

SUB-SECTION

RR

TYPE 53

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TYPE 53.

METHOD OF CARRYING

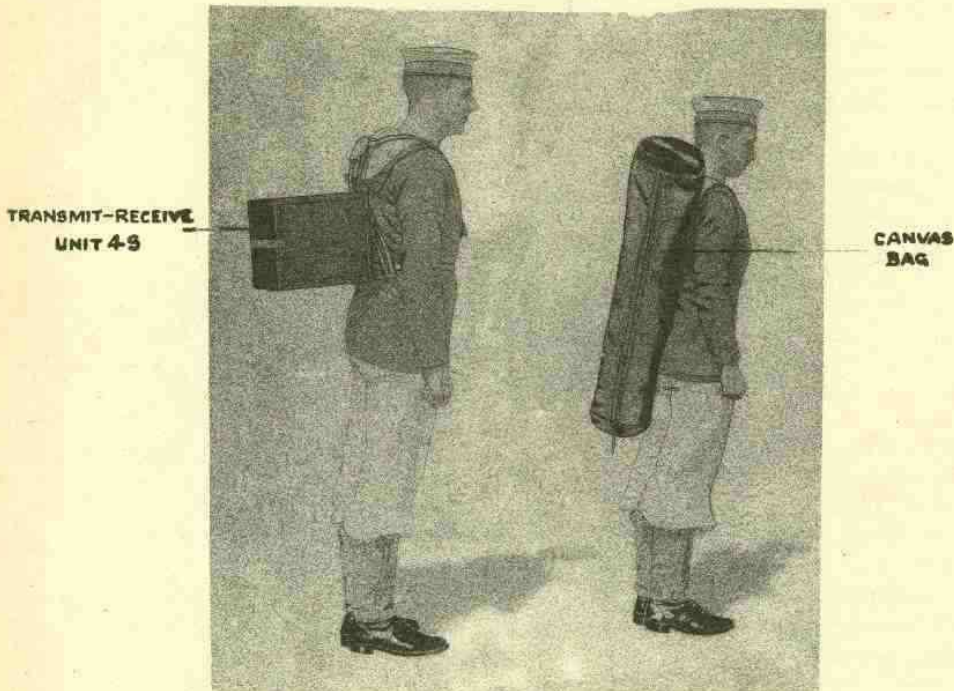


Fig. a.

