THE FISK AWA RADIOLA

Models 701, 702, 276 and 316

SIX VALVE, SEVEN BAND, A.C. OPERATED SUPERHETERODYNES

Technical Information & Service Data

ELECTRICAL SPECIFICATIONS

TUNING RANGES.

(1) 1500-550 K.C. (200-545 metres)
(2) 4.0-1.5 M.C. (75-200 metres)
(3) 9.7-3.6 M.C. (30.9-83 metres)
(4) 12.0-9.5 M.C. (25.0-31.6 metres)
(5) 15.0-11.7 M.C. (20.0-25.6 metres)
(6) 19.0-15.1 M.C. (15.8-19.9 metres)
(7) 22.5-17.7 M.C. (13.3-17 metres)

R.F. ALIGNMENT FREQUENCIES.

	OSCILLATOR.		R.F.	AERIAL.
(1)	600 K.C. (core)	1500 K.C. (Air Tr.)	1480 K.C. (Mica Tr.)	1480 K.C. (Mica Tr.)
(2)	1.5 M.C. „	3.8 M.C. „ „	—	—
(3)	4.0 M.C. „	9.5 M.C. „ „	9.5 M.C. „ „	9.5 M.C. „ „
(4)	9.6 M.C. „	—	—	—
(5)	11.8 M.C. „	—	11.8 M.C. „ „	11.8 M.C. „ „
(6)	15.2 M.C. „	—	—	—
(7)	17.8 M.C. „	21.4 M.C. „ „	17.8 M.C. „ „	17.8 M.C. „ „

INTERMEDIATE FREQUENCY ..... 455 K.C.

POWER SUPPLY RATING.

Model 702 ..... 95/110 — 110/125 — 190/220 — 220/250 Volts A.C., 40-60 cycles.
Models 701, 276 & 316 ..... 200/260 Volts, A.C., 50-60 cycles.

POWER CONSUMPTION ..... 80 watts.

VALVE COMPLEMENT.

(1) 6U7G R.F. Amplifier.
(2) 6J8G Converter.
(3) 6U7G I.F. Amplifier.
(4) 6B8G Det., A.V.C. & A.F. Amp.
(5) 6V6G Output.
(6) 5Y3G Rectifier.

6U5 Visual Tuning Indicator (Model 276).

CONTROLS.

Models 701 & 276: Tone (left) and Volume (right) on cabinet front, Tuning and Range Switch at side.
Model 702: Same as above, excepting that a Power Switch is incorporated in the Volume Control.
Model 316: Controls are the same as for Models 701 and 276 plus a Radio-Phono. Switch between the Tone and Volume Controls.

LOUDSPEAKER.

MODELS 701 & 702.

Type AW9—7 inch.
Transformer XA1.
Field Coil Resistance, 1100 ohms.
Voice Coil Impedance, 3 ohms at 400 cycles.

MODELS 276 & 316.

Type AS13—12 inch.
Transformer TX20.
Field Coil Resistance, 1500 ohms.
Voice Coil Impedance, 2.2 ohms at 400 cycles.

UNDISTORTED POWER OUTPUT ..... 4.2 watts.

DIAL LAMPS.

Models 701, 702 and 316 (5) ..... 6.3 Volt, .25 amp.
Model 276 (1) ..... 240 Volt, 15 watt.

GENERAL DESCRIPTION.

The Radiola Models 701, 702, 276 and 316 are six valve, A.C. operated superheterodynes with a tuning range of 22.5 M.C. (13.3 M.) to 550 K.C. (545 M.) in seven bands. Bandspreading is provided on the 16, 19, 25 and 31 metre bands and ease of tuning on these bands is comparative with that on Medium Wave broadcasting.

The design of the R.F. Switch and Coil Unit is unique and the high performance of the instrument is largely due to this component. Built and tested as a self-contained unit, it may be readily removed from the chassis for servicing, if necessary.

Other features of these Models include the following: Permeability tuned oscillator coils and I.F. transformers; temperature compensated circuits; straight line frequency tuning condenser; illuminated band indicator on dial; "Beam-Power" output stage; inverse feed-back; dustproof welded-construction elecro-dynamic loudspeaker.

On all models the dial with the dial pointer attached is a separate unit mounted on the cabinet. The drive cord connects to the pointer upon fitting the chassis in the cabinet.

MODEL 701.

Standard table model for 200-260 V. operation. Fitted with flat glass edge-lit dial scale inclined on top of cabinet and 7in. loudspeaker mounted on the chassis.

MODEL 702.

Export table model fitted with a universal power transformer for 95-250 V. operation, special export glass dial scale power switch in volume control, and with components specially impregnated to suit tropical conditions. Apart from the above details, the chassis employed is identical with that used in the Model 701.

MODEL 276.

The Console equivalent of Model 701. Fitted with visual Tuning Indicator, Convex Quadrant dial and 12in. loudspeaker detached from the chassis. The power transformer used differs from that installed in the Model 701 chassis in that the secondary voltage rating is higher to suit the loudspeaker field coil.

MODEL 316.

A Radio-Gramophone combination employing the same chassis as that used in the Model 276 plus a suitable phono. pick-up filter circuit and Radio-Phono. Switch. A Tuning Indicator is not fitted. The gramophone motor used is a "Garrard" A.C. induction type with an automatic stop device.

ALIGNMENT PROCEDURE.

Alignment should be necessary only when adjustments have been altered from the factory setting or when repairs have been made to the tuned circuits. Climatic conditions should not seriously affect the Receiver.

It is important to apply a definite procedure, as given in this booklet, and to use adequate and reliable test equipment. Instruments ideally suited to the requirements are either the A.W.A. Junior Signal Generator, Type 2R3911 or the A.W.A. Modulated Oscillators, Types J6726 and C1070.* An output meter is necessary with both these instruments.

As the calibration of the band-spread bands (16, 19, 25 and 31 M.) requires great accuracy, it is recommended that an A.W.A. Crystal Calibrator, Type 6795 be used, after setting the oscillator calibration, to check the accuracy of the Signal Generator. The Crystal Calibrator emits a modulated signal at intervals of either 100 or 1000 K.C. throughout the radio frequency spectrum, thus providing a series of fixed and equally-spaced calibration points of known accuracy. When using this instrument, care should be taken to select the correct signal. With the crystal set at the 1000 K.C. position a spurious image signal can generally be obtained by turning the tuning control of the Receiver to a point approx. 100 K.C. higher in frequency. This is a useful check as to whether a harmonic or a spurious image is being tuned. If a Crystal Calibrator is not available, broadcasting stations of known frequency may be used as an alternative.

When using a Signal Generator or Modulated Oscillator with the tuning of the Receiver fixed, two frequencies can be tuned from the test instrument, one .92 M.C. higher in frequency than the other. In all cases the desired frequency is the lower of the two.

A convenient alignment jig designed to hold the Receiver Chassis and fitted with a dial scale and pointer may be obtained from the Service Department of the Company. With this jig alignment may be carried out with the chassis coupled to an actual scale, thus ensuring that the calibration will be correct when the chassis is placed in the cabinet, otherwise use the 0-180° calibration scale on the drum. See Alignment Table.

Perform alignment in the proper order as shown in the chart, starting from No. 1 and following all operations across, then No. 2, etc. Adjustment locations are shown in figure 1 and in the layout diagrams.

Keep the Volume Control set in the maximum clockwise position and regulate the output of the test instrument so that a minimum signal is introduced to the Receiver to give a standard indication on the output meter. This will avoid A.V.C. action and overloading.

When the Receiver has been satisfactory aligned, seal the adjusting screws with a small quantity of celluloid cement to eliminate the possibility of their shifting.

* If a Type J6726 or C1070 instrument is used, see that a 250,000 ohms resistor is connected between the output terminals and for Short Wave alignment, a 400 ohms non-inductive resistor in series with the active output lead.

SIMPLE SHORT WAVE CALIBRATION ADJUSTMENT.

The Short Wave calibration may be adjusted slightly, without removing the chassis from the cabinet for full alignment, by adjusting four cores L19, L21, L23 and L25 after a station whose frequency is definitely known is received.

The correct procedure is as follows:—

(1) Set the dial pointer so that calibration is correct on the Medium Wave band.

(2) To adjust the calibration of the 16 metre band, tune in the known station, and to shift the pointer position to the left turn L19 clockwise or vice-versa until the station can be tuned in at its assigned frequency.

(3) The adjustment for the 19, 25 and 31 metre bands are similar, using L21, L23 and L25, respectively.

