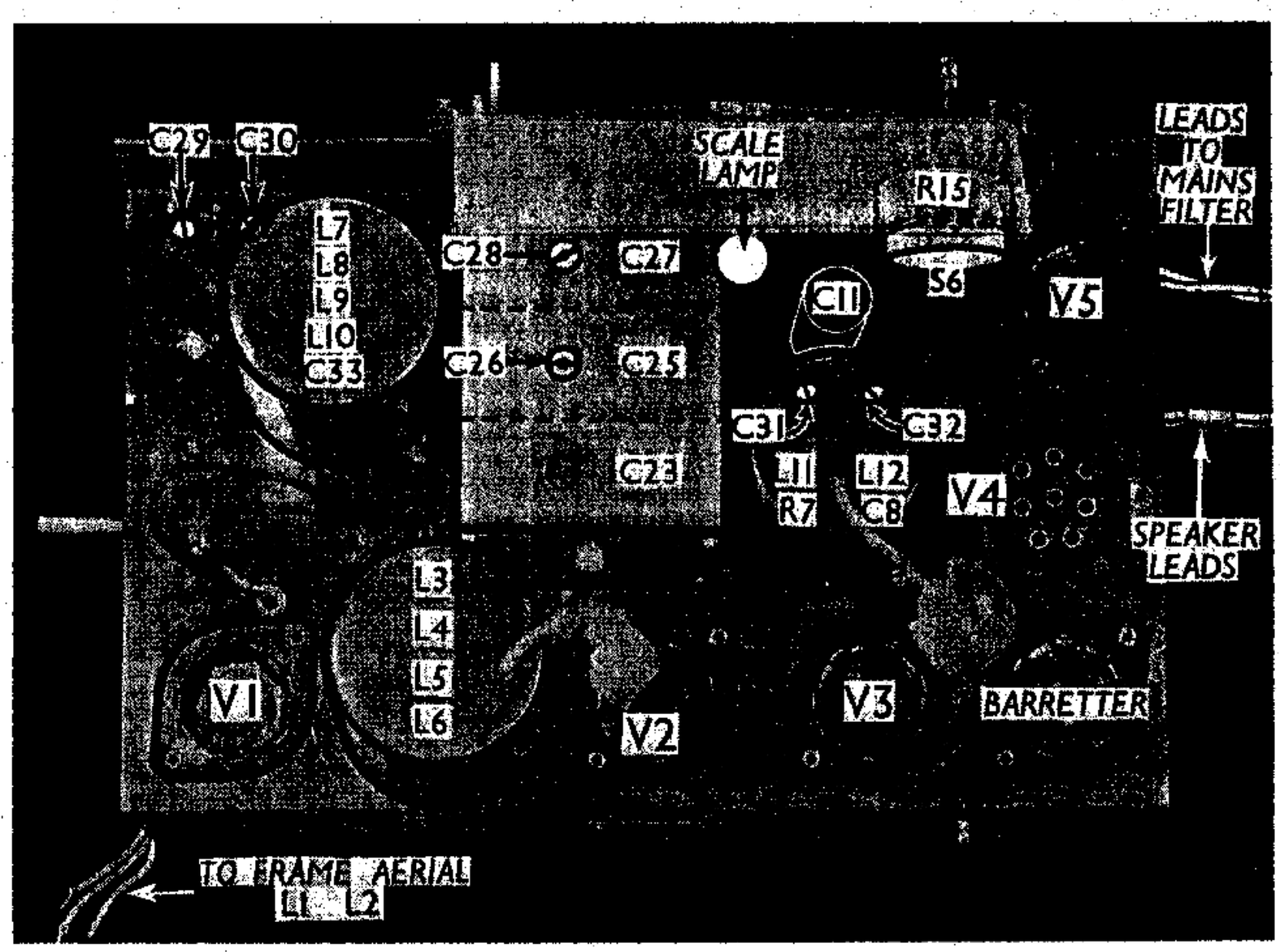
* Electrolytic. † Variable. ‡ Pre-set.



