The FISK

RADIOLA

MODEL 261

•

Five Valve, Three Band, 32 V. D.C. Operated

Superheterodyne

•

TECHNICAL INFORMATION

AND SERVICE DATA

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Amalgamated Wireless (Australasia) Ltd

THE FISK RADIOLA, MODEL 261

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TECHNICAL INFORMATION

Electrical Specifications

TUNING RANGE		ALIGNMENT FREQUENCIES	
"Standard Medium Wave" (a)	1500-550 K.C.	"Standard Medium Wave" (a)	1400 K.C. 600 K.C.
"Short Wave" (b)	35-105 metres	"Short Wave" (b)	38 metres
"Short Wave" (c)	13-39 metres	"Short Wave" (c)	14 metres

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

Power Supply Rating ..... 32 volts D.C.

Current Consumption ..... 1.9 amps.

Replacement Fuses ..... 3.0 amps.

Dial Lamp ..... 3.2 volts, .03 amps.

Loudspeaker ..... 10 inch Type AN6 Loudspeaker Transformer TA.16Y

Loudspeaker Field Coil Resistance ..... 200 ohms

VALVE COMPLEMENT

(1) 6D6	R.F. Amplifier
(2) 6A7	Detector-Oscillator
(3) 6D6	I.F. Amplifier
(4) 6B7	2nd Det., A.V.C. and Audio Amplifier
(5) 43	Output Pentode
6G5	Visual Tuning Indicator

The Radiola 261 is a five valve, three band, superheterodyne, designed for operation on a 32 volt D.C. supply.

Apart from the power supply unit, the circuit arrangement is similar to that employed in the Radiola 256. Plate voltages are supplied by a power unit employing a 32V synchonous Vibrator.

General Circuit Description

TUNED CIRCUITS.

In the R.F. Detector and oscillator stages the coils for bands "a" and "b" are wound on single forms which are mounted in coil shields on the top of the chassis. The coils for band "c" are wound on separate forms which are mounted on the range switch assembly. A multiple contact rotary range switch is used to select the band it is desired to tune and sections of the switch are also used to short-circuit the secondaries of the band "b" aerial, R.F. and oscillator coils, when operating the Radiola on band "c". This is done to prevent these coils resonating at frequencies within band "c" and thus causing dead-spots. The coils are tuned by a three section variable condenser. Plunger type air trimmers are used for alignment purposes and these are mounted in easily accessible locations beside the coil shields on the top of the chassis — see fig. 3. Fixed mica padding condensers are used in the oscillator stage for each band, the padding adjustment on the "Standard Medium Wave" band (band "a") being in the form of a magnetite core inserted within the oscillator coil and adjustable from the top of the shield — see fig. 3.

Sensitivity is controlled manually by the variable resistance R11 which increases or decreases the cathode bias potential on the Detector-Oscillator and I.F. amplifier valves.

The intermediate frequency amplifier system comprises a 6D6 valve and two transformers. The stage operates at a basic frequency of 460 K.C. Adjustable magnetite cores are provided for adjusting the inductance of the I.F. transformer primary and secondary windings.

DETECTOR AND OSCILLATOR.

The modulated signal, as obtained from the output of the I.F. stage, is detected by one diode in the 6B7 valve. The audio frequency component, secured by this process, is transferred from the movable arm of the Volume Control R16 through

the coupling condenser C43 to the control grid of the 6B7 for voltage amplification. A signal is also transferred via C40 to the other diode in the 6B7 and the D.C. potential produced across R33 (proportional to the strength of the incoming signal) is fed to the control grid circuits of the R.F. amplifier, 1st Detector and I.F. amplifier valves to provide A.V.C.

AUDIO SYSTEM.

The audio frequency component mentioned under "Detector and A.V.C.", is amplified in the valve and resistance capacity coupled to the 43 output pentode. The output of the 43 is transformer coupled to the electro-dynamic loudspeaker by the transformer T.A.16Y.