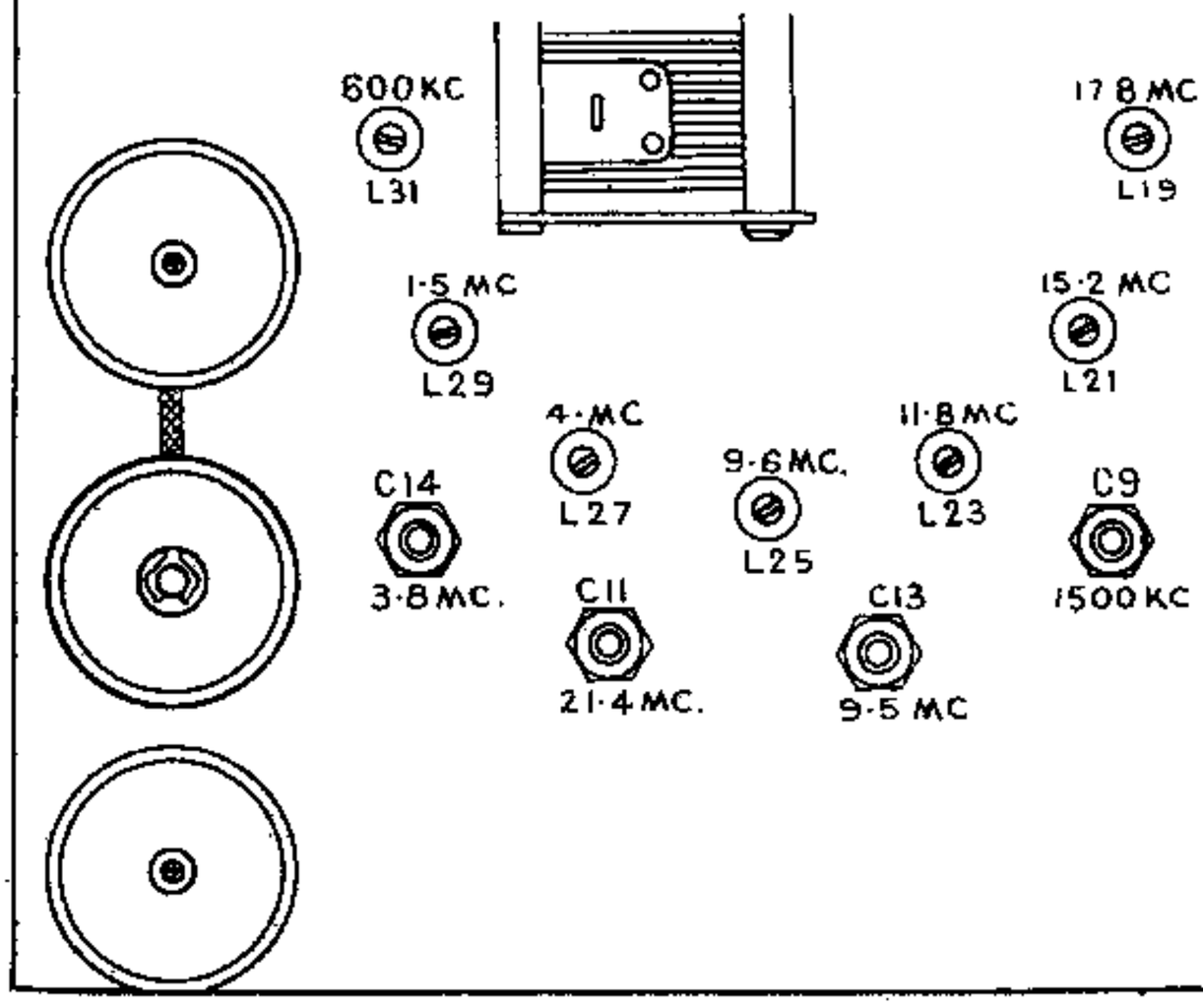


Fig. 1.—R.F. Adjustment Location.

ALIGNMENT TABLE

Align-ment Order.	Test Inst. Connection to Receiver.	Test Inst. Frequency Setting.	Receiver Band Setting.	Calibration Scale Setting.	Circuit to Adjust.	Adjustment Symbol.	Adjustment Type.	Adjust to Obtain.
1.	*6J8G Grid Cap	455 K.C.	Med. Wave Setting.	0°	2nd I.F. Trans.	L36	Core	Max. (Peak)
2.	*6J8G Grid Cap	455 K.C.	Med. Wave	0°	2nd I.F. Trans.	L35	Core	Max. (Peak)
3.	*6J8G Grid Cap	455 K.C.	Med. Wave	0°	1st I.F. Trans.	L34	Core	Max. (Peak)
4.	*6J8G Grid Cap	455 K.C.	Med. Wave	0°	1st I.F. Trans.	L33	Core	Max. (Peak)
5.	Aerial	600 K.C.	Med. Wave	17.5°†	Oscillator	L31	Core	Max. (Peak)
6.	Aerial	1500 K.C.	Med. Wave	165.5°	Oscillator	C9	Air. Trim.	Max. (Peak)
7.	Aerial	1480 K.C.	Med. Wave	161.5°	R.F.	C22	Mica Trim.	Max. (Peak)
8.	Aerial	1480 K.C.	Med. Wave	161.5°	Aerial	C7	Mica Trim.	Max. (Peak)
			Re-check adjustment 5, 6, 7, 8.					
9.	Aerial	17.8 M.C.	13-16 M.	14.5°	Oscillator	L19	Core	Calibration
10.	Aerial	17.8 M.C.	13-16 M.	14.5°	R.F.	C19	Mica Trim.	Max. (Peak)
11.	Aerial	17.8 M.C.	13-16 M.	14.5°	Aerial	C2	Mica Trim.	Max. (Peak)
12.	Aerial	21.4 M.C.	13-16 M.	150°†	Oscillator	C11	Air. Trim.	Max. (Peak)
13.	Aerial	15.2 M.C.	19 M.	18°	Oscillator	L21	Core	Calibration‡
14.	Aerial	11.8 M.C.	25 M.	22°	Oscillator	L23	Core	Calibration
15.	Aerial	11.8 M.C.	25 M.	22°	R.F.	C20	Mica Trim.	Max. (Peak)
16.	Aerial	11.8 M.C.	25 M.	22°	Aerial	C3	Mica Trim.	Max. (Peak)
17.	Aerial	9.6 M.C.	31 M.	26°	Oscillator	L25	Core	Calibration‡
18.	Aerial	9.5 M.C.	31-83 M.	169°	Oscillator	C13	Air. Trim.	Calibration
19.	Aerial	9.5 M.C.	31-83 M.	169°	R.F.	C21	Mica Trim.	Max. (Peak)
20.	Aerial	9.5 M.C.	31-83 M.	169°	Aerial	C6	Mica Trim.	Max. (Peak)
21.	Aerial	4 M.C.	31-83 M.	18°†	Oscillator	L27	Core	Max. (Peak)
			Re-check adjustment 18, 19, 20.					
22.	Aerial	1.5 M.C.	75-200 M.	3°†	Oscillator	L29	Core	Max. (Peak)
23.	Aerial	3.8 M.C.	75-200 M.	175°†	Oscillator	C14	Air. Trim.	Max. (Peak)
			Re-check adjustment 22.					

Finally, re-check Medium Wave band. This is only necessary if the setting of C11 (21.4 M.C.) has been altered.

*With grid clip connected. A .001 mfd condenser should be connected in series with the active output lead of the test instrument.

†Rock the Tuning Control back and forth through the signal.

‡An alternative method of making this adjustment is to rock the tuning control for max. peak. The calibration may be slightly out.

The column headed "Receiver Calibration Scale Setting" refers to the 180° scale on the tuning condenser drive drum. In taking readings on this scale read from the right-hand edge of the pointer; that is the edge nearest the rear of the chassis. Check setting of drum before taking readings. The zero mark should be exactly opposite the pointer with the tuning condenser plates in full mesh.

