The FISK
RADIOLA
MODELS 50 and 165

•

Five Valve, Two Band, Battery-operated
Superheterodynes

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TECHNICAL INFORMATION
AND SERVICE DATA

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Amalgamated Wireless (Australasia) Ltd

THE FISK RADIOLA, MODELS 50 and 165

Five Valve, Two Band, Battery-operated, Superheterodynes

TECHNICAL INFORMATION

Electrical Specifications

TUNING RANGES.

"Standard Medium Wave" "a" .... 1500-550 K.C.
"Short Wave" "b" ..... 16-50 metres

ALIGNMENT FREQUENCIES.

"Standard Medium Wave" "a" ..... 1400 K.C.
600 K.C.
"Short Wave" "b" ..... 18 metres

Intermediate Frequency.....460 K.C.

CURRENT CONSUMPTION.	Mantel & Console ("B")	Console ("V")
"A" battery at 2 volts	0.60 amps.	
"A" battery at 6 volts		1.2 amps.
"B" battery at 135 volts	15-18 M.A.	(Supplied from Vibrator power unit)
Replacement Fuse	3/8 amp.	3 amp.

VALVE COMPLEMENT.

(1) 1C6.....Detector-Oscillator
(2) 1D5G.....I.F. Amplifier
(3) 1D5G.....I.F. Amplifier
(4) 1K6 Second Detector, A.V.C. & Audio Amplifier
(5) 1D4.....Output Pentode

Dial lamps.....2.5 volts, .06 amps.

Loudspeaker.....Type AG2 (Mantel).....Type AL2 (Console)

Loudspeaker Transformer.....TG53 (Mantel).....TG131 (Console)

General Description

The circuit arrangements of these two receivers are similar. The Mantel model is housed in a moulded cabinet and uses dry type "B" batteries for plate supply. Filament supply is either from a 2 volt accumulator or air-cell.

The Console is available in two types; one, Console ("B"), using the same battery complement as the Mantel and the other, Console ("V"), which obtains its plate supply from a vibrator power unit and this in turn is operated from a 6 volt accumulator.

A Console ("B") may be readily changed to vibrator power unit operation or a Console ("V") to "B" battery operation, instructions being given on pages 10 and 11.

Features embodied in the chassis of these instruments include the following:—

Air trimmers and inductance tuning ensure permanent alignment and efficiency of delicately tuned R.F. and I.F. circuits; Fixed condensers and inductances specially impregnated against moisture, thus ensuring sustained efficient performance under all climatic conditions; Automatic Volume Control; Continuously variable Tone Control; Automatic dial illumination. The dial may be illuminated only while tuning, lessening battery current drain; Straight line frequency tuning condenser allowing a greater number and more even spacing of call-signs; Chassis of high grade steel, heavily plated with cadium to resist corrosion and suspended on rubber mountings.

Vibrator Power Unit

The vibrator power unit, if used, supplies the correct socket voltages for the operation of the console model. It contains a plug-in type vibrator step-up transformer, and an efficient filter system.

Rectification of the high voltage is accomplished by the synchronous vibrator. The complete unit is enclosed in a soundproof case and is rubber-mounted to prevent mechanical noise. The unit has been carefully adjusted at the factory by special equipment to ensure quiet operation over an extensive period of life. No adjustments should be attempted on a vibrator suspected of being faulty. If a fault is suspected, the vibrator should

