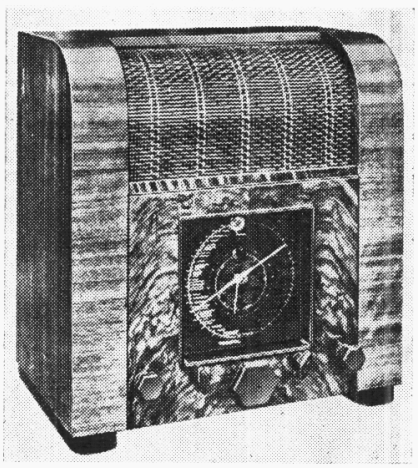
Supplement to The Wireless & Electrical Trader, May 13, 1939

"TRADER" SERVICE SHEET

403

R.G.D. 718

723 AND 739 AC MODELS



The R.G.D. 718 table receiver.

THE AC version of the R.G.D. 718 is a table five-valve (plus rectifier) superhet, incorporating three wave-bands, including a SW range of 16.5-50 m. An RF stage prior to the frequency changer is used, and a tuning indicator is fitted. Late models have pick-up sockets, with suitable radio/gram switching at the rear of the chassis. but this was not incorporated in early models.

Model 723 is a console with an identical chassis, while the 739 is an auto-radiogram, with a similar chassis, the divergencies being explained under "Radiogram Model 739."

This *Service Sheet* was prepared on a late model 718. The set is suitable for 200-250 V, 40-100 C/S AC mains.

Release dates: 718AC, Feb., 1938; 723AC and 739AC, March, 1938.

CIRCUIT DESCRIPTION

Aerial input is via coupling coils **L1** (SW), **L2** (MW) and **L3** (LW) to single tuned circuits **L4, C37** (SW). **L5, C37** (MW), and **L6, C37** (LW) which precede a variable-mu RF pentode valve (**V1, Mazda metallised AC/VP2**) operating as signal frequency amplifier.

Tuned-secondary RF transformer coupling by **L7, C5, L10, C41** (SW), **L8, L11, C41** (MW) and **L9, L12, C41** (LW) between **V1** and triode pentode valve (**V2, Mazda metallised AC/THI**) which operates as frequency changer with internal coupling. Triode oscillator anode coils **L16** (SW), **L17** (MW) and **L18** (LW) are tuned by **C47**; parallel trimming by **C44** (SW), **C45** (MW) and **C16, C46** (LW); series tracking by **C13** (SW), **C14, C42** (MW) and **C15, C43** (LW). Reaction by grid coils **L13** (SW), **L14** (MW) and **L15** (LW).

