SUB-SECTION

RQ

TYPE 52 FH/FHV/CFH PAGE RQ2

" 89/M. " RQ.16.

RQ2

TYPE 52 FH/FHV/CFH

FRONT VIEW

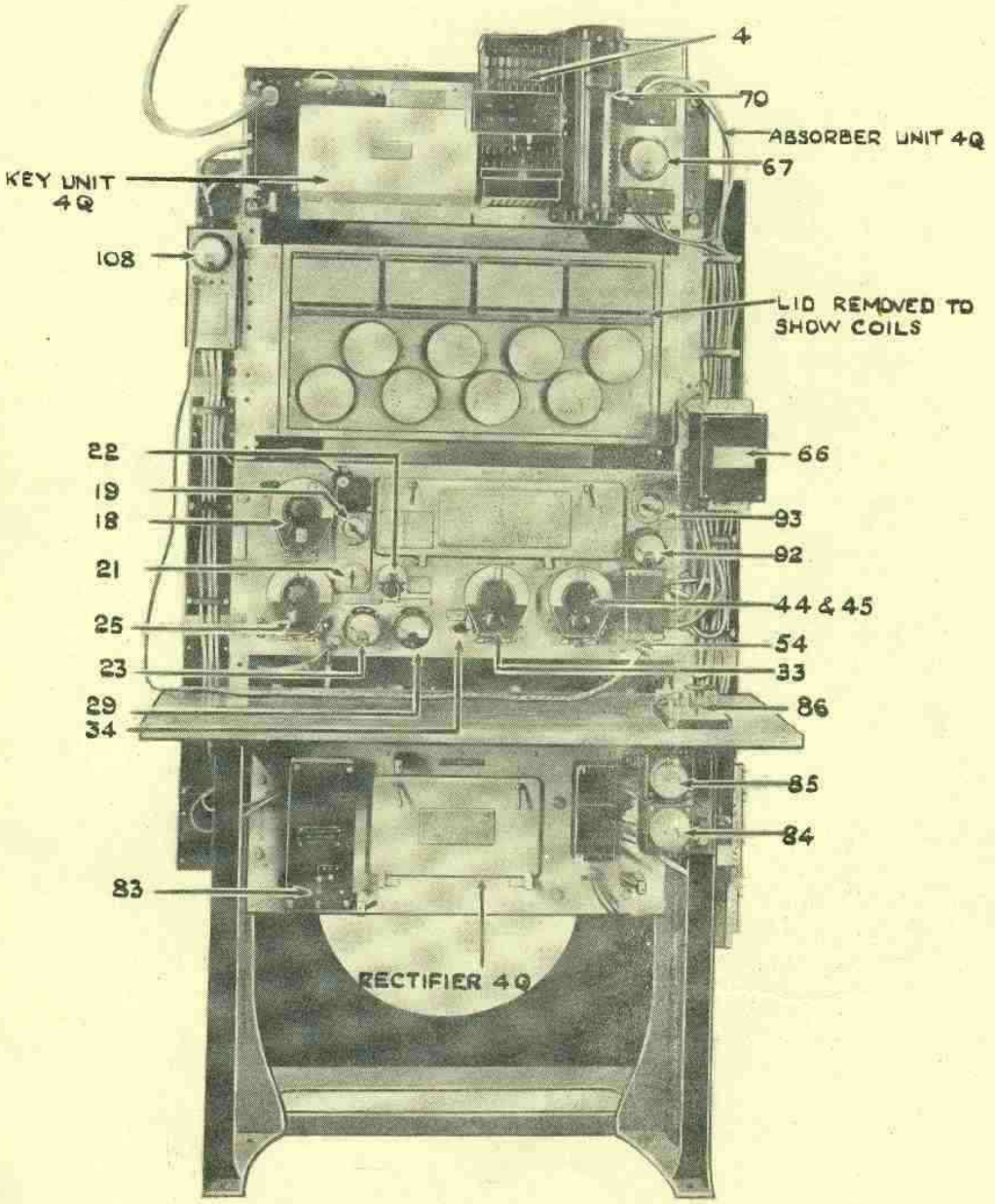

FIG. A.

TYPE 52FH/FHV/CFH

RQ3

Date of Design:-	1938.
Frequency Range:-	900 - 13,500 kc/s
Power Supply:-	250 watts, 230 volts - 50 cycles from a suitable A.C. supply Outfit H.T. from a Rectifier Unit 4Q, L.T. from a Separate voltage step-down transformer.
Character of Transmission :-	C.W. and M.C.W. (1000 cycles).
Range in miles:-	50 miles using C.W. on M/F variable on H/F.
Maximum Power in Aerial:-	25 - 30 watts.
Associated Wavemeter:-	G61/G62.
Where fitted:-	52 FH Non C.C.S. Ships, general purpose and cruisers' fire control. 52 FHV Some older destroyers for fire control. 52 CFH C.C.S. Ships; general purpose and Cruisers' fire control.

1. GENERAL DESCRIPTION.

W/T Sets Types 52 FH/FHV/CFH were designed as low-power master oscillator M/F - H/F transmitters, incorporating transmitter 5Q, to replace Types 43A, 45, 51H and 51L.