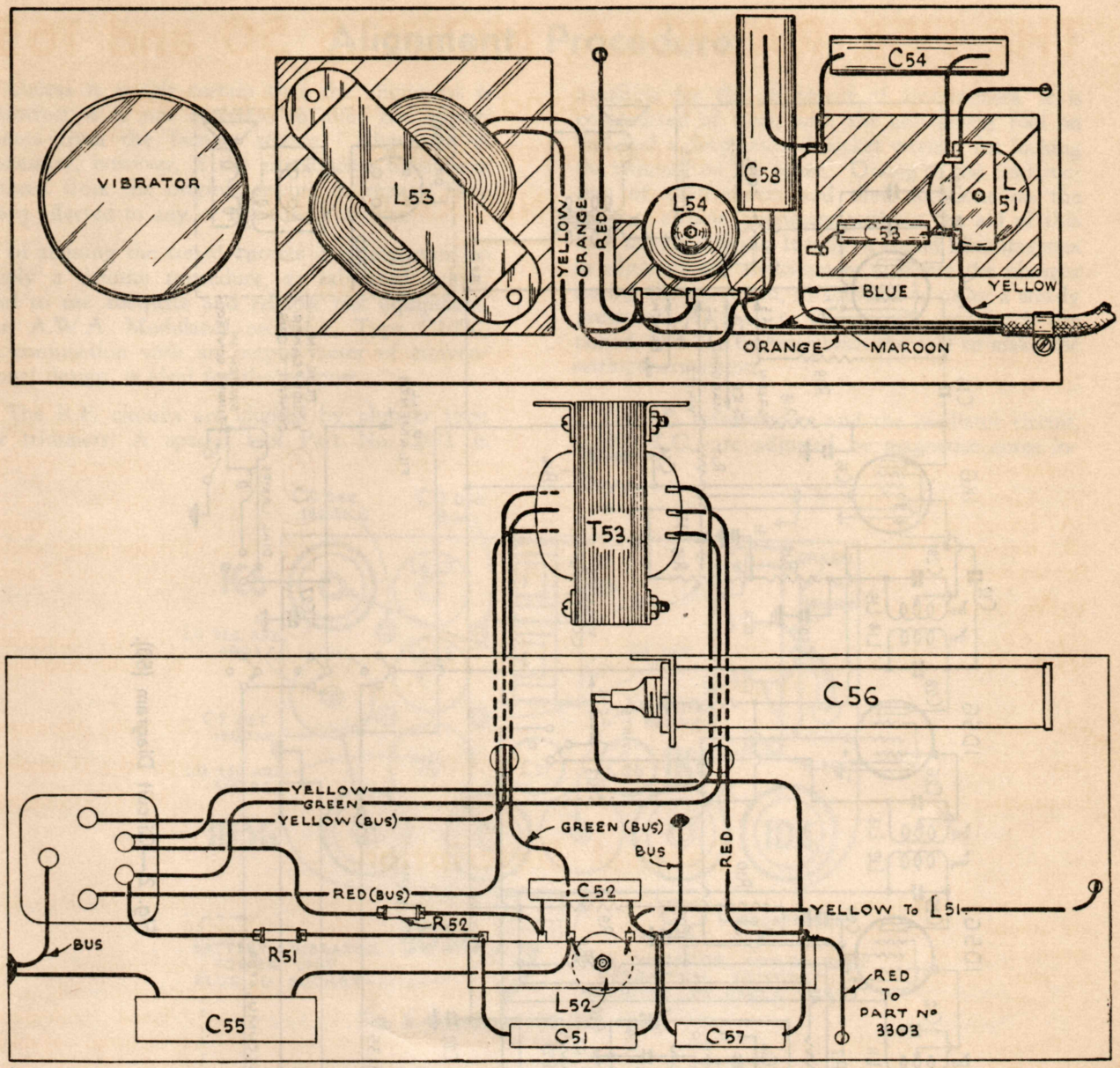

Fig. 1.—Vibrator Power Unit (underneath and top views).

be returned to the company for test or a replacement installed. The plug-in feature affords easy removal or replacement. The case lid is fastened by four screws and when removed gives access to the vibrator. Three screws will be found at the bottom of the case and the removal of these allows the power unit to be completely removed from the case for service.

The instrument is protected by a fuse, which is located in the power unit cable. It is necessary when replacing the fuse to sheath it in the tubing provided before inserting in the fuse holder. If the tubing is not used, the fuse is useless and the installation is deprived of protection. Before inserting a replacement fuse, alwayse examine the installation to determine the fault which caused the fuse to "blow."

Replacement fuse..... 3 amp.

Proper connection of the power unit to the receiver unit is essential. In the event of noisy operation, see that the earth lug attached to the cable is firmly connected to the receiver chassis. A tapped hole and screw are provided on the rear of the receiver chassis adjacent to the power unit socket, for the purpose. Do not connect an earth wire to the power unit other than this, as interference will result.

Fig. 8 shows the accumulator connections and it is important that the leads should always be arranged as shown. Do not reverse the blue and black leads and space them as far apart as possible on the connecting strap to avoid vibrator buzz, which might otherwise result if these two leads

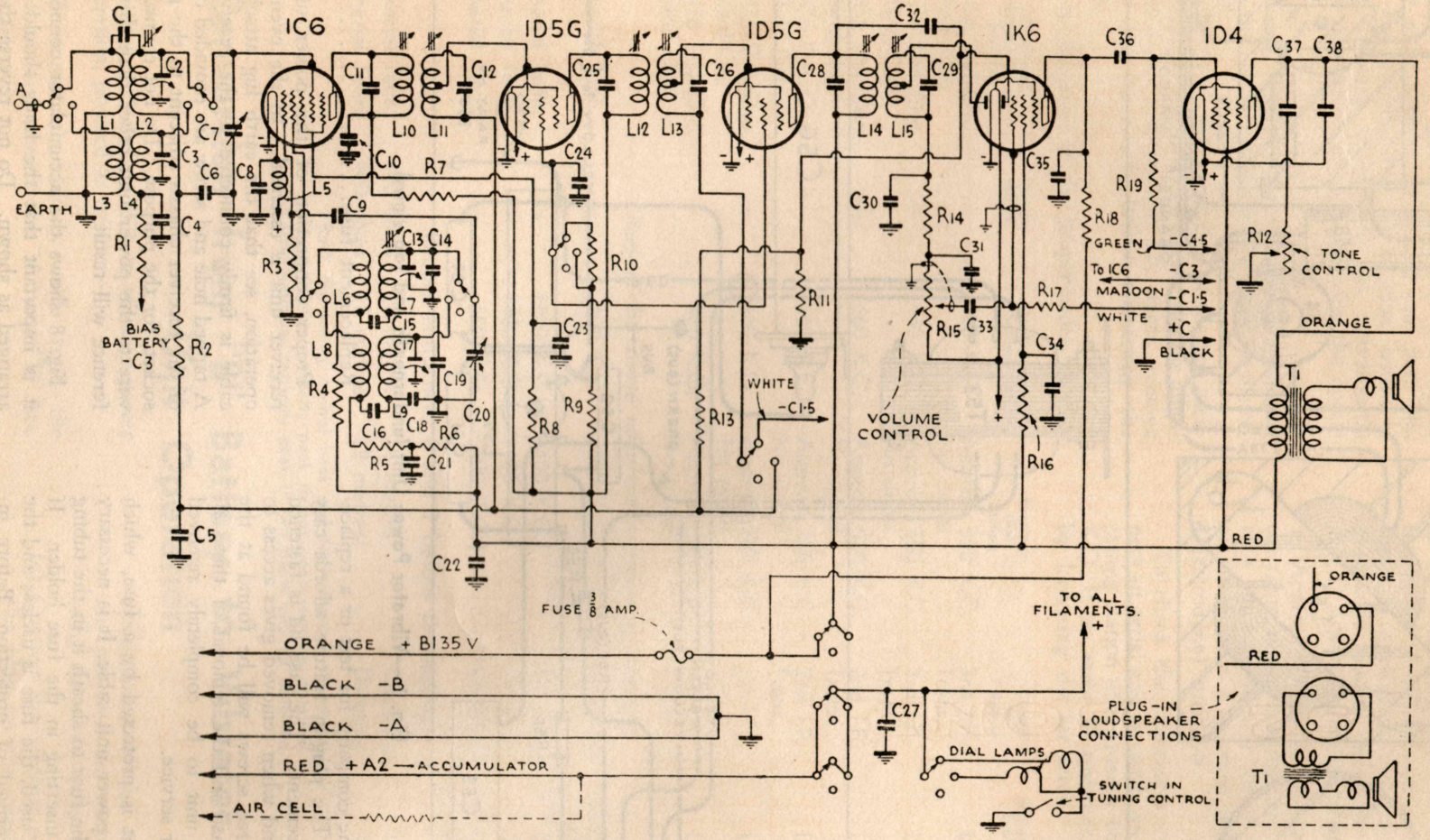

Fig. 2.—Circuit Diagram (50).

