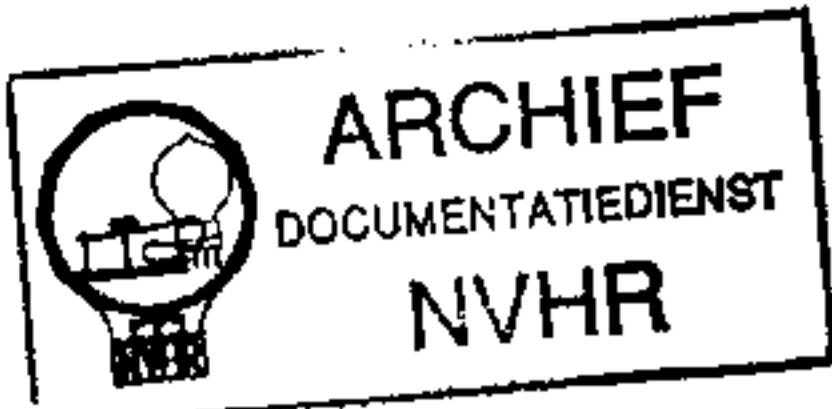


Ned. Ver. v. Historie v/d Radio



BURNDEPT 267

4-BAND A.C. SUPERHET

TWO short-wave bands of 13.5-51 metres (referred to below as S.W.1) and 50-180 metres (S.W.2) are covered by the Burndept 267 receiver, in addition to the usual medium and long waves. The chassis is a 4-valve (plus rectifier) A.C. superhet type suitable for mains of 200-260 V, 50-100 C/S, and has provision for both a gramophone pick-up and an extension speaker.

CIRCUIT DESCRIPTION

Aerial input via coupling coils **L1** (S.W.1), **L3** (S.W.2), **L5** (M.W.) and **L7** (L.W.) to single-tuned circuits **L2**, **C26** (S.W.1), **L4**, **C26** (S.W.2), **L6**, **C26** (M.W.) and **L8**, **C26** (L.W.).

First valve (**V1**, Mazda metallised AC/TH1) is a triode-hexode operating as a frequency changer with internal coupling. Oscillator anode coils **L10** (S.W.1), **L12** (S.W.2), **L14** (M.W.) and **L16** (L.W.) are tuned by **C34**; parallel trimming by **C30** (S.W.1), **C31** (S.W.2), **C32** (M.W.) and **C7**, **C33** (L.W.); series tracking by **C6** (S.W.1), **C27** (S.W.2), **C28** (M.W.) and **C29** (L.W.); oscillator grid reaction

double diode valve (**V3**, Mullard metallised 2D4A). Audio-frequency component in rectified output is developed across load resistance **R13** and passed via I.F. stopper **R12**, coupling condenser **C14** and manual volume control **R15** to C.G. of pentode output valve (**V4**, Mullard Pen A4). Fixed tone correction in anode circuit by **C16**. Provision for connection of high impedance external speaker across primary of **T1**.

Second diode of **V3**, fed from **V2** anode via **C13**, provides D.C. potential which is developed across load resistance **R14** and fed back through decoupling circuits as G.B. to F.C. and I.F. valves, giving automatic volume control. Delay voltage is obtained from drop along **R16**, **R17**.

H.T. current is provided by full-wave I.H.C. rectifying valve (**V5**, Brimar R2 or R3). Smoothing by speaker field coil **L23** and dry electrolytic condensers **C18**, **C19**. R.F. filtering by by-pass condensers **C17**, **C20**.

