

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 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.

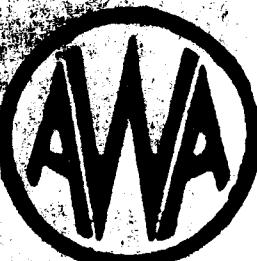
Adjustments are similar to those on the 13-16 M. band except that there is no H.F. adjustment for the oscillator. Adjustments at L.F. end are trimmers C20 and C3 and core L23.

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.

NOTE: • INDICATES TWO OR MORE CONNECTIONS THROUGH SWITCH SECTION
EG 'R57' REPRESENTS 'REAR OF SECTION OF'
EG 'F50' REPRESENTS 'FRONT OF SECTION OF'

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. (15.3-19.9 metres)
- (7) 22.5-17.7 M.C. (13.3-17 metres)

R.F. ALIGNMENT FREQUENCIES.

OSCILLATOR.

- (1) 600 K.C. (core) 1500 K.C. (Air Tr.)
- (2) 1.5 M.C. " 3.8 M.C. "
- (3) 4.0 M.C. " 9.5 M.C. "
- (4) 9.6 M.C. "
- (5) 11.8 M.C. "
- (6) 15.2 M.C. "
- (7) 17.8 M.C. "

R.F.

- 1480 K.C. (Mica Tr.)
- " "
- " "
- " "
- " "
- " "
- " "

AERIAL

- 1480 K.C. (Mica Tr.)
- " "
- 9.5 M.C. "
- " "
- 11.8 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. | (4) 6B8G Det., A.V.C. & A.F. Amp. |
| (2) 6J8G Converter. | (5) 6V6G Output. |
| (3) 6U7G I.F. Amplifier. | (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 sides.

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 XAI.

Field Coil Resistance, 1100 ohms.

Voice Coil Impedance, 3 ohms at 100 cycles.

MODELS 276 & 316.

Type AS13—12 inch.

Transformer TX20.

Field Coil Resistance, 1500 ohms.

Voice Coil Impedance, 2.2 ohms at 100 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 electro-dynamic loud-speaker.

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

ON TUNER 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. loud-speaker 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 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 satisfactorily 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.