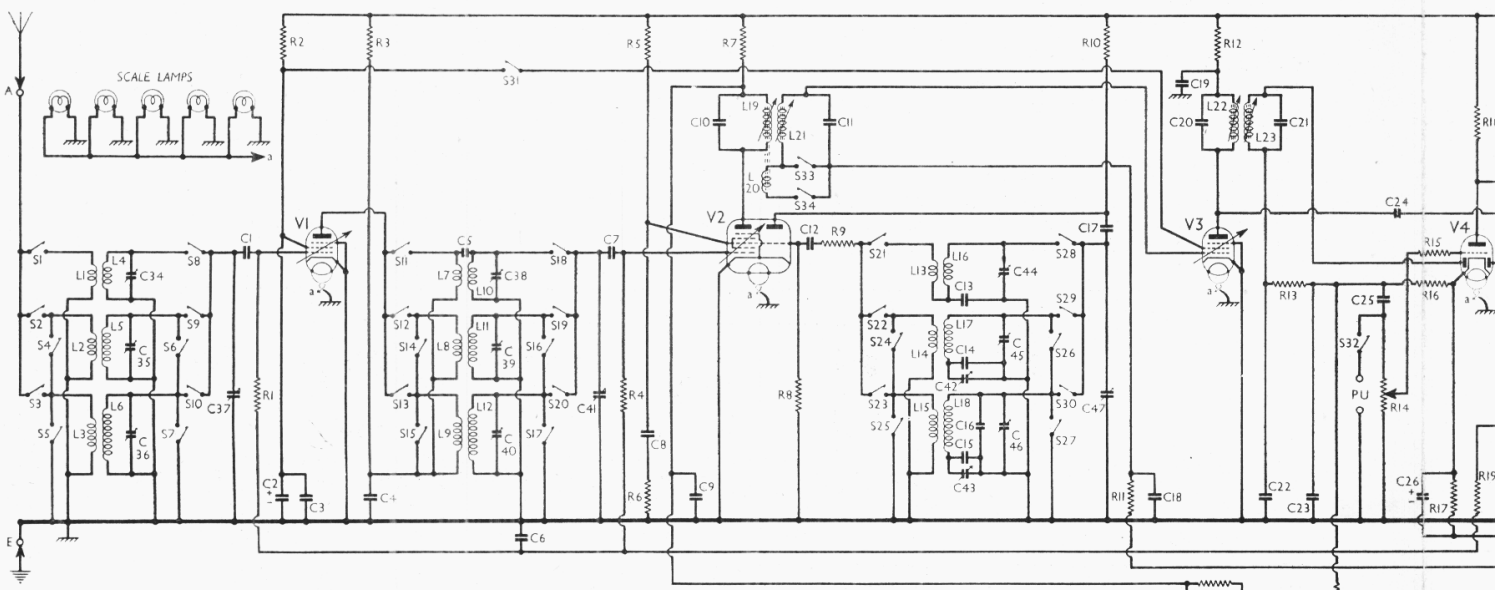
Third valve (**V3, Mazda metallised AC/VP2**) is a variable-mu RF pentode valve operating as intermediate frequency amplifier with tuned-primary tuned-secondary iron-cored transformer couplings **C10, L19, L20, L21, C11** and **C20, L22, L23, C21.** Tuning is effected by adjustment of the iron cores. A two position band width control provides variable selectivity: when **S33** is closed the first IF transformer operates with normal coupling; when **S33** opens and **S34** closes, the secondary circuit is completed via **L20,** and the coupling is modified.

Intermediate frequency 465 KC/S.

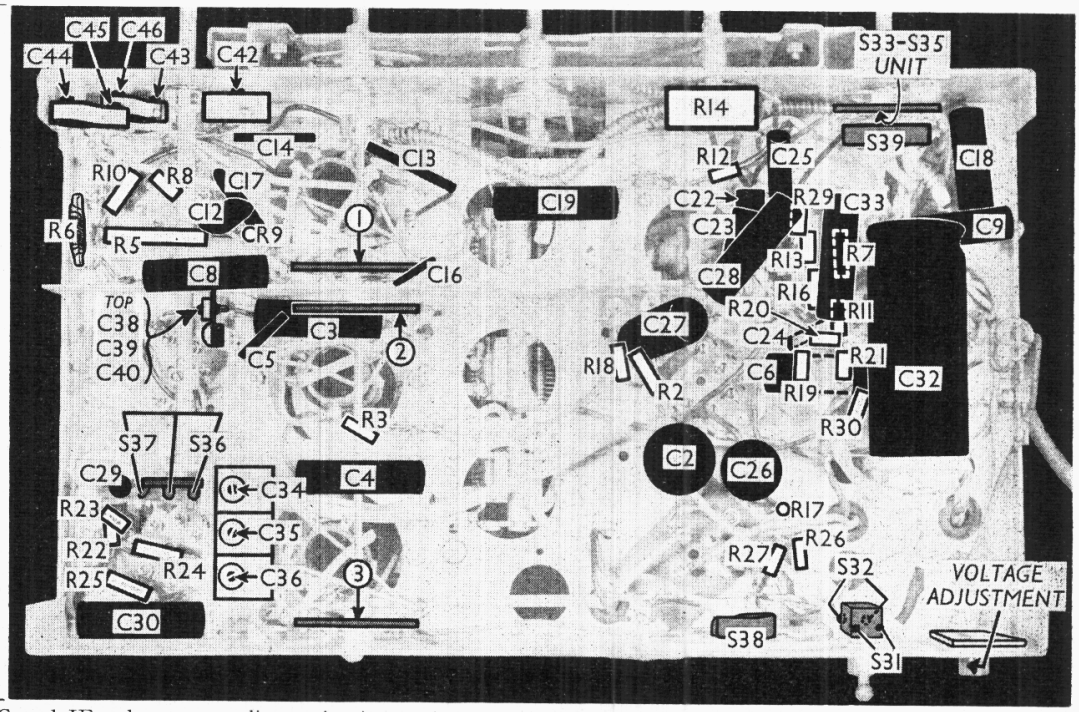
Diode second detector is part of double diode triode valve (**V4, Mullard metallised TDD4**). Audio frequency component in rectified output is developed across load resistance **R16** and passed via **C25, R14** and stopper **R15** to CG of triode section, which operates as AF amplifier. IF filtering by **C22, R13** and **C23.** Provision for connection of gramophone pick-up across **R14**: when the radio/gram switch control knob is pressed upwards, **S32** closes to connect the pick-up and **S31** opens to mute radio.