POWER SUPPLIES & KEYING CIRCUITS

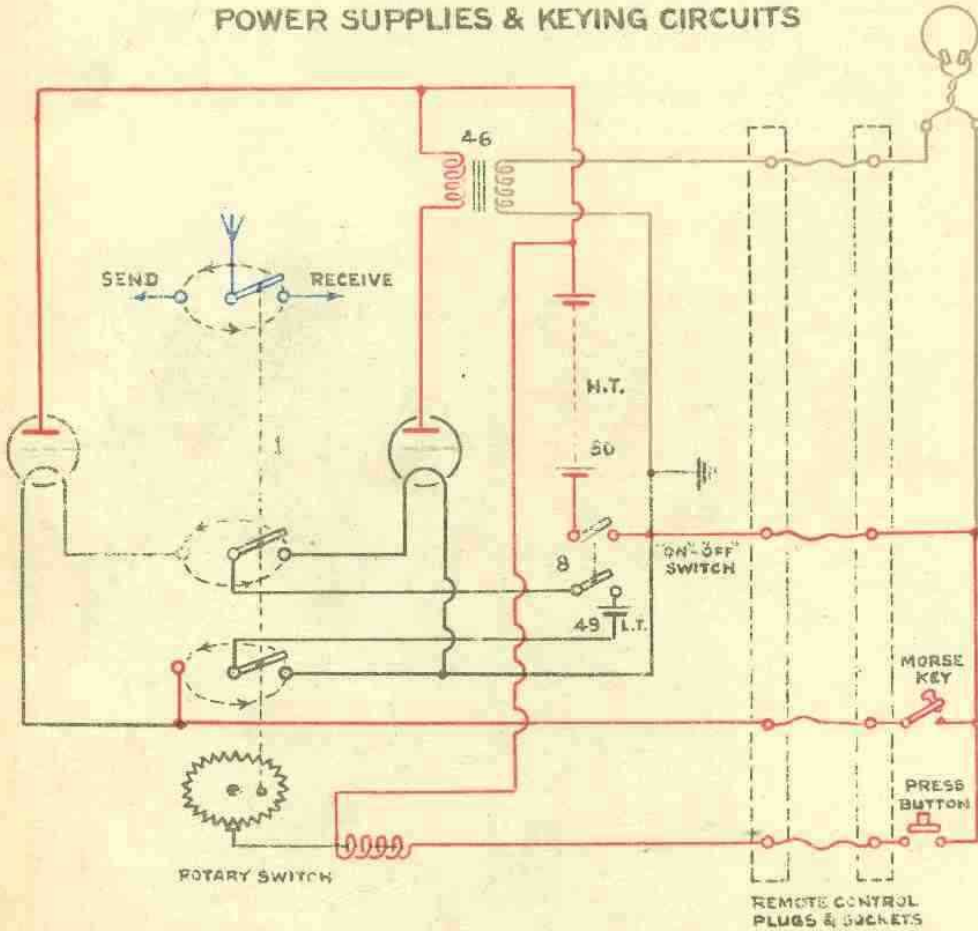


Fig. b.

TYPE 53.

Designed:- 1933.
 Frequency Range:- 3,000 - 6,000 kc/s.
 Employment:- As a light portable set.

General Description. The set is complete, having transmitter, receiver and power supplies in transmit-receive unit 4S. The change from transmission to reception, or vice versa, is made by an electrically operated rotary send-receive switch.

Loads for Transport. The set is divided into two loads for transport, which can be carried by two men.

1. (32 lbs.). Transmit-receive box slung on the back.
2. (26 lbs.). Canvas bag with zip fastener containing the aerial, ground sheet, two pairs of headphones, two operating units, remote control cable and local control cable, slung across the back.

If necessary, spare H.T. and L.T. batteries can be taken in a wooden transport box.

Aerial. Four 3-ft. duralumin rods, with an umbrella top, mounted in an insulated socket on the left of the transmitter. An insulator with three guys and pegs are provided for staying the aerial in a high wind. A terminal is provided on the aerial socket for a cable aerial, best results being obtained with a vertical aerial, not more than 50-ft. high. No earth is required.

Power Supplies. (designed for 20 hours continuous working).

H.T. 99 volt dry battery supplies H.T. to the valves and works the bobbin of the send-receive switch.

L.T. 2-volt accumulator (non-spillable).

Operating Units. Comprise a Morse key, send-receive control button, telephone terminals and socket for 4-pin plug of control cable.

Power Supply and Keying Circuits. The rotary send-receive switch (1) is electrically controlled by the press button in the operating unit. Each time this button is pressed, the switch rotates and changes over the circuits. The send-receive switch has three contacts

1. Connects the aerial to transmitter or receiver.
2. Connects L.T. positive to receiving and transmitting valves.
3. Connects L.T. negative similarly.

In the "Receive" position it also connects the filaments to H.T. negative. In the "Send" position it connects the filaments to the operating unit, which latter completes the circuit to H.T. negative when the key is pressed.

ON-OFF Switch (8). When this switch is made, it

1. Earths H.T. negative to the case,
2. Connects L.T. positive to the send-receive switch (1).

H.T. positive is permanently connected to the anodes of all valves and to the bobbin of the send-receive switch. With the "ON-OFF" switch made, an earth on the remote control cable may produce the following results,

1. If on the send-receive switch control lead, the H.T. battery energises the bobbin of this switch and it cannot be controlled by the press button on the operating unit.
2. If on the Morse key lead and the send-receive switch to "send" a continuous "long" is transmitted.
3. If on the telephone leads it will short circuit the headphones.