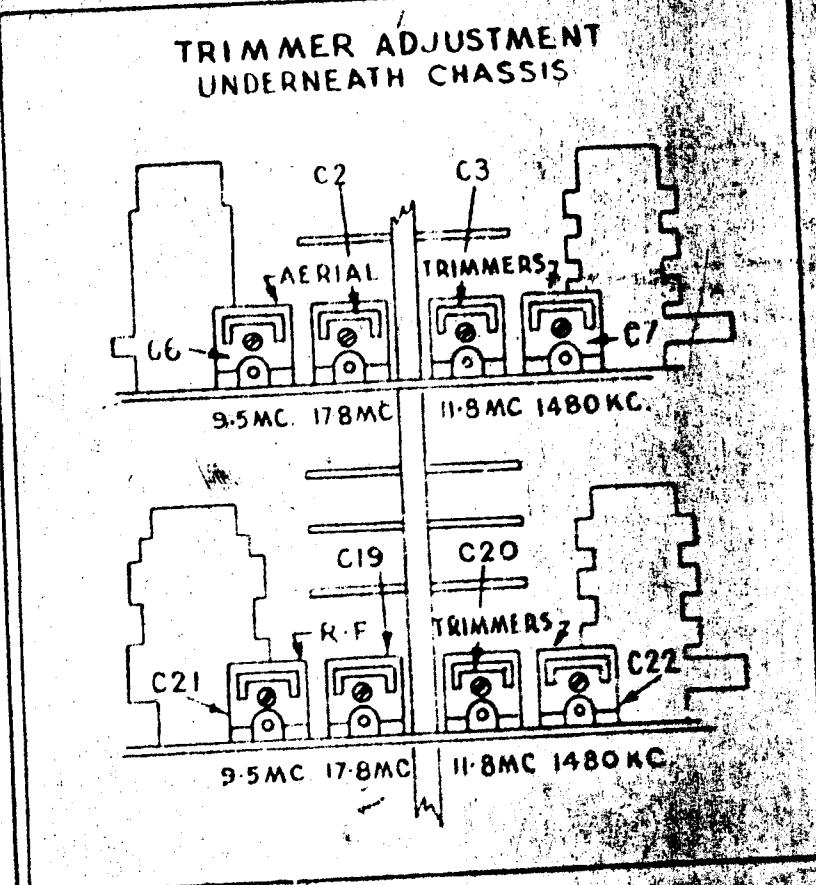
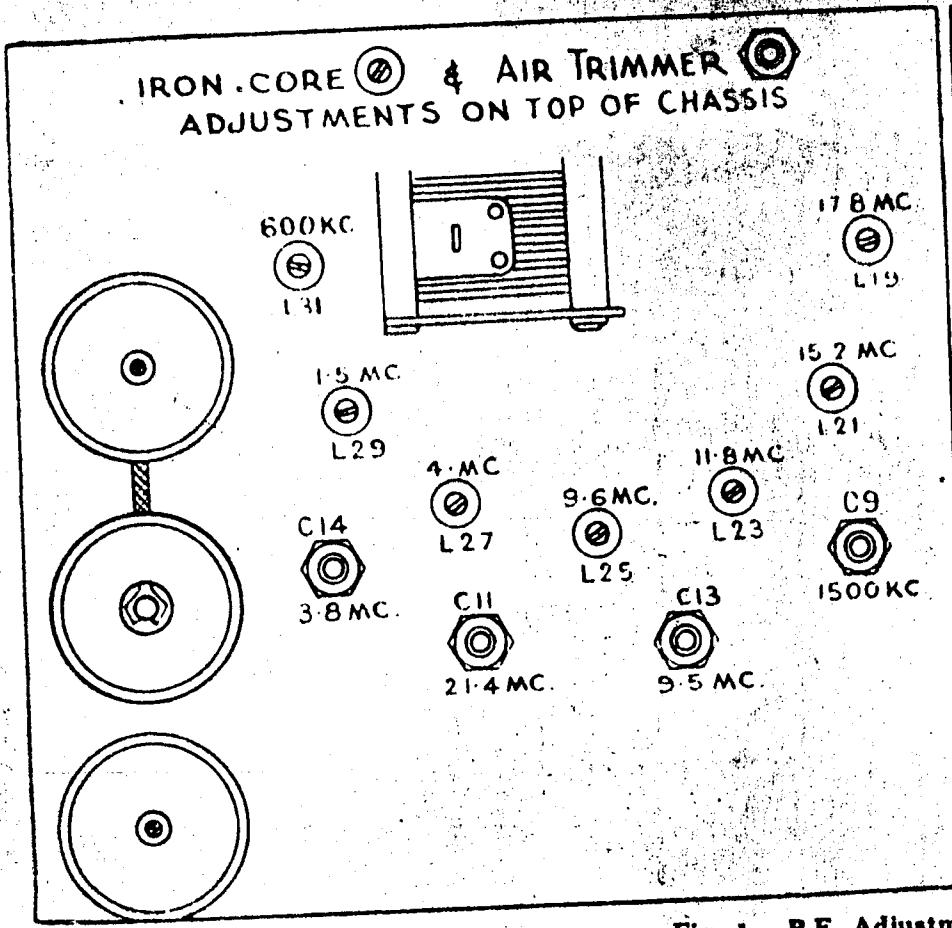


Fig. 1.—R.F. Adjustment Location.

ALIGNMENT TABLE

Alignment Order.	Test Inst. Connection to Receiver.	Test Inst. Frequency Setting.	Receiver Band Setting.	Receiver Calibration Scale Setting.	Circuit to Adjust.	Adjustment Symbol.	Adjustment Type.	Adjust to Obtain.
1.	*6J8G Grid Cap	455 K.C.	Med. Wave	0°	2nd I.F. Trans.	L36	Core	
2.	*6J8G Grid Cap	455 K.C.	Med. Wave	0°	2nd I.F. Trans.	L35	Core	
3.	*6J8G Grid Cap	455 K.C.	Med. Wave	0°	1st I.F. Trans.	L34	Core	
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	180 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.					Calibration
9.	Aerial	17.8 M.C.	13-16 M.	14.5°	Oscillator	L19	Core	Max. (Peak)
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	Calibration
		Re-check adjustment 18, 19, 20.						Max. (Peak)
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 off.

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.

