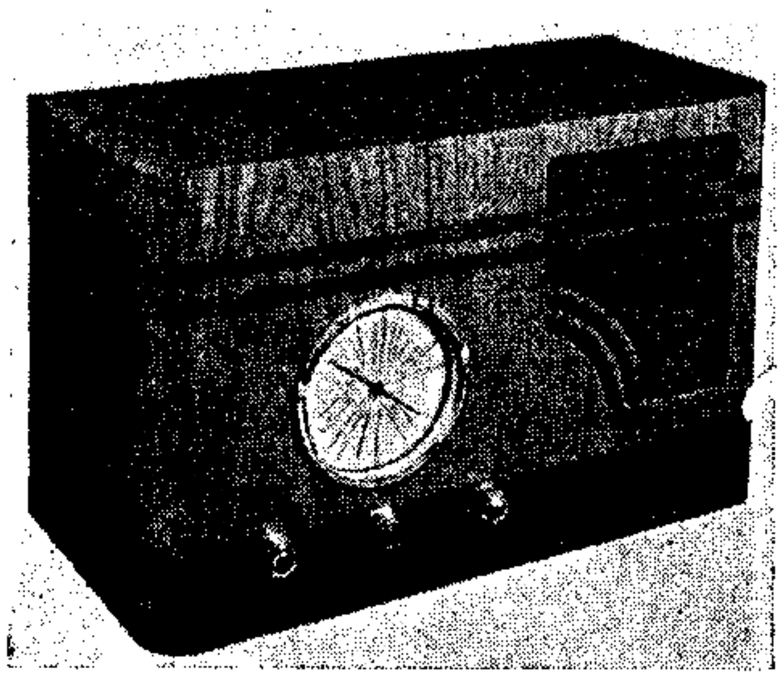
REVISED ISSUE OF

SERVICE - SHEET No. 65

BURGOYNE 'FURY STAR'

AC/DC RECEIVER and RADIOGRAMS



The 'Fury Star' table receiver.

THE Burgoyne "Fury Star" receiver is a 3-valve (plus rectifier) 2-band TRF model designed to operate from AC or DC mains of 200-250 V, 25-100 c/s in the case of AC.

The same chassis is fitted in a table radiogram and a pedestal radiogram, but this *Service Sheet* was prepared from the table receiver. There is also a pedestal radiogram which bears the same name as the foregoing, but which is designed for AC mains only, and care should be taken not to confuse it with the AC/DC models.

Release date and original prices: 1935 (*all models*); *table receiver*, £7 17s. 6d.; *table radiogram*, £11 11s.; *pedestal radiogram*, £15 15s.

CIRCUIT DESCRIPTION

Two alternative aerial input sockets, **A1, A2.** Input from **A2** is via **S1** (MW) or **L2** (LW), **C1** and coupling coil **L3** to single tuned circuit **L4, L5, C19** which precedes a variable-mu RF pentode valve **(V1, Mullard metallised VP13A),** operating as signal frequency amplifier, with gain control by variable resistor **R4,** which forms part of the potential divider **R1, R2, R4** and varies GB applied to **V1.**

Aerial socket **A1** is provided for use where interference is experienced from Droitwich. Input from **A1** is via rejector circuit **L1, C18** to socket **A2.**

Tuned-secondary RF transformer coupling by **L6, L9** (MW), plus **L7, L10** (LW), tuned by **C22,** between **V1** and RF pentode valve **(V2, Mullard metallised SP13),** which operates as detector on the grid leak system with **C6** and **R5.** Reaction is applied from anode via coupling coil **L8,** and controlled by variable condenser **C21.** RF filtering in anode circuit by air-cored choke **L11** and condenser **C10.**

Provision for connection of a gramophone pick-up, via switch **S6,** and isolating condenser **C7,** in control grid circuit, and when the receiver is switched to gram, **S2** closes, short-circuiting the aerial input and muting radio.