The tone control circuit comprises a 100,000 ohms variable resistance connected in series with a .035 mfd. paper condenser between the plate of the 43 and earth.

A filter unit is used to filter the 32 volt D.C. supply and this is mounted on the inside of the Radiola cabinet. The cabinet back is fitted with a connection plug in such a manner as to disconnect the power supply when the back is removed.

The filter unit comprises two 3 amp. fuses for protection, an R.F. choke T13 and .1 mfd. by pass condenser. Provision is made on the terminal panel for terminating the cables from the power unit and the receiver. A .5 mfd. paper condenser is also included in the unit to by-pass the B+ from the power unit.

VISUAL TUNING INDICATOR.

The voltage produced by the rectification of the I.F. signal in the diode circuit of the 6B7 is applied to the control grid of the 6G5 "Visual Tuning Indicator," and variations in this voltage are visible on a fluorescent screen within the device. The control voltage applied to the 6G5 is independent of the audio signal, hence the Radiola may be tuned visually, with the volume control in the minimum (anti-clockwise) position.

EARTH WIRE.

If it is desired to connect an earth wire direct to the Radiola chassis instead of to the "Radio Earth" terminal, which is isolated from the chassis by a condenser, it is essential to inspect the power supply. Most 32 volt systems have the negative of the supply earthed, while occasionally it is found that the positive is earthed. If the latter is the case and an earth wire is connected to the chassis, a short circuit of the supply will result.

Alignment Procedure

Unless it is felt certain that the alignment of the Radiola is incorrect, it is not desirable to alter the adjustments from the factory setting. However, when repairs have been made to I.F. or R.F. circuits or tampering is suspected, alignment becomes necessary.

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.WA. Modulated Oscillator, Type C.1070, is ideal for the purpose. Visual indication of the output from the Radiola is also necessary, any output meter of conventional design being suitable.

Connect the ground connection of the Modulated Oscillator to the Radiola R.E. terminal, and for I.F. alignment remove the grid clip from the 6A7 before connecting the oscillator. See that a 250,000 ohms resistor is connected between the output terminals of the Modulated Oscillator.

During alignment set the volume and sensitivity controls in the maximum clockwise position and regulate the output of the Modulated Oscillator so that a minimum signal is applied to the Radiola to obtain an observable indication. This will avoid A.V.C. action and overloading.

The I.F. adjustments are approached from above and below the chassis — see figs. 2 and 3, and should be adjusted with a non-metallic screwdriver, since the self-capacity of a metallic driver will upset the adjustment. The Padding adjustment, referred to in the chart, is situated on the top of the oscillator coil shield — see fig. 3. The R.F. circuits are aligned by plunger type air trimmers. 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 air trimmer to make the setting permanent.

"Approx. 550 K.C. No Signal" means that the Radiola 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.

The term "Dummy Aerial" means the device which should be connected between the output cable of the Modulated Oscillator and the aerial terminal of the Radiola, on short waves only, to simulate the characteristics of the average aerial. The "Dummy Aerial" in this case is a 400 ohms non-inductive resistor.

To check the calibration of the Radiola, connect an aerial and an earth wire and tune a broadcasting station of wavelength between 450 and 550 metres. If there is an error in the calibration, reset the pointer by loosening the mounting screws. Then, repeat instructions 4, 5 and 6 of the chart.

