# BURGOYNE AWTV

## H.T. VIBRATOR MODEL

OPERATED from a 6 V accumulator, the Burgoyne AWTV receiver derives its H.T. supply from a vibrator and Westinghouse rectifier. The set is of the 3-band type, and covers a short-wave range of 19-51 metres, while provision is made for a gramophone pick-up and an extension speaker.

### CIRCUIT DESCRIPTION

Two alternative aerial input connections, **A1** via Droitwich rejector **L1, C21,** and series choke **L2,** and **A2** via fixed series condenser **C1,** to coupling condensers and coils **C2** (S.W.), **C3, L5** (M.W.), **L3, L7** (L.W.). Single tuned circuits comprising **L4, C24** (S.W.), **L6, C24** (M.W.), **L8, C24** (L.W.) precede variable-mu pentode R.F. amplifier (**V1, Tungsram metallised SP2B**). Gain control by potentioneter **R7** in H.T. negative lead, which varies G.B. applied.

Tuned anode coupling by **L10, C25** (S.W.), **L12, C25** (M.W.), **L13, C25** (L.W.) between **V1** and triode detector valve (**V2, Tungsram LD210**) which operates on grid leak system with **C8** and **R3.** Reaction is applied from anode of **V2** by coils **L11** (S.W.) and **L14** (M.W. and L.W.) and controlled by variable condenser **C29.** Provision for connection of gramophone pick-up in C.G. circuit via switch **S18.** R.F. filtering in anode circuit by **L15, C9, R5** and stopper resistance **R6.**

Parallel-fed transformer coupling by **R4, C10** and **T1** between **V2** and pentode output valve (**V3, Tungsram PP222**). Fixed tone correction in anode circuit by **C13.** Provision for connection of high impedance external speaker across primary of **T2.** Plug-operated switch **S19** breaks internal speaker transformer primary circuit when the plug is turned slightly in an anti-clockwise direction.

**V3** G.B. voltage is obtained from drop across H.T. smoothing choke **L17** which, with **R10,** is in series with H.T. supply negative lead.

H.T. current is supplied by vibratory convertor unit; output developed across H.T. transformer **T3** is rectified by half-wave rectifier (**MR1, Westinghouse type H40**). Smoothing by **L17** and dry electrolytic condensers **C14, C16, C17.** Filtering in H.T. positive circuit by **C15**; in L.T. positive circuit by **L18.**

**Convertor Unit.**—L.T. input to vibrator unit causes two pairs of primary contacts to open and close alternately, feeding L.T. impulses in rapid succession to alternate halves of the centre-tapped primary of **T3.** H.T. pulses produced in secondary of **T3** provide alternating output from which the receiver, in conjunction with **MR1,** derives its H.T. supply. Interference suppression in input circuit by chokes **L19, L20** and condensers **C19, C20**; in output circuit by **C18.**