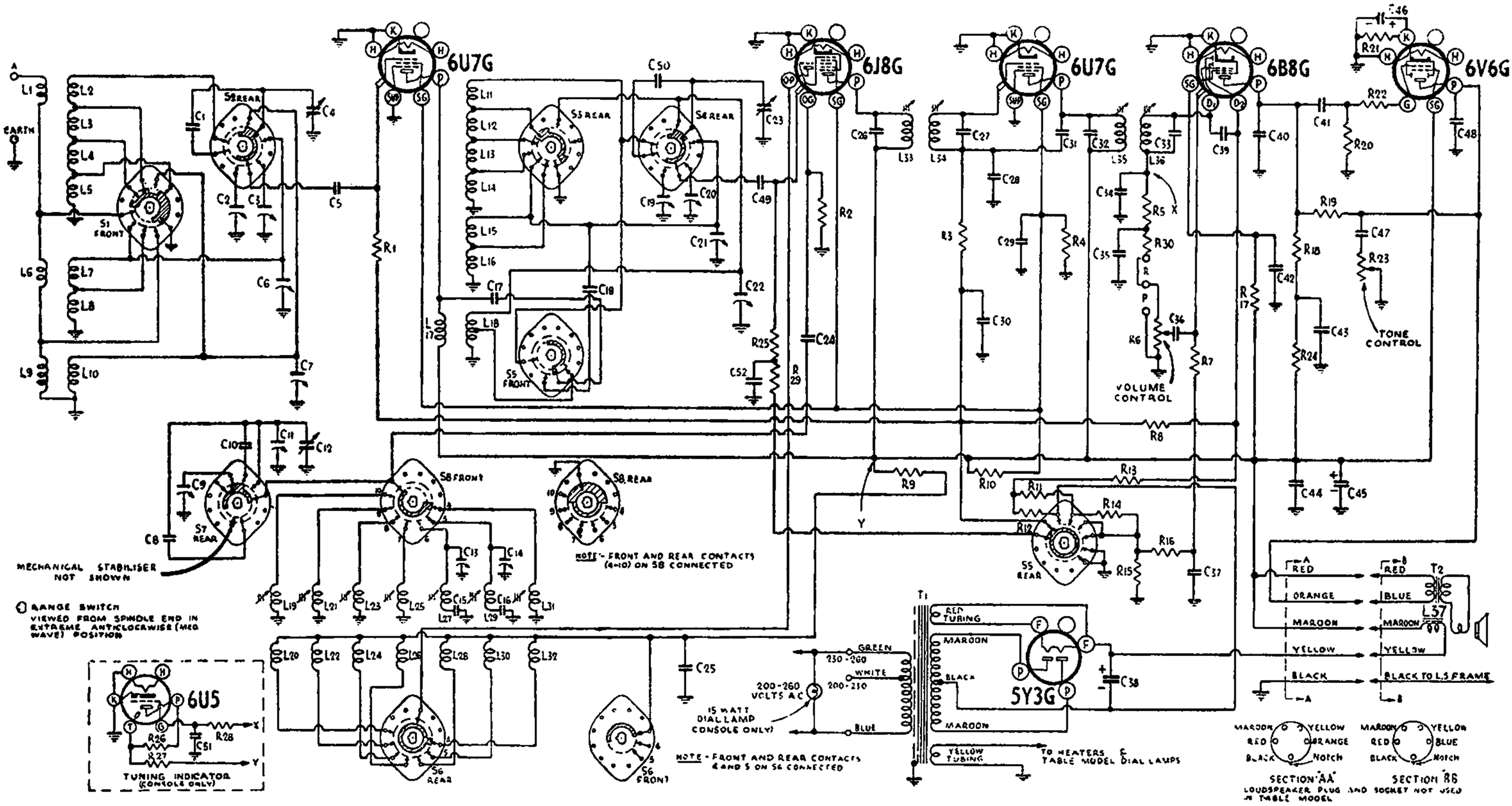
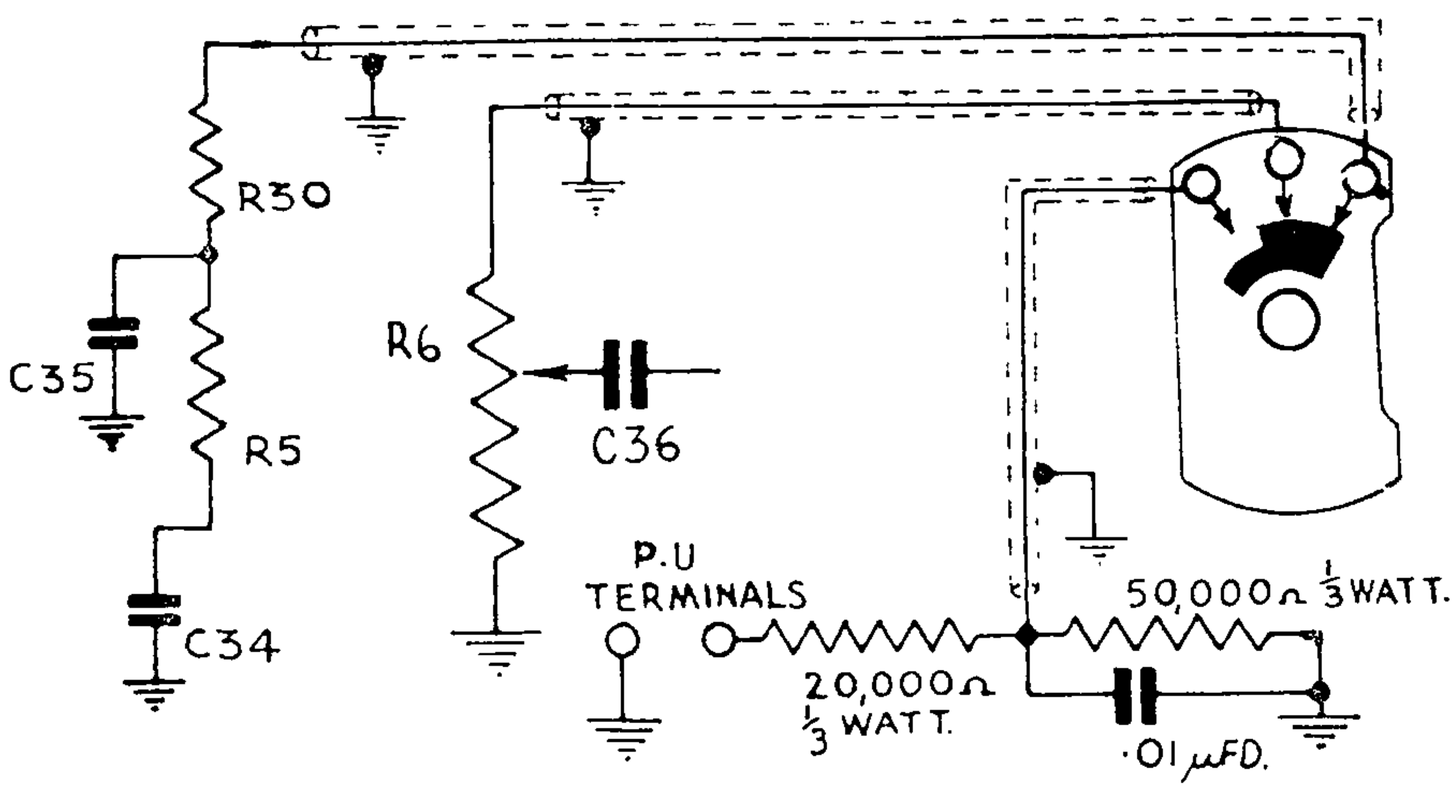


Fig. 2.—Circuit Diagram R701, R276, and R316.



Switch Viewed from Spindle End in Radio (Clockwise) Position.

Fig. 3.—Phono. Pick-up Circuit for R316.