Transmitter 5Q was originally designed as part of the transportable set Type 52T (now Type 52 ERT), but has been modified and arranged for rack mounting in ships and to work off a 230 volt, 50 cycles A.C. supply. The main components of Types 52FH, 52FHV and 52CFH are as follows:-

Types 52 FH and 52 FHV.	Unipole Aerial System. Key Unit 4Q. Transmitter 5Q. Absorber Unit 4Q. Rectifier Unit 4Q.
Type 52 CFH.	Unipole Aerial System. Board 2 BD, Local-Change-Over Transmitter 5Q Absorber Unit 4Q Rectifier Unit 4Q

Type 52 CFH is fitted with a Board 2BD, Local change-over, in lieu of the Key Unit 4Q, so as to enable the set to be controlled either locally or through the central control W/T System.

The item numbers in these notes are the same as those used in SS 69, Book of Instructions for W/T Sets Type 52FH/FHV/CFH to which reference should be made for details not given here.

2. CONTROLS AND FITTINGS.

The item numbers quoted below should be identified on the photograph in Fig. A.

Name and Item No.	Description and Use.
CONTROL SWITCHES.	
D.C. Supply Switch (85) (FH/FHV only).	A tumbler switch which completes the D.C. supply to the morse key circuit and to control switch (84).

TYPE 52FH/FHV/CFH

Name and Item No.	Description and Use.
Transmitter Control Switch (84).	A tumbler switch fitted beneath the operator's bench, by means of which the operator can switch on the transmitter at will. This switch completes the D.C. supply to the Rectifier Unit Magnetic Control Switch (79) which is situated in the Rectifier Unit and which, when operated, completes the A.C. supply, via transformers, to the rectifier anodes and to the transmitter and absorber valve filaments. In the case of Type 52 CFH, switch (84) completes the D.C. supply to Magnetic Switch (100) in Board 2BD and one contact of the Magnetic Switch then completes the D.C. supply to the Rectifier Unit Magnetic Control Switch (79).
RECTIFIER UNIT 4Q.	
A.C. Supply Switch (83)	A double-pole "ON-OFF" switch which makes and breaks the A.C. Supply to the rectifier. The A.C. Input fuses (82) are immediately above the switch behind the switch cover. Safety contacts are fitted on the rectifier panel door and this door must be closed before power can reach the rectifier. The rectifier valve filaments should light up when the switch is made.
TRANSMITTER 5Q.	
Power Input Control Switch (93)	A four-position switch marked "OFF-C.W.-I.C.W.-R/T" which controls the H.T. and filament supplies to the transmitter valves. In the "OFF" position the switch breaks the H.T. and L.T. supplies and in the C.W. and R/T positions disconnects the supplies to the modulator valve. It also controls the switching of the A/F circuits for I.C.W. and for R/T when 5Q is fitted with an R/T attachment.
Wavemeter Jack (54)	A wavemeter plug-in position. The wavemeter is coupled via this jack to the input circuit of the 1st Stage Amplifier. This circuit is coupled to the Master Oscillator and the wavemeter indicator (107) in addition to its function in measuring the frequency, will indicate whether or not the Master Oscillator Circuit is oscillating.
1st Stage Tuning Indicator (92)	A Patt. 893 milliammeter 0 - 50 milliamps. The meter registers the rectified grid current of the two output pentodes and is of use in tuning the 1st Stage Amplifier.
Master Oscillator Tuning (44) (45)	The tuning dial marked "Master Osc. Tuning" on the right-hand side of the panel. It controls two ganged condensers and is used to tune the master oscillator circuit.
1st Stage Tuning (33)	The tuning dial marked "1st Stage Tuning" on the left of the M.O. Tuning control. It controls a condenser in the anode circuit of the 1st Stage Amplifier Valve (7) and is used to tune the 1st Stage Amplifier.
2nd Stage Protecting Switch (34).	A "push-pull" switch on the left of the 1st Stage Tuning Control. This switch is provided to disconnect the H.T. from the Output valves when tuning the M.O. and 1st Amplifier Stages, in order to prevent excessive current passing through the output valves. When the switch is pulled out the H.T. to the Output valves is OFF.
2nd Stage Tuning Indicator (29)	A Patt. 894 milliammeter 0 - 500 milliamps. It registers the anode current taken by the Output Valves and is used in tuning the Output Stage.
2nd Stage Tuning (25)	The tuning dial marked "Second Stage Tuning", in the bottom left hand corner of the panel. It controls a condenser in the anode circuit of the output valves and is used to tune the 2nd Amplifier Stage.
Aerial Ammeter (23)	A Patt. 892 Ammeter 0 - 2 amps. This ammeter is in the aerial circuit and registers aerial current.

Name and Item No.	Description and Use.
Aerial Coupling (22)	The small dial marked "Coupling 2nd Stage to Aerial". Used to vary the degree of aerial coupling.
Aerial Coil Tapping Switch (21)	An eight-position tapping switch which provides coarse aerial tuning. It is mechanically interlocked with the Aerial Tuning Condenser Switch (19) so that only positions 6, 7 or 8 can be used when the latter switch is in the "parallel" position.
Aerial Tuning Condenser Switch (19)	A three-position switch marked "Parallel-Series-Dipole". This switch enables the aerial condenser (18) to be connected either in series or in parallel with the Aerial Tuning Inductance (20) and Coupling Coil (21) in order to obtain the best electrical conditions for feeding power to the aerial. The dipole position is not used.
Aerial Tuning Condenser (18)	The tuning dial marked "Aerial Tuning Condenser" in the top left hand corner of the panel. This dial controls the tuning condenser in the aerial circuit and provides fine aerial tuning.
Plug-in Coils	The frequency range of the transmitter is covered by four sets of plug-in coil units. The sets are lettered A to D and in each set are three coils, one marked "M.O." for the Master Oscillator (43), one marked "Stage I" for the 1st Stage Amplifier (32) and the other marked Stage II for the 2nd Stage Amplifier (24). To insert the coils in the transmitter the panel door is opened and the coils for the range required are plugged into their respective sockets, the M.O. Stage coil on the right, the Stage I coil in the middle and the Stage II coil on the left. The coils cover the following frequency ranges:-

Coil Unit	A	900 -	1960	kc/s.
" "	B	1960 -	4200	"
" "	C	4200 -	9600	"
" "	D	9600 -	13,500	"

ABSORBER UNIT 40.