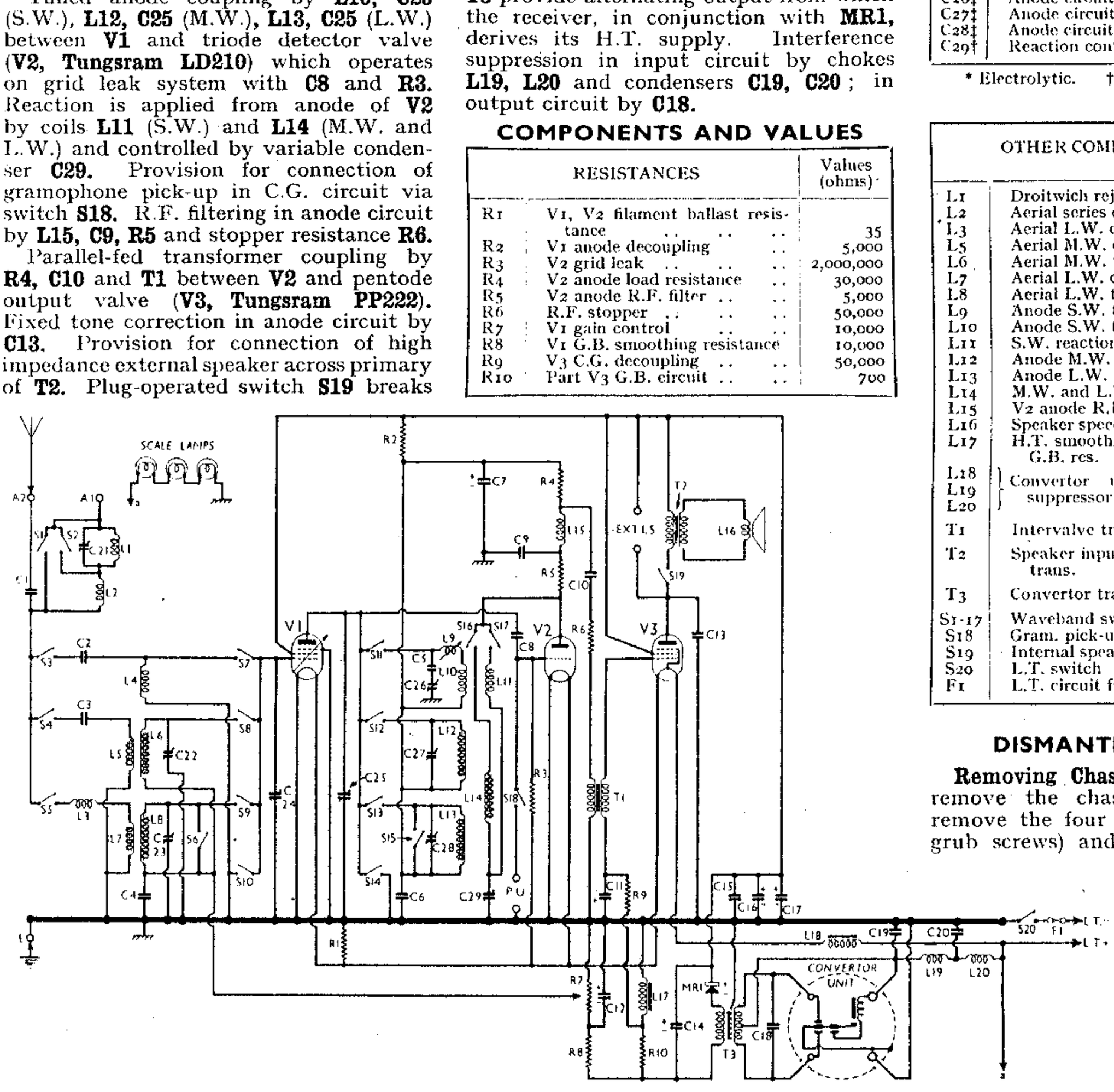
### COMPONENTS AND VALUES

| | RESISTANCES | Values (ohms) |
|---|---|---|
| R1 | V1, V2 filament ballast resistance | 35 |
| R2 | V1 anode decoupling | 5,000 |
| R3 | V2 grid leak | 2,000,000 |
| R4 | V2 anode load resistance | 30,000 |
| R5 | V2 anode R.F. filter | 5,000 |
| R6 | R.F. stopper | 50,000 |
| R7 | V1 gain control | 10,000 |
| R8 | V1 G.B. smoothing resistance | 10,000 |
| R9 | V3 C.G. decoupling | 50,000 |
| R10 | Part V3 G.B. circuit | 700 |

| | CONDENSERS | Values (μF) |
|---|---|---|
| C1 | Aerial series condenser | 0·0002 |
| C2 | Aerial S.W. coupling | 0·0002 |
| C3 | Aerial M.W. coupling | 0·0002 |
| C4 | V1 C.G. decoupling | 0·1 |
| C5 | V1 anode fixed S.W. trimmer | 0·00005 |
| C6 | V1 anode R.F. by-pass | 0·1 |
| C7* | V1 anode decoupling | 2·0 |
| C8 | V2 C.G. condenser | 0·0001 |
| C9 | V2 anode R.F. by-pass | 0·0002 |
| C10 | A.F. coupling to T1 | 0·1 |
| C11* | V3 C.G. decoupling | 20·0 |
| C12* | V1 G.B. circuit decoupling | 25·0 |
| C13 | V3 anode tone corrector | 0·01 |
| C14* | H.T. smoothing | 2·0 |
| C15 | H.T. line R.F. by-pass | 0·1 |
| C16* | H.T. smoothing | 8·0 |
| C17* | H.T. smoothing | 2·0 |
| C18 | Convertor unit interference suppressors | 0·1 |
| C19 | Convertor unit interference suppressors | 0·5 |
| C20 | Convertor unit interference suppressors | 0·2 |
| C21‡ | Droitwich rejector tuning | — |
| C22‡ | Aerial M.W. trimmer | — |
| C23‡ | Aerial L.W. trimmer | — |
| C24† | Aerial circuit tuning | — |
| C25† | Anode circuit tuning | — |
| C26‡ | Anode circuit S.W. trimmer | — |
| C27‡ | Anode circuit M.W. trimmer | — |
| C28‡ | Anode circuit L.W. trimmer | — |
| C29† | Reaction control | — |