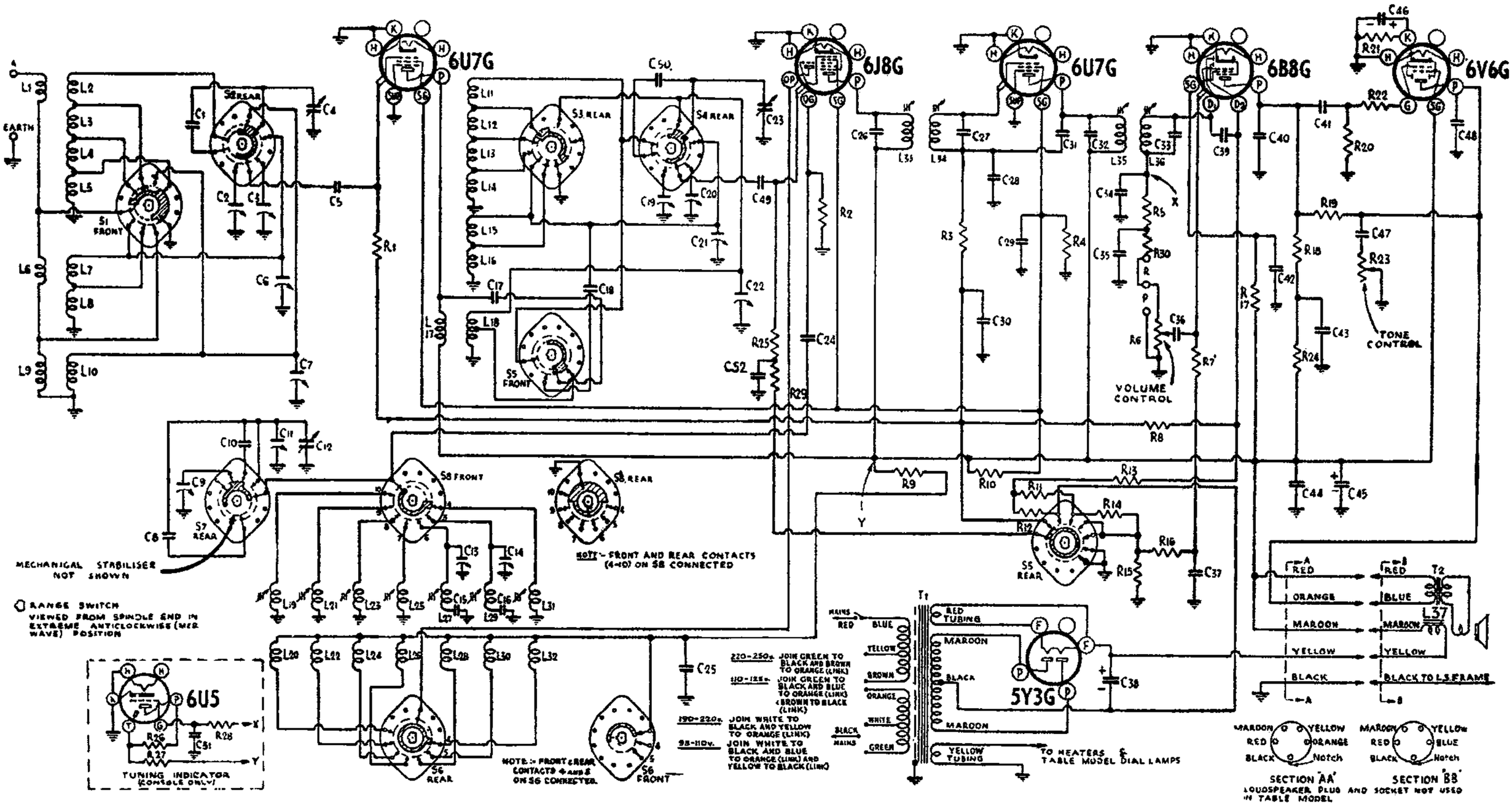


Fig. 4.—Circuit Diagram R702.

CIRCUIT CODE—R701, 702, 276 and 316

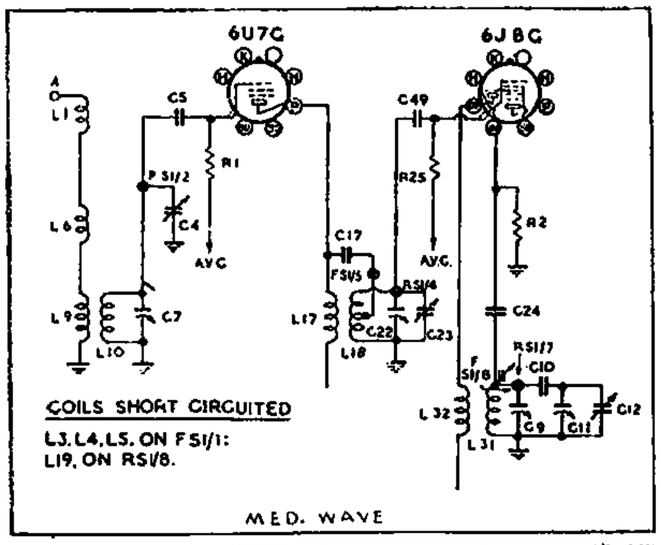
Code. No.	Part No.	COILS.
L9, 10	9748	Aerial Coil 1500-550 Kc.
L6, 7, 8	9854	Aerial Coil 75-200 M.
L6, 7	9854	Aerial Coil 31-83 M.
L1, 2, 3 L4, 5	9852	Aerial Coil 31 M.
L1, 2, 3, 4	9852	Aerial Coil 25 M.
L1, 2, 3	9852	Aerial Coil 19 M.
L1, 2	9852	Aerial Coil 13-16 M.
L17, 18	9749	R.F. Coil 1500-550 Kc.
L15, 16	9855	R.F. Coil 75-200 M.
L15	9855	R.F. Coil 31-83 M.
L11, 12 L13, 14	9853	R.F. Coil 31 M.
L11, 12, 13	9853	R.F. Coil 25 M.
L11, 12	9853	R.F. Coil 19 M.
L11	9853	R.F. Coil 13-16 M.
L31, 32	9741	Oscillator Coil 1500-550 Kc.
L29, 30	9742	Oscillator Coil 75-200 M.
L27, 28	9743	Oscillator Coil 31-83 M.
L25, 26	9744	Oscillator Coil 31 M.
L23, 24	9745	Oscillator Coil 25 M.
L21, 22	9746	Oscillator Coil 19 M.
L19, 20	9747	Oscillator Coil 13-16 M.
L33, 34	8286	1st I.F. Transformer
L35, 36	8287	2nd I.F. Transformer
L37		(Console) 1500 ohms field
L37		(Table) 1100 ohms field

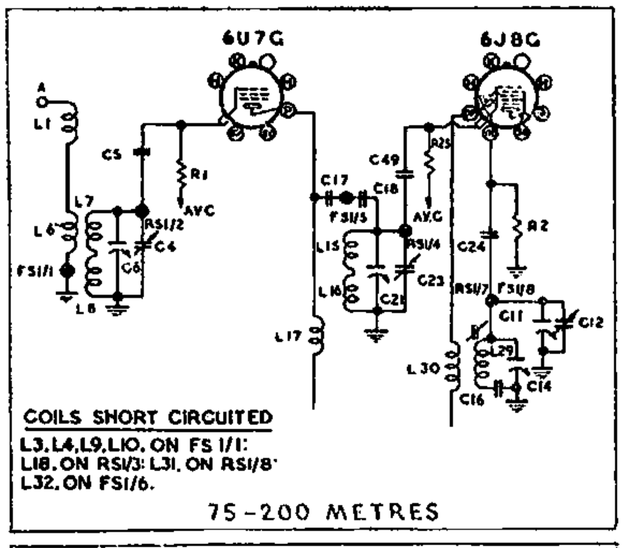
TRANSFORMERS.

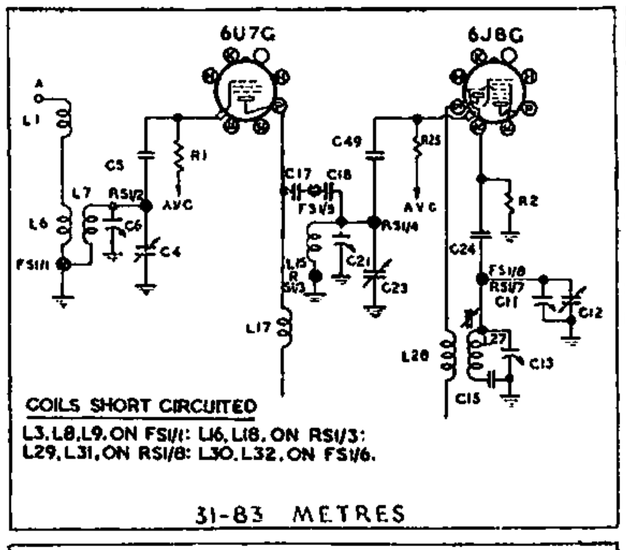
T1 (Table) T1 (Console)	7979C 8444B	Power Transformer 50-60 c.
T1 (Table) T1 (Console)	7981C 8446B	Power Transformer 40 c.
T1	9737A	Power Transformer Export
T2 (Table)	XA1	Loudspeaker Transformer
T2 (Console)	TX20	Loudspeaker Transformer

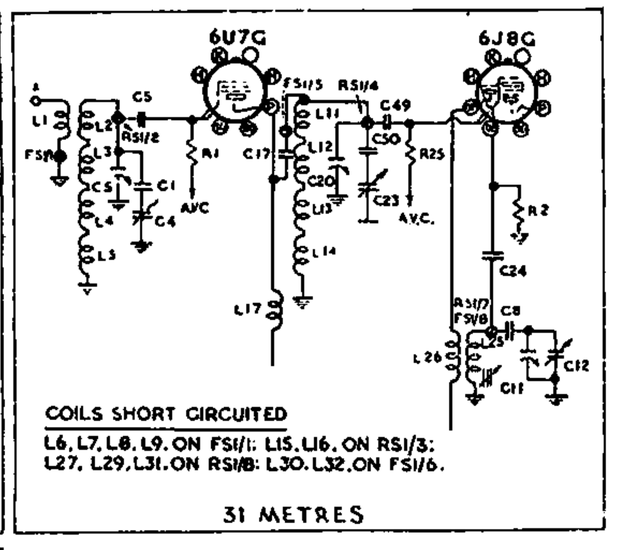
Code. No.	Part No.	RESISTORS.
R1		1 meg. 1/3 watt
R2		50,000 ohms 1/3 watt
R3		100,000 ohms 1/3 watt
R4		20,000 ohms 1 watt
R5		50,000 ohms 1/3 watt
R6	9484	500,000 ohms Vol. Control
R7		1.75 meg. 1/3 watt
R8		1.75 meg. 1/3 watt
R9		20,000 ohms 2 watt
R10		15,000 ohms 1 watt
R11		20 ohms 3 watt
R12		20 ohms 3 watt
R13		2.3 meg. 1/3 watt
R14		11 ohms 3 watt
R15		20 ohms 3 watt
R16		500,000 ohms 1/3 watt
R17		1.5 meg. 1 watt
R18		200,000 ohms 1 watt
R19		3 meg. 1 watt
R20		500,000 ohms 1/3 watt
R21		250 ohms 3 watt
R22		50,000 ohms 1/3 watt
R23	9765	100,000 ohms Tone Control
R24		50,000 ohms 1 watt
R25		1 meg. 1/3 watt
R26		1 meg. 1 watt
R27		20,000 ohms 1 watt
R28		1.75 meg. 1/3 watt
R29		1 meg. 1/3 watt
R30		50,000 ohms 1/3 watt (Console only)