Code No.	Part No.	COILS
L1,L2	4353	Aerial Coil, 1500-550 K.C.
L3,L4	4331	Aerial Coil, 16-50 Met.
L5	3149	R.F. Filament Choke
L6,L7	4354	Osc. Coil, 1500-550 K.C.
L8,L9	4332	Osc. Coil, 16-50 Metres
L10,L11	4327	1st I.F. Transformer
L12,L13	4327	2nd I.F. Transformer
L14,L5	4329	3rd I.F. Transformer
		TRANSFORMERS
T1	TG53	Loudspeaker Transformer

Code No.	Part No.	RESISTORS
R1		100,000 ohms, $\frac{1}{3}$ watt
R2		100,000 ohms, $\frac{1}{3}$ watt
R3		60,000 ohms, $\frac{1}{3}$ watt
R4		50,000 ohms, $\frac{1}{3}$ watt
R5		400 ohms, $\frac{1}{3}$ watt
R6		5000 ohms, $\frac{1}{3}$ watt
R7		300 ohms, $\frac{1}{3}$ watt
R8		40,000 ohms, $\frac{1}{3}$ watt
R9		100,000 ohms, $\frac{1}{3}$ watt
R10		50,000 ohms, $\frac{1}{3}$ watt
R11		$1\frac{3}{4}$ Megohms, $\frac{1}{3}$ watt
R12	4284	100,000 ohms, Tone Cont.
R13		$1\frac{3}{4}$ Megohms, $\frac{1}{3}$ watt
R14		100,000 ohms, $\frac{1}{3}$ watt
R15	4286	500,000 ohms, Vol. Control
R16		1 Megohm, 1 watt
R17		$1\frac{3}{4}$ Megohms, $\frac{1}{3}$ watt
R18		200,000 ohms, 1 watt
R19		500,000 ohms, $\frac{1}{3}$ watt

Code No.	Part No.	CONDENSERS
C1		4 mmfd. Mica (I)
C2	3658	2-10 mmfd. Air Trimmer
C3	3661	2-20 mmfd. Air Trimmer
C4		.05 mfd. Paper
C5		.05 mfd. Paper
C6		.05 mfd. Paper
C7	4452	Variable Condenser
C8		.1 mfd. Paper
C9		110 mmfd. Mica (L)
C10		.05 mfd. Paper
C11		115 mmfd. Mica (A)
C12		130 mmfd. Mica (H)
C13	3661	2-20 mmfd. Air Trimmer
C14		14 mmfd. Mica (C)
C15		.05 mfd. Paper
C16		.05 mfd. Paper
C17	3658	2-10 mmfd. Air Trimmer
C18		3500 mmfd. Mica (Padder)
C19		440 mmfd. Mica (Padder)
C20	4452	Variable Condenser
C21		8 mfd. 450V. Electrolytic
C22		.5 mfd. Paper
C23		.1 mfd. Paper
C24		.1 mfd. Paper
C25		115 mmfd. Mica (A)
C26		130 mmfd. Mica (H)
C27		.5 mfd. Paper
C28		115 mmfd. Mica (A)
C29		130 mmfd. Mica (H)
C30		110 mmfd. Mica (L)
C31		110 mmfd. Mica (L)
C32		200 mmfd. Mica (J)
C33		.02 mfd. Paper
C34		.1 mfd. Paper
C35		110 mmfd. Mica (L)
C36		.05 mfd. Paper
C37		.035 mfd. Paper
C38		.0025 mfd. Paper

Circuit Code (50).