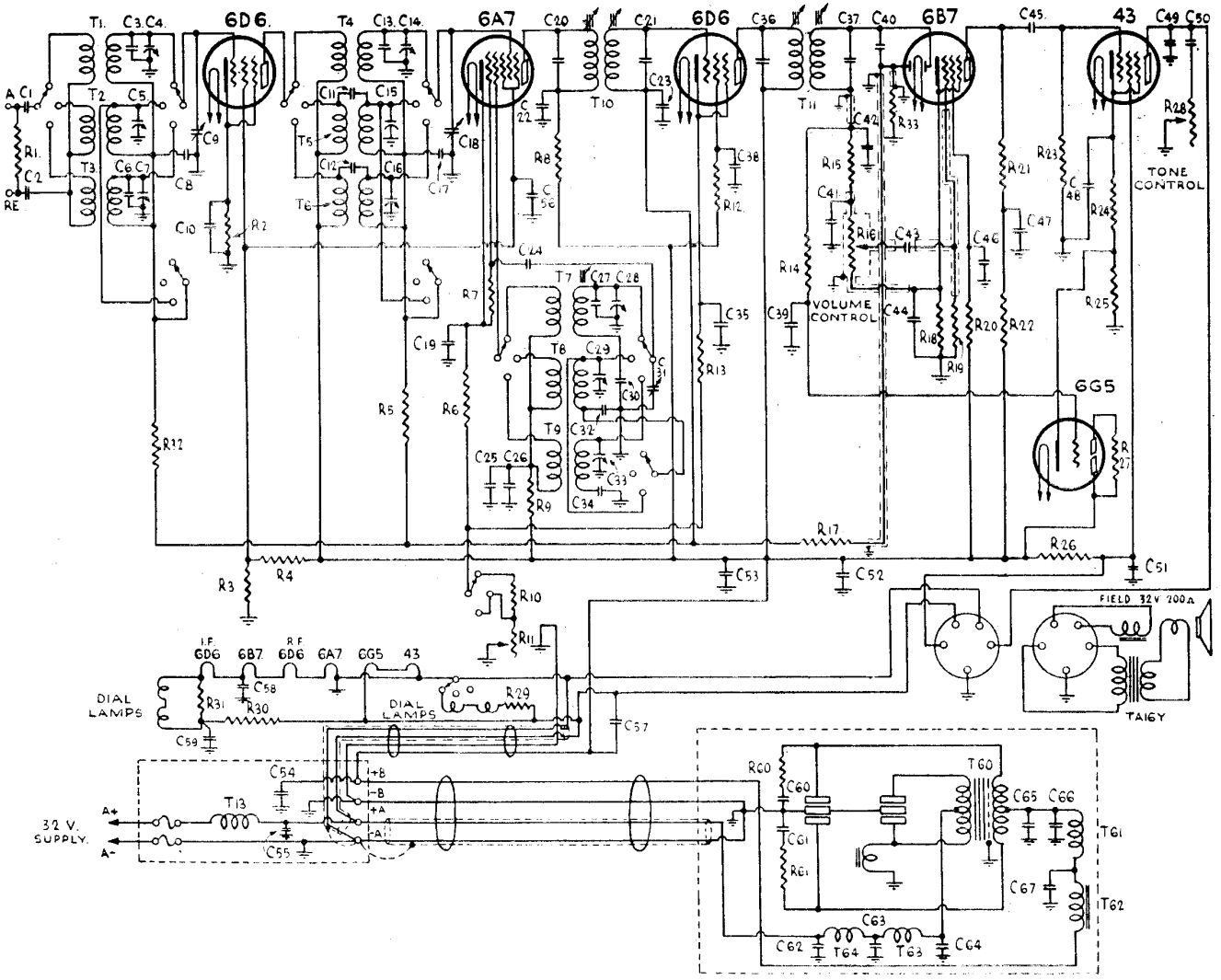

Fig. 1.—Circuit Diagram.