BACK COVER REMOVED

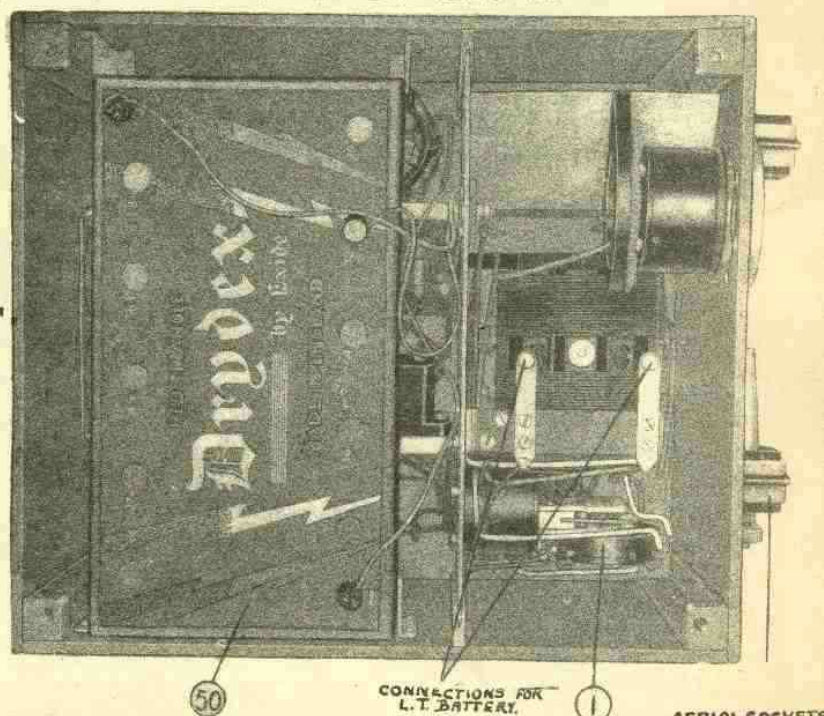


FIG. C.

TYPE 53.

SIMPLIFIED DIAGRAM OF TRANSMITTER

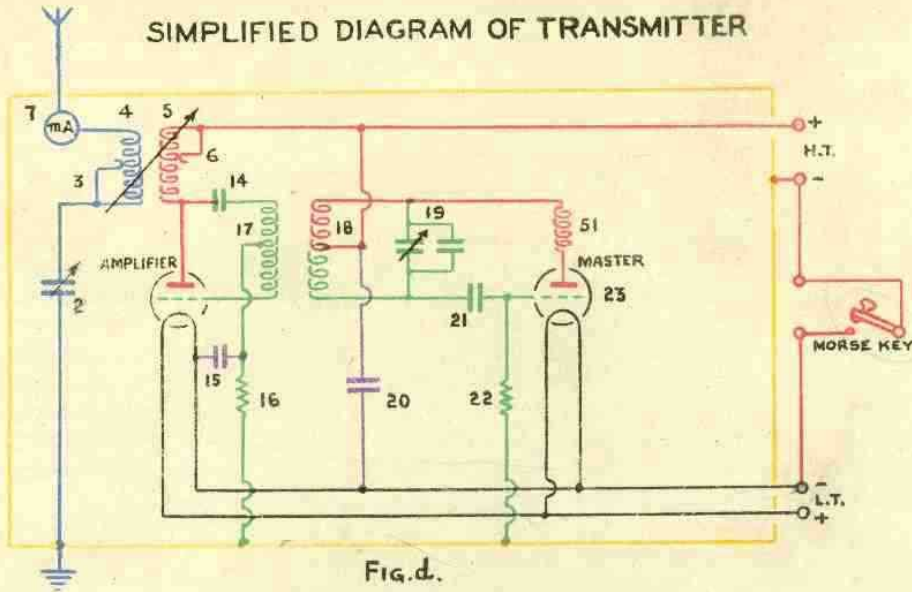


FIG. d.