DISMANTLING THE SET

A detachable bottom is fitted to the cabinet and upon removal (four counter-

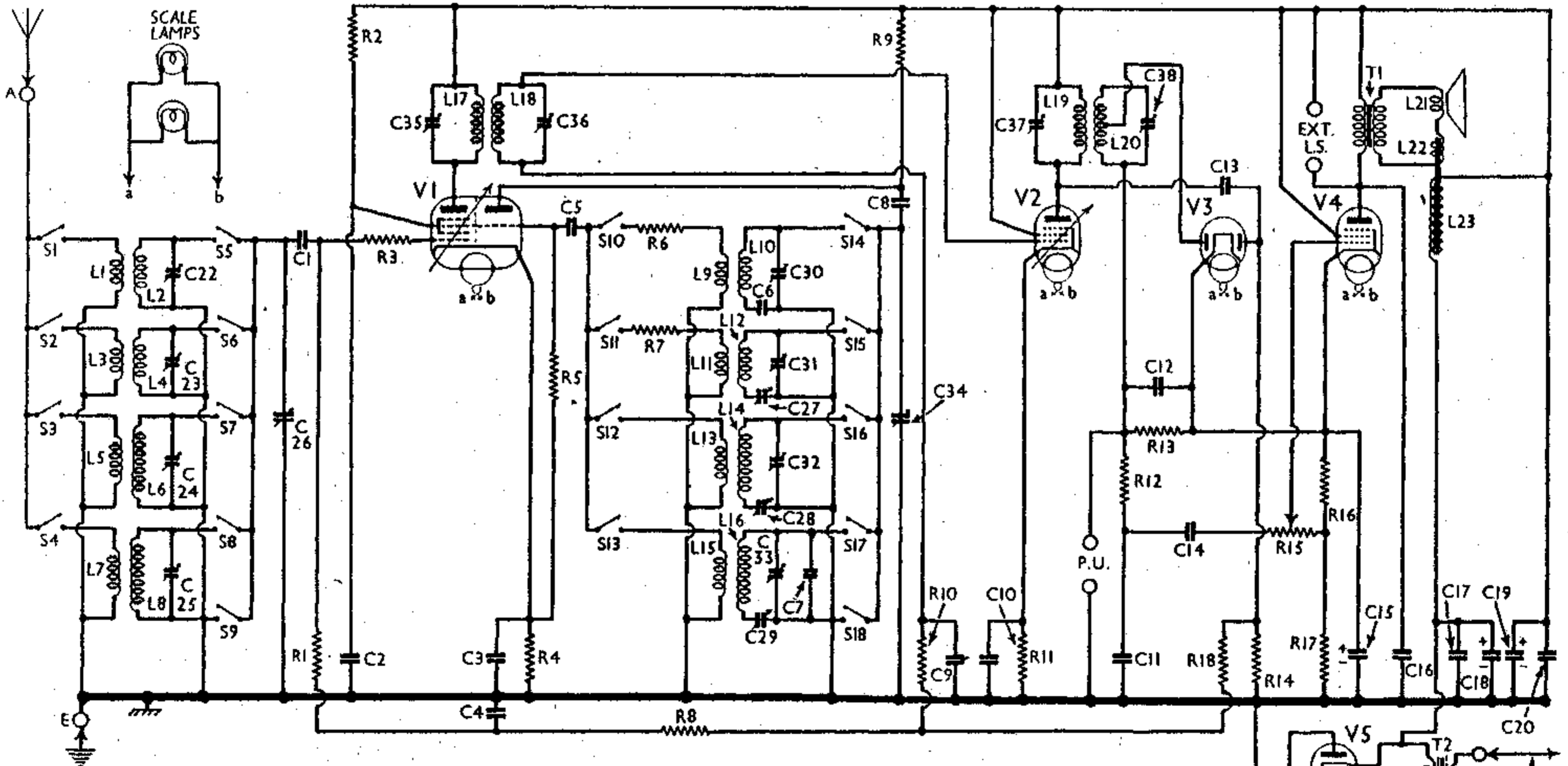
sunk-head wood screws) gives access to most of the under-chassis components.

Removing Chassis.—If it is necessary to remove the chassis from the cabinet, remove the three control knobs (recessed grub screws) and the four bolts (with washers) holding the chassis to the bottom of the cabinet. Now unsolder the speaker leads, when the chassis is free.

When replacing the chassis, connect the speaker leads as follows:—F, red; 3, blue; 1 and F joined together, black. The green lead goes to the earthing tag.

Removing Speaker.—To remove the speaker from the cabinet, unsolder the leads and remove the nuts (with lock washers) from the four screws holding it to the sub-baffle.

When replacing, see that the transformer is on the right and do not forget to fix the earthing tag on the bottom right-hand screw. Connect the leads from the chassis as above and take the red lead from the electrolytic block to tags F and 1 (which are joined together), the yellow lead to the other F tag, and the black lead to the earthing tag on one of the speaker fixing screws.