Code	Part No.	COILS—RECEIVER UNIT
T1	3563	Aerial Coil, 1500-550 K.C.
T2	3563	Aerial Coil, 35-105 metres
T3	3568	Aerial Coil, 13-39 metres
T4	3565	R.F. Coil, 1500-550 K.C.
T5	3565	R.F. Coil, 35-105 metres.
T6	3569	R.F. Coil, 13-39 metres
T7	3567	Osc. Coil, 1500-550 K.C.
T8	3567	Osc. Coil, 35-105 metres
T9	3570	Osc. Coil, 13-39 metres
T10	3243	1st I.F. Transformer
T11	3244	2nd I.F. Transformer
T13		Line Filter Choke
		COILS—POWER UNIT
T60	3916	Vibrator Transformer
T61	3303	R.F. Choke
T62	3292	Smoothing Choke
T63	3149	R.F. Choke
T64	3294	R.F. Choke
		RESISTORS—RECEIVER UNIT
R1		100,000 ohms, ⅓ watt
R2		300 ohms, ⅓ watt
R3		11,000 ohms, 3 watt
R4		11,000 ohms, 3 watt
R5		100,000 ohms, ⅓ watt
R6		300 ohms, ⅓ watt
R7		60,000 ohms, ⅓ watt
R8		300 ohms, ⅓ watt
R9		20,000 ohms, ⅓ watt
R10		300 ohms, ⅓ watt
R11	3410	3,000 ohms, Sens. Control.
R12		100,000 ohms, 1 watt
R13		300 ohms, ⅓ watt
R14		1¾ megohms, ⅓ watt
R15		100,000 ohms, ⅓ watt
R16	1668	300,000 ohms, Vol. Control
R17		1¾ megohms, ⅓ watt
R18		3,000 ohms, ⅓ watt
R19		500,000 ohms, ⅓ watt
R20		1 megohm, 1 watt

Code	Part No.	RESISTORS—RECEIVER UNIT
R21		100,000 ohms, 1 watt
R22		50,000 ohms, ⅓ watt
R23		300,000 ohms, ⅓ watt
R24		500 ohms, 1 watt
R25		50 ohms, ⅓ watt
R26	3910	1,300 ohms, Wire Wound
R27		1 megohm, ⅓ watt
R28	2762	100,000 ohms, Tone Control
R29	3738	85 ohms, Wire Wound
R30	4007	14 ohms, Wire Wound
R31	2473	50 ohms, Wire Wound
R32		100,000 ohms, ⅓ watt
R33		1¾ megohms, ⅓ watt
		RESISTORS—POWER UNIT
R60		50 ohms, ⅓ watt
R61		50 ohms, ⅓ watt
		CONDENSERS—RECEIVER UNIT
C1		500 mmfd. Mica
C2		500 mmfd. Mica
C3		10 mmfd. Mica
C4	3661	2-20 mmfd. Air Trimmer
C5	3661	2-20 mmfd. Air Trimmer
C6		10 mmfd. Mica
C7	3661	2-20 mmfd. Air Trimmer
C8		.05 mfd. Paper
C9	3581A	Variable Condenser
C10		.1 mfd. Paper
C11		6 mmfd. Mica
C12		10 mmfd. Mica
C13		10 mmfd. Mica
C14	3661	2-20 mmfd. Air Trimmer
C15	3661	2-20 mmfd. Air Trimmer
C16	3661	2-20 mmfd. Air Trimmer
C17		.05 mfd. Paper
C18	3581A	Variable Condenser
C19		.1 mfd. Paper
C20		115 mmfd. Mica
C21		115 mmfd. Mica
C22		.05 mfd. Paper
C23		.05 mfd. Paper

Code	Part No.	CONDENSERS—RECEIVER UNIT (Con.)
C24		50 mmfd. Mica
C25		.05 mfd. paper
C26		8 mfd. 500V. Electrolytic
C27		15 mmfd. Mica
C28	3661	2-20 mmfd. Air Trimmer
C29	3661	2-20 mmfd. Air Trimmer
C30		440 mmfd. Mica Padding
C31	3581A	Variable Condenser
C32		2025 mmfd. Mica Padding.
C33	3658	2-10 mmfd. Air Trimmer
C34		2800 mmfd. Mica Padding
C35		.1 mfd. Paper
C36		115 mmfd. Mica
C37		115 mmfd. Mica
C38		.1 mfd. Paper
C39		.05 mfd. Paper
C40		700 mmfd. Mica
C41		100 mmfd. Mica
C42		100 mmfd. Mica
C43		.035 mfd. Paper
C44		25 mfd. 25V. Electrolytic
C45		.05 mfd. Paper
C46		.1 mfd. Paper
C47		.5 mfd. Paper
C48		25 mfd. 25V. Electrolytic
C49		.005 mfd. Paper
C50		.035 mfd. Paper
C51		8 mfd. 500V. Electrolytic
C52		.5 mfd. Paper
C53		8 mfd. 500V. Electrolytic
C54		.5 mfd. Paper
C55		.1 mfd. Paper
C56		.1 mfd. Paper
C57		700 mmfd. Mica
C58		25 mfd., 25 volt Electrolytic
C59		25 mfd., 25 volt Electrolytic
		CONDENSERS—POWER UNIT
C60		.02 mfd. Paper, 2000V.
C61		.02 mfd. Paper, 2000V.
C62		.1 mfd. Paper
C63		.25 mfd. Paper
C64		.25 mfd. Paper
C65		8 mfd. 500V. Electrolytic
C66		.02 mfd. Paper
C67		.5 mfd. Paper