* Electrolytic. † Variable. ‡ Pre-set.

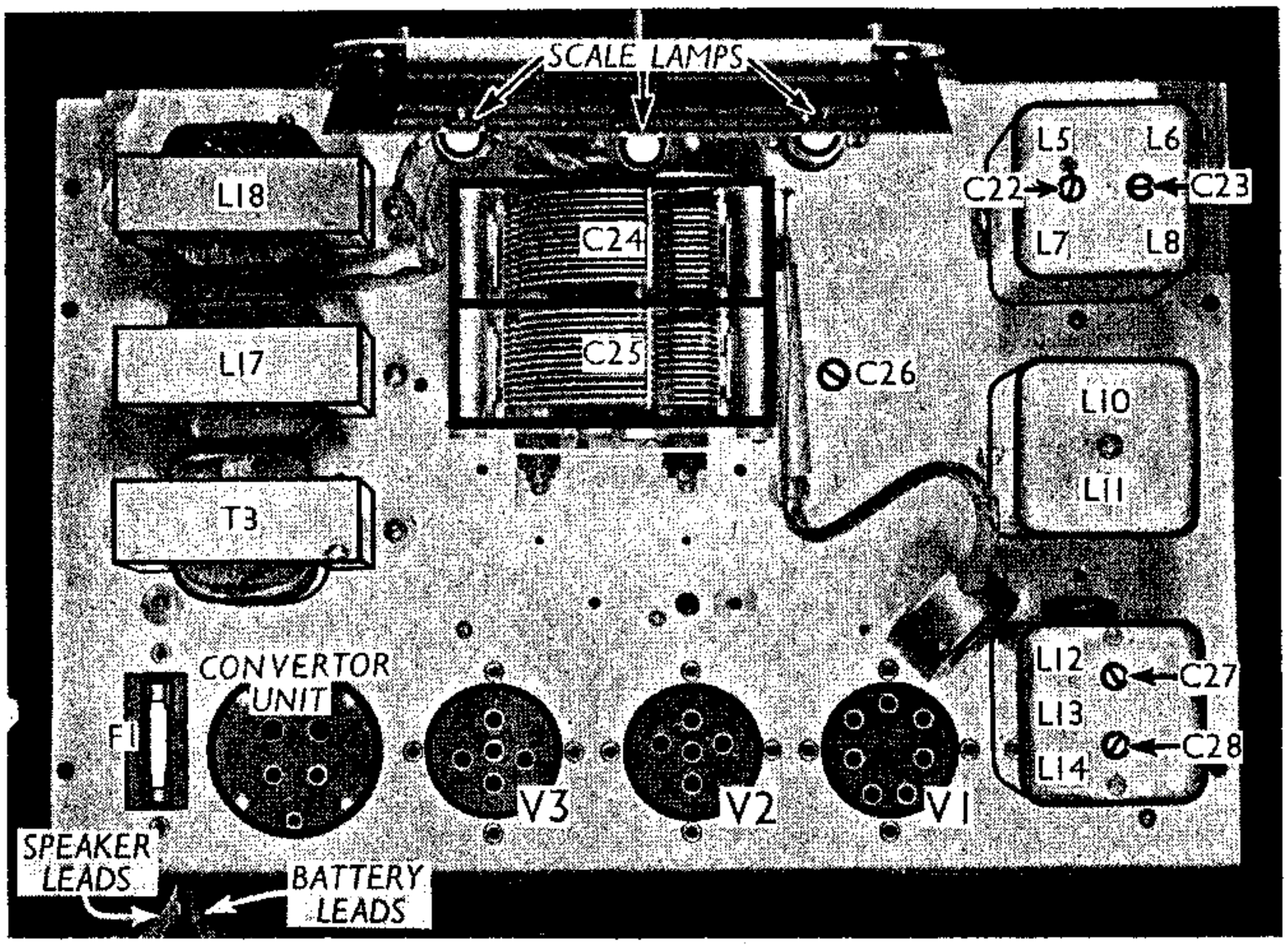
| | OTHER COMPONENTS | | Approx. Values (ohms) |
|---|---|---|---|
| L1 | Droitwich rejector coil | | 30·0 |
| L2 | Aerial series choke | | 9·0 |
| L3 | Aerial L.W. choke | | 21·0 |
| L5 | Aerial M.W. coupling | | 0·05 |
| L6 | Aerial M.W. tuning coil | | 2·4 |
| L7 | Aerial L.W. coupling | | 2·9 |
| L8 | Aerial L.W. tuning coil | | 12·0 |
| L9 | Anode S.W. trimming coil | | Very low |
| L10 | Anode S.W. tuning coil | | 0·05 |
| L11 | S.W. reaction coil | | 0·15 |
| L12 | Anode M.W. tuning coil | | 2·75 |
| L13 | Anode L.W. tuning coil | | 12·0 |
| L14 | M.W. and L.W. reaction coil | | 1·5 |
| L15 | V2 anode R.F. choke | | 175·0 |
| L16 | Speaker speech coil | | 2·3 |
| L17 | H.T. smoothing choke and V3 G.B. res. | | 475·0 |
| L18 | Convertor unit interference suppressor chokes | | 8·0 |
| L19 | Convertor unit interference suppressor chokes | | 0·3 |
| L20 | Convertor unit interference suppressor chokes | | 0·3 |
| T1 | Intervalve trans. | Pri. | 1,500·0 |
| | | Sec. | 3,250·0 |
| T2 | Speaker input trans. | Pri. | 680·0 |
| | | Sec. | 0·3 |
| T3 | Convertor trans. | Pri. (total | 1·4 |
| | | Sec. | 240·0 |
| S1-17 | Waveband switches | | — |
| S18 | Gram. pick-up switch | | — |
| S19 | Internal speaker switch | | — |
| S20 | L.T. switch | | — |
| F1 | L.T. circuit fuse (2 A) | | — |