Absorber Unit Milliammeter (67)	A Patt. 6241 milliammeter 0 - 500 milliamps. This milliammeter indicates the anode current taken by the transmitter when the morse key is pressed (marking) and the current taken by the absorber valve when the key is released (spacing).
Absorber Unit Adjusting Resistance (70).	The control on the front of the unit marked "Absorber Adjustment". Adjustment of this control varies a resistance in the absorber circuit thereby controlling the amount of current passed by the absorber valve. The resistance is adjusted so that the anode current of the absorber valve during spacing is equal to that taken by both the absorber and transmitting valves when marking. The anode current is indicated on meter (67) and should be approximately 300 milliamps during both marking and spacing periods.

BOARD 28D CHANGE-OVER.
(TYPE 52 CFH ONLY).

Change Over Switch (99)	A four pole two-way switch which enables the set to be controlled either locally or from the Board 23 Central control in the C.R.R. or C.C.O. (See para 18 (b)).

NOTE:- All the meters described above are of the plug-in type and care should be taken to see that they are plugged into their correct sockets.

3. CRYSTAL ATTACHMENT.

All sets will eventually be fitted with a crystal attachment which provides crystal control of the transmitter frequency. The attachment is fitted inside the master compartment and is visible to the left of the M.O. Coil when the transmitter panel door is open.

Plug in crystals (104) are used and the set may be operated at the fundamental frequency of the crystal, or at double or treble the fundamental frequency. It is necessary to remove the M.O. coil in order to insert the crystal.

The change-over to crystal control is effected by means of a two-position switch (105) which is operated by a screwdriver.

4. INSTRUCTIONS FOR TUNING.

Where a trunk sealing and earthing switch (88) is fitted, tuning or check tuning of the transmitter circuits, except the aerial circuit may be carried out with the trunk sealed. Sets should not, however, be tuned during W/T silence unless fitted also with an aerial isolating and earthing switch (103) as transmissions may be heard outside the ship on certain frequencies even with the trunk sealed.

It is assumed that the aerial links (94) inside the transmitter are set to the correct position for use with a unipole aerial system, i.e. one link across the terminals marked "AM" and "EARTH".

The position for setting the links for unipole or dipole aerial are shown in the wiring diagram pasted on the inside of the transmitter box. It is necessary to remove the Transmitter 5Q from its box to see the wiring diagram.

(a) See that the Trunk Sealing and Earthing switch (88) is closed. This seals the trunk, earths the aerial and causes the RED light to burn in the trunk indicator box. Auxiliary contacts of the Trunk Sealing Switch also break the circuit of the aerial isolating switch, which disconnects the transmitter aerial lead from the aerial and earths it.

(b) Plug in the appropriate range coil units (24) (32) (43) for the frequency required and apply the approximate adjustments from the tuning card if these are available.

(c) Pull the second stage protecting switch (34) to "OFF".

(d) Set the power input switch (93) to "OFF".

(e) Make the A.C. supply switch (83) on the Rectifier Unit 4Q.

(f) Make the D.C. supply switch (85) and the Tumbler switch (84), which operates the control switch (79) in the Rectifier Unit 4Q.

(g) Set the power input switch (93) to "C.W." or "I.C.W." as required. The H.T. supply should now be made and an indication of this should show on the absorber unit milliammeter (67).

(h) Plug the wavemeter connection into the wavemeter socket (54) and set the wavemeter to the required frequency.

(j) Press the morse key (86).

(k) Tune the master oscillator circuit, by means of the wavemeter, to the required frequency.

Note:- There is no milliammeter indication to show that the master oscillator circuit is oscillating, but the ammeter in the wavemeter (or wavemeter indicator box (108) on the side of the rack) will indicate this.

(l) Tune the first stage by means of the "1st Stage Tuning" dial (33) to obtain a maximum deflection in the first stage tuning indicator (92).

(m) Set the aerial coupling to minimum by setting the "Coupling, 2nd Stage to Aerial" dial (22) to zero.

(n) Push in the second stage protecting switch (34) to "ON". The second stage tuning indicator milliammeter (29) should now register.

(o) Tune the second stage by means of the "2nd Stage Tuning" dial (25) to obtain a minimum reading in the second stage tuning indicator (29).

(p) Set the aerial circuit of the Transmitter 5Q to the approximate tuning adjustments for the desired frequency. These should be available on the tuning card.

The above operations will ensure that a transmission taking place immediately after W/T silence is broken will be radiated on the correct wave-frequency. The aerial circuit should be readjusted, if necessary, for maximum radiation as soon as practicable.

5. INSTRUCTIONS FOR TUNING THE AERIAL CIRCUIT.

(q) Unseal the trunk (if Trunk Sealing Switch is fitted). This causes the GREEN light to burn in the TRUNK INDICATOR BOX.

(r) Increase the aerial coupling by setting the "Coupling, 2nd Stage to Aerial" dial (22) to about 50 degrees.