Circuit diagram of the Burndept Model 229 A.C./D.C. transportable receiver. L19 is a coupling coil (in the frame) for an external aerial and earth, and is not shown in the makers' original diagram. The crosses on the connections to the top of L1, the junction of L1, L2, and the lower ends of R1, C1 indicate the connections from chassis to frame.

	Resistances	Values (ohms)
R1	V1 cont. grid decoupling ..	1,000
R2	V1 A.V.C. line decoupling ..	500,000
R3	V1 S.G. H.T. feed	50,000
R4	V1 fixed G.B. resistance ..	400
R5	V2 fixed G.B. resistance ..	250
R6	V2 osc. grid resistance ..	50,000
R7	V3 grid leak	500,000
R8	V2 S.G.'s and osc. anode H.T. feed	20,000
R9	A.V.C. line decoupling ..	1,000,000
R10	V3 S.G. H.T. feed	1,000,000
R11	V3 anode decoupling	50,000
R12	V3 anode load	250,000
R13	I.F. stopper	15,000
R14	Westector load resistance ..	100,000
R15	Manual volume control ..	500,000
R16	V4 grid I.F. stopper	100,000
R17	V4 G.B. resistance	150

	Other Components		Values (ohms)
L1	Frame aerial windings		0·85
L2			5·5
L3	H.F. transformer primary		4·25
L4			2·75
L5	H.F. transformer secondary		5·0
L6			9·0
L7	Oscillator grid tuning coils		4·5
L8			6·5
L9	Oscillator anode coils ..		1·0
L10			4·0
L11	I.F. transformer ..	Pri.	27·0
L12		Sec.	27·0
L13	V3 anode I.F. choke		185·0
L14	Speaker speech coil		2·3
L15	Hum neutralising coil		0·1
L16	Speaker field winding ..		820·0
L17	Main filter chokes ..		5·8
L18			5·8
L19	Ext. aerial-earth coupling ..		Very low
T1	Speaker input trans. ..	Pri.	725·0
		Sec.	0·5
S1-S5	Waveband switches		—
S6	Mains switch, ganged R15 ..		—



Plan view of the chassis. Note the trackers C29, C30. The trimmer of C23 is inside the frame aerial. The I.F. transformer, L11, L12, contains also the trimmers C31, C32, and R7, C8.

DISMANTLING THE SET

Removing Chassis.—To remove the chassis, remove the two control knobs on the front (recessed grub screws) and the wave-change switch knob at the side (recessed grub screw) and the escutcheon (three wood screws). Remove the nuts and lock washers from the two bolts holding the front of the chassis to the sub-baffle, and the two round-head screws (with washers) holding the back of the chassis to the shelf, the heads being under the shelf. Remove the ventilator, grille and escutcheon from the top of the cabinet (three counter-sunk-head screws), taking care not to lose the asbestos twine on the ventilator.