Circuit diagram of the Burgoyne AWTV. The convertor unit is shown beneath the chassis on the right.

### DISMANTLING THE SET

**Removing Chassis.**—If it is desired to remove the chassis from the cabinet, remove the four control knobs (recessed grub screws) and the nuts and washers




Plan view of the chassis. **L17, L18** and **T3** are used in the H.T. supply circuit.

from the four bolts passing through the chassis and holding it to the fillets on the sides of the cabinet.

Now free the speaker leads from the cleat holding them to the shelf and unsolder them, when the chassis can be withdrawn.

*When replacing*, connect the black lead to the bottom tag on the speaker terminal panel and the red lead to the top tag, and do not forget to fix the soldering tag for the black lead from the electrolytic condenser on the nearer left-hand chassis fixing bolt.

**Removing Speaker.**—To remove the speaker from the cabinet, unsolder the leads and remove the nuts from the four bolts holding it to the sub-baffle. *When replacing*, see that the transformer is on the left and connect the black lead from the chassis to the bottom tag and the red leads from the chassis and electrolytic condenser to the top tag.

## VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating from an accumulator reading 6 V on load. The receiver was tuned to the lowest wavelength on the medium band and the volume control was at maximum, but the reaction control was at minimum. 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 SP2B | 95 | 1·9 | 110 | 1·7 |
| V2 LD210 | 55 | 1·1 | — | — |
| V3 PP222 | 108 | 3·4 | 110 | 0·7 |

## GENERAL NOTES

**Switches.**—**S1-S18** are the wavechange and gramophone switches, ganged in three rotary units beneath the chassis, and indicated in our under-chassis view. The switches are shown in detail in the diagrams on page IV, where they are as seen from the underside of the chassis, looking in the directions of the arrows in the under-chassis view.