Operating potential for cathode ray tuning indicator (**T.I. Mullard TV4A or TV4**) is obtained from DC potential developed across **R16.**

Second diode of **V4,** fed from **V3** anode via **C24,** provides DC potentials which are developed across load resistances **R20** and **R21** and fed back through decoupling



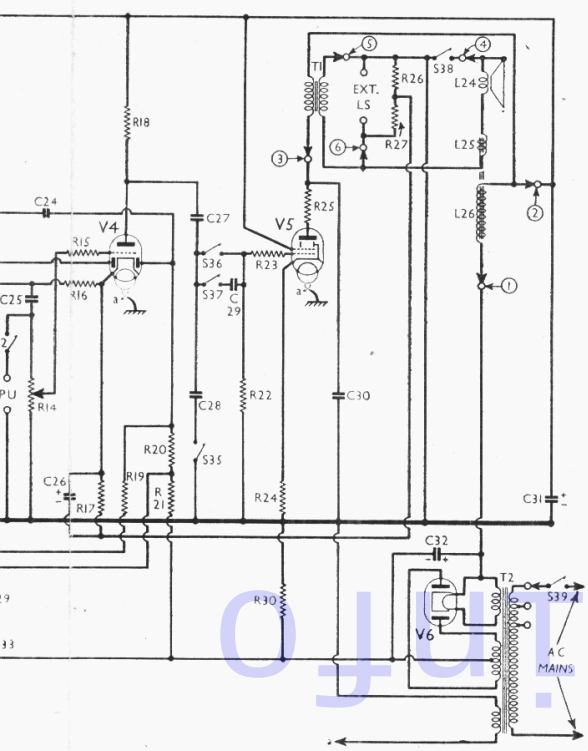
Circuit diagram of the R.G.D. 718 and 723. A diagram of the speaker connection pin arrangement is inset beneath. Note the various tone control and selectivity switches, and the negative feed-back circuit. The 739 radiogram modifications are in col. 4 overleaf.



Under-chassis view. Diagrams of the three wavechange units, as seen in the directions of the arrows, are in col. 6 overleaf. The **S33-S35** unit is in col. 3 overleaf. This illustration shows the latest chassis arrangement. Early models may have a somewhat different layout. **C44** is above **C45** and **C46** above **C43**.

circuits as GB to RF, FC and IF valves, giving automatic volume control. Delay voltage, together with GB for triode section, is obtained from drop along **R17** in cathode circuit.

Resistance-capacity coupling by **R18, C27** and, when **S36** is closed, **R22,** via stopper **R23,** between **V4** triode and beam tetrode output valve (**V5, Mazda AC/4Pen**). When the "speech-music" control is turned to "speech," **S36** opens and **S37** closes, so that **C29** is interposed in the coupling circuit and produces bass attenuation. **S35,** which operates in conjunction with **S33** and **S34** closes on position 3 of the "selectivity and tone" control, to attenuate high note response. Fixed tone correction by **C30** in anode circuit. Provision for connection of a low impedance external speaker across secondary of internal speaker input transformer **T1. S38,** which is operated by the external speaker connecting plug, permits the internal speaker to be muted if desired.



Part of the output from **T1** secondary is developed across potential divider **R26, R27,** that across **R26** being fed back to **V4** cathode circuit to introduce feed-back. Feed-back is also introduced in the cathode circuit of **V5** by the omission of the usual by-pass condenser.

HT current is supplied by IHC rectifier (V6, **Mazda UU4**). Smoothing by speaker field **L26** and electrolytic condensers **C31** and **C32.** Voltage developed across **R30** in negative HT lead to chassis is fed via **R21, R20** and AVC line to grid circuits of **V1, V2** and **V3** to provide fixed minimum GB potential.