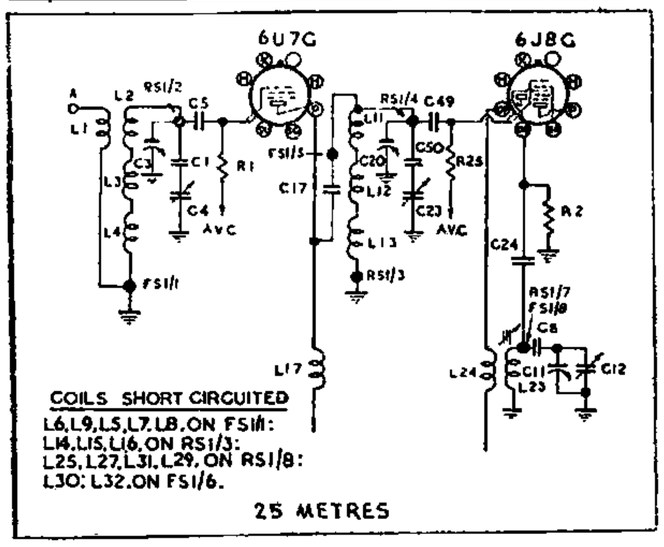
Code. No.	Part No.	CONDENSERS.
C1		53 mmfd Silvered Mica
C2		5-50 mmfd Mica Trimmer
C3		5-50 mmfd Mica Trimmer
C4	9596A	Tuning Condenser
C5		200 mmfd Silvered Mica
C6		5-50 mmfd Mica Trimmer
C7		5-50 mmfd Mica Trimmer
C8		40 mmfd Temp. Compensated
C9	3411	11-29 mmfd Air Trimmer
C10		490 mmfd Mica Padder
C11	3658	2-10 mmfd Air Trimmer
C12	9596A	Tuning Condenser
C13	3661	2-20 mmfd Air Trimmer
C14	3411	11-29 mmfd Air Trimmer
C15		2550 mmfd Mica Padder
C16		1350 mmfd Mica Padder
C17		200 mmfd Silvered Mica
C18		50 mmfd Silvered Mica
C19		3-30 mmfd Mica Trimmer
C20		3-30 mmfd Mica Trimmer
C21		3-30 mmfd Mica Trimmer
C22		3-30 mmfd Mica Trimmer
C23	9596A	Tuning Condenser
C24		70 mmfd Silvered Mica
C25		.1 mfd Paper
C26		70 mmfd Silvered Mica
C27		70 mmfd Silvered Mica
C28		.01 mfd Paper
C29		.1 mfd Paper
C30		.05 mfd Paper
C31		4 mmfd Mica
C32		70 mmfd Silvered Mica
C33		70 mmfd Silvered Mica
C34		30 mmfd Mica (U) (C'sole)
C34		110 mmfd Mica (L) (Table)
C35		30 mmfd Mica (U) (C'sole)
C35		110 mmfd Mica (L) (Table)
C36		.02 mfd Paper
C37		.1 mfd Paper
C38		16 mfd., 525 V. Electro.
C39		50 mmfd Mica (D)
C40		200 mmfd Mica (J)
C41		.02 mfd Paper
C42		.1 mfd Paper
C43		.5 mfd Paper
C44		.1 mfd Paper
C45		16 mfd., 350 Reg. Electro.
C46		25 mfd., 25 V. Electro.
C47		.1 mfd Paper
C48		.0025 mfd Paper (Console)
C48		.015 mfd Paper (Table)
C49		200 mmfd Silvered Mica
C50		53 mmfd Silvered Mica
C51		.05 mfd. Paper
C52		.05 mfd. Paper

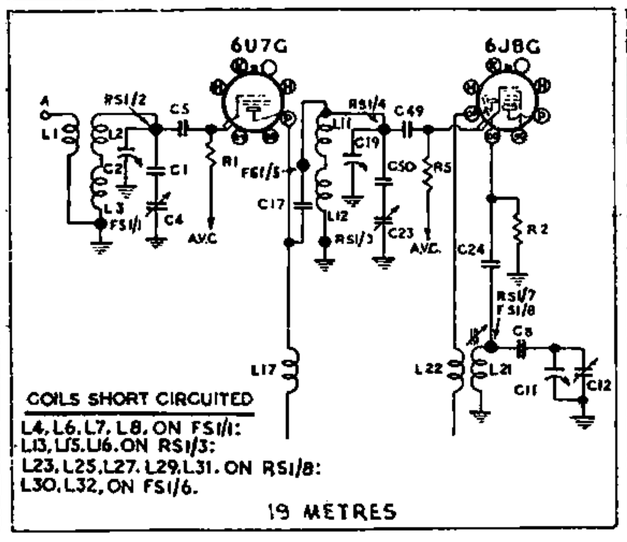


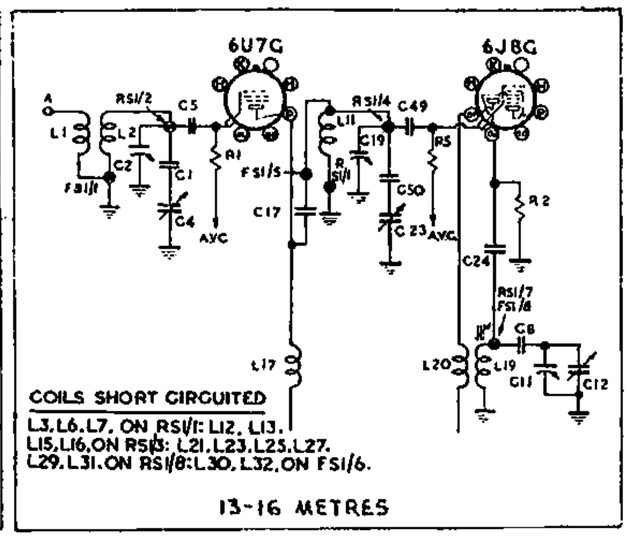












NOTE:- ● INDICATES TWO OR MORE CONNECTIONS THROUGH SWITCH SECTION

E.G. 'RSI/7' REPRESENTS 'REAR OF SECTION 7'
'FSI/8' REPRESENTS 'FRONT OF SECTION 8'

Fig. 5.—Tuning Circuit Arrangement.

DESCRIPTION OF TUNING CIRCUIT ADJUSTMENTS.

MEDIUM WAVE BAND.

The Medium Wave band adjustments follow usual practice with three trimming condensers—C7 Aerial, C22 R.F., C9 Oscillator and a variable coil adjustment L31 at the L.F. end in the oscillator section.

31-83 M. BAND.

Adjustment arrangements are the same as those used on the Medium Wave band, that is, with three trimmers—C6 Aerial, C21 R.F. and C13 Oscillator and L.F. Oscillator coil adjustment L27.

75-200 M. BAND.

All the condensers in the aerial and R.F. sections are common with those in the 31-83 M. band, the change of band being accomplished merely by switching tapped coils. The oscillator section, however, is provided with a separate condenser, C14, for tracking with the signal circuits at the H.F. end and a core adjustment, L29, for tracking at the L.F. end.

13-16 M. BAND.

At the L.F. end of this band three adjustments L19 oscillator, C19 R.F. and C2 aerial. Small series condensers C1, C50 and C8 are used in series with the tuning condenser sections to accomplish band-spreading at the L.F. end of this band, the oscillator circuit is made to track with the signal circuits at the H.F. end by adjustment of C11. The three series condensers mentioned above are chosen to give three point tracking between signal and oscillator circuits.

19 M. BAND.

The capacity system is exactly the same as for the 13-16 M. band, the change of band being accomplished merely by switching coils, the oscillator of which is variable (L21) for the adjustment at the L.F. end of the band.

25 M. BAND.

Adjustments are similar to those on the 13-16 M. band except that there is no H.F. adjustment for the oscillator. Adjustments at L.F. end are trimmers C20 and C3 and core L23.

31 M. BAND.

Only one adjustment (L25) as on the 19 M. Band.