Resistance-capacity coupling by **R8, C11** and **R10,** via further RF filter circuit **R9, C12,** between **V2** and pentode output valve **(V3, Mullard Pen 36C** or **Mazda Pen 3520).** Fixed tone correction by **C14.**

When the receiver is operating from AC mains, HT current is supplied by IHC half-wave rectifying valve **(V4, Brimar 1D5)** which, with DC mains, behaves as a low resistance. Smoothing by speaker field **L14** and condensers **C15, C16.**

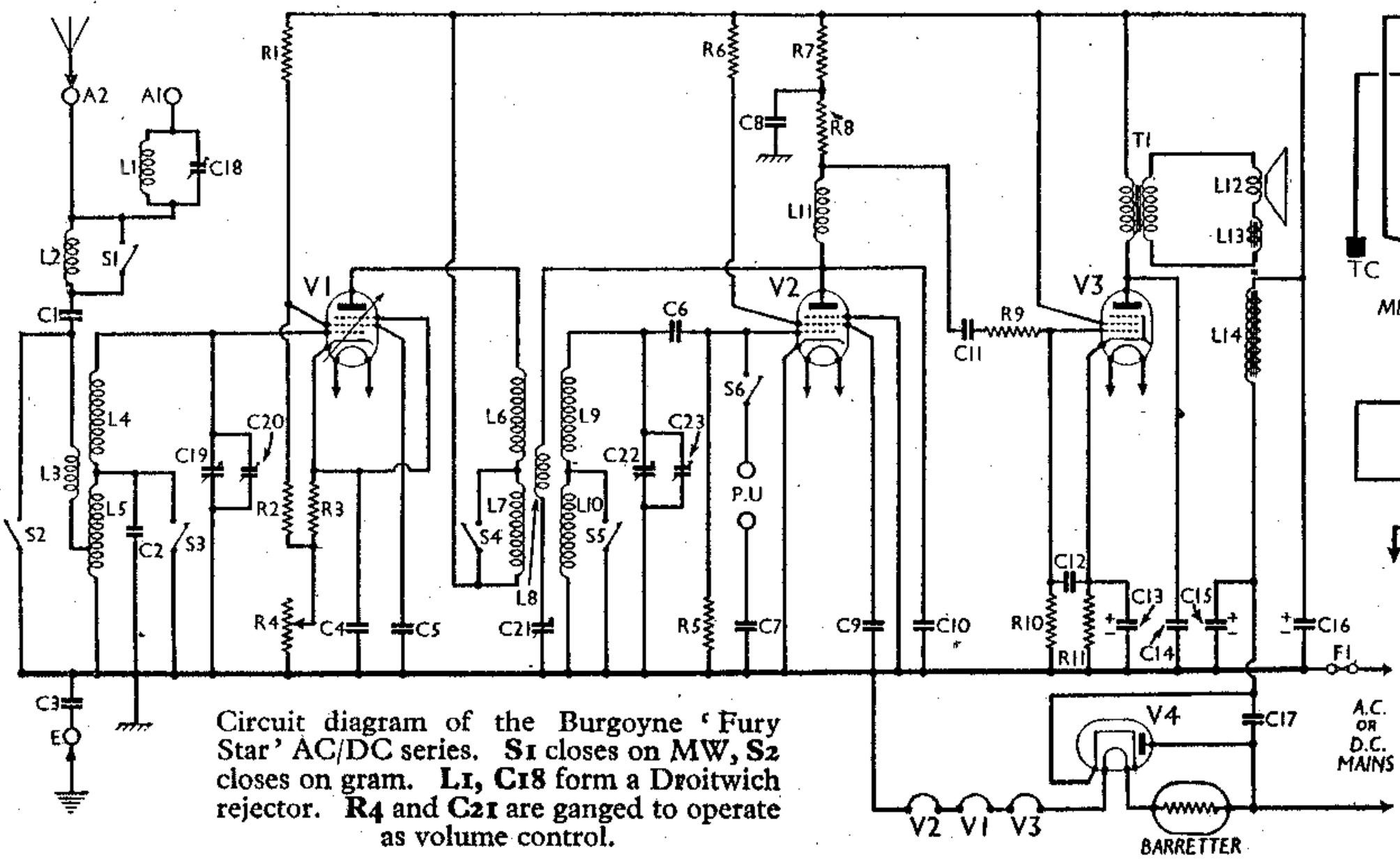
Valve heaters, together with current regulating resistor **(Barretter, Philips C1),** are connected in series across the mains input circuit.