DISMANTLING THE SET

Removing Chassis.—A detachable bottom is fitted to the cabinet, upon removal of which access may be gained to most of the components beneath the chassis. To remove the chassis from the cabinet, remove the five control knobs (self threading screws) from the front of the cabinet, and the four hexagon bolts (with washers) holding the chassis to the bottom of the cabinet, and withdraw the connector socket from the speaker transformer, when the chassis may be withdrawn. *When replacing,* a felt washer should be fitted to each control spindle, between the knob and the cabinet.

Removing Speaker.—First slacken the four hexagon nuts holding the fixing clamps to the speaker frame. Then remove the two top nuts and clamps, when the speaker may be withdrawn. *When replacing,* the transformer should be on top and a lock-washer should be fitted between each clamp and nut that has been removed.

COMPONENTS AND VALUES

	CONDENSERS	Values (μF)
C1	V1 CG condenser	0·00015
C2*	V1, V3 SG's decoupling	8·0
C3	V1, V3 SG's RF by-pass	0·1
C4	V1 anode decoupling	0·1
C5	RF trans. SW coupling	0·000005
C6	AVC line decoupling	0·1
C7	V2 pent. CG condenser	0·00015
C8	V2 SG decoupling	0·1
C9	V2 pent. anode and T.I. decoupling	0·1
C10, C11	1st IF transformer tuning condensers	—
C12	V2 osc. CG condenser	0·0001
C13	Osc. circuit SW tracker	0·003
C14	Osc. circuit MW fixed tracker	0·000465
C15	Osc. circuit LW fixed tracker	0·00012
C16	Osc. circuit LW fixed trimmer	0·00005
C17	V2 osc. anode coupling	0·0001
C18	V3 CG decoupling	0·04
C19	V3 anode decoupling	0·1
C20, C21	2nd IF transformer tuning condensers	—
C22, C23	IF by-pass condensers	0·0001
C24	Coupling to V4 AVC diode	0·0001
C25	AF coupling to V4 triode	0·00005
C26*	V4 cathode by-pass	0·01
C27	V4 triode to V5 AF coupling	50·0
C28, C29	Parts of tone control	0·1
C30	Fixed tone corrector	0·04, 0·001, 0·001
C31*, C32*	HT smoothing condensers	16·0, 8·0
C33	T.I. CG decoupling	0·04
C34‡	Aerial circuit SW trimmer	0·00003
C35‡	Aerial circuit MW trimmer	0·00003
C36‡	Aerial circuit LW trimmer	0·00003
C37†	Aerial circuit tuning	—
C38‡	RF trans. sec. SW trimmer	0·00003
C39‡	RF trans. sec. MW trimmer	0·00003
C40‡	RF trans. sec. LW trimmer	0·00003
C41†	RF trans. sec. tuning	—
C42‡	Osc. circuit MW tracker	0·0001
C43‡	Osc. circuit LW tracker	0·0001
C44‡	Osc. circuit SW trimmer	0·00003
C45‡	Osc. circuit MW trimmer	0·00003
C46‡	Osc. circuit LW trimmer	0·00003
C47†	Oscillator circuit tuning	—

* Electrolytic. † Variable. ‡ Pre-set.

	RESISTANCES	Values (ohms)
R1	V1 CG resistance ..	490,000
R2	V1, V3 SG's HT feed ..	10,000
R3	V1 anode HT feed ..	1,000
R4	V2 pent. CG resistance ..	490,000
R5	V2 SG HT feed	25,000
R6	V2 SG stabiliser	0·7
R7	V2 pent. anode HT feed ..	6,500
R8	V2 osc. CG resistance ..	50,000
R9	V2 osc. CG stabiliser ..	100
R10	V2 osc. anode HT feed ..	40,000
R11	V3 CG decoupling	1,000,000
R12	V3 anode HT feed	1,000
R13	IF stopper	50,000
R14	Manual volume control ..	2,000,000
R15	V4 triode CG stopper ..	250,000
R16	V4 signal diode load ..	500,000
R17	V4 triode GB ; AVC delay ..	700
R18	V4 triode anode load ..	40,000
R19	AVC line decoupling ..	1,000,000
R20, R21	V4 AVC diode load resistances	500,000, 200,000
R22	V5 CG resistance	100,000
R23	V5 CG stopper	25,000
R24	V5 GB resistance	115
R25	V5 anode stopper	50
R26, R27	Feed-back feed potential divider resistances	20, 60
R28	T.I. anode HT feed	2,000,000
R29	T.I. CG decoupling	2,000,000
R30	V1, V2, V3 fixed GB resistance	28