Unsolder the leads to the frame, mains filter and speaker. The chassis can now

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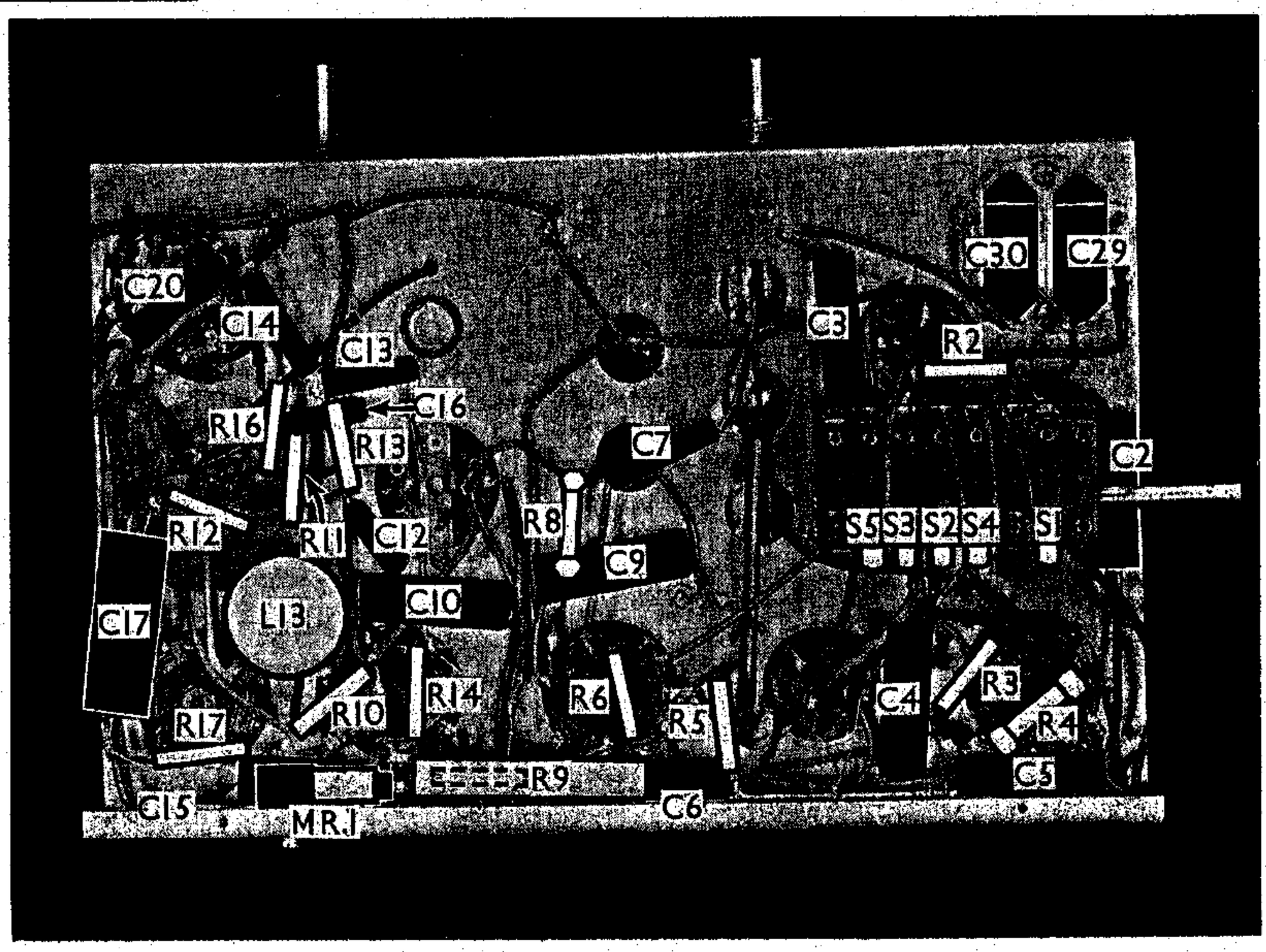

Under-chassis view. One of the switches in the unit on the right is blank. R9 is inside a piece of sleeving. MR1 is the Westector for A.V.C. C29 and C30 are adjusted through holes in the chassis deck.

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be withdrawn. If it is desired to carry out tests when the receiver is operating, the leads to the mains filter and speaker must be replaced and the frame connected by extending the leads.

When replacing the chassis do not forget the metal strip which is placed between the chassis and the shelf, and also note that the leads to the frame go straight across to the nearest tag.

The code for the speaker leads and also the point to which the mains filter leads should be connected are indicated in one of our illustrations. The yellow lead from the electrolytic condenser goes to the F tag on the speaker terminal panel which is joined to the red lead from the chassis, while the red lead from the condenser goes to tags 1 and F, which are joined together. The black lead from the condenser goes to the speaker frame.