COMPONENTS AND VALUES

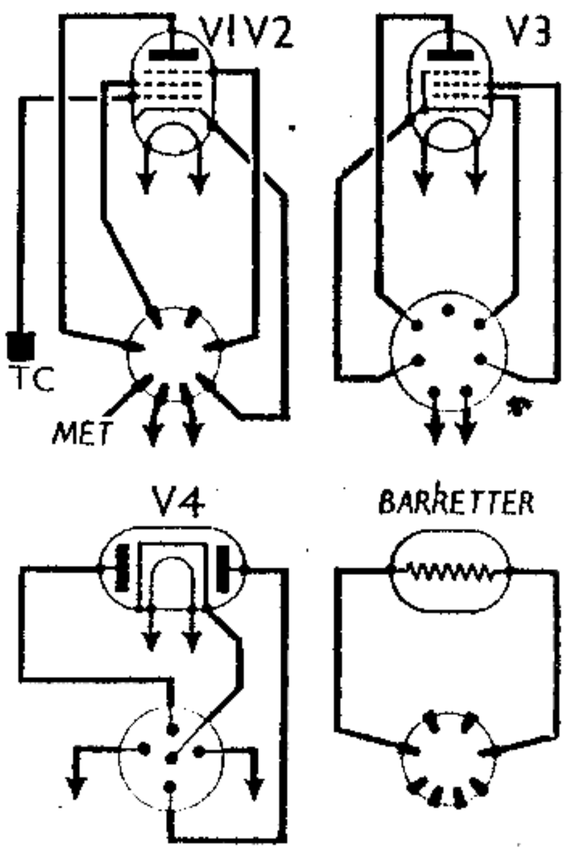
	CONDENSERS	Values (μF)
C1	Aerial series condenser ...	0·0001
C2	Aerial LW trimmer ...	Very low
C3	Earth isolating condenser	0·1
C4	V1 cathode by-pass ...	0·1
C5	V1 SG decoupling ...	0·1
C6	V2 CG condenser ...	0·0001
C7	PU isolating condenser ...	0·1
C8	V2 anode decoupling ...	0·1
C9	V2 SG decoupling ...	0·1
C10	RF by-pass	0·0005
C11	AF coupling to V3 ...	0·01
C12	RF by-pass	0·001
C13*	V3 cathode by-pass ...	50·0
C14	Fixed tone corrector ...	0·005
C15*	HT smoothing condensers	8·0
C16*	HT smoothing condensers	12·0
C17	Mains RF by-pass ...	0·1
C18‡	Droitwich rejector tuning	0·0002
C19†	Aerial tuning condenser...	0·0005
C20‡	Aerial MW trimmer ...	—
C21†	Reaction control	0·0005
C22†	RF trans. sec. tuning ...	0·0005
C23‡	RF trans. MW trimmer ...	—

* Electrolytic. † Variable. ‡ Preset.

	RESISTORS	Values (ohms)
R1	V1 SG HT feed potential divider	10,000
R2	V1 SG HT feed potential divider	30,000
R3	V1 fixed GB resistor ...	400
R4	V1 gain control	5,000
R5	V2 grid leak	500,000
R6	V2 SG HT feed	1,000,000
R7	V2 anode decoupling ...	10,000
R8	V2 anode load	100,000
R9	RF stopper	50,000
R10	V3 CG resistor	250,000
R11	V3 GB resistor	160



Circuit diagram of the Burgoyne 'Fury Star' AC/DC series. **S1** closes on MW, **S2** closes on gram. **L1, C18** form a Droitwich rejector. **R4** and **C21** are ganged to operate as volume control.



Above are the base connections of the four valves and the barretter tube, viewed from the free ends of the pins.