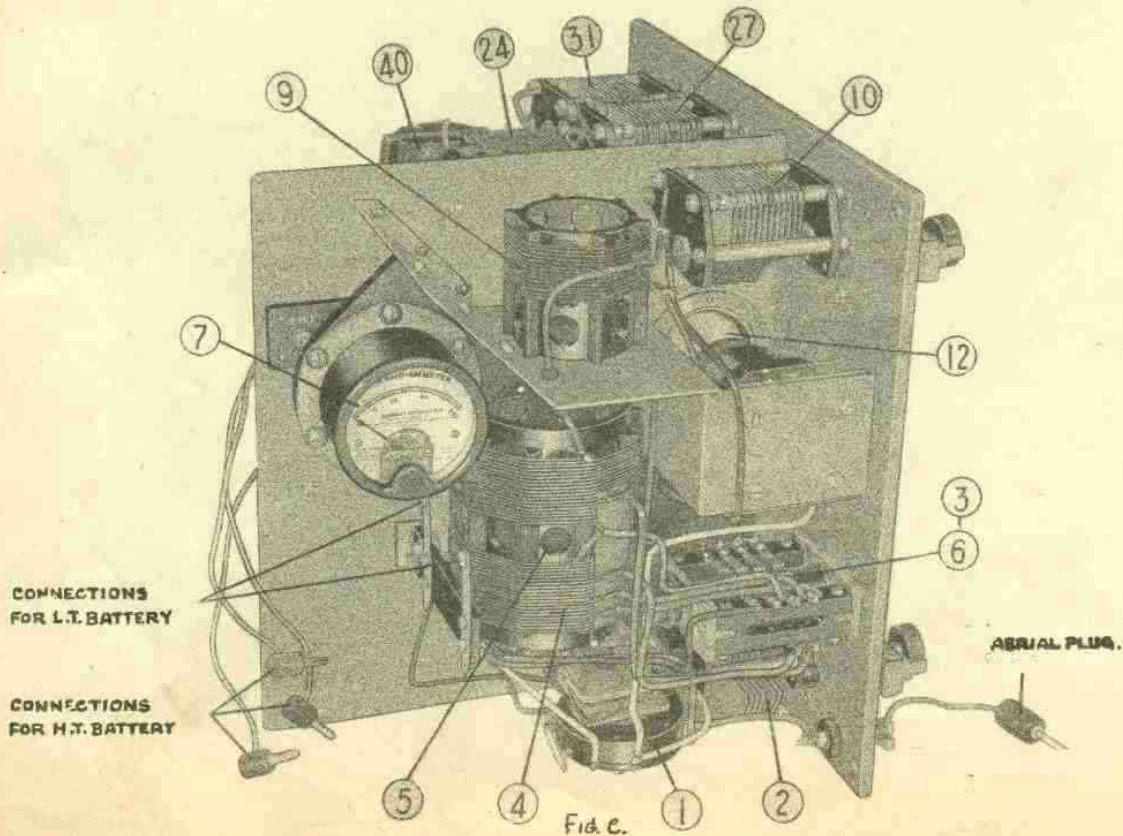
TRANSMITTER

Wave Form	Method of Producing Oscillations	Nature of Circuit		Grid Excitation		Feed.		Aerial Excitation	High Oscillating Potential Electrode
		Master	Main	Master	Main	Master	Main		
C.W.	Master controlled	Tuned circuit between anode and grid	Tuned circuit between anode and filament	Direct Inductive	Mutual Inductive from Master Circuit	Series	Series	Mutual Inductive	Anode

(References:- Admiralty Handbook of W/T 1938, Vol. II, Section K, 7, and F, 34(7).)

Neutralising. The input inductance (17) is centre-tapped and the "feed back" through the anode-grid capacity of the amplifier valve is neutralised by the condenser (14). This condenser is set in Signal School and should not be altered.

Aerial Coupling, which is varied by rotating the anode coil (5) inside the aerial coil (4) is critical on the higher frequencies. (3) and (6) are combined in a six-position barrel switch.