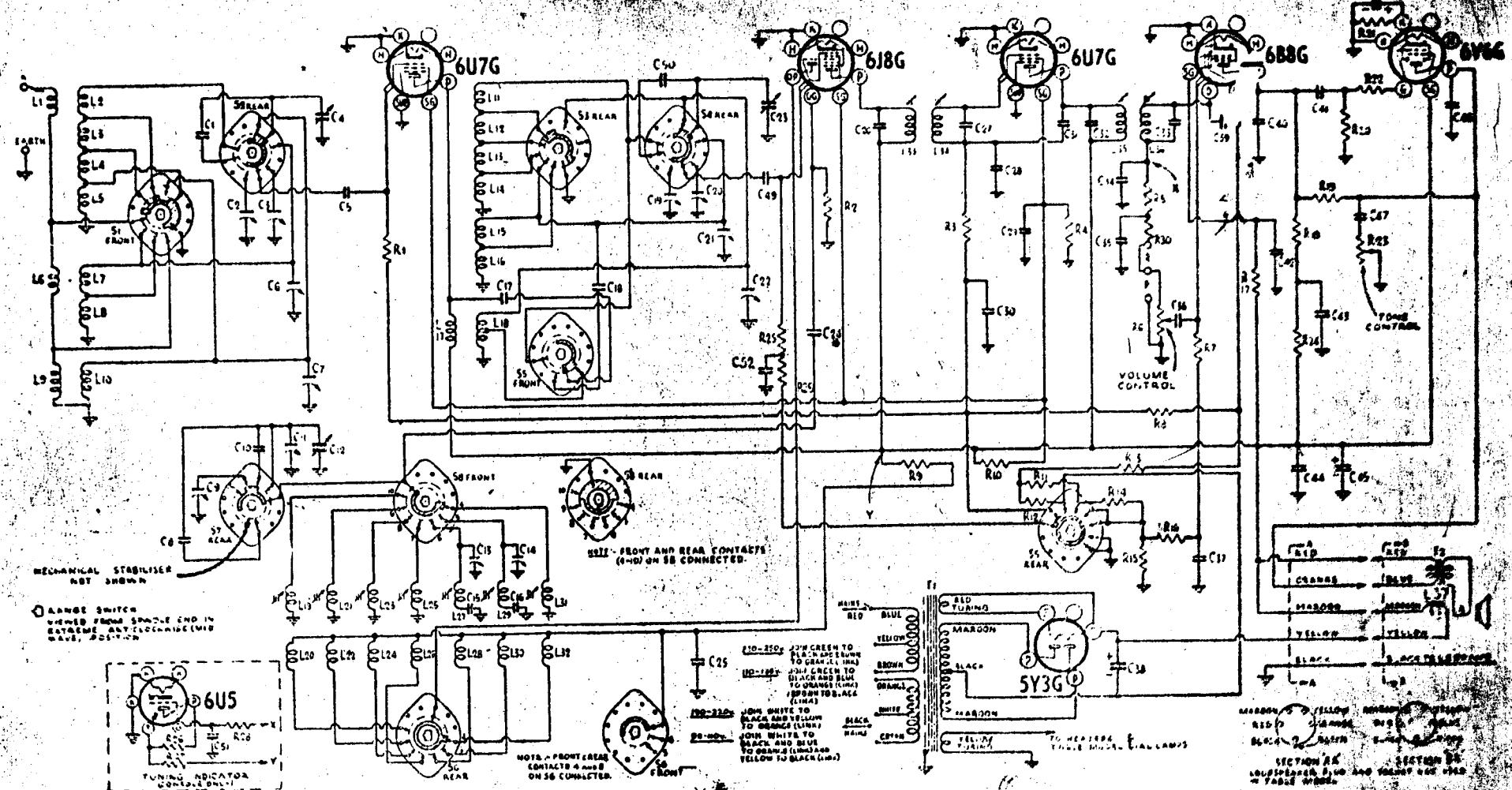


Fig. 4.—Circuit Diagram R702.