Circuit Code.

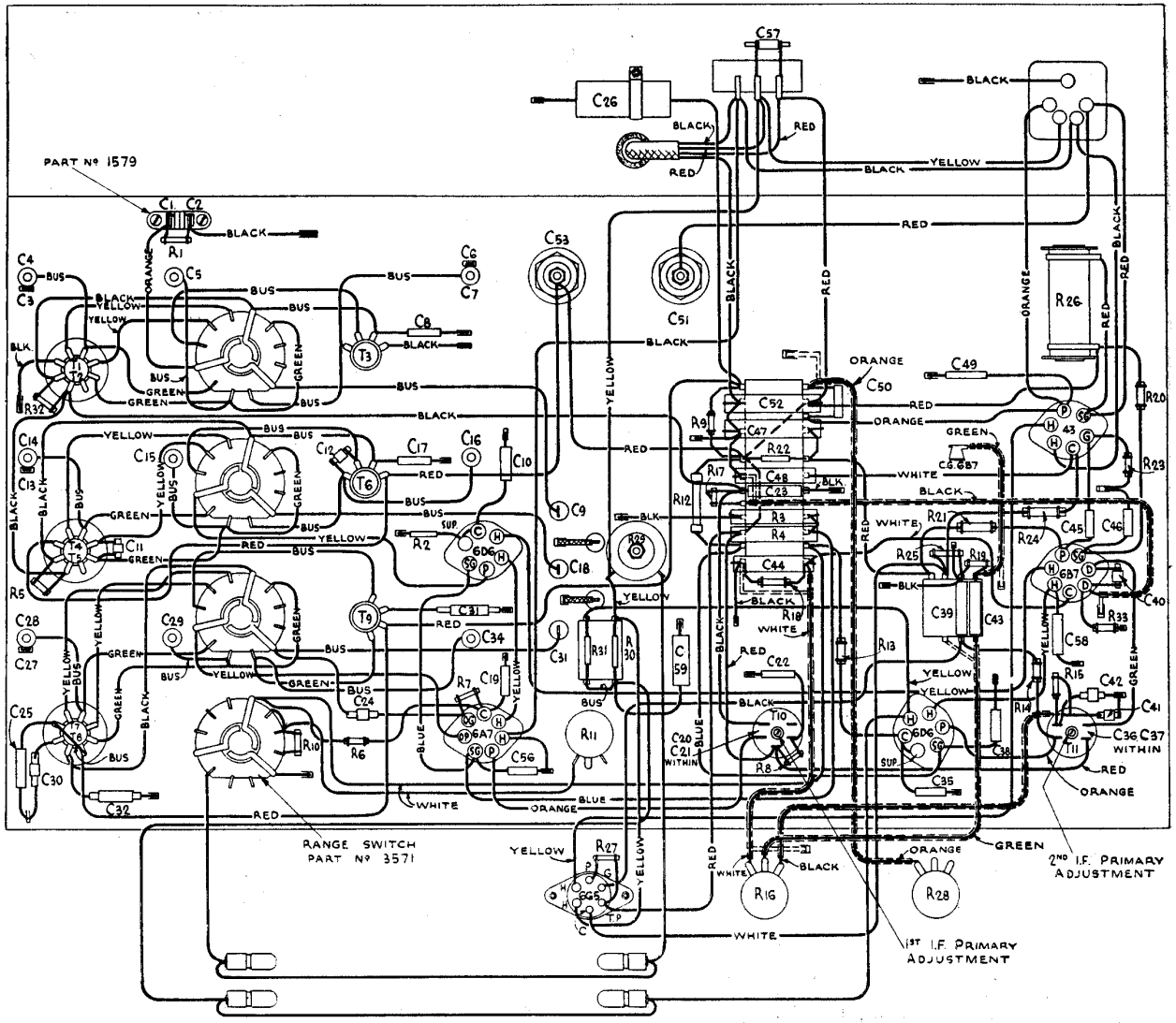

Fig. 2.—Lay-out Diagram (underneath view).

Alignment Order	Oscillator Connection to Radiola	Dummy Aerial	Oscillator Setting	Radiola Dial Setting	Circuit to Adjust	Adjustment Symbols	Adjust to Obtain
1	6A7 Det.-Osc. Grid Cap		460 K.C.	Approx. 550 K.C. No signal	2nd I.F. Trans.	Secondary and Primary	Max. (peak)
2	6A7 Det.-Osc. Grid Cap		460 K.C.	Approx. 550 K.C. No signal	1st I.F. Trans.	Secondary and Primary	Max. (peak)
	Repeat the above adjustments before proceeding.						
3	Aerial Term.	—	600 K.C.	600 K.C.	Oscillator	Padding Adjustment	Max. (peak)
4	Aerial Term.	—	1400 K.C.	1400 K.C.	Oscillator	C28	Max. (peak)
5	Aerial Term.	—	1400 K.C.	1400 K.C.	Detector	C14	Max. (peak)
6	Aerial Term.	—	1400 K.C.	1400 K.C.	R.F.	C4	Max. (peak)
7	Aerial Term.	—	600 K.C.	600 K.C.‡	Oscillator	Padding Adjustment	Max. (peak)
	Repeat adjustments 4, 5 and 6 before proceeding.						
8	Aerial Term.	400 ohms	38 metres	38 metres	Oscillator	C29	Max. (peak)*
9	Aerial Term.	400 ohms	38 metres	38 metres‡	Detector	C15	Max. (peak)**
10	Aerial Term.	400 ohms	38 metres	38 metres‡	R.F.	C5	Max. (peak)†
11	Aerial Term.	400 ohms	42 metres	14 metres	Oscillator	C33	Max. (peak)*
12	Aerial Term.	400 ohms	42 metres	14 metres‡	Detector	C16	Max. (peak)**
13	Aerial Term.	400 ohms	42 metres	14 metres‡	R.F.	C7	Max. (peak)††

NOTE: To align the Radiola at 14 metres with a Type C1070 modulated oscillator, set the oscillator to 42 metres and use the third harmonic.

* Use minimum capacity peak if two peaks can be obtained.
** Use maximum capacity peak if two peaks can be obtained.
† After this adjustment, check for image signal by tuning the Radiola to approx. 42.5 metres.
†† After this adjustment, check for image signal by tuning the Radiola to approx. 14.6 metres.
‡ Rock the station selector back and forth through the signal.