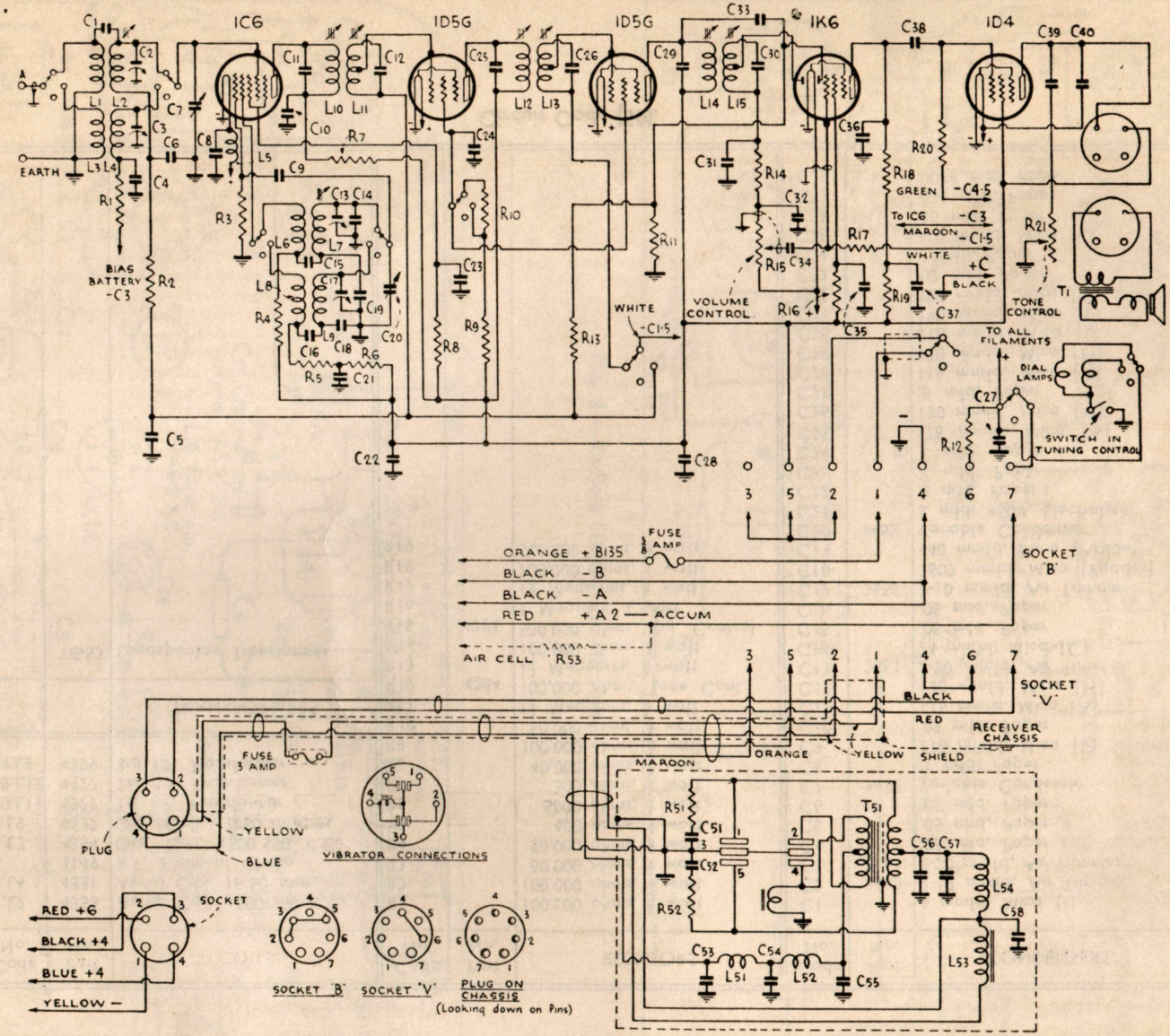

Fig. 3.—Circuit Diagram (165).

Code No.	Part No.	TRANSFORMERS
T1	TG131	Loudspeaker Transformer
		COILS
L1,L2	4353	Aerial Coil, 1500-550 K.C.
L3,L4	4331	Aerial Coil, 16-50 Met.
L5	3149	R.F. Filament Choke
L6,L7	4354	Osc. Coil, 1500-550 K.C.
L8,L9	4332	Osc. Coil, 16-50 Metres
L10,L11	4327	1st I.F. Transformer
L12,L13	4327	2nd I.F. Transformer
L14,L15	4329	3rd I.F. Transformer
		RESISTORS
R1		100,000 ohms, ⅓ watt
R2		100,000 ohms, ⅓ watt
R3		60,000 ohms, ⅓ watt
R4		50,000 ohms, ⅓ watt
R5		400 ohms, ⅓ watt
R6		6,500 ohms, 1 watt
R7		300 ohms, ⅓ watt
R8		40,000 ohms, ⅓ watt
R9		100,000 ohms, ⅓ watt
R10		50,000 ohms, ⅓ watt
R11		1¾ Megohms, ⅓ watt
R12	3367	4.5 ohms, Wire Wound
R13		1¾ Megohms, ⅓ watt
R14		100,000 ohms, ⅓ watt
R15	4286	500,000 ohms, Vol. Control
R16		1 Megohm, 1 watt
R17		1¾ Megohms, ⅓ watt
R18		200,000 ohms, 1 watt
R19		50,000 ohms, ⅓ watt
R20		500,000 ohms, ⅓ watt
R21	4284	100,000 ohms, Tone Cont.

Code No.	Part No.	CONDENSERS
C1		4 mmfd. Mica (I)
C2	3658	2-10 mmfd. Air Trimmer
C3	3661	2-20 mmfd. Air Trimmer
C4		.05 mfd. Paper
C5		.05 mfd. Paper
C6		.05 mfd. Paper
C7	4452	Variable Condenser
C8		.1 mfd. Paper
C9		110 mmfd. Mica (L)
C10		.05 mfd. Paper
C11		115 mmfd. Mica (A)
C12		130 mmfd. Mica (H)
C13	3661	2-20 mmfd. Air Trimmer
C14		14 mmfd. Mica (C)
C15		.05 mfd. Paper
C16		.05 mfd. Paper
C17	3658	2-10 mmfd. Air Trimmer
C18		3500 mmfd. Mica (Padder)
C19		440 mmfd. Mica (Padder)
C20	4452	Variable Condenser
C21		8 mfd. 450V. Electrolytic
C22		.5 mfd. Paper
C23		.1 mfd. Paper
C24		.1 mfd. Paper
C25		115 mmfd. Mica (A)
C26		130 mmfd. Mica (H)
C27		.5 mfd. Paper
C28		8 mfd. 450V. Electrolytic
C29		115 mmfd. Mica (A)
C30		130 mmfd. Mica (H)
C31		110 mmfd. Mica (L)
C32		110 mmfd. Mica (L)
C33		200 mmfd. Mica (J)
C34		.02 mfd. Paper
C35		.1 mfd. Paper
C36		110 mmfd. Mica (L)
C37		.5 mfd. Paper
C38		.05 mfd. Paper
C39		.035 mfd. Paper

Code No.	Part No.	CONDENSERS
C40		.0025 mfd. Paper
C41		.02 mfd. Paper
		VIBRATOR POWER UNIT
		TRANSFORMERS
T51	3290	Vibrator Transformer, 4V.
		COILS
L51	3149	R.F. Choke
L52	3294	R.F. Choke
L53	3292	Smoothing Choke
L54	3303	R.F. Choke
		RESISTORS
R51		50 ohms, ⅓ watt
R52		50 ohms, ⅓ watt
		CONDENSERS
C51		.02 mfd. Paper
C52		.02 mfd. Paper
C53		.1 mfd. Paper
C54		.25 mfd. Paper
C55		.25 mfd. Paper
C56		8 mfd. 450V. Electrolytic
C57		.02 mfd. Paper
C58		.5 mfd. Paper

Circuit Code (165).

are joined or touch each other. As the cable is permanently connected to the accumulator, keep it smeared with light grease or vaseline to resist corrosion.