	OTHER COMPONENTS	Approx. Values (ohms)
L1	Aerial SW coupling coil ..	2·0
L2	Aerial MW coupling coil ..	31·0
L3	Aerial LW coupling coil ..	72·0
L4	Aerial SW tuning coil ..	Very low
L5	Aerial MW tuning coil ..	5·5
L6	Aerial LW tuning coil ..	20·0
L7	RF trans. SW primary ..	1·7
L8	RF trans. MW primary ..	1·2
L9	RF trans. LW primary ..	1·5
L10	RF trans. SW secondary ..	Very low
L11	RF trans. MW secondary ..	5·0
L12	RF trans. LW secondary ..	21·0
L13	Oscillator SW reaction ..	0·5
L14	Oscillator MW reaction ..	0·9
L15	Oscillator LW reaction ..	1·4
L16	Osc. circuit SW tuning coil ..	Very low
L17	Osc. circuit MW tuning coil	3·6
L18	Osc. circuit LW tuning coil	8·5
L19, L20, L21	1st IF trans. Pri. .. .. / Coupling coil .. / Sec.	14·0, 0·5, 13·5
L22, L23	2nd IF trans. Pri. .. / Sec. ..	8·0, 8·0
L24	Speaker speech coil	2·4
L25	Hum neutralising coil ..	0·15

	OTHER COMPONENTS (*Continued*)	Approx. Values (ohms)
L26	Speaker field coil	700·0
T1	Speaker input trans. Pri. .. / Sec. ..	220·0, 0·4
T2	Mains trans. Pri., total .. / Heater sec. .. / Rect. heat. sec. .. / HT sec., total ..	18·0, 0·05, 0·1, 240·0
S1-S30	Waveband switches	—
S31, 32	Radio/Gram. change switches	—
S33, 34	Variable selectivity switches	—
S35-37	Tone control switches ..	—
S38	Internal speaker switch ..	—
S39	Mains switch	—

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating on mains of 223 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 400 V scale of a model 7 Universal Avometer, chassis being negative.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 AC/VP2	260	7·8	212	2·3
V2 AC/TH1	238	2·8	100	6·5
	Oscillator			
	90	3·8		
V3 AC/VP2	253	8·5	212	2·4
V4 TDD4	120	3·1	—	—
V5 AC/4Pen	250	62·0	265	10·0
V6 UU4	322†	—	—	—
T.I. TV4A	15	0·15	—	—
	Target			
	238	0·4		

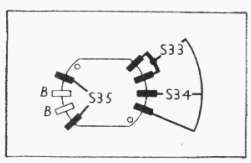
† Each anode, AC.

GENERAL NOTES

Switches.—**S1-S30** are the waveband switches, in three rotary units beneath the chassis, indicated in our under-chassis view, and shown in detail in the diagrams in col. 6, where they are drawn as seen looking in the directions of the arrows in the under-chassis view. The table (Col. 5) gives the switch positions for the three control settings, starting from fully anti-clockwise. A dash indicates open, and **C**, closed.

S31, S32 are the radio/gram change switches, in a single QMB unit at the rear of the chassis, and are indicated in our under-chassis view. In the radio position (knob down) **S31** is closed and **S32** open, and in the gram position (up), **S31** is open to mute radio, and **S32** is closed. These two switches, and the pick-up sockets, may not be fitted on early models.

S33, S34 are the selectivity switches, and **S35** one of the tone control switches, ganged together in a unit, which is also ganged with the QMB mains switch **S39.** The unit is indicated in our under-chassis view, and shown in detail in the diagram below, as seen from the rear of the underside of the chassis. In the fully anti-clockwise position of the control **S39** is open, while in the three other positions it is closed. In the first of these, **S34** is closed ; in the second, **S33** is closed ; while in the third **S33** and **S35** are closed.



The **S33-S35** unit, seen from the rear of the underside of the chassis.

