B29

Receiver

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ADMIRALTY PATTERN S.S.104.

BOOK OF INSTRUCTIONS FOR

RECEIVER B29.

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HANDBOOK FOR RECEIVER B29.

CHAPTER I.

GENERAL DESCRIPTION.

1. DETAILS.

Date of design - 1941.

Frequency range 15 - 550 kc/s.

Valves used:-

1st R/F Amplifier Valve	VR100	(KTW62)
2nd R/F Amplifier Valve	VR100	(KTW62)
Detector/Oscillator Valve	VR99	(X66)
1st A/F Amplifier Valve	MR68	(DH63)
2nd A/F Amplifier Valve	6J5G	(L63)
Rectifier Valve	VU71A	(5U4G)

Power Supply - 100/110 or 200-250-volt, 50 cycle A.C. mains
OR 200-volt and 6-volt batteries.

2. GENERAL.

Receiver B29 is an I/F receiver designed for the reception of either C.W. or modulated (I.C.W. or R/T) signals. It comprises two stages of R/F amplification, a detector/oscillator and two stages of A/F amplification. A rectifier valve is also provided for use when the set is worked from an A.C. supply.

Tuning is effected by means of a main tuning control, which adjusts the three tuned R/F circuits and the heterodyne oscillator simultaneously, and a separate aerial tuning control. The frequency range of 15 to 550 kc/s is covered in four steps by means of a multi-contact band change switch, which brings the appropriate inductances and trimming condensers into circuit and short-circuits the unused inductances of lower-frequency bands. All the tuning inductances have iron dust cores which are adjustable for trimming the inductances. The frequency bands covered by the different positions of the switch are as follows:-

Band 1 15 to 38 kc/s.
Band 2 38 to 90 kc/s.
Band 3 90 to 240 kc/s.
Band 4 240 to 550 kc/s.

Provision is made for connection to either a unipole aerial, a dipole aerial (or remote unipole aerial) connected via an 80-ohm feeder line, or either a high- or low-impedance loop aerial, the latter being used on bands 1 and 2 only.

The local oscillator is normally tuned by a condenser ganged with the main tuning control, but a vernier adjustment is also provided by means of which the oscillator frequency may be varied to approximately 1 kc/s below that of the signal being received (instead of 1 kc/s above). This adjustment is used when interference is experienced from a station operating on a frequency approximately 2 kc/s above

that of the wanted station, as described in Chapter V, Section 2.

An operating switch is provided on the receiver as well as the main ON/OFF switch. This operating switch has a central "H.T. OFF" position, which is used for standing-by for short periods and two "ON" positions on either side of this stand-by position. The first ON position on either side disconnects the 1,000 c.p.s. A/F filter, while the second position brings it into use. The positions to the left are for the reception of modulated signals, while those to the right bring the local oscillator into use for the reception of C.W. signals.

Separate R/F and A/F gain controls are provided, the former being the normal manual gain control while the latter is a preset control mounted under a cover plate on the panel. This A/F gain control should be moved from its mid position only if experience shows that a permanent change in the A/F output is required, as when using the receiver for the reception of automatic H/S signals.

Two telephone jacks are fed through an output transformer at an impedance suitable for the Pattern W621 head telephones, while an additional output at 5,000 ohms is provided for connection to the A/F input terminals of the D.C. amplifier for auto H/S reception or for feeding a loudspeaker.

The suppressor grids of the two R/F valves are connected to a potentiometer by means of which the amplitude of the noise suppression pulses fed to them from the R.I.S. outfit may be adjusted as necessary.

A complete circuit diagram of the receiver is given in Fig. 1.

3. CONSTRUCTION.

The receiver is contained in an enamelled sheet steel cabinet, the dimensions of which are as follows :-

Height - 13-7/16 ins.
Width - 19 ins.
Depth - 16 ins.

The weight of the receiver is 82 lbs.

The main chassis of the receiver is a simple inverted tray of cadmium-plated steel, to which the panel is permanently attached. The R/F tuning and calibration sub-assembly, the aerial tuning condenser, the input switch, the heterodyne Vernier control, the valves, the A/F filter and the supply circuits are carried on top of the chassis, while the remaining components are mounted beneath the chassis.

All input and output connections are made on the front panel of the receiver, which also carries all the controls.

Access to the top of the chassis for valve replacements is obtained by means of a hinged lid in the top of the cabinet, secured by two captive screws. Access to the remaining components is obtained by disconnecting all leads to the receiver and withdrawing the twelve retaining screws round the edge of the panel, after which the panel and chassis may be withdrawn forward out of the cabinet. It

should therefore be taken when replacing them, as repeated incorrect insertion of the screws will cause the thread to strip.

The back of the chassis is held down in the cabinet by two brackets fastened to the back of the cabinet under which the rear of the chassis fits.

Figures 5 and 6 are plan and underside views of the chassis, showing the positions of the principal components.

CHAPTER II.

POWER SUPPLIES.

1. GENERAL.

Receiver B29 is designed to operate either directly from a 100/110 or 200 - 250 volt, 50 cycle A.C. supply or from 6-volt and 200-volt batteries.

The receiver is despatched ready for operation from A.C. mains and the A.C. supply should be connected to the terminals so marked in the terminal board at the right-hand side of the panel. If the model is to be operated from batteries the supply circuit must be changed over by means of the link board (111) situated on the top of the chassis. This board is accessible by opening the lid in the top of the cabinet. The four link screws should then be withdrawn from the "Mains" positions and inserted in the "Batteries" positions in the contact strips.

When using battery supplies it is ESSENTIAL that the full six volts be applied to the "6-volt Battery" terminals of the receiver and care must be taken that the supply leads from the battery to the receiver are of adequate size to avoid an appreciable drop in voltage between battery and receiver.

The power consumption of the receiver when supplied from A.C. mains or from batteries is given below:-

A.C.		100/110 or 200-250V. 33 watts.
Batteries.	H.T.	19mA. with oscillator OFF. 22mA. with oscillator ON.
	L.T.	2.1 amps.

The H.T. supply may therefore be provided by four Pattern 3773 dry batteries, while the L.T. supply may be taken from three Pattern 5503 or 1551B cells connected in series.

The receiver is supplied with the supply change-over link board (111) set to "Mains" and the supply connected to the 230-volt tapping on the transformer. If the receiver is required to be operated from an A.C. supply of any other voltage than 230, the tapping lead must be unsoldered from the 230-V tag on the transformer and connected to the correct tag.

2. RECTIFIER CIRCUIT.

The rectifier circuit of the Receiver B29 is shown in Fig.1. The A.C. supply is connected to the terminals marked " 50~ supply" in the terminal box at the right-hand side of the receiver panel and is fed from these terminals via the double-pole supplies ON/OFF switch (113) and the supply change-over link board (111) to the primary winding of the mains transformer (105).

This transformer has three secondary windings, one of which supplies the rectifier valve filament at 5 volts, one the rectifier valve anodes at 215-0-215 volts, while the third supplies the heaters of the receiver valves at 6.3 volts.

The rectifier valve (6) is a VU71A (5U4G) directly

filament of the valve and supplies approximately 220 volts D.C. to the H.T. line through a smoothing filter consisting of 8-mfd. condensers (106) (107) (108) and 15-henry chokes (109) (110). A 60 mA. fuse (112) is included in the H.T. lead.

The screen grids of the two R/F amplifier valves (1) (2) are fed from the tapping of a potentiometer consisting of two 50,000-ohm resistances (114) (115) connected across the H.T. supply.

The cathodes of these valves are returned to the tapping of a variable potentiometer (41), which is connected in series with a resistance (40) across the H.T. supply. Adjustment of this potentiometer varies the positive bias on the cathodes of the valves, thus effectively changing the negative grid bias and hence the gain of the valves. This adjustment forms the normal gain control of the receiver.

When the receiver is operated from batteries, the 200-volt battery supply is fed via the ON/OFF switch (113), change-over link board (111) and fuse (112) to the H.T. line.

3. FILAMENT SUPPLY.

When the receiver is operated from an A.C. supply the valve heaters are fed from a secondary winding of the transformer (105) which supplies them at 6.5 volts via the change-over link board (111). When the receiver is battery fed the heaters are supplied from the 6-volt battery via the ON/OFF switch (113) and link board (111). In this case, care must be taken that the cables connecting the L.T. battery to the receiver are of adequate size to carry the current (2 amps), taken by the heaters without appreciable voltage drop.

CHAPTER III.

OSCILLATORY CIRCUITS.

1. GENERAL.

Receiver B29 comprises a two stage tuner and two R/F stages employing variable-mu screened pentodes with tuned grid circuits, followed by a tuned-grid detector stage with electronically coupled local oscillator using a triode hexode mixer valve for both functions, and two stages of A/F amplification. The first A/F stage is transformer-fed from the detector stage (via an R/F filter circuit) and is itself resistance/capacity coupled to the second A/F (output) stage.

The grid circuits of the two R/F stages, the detector stage and the local oscillator are tuned simultaneously by a four-gang condenser, the coils and trimming condensers (and padding condensers in the case of the local oscillator) being brought into circuit by means of the band-change switch.

Gain control is effected primarily by altering the standing positive bias on the cathodes of the R/F valves, this being equivalent to altering the negative grid bias. A secondary means of gain control is provided by the A/F gain control potentiometer, which is a preset control and is not used in normal operation of the receiver.

A Vernier tuning inductance is included in the grid circuit of the local oscillator by means of which the frequency of the oscillator may be lowered when it is desired to avoid interference from a station operating on the image frequency of the wanted station.

An A/F filter circuit tuned to 1,000 c.p.s. may be connected between the first and second A/F valves when receiving C.W. in order to provide additional selectivity.

Provision is made for feeding the set from either a normal vertical aerial or from a dipole aerial or remote vertical aerial through an 80-ohm feeder. On ranges 1 and 2 (15 to 90 kc/s) a high or low-impedance loop aerial may also be used.

A phase A.C. input from an Outfit R.I.S. (1) can be applied to the suppressor grids of the two R/F valves, the amplitude of this input being adjusted as necessary by a potentiometer (28) control.

2. CONTROLS.

The following controls are placed on the panel of the receiver, as shown in Fig.4:-

Input Switch (9). (See Fig.3). This connects the input circuits under various conditions. In the "Stand By" position the aerial is inductively coupled to the grid circuit of the 1st R/F valve which is tuned by the main 4-gang tuning condenser. In the "Tune" position the aerial is coupled to a separately tuned aerial circuit which in turn, is inductively coupled to the grid circuit of the 1st R/F valve.