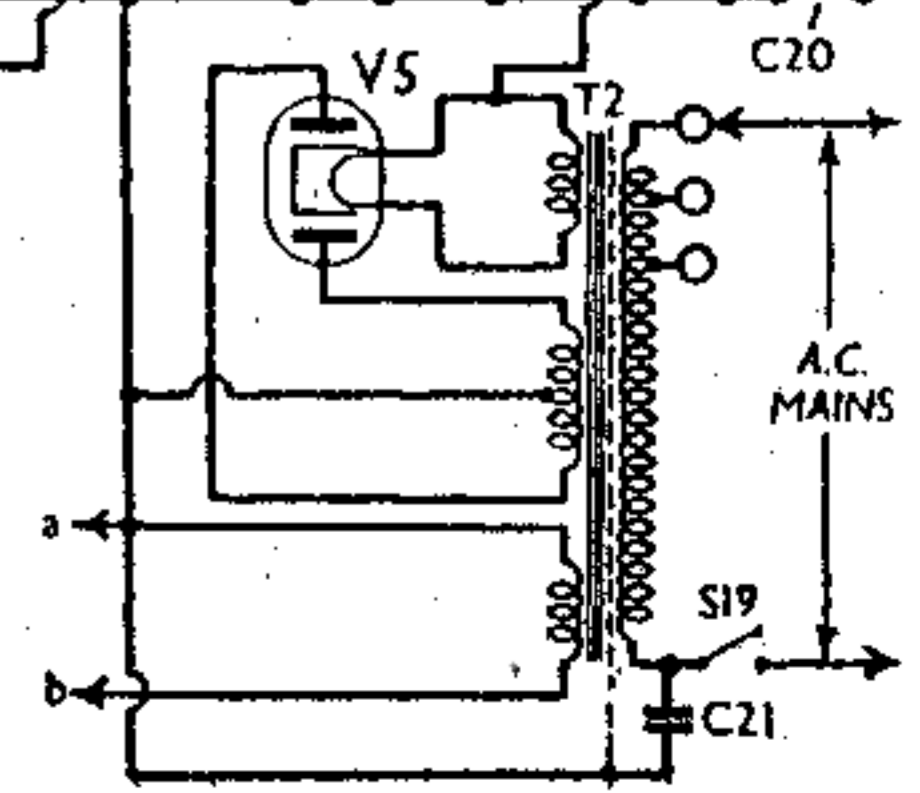
coils **L9** (S.W.1), **L11** (S.W.2), **L13** (M.W.) and **L15** (L.W.).

Single variable-mu pentode intermediate frequency amplifier (**V2**, Mullard metallised VP4B) operates with tuned-primary tuned-secondary transformer couplings **C35**, **L17**, **L18**, **C36** and **C37**, **L19**, **L20**, **C38**.