Removing Speaker.—The speaker can be removed by taking off the nuts and lock washers from the four bolts holding it to the sub-baffle.

Removing Frame Aerial.—If it is necessary to remove the frame aerial, remove the four countersunk-head wood screws and unsolder the leads on the external aerial and earth sockets.

VALVE ANALYSIS

Readings of valve voltages and currents given in the table below were measured with the receiver operating on 220 V A.C. mains and with no signal input—that is to say, with the leads to the frame shorted together. The volume control was at maximum and the set was tuned to the minimum on the M.W. band. Voltages were measured on the 1,200 V scale of an Avometer, with chassis as negative.

Valve	Anode Volts	Anode Current (mA)	Screen Volts	Screen Current (mA)
V1 VP13A	170	4·5	90	1·4
V2 FC13*..	170	0·6	65	3·9
V3 SP13 ..	25	0·4	20	0·15
V4 Pen36C	150	36·0	175	8·2
V5 UR1†	—	—	—	—

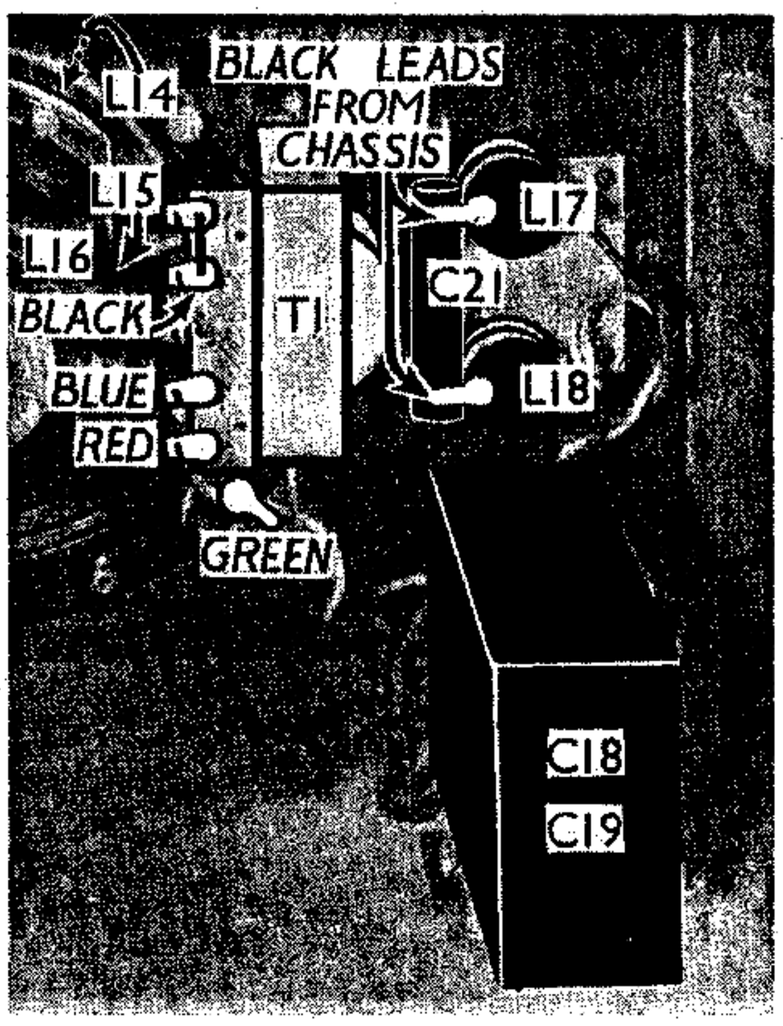
* Osc. anode (G2) 65 V, 1·5 mA.
† 225 V, cathode to chassis.

GENERAL NOTES

Switches.—**S1** to **S5** are the waveband switches, in one unit, the spindle of which projects from one side of the chassis. All the switches are *closed* on the M.W. band, and *open* on the L.W. band. Note that one set of contacts, between **S1** and **S4**, is not used. The switch is shorted out, and earthed.