In the "Loop" positions the high or low impedance loop circuit is inductively coupled to the grid circuit of the 1st R/F valve which is separately tuned by the aerial tuning condenser.

Band Change Switch (10). This switch connects the appropriate coils in the aerial circuit, the two R/F stages, the detector stage and the local oscillator circuit. The switch has four positions, giving the following nominal frequency bands:-

Band 1 - 15 - 38 kc/s.
Band 2 - 38 - 90 kc/s.
Band 3 - 90 - 240 kc/s.
Band 4 - 240 - 550 kc/s.

Suitable overlaps between the bands are also provided.

The movement of the band change switch rotates a drum which carries the frequency calibration of the various wave ranges so as to present the appropriate calibration behind the window in the panel.

Aerial Tuning Condenser (11). This condenser is fitted with a direct coupled dial graduated from 0 to 25 and serves to tune the aerial circuit.

H/F Gain Control (41). This controls the gain of the two R/F valves by altering the bias on the cathodes.

L/F Gain Control (77). This control is situated under a cover plate on the panel and is screwdriver-operated. It should be left in its midway position unless a permanent change of output level is found to be necessary.

Operating Switch (87). This switch has five positions, the effects of which are shown by the tallies, which are:-

Oscillator ON. { Filter In. / Filter Out.

H.T. OFF.

Oscillator OFF. { Filter Out. / Filter In.

Crash Filter Switch (102). This switch, when in the "IN" position, connects the limiter (consisting of a pair of paralleled metal rectifiers in opposition) across the telephone output, thus limiting the maximum output of the receiver to 0.2 milliwatts.

Supplies Switch (113). This switch breaks the supply leads to the receiver.

Heterodyne Vernier Control (123). This varies the grid circuit vernier inductance of the local oscillator to enable image frequency interference to be avoided. It must always be left in the fully anti-clockwise position when searching for a station.

R.I.S. Control (28). This control varies the amplitude of the phased A.C. input applied to the suppressor grids of the two R/F valves from the outfit R.I.S. to which the set is connected. The control knob of the R.I.S. potentiometer (28) is coloured RED and it is essential that the knob is kept in the "OFF" position when full R.I.S. equipment is not in operation or not fitted, otherwise the receiver will suffer from some reduction

3. AERIAL CIRCUITS.

The aerial circuits of the receiver may be connected in one of four conditions, according to the position of the input switch (9). The four conditiohs are shown in Fig.3 and are as follows:-

"Tune" - Aerial terminal connected to aerial coupling coil (13), which is coupled to aerial tuned circuit (11), (12), (18). 80-ohm input jack connected to coupling coil (15), which is coupled to aerial tuned circuit. Aerial circuit coupled by coil (18) to tuned grid circuit (16) (119) (20) of first R/F valve.

"Stand-by" Aerial terminal connected to coupling coil (17), which is coupled to first R/F tuned grid circuit (16) (119) (20). 80-ohm input jack (8) connected to coupling coil (19), which is coupled to first R/F tuned circuit.

"Loop 1" Loop Input terminals connected to low-impedance coupling coil (15), which is coupled to aerial tuned circuit (11) (12) (18). Aerial circuit connected direct to grid of first R/F valve.

"Loop 2" Loop Input terminals connected to high-impedance coupling coil (14), which is coupled to aerial tuned circuit (11) (12) (18). Aerial circuit connected direct to grid of first R/F valve.

The two "Loop" positions of the switch are only intended for use in submarines where a single-turn loop or frame aerial is fitted for submerged reception, on Bands 1 and 2 (i.e. on frequencies between 15 and 90 kc/s).

The vertical aerial input terminal is shunted to earth by a Pattern 8431 gas-gap arrestor.

4. FIRST R/F AMPLIFIER CIRCUIT.

The grid circuit of the first R/F amplifier depends upon the position of the input switch (9). When this switch is in either the "Tune" or "Stand-by" position the grid circuit consists of one of the coils (16), tuned by its individual trimming condenser (119) and the main tuning condenser (20). When the input switch (9) is in either of the "Loop" positions, the grid circuit consists of the coils (12) (18) for the range in use and the aerial tuning condenser (11). The tuning condenser (20) is one section of the four-gang condenser operated by the main tuning control (122) which tunes the R/F, detector and oscillator stages. When Band 2, 3 or 4 is in use the coils of the lower-frequency ranges are short-circuited by the range switch (10).

The valve used is a VR100 variable-mu screened pentode (1) the anode of which is coupled to the tuned grid circuit of the second R/F stage by means of the coupling coil (31), the coil for the range in use being selected by means of the band change switch (10). The bottom of the coupling coil is connected to the H.T. line through a 5,000-ohm resistance (29) and to earth through a 0.1 mfd. condenser (30).

The screen grid of the valve is connected to the screen grid supply line through a 5,000-ohm resistance (21)

and to earth through a 0.1-mfd. condenser (22). The cathode of the valve is connected to the bias line through a 1,250-ohm resistance (23) and to earth through a 0.1-mfd. condenser (24).

The suppressor grid of the valve is connected to that of the second R/F valve (2) and both are connected to earth through a 1-megohm resistance (25) and 0.02-mfd. condenser (26). They are also connected to the slider of the 100,000-ohm R.I.S. potentiometer (28), which is supplied from the secondary winding of the R.I.S. transformer (27). The primary winding of this transformer is fed from the R.I.S. Input terminal.

5. SECOND R/F AMPLIFIER CIRCUIT.

The grid circuit of the second R/F amplifier consists of one of the coils (32) tuned by the main tuning condenser (35) and its individual trimming condenser (33). The coil for the range in use is selected by means of the band change switch (10) any lower-frequency coils being short-circuited. The coil for range I is shunted by a 2-megohm resistance (34) **to decrease the gain.**

The valve used is a VR100 screened pentode (2), the anode of which is coupled to the tuned circuit of the detector valve (3) by means of a coupling coil (44), the appropriate coil for the range in use being selected by means of the band change switch (10). The bottom of the coupling coil (44) is connected to the H.T. line through a 5,000-ohm resistance (42) and to earth through a 0.1-mfd. condenser (43).

The screen grid of the valve is connected to the screen grid supply line through a 5,000-ohm resistance (36) and to earth through a 0.1-mfd. condenser (37). The cathode of the valve is connected to the bias line through a 1,250-ohm resistance (38) and to earth through a 0.1-mfd. condenser (39).

The suppressor grid of the valve is connected in parallel with that of the first R/F valve (1) so that noise-suppression voltages are applied to both valves.

6. DETECTOR CIRCUIT.

The grid circuit of the detector valve consists of one of the coils (45) tuned by the main tuning condenser (49), which is shunted by the range trimming condenser (47). The coil for the range in use is selected by the band change switch (10), which short-circuits any lower frequency coils. The coil for range 4 is shunted by a 250,000-ohm resistance (48) **to decrease the gain.**

The valve is a VR99 triode-hexode mixer, the hexode portion being used as the detector and the triode portion as the local oscillator. The signal grid of the hexode portion is connected to the tuned circuit through a 100-mmfd. condenser (50) and 2-megohm resistance (51) in parallel.

The screen grids of the valve are connected to the H.T. line through a 100,000-ohm resistance (52) and to earth through a 1-mfd. condenser (53).

The anode of the valve is connected to the H.T. line through a 50,000-ohm load resistance (56) and 50,000-

condenser (55). The anode of the valve is also connected to earth through a 0.002-mfd. condenser (72) and to the R/F filter through a 0.01-mfd. condenser (71).

The R/F filter consists of a choke (74), a 0.001-mfd. condenser (73) and a 0.0015-mfd. condenser (75), followed by a 500,000-ohm resistance (76) and the 250,000-ohm preset A/F volume control. The slider of the volume control potentiometer is connected to the primary winding of the inter-valve transformer (78).

7. LOCAL OSCILLATOR CIRCUIT.

The tuned circuit of the local oscillator, which employs the triode section of the VR99 detector valve, consists of one of the coils (65) shunted by the range trimming condenser (66) and both in series with the appropriate vernier inductance (62) or (63) and is tuned by one section (61) of the main tuning condenser. On ranges I and 4 the inductance is shunted by resistances (67) of 1-megohm, and 500,000-ohms respectively. On range 1 a padding condenser (68) of 6,500-mmfd. is connected in series with the tuned circuit.

The grid of the local oscillator valve is connected to the tuned circuit through a 100-mmfd. condenser (58), which is shunted by a 2-megohm resistance (59). The vernier inductance and tuned circuit coil are selected by the range switch (10). The grid of the valve is also connected to earth through a 2-megohm resistance (60).

The anode of the local oscillator is connected via the range switch (10) to the appropriate coupling coil (65) by means of which the feedback necessary to make the system self-oscillatory is obtained. The other end of the coupling coil is connected to the H.T. line through a 30,000-ohm resistance (69) and the operating switch (87) (when this is in either of the "Het. On" positions) and is connected to earth through a 0.1-mfd. condenser (70).

Coupling between the local oscillator and detector is electronic, the grid of the triode section of the VR99 valve being internally connected to a grid of the hexode detector portion.

8. FIRST A/F AMPLIFIER STAGE.

The grid of the first A/F amplifier valve (4) which is an NR68 indirectly heated triode, is fed from the secondary winding of the inter-valve transformer (78), the other end of which is connected to earth.

The anode of the valve is connected to the H.T. line through a 50,000-ohm anode load resistance (81) and 50,000-ohm decoupling resistance (79). The junction of the two resistances is connected to earth through a 1-mfd. condenser (80) and the anode of the valve is bypassed for R/F by a 0.001-mfd. condenser (83).

The output from the valve is taken from the anode via a 0.1-mfd. condenser (82) to the second A/F valve either via the A/F filter or direct, according to the position of the operating switch (87).

The cathode of the valve is connected to earth through a 1,250-ohm resistance (84), which is shunted by two 1-mfd. condensers (85) (86).

9. SECOND A/F AMPLIFIER (OUTPUT) STAGE.

The grid of the second A/F amplifier valve (5), which is a 6J5G indirectly heated triode valve, is fed from the anode of the first A/F stage valve (4) either directly through the coupling condenser, when the operating switch (87) is in either of its "Filter Out" positions or via the A/F filter circuit when the operating switch is in either of its "Filter In" positions. The grid is earthed through a 1-megohm resistance (94).

