

SUB-SECTION **UB** S/T TRANSMITTING SETS

TYPE	102	PAGE	UB2
"	104	"	UB4
"	105	"	UB6
"	105A	"	UB8
"	106	"	UB8

Watt of design:- 7513
 Frequency:- 540 cycles/sec.

This is an old 8000 Telephony set employing as a rule two Tunecorder type oscillators (1)(2) (see page 102). A motor-alternator with hand starter (18) and motor and alternator field regulators (17)(19) and D.C. and A.C. switchboards are fitted. A.C. output 240 volts at 12 amps.

D.C. supply is taken from the ring main to a D.P. main switch (13) on the D.C. switch-board. Across the poles of this main switch are fitted a pair of auxiliary contacts which make just before the main switch breaks placing a non-inductive resistance (20), the kick coil, in parallel with the A.C. field coils of the oscillators (23)(24). From the main switch the D.C. passes through an ammeter (25) and then is distributed to the two oscillators, each supply having its own wire of fuses. From the live side of the main switch (13), a pair of leads are taken through a D.P. switch (21) and fuses (22) to the mace key (26) and both in of the telephonic key (27), a condenser (28) being placed across the contacts of the mace key.

D.C. supply for the motor alternator (15) is taken direct from the ring main via a hand starter (18) fitted with no-volt and overload coils.

A.C. output is taken, ammeter (11), voltmeter (12), and frequency motor (13) being fitted, the supply to the two latter being controlled by a single pole switch (14), to the two send-receive switches (5)(6) in the silent cabinet, the magnetic key (10) forming a break in one of these leads. When no back short circuit is fitted the signalling key is connected in one lead of the A.C. circuit and there is no means of short circuiting the hydrophone telephones. From the centre of the switches A.C. supply is distributed to the A.C. coils (3)(4) of the oscillators (1)(2) each supply being taken through its own pair of fuses (2)(4). In order to keep the alternator frequency as steady as possible a back short circuit consisting of a resistance (8), inductance (9) and the D.P. switch (7) is connected between the back contact of the magnetic key and the dead side of the fuses (2)(4) in the oscillator leads. A second contact of the magnetic key short circuits or shunts the hydrophone telephones when the key (20) is pressed, otherwise the noise would be deafening. The resistance (8) can be adjusted so that our transmission may be read. When the send-receive switches (5)(6) are put to receive the oscillators are connected direct to special low resistance telephones (23)(24) for oscillator reception. When receiving, the switch (7) in the back short circuit should be broken.