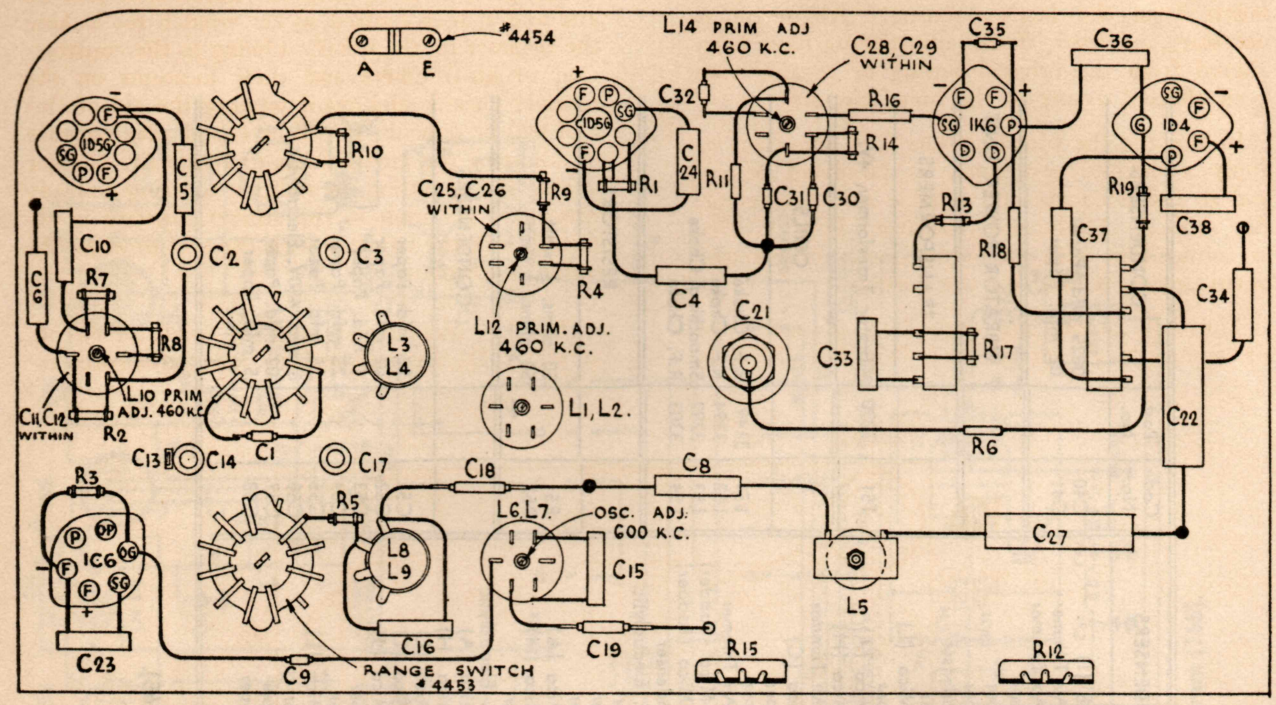

Fig. 4.—Radiola 50 (underneath view).

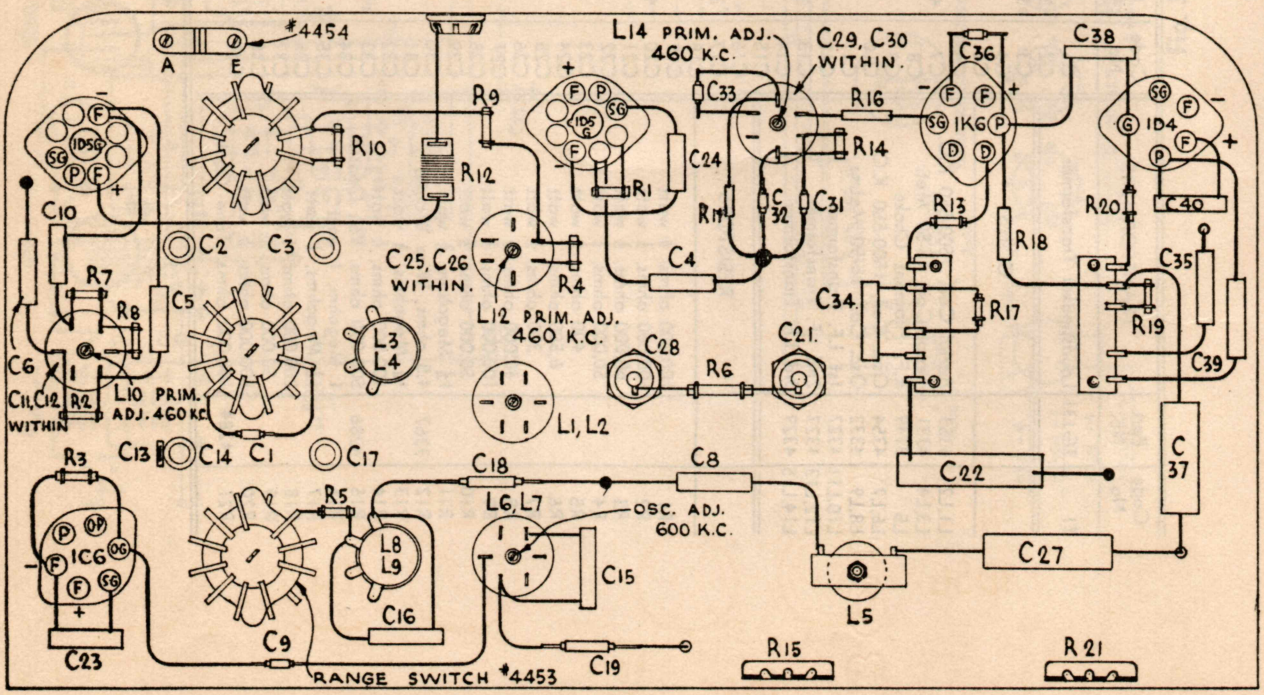

Fig. 5.—Radiola 165 (underneath view).

Alignment Procedure

Unless it is felt certain that the alignment is incorrect it is not desirable to alter the adjustments from the factory setting. Alignment is necessary, however, if the adjustments have been altered from the original setting or repairs have been effected to any of the tuned circuits.

In aligning the tuned circuits it is important to apply a definite procedure, as tabulated below, and to use adequate and reliable test equipment. An A.W.A. Modulated oscillator, Type C1070, in conjunction with an output meter of conventional design, is ideal for the purpose.

The R.F. circuits are aligned by plunger type air trimmers. A special tool Part No. 5371 is available for the alignment of air-trimmers. It is constructed of steel, with the adjustment tool on end and a deep centred socket wrench for locking the trimmer on the other. Owing to the construction of air-trimmers and their locations on the receiver chassis, alignment without the aid of this tool will be difficult. It will be found advantageous in adjusting the air-trimmers to rotate the plunger during the operation, in addition to using a steady pressure. As soon as the correct capacity is obtained, lock the trimmer with the tool to make the setting permanent.