The A/F filter consists of two iron cored inductance (90) (91) tuned by fixed condensers (89) (92) and preset condensers (88) (93) to the beat frequency of 1,000 c.p.s.

The anode of the valve is connected to the H.T. line through the primary winding of the output transformer (98) and a 1,000-ohm decoupling resistance (120). The junction of the transformer winding and resistance is connected to earth through a 1 mfd. condenser (121).

A high-impedance (5,000-ohms) output is taken from the anode of the valve through a 1 mfd. condenser (100), the anode of the valve being bypassed to earth for R/F by 0.01 mfd. condenser (99). The telephone output, which is matched to a pair of Pattern W.621 head telephones, is taken from the secondary winding of the output transformer (98) to the telephone jacks (103) (104). When the "Crash Filter" Switch (102) is made, this output is shunted by a pair of metal rectifiers (101), which limit the amplitude of the voltage applied to the telephones. This prevents sharp peaks of audio frequency impulses from giving more than a limited A/F output. When "listening through" this limiter prevents excessive output in the telephones from the local transmitter. The 5,000-ohm output is intended to drive a D.C. Amplifier M31 for Auto-H/S reception.

CHAPTER IV.

INSTALLATION.

1. GENERAL.

Receiver B29 is arranged for mounting either in a standard W/T rack or on the operator's bench in small craft. When the receiver is to be rack-mounted it is supplied with a Pattern W.3881 Mount for Receiver B29 for W/T racks; when it is to be bench-mounted a pair of Pattern W.3880 straps, securing are supplied.

The rack-mounting assembly is shown in Fig.9. When the receiver is to be fitted in the rack, the four long securing bolts should be placed through the four outer holes in the tray of the Pattern W.3881 mount, the heads below the tray, and secured by the four clip brackets, which are fastened to the tray by small screws and nuts. The runner bars and mount should then be secured to the rack by the ten large bolts, and the receiver may then be slid into the mounting until it is arrested by the stops at the back of the tray. Then place the securing bars over the securing bolts and tighten down on to the top of the receiver by the wing nuts. If it is not possible to reach the back of the mount when the receiver is in place, the receiver should be fitted in the mount before this is fitted to the rack.

When the receiver is to be bench mounted it is placed in position on the bench and secured by the Pattern W.3880 straps which are bolted to the bench, as shown in Fig.9.

NOTE:- Before the receiver is secured in the rack, the lid should be opened and the two packing pads removed, if this has not already been done. The presence in the receiver of all the valves should be checked.

When the receiver is fitted in the rack or on the bench, the aerial terminal box should be opened and the Pattern 8431 gas-gap arrestor fitted in its holder, the lid of the box being then replaced.

The receiver should then have the A.C. supply connected to it and the R.I.S. terminal should be wired to the appropriate R.I.S. Phase Control Unit, design "B", "C" or "E" by Pattern 9084 cable.

The aerial should then be connected, using Pattern 9084 cable where a loop aerial is fitted and Pattern 1165 plugs and lead when the aerial is connected to the receiver through an 80-ohm feeder. A normal "vertical" aerial is connected by means of Pattern 1429 plugs and lead.

When the receiver is to be used for Auto H/S reception, the 5,000-ohm output terminals will be connected to the input terminals of the Auto H/S D.C. amplifier by Pattern 9084 cable.

When the telephones have been plugged in the receiver is ready for operation, as described in Chapter V.

NOTE:- 3-point telephone plugs, such as Pattern 7151, must invariably be used. If a 2-point plug is used, half the secondary winding of the output transformer will be short-circuited with consequent great loss in signal strength.

CHAPTER V.

OPERATION.

1. NORMAL OPERATION.

The normal procedure for operating Receiver B29 is as follows:-

(i) Make the Supplies switch (113) to "ON". Note that the lamps for illuminating the tuning scale are burning.

(ii) Set the Input switch (9) to "Std. By.".

(iii) Set the Operating switch (87) to "Osc. On - Filter Out".

(iv) Set the Crash Filter switch (102) to the "Out" position.

(v) Set the Band Change switch (10) to the frequency band containing the desired frequency, as shown below:-

Frequency.	Band.
15 - 38 kc/s.	1
38 - 90 kc/s.	2
90 -240 kc/s.	3
240 -560 kc/s.	4

(vi) Set the H/F Gain control (41) to three-quarters of its travel in a clockwise direction.

(vii) Set the tuning control (122) to the desired frequency as indicated on the tuning scale and search on either side of this position until the wanted station is heard. The beat frequency thus obtained will change as the signal is "tuned through" from a high audio frequency on the other side. It is very important that the main tuning control should always be adjusted on that side of the zero beat position which gives an increasing beat frequency for a clockwise rotation of the main tuning control.

(viii) If additional selectivity is required in order to avoid interference the input switch (9) is now set to "Tune" and the aerial tuning control (11) adjusted for maximum signal strength.

(ix) If the signal being received is I.C.W. or R/T the operating switch (87) should now be set to "Osc. Off - Filter Out".

(x) When the signal has been tuned in as described above, readjust the H/F gain control (41) as necessary. The L/F gain control (77), which is located under a cover plate on the panel should be adjusted only if after considerable experience with the receiver, it appears that a permanent increase or decrease in A/F output is desirable (as when the receiver is employed for Auto H/S reception).

(xi) When a C.W. signal is being received, the A/F

the selectivity of the receiver. This is done by setting the operating switch (87) to the appropriate "Filter In" position and carefully retuning the beat note by the main tuning control (122) to the A/F filter frequency, which will be indicated by a sharp increase in output.

2. CRASH FILTER.

When tuning in a signal, this limiter must always be out, otherwise the tuning will be flat and the receiver will appear to be unselective. After the signal has been correctly tuned the limiter may be switched in for listening through or to reduce atmospheric, pulse or ignition interference, but the H/F gain control must then be turned down until the wanted signal is just beginning to weaken.

Unless this is done the effect of this limiter may be to cut down the output from the wanted signal until it is hardly greater than that of relatively much weaker interfering signals.

3. IMAGE INTERFERENCE.

When the receiver has been tuned to a wanted frequency, as described above, it sometimes happens that an unwanted station operating on a frequency 2 kc/s above that of the wanted station can be received owing to "heterodyne ambiguity". A simple numerical example will make this clear.

If the desired signal has a frequency of 300 kc/s and the main tuning control is correctly adjusted to this frequency, the local oscillator will be oscillating at a frequency of 301 kc/s: the difference in frequency of the received and local signals giving a beat or heterodyne note of 1,000 c/s, which is the optimum frequency of the A/F filter.

If there is an unwanted station operating on a frequency of 302 kc/s, this also will give a beat note of 1,000 c/s, though it will be somewhat attenuated by the R/F tuned circuits, as the frequency difference between this signal and the local oscillation is also 1 kc/s.

To overcome this difficulty the heterodyne vernier control (123) is fitted. This control adjusts the variable inductances (62) (63), one of which is connected in the grid circuit of the local oscillator on each frequency range, thus varying the frequency of the oscillations generated by the local oscillator. Clockwise rotation of the control lowers the frequency of the local oscillator.

In the example given above, the "Het. Vernier" control would be rotated clockwise until the wanted signal reappeared. The local oscillator frequency would then have been lowered to 299 kc/s. so that the wanted signal would again give a beat frequency of 1 kc/s. with the local oscillations, but the unwanted signal would give a beat frequency of 3 kc/s. which would be eliminated by the A/F filter.

THE VERNIER CONTROL MUST ALWAYS BE RETURNED TO THE FULLY ANTI-CLOCKWISE POSITION WHEN SEARCHING FOR A STATION.

4. TUNING LOOP AERIALS. (S/M's only).

The procedure for operating the set when receiving on a loop aerial is as follows:-

(i) Make the supplies "ON/OFF" switch (113). Note that the lamps for illuminating the tuning scale are burning.

(ii) Set the input switch (9) to "Loop 1" or "Loop 2" according to whether the loop aerial fitted with the receiver is a low-impedance (single-turn) or high-impedance (multi-turn loop).

(iii) Set the operating switch (87) to "Osc. on, Filter Out".

(iv) Set the crash filter switch (102) to the "Out" position.

(v) Set the Band Change switch (10) to the frequency band containing the desired frequency.

(vi) Set the H/F gain control (41) to three-quarters of its travel in a clockwise direction.

(vii) Set the main tuning control (122) to the desired frequency as shown on the tuning scale.

(viii) Adjust the aerial tuning control (11) until the desired signal is at maximum strength. If necessary, readjust the main tuning control (122).

(ix) Adjust the H/F gain control (41) so that the maximum signal strength does not overload the receiver.

CHAPTER VI.

SERVICING.

1. GENERAL.

Since all connections to the receiver B29 are made on the front panel, the receiver may be wired up and operated when the chassis is removed from the cabinet, but instability may sometimes occur in these circumstances.

The best position in which to operate the receiver when it is withdrawn from the cabinet for servicing is lying on its left side with the bottom of the chassis towards the operator, so that the majority of the components and connections are readily accessible.

NOTE:- No attempt should be made to alter the ganging of the receiver unless a false bottom is fitted to the chassis, holes being drilled in it to allow access to the ganging trimmer controls.

Figure 2 is a servicing diagram of the receiver and gives the point-to-point wiring of the model, while Figs.5 and 6 show the location of the major components. The identity numbers used in Fig.2 are marked on the majority of the components in the receiver.

2. REPLACEMENT OF VALVES.

When Receiver B29 is bench mounted, the valves may be replaced by opening the lid in the top of the receiver, which is secured by two captive screws. When the receiver is rack-mounted, however, the top lid cannot be opened and valve replacements must be effected by removing the chassis from the cabinet.

A list of the valves used with their commercial and American equivalents is given below:-

Position in Set.	Service Type.	Commercial Type.	American Type.
1st R/F Amplifier.	VR100	KTW62	6K7G
2nd R/F Amplifier.	VR100	KTW62	6K7G
Detector/Oscillator.	VR99	X66	6K8G
1st A/F Amplifier.	NR68	DH63	6Q7G
2nd A/F Amplifier.	6J5G (Patt.W1528A)	L63	6J5G
Rectifier Valve.	VU71A	-	5U4G

3. POINT-TO-POINT RESISTANCES.

The following figures give the point-to-point resistance measurements of the receiver under the following conditions:-

(i) All valves and lamps removed from the receiver.

(ii) The supply change-over link board (111) set to "Battery".