It will be noticed that the ratio, $\frac{\text{max. frequency}}{\text{min. frequency}}$ is the same on the four bands, 31 M., 25 M., 19 M., 13-16 M. and the tracking is practically correct using the same series condenser for all four bands. The ratio, $\frac{\text{max. frequency}}{\text{min. frequency}}$ is also the same on the 75-200 M. and 31-83 M. bands, but due to the greatly different frequency spectrum of the oscillator, the series condensers in the two oscillator circuits are different.

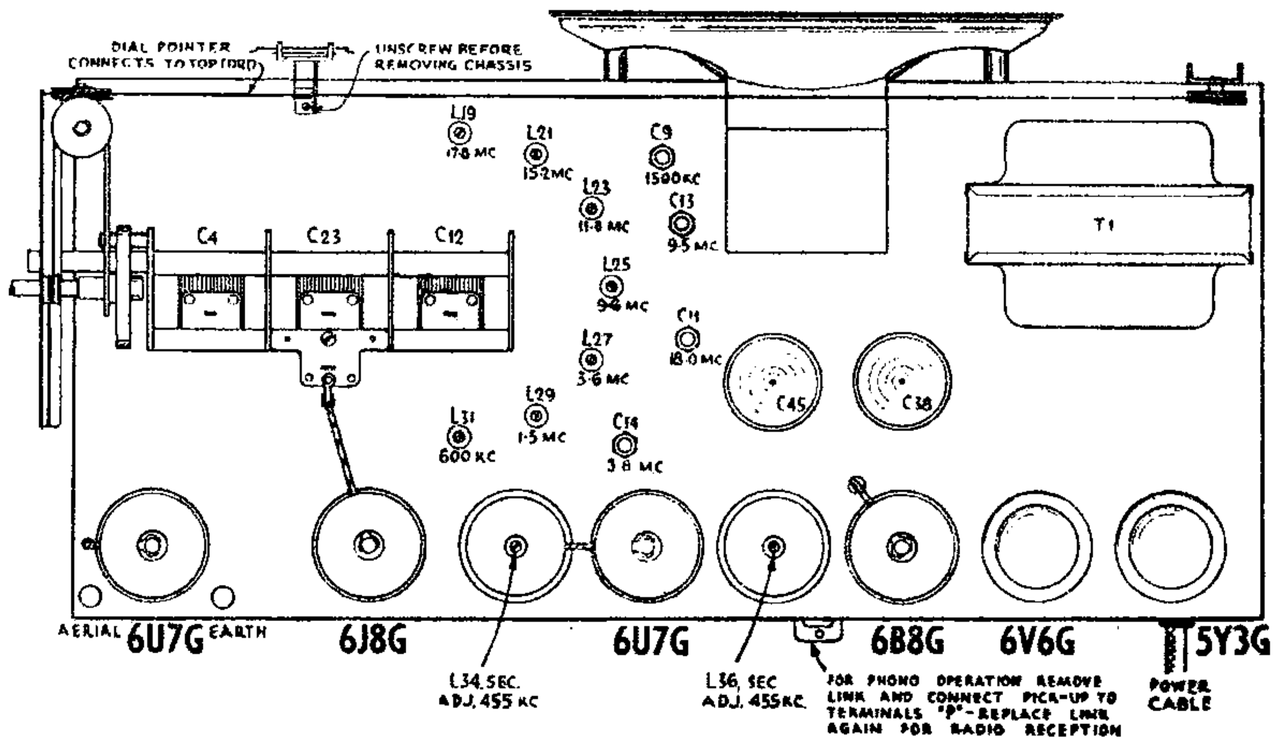


Fig. 6.—Layout Diagram (Top View).

SOCKET VOLTAGES.

VALVE.		Control Grid to Chassis Volts.	Cathode to Chassis Volts.	Screen Grid to Chassis Volts.	Plate to Chassis Volts.	Plate Current M.A.	Heater Volts.
6U7G	R.F. Amp.	-3.9*	0	100	255	7.0	6.3
6J8G	Converter M.W.	-3.9*	0	100	255	0.8	6.3
	S.W.	-4-5*	0	100	255	0.6-0.8	—
	Oscillator	—	—	—	150	5.0	—
6U7G	I.F. Amp.	-3.9*	0	100	255	7.0	6.3
6B8G	Detector	-1.5*	0	30*	125*	0.5	6.3
6V6G	Output	0	12.5	255	245	44.0	6.3
5Y3G	Rectifier (Mantel) 700/350 V.				80 M.A. Total Current Drain.		5.0
5Y3G	Rectifier (Console) 800/400 V.				80 M.A. Total Current Drain.		5.0

* Cannot be measured with ordinary voltmeter.
Measured with Receiver connected to 240 volts A.C. Supply.
Volume Control at maximum. No signal input.

Fig. 7.—Layout Diagram (Underneath View).

MECHANICAL REPLACEMENT PARTS.

DESCRIPTION.	Part No.
Dial Frame Assembly with Cylindrical Band Indicator—	
Model 701	9594A
,, 702	9594B
,, 276	9475A
Dial Frame Assembly with Disc Band Indicator—	
Model 701	10350A
,, 702	10350B
,, 316	10350A
Dial Scale — Models 701 and 316	9462
Model 702	9464
,, 276	9461
Band Indicator Assembly (Cylindrical—	
Model 701	9473A
,, 702	9473E
,, 276	10262A
Band Indicator Assembly (Disc)—	
Model 701	10351
,, 702	10351
,, 316	10351

DESCRIPTION.	Part No.
Calibration Scale — 0 — 180°	9409
Dial Pointer Drive Cord	9576C
Dial Pointer Drive Cord Spring	6641
Pointer Drive Drum	9090
R.F. Switch and Coil Unit	9740
Tuning Control Knob	8075
Volume, Tone, Radio-Phono. Knobs	4589
Range Switch Knob	5846
Valve Sockets (5)	4704
Valve Socket (Cushion)	7326
Valve Shields	8147
Valve Clips	7459
Dial Lamp Sockets (Models 701, 702, 316)	4194
Dial Escutcheon (Model 276)	5850
Loudspeaker Cone Assembly—AW9	9356
AS13	7071

POWER SUPPLY VOLTAGE ADJUSTMENT (MODEL 702).

A Voltage Selector Panel is situated on the rear of the chassis and is protected by a cover plate which must not be removed unless the power supply has been switched OFF and the plug removed from the power point.

Connection details for the four voltage ranges as shown in figure 8 are as follows:

220-250 VOLTS.

The instrument is shipped with the Voltage Selector Panel connected for use on this range, that is with one link connecting the two lower terminals as shown in fig. 8a.

110-125 VOLTS.

To operate on this range, two links are used to connect the upper terminals with the lower—see fig. 8b. The second link will be found fastened to the outside of the cover plate.

190-220 VOLTS.

Connect one link as for 220-250 volts range fig. 8a with the Voltage Selector Panel rewired as shown in fig. 8d. Viz.—Interchange brown with yellow and green with white. It is necessary to remove the chassis from the cabinet to do this.

95-110 VOLTS.

Connect two links as for the 110-125 volts range fig. 8b with the Voltage Selector Panel rewired as shown in fig. 8d. It is necessary to remove the chassis from the cabinet to do this.

The original wiring of the Voltage Selector Panel is also shown in fig. 8c.