The table (p. IV) gives the switch positions for the four control settings, starting from fully anti-clockwise. O indicates open, and **C** closed.

**S19** is the internal speaker switch at the rear of the chassis which is normally closed, but opens when the external speaker plug is inserted and rotated anti-clockwise.

**S20** is the Q.M.B. battery switch, ganged with the gain control **R7.**

**Coils.**—**L1, L2, L3** and **L4** are on separate unscreened tubular formers beneath the chassis. **L5-L8, L10, L11** and **L12-L14** are in three screened units on the chassis deck, two of them containing also two trimmers each. **L9** is a small inductive trimmer, in series with the S.W. anode coil for adjustment purposes. It may not be used in some chassis, but is generally present. **L15, L19** and **L20** are air-cored chokes, beneath the chassis, while **L17** and **L18** are iron-cored chokes. **L16** is the speaker speech coil.

**Scale Lamps.**—These are three Osram

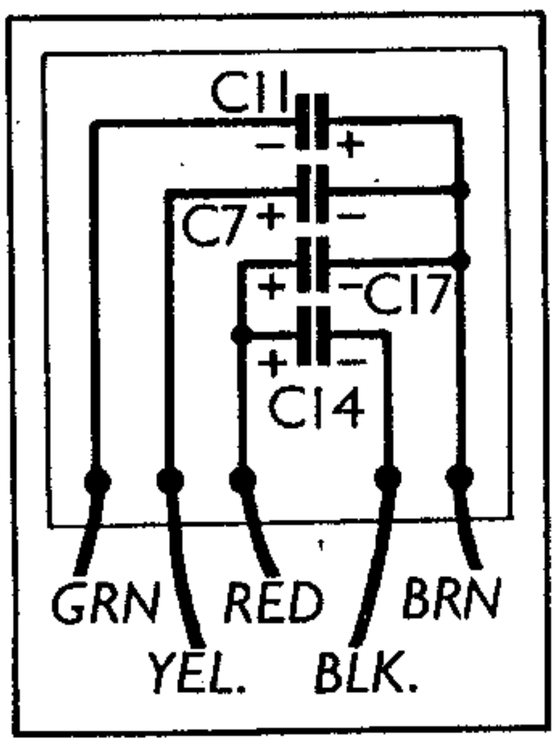



Diagram of the internal connections of the condenser block, with the colour coding of the leads.

M.E.S. types, rated at 2·5 V, 0·2 A, and wired in series across the L.T. supply.

**External Speaker.**—A special plug and socket device is provided at the rear of the chassis for a high impedance (7,000-8,000 O) external speaker. By rotating the plug anti-clockwise, **S19** opens and mutes the internal speaker.