(iii) The H/F gain control (41) set to maximum (fully clockwise).

(iv) The operating switch (87) set to "Osc. On - Filter In".

(v) The band change switch (10) set to range 4.

The resistances given below are approximate, but in no case should the resistance measured depart widely from that specified. All resistances are given in ohms except where otherwise stated.

TERMINAL BOARD.

Test between	Supply Switch. ON.	OFF.
L.T. + and L.T.-	Infinity	Infinity
H.T. + and L.T.-	41,200	Infinity
Earth terminal and chassis.	0	0
L.S. Terminals.	Infinity	Infinity
Phone Jack.	24	24

VALVE SOCKETS.

Valve.	Test between Socket No. and	H.T.+	L.T.+	Earth.
1	2	Infinity	0	Infinity
	3	5,000	Infinity	46,200
	4	40,300	"	40,300
	5	1,041,200	"	1 megohm
	7	41,200	"	0
	8	42,400	"	1,200
	Top Cap	41,200	"	3
2	2	Infinity	0	Infinity
	3	5,000	Infinity	46,200
	4	40,300	"	40,300
	5	1,041,200	"	1 megohm
	7	41,200	"	0
	8	42,400	"	1,200
	Top Cap	41,200	"	3
3	2	Infinity	0	Infinity
	3	100,000	Infinity	141,200
	4	100,000	"	141,200
	5	1,041,200	"	1 megohm
	6	30,000	"	71,200
	7	41,200	"	0
	8	41,200	"	0
	Top Cap	2,041,200	"	2 megohms
4	2	Infinity	0	Infinity
	3	100,000	Infinity	141,200
	4	Infinity	"	Infinity
	5	"	"	"
	7	41,200	"	0
	8	42,400	"	1,200
	Top Cap	45,200	"	4,000
5	2	Infinity	0	Infinity
	3	1,800	Infinity	43,000
	5	41,720	"	520
	7	41,200	"	0
	8	43,200	"	2,000

The mains section should be tested as follows, with the supply change-over link board (111) set to "Mains".

Test between.	Resistance.
Valve 6, pins 2 and 8.	0.13 ohms.
" pins 6 and 4.	330 ohms.
" pins 2 and fuse (112).	1,200 ohms.
Valve 5, pins 2 and 7	0.115ohms.
"50 cycle supply" terminals with supply switch (113) ON.	22 ohms.

4. VOLTAGES AND CURRENTS.

The following figures give the values of voltage and current to be found at various points of the receiver under the following conditions:-

(i) All valves and lamps in place in receiver.

(ii) The supply change-over link board set to "Mains".

(iii) The supply switch (113) set to "ON" and an A.C. supply of appropriate voltage connected to the "50 cycle supply" terminals.

(iv) The band change switch (10) set to Range 4.

(v) The operating switch (87) set to "Osc. on - Filter in".

The currents and voltages should not differ widely from those given below:-

VOLTAGES.

Test between.	Voltage.
Valve 6, pin 4 and earth.	214 V. A.C.
" pin 6 and earth.	214 V. A.C.
" pin 2 and earth.	234 V. A.C.
" pins 2 and 8.	5 V. A.C.
Valve 5, pin 2 and earth.	6.5 V. A.C.
Fuse (on link board) and earth.	218 V. A.C.

CURRENTS.

Test points.	Current.
Remove fuse and connect meter in lieu.	19 mA. with Osc. off. 22 mA. with Osc. on.

For the following measurements the resistances must be disconnected on the H.T. side and the meter connected between the resistance and the H.T. line.

R12 (Valve 1)	2.0 mA.
R14 (Valve 2)	2.5 mA.
R17 (Valve 3)	1.5 mA. with Osc.off. 0.5 mA. with Osc.on.
R18 (Valve 4)	1.0 mA.
R19 (Valve 5)	4.2 mA.

5. GANGING.

The operation of ganging the R/F circuits of the receiver must be attempted only after a false bottom pierced with holes for adjusting the various trimmers. has been fitted

to the chassis. The inductance trimmers are operated by the screws found in the centres of the screening cans, while the capacity trimmers are the normal preset condensers mounted on the cans.

In the following, the "top" of the range means the higher frequency end of the range, while the "bottom" is the lower frequency end.

The procedure for ganging the R/F circuits of the receiver is as follows:-

(i) Make the Supplies switch and set the operating switch to "Osc. on - Filter in". Allow the receiver to warm up for 15 minutes.

(ii) Connect the output of a G35 Oscillator to the top cap (grid) of V3 through a large condenser.

(iii) Set the band change switch to range 4 and the tuning control to 240 kc/s.

(iv) Connect an A.C. voltmeter or avometer across the 5,000-ohm output terminals of the receiver to give an indication of the output. In all the following tests the input to the receiver must be adjusted by ranging the output of Oscillator G35 to ensure that there is no overloading in the receiver. The crash filter must be switched "Out".

(v) Note the setting of the Oscillator G35 which gives maximum output from the receiver and adjust the inductance trimmer of the Range 4 "Oscillator" circuit so that this coincides with the calibrated frequency, i.e. 240 kc/s.

(vi) Set the tuning control at 560 kc/s and adjust the capacity trimmer of the tuned circuit for correct calibration.

(vii) Set the band change switch to range 3 and adjust "Oscillator" inductance trimmer at the bottom of this range and the capacity trimmer at the top of the range as shown in Fig.8, i.e. at 90 and 220 kc/s respectively.

(viii) Adjust trimmers of ranges 1 and 2 similarly.

(ix) Connect the output from the G35 to the grid (top cap) of V2 and adjust the trimmers of the "mixer" tuned circuits as described. Repeat the operations until a stable condition is obtained, always adjusting the inductance trimmer at the bottom and the capacity trimmer at the top of each range.

(x) Connect the G35 to the grid (top cap) of V1 and gang the second R/F circuits as before.

(xi) Connect the output from the G35 to the aerial terminal using a dummy aerial of 100 mmfd. capacity and adjust the first R/F circuits as before. For this operation the input switch should be put to the "Std. By" position.

(xii) Check that the aerial tuning condenser covers the range on all bands by setting the input switch to "Tune". If necessary the inductance of the aerial inductances may be adjusted by the trimmers.

(xiii) Check the adjustment of all the tuned circuits when the first R/F and aerial trimmers have been adjusted.

In ganging, the R/F gain control should be kept somewhere between half and three-quarters of the way to maximum.

6. A/F RESPONSE.

The procedure for adjusting the A/F filter is as follows:-

(i) Connect the output of an A/F oscillator through a 0.1 mfd. condenser to the grid of V3. Connect an output meter to the 5,000-ohm output terminals of the receiver.

(ii) Set the oscillator to approximately 1,000 c.p.s. and operating switch of the receiver to "Osc. off - Filter in".

(iii) Connect a 100,000-ohm resistance across the trimmer of the first section of the filter (C.33) and adjust the trimmer of the second section (C.34) for maximum output from the receiver.

(iv) Remove the resistance from C.33 and connect it across C.34. Now adjust C.33 for maximum output from the receiver.

(v) Remove the resistance from C.34 and the operation is completed.

NOTE:- If for any reason the adjustment of the A/F filter is disturbed it will probably be necessary to re-gang the oscillator circuits to obtain a beat note corresponding to the pass frequency of the filter.

Figure 7 shows the response curves of the receiver with and without the filter in circuit.

7. SPARES.

The following spares are supplied with Receiver B29 on first fitting:-

1 Plug, single, 3-point, with lead, Pattern 7151.
2 Receivers, telephone, equalised type, Pattern W.621.
1 Box of spares for Receiver B29, comprising:-

1 resistance, 1,250-ohms, Erie R.M.A. No.9.
1 " 2,000-ohms, " " "
1 " 5,000-ohms, " " " Patt. W.3347.
1 " 50,000-ohms, " " No.8.
1 " 500,000-ohms, " " No.9.
1 " 1 megohm, " " " Patt. W.3352.
1 " 2 megohms, " " "
1 condenser, 100 mmfd. Dubilier Type 635, Patt.W2985.
1 " 3½-30 mmfd. Polar Type S.607.

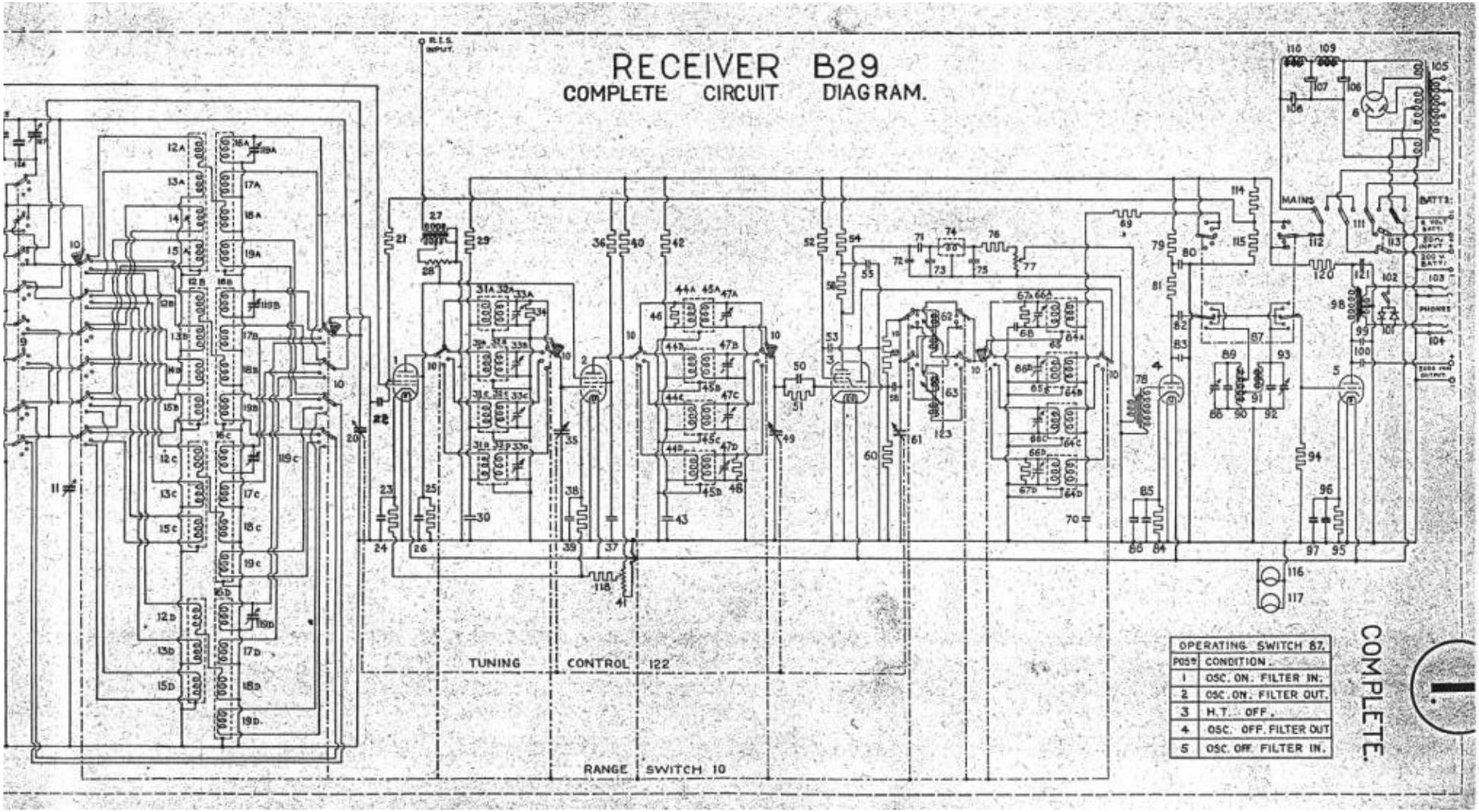
1 condenser, 1 mfd. 2 tag Muirhead Type 134N.
1 " 0.1 mfd. 1-tag Dubilier.
1 " 0.0001 mfd. Dubilier Type 690W.
2 condensers, 8+8+8 mfd. T.C.C. electrolytic, Patt.W.298.
2 fuses, Belling-Lee, Type 1055/250 mA.
2 grid clips for top caps of valves.
1 potentiometer, 100,000-ohms, Painton Type CV5.
6 lamps, 6.5-volt, 0.3-amp, Ever Ready No.2116.
4 valves, VR100 (V1 and V2).
2 valves, VR99 (V3).
2 valves, NR68 (V4).
2 valves, 6J5G (V5).
2 valves, VU71A (V6).