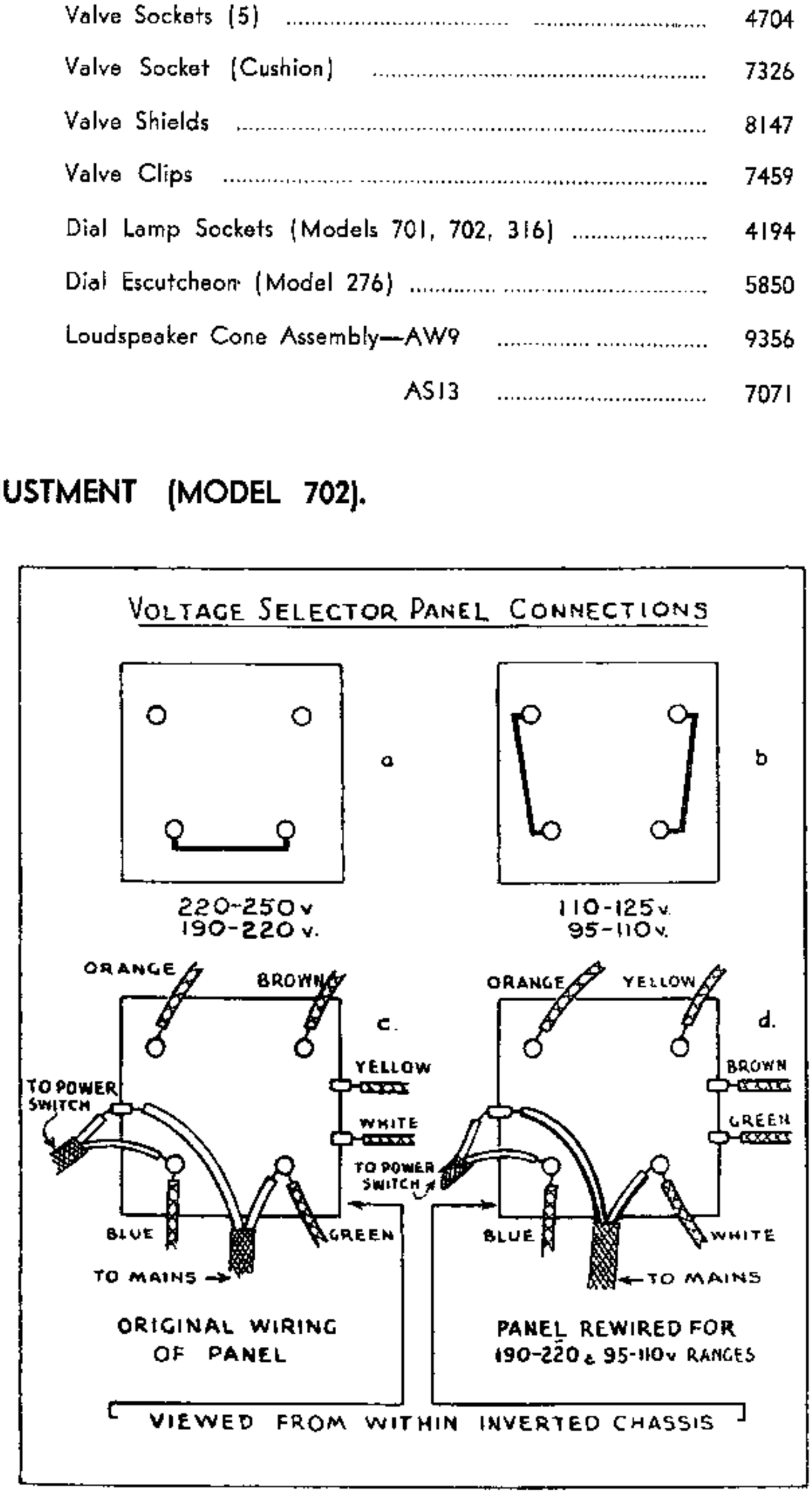


Fig. 8.

CHASSIS REMOVAL.

To remove the chassis from the cabinet, proceed as follows:

(1) Turn the Tuning Control to bring the dial pointer to its end of travel past 550 K.C., make a note of pointer position and disconnect pointer from drive cord. Make sure that the tuning condenser plates are in full mesh and that the pointer is in its original position on replacing the chassis.

(2) Withdraw dial lamp conecting leads from terminals on the chassis base. When replacing, make sure that the black lead is inserted in the terminal nearest the chassis front.

(3) Remove all knobs excepting that on the Range Switch. The two on the cabinet front are fastened by set screws, the Tuning Control knob at the side pulls straight off.

(4) Two types of Band-Indicator are used, one cylindrical, the other a disc type. Instructions for disconnecting the Range Switch spindle differ for type of indicator and they are as follows:

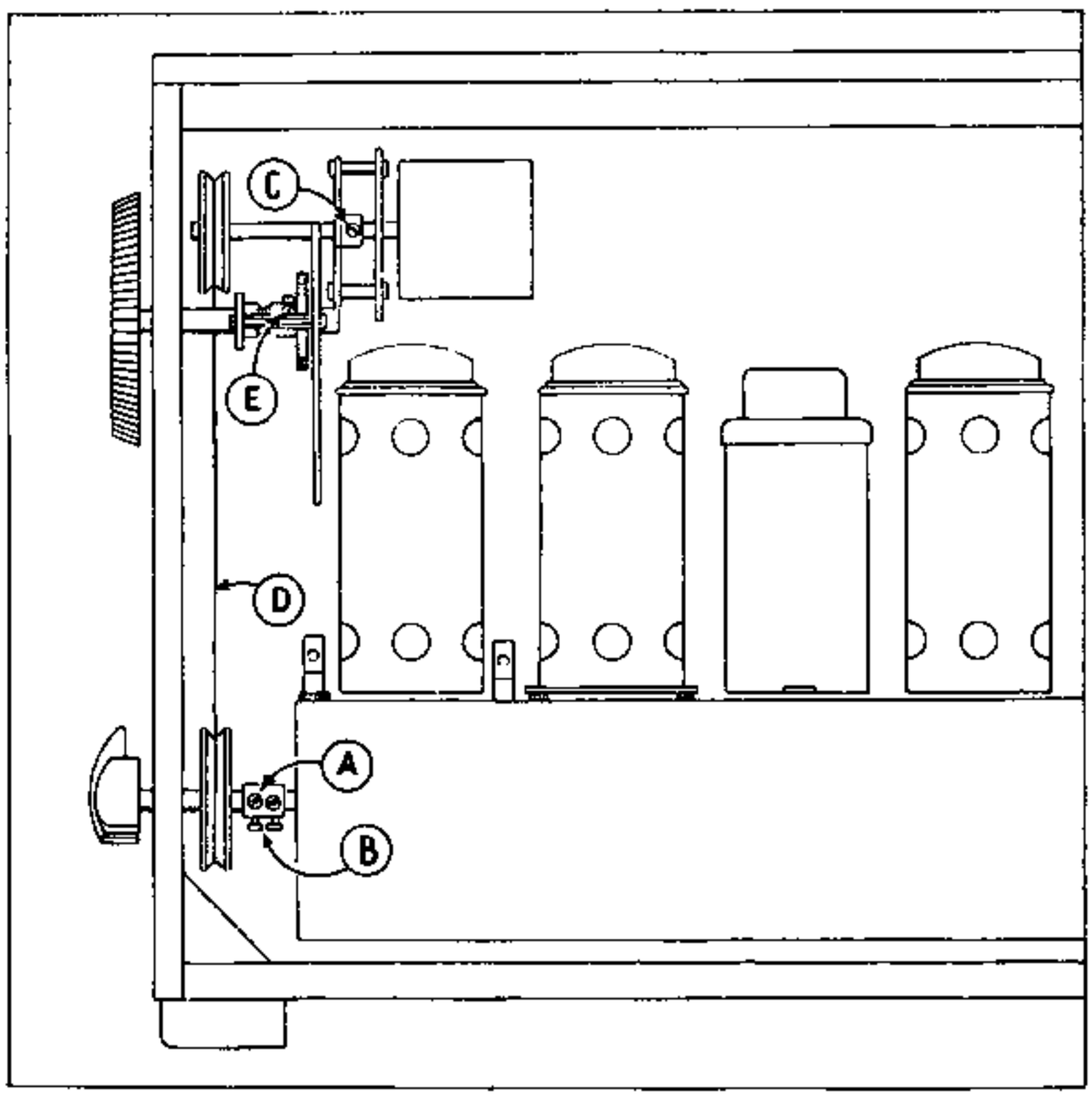


Fig. 9.

CYLINDRICAL INDICATOR.

Fig. 9 illustrates the correct procedure. The spindle is joined by a coupling within the cabinet. Turn the Range Switch to the 25 M. position and loosen the one screw B nearest the chassis. Do not loosen the screw adjacent to the pulley. Turn the Range Switch to the 13-16 M. position and tighten screw C on the band indicator shaft. Loosen the one screw A nearest the chassis and part the spindle. Leave the extension spindle, with pulley attached, in the cabinet and take care not to unwind the drive cord from the pulley.

DISC TYPE INDICATOR.

Fig. 10 illustrates the correct procedure. First, with the forefinger carefully lift the Band-Indicator drive cord from its upper jockey pulley and let the cord drop down behind the pulley. Loosen the two screws in the coupling as in the case of the cylindrical indicator and part the spindle. Leave the extension spindle, with pulley attached, in the cabinet and take care not to unwind the drive cord from the pullley.

On replacing the chassis, see that the Range Switch is set in the 13-16 M. position, place the extension spindle on the main spindle so that screw A is opposite the flat on the spindle, with the drive cord taut, and tighten screw A. Loosen screw C, turn the Range Switch to the 25 M. position and tighten screw B.

(5) The Tuning Control spindle is held by two screws E in the flywheel boss—see figs. 9 and 10. Loosen screws E and push the spindle inwards sufficiently to allow the chassis to be withdrawn without fouling the cabinet.

(6) Remove four bolts from beneath the cabinet and withdraw the chassis.