**Condensers C7, C11, C14, C17.**—These are four dry electrolytic condensers in a

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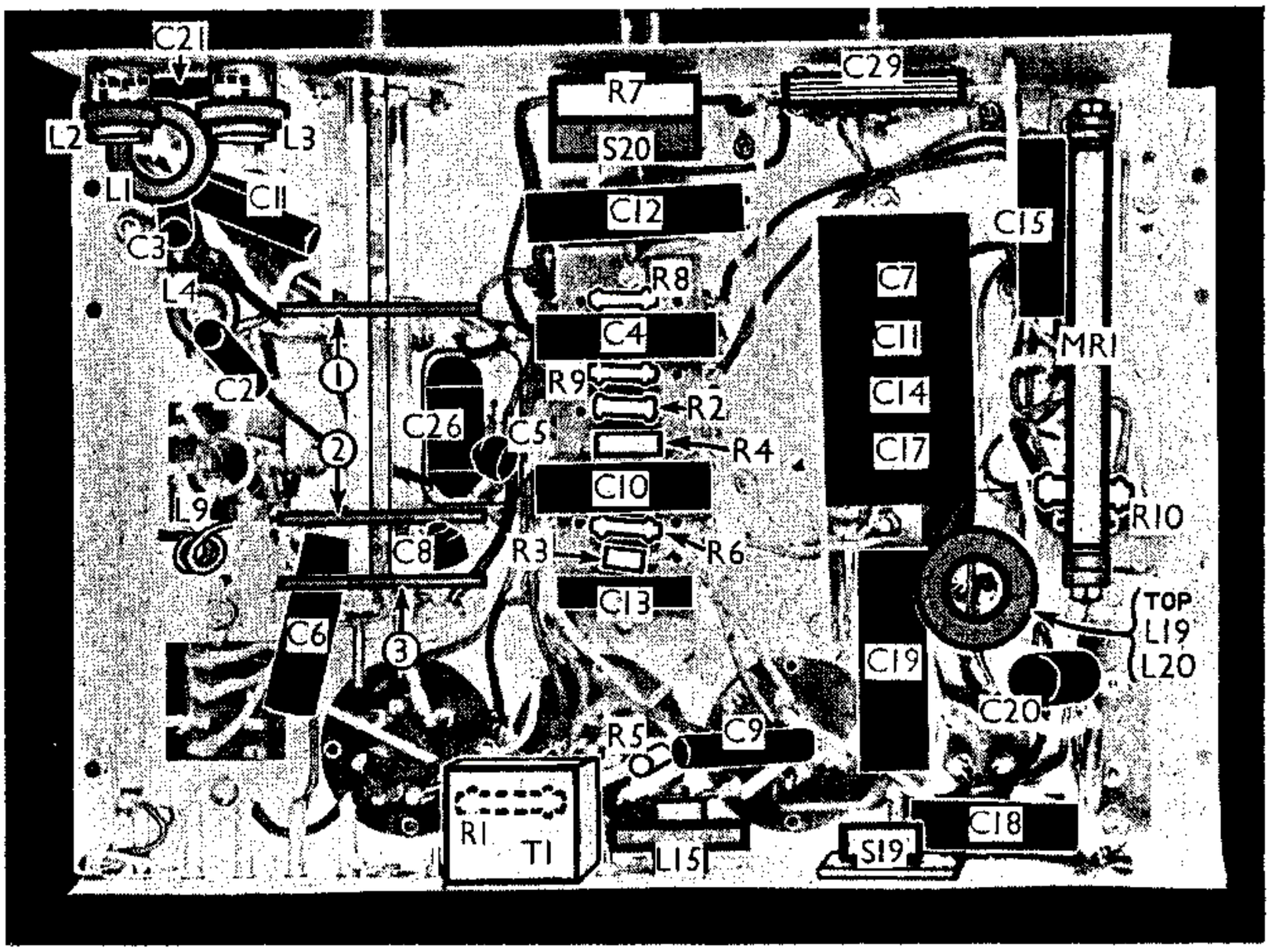



Under-chassis view. Note the inductive trimmer, **L9.**

## BURGOYNE AWTV—*Continued*

single carton beneath the chassis. Five coloured leads emerge, and the internal connections are shown in the diagram on page III. **C11** is a 20 $\mu$F condenser, all the others being 2 $\mu$F types.

**Condenser C16.**—This is a separate 8 $\mu$F dry electrolytic unit, mounted in the cabinet beneath the chassis platform.

**Fuse F1.**—This is a standard 1¼ in. glass type, rated at 2 A.

**Rectifier MR1.**—This is a Westinghouse half-wave metal rectifier unit, type H40. Note polarity if replacement is necessary.

**Convertor Unit.**—This is a metal cased 6 V type, fitted with an American 4-pin base. The internal arrangement is shown in our circuit diagram, and the four small circles inside the large dotted circle represent the contact pins, looking at the underside of the convertor base.

The convertor is of the full-wave vibrator type, but is not self-rectifying. **MR1** performs this function. The continuity of the energising winding can be checked across the two large pins. The resistance should be about 11 Ω.