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	9852	Aerial Coil 31 M.
L4, 5		
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	9853	R.F. Coil 31 M.
L13, 14		
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)	7979C	Power Transformer
T1 (Console)	8444B	30-60 c.
T1 (Table)	7981C	Power Transformer
T1 (Console)	8446B	40 c.
T1	9737A	Power Transformer Export
T2 (Table)	XAI	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		100,000 ohms 1/3 watt
R21		200 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. 1/3 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

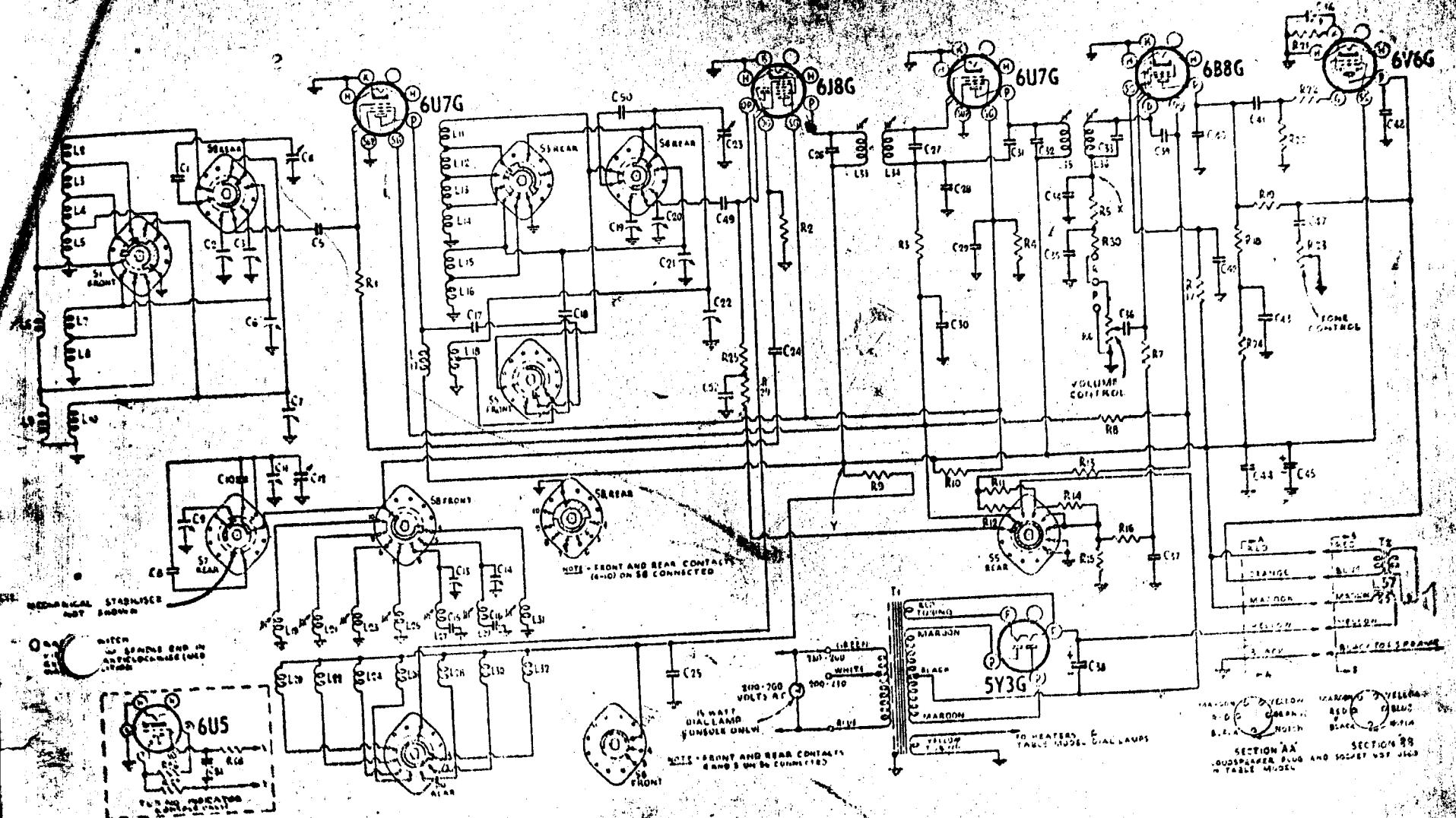
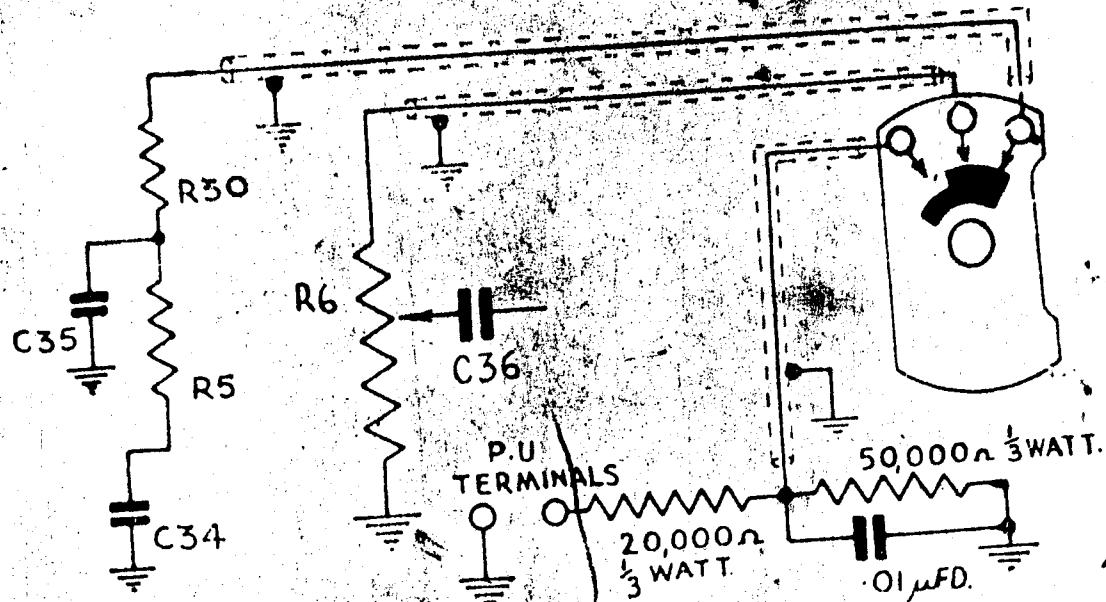