(s) Set the aerial tuning condenser switch (19) to "Series" with the aerial coil tapping switch (21) in position "1", and tune over the whole scale of the aerial tuning condenser (18) to obtain the maximum reading in the aerial ammeter (13). Repeat as above, with the aerial tapping switch in positions "2", "3", "4", etc., until a position is found giving the greatest aerial current reading. If no reading or a very small one is obtained using the "Series" position, the aerial tuning condenser switch should be set to "Parallel" and the tuning operation repeated. It will be found that only positions "6", "7", or "8" can be used on the aerial coil tapping switch when using the "Parallel" position.

Note:- If approximate readings for the aerial in use are available, a slight adjustment of the aerial tuning condenser (18), should be all that is necessary to obtain maximum reading in the aerial ammeter.

(t) When the maximum aerial current in the above condition has been obtained, the aerial coupling should be readjusted to obtain a further increase of aerial current, readjusting the aerial tuning condenser slightly if necessary.

(u) Adjust the adjustable resistance (70) of the Absorber Unit 4Q until the reading in the absorber unit milliammeter (67) remains steady when the morse key (86) is pressed and released.

6. INSTRUCTIONS FOR TUNING WHEN USING CRYSTAL CONTROL.

(1) To tune to the Crystal fundamental frequency.

(a) Carry out operations (a) to (h) of para 4.

(b) With a Screw driver turn switch (105) to the crystal position switch turned to the left.

(c) Plug in the appropriate crystal (It will be necessary to remove the M.O. coil in order to reach the crystal socket).

(d) Press the morse key (86).

(e) Adjust the Master Oscillator Tuning (44,45) for maximum deflection in the wavemeter indicator (108), using the wavemeter indicator as the M.O. Stage tuning indicator. If no wavemeter indicator is fitted set approximate adjustments on the Master Oscillator Tuning Dial (44, 45) and 1st Stage Tuning Dial (33) for the frequency required and adjust for maximum deflection in the 1st Stage Tuning Indicator (92).

(f) Line up the remaining tuned circuits, as for Master Oscillator Control (Paras. 4 and 5, operations (1) to (u)).

(11) To Tune to double or treble the fundamental frequency of the crystal.

(a) Tune the transmitter in Master Oscillator Control to the required frequency (See para 4 and 5).

(b) With a screwdriver turn switch (105) to the crystal position (Switch turned to the left).

(c) Remove the M.O. Coil Unit and insert the appropriate crystal.

(d) Insert the Master Coil unit which covers the fundamental frequency of the crystal.

(e) Set the wavemeter to the crystal fundamental frequency.

(f) Press the morse key (86).

(g) Adjust the Master Tuning Condenser to give maximum deflection in the wavemeter indicator (108) using the wavemeter indicator as the M.O. Stage Tuning Indicator. If no wavemeter indicator is fitted adjust for maximum deflection in the 1st Stage Tuning Indicator (92).

(h) Line up the remaining tuned circuits as for Master Oscillator Control (Paras. 4 and 5 operations (1) to (u)).

NOTE:- When the crystal frequency is covered by two coil units, the coil covering the lower range will generally give best results.

BRIEF TECHNICAL DESCRIPTION.

7. POWER SUPPLIES.

(i) A.C. Supply. The A.C. supply, at 230 volts, 50 cycles, is obtained from the A.C. supply outfit fitted in the W/T office and is connected to Rectifier Unit 4Q.

(ii) D.C. Supply. The D.C. supply for the control circuits is taken from the ship's D.C. mains and is obtained from the Pattern 1331 Fuse Board, which may be part of the main W/T set, or a board distributing 7-way.

8. RECTIFIER UNIT 4Q. (See Fig. B).

The rectifier unit 4Q consists of a full-wave single phase rectifier employing a transformer (76) and two NU12 full-wave rectifier valves, which are used as half-wave rectifiers, the two anodes in each valve being strapped together. The NU12 valves are inserted in the two front valve holders, centre and left. The right-hand holder (dummy) may be used as a stowage position for a spare NU12 valve.

The rectified output of the rectifier unit is used for supplying H.T. to the transmitter 5Q and absorber unit 4Q. A centre tapping on the secondary of the filament transformer (78) is connected through a 50 c.p., 220-volt carbon filament lamp (73) to a smoothing unit consisting of two coils (71) (72) and two 2-mfd. condensers (74) (75). The resistance lamp (73) is fitted to limit the voltage output of the rectifier unit to approximately 460 volts, which should not be exceeded when rectifier unit 4Q is used in conjunction with transmitter 5Q.

The H.T. supply to the transmitter 5Q is connected via the safety contacts (68) and anode current milliammeter (67) in the Absorber Unit, and safety contacts (96) in the transmitter.

The total current taken by the absorber and transmitting valves, or by the absorber valve only during the "Marking" and "Spacing" periods respectively is indicated by the milliammeter (67). A separate milliammeter (29), fitted on the front of the transmitter, indicates the anode current taken by the output valves (8) (9) only.

The variable resistance (70) should be adjusted so that the anode current (as indicated by the milliammeter (67)) taken by the absorber valve (4) during the "Spacing" periods is equal to that taken by the absorber and transmitter valve during the "Marking" periods. This should be approximately 300 milliamps.

9. FILAMENT SUPPLY.

All the valves used in this set, except the first stage amplifier, which is indirectly heated, are of the directly heated filament type. The filament supplies are obtained from voltage step-down secondary windings on transformers (66) (69) (78) which have their primary windings connected to the 230-volt A.C. supply.