S6 is the mains switch, ganged with the volume control **R15.**

Coils.—**L1** and **L2** are the frame aerial windings, contained inside the hinged back of the cabinet. The larger (outer) winding is **L1**, while the inner one is **L2.** One end of each is common, and goes to the centre of the three tags, to which the leads to the chassis connect. Coils **L3-L6** and **L7-L10** are in two screened units on the chassis deck.



This shows the components fixed inside the cabinet, and the coding for the speaker and filter lead connections.

The second of these also contains **C33,** a fixed trimmer of low capacity, formed by a winding of wire over a short length of insulated wire.

The third screened unit on the chassis deck is the single I.F. transformer **L11, L12,** containing also the trimmers **C31, C32** and **R7** and **C8.**

L13 is a screened I.F. choke, mounted beneath the chassis.

L19 (which may not occur in early chassis), is the external aerial-earth coupling coil, consisting of about two turns of wire wound between **L1** and **L2.**

Trimmers C22, C24.—The frame aerial L.W. and main trimmers are inside the frame aerial unit itself. **C24** is towards the edge of the frame, and is adjustable through a hole in the cabinet back. **C22** is nearer the centre of the frame, and can only be adjusted by first removing the frame.

Condenser C1, Resistance R1.—These are in parallel, and are mounted inside the frame. **C1** is a tubular condenser.

Scale Lamp.—This is an Osram M.E.S. type, rated at 6.5 V, 0.3 A.

Components at Base of Cabinet.—Apart from the speaker and its transformer (**T1**), **C18, C19, C21, L17** and **L18** are mounted inside the cabinet. These are shown in a separate illustration, together with the coding of the leads from the chassis.

C18 and **C19** are two dry electrolytics in a single unit. The black lead is the common negative, the yellow the positive of **C18** (8μF), and the red the positive of **C19** (16μF).

Valve-holder Tags.—Note that in some cases tags normally blank are used as bearers for other wiring, particularly in the case of **V4** and **V5.**

RECEIVER ALIGNMENT

Remove chassis from cabinet, leave frame disconnected, but connect a 0.25 MO resistance across the two outer frame leads on chassis. Connect a 0.25 MO resistance from top cap of **V2** to chassis, leaving normal top cap connector off. Connect signal generator across this latter resistance. Switch set to L.W. and tune to bottom of L.W. band. Switch set on, volume control at maximum. Set generator to 130 KC/S, switch on, and keep input low. Adjust **C31** and **C32** for maximum output. Remove 0.25 MO resistance from top cap of **V2** to chassis, and replace normal connector.

Turn gang condenser to minimum and adjust pointer to coincide with spot at lower end of scale. Set receiver to 200 m., switch to M.W., and inject 200 m. signal across 0.25 MO resistance across frame leads. Keep input low, and receiver volume control at maximum.

Adjust **C28,** then **C26,** for maximum output. Reduce input progressively as receiver comes into alignment.

Inject 500 m. signal, adjust receiver to 500 m. on scale and adjust **C30** for maximum output, rocking tuning knob slightly for optimum results.

Go back to 200 m., re-check, then re-check at 500 m. and so on until receiver is aligned at both settings.

Switch set to L.W. and tune to 2,000 m. on scale. Inject 2,000 m. signal, and adjust **C29** for maximum output. Rock gang condenser for optimum output, and re-adjust **C29.** Pointer should not be far from 2,000 m. mark when maximum output is obtained.

Remove 0.25 MO resistance, replace chassis, re-connect all leads. Leave output meter connected, but close back of cabinet as far as possible. Connect signal generator to external A.E. sockets, or to 20-60 turn coil placed close to back of set. Switch receiver to M.W., tune to 200 m., adjust generator to 200 m. Adjust **C24** (through hole in back of cabinet) for maximum output.