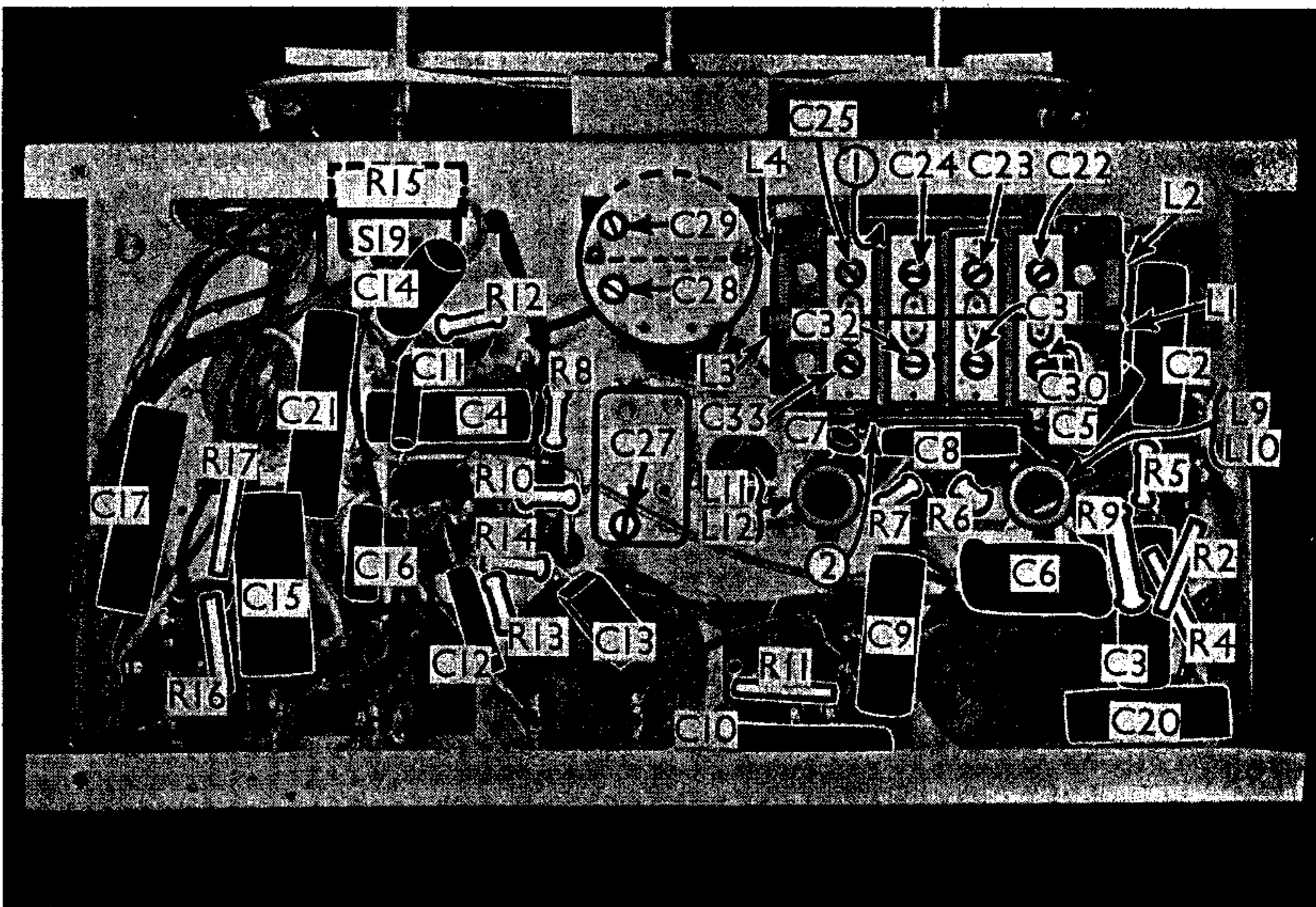
Intermediate frequency 473 KC/S.

Diode second detector is part of separate

Circuit diagram of the Burndept 267 4-band A.C. superhet. The switching arrangements are shown in their simplified form as explained under "General Notes." **R18** was not included in our chassis.



Under-chassis view. Note the neat arrangement of the various trimmers. The coils for the S.W.1 and S.W.2 bands are on tubular formers. The two switch units are indicated by numbers in circles and arrows.



COMPONENTS AND VALUES

| RESISTANCES | | Values (ohms) |
|-------------|-----------------------------------|---------------|
| R1 | V1 hexode C.G. decoupling .. | 500,000 |
| R2 | V1 S.G. H.T. feed .. | 20,000 |
| R3 | V1 hexode C.G. resistance .. | 50 |
| R4 | V1 fixed G.B. resistance .. | 200 |
| R5 | V1 osc. C.G. resistance .. | 50,000 |
| R6 | Osc. circuit S.W.1 stabiliser .. | 50 |
| R7 | Osc. circuit S.W.2 stabiliser .. | 500 |
| R8 | V1 A.V.C. line decoupling .. | 500,000 |
| R9 | V1 osc. anode decoupling .. | 30,000 |
| R10 | V2 C.G. decoupling .. | 500,000 |
| R11 | V2 fixed G.B. resistance .. | 200 |
| R12 | I.F. filter resistance .. | 10,000 |
| R13 | V3 signal diode load .. | 500,000 |
| R14 | V3 A.V.C. diode load .. | 1,000,000 |
| R15 | Manual volume control .. | 500,000 |
| R16 | V3, V4 G.B. pot., A.V.C. .. | 150 |
| R17 | delay .. | 100 |
| R18* | V1, V2, A.V.C. line decoupling .. | 500,000 |

* Not in our chassis.