When the A.C. supply switch (83) on the rectifier unit is set to "ON" the A.C. supply is made to the filament transformer of the rectifier valves (1) (2) through the A.C. fuses (82) and safety contacts (80) (81). It should be noted that the A.C. supply to the H.T. transformer (76) of the rectifier valves, the filament transformer (66) of the transmitting valves and the filament transformer (69) of the absorber valve is NOT made until the magnetic switch (79) is made.

There is, therefore, no H.T. or filament supply to the transmitter or absorber unit until the D.C. control circuits are made.

Voltmeters are not used in any of the filament supply circuits and it is important that the A.C. supply be maintained at 230-volts to ensure the correct filament voltage being applied to the valves.

TRANSMITTER 5Q. (See Fig. C).

10. Valves Used.

Master Oscillator	One NT20
1st Stage Amplifier (Buffer)	One NT37
2nd Stage Amplifier (Output)	Two NT62A connected in push-pull
Modulator	One NT20
Absorber	One NT18
Rectifier.	Two NU12.

TYPE 52FH/FHV/CFH

H.T. AND FILAMENT SUPPLIES.

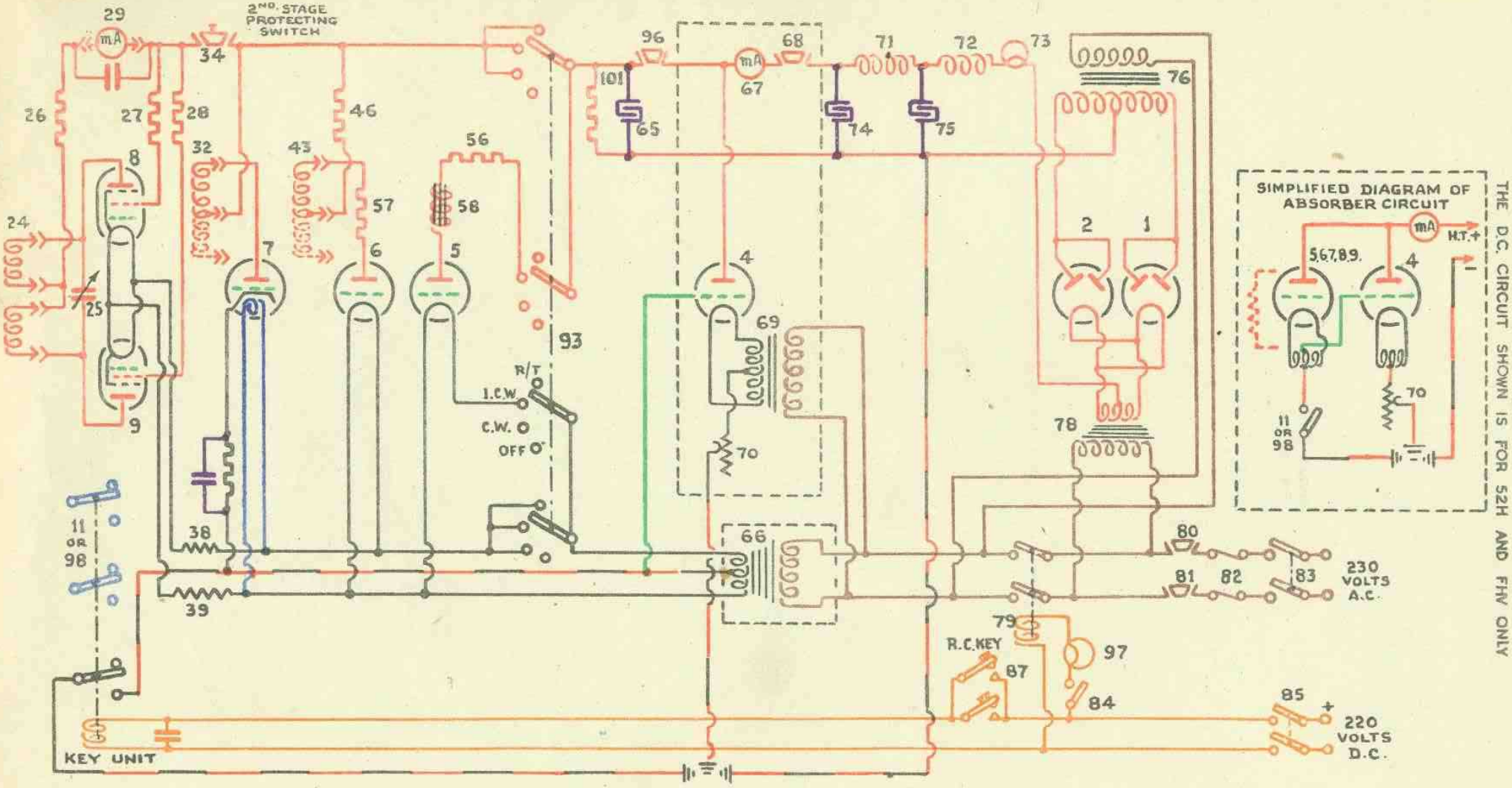

FIG. 6.

11. Type of Circuit.

Reference Admiralty Handbook of W/T (1938) Vol.II para.K21.

The transmitter consists of five circuits, namely:-

The Master Oscillator.
First Stage Amplifier (Buffer).
Second Stage Amplifier (Output).
Modulator and
Aerial Circuits.

Brief details of the circuits are given below.