TYPE 53. RECEIVER SIMPLIFIED DIAGRAM

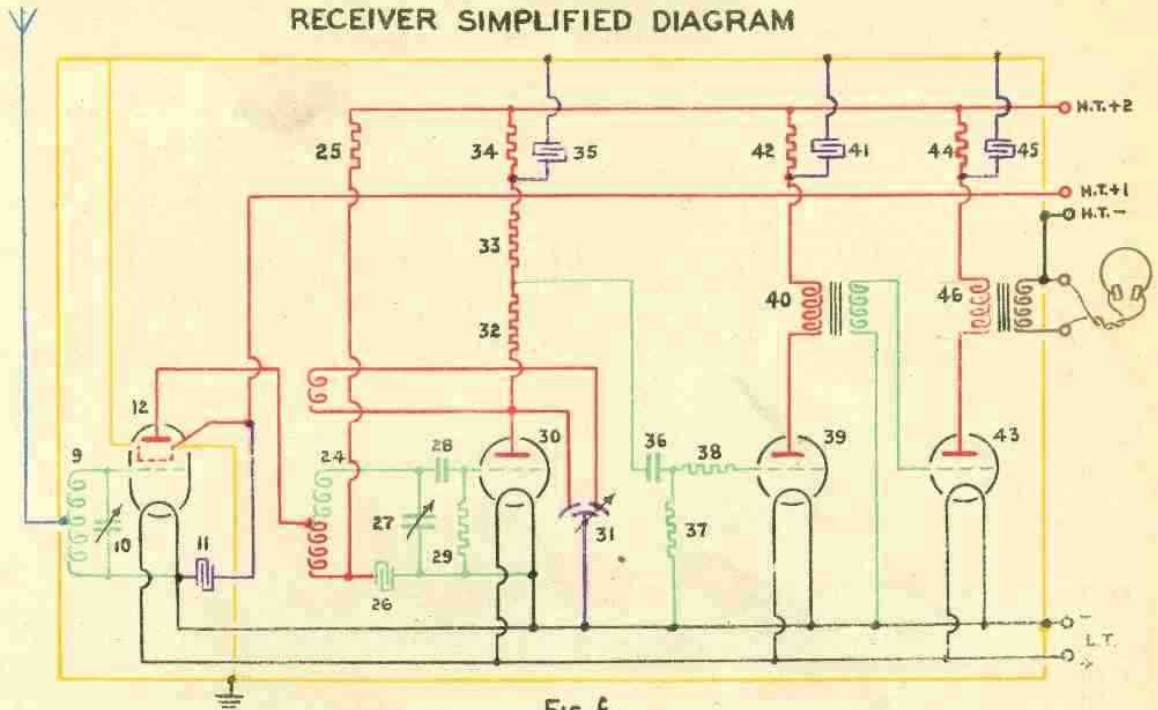


Fig. f.

RECEIVER

General Description. The receiver has one stage of R/F amplification, one detector (capable of self-oscillation for reception of C.W.) and two A/F stages. The coupling between the R/F valve and detector is tuned anode, between the detector and first A/F valve resistance capacity, and between the A/F valves transformer. The telephones are connected to a transformer in the output of the last A/F valve.

Reaction. (See Admiralty Handbook of W/T 1938, Vol. II, Section F.44).

Resistance (32) is fitted instead of an R.F. choke to prevent threshold howl.

Resistance (38) prevents residual R/F oscillations from reaching the grid of the first A/F valve.

Decoupling (Admiralty Handbook of W/T 1938, Vol. II, Section F, 34 (2)), is obtained with resistances (25)(34)(42) and (44) and condensers (26)(35)(41) and (45).