	OTHER COMPONENTS		Approx. Values (ohms)
L1	Droitwich rejector coil	...	31·0
L2	Aerial choke coil	...	20·0
L3	Aerial coupling coil	...	2·5
L4	Aerial tuning coils	...	4·6
L5			20·0
L6	RF trans. pri. coils	...	2·9
L7			8·6
L8	Reaction coil	...	1·6
L9	RF trans. sec. coils	...	4·6
L10			20·0
L11	V2 anode RF choke	...	290·0
L12	Speaker speech coil	...	2·5
L13	Hum neutralising coil	...	0·1
L14	Speaker field coil	...	2,000·0
T1	Speaker input trans. Pri.	...	500·0
	Speaker input trans. Sec.	...	0·4
S1-S5	Waveband switches	...	—
S6	Gram pick-up switch	...	—
F1	Mains circuit fuse	...	—

DISMANTLING THE SET

Removing Chassis.—Remove the three control knobs (recessed grub screws);
remove the threaded bush from the waveband switch spindle.
remove the three round-head wood screws holding the flange at the rear of the chassis to the bottom of the cabinet.
The chassis may now be withdrawn to the extent of the speaker leads, which is sufficient for normal purposes.
To free chassis entirely, free the speaker leads from the cleat at the top of the cabinet, and unsolder them from the tags on the speaker transformer.
When replacing, connect the leads as follows, numbering the tags from left to right, as seen from the rear:
F and 3, joined together, blue/white;
1, grey;
2, no external connection;
F, green/white.
The green earthing lead goes to the speaker frame.
Some care must be taken in positioning the switch knob correctly, as its spindle is not slotted.
Removing Speaker.—Remove the nuts from the four bolts holding the speaker to the sub-baffle.
When replacing, the transformer should be at the top, and the leads should be connected as described above.