LIST OF IDENTITY NUMBERS.

1.	First R/F Amplifier Valve, VR100.		V1
2.	Second R/F Amplifier Valve, VR100.		V2
3.	Detector/Oscillator Valve, VR99.		V3
4.	First A/F Amplifier Valve, NR68.		V4
5.	Second A/F Amplifier Valve, 6J5G.		V5
6.	Rectifier Valve, VU71A.		V6
7.	Gas-gap Arrestor, Pattern 8431.		SG1
8.	Input Jack, P.O. Gauge "A", Pattern 676.		J1
9.	Input Switch, Oak 2-section.		S4
10.	Range Switch, Oak 12-section.		S6
11.	Aerial Tuning Condenser, Polar.		C6
12.	Aerial Tuning Inductance,	"A" Range I,	L1
13.	Aerial Coupling Inductance,	"B" Range II,	L2
14.	High Impedance Loop Aerial Coupling Inductance,	"C" Range III,	L3
15.	Low Impedance Feeder Coupling Inductance,	"D" Range IV,	L4
16.	First R/F Tuning Inductance,	"A" Range I,	L5
17.	"Stand-by" Aerial Coupling Inductance,	"B" Range II,	L6
18.	Tuned Circuit Coupling Inductance,	"C" Range III,	L7
19.	"Stand-by" Feeder Coupling Inductance,	"D" Range IV,	L8
20.	Input Main Tuning Condenser, ganged with 35, 49 and 61.		C1
21.	First R/F Valve Screen Decoupling Resistance, 5,000-ohms.		R11
22.	First R/F Valve Screen Decoupling Condenser, 0.1-mfd.		C47
23.	First R/F Valve Cathode Decoupling Resistance, 1,250-ohms.		R1
24.	First R/F Valve Cathode Decoupling Condenser, 0.1 mfd.		C40
25.	R/F Valves Suppressor Grid Leak Resistance, 1-megohm.		R30
26.	R/F Valves Suppressor Grid Bypass Condenser, 0.02 mfd.		C62
27.	R.I.S. Transformer.		T4
28.	R.I.S. "Suppressor Control" Potentiometer, 0.1-megohm.		P3
29.	First R/F Valve Anode Decoupling Resistance, 5,000-ohms.		R12
30.	First R/F Valve Anode Decoupling Condenser, 0.1-mfd.		C48
31.	First R/F Anode Coupling Coil,	"A" Range I,	L9
32.	Second, R/F Tuned Circuit Inductance,	"B" Range II,	L10
		"C" Range III,	L11
		"D" Range IV,	L12
33.	Second R/F Trimming Condenser, 3½/30-mmfd.	"A" Range I,	C9
		"B" Range II,	C14
		"C" Range III,	C19
		"D" Range IV,	C24
34.	Second R/F Tuned Circuit Damping Resistance, 2-megohms.		R23
35.	Second R/F Tuning Condenser, ganged with 20, 49 and 61.		C2
36.	Second R/F Screen Decoupling Resistance, 5,000-ohms.		R13
37.	Second R/F Screen Decoupling Condenser, 0.1-mfd.		C49
38.	Second R/F Cathode Decoupling Resistance, 1,250-ohms.		R2
39.	Second R/F Cathode Decoupling Condenser, 0.1-mfd.		C41
40.	R/F Valves Bias Potentiometer Resistance, 60,000-ohms.		R22
41.	R/F Valves Bias Potentiometer 10,000-ohms.		P2
42.	Second R/F Anode Decoupling Resistance, 5,000-ohms.		R14
43.	Second R/F Anode Decoupling Condenser, 0.1-mfd.		C50
44.	Second R/F Anode Coupling Coil,	"A" Range I,	L13
45.	Detector Tuned Circuit Inductance,	"B" Range II,	L14
		"C" Range III,	L15
		"D" Range IV,	L16
46.	Damping Resistance, 500,000-ohms.		R24
47.	Detector Trimming Condenser, 3½/30-mmfd.	"A" Range I.	C10

48.	Damping Resistance, 250,000-ohms.	R25
49.	Detector Tuning Condenser, ganged with 20, 35 and 61.	C3
50.	Detector Grid Condenser, 100 mmfd.	C56
51.	Detector Grid Leak Resistance, 2-megohms.	R6
52.	Detector Screen Grid Decoupling Resistance, 100,000-ohms.	R15
53.	Detector Screen Grid Decoupling Condenser, 1 mfd.	C51
54.	Detector Anode Decoupling Resistance, 50,000-ohms.	R17
56.	Detector Anode Decoupling Condenser, 1 mfd.	C53
57.	Detector Anode Load Resistance, 50,000-ohms.	R8
58.	Oscillator Grid Condenser, 2 mmfd.	C36
59.	Oscillator Grid Leak Resistance, 2 megohms.	R7
60.	Oscillator Grid Leak Resistance, 2 megohms.	R32
61.	Oscillator Tuning Condenser, ganged with 20, 35 and 49.	C4
62.	Oscillator Vernier Tuning Inductance (Ranges 1& 2).	L21
63.	Oscillator Vernier Tuning Inductance (Ranges 3 & 4).	L22
64.	Oscillator Anode Coupling Coil.) "A" Range 1	L17
	) "B" Range 2	L18
	) "C" Range 3	L19
65.	Oscillator Tuned Circuit) "D" Range 4 Inductance.	L20
66.	Oscillator Trimming Condenser, 3½/30 mmfd. "A" Range 1,	C11
	Oscillator Trimming Condenser, varies, "B" Range 2,	C16
	Oscillator Trimming Condenser, varies, "C" Range 3,	C21
	Oscillator Trimming Condenser, varies, "D" Range 4,	C26
67.	Oscillator Damping Resistance, 1-megohm, "A" Range 1,	R26
	Oscillator Damping Resistance, ½-megohm, "D" Range 4,	R28
68.	Oscillator Padding Condenser, 6,500 mmfd.	C60
69.	Oscillator Anode Decoupling Resistance, 30,000-ohms.	R16
70.	Oscillator Anode Decoupling Condenser, 0.1 mfd.	C52
71.	Detector Coupling Condenser, 0.01 mfd.	C27
72.	Detector R/F Bypass Condenser, 0.002 mfd.	C57
73.	Detector R/F Filter Condenser, 0.001 mfd.	C58,
74.	Detector R/F Filter Choke.	L23
75.	Detector R/F Filter Condenser, 0.0015 mfd.	C59
76.	Detector R/F Filter Resistance, 500,000-ohms.	R29
77.	A/F Volume Control Potentiometer, preset, 250,000-ohms.	P1
78.	Inter-valve transformer.	T3
79.	First A/F Anode Decoupling Resistance, 50,000-ohms.	R18
80.	First A/F Anode Decoupling Condenser, 1 mfd.	C54
81.	First A/F Anode Load Resistance, 50,000-ohms.	R9
82.	First A/F Coupling Condenser, 0.1 mfd.	C29
83.	First A/F Anode Bypass Condenser, 0.001 mfd.	C28
84.	First A/F Cathode Bias Resistance, 1,250-ohms.	R4
85.	First A/F Cathode Bypass Condenser, 1 mfd.	C43
86.	First A/F Cathode Bypass Condenser, 1 mfd.	C44
87.	Operating Switch, Oak, 2-section.	S2
88.	A/F Filter Trimming Condenser, 1450/2000mmfd.	C33
89.	A/F Filter Tuning Condenser, 3,100 mmfd.	C32
90.	A/F Filter Inductance.	CH3
91.	A/F Filter Tuning Condenser, 3,100 mmfd.	C35
93.	A/F Filter Trimming Condenser, 1450/2000mmfd.	C34
94.	Second A/F Grid Leak Resistance, 1-megohm.	R10
95.	Second A/F Cathode Bias Resistance, 2,000-ohms.	R5
96.	Second A/F Cathode Bypass Condenser, 1 mfd.	C45
97.	Second A/F Cathode Bypass Condenser, 1 mfd.	C46
98.	Output Transformer.	T1
99.	Second A/F Anode Bypass Condenser, 0.01 mfd.	C30
100.	Output Coupling Condenser, 1 mfd.	C31
101.	Crash Filter Rectifier, Westinghouse H1.	W1 & W2
102.	Crash Filter Switch, Bulgin 5-amp, single-pole.	S5
103.	Telephone Jack, P.O. Gauge "A", Pattern 676.	J2
104.	Telephone Jack, P.O. Gauge "A", Pattern 676.	J3
105.	Mains Transformer, Pattern 1968A.	T2
106.	Smoothing Condenser, Electrolytic, 8 mfd.)	C37
107.	Smoothing Condenser, Electrolytic, 8 mfd.) One	