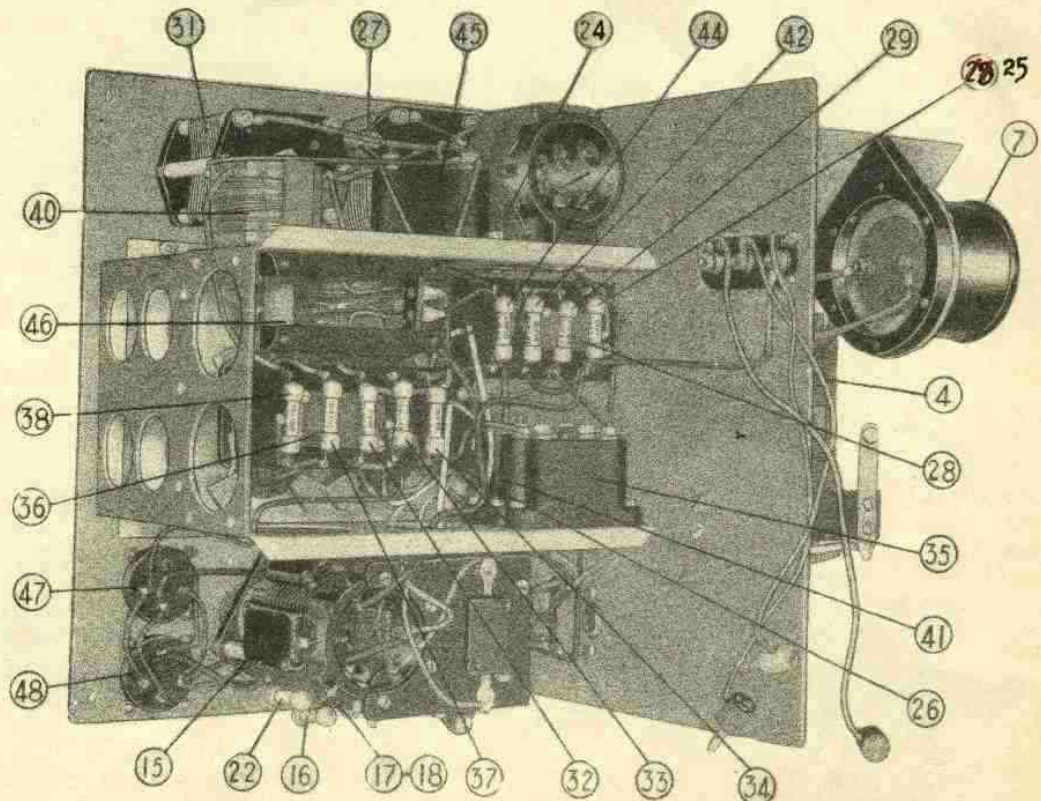


Fig. g.

TYPE 53.

ERECTION AND OPERATION.

Erection.

- (a) Place the transmit-receive box in a level position so that the rod aerial will be vertical. If other conditions permit, the aerial should be clear of trees and buildings.
- (b) Erect the aerial. The full length should be used if conditions allow.
- (c) Plug in the local control cable to the set and to the operating unit, and connect up the telephones.
- (d) Connect up the remote control similarly if required.

TYPE 53 TRANSMIT RECEIVE UNIT FRONT VIEW

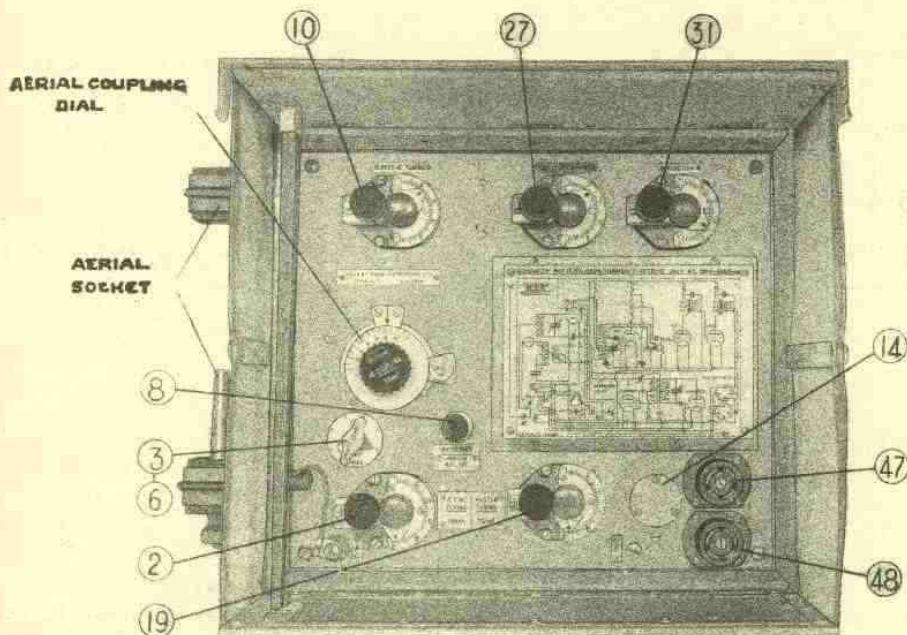


FIG. K.

Operation and Tuning.