Circuit	Feed	Nature of Circuit	Grid Excitation.	Coupling to next stage.
Master	Series	Tuned circuit between anode and grid of triode valve.	(1) Self excited Direct inductive. (2) Crystal Control.	Mutual Inductive.
1st Stage Amplifier (Buffer)	Series	Tuned circuit between anode and cathode of neutralised triode.	Mutual Inductive from output of Master Valve.	Mutual Inductive.
2nd Stage Amplifier (Output).	Series	Tuned circuit between anodes of two pentode valves in push-pull.	Mutual Inductive from output of 1st Amplifier Stage.	Mutual Inductive (to aerial).
Modulator	Series	Divided tuned circuit between anode and grid of triode valve.	Self excited Direct inductive.	Capacitive to grid of 2nd stage valves.

MASTER OSCILLATOR CIRCUIT.

12. This originally consisted of a series-feed self oscillatory circuit in which the R/F oscillations were maintained by an NT20 Triode Valve (6). Crystal control of this stage has since been introduced and where the crystal attachment is fitted the change over from master to crystal control is effected by means of a switch (105) which is operated by a screw-driver.

When the crystal switch (105) is in the crystal position, condenser (106) is brought into circuit in series with condenser (48) and provides a limited amount of grid excitation to valve (6) which, while not enough to allow the circuit to operate as a Hartley Master Oscillator, is sufficient to maintain oscillations in the crystal if the Master Circuit is tuned near to the crystal frequency.

When frequency doubling or trebling the Master Circuit is tuned to the crystal fundamental frequency and the required harmonic is selected in the 1st Amplifier Stage. (See Admiralty Handbook of W/T (1938) Vol. II, para. K46). To do this it is necessary to tune the transmitter in Master Control in the normal way to the required output frequency and then change the master circuit coil for the one covering the fundamental frequency of the crystal.

The tuning inductance in the Master Circuit is contained in a plug-in coil unit, the plug connections of the particular range coil unit in use also determining the electrical connections to the two variable tuning condensers (44) and (45) so as to maintain, as far as possible, the same L/C ratio on each range.

TYPE 52FH/FHV/CFH

TRANSMITTER 5Q

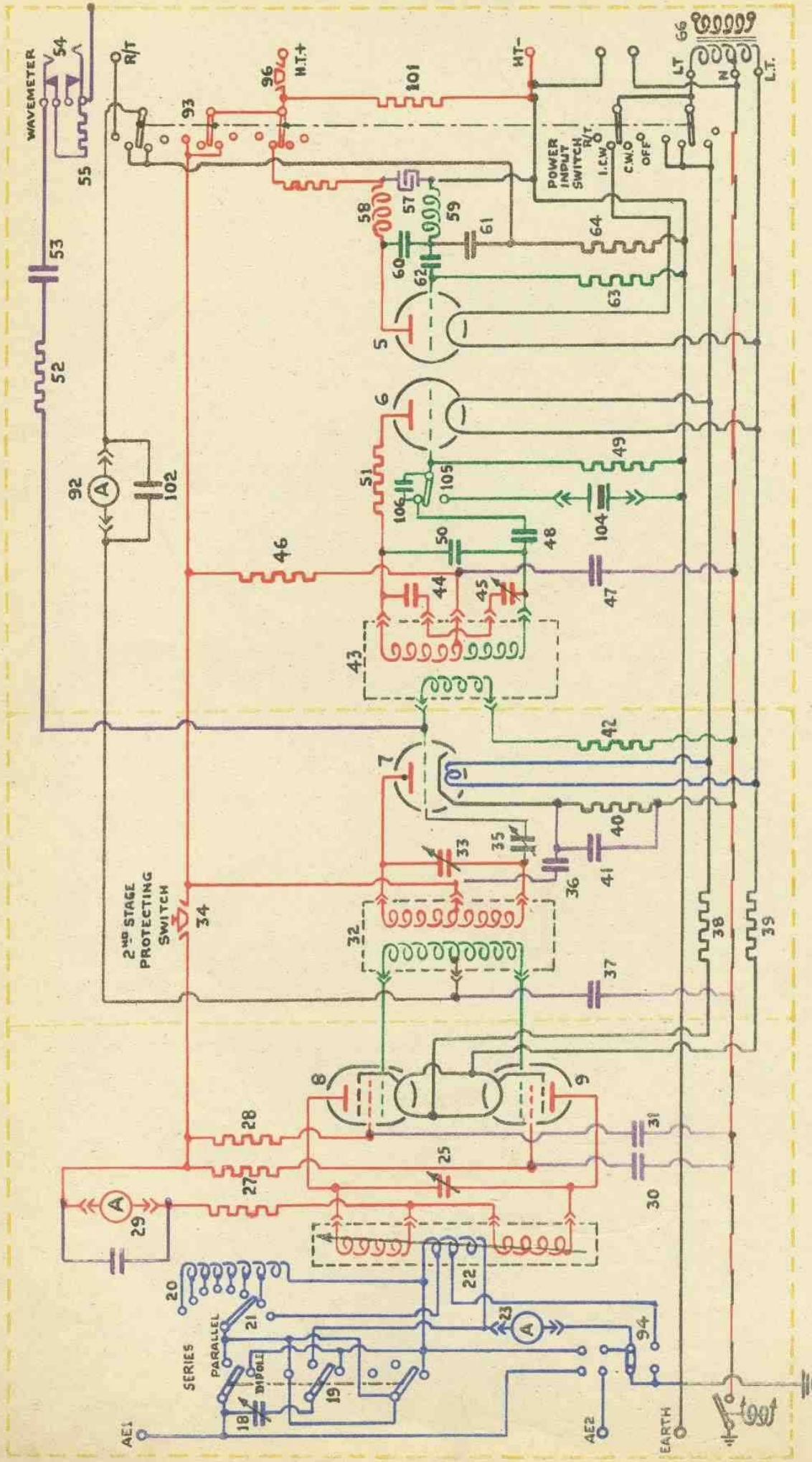

FIG. C

13. FIRST STAGE AMPLIFIER (BUFFER) CIRCUIT.

The main purpose of this stage is to function as a voltage amplifier to provide the necessary grid excitation voltage for the second stage (output) amplifier and at the same time to isolate the master oscillator circuit from the effects of any adjustment of the tuning of the output circuit (See Admiralty Handbook of W/T (1938) Vol. II K39).