| CONDENSERS | | Values (μF) |
|------------|------------------------------------|-------------|
| C1 | V1 hexode C.G. condenser .. | 0.0001 |
| C2 | V1 S.G. decoupling .. | 0.1 |
| C3 | V1 cathode by-pass .. | 0.1 |
| C4 | V1 hexode C.G. decoupling .. | 0.1 |
| C5 | V1 osc. C.G. condenser .. | 0.0002 |
| C6 | Osc. S.W.1 fixed tracker .. | 0.005 |
| C7 | Osc. L.W. fixed trimmer .. | 0.00004 |
| C8 | V1 osc. anode coupling .. | 0.0002 |
| C9 | V2 C.G. decoupling .. | 0.1 |
| C10 | V2 cathode by-pass .. | 0.1 |
| C11 | I.F. by-passes .. | 0.0005 |
| C12 | | 0.0001 |
| C13 | V3 A.V.C. diode feed .. | 0.0001 |
| C14 | A.F. coupling to V4 .. | 0.05 |
| C15* | V4 cathode by-pass .. | 25.0 |
| C16 | V4 anode tone corrector .. | 0.005 |
| C17 | V5 cathode R.F. by-pass .. | 0.01 |
| C18* | H.T. smoothing .. | 8.0 |
| C19* | | 16.0 |
| C20 | H.T. line R.F. by-pass .. | 0.1 |
| C21 | Mains R.F. by-pass .. | 0.01 |
| C22† | Aerial circuit S.W.1 trimmer .. | — |
| C23† | Aerial circuit S.W.2 trimmer .. | — |
| C24† | Aerial circuit M.W. trimmer .. | — |
| C25† | Aerial circuit L.W. trimmer .. | — |
| C26† | Aerial circuit tuning condenser .. | — |
| C27† | Osc. circuit S.W.2 tracker .. | — |

| CONDENSERS (Continued) | | Values (μF) |
|------------------------|----------------------------------|-------------|
| C28† | Osc. circuit M.W. tracker .. | — |
| C29† | Osc. circuit L.W. tracker .. | — |
| C30† | Osc. circuit S.W.1 trimmer .. | — |
| C31† | Osc. circuit S.W.2 trimmer .. | — |
| C32† | Osc. circuit M.W. trimmer .. | — |
| C33† | Osc. circuit L.W. trimmer .. | — |
| C34† | Osc. circuit tuning condenser .. | — |
| C35† | 1st I.F. trans. pri. tuning .. | — |
| C36† | 1st I.F. trans. sec. tuning .. | — |
| C37† | 2nd I.F. trans. pri. tuning .. | — |
| C38† | 2nd I.F. trans. sec. tuning .. | — |

* Electrolytic. † Variable. ‡ Pre-set.

| OTHER COMPONENTS | | Approx. Values (ohms) | |
|------------------|---------------------------------|-----------------------|-------|
| L1 | Aerial S.W.1 coupling coil .. | 0.65 | |
| L2 | Aerial S.W.1 tuning coil .. | 0.05 | |
| L3 | Aerial S.W.2 coupling coil .. | 0.45 | |
| L4 | Aerial S.W.2 tuning coil .. | 0.4 | |
| L5 | Aerial M.W. coupling coil .. | 1.1 | |
| L6 | Aerial M.W. tuning coil .. | 2.1 | |
| L7 | Aerial L.W. coupling coil .. | 100.0 | |
| L8 | Aerial L.W. tuning coil .. | 9.0 | |
| L9 | Osc. S.W. 1 grid coil .. | 0.5 | |
| L10 | Osc. anode S.W.1 tuning coil .. | Very low | |
| L11 | Osc. S.W.2 grid coil .. | 40.0 | |
| L12 | Osc. anode S.W.2 tuning coil .. | 0.3 | |
| L13 | Osc. M.W. grid coil .. | 65.0 | |
| L14 | Osc. anode M.W. tuning coil .. | 4.0 | |
| L15 | Osc. L.W. grid coil .. | 1.5 | |
| L16 | Osc. anode L.W. tuning coil .. | 4.6 | |
| L17 | 1st I.F. trans. { Pri. .. | 5.0 | |
| L18 | | Sec. .. | 5.0 |
| L19 | 2nd I.F. trans. { Pri. .. | 5.0 | |
| L20 | | Sec. total .. | 5.0 |
| L21 | Speaker speech coil .. | 1.9 | |
| L22 | Hum neutralising coil .. | 0.1 | |
| L23 | Speaker field coil .. | 2,000.0 | |
| T1 | Speaker input trans. { Pri. .. | 460.0 | |
| | | Sec. .. | 0.3 |
| | Pri. total .. | 22.5 | |
| T2 | Mains trans. { Heater sec. .. | 0.1 | |
| | | Rect. heat. sec. .. | 0.1 |
| | | H.T. sec. total .. | 350.0 |
| S1-S18 | Waveband switches .. | — | |
| S19 | Mains switch, ganged R15 .. | — | |

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating on mains of 235 V, using the 230 V tapping on the mains transformer. The receiver was tuned to the lowest wavelength on the medium band and the volume control was at maximum, but there was no signal input.