Fig. 2.—Circuit Diagram R701, R276, and R316.



Switch Viewed from Spindle End in Radio (Clockwise) Position

Fig. 3.—Phono Pickup Circuit for R316.

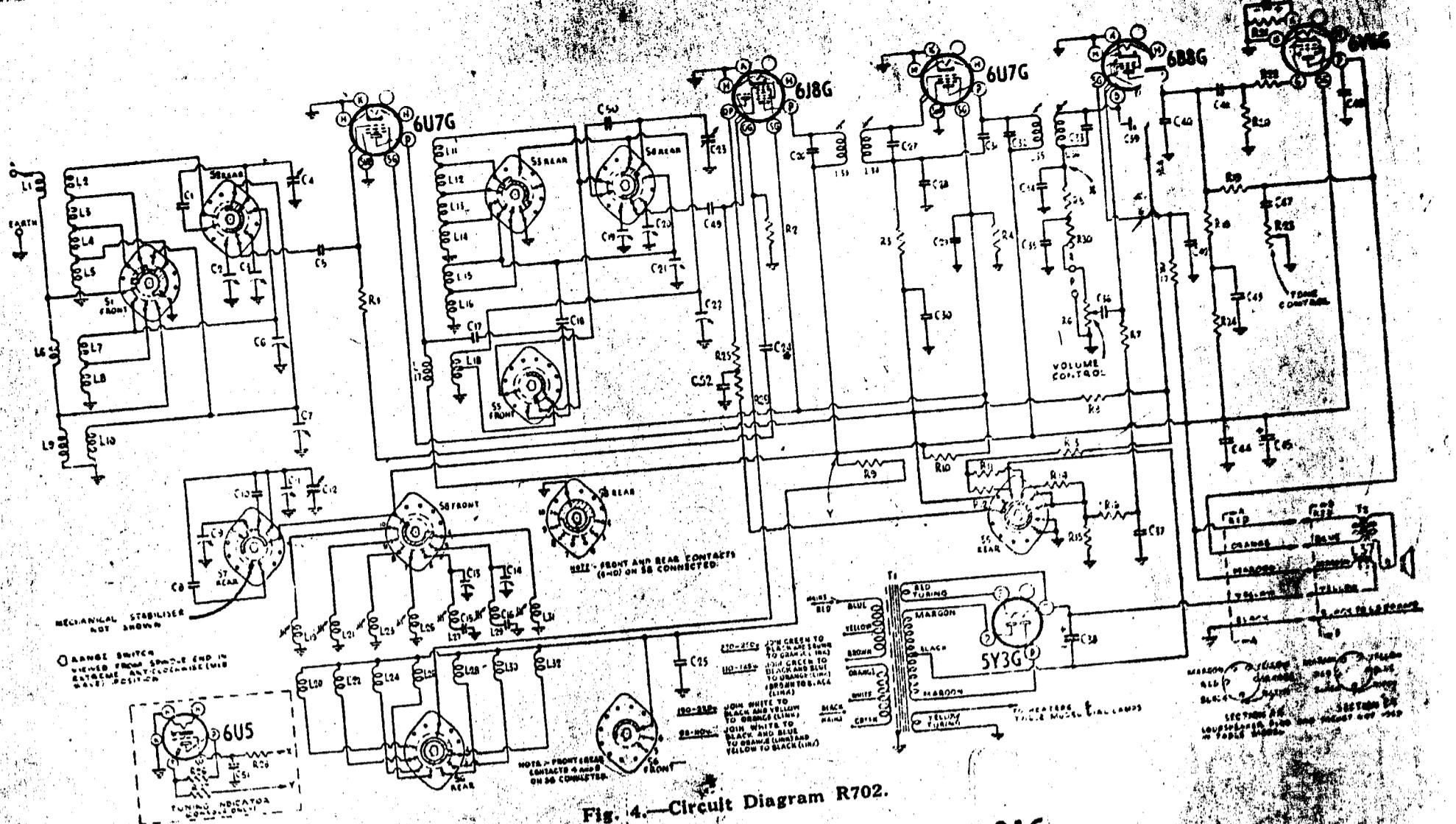


Fig. 4. Circuit Diagram R702.

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L4, 5	19852	Aerial Coil 25 M.
L1, 2, 3, 4	19852	Aerial Coil 19 M.
L1, 2, 3	19852	Aerial Coil 13-16 M.
L1, 2	19852	Aerial Coil 1500-550 Kc.
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	19853	R.F. Coil 31 M.
L13, 14	19853	R.F. Coil 25 M.
L11, 12, 13	19853	R.F. Coil 19 M.
L11, 12	19853	R.F. Coil 13-16 M.
L11	19853	Oscillator Coil 1500-550 Kc.
L31, 32	9741	Oscillator Coil 75-200 M.
L29, 30	9742	Oscillator Coil 31-83 M.
L27, 28	9743	Oscillator Coil 31 M.
L25, 26	9744	Oscillator Coil 25 M.
L23, 24	9745	Oscillator Coil 19 M.
L21, 22	9746	Oscillator Coil 13-16 M.
L19, 20	9747	Oscillator Coil 1500-550 Kc.
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)	7979C	Power Transformer
T1 (Console)	8444B1	30-60 c.
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T2 (Console)	TX20	Loudspeaker Transformer

Code. No.	Part No.	RESISTORS.
R1		1 meg. 1/3 watt
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R3		100,000 ohms 1/3 watt