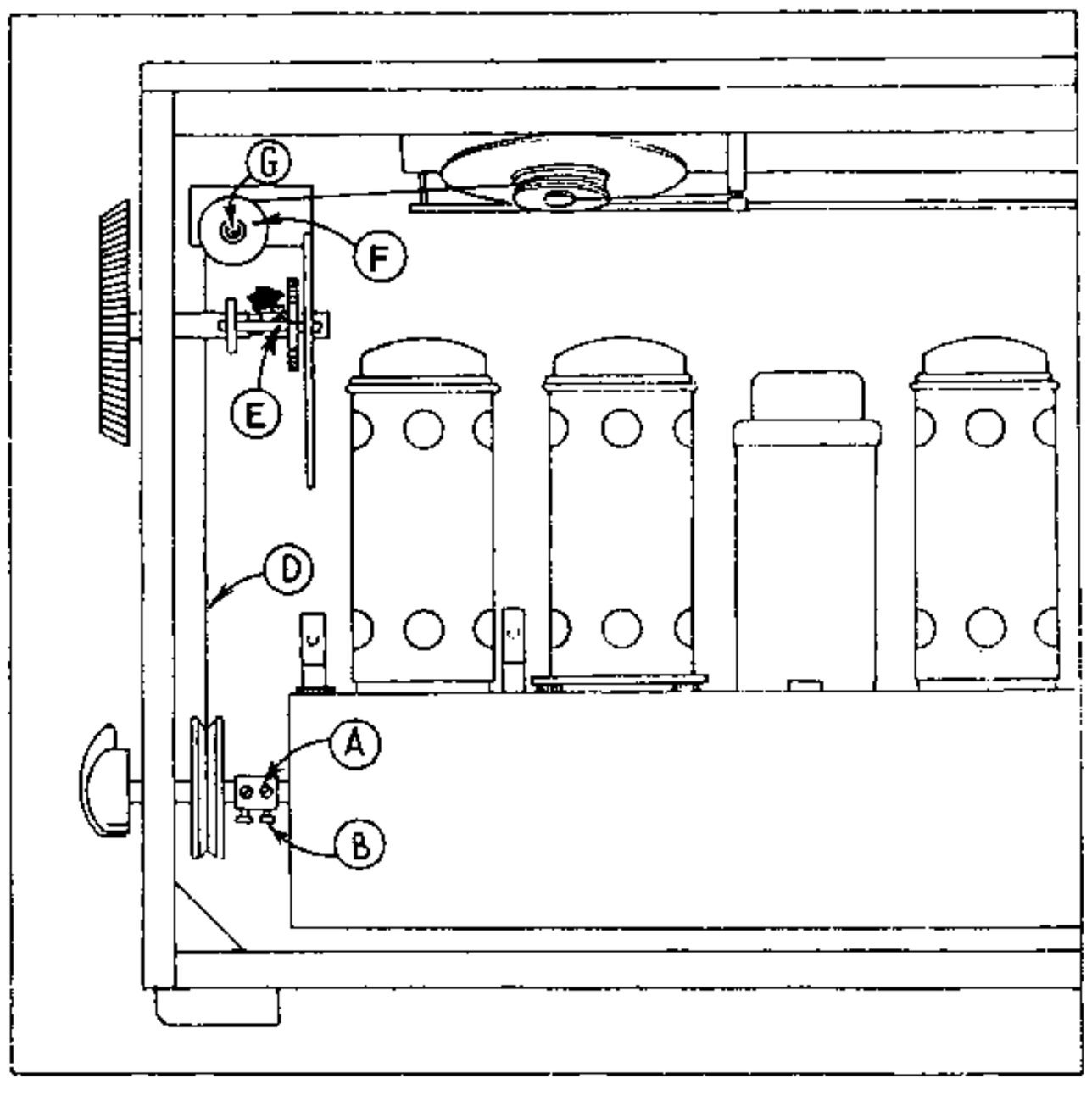


Fig. 10.

MODEL 316. GRAMOPHONE MOTOR SERVICE.

AUTOMATIC STOP ADJUSTMENT.

The Patent Stop and Switch is fully automatic.

As the needle travels towards the centre of the Record, the Pick-up Arm moves Friction Plate A (see fig. 11), which, through the friction pad and spring, carries with it the Main Lever B and Trip Lever C.

This Main Lever moves in towards the Turntable Spindle on which is mounted the Striker, which gently wipes against the rubber bush on end of Trip Lever C at every revolution, thus tapping back the Main Lever B (the friction between Lever A and Lever B allows this).

The "tapping back" process continues until the needle reaches the "run-in" groove in the centre of the record. The trip lever is now moved forward into the path of the striker, which strikes the side of the lever and trips the Stop mechanism.

If Stop fails to operate at finish of record, there is probably insufficient friction between Lever A and Lever B. This may be rectified by turning the friction screw in Lever B in a counter-clockwise direction.

When Stop operates early, i.e., before needle reaches the end of the record, the trouble is either due to excessive friction or to the rubber bush on the trip lever being worn. Friction can be reduced by turning the friction screw clockwise.

As this adjustment is very sensitive, the screw should not be turned more than a quarter of a turn at a time. Excessive friction may cause a knocking sound to be heard in the loudspeaker and undue wear on records.

When the rubber bush is worn, this may be turned round on its pin to expose a new face to the striker.

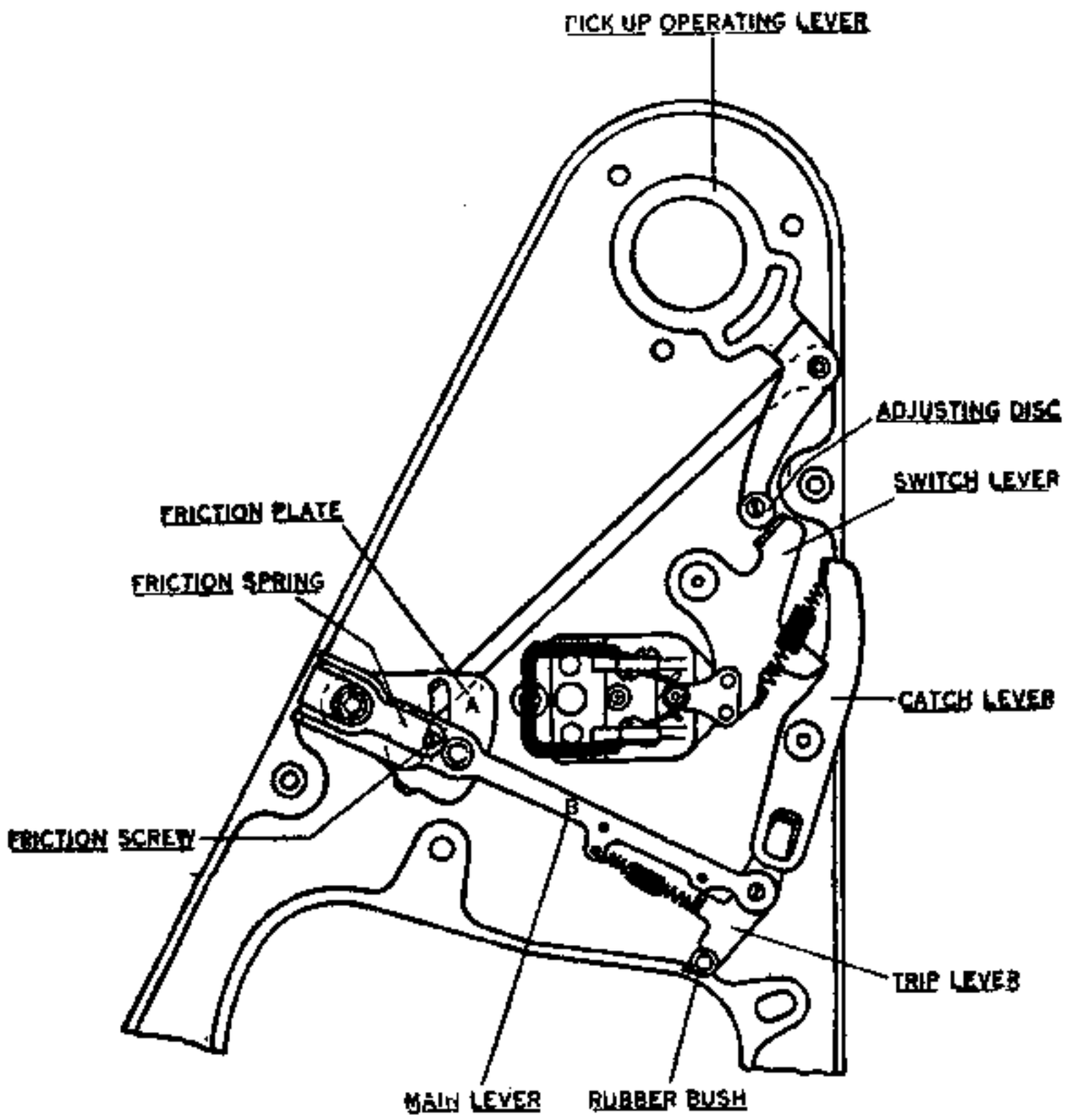


Fig. 11.