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

| Valve | Anode Voltage (V) | Anode Current (mA) | Screen Voltage (V) | Screen Current (mA) |
|-------------|-------------------|--------------------|--------------------|---------------------|
| V1 AC/TH1* | 220 | 3.0 | 100 | 6.0 |
| V2 VP4B .. | 220 | 10.6 | 220 | 3.9 |
| V3 2D4A .. | — | — | — | — |
| V4 PenA4 .. | 205 | 33.0 | 220 | 5.2 |
| V5 R2 .. | 315† | — | — | — |

* Oscillator anode, 80 V, 3.9 mA.
† Each anode, A.C.

GENERAL NOTES

Switches.—The wavechange and gramophone switches S1-S18 are in two ganged rotary units beneath the chassis, indicated in our under-chassis view, and shown in detail in the diagrams on page IV. It will be noted on examining the actual units that each has a large plate on the rotor which shorts together all the switches, except the two in use in each unit. In the radio positions the shorted switches are also earthed. On gram. the tuned input circuit and the tuned oscillator anode circuit are earthed for radio muting purposes.

The makers' diagram shows the two contacts which are marked blank (B) in our diagrams connected to chassis.

Continued overleaf

BURNDIPT 267—Continued

This modification would add two switches which would earth the aerial coupling and oscillator grid circuits on gram.

In our circuit and switch diagrams we have omitted the switches formed by the centre plates for the sake of clarity. If they were included the total number of wavechange and gramophone switches would rise from eighteen to thirty-six.

The table below gives the switch positions for the five control settings, starting from fully anti-clockwise. O indicates open, and C closed.

S19 is the Q.M.B. mains switch, ganged with the volume control, **R15**.

Coils.—**L1, L2; L3, L4; L9, L10** and **L11, L12** are on four tubular un-screened units beneath the chassis. **L5-L8, L13-L16**, and the I.F. transformers **L17, L18** and **L19, L20** are in four screened units on the chassis deck. **L5-L8** and the I.F. transformers are iron dust-cored.

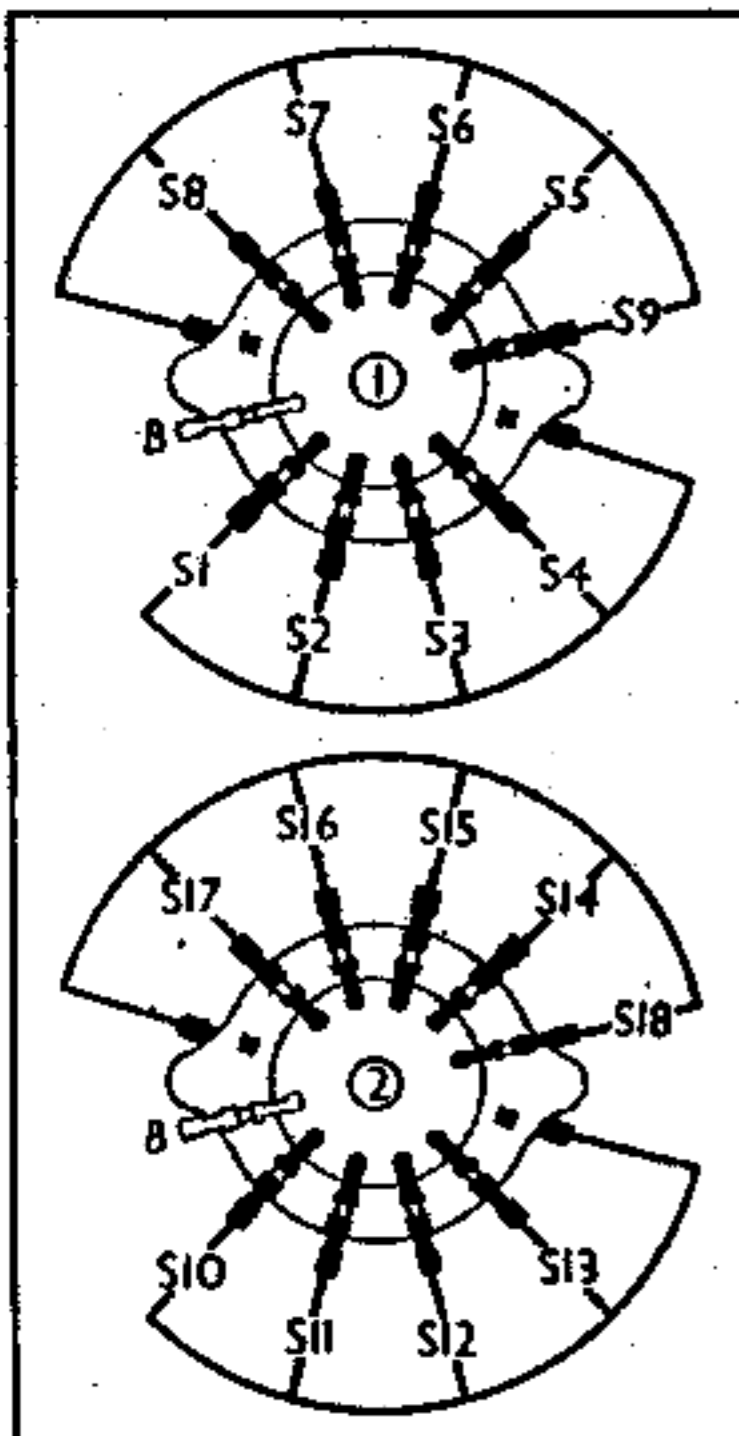
Scale Lamps.—These are two M.E.S. types, rated at 6.0 V, 0.3A.