S36, S37 are two bass control switches, ganged in a unit near the rear member of the chassis, and are indicated in the under-chassis view. In the anti-clockwise position of their control **S36** is closed ; in the clockwise position **S37** is closed.

S38 is the internal speaker muting switch, associated with the external speaker sockets. The switch is normally closed, but on inserting the special external speaker plug and rotating it, **S38** opens.

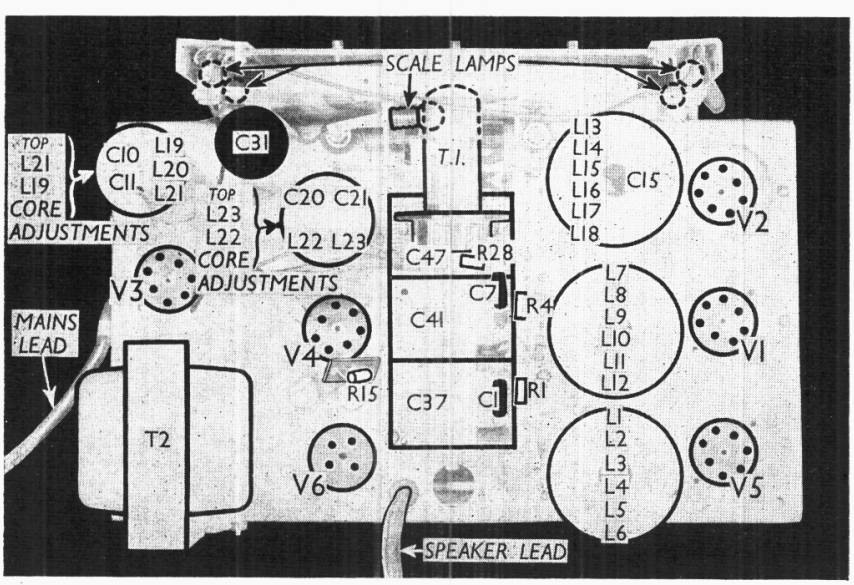
The QMB mains switch, **S39**, has been mentioned above.

Coils.—**L1-L6, L7-L12, L13-L18** and the IF transformers **L19-L21** and **L22, L23** are in five screened units on the chassis deck. The adjustments for the cores of the IF transformers are at the sides of their cans, as indicated in our plan chassis view. The IF units also contain the associated fixed trimmers, while the **L13-L18** unit also contains **C15.**

Scale Lamps.—These are five Philips MES types, rated at 6·2 V, 0·3 A. They have tubular bulbs.

External Speaker.—Provision is made at the rear of the chassis for a low impedance (2-4 O) external speaker. By rotating the special plug the internal speaker may be muted (see under " Switches ").

Speaker Connector.—A six-way cable from the chassis carries at its end a six-socket connector, which plugs on to six similarly arranged plugs on the speaker connection panel. A diagram of the plugs looking towards their free ends is inset beneath the circuit diagram, and the plugs are numbered to agree with the numbered



Plan view of the chassis. Note the IF transformer core adjustments. **L20,** of course, is of fixed inductance.

arrows and circles showing the connection points in the circuit diagram.

The coding of the leads to the corresponding sockets is : 1, yellow ; 2, white ; 3, red ; 4, blue ; 5, black ; 6, brown.

Chassis Divergencies.—The makers' diagram shows **R28** and T.I. target connected to **V3** screen, and disconnected on gram. In our chassis, this connection goes to the junction of **R7** and **C9.** Further, the **T.I.** control grid is shown connected to the junction of **R11, C18,** whereas in our chassis it goes to the junction of **R29, C33.** These components are not present in the makers' diagram.

Trimmer-type IF transformers are shown in the makers' diagram, but they are permeability-tuned types in our chassis, with fixed trimmers.

S35 and **C28** are transposed in the makers' diagram. **R15** is 250,000 Ω in our chassis, not 50,000 Ω, as in the makers' information.

In early models there may be no pick-up sockets, and the **S31, S32** unit and its wiring is omitted.

There are also several other minor divergencies compared with the makers' diagram.