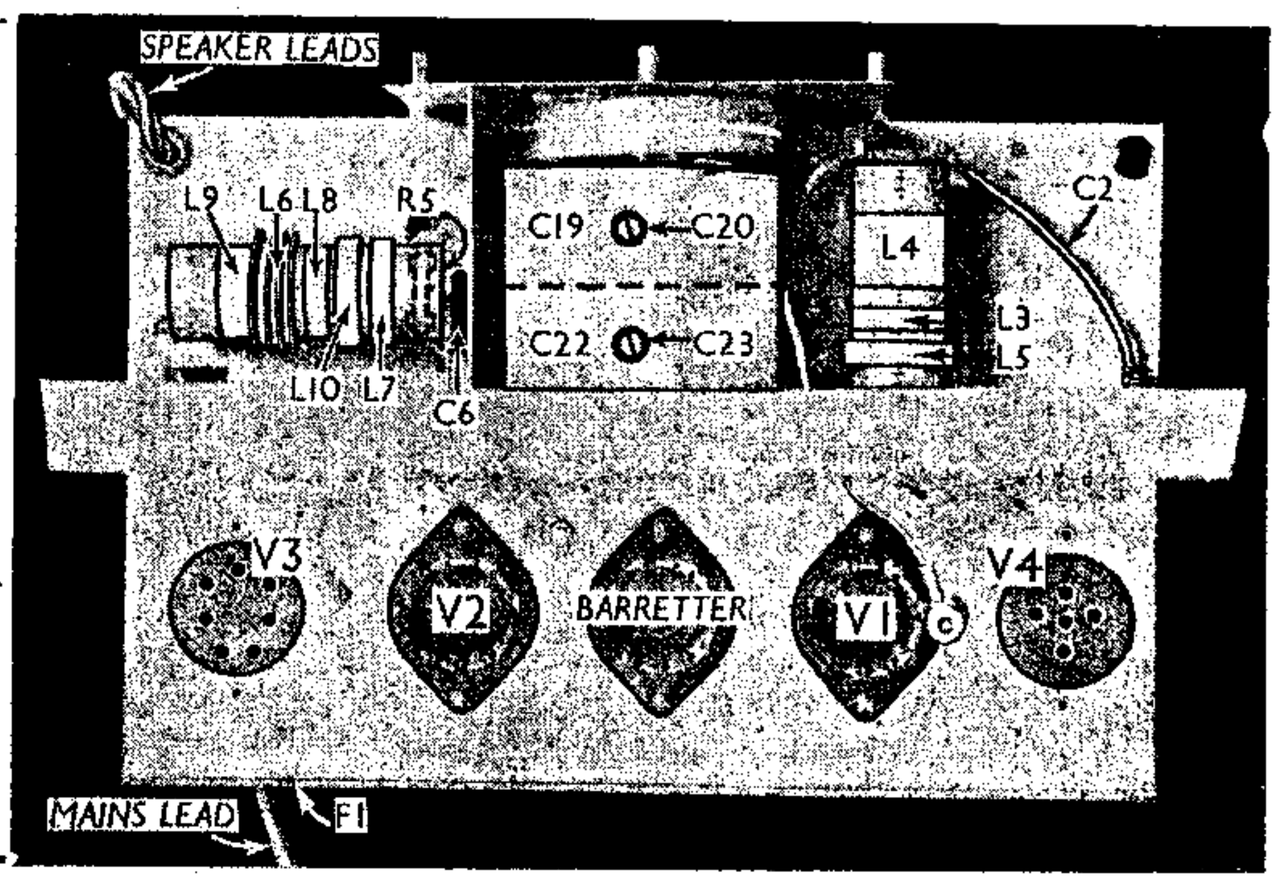
GENERAL NOTES

Switches.—S1-S6 are the waveband and gramophone switches, in spring-leaf unit beneath the chassis. This is indicated in our under-chassis view, where the individual switches are identified. The leaves of **S2** and **S6** are wholly visible there, but those of **S1, S3, S4, S5,** which are on the side facing the chassis deck, are almost obscured by those in the outer layer. The table below gives the switch positions for the three control settings; a dash indicates open, and **C,** closed.

No mains circuit switch is fitted.

Switch	MW	LW	Gram
S1	C	—	—
S2	—	—	C
S3	C	—	—
S4	C	—	—
S5	C	—	—
S6	—	—	C

Coils.—The aerial series coils **L1, L2,** and the RF choke **L11,** are fitted beneath the chassis. The aerial tuning and RF transformer coils **L3-L5** and **L6-L10** are in two unscreened units on the chassis deck. Resistor **R5** is fitted inside the **L6-L10** former.



Plan view of the chassis. **R5** is inside the **L6-L10** coil unit. **C2** is a small condenser formed by the capacity between the conductor of a lead and its braiding.