External Speaker.—Two sockets are provided at the rear of the chassis for a high impedance external speaker.

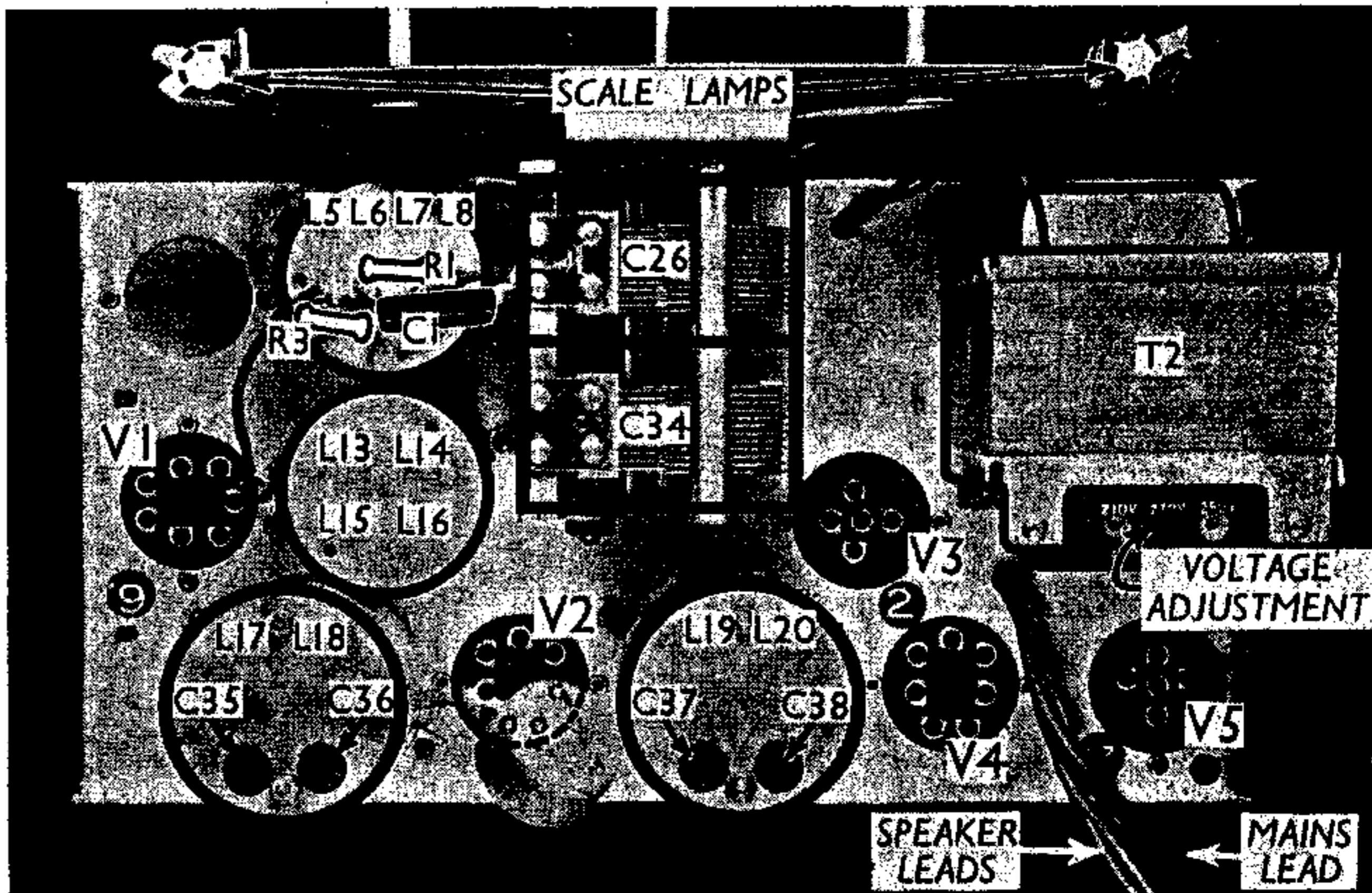
Condensers C18, C19.—These are two dry electrolytics in a single carton, mounted in a clip fitted to the inside of the cabinet. The black lead to the earthing tag on the speaker chassis is the common negative. The yellow lead to the bottom field tag on **T1** is the positive of **C18** (8 μ F), while the red lead