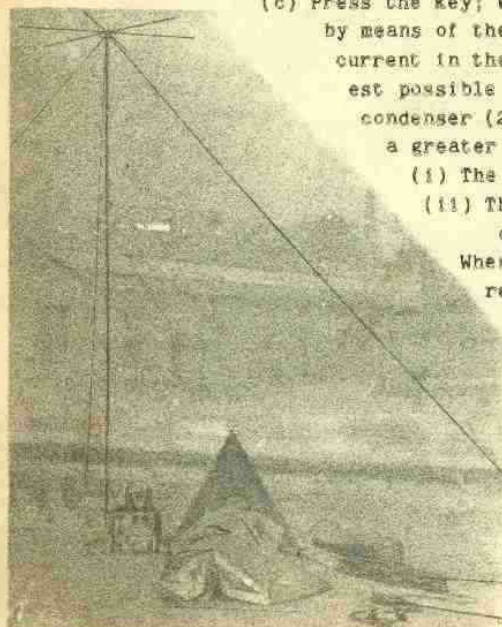
- (a) Make the ON-OFF switch (8). If the send-receive switch is to "Receive", mush will be heard in the telephones. Press the button in the operating unit to change-over to "send".
- (b) Set the master oscillator condenser (19) to the value required. The set should be tuned, by reception, on board; if this has not been done, the master oscillator must be set by interpolating between the settings given in the calibration chart.

- (c) Press the key; with the aerial coupling near the minimum, tune the aerial by means of the aerial tuning inductance (3) and condenser (2) for maximum current in the ammeter (7); then increase the coupling to get the greatest possible current. It may be necessary slightly to readjust the condenser (2). The coupling should NEVER EXCEED the optimum since with a greater value:-

- (i) The frequency stability will be decreased; and
- (ii) The amplifier valve will take a very heavy current, and so drain the H.T. battery.

When communicating at very short range, the coupling may be reduced below the value for maximum current.

- (d) Set the detector tuning condenser (27) to the correct value as obtained from the calibration chart. Adjust the reaction condenser (31) so that the detector valve is just oscillating for C.W. or just not oscillating for I.C.W. Then adjust the tuning condenser (10) for maximum mush.



REMOTE CONTROL CABLE ON WINDER.

OPERATING UNIT.

FIG. J.

TYPE 53.

NUMBERS AND VALUES.

1. Send-receive switch.
2. Transmitter aerial tuning condenser (0.0002 mfd. variable).
3. Transmitter aerial coil tuner.
4. Transmitter aerial tuning inductance (40 turns on 3 inch former).
5. Transmitter amplifier anode coil (20 turns on 2 inch former).
6. Transmitter amplifier anode coil tuner.
7. Transmitter aerial ammeter (0 - 250 mA, R/F).
8. ON-OFF switch.
9. Receiver R/F amplifier grid tuning coil.
10. Receiver R/F amplifier grid tuning condenser.
(0.0003 mfd. variable).
11. R/F by-pass condenser (2 mfd. electrolytic).
12. Receiver R/F amplifier (VR18, screened-grid).
13. Transmitter amplifier valve (NT82).
14. Neutralising condenser (value determined and set in Signal School).
15. R/F by-pass condenser (0.01 mfd. fixed).
16. Grid leak.
17. Transmitter amplifier grid inductance (10 turns interleaved with
turns of coil (18).)
18. Transmitter master anode coil (11 turns on 2½ inch former).
19. Transmitter master tuning condenser (two condensers in parallel
0.0005 mfd. variable and 0.0001 mfd. fixed.)
20. Filament insulating condenser and R/F by-pass (0.01 mfd. fixed).
21. Grid insulating condenser (0.001 mfd. fixed).
22. Grid leak.
23. Transmitter master valve (NT82).
24. Receiver detector grid coil.
25. Decoupling resistance (1000 ohms).
26. Decoupling condenser and R/F by-pass (2 mfd. electrolytic).
27. Receiver detector grid tuning condenser (0.003 mfd. variable).
28. Receiver detector grid insulating condenser (0.0001 mfd. fixed.)
29. Grid leak (0.25 megohms).
30. Receiver detector (VR21 or VR27).
31. Differential condenser.
32. R/F stopper (5000 ohms).
33. Coupling resistance (50,000 ohms).
34. Decoupling resistance (20,000 ohms).
35. Decoupling condenser (2 mfd. electrolytic).
36. Grid insulating condenser.
37. Grid leak (0.25 megohms).
38. R/F stopper (100,000 ohms).
39. Receiver first A/F amplifier (VR21 or VR27).
40. Coupling transformer.
41. Decoupling condenser (2 mfd. electrolytic).
42. Decoupling resistance (20,000 ohms).
43. Receiver second A/F amplifier (VR21 or VR27).
44. Decoupling resistance (50,000 ohms).
45. Decoupling condenser (2 mfd. electrolytic).
46. Telephone transformer.
47. Socket for local control cable.
48. Socket for remote control cable.
49. L.T. battery (2 volts, unspillable accumulator).
50. H.T. battery (99 volts, dry battery).
51. Antiparasitic choke.