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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
R10		20,000 ohms 2 watt
R11		15,000 ohms 1 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		1.2 meg. 1 watt
R18		200,000 ohms 1 watt
R19		3 meg. 1 watt
R20		50,000 ohms 1/3 watt
R21		200 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.
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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
C14	3411	11-29 mmfd Air
C15	2550	mmfd Mica
C16	1350	mmfd Mica
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	.01	mfd Paper
C28	.01	mfd Paper
C29	.05	mfd Paper
C30	4	mmfd Mica
C31	70	mmfd Silvered Mica
C32	70	mmfd Silvered Mica
C33	30	mmfd Mica (U) (C'sol)
C34	110	mmfd Mica (L) (Tabl)
C35	30	mmfd Mica (U) (C'sol)
C36	110	mmfd Mica (L) (Tabl)
C37	.02	mfd Paper
C38	.1	mfd Paper
C39	16	mfds. 525 V. Electro
C40	50	mmfd Mica (D)
C41	200	mmfd Mica (J)
C42	.02	mfd Paper
C43	.1	mfd Paper
C44	.5	mfd Paper
C45	.1	mfd Paper
C46	16	mfds. 350 Reg. Ele
C47	25	mfds. 25 V. Electro
C48	.1	mfd Paper
C49	.0025	mfd Paper (Con
C50	.015	mfd Paper (Tab
C51	200	mmfd Silvered M
C52	.53	mmfd Silvered M
	.05	mfd. Paper
	.05	mfd. Paper