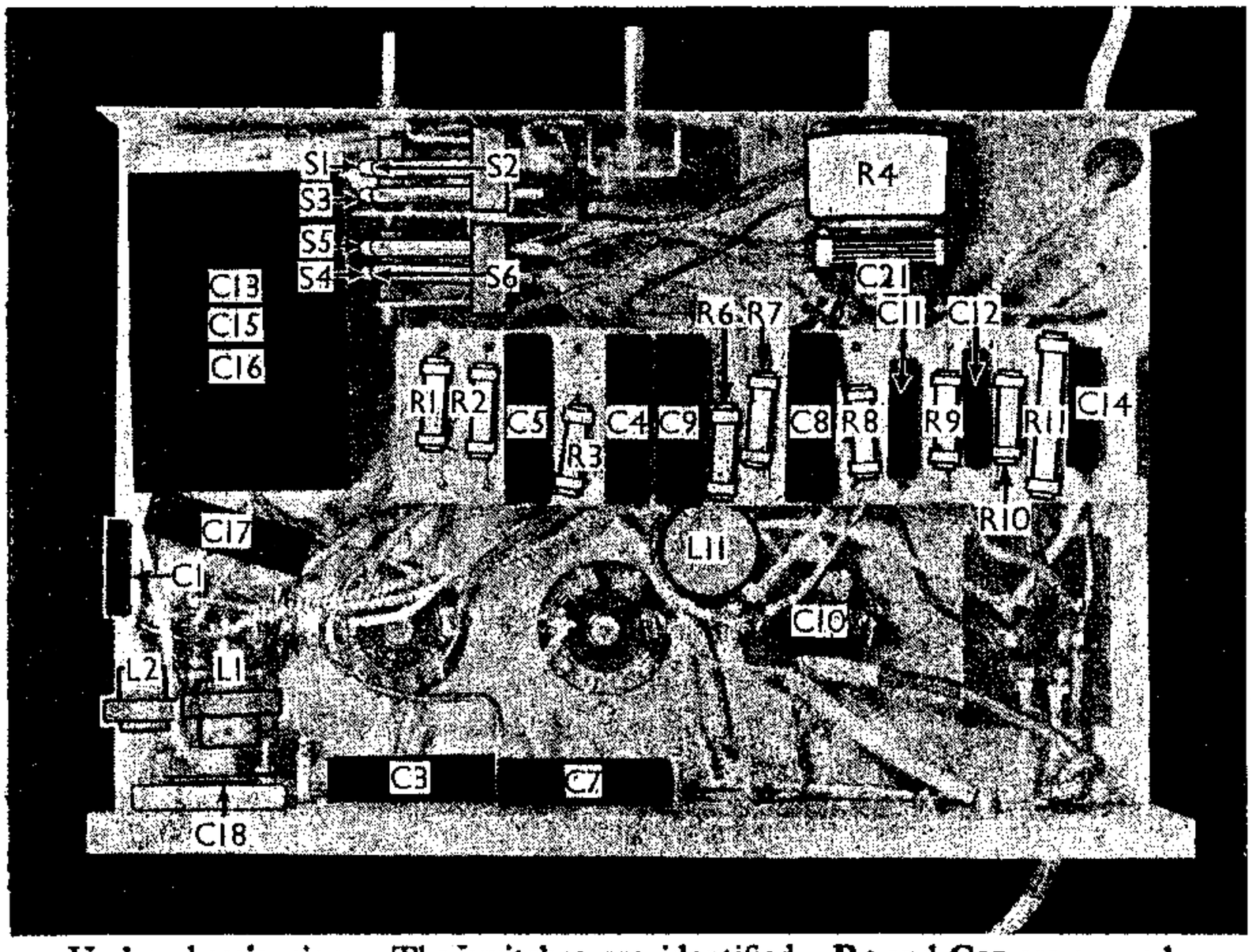
Condenser C2.—This is a very small fixed condenser formed by the capacity between a rubber-covered lead and its metallic braiding.

External Speaker.—No provision is made for this, although a high impedance speaker of about 4,500Ω could be connected across the primary winding of **T1** via isolating condensers, which should be inserted in the leads before they emerge from the cabinet. A low-impedance speaker of about 3-5 Ω could be connected across **T1** secondary, but the insulation of this transformer may not be safe at mains voltages.

Fuse.—This is reached by taking off a paxolin cover plate at the rear of the chassis (2 screws). The fuse itself is a length of 1A fuse wire gripped under two screws.

Condensers C13, C15, C16.—These are three dry electrolytics in a single unit. They have a common negative (black) lead. The green lead is the positive of **C13** (50μF), the yellow the positive of **C15** (8μF) and the red the positive of **C16** (12μF).

Chassis Divergencies.—In late chassis, **C10** may be 0.0003μF, and **C17** 0.01μF, instead of 0.0005μF and 0.1μF respectively. Also, **L1** may be centre-tapped.



Under-chassis view. The switches are identified. **R4** and **C21** are ganged.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating on AC mains of 225 V. The reaction control was turned to a point at which the vanes were just out of mesh, and there was no signal input.

Voltages were measured on the 1,200 V scale of an Avometer, chassis being the negative connection.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 VP13A	160	4·2	115	0·8
V2 SP13	75	0·5	20	0·1
V3 Pen 36C	140	34·5	160	7·4
V4 1D5	265†	—	—	—

† Cathode to chassis, DC.

CIRCUIT ALIGNMENT

Correct signal generator via a suitable dimming aerial to **A2** and **E** sockets.

Switch set to MW, turn the gain control to a point that is just short of oscillation. Tune to 200 m on scale, feed in a 200 m (1,500 kc/s) signal, and adjust **C20** and **C23** for maximum output, at the same time rotating the reaction control so that it is maintained at a point just short of oscillation.

Check calibration at 300 m (1,000 kc/s) and 500 m (600 kc/s) on the MW band, and at several points on the LW band.

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