The first stage amplifier consists of a series feed indirectly heated NT37 triode valve (7), which has its inter-electrode capacity balanced out by a neutralising condenser (35). The setting of this condenser is not a tuning adjustment; it is adjusted before the transmitter is issued and should thereafter remain set.

14. SECOND STAGE OUTPUT AMPLIFIER.

This stage is essentially a power amplifier in which the power is developed to feed the aerial system (See Admiralty Handbook of W/T (1938) Vol.II paras. F27 and F28).

It consists of two NT62A pentode valves (8) and (9) which are connected in push-pull.

15. MODULATOR CIRCUIT.

The modulator circuit consists of a series feed self-oscillatory circuit in which the note frequency (1,000 cycles) oscillations are maintained by an NT20 Valve (5).

16. AERIAL CIRCUIT (See Figs. C and D).

The aerial is connected to the terminal marked "Aerial 1" on the transmitter through one contact of the Key Unit 4Q (11), or Magnetic Key Switch (98) in Board 28D. This contact acts as a send-receive switch.

The aerial circuit consists of the variable aerial tuning condenser (18), aerial tuning inductance coil, (20), aerial coupling coil (22) and aerial ammeter (23).

17. ABSORBER CIRCUIT.

The absorber unit 4Q consists of an NT18 triode valve (4), which is connected in parallel with the H.T. supply to the transmitter 5Q by having its anode connected to the H.T. positive and its filament connected through an adjustable resistance (70) to earth.

A circuit diagram of the absorber unit is shown in Fig.B. The black and red lines show the return paths taken by the anode current.

The grid connection of the absorber valve is controlled by one contact of the key unit (11) or magnetic key switch (98).

As the amount of load (anode) current taken from the rectifier unit 4Q by the absorber valve under operating conditions will be determined by the biassing voltage applied to its grid, it will be seen that, by varying the grid connection by means of the key unit, and hence the biassing voltage applied during the "Spacing" and "Marking" periods, the absorber valve is made to operate as a variable lead resistance connected across the output of the rectifier unit. The operation is as follows:-

Spacing. A study of the circuits in Fig. B will show that under operating conditions during "Spacing" periods (i.e. when the morse key is released and the earth connection broken) the grid of the absorber valve is connected in series with the internal resistance of the transmitting valves to the H.T. supply.

This raises the potential of the absorber valve grid and gives it a positive bias of about 200 volts which causes a large anode current to flow through the absorber valve and through the adjustable resistance (70) connected in series with the valve.

When current is flowing, the P.D. set up across the resistance (70) raises the cathode potential of the valve with respect to the other electrodes and hence limits the amount of current passing through the valve.

The anode current of the absorber valve can, therefore, be controlled by the setting of the adjustable resistance (70). In practice, the setting is arranged so that the anode current of the absorber valve during spacing periods is equal to that taken by both the absorber and transmitting valves during marking periods. The anode current taken is approximately 300 milliamps.

Marking. Under operating conditions during the "Marking" periods (i.e. when the morse key is pressed) the grid of the absorber valve is connected to the filament through one contact of the key unit (11) and the adjustable absorber resistance (70). This will remove the positive bias from the grid of the absorber valve and leave only a negative bias provided by the voltage drop across the resistance (70).