TYPE 53. TRANSMITTER AND RECEIVER COMPLETE CIRCUIT DIAGRAM

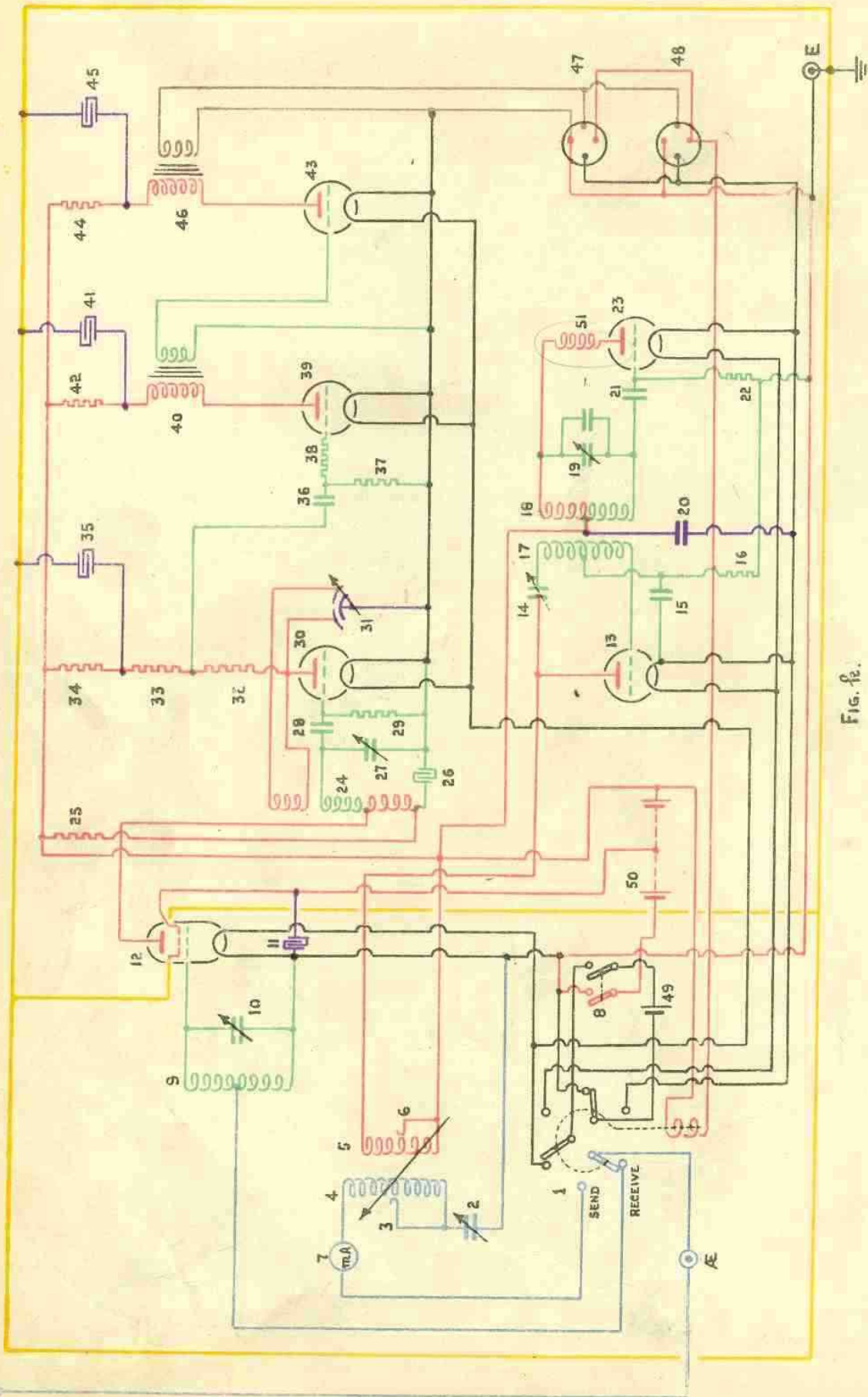


FIG. 18.