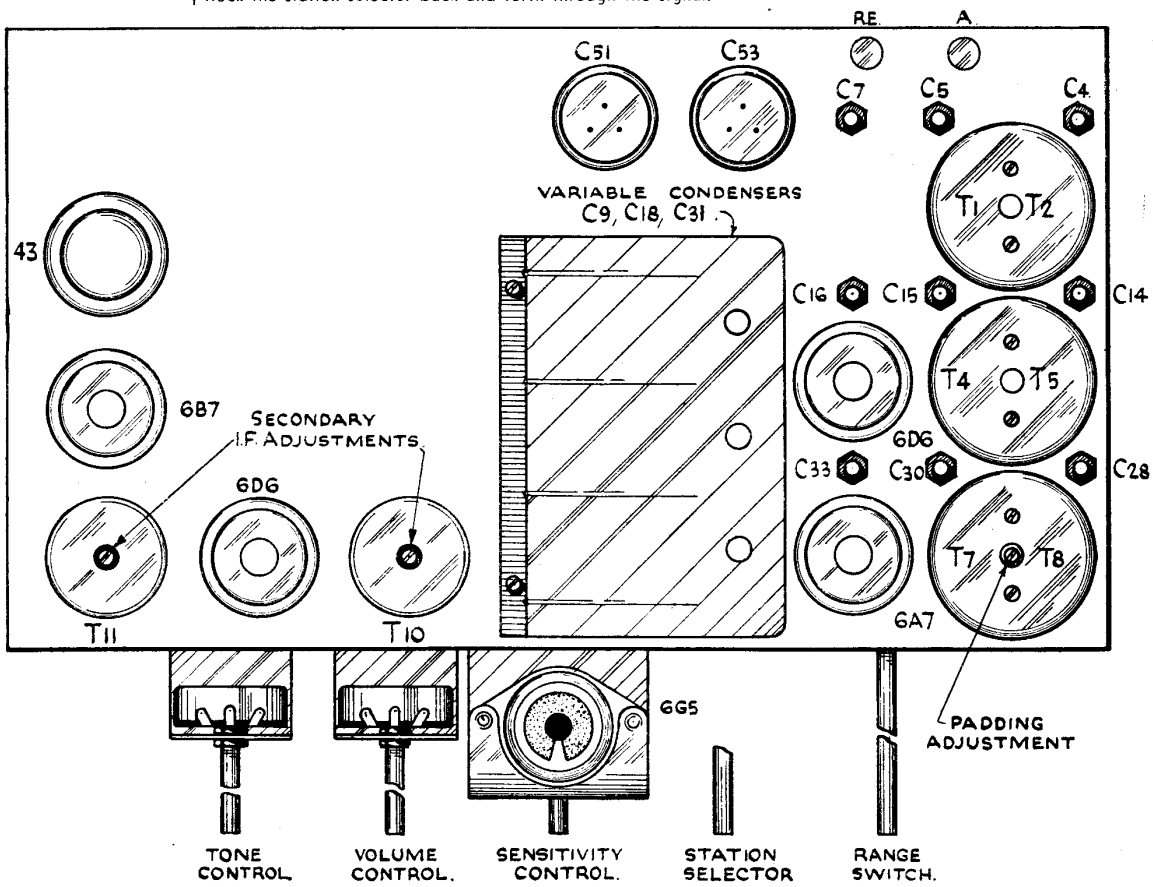

Fig. 3.—Lay-out Diagram (top view).

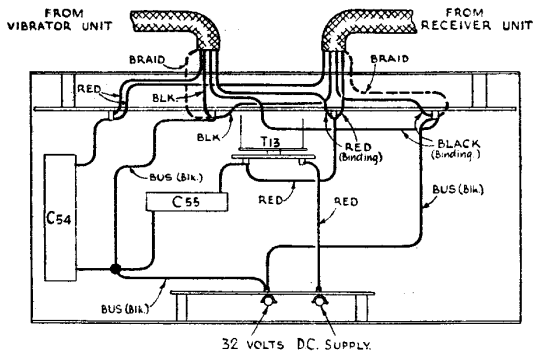

Fig. 4.—Filter Unit.

RESISTANCE MEASUREMENTS.

The resistance values shown in fig. 5 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 diagrams 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.