TYPE 52 FH/FHV/CFH

AERIAL & D.C. CONTROL CIRCUITS FOR TYPE 52CFH

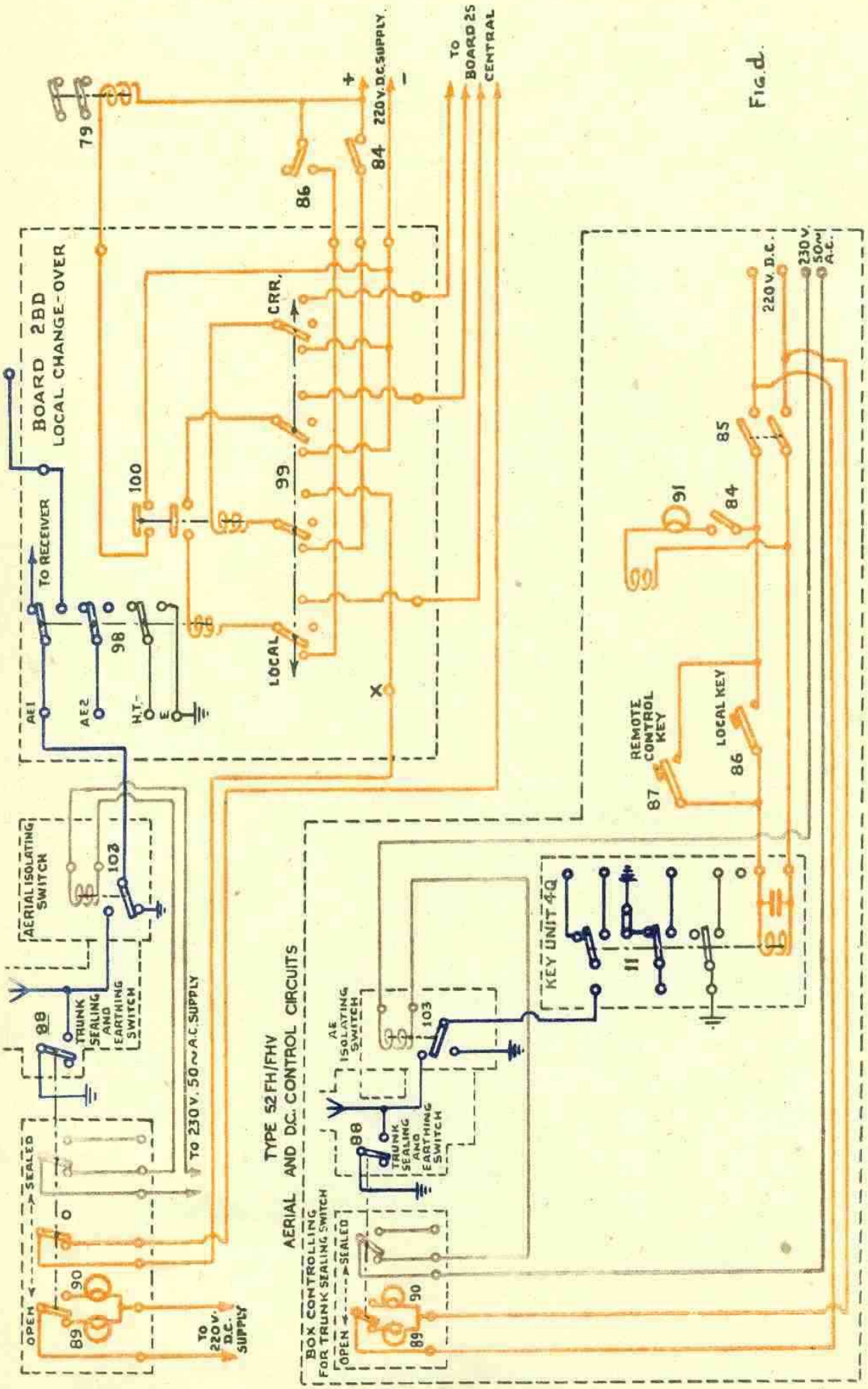

Fig. d.

The reduction in absorber valve anode current which results (about 200 milliamps) will be found to be approximately equal to the load current taken by the transmitter 5Q during "Marking" periods, thus maintaining a steady load on the rectifier unit 4Q during keying of the transmitter.

18. OPERATING CIRCUITS (Fig. D).

(a) Type 52 FH and 52 FHV Operating Circuits.

The 200-volt D.C. supply for the operating circuits is obtained from the ship's mains via a Pattern 7331 Board, Fuse and a D.C. supply switch (85). The D.C. supply is used for controlling the rectifier unit magnetic switch (79) via an economy lamp (97) and a single-pole Tumbler switch (84), which is fitted on the local operator's bench.

The D.C. supply is also used for operating the Key Unit (11) via the morse key (86) or the remote control morse key (87).

One contact of the key unit acts as a send-receive switch and another (when the morse key is pressed) completes the negative H.T. return to earth from the centre-tap on the transmitting valve filament transformer (66), thus keying the transmitter. This contact of the key also completes the grid-filament circuit of the absorber valve (4), via earth and the adjustable resistance (70) during marking periods. See Fig. B.

The D.C. supply is also used to light the appropriate lamp (89) (90) in the trunk sealing switch indicator box, under the control of the auxiliary contacts of the trunk sealing switch (88).

Other auxiliary contacts of the trunk sealing switch complete a circuit from the 230-volt A.C. supply through the bobbin of the aerial isolating switch (103), where this is fitted.

(b) Type 52 CFH Operating Circuits.

To enable the set to be controlled from either the local position or through the central control W/T system, a Board 2BD, local change-over, is fitted in lieu of the Key Unit.

The Board 2BD consists of a three-pole magnetic switch (98) a four-pole two-way change-over switch (99) and a magnetic switch (100).

One contact of the magnetic key switch (98) acts as a "Send Receive" switch, connecting the aerial system to the transmitter during "Marking" periods and to the receiver during "Spacing" periods. Another contact (when the morse key is pressed) completes the negative H.T. return circuit to earth of the transmitting valve, thus keying the transmitter 5Q. It also completes the grid-filament circuit of the absorber valve (4) during "Marking" periods.

The 220-volt D.C. supply for the operating circuits is obtained from the ship's mains, either direct from a fuse board in the transmitter room when the change-over switch (99) is in the "Local" position or via the board 2S central and switch auxiliary and indicator, when the change-over switch is in the "C.R.R." position.

When the change-over switch (99) is set to the "Local" position the tumbler switch (84) fitted on the local operator's bench completes the 220-volt D.C. supply through the bobbin of the magnetic switch (100). One contact of the magnetic switch then completes the D.C. supply through the bobbin of the rectifier unit 4Q control switch (79), a second contact of this switch completes the D.C. supply to the bobbin of the magnetic key switch (98) when the local morse key (86) is pressed.

When the change-over switch (99) is set to "C.R.R." position the set is controlled from the Board 2S central control in the C.R.R. or C.C.O.

When Type 52 CFH is fitted as a fire control set, an additional tumbler switch marked "R/C, SET ON" is fitted on the rack table and completes the circuit of the magnetic switch (100) in the Board 2BD when the change-over switch (99) is set to "C.R.R."