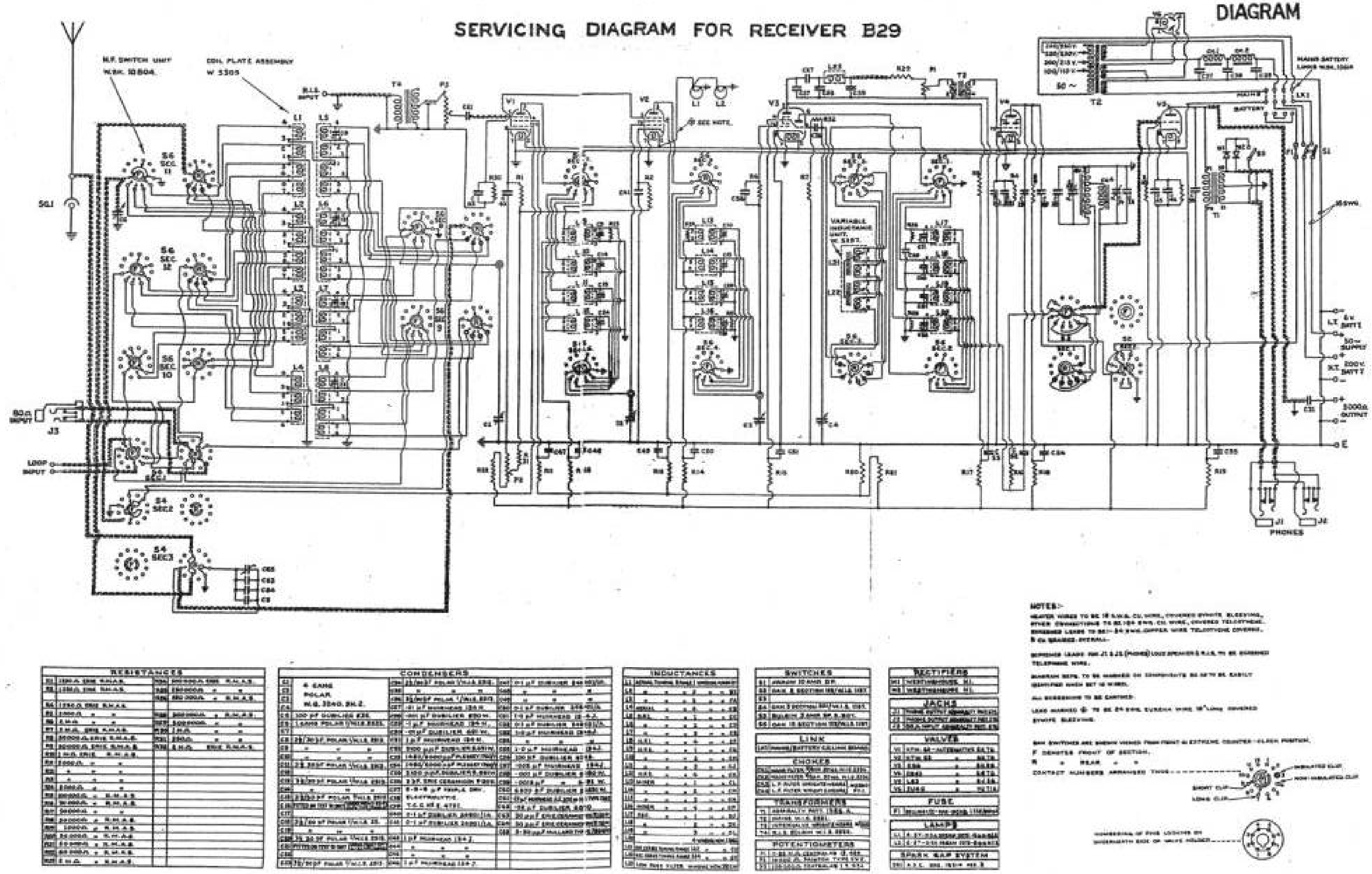
109. Smoothing Choke, 15/20-henry, 50 mA. CH1
110. Smoothing Choke, 15/20-henry, 50 mA. CH2
111. Mains-Battery Supply C.O., Link Board or Switch. LK1 or S7
112. H.T. Fuse, 60 mA. F1
113. Supply "ON/OFF" switch, Arrow 10-amp, D.P. S1
114. Screen Grid Potentiometer Resistance, 50,000-ohms. R21
115. Screen Grid Potentiometer Resistance, 50,000-ohms. R20
116. Scale Lamp, 6.5 V., 0.3-amp. L1
117. Scale Lamp, 6.5 V., 0.3-amp. L2
118. R/F Valves Bias Series Resistance, 250-ohms. R31
119. Input Trimming Condenser, 3½/30 mmfd.,
"A" Range I, C8
"B" Range II, C13
"C" Range III, C18
"D" Range IV, C23
120. Second A/F Anode Decoupling Resistance, 1,000-ohms. R19
121. Second A/F Anode Decoupling Condenser, 1 mfd. C55
122. Main Tuning Control.
123. Heterodyne Vernier Control.
124. "Stand-by" Tuned circuit Condenser, 100 mmfd. C5
125. "Stand-by" Tuned Circuit Condenser, 30 mmfd. C63
126. "Stand-by" Tuned Circuit Condenser, 30 mmfd. C64
127. "Stand-by" Tuned Circuit Trimmer, 3-30 mmfd. C65


RECEIVER B29
COMPLETE CIRCUIT DIAGRAM.
R.F.S. INPUT.
MAINS
BATTS.
PHONES
TUNING CONTROL 122
RANGE SWITCH 10
OPERATING SWITCH 87.
POSN CONDITION.
1 OSC. ON. FILTER IN.
2 OSC. ON. FILTER OUT.
3 H.T. OFF.
4 OSC. OFF. FILTER OUT
5 OSC. OFF. FILTER IN.
COMPLETE.

2

SERVICING DIAGRAM

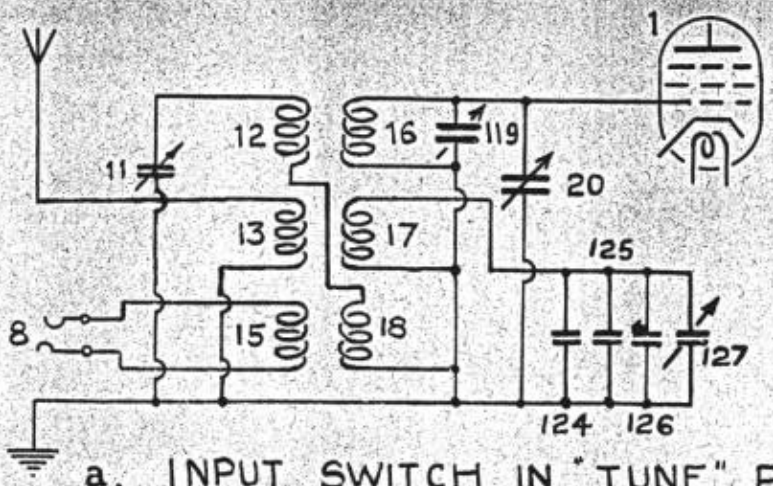
SERVICING DIAGRAM FOR RECEIVER B29



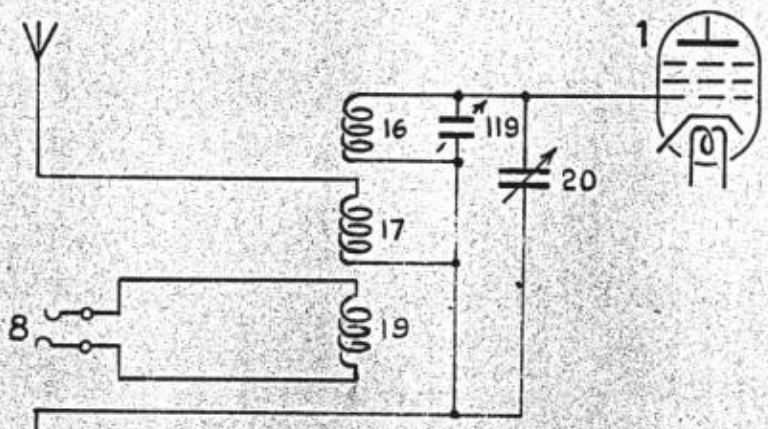
RECEIVER B29.

INPUT CIRCUITS, SIMPLIFIED DIAGRAMS.

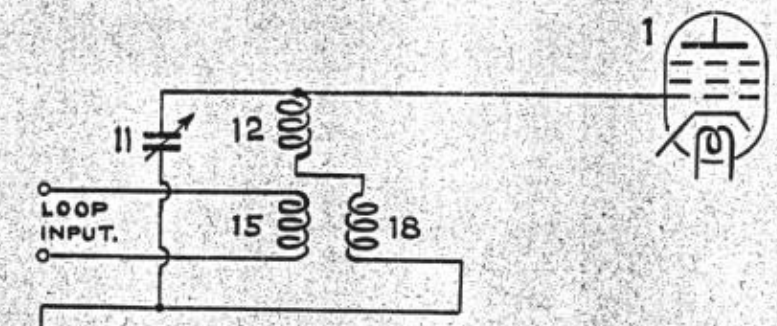
3
INPUT



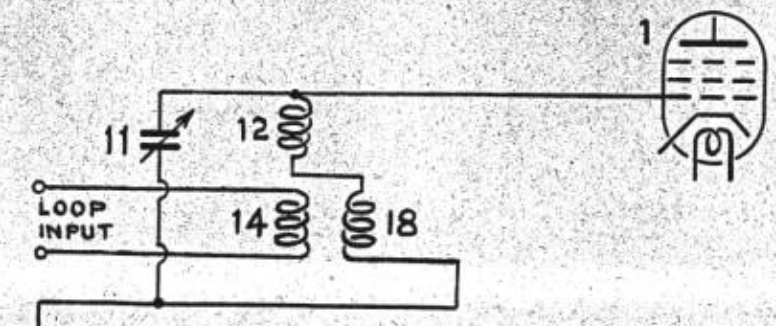
a. INPUT SWITCH IN "TUNE" POSITION.



b. INPUT SWITCH IN "STAND-BY" POSITION.



c. INPUT SWITCH IN "LOOP 1" POSITION.