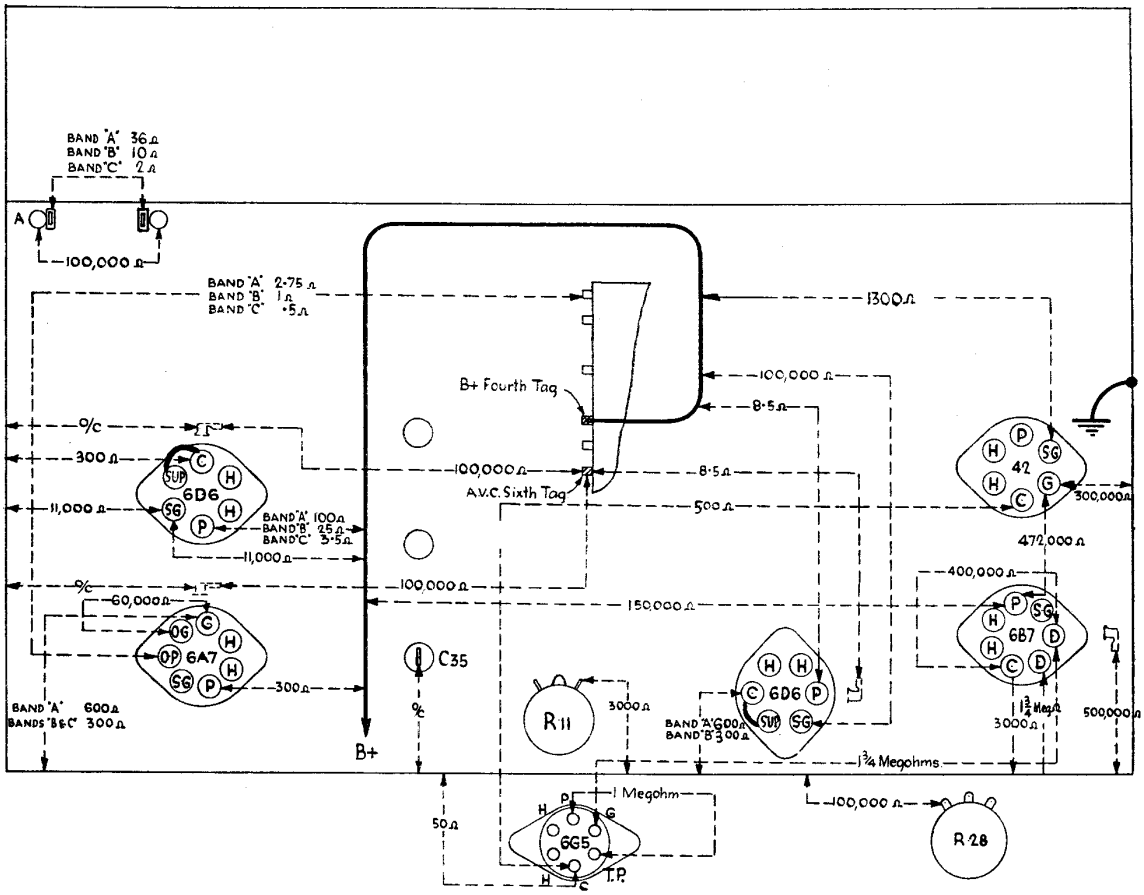

Fig. 5.—Resistance Diagram.

Resistance values were taken with the valves removed from sockets, power supply disconnected, variable condensers in full mesh and volume and sensitivity controls in maximum clockwise position.

SOCKET VOLTAGES.

	Chassis to Cathode Volts	Chassis to screen grid volts	Chassis to plate volts	Plate Current M.A.	Heater Volts
6D6 R.F. Amplifier	3.0	70	180	6.0	6.3
6A7 Detector M.W.	5.5	70	180	2.0	6.3
SW. 35-105	3.0	75	180	4.0	—
S.W. 13- 39	3.0	75	180	4.0	—
Oscillator ...	—	—	135	4.0	—
6D6 I.F. Amplifier					
M.W.	5.5	85	180	2.0	6.3
S.W. 35-105	3.0	85	180	4.0	—
S.W. 13- 39	3.0	85	180	4.0	—
6B7 Detector	2.5	*25	*80	0.75	6.3
43 Output Pentode	16.0	135	120	25.0	25.0

Measured at 32 volts D.C. supply. No signal input. Controls in maximum clockwise position excepting range switch, which is set as desired.

* Cannot be measured with ordinary voltmeter.


AWA