The I.F. transformers and the oscillator circuit, at 600 K.C., are adjusted by magnetite cores in-

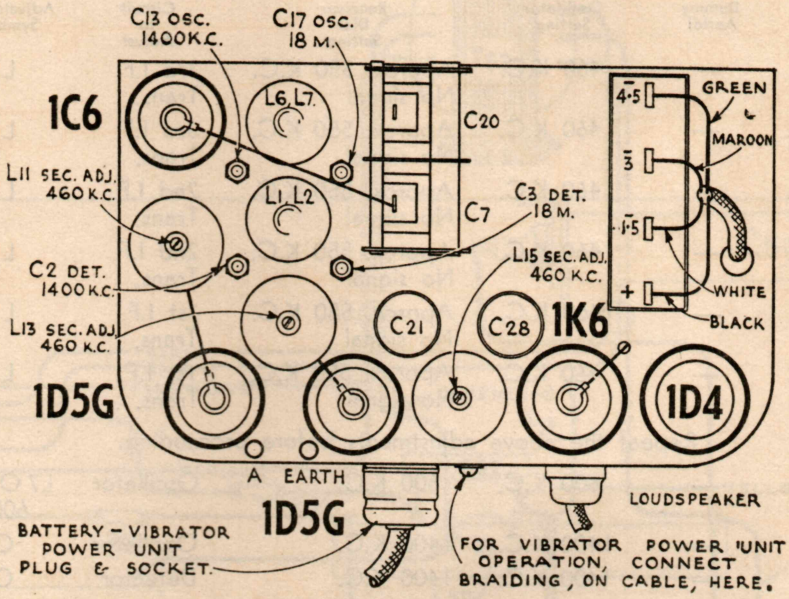

Fig. 6.—Radiola 165 (top view).

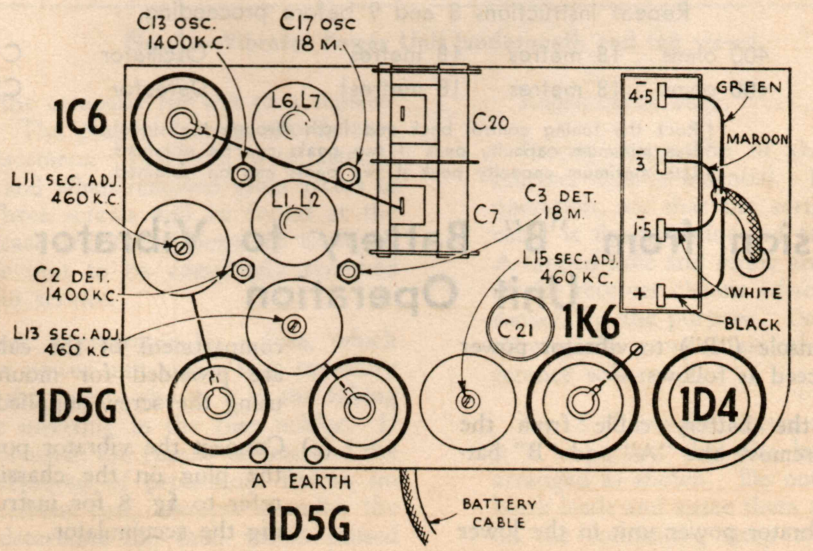

Fig. 7.—Radiola 50 (top view).

serted within the windings. The adjustment screws are shown in figs. 4, 5, 6 and 7, and these require the use of a non-metallic screwdriver, since the self-capacity of a metal screwdriver will render accuracy most difficult. A special tool part No. 5372 is also available for this purpose, which in addition to being non-metallic fits conveniently over the adjustment screw, simplifying the operation.

See that a 250,000 ohms resistor is connected between the output terminals of the test oscillator.

Connect the ground connection of the test oscillator to the chassis of the receiver during alignment and when aligning the I.F. stages, remove the grid clip from 1C6 before connecting the oscillator.

Perform alignment in the proper order, starting with No. 1 and following all operations across, then No. 2, etc. Adjustment locations are shown in figs. 4, 5, 6, and 7. Keep the volume control set in the maximum clockwise position and regulate the output of the test oscillator so that a minimum signal is applied to the receiver to obtain an observable output indication. This will avoid A.V.C. action and overloading.

"Approx. 550 K.C. no signal," mentioned in the chart, means that the receiver should be tuned to a point at or near 550 K.C. where no signal or interference is received from a station or local (Heterodyne) oscillator.

To check the calibration of the receiver, connect an aerial and an earth wire and tune a broadcasting station of frequency between 700 and 550 K.C. If an error is apparent, re-set the pointer by loosening the set screw.

Alignment Order	Oscillator Connection to Receiver	Dummy Aerial	Oscillator Setting	Receiver Dial Setting	Circuit to Adjust	Adjustment Symbol	Adjust to Obtain
1	1C6 Det.-Osc. Grid Cap	—	460 K.C.	Approx. 550 K.C. No signal	3rd I.F. Trans.	L15	Max. (peak)
2	1C6 Det.-Osc. Grid Cap	—	460 K.C.	Approx. 550 K.C. No signal	3rd I.F. Trans.	L14	Max. (peak)
3	1C6 Det.-Osc. Grid Cap	—	460 K.C.	Approx. 550 K.C. No signal	2nd I.F. Trans.	L13	Max. (peak)
4	1C6 Det.-Osc. Grid Cap	—	460 K.C.	Approx. 550 K.C. No signal	2nd I.F. Trans.	L12	Max. (peak)
5	1C6 Det.-Osc. Grid Cap	—	460 K.C.	Approx. 550 K.C. No signal	1st I.F. Trans.	L11	Max. (peak)
6	1C6 Det.-Osc. Grid Cap	—	460 K.C.	Approx. 550 K.C. No signal	1st I.F. Trans.	L10	Max. (peak)
			Repeat the above adjustments before proceeding.				
7	Aerial Term.	—	600 K.C.	600 K.C.	Oscillator	L7 OSC. 600 K.C.	Max. (peak)
8	Aerial Term.	—	1400 K.C.	1400 K.C.	Oscillator	C13	Max. (peak)
9	Aerial Term.	—	1400 K.C.	1400 K.C.	Detector	C2	Max. (peak)
10	Aerial Term.	—	600 K.C.	600 K.C.†	Oscillator	L7 OSC. 600 K.C.	Max. (peak)
			Repeat instructions 8 and 9 before proceeding.				
11	Aerial Term.	400 ohms	18 metres	18 metres	Oscillator	C17	Max. (peak)*
12	Aerial Term.	400 ohms	18 metres	18 metres†	Detector	C3	Max. (peak)‡