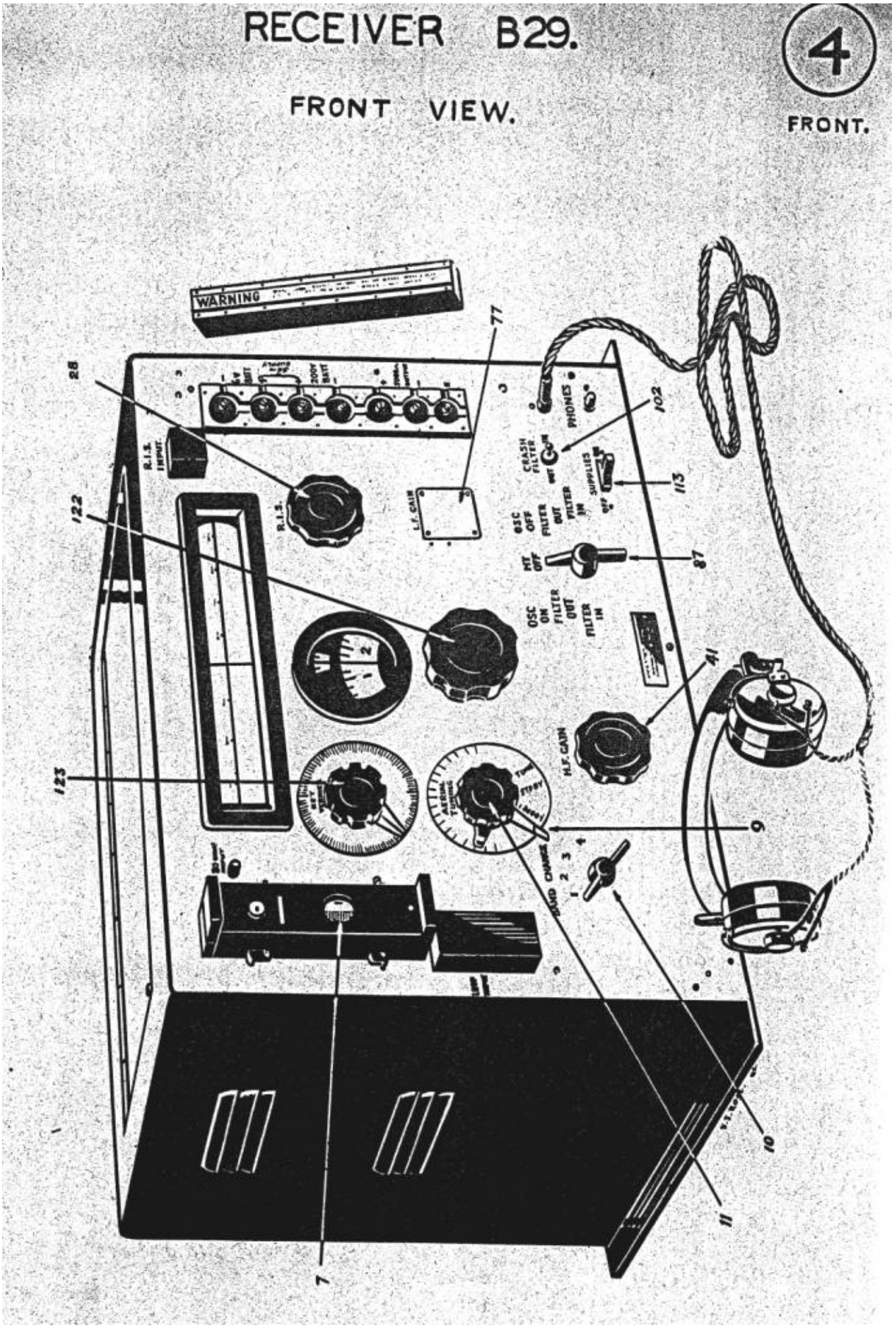
d. INPUT SWITCH IN "LOOP 2" POSITION.

RECEIVER B29.

FRONT VIEW.

4

FRONT.

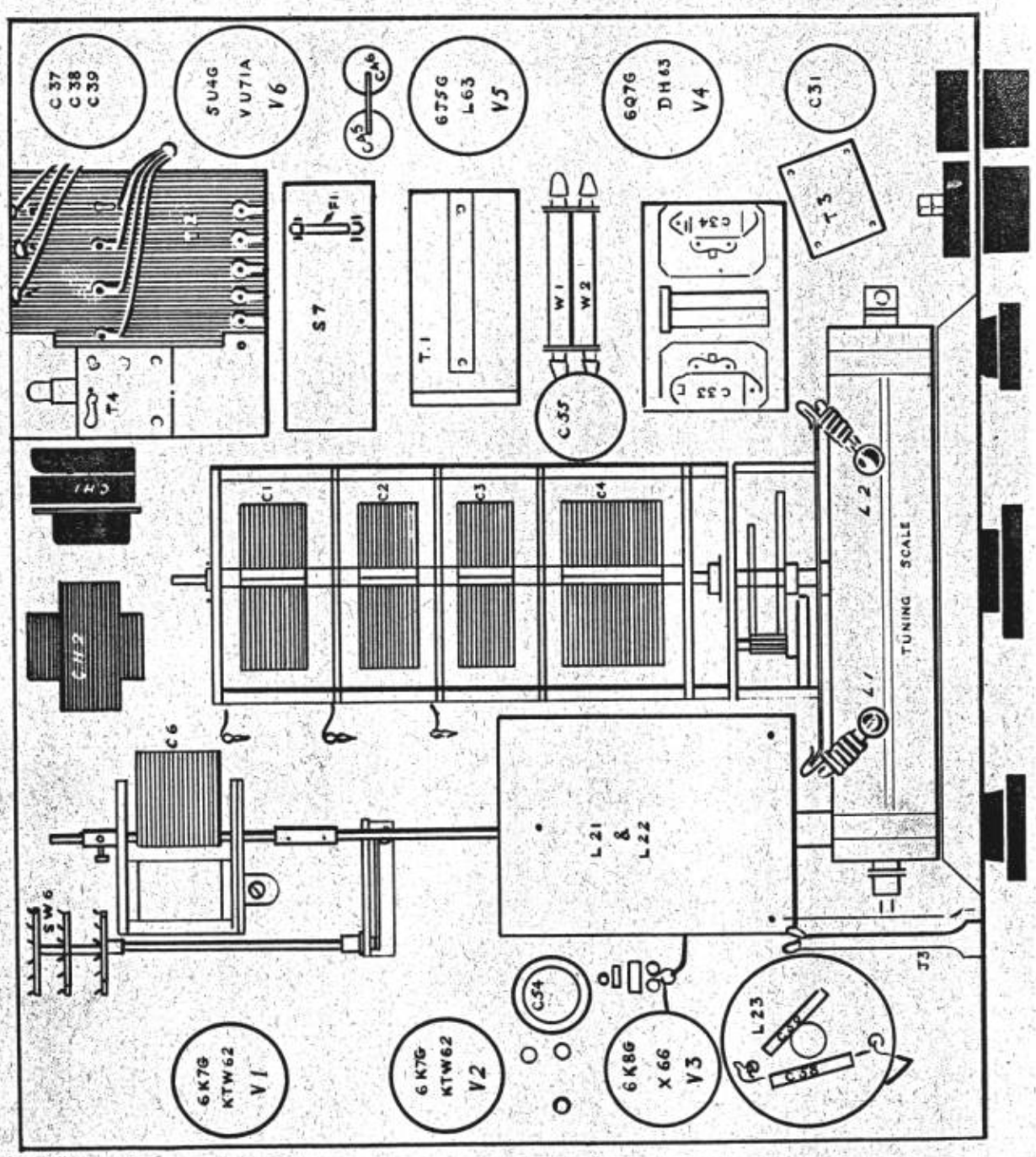


RECEIVER B 29.

5

TOP VIEW.

TOP.



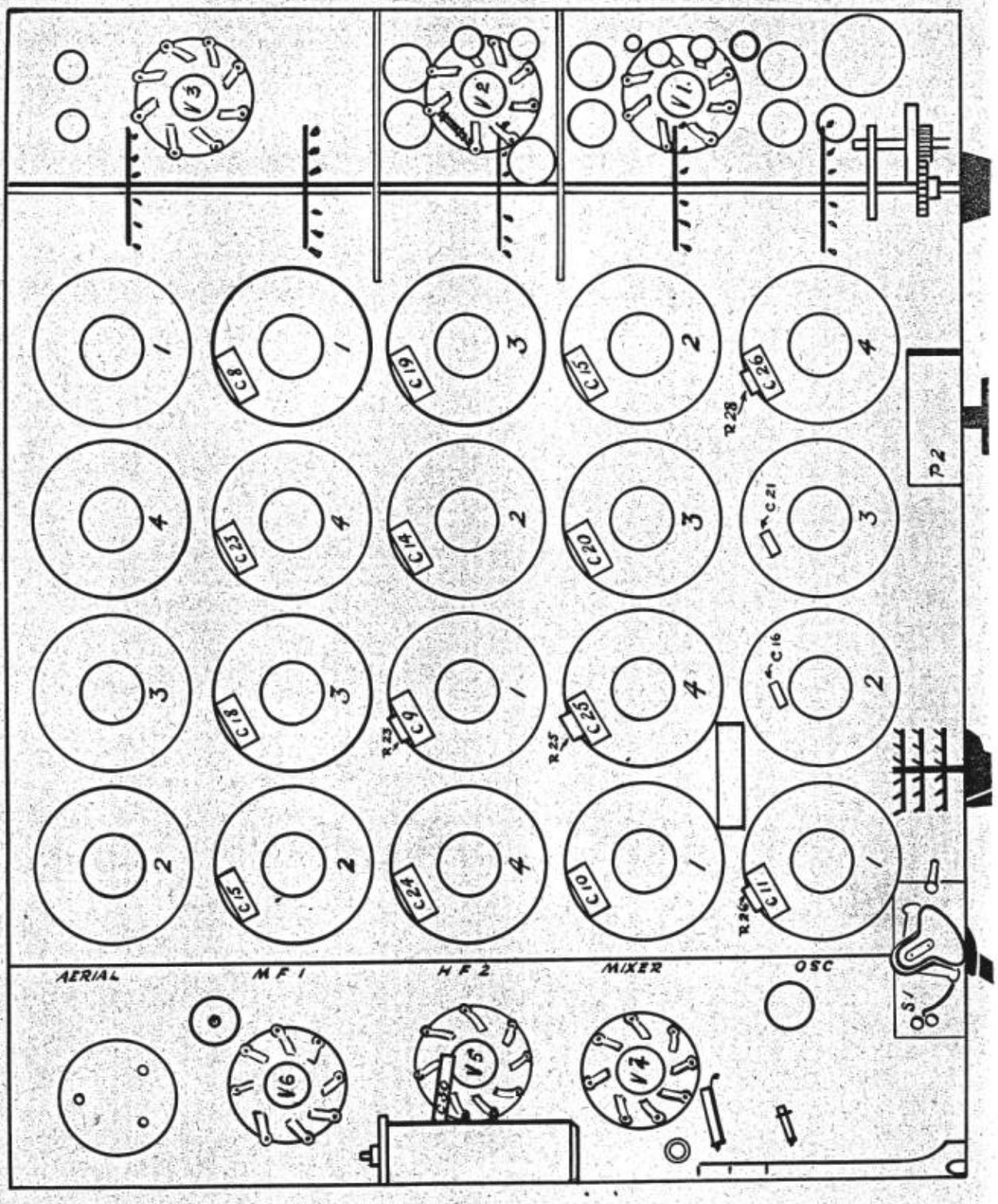
RECEIVER B29.