RADIOGRAM MODEL 739

This has the same basic chassis as the 718 table model, but the radio/gram switching is different. A rotary switch arrangement is ganged with the wave-change switch control, which has an extra position for gram. In the gram. position the feed to the screen of **V1** is broken, to mute radio, while at the same time the top of **R14** is disconnected from **C25** and connected to the upper pick-up socket. On radio the connections are as in our diagram.

A 50,000 Ω resistor is connected across the two pick-up sockets.

There is an extra switch in the **S33-S35** unit which closes, with **S33,** in the next to fully clockwise position of the selectivity—tone switch, connecting a 0·01 μF condenser from the bottom of **C27** to chassis.

CIRCUIT ALIGNMENT

IF Stages.—Switch set to MW or LW and turn gang to minimum. Turn volume control to maximum, and selectivity control to maximum selectivity (position 2). Connect signal generator, via a 0·0002 μF fixed condenser, to control grid (top cap) of **V3,** and chassis, and feed in a 465 KC/S signal. Adjust cores of **L22** and **L23** for maximum output. Transfer signal generator to control grid (top cap) of **V2,** and adjust cores of **L19** and **L21** for maximum output. Re-check the **L22, L23** settings.

RF and Oscillator Stages.—With gang at maximum, pointer should be vertical (behind two dots on the scale). Connect signal generator to **A** and **E** sockets, via a suitable dummy aerial.

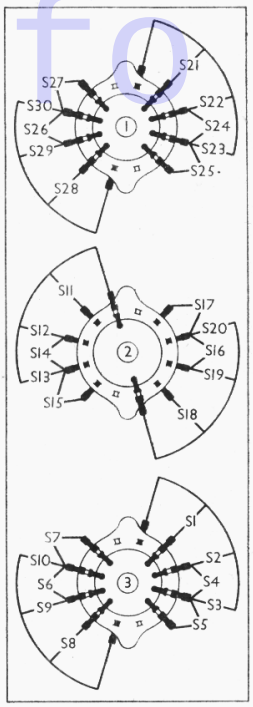
LW.—Switch set to LW, tune to 800 m on scale, feed in a 800 m (375 KC/S) signal and adjust **C46,** then **C40** and **C36,** for maximum output. Feed in a 2,000 m (150 KC/S) signal, tune it in, and adjust **C43** for maximum output, while rocking the gang for optimum results. Re-check at 800 m and 2,000 m until no further improvement can be made.

MW.—Switch set to MW, tune to 220 m on scale, feed in a 220 m (1,362 KC/S) signal, and adjust **C45,** then **C39** and **C35,** for maximum output. Feed in a 550 m (545 KC/S) signal, tune it in, and adjust **C42** for maximum output, while rocking the gang for optimum results. Re-check at 220 m and 550 m until no further improvement can be made.

SW.—Switch set to SW, and tune to 6·5 m on scale. Feed in a 16·5 m (18·2 MC/S) signal and adjust **C44** for maximum output on the peak involving the *lesser* trimmer capacity. Then adjust **C38** and **C34.** If "pulling" occurs, shown by double-humped tuning when adjusting **C38,** set this trimmer to give minimum reading between the two humps, and then slightly re-adjust **C44** for maximum output. Repeat two or three times until the pulling effect disappears. As a final check, increase the signal generator output and verify that the second channel signal comes in on the receiver dial at about 17·4 m. Check calibration at 50 m.

TABLE AND DIAGRAMS OF THE SWITCH UNITS

Switch	SW	MW	LW
S1	C	—	—
S2	—	C	—
S3	—	—	C
S4	C	—	—
S5	—	C	—
S6	C	—	—
S7	—	C	—
S8	C	—	—
S9	—	C	—
S10	—	—	C
S11	C	—	—
S12	—	C	—
S13	—	—	C
S14	C	—	—
S15	—	C	—
S16	C	—	—
S17	—	C	—
S18	C	—	—
S19	—	C	—
S20	—	—	C
S21	C	—	—
S22	—	C	—
S23	—	—	C
S24	C	—	—
S25	—	C	—
S26	C	—	—
S27	—	C	—
S28	C	—	—
S29	—	C	—
S30	—	—	C



Diagrams of the wave-change switch units, as seen from the underside of the chassis in the directions of the arrows in the under-chassis view.

Printed in Great Britain by Sanders Phillips & Co., Ltd., The Baynard Press, Chryssell Road, London, S.W.9.