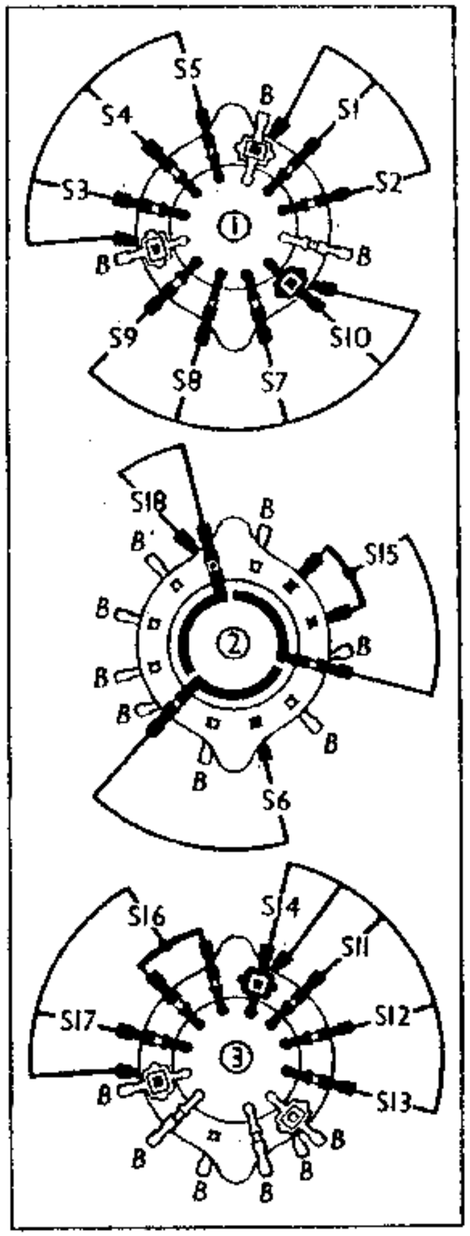
**L.T. Accumulator.**—This should be a 6 V type, of at least 20 AH actual capacity. A 40 AH type is recommended. The L.T. consumption is about 0·8 A at 6 V.

**Chassis Divergencies.**—**C19** may have been 0·2 $\mu$F (not 0·5$\mu$F) in chassis prior to January 10, 1937. The switch shown in the makers' diagram between the bottom of **C1** and chassis is omitted in our receiver

The positive connection of **C14** in some chassis may go to the junction of **R10** and **L17,** not to **MR1** as shown in our diagram.

## SWITCH TABLE AND DIAGRAM

| Switch | L.W. | M.W. | S.W. | Gram. |
|---|---|---|---|---|
| S1 | O | O | C | O |
| S2 | O | C | O | O |
| S3 | O | C | O | O |
| S4 | O | C | O | O |
| S5 | C | O | O | O |
| S6 | O | C | O | O |
| S7 | O | O | C | O |
| S8 | O | C | O | O |
| S9 | C | O | O | O |
| S10 | O | O | O | C |
| S11 | O | O | C | O |
| S13 | C | O | O | O |
| S14 | O | O | C | C |
| S15 | O | C | C | O |
| S16 | C | C | O | O |
| S17 | O | O | C | O |
| S18 | O | O | O | C |




Switch diagrams, looking at the units in the directions of the arrows in the underchassis view on page III.

## CIRCUIT ALIGNMENT

With gang condenser at minimum, pointer should cover black line at lower end of yellow S.W. "strip."

Connect signal generator to **A2** and **E** sockets, switch set to M.W., and turn gain control to maximum. Feed in a 200 m. signal, tune to 200 m. on scale, and adjust **C22** and **C27** for maximum output with reaction control advanced until set is just short of oscillation.

Switch set to L.W., feed in a 1,200 m. signal, tune to 1,200 m. on scale, and adjust **C23** and **C28** for maximum output, again with critical reaction.

Feed a 1,500 m. signal into **A1** and **E** sockets, tune to 1,500 m. on scale, and adjust **C21** (front of chassis) for *minimum* output, keeping reaction control at minimum.

Switch set to S.W., feed a 21 m. signal into **A2** and **E** sockets, tune to 21 m. on scale and adjust **C26** (through hole in chassis deck) for maximum output with critical reaction. Tune to 48 m. on scale, feed in a 48 m. signal, and adjust inductive trimmer **L9** (by pulling out or squeezing in the turns) for maximum output with critical reaction. Re-adjust **C26** at 21 m. and **L9** at 48 m. until no improvement results, and calibration is correct at both points.