SWITCH TABLE AND DIAGRAM

| Switch | Gram. (G) | S.W.1 (1) | S.W.2 (2) | M.W. (3) | L.W. (4) |
|--------|-----------|-----------|-----------|----------|----------|
| S1 | O | C | O | O | O |
| S2 | O | O | C | O | O |
| S3 | O | O | O | C | O |
| S4 | O | O | O | O | C |
| S5 | O | C | O | O | O |
| S6 | O | O | C | O | O |
| S7 | O | O | O | C | O |
| S8 | O | O | O | O | C |
| S9 | C | O | O | O | O |
| S10 | O | C | O | O | O |
| S11 | O | O | C | O | O |
| S12 | O | O | O | C | O |
| S13 | O | O | O | O | C |
| S14 | O | C | O | O | O |
| S15 | O | O | C | O | O |
| S16 | O | O | O | C | O |
| S17 | O | O | O | O | C |
| S18 | C | O | O | O | O |



Switch diagrams, looking from the rear of the underside of the chassis. The switches formed by the centre contact plates have been omitted.



Plan view of the chassis. The coils in the **L5-L8** unit are iron dust cored.

(to tag 1) is the positive of **C19** (16 μ F).

Resistance R18.—This is shown in the makers' diagram, and in our circuit diagram, but was omitted from our chassis.

CIRCUIT ALIGNMENT

For alignment the volume control should be at maximum. With the gang fully meshed the pointer should coincide with the two ends of the wavelength scales.

I.F. Stages.—Remove the grid connector from the top of **V1**, and connect signal generator to top cap of the valve and chassis, with a 0.25 MO resistance shunted across these two points. Short **C34**.

Feed in a 473 KC/S (634.2 m.) signal, and adjust **C38, C37, C36** and **C35** in that order for maximum output. Repeat with low signal input, and check by swinging generator from 468 to 478 KC/S, noting that resonance occurs exactly at 473 KC/S.

Remove short from **C34** and replace normal top cap of **V1**.

R.F. and Oscillator Stages.—Connect signal generator to **A** and **E** sockets.

Switch set to L.W., tune to 750 m. on scale, feed in a 750 m. signal, and adjust **C33**, then **C25** for maximum output. Feed in a 2,000 m. signal, tune it in on receiver, and adjust **C29** for maximum output, rocking the gang slightly for optimum results. Re-trim **C33** and **C25** and re-track **C29** until no further improvement results.

On the M.W. (3) band and S.W.2 (2) band a similar procedure is adopted. On M.W., adjust **C32** and **C24** at 200 m., and **C28** at 550 m. On S.W.2, adjust **C31** and **C23** at 50 m., and **C27** at 170 m.

On the S.W.1 (1) band, there is no variable tracker, so **C30** and **C32** are adjusted at 13.5 m. Trimming is very critical on this band, and care must be taken to see that the pressure of the trimming tool is not affecting the process. If a dummy aerial is used with the signal generator, it should be replaced by a 40 μ F fixed condenser on the S.W.1 band.