† Rock the tuning control back and forth through the signal.
* Use minimum capacity peak if two peaks can be obtained.
‡ Use maximum capacity peak if two peaks can be obtained.

Conversion from "B" Battery to Vibrator Power Unit Operation

To convert a Console ("B") to vibrator power unit operation, proceed as follows:—

(a) Disconnect the battery cable from the chassis and remove the "A" and "B" batteries.

(b) Place the vibrator power unit in the lower compartment of the cabinet, where holes are provided for mounting, and mount, using the screw supplied.

(c) Connect the vibrator power unit socket to the plug on the chassis, see fig. 6, and refer to fig. 8 for instructions in connecting the accumulator.

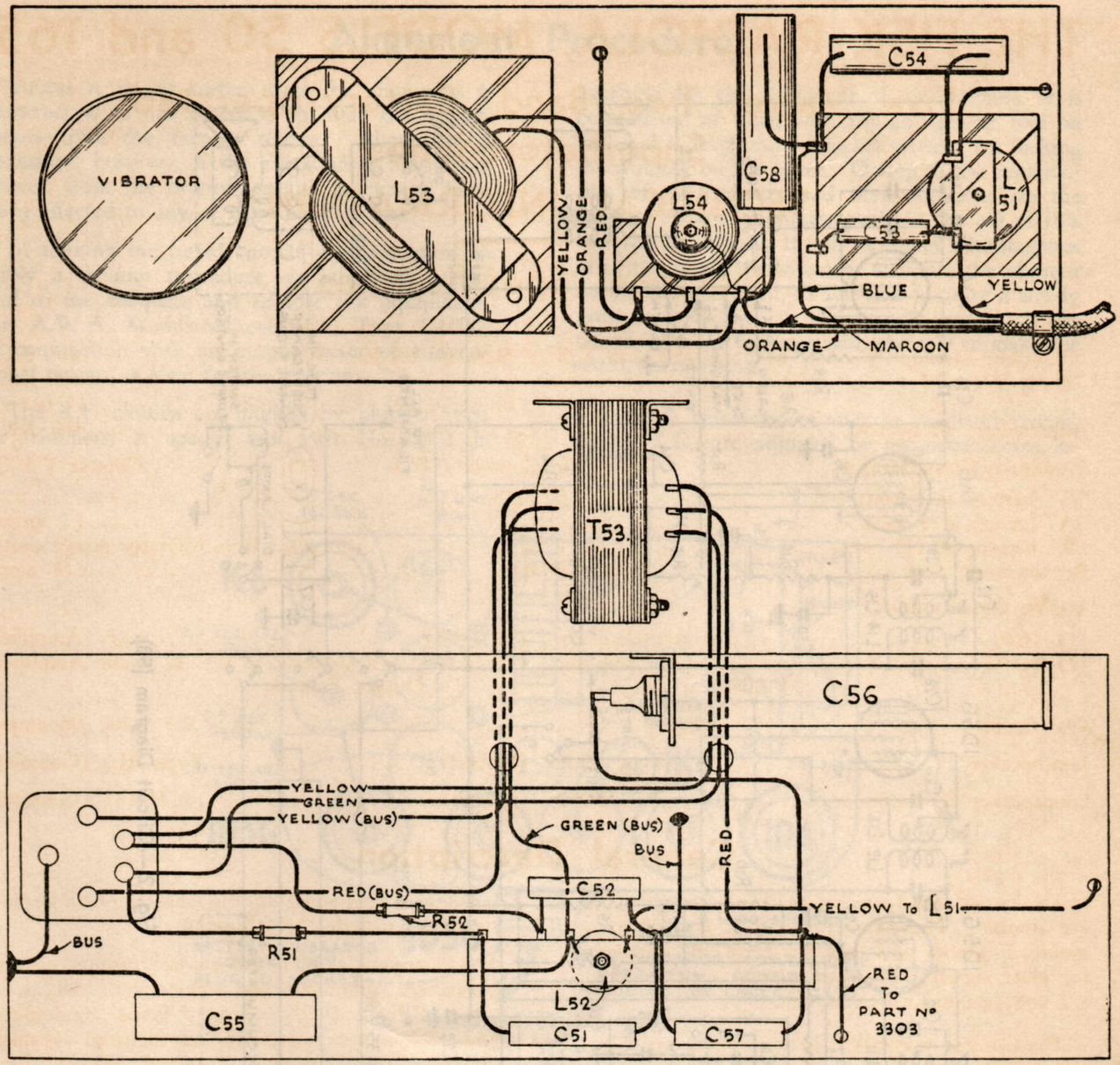

Fig. 1.—Vibrator Power Unit (underneath and top views).

be returned to the company for test or a replacement installed. The plug-in feature affords easy removal or replacement. The case lid is fastened by four screws and when removed gives access to the vibrator. Three screws will be found at the bottom of the case and the removal of these allows the power unit to be completely removed from the case for service.

The instrument is protected by a fuse, which is located in the power unit cable. It is necessary when replacing the fuse to sheath it in the tubing provided before inserting in the fuse holder. If the tubing is not used, the fuse is useless and the installation is deprived of protection. Before inserting a replacement fuse, alwayse examine the installation to determine the fault which caused the fuse to "blow."

Replacement fuse..... 3 amp.