6

BOTTOM VIEW.

BOTTOM

Baseplate: 16 3/4 in. ± 1/3 in
add 3/16" to trimmer measurements on width
No. corrections needed for depth.



RECEIVER B 29.

A/F RESPONSE CURVES.

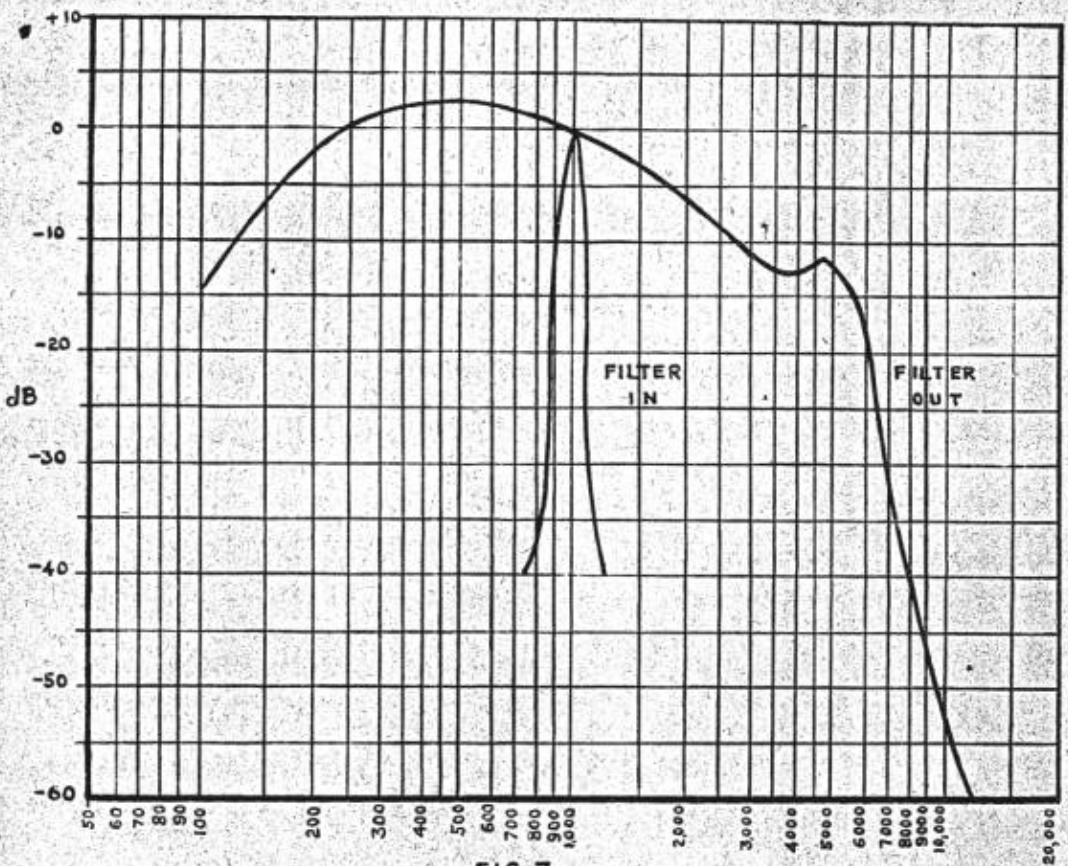
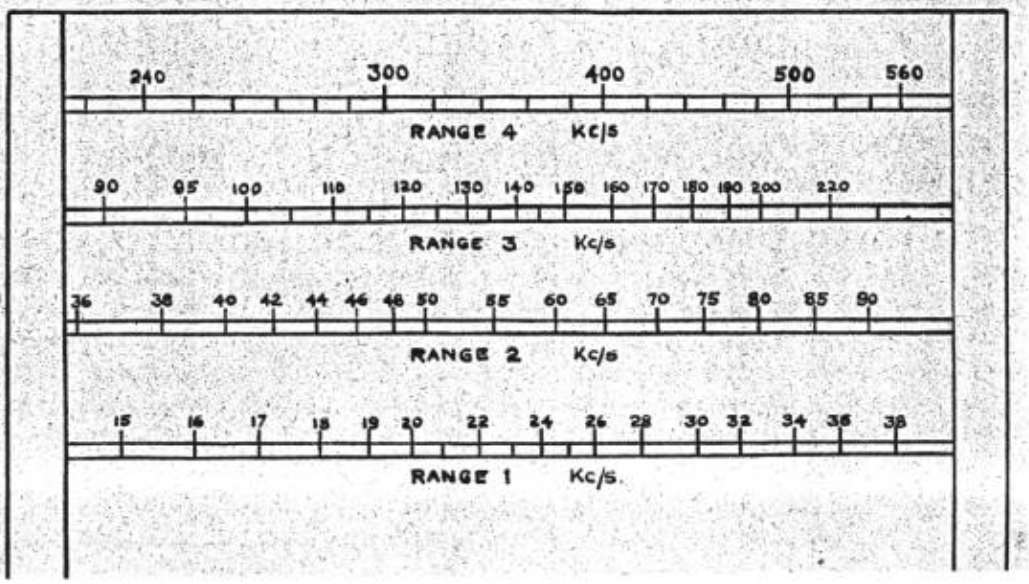


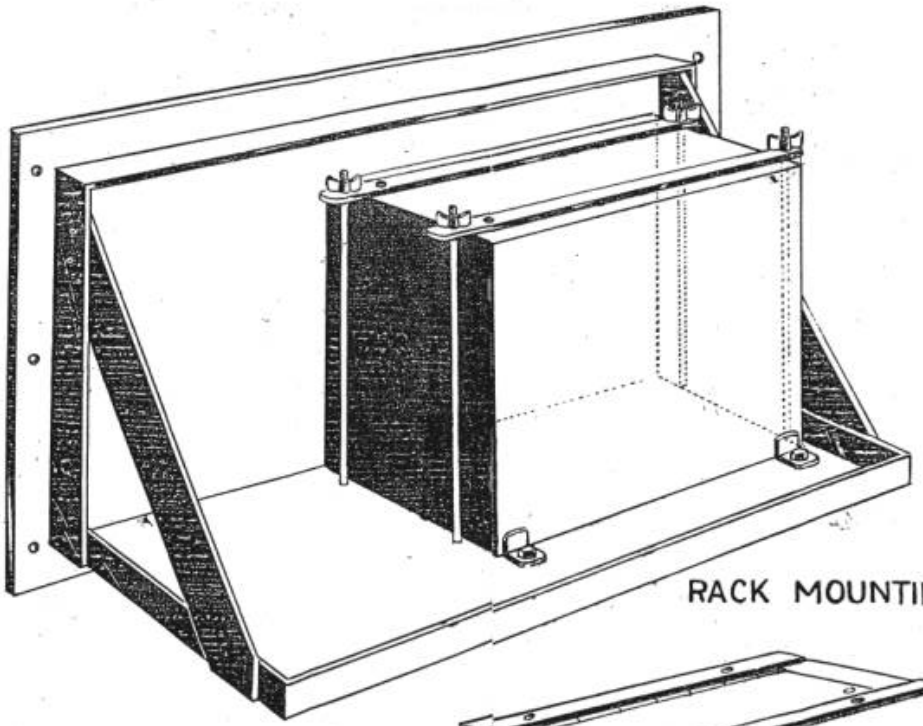
FIG 7.

TUNING SCALES.

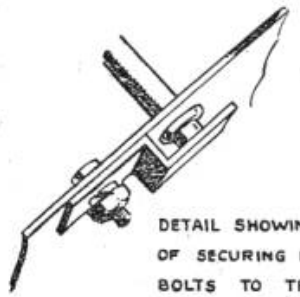


RECEIVER B29.

RACK AND BENCH MOUNTING.

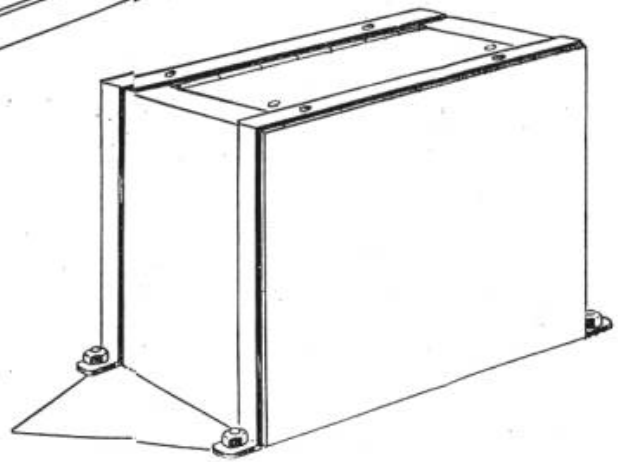


RACK MOUNTING.



DETAIL SHOWING METHOD OF SECURING RETAINING BOLTS TO TRAY.

MOUNTING FOR RECEIVER B29.
FOR W/T RACKS, PATT. W 3881.



STRAPS, SECURING
PATT. W. 3880.

A. P. 56152

FILTER UNIT DES. 12

CIRCUIT DIAGRAM

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