Proper connection of the power unit to the receiver unit is essential. In the event of noisy operation, see that the earth lug attached to the cable is firmly connected to the receiver chassis. A tapped hole and screw are provided on the rear of the receiver chassis adjacent to the power unit socket, for the purpose. Do not connect an earth wire to the power unit other than this, as interference will result.

Fig. 8 shows the accumulator connections and it is important that the leads should always be arranged as shown. Do not reverse the blue and black leads and space them as far apart as possible on the connecting strap to avoid vibrator buzz, which might otherwise result if these two leads

Conversion from Vibrator Power Unit to Battery Operation

To convert a Console ("V") to "B" battery operation, proceed as follows:

(a) Disconnect the vibrator power unit cable from the chassis and disconnect and remove the accumulator.

(b) Remove the vibrator power unit from the cabinet.

(c) Connect the battery cable socket to the plug on the chassis, see fig. 6, and refer to the Radiola instruction book for instructions in installing and connecting the "A" and "B" batteries.

RESISTANCE MEASUREMENTS.

The resistance values shown in fig. 9 have been carefully prepared so as to facilitate a rapid check of the circuit for irregularities. To obtain the full benefit from this diagram it is advisable to consult the circuit and layout diagram when conducting the check. Each value should hold within ±20%. Variations greater than this limit will usually be a pointer to trouble in the circuit.

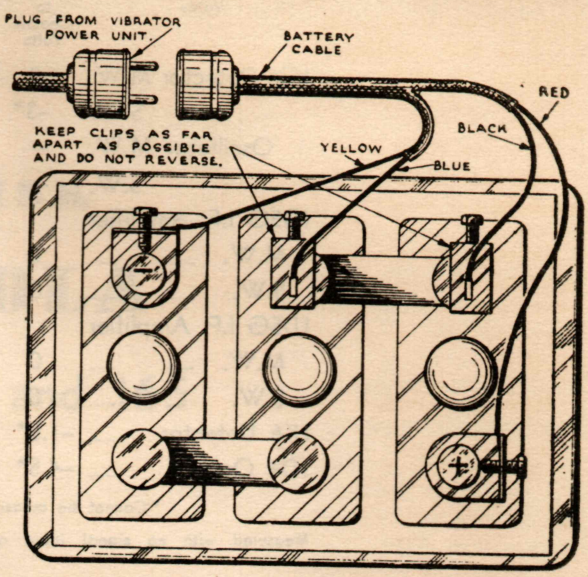

Fig. 8.—Accumulator Connections.

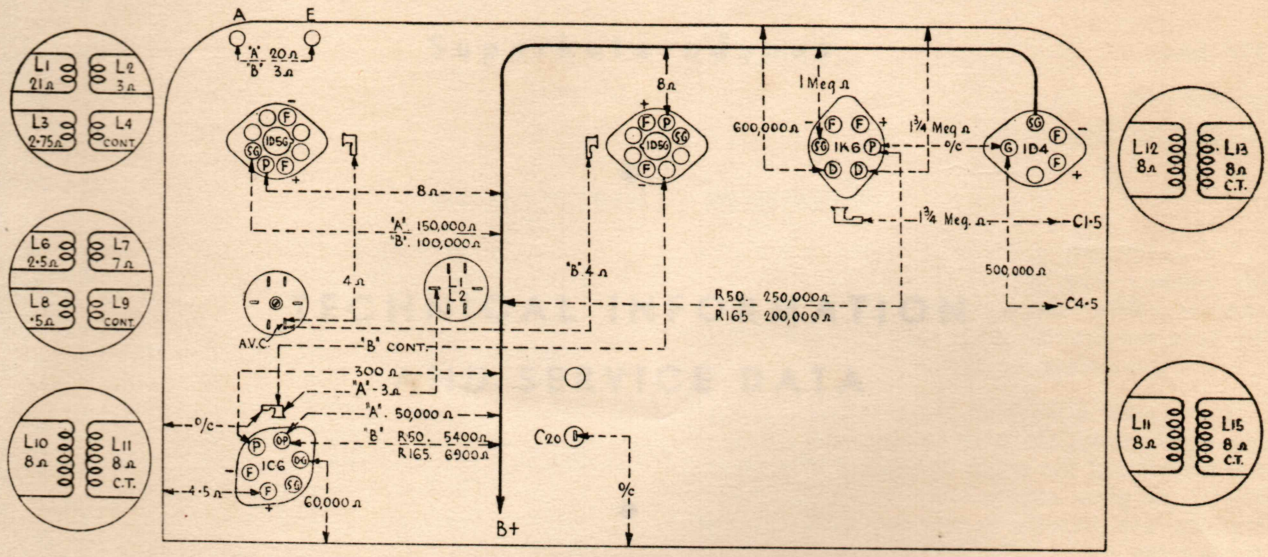

Fig. 9.—Resistance Diagram.

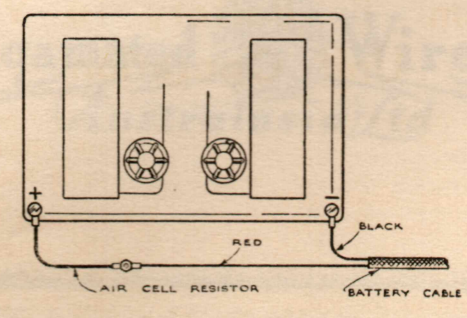

Fig. 10.—Air-Cell Connections.

SOCKET VOLTAGES.

Valve	Control Grid to Chassis Volts	Screen Grid to Chassis Volts	Plate to Chassis Volts	Plate Current M.A.	Filament Volts
1C6 Detector M.W.	0	56	134	2.25	2.0
S.W.	–3*	61	134	1.85	—
Oscillator M.W.	—	—	75	1.20	—
S.W.	—	—	117	3.25	—
1D5G I.F. Amplifier					
M.W.	0	25	135	1.2	2.0
S.W.	0	27	135	1.5	—
1D5G I.F. Amplifier					
M.W.	0	25	135	1.2	2.0
S.W.	0	27	135	1.5	—
1K6 Detector	–1.5*	51*	90*	0.25	2.0
1D4 Output	–4.5*	135	130	6.0	2.0

* Cannot be measured with ordinary voltmeter.

Measured with no signal input and Volume Control in maximum clockwise position.