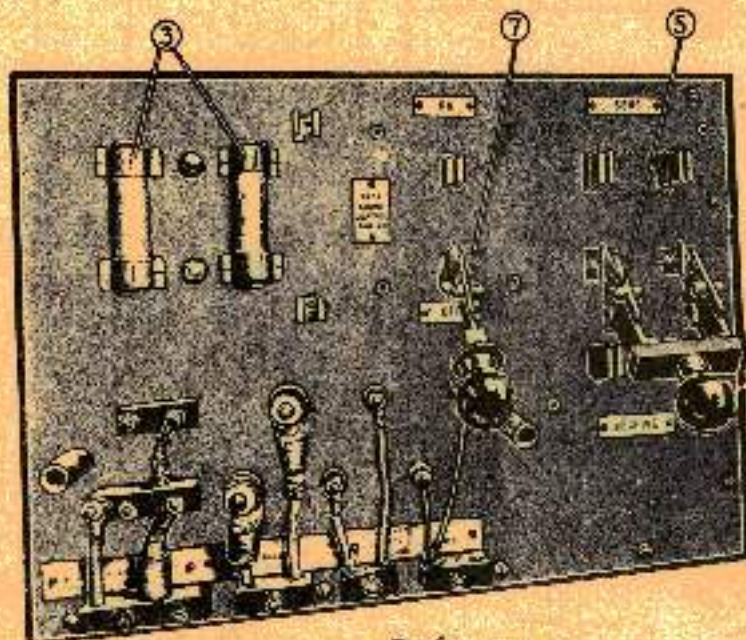


Fig. 6

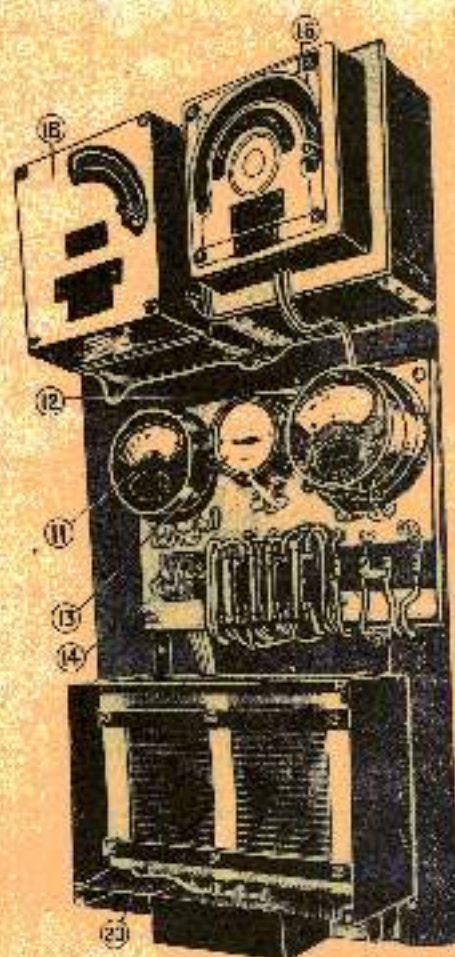


Fig. 7

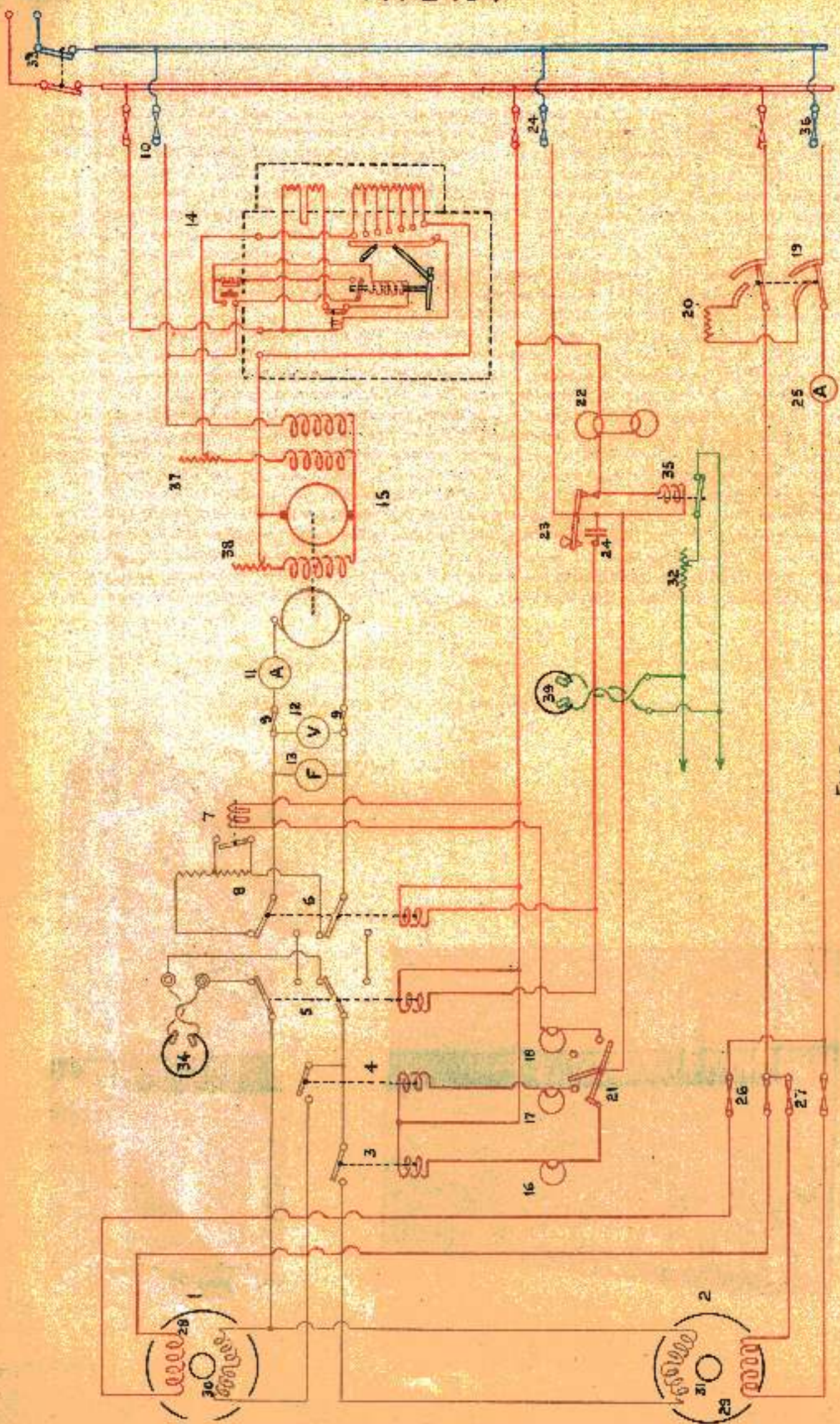


Fig. a.

Date of design:- 1934.
 Frequency:- 540 cycles/sec.

This set has been designed in line with modern practice. One motor-alternator (15) with automatic starter (14), Y or Z size (see pages M47 or M48) according to the motor-alternator fitted, as well as motor and alternator field regulators (27)(28), is fitted, controlled from the silent cabinet. Magnetic keys are used and in order to maintain the load as constant as possible so as to prevent variation of frequency a back shunt circuit (7)(8) is fitted. A.C. output 240 volts at 12 amps.

Power is taken from the ring mains to the main supply board through a D.P. switch (23) and from there it is distributed to the main and auxiliary circuits. The A.C. output is also taken to this board where it passes through an ammeter (11), pair of fuses (9) and magnetic key (8) and thence to the magnetic key board. It is this magnetic key (8) in the main supply board that connects the A.C. supply to the back shunt circuit (9) and (8) when the key (20) is not pressed. The back shunt consists of a resistance (6) across a portion of which is placed a magnetic switch (7) which makes when both oscillators are in use, short circuiting this portion of the back shunt resistance.

The control switch (21) (see figure 5.), fitted in the silent cabinet, operates the bottoms of the magnetic switches (3)(4) situated in the magnetic key board which supply the A.C. circuits to the oscillators and the magnetic switch (7). Trimming lamps (16)(17)(18) are in series with the bottoms of these switches and burn on making the control switch on a lamp board in the silent cabinet above tallies showing "Port", "Starboard" and "Both".

There is a magnetic listening-through switch (5) in the magnetic key board which connects the oscillators to the special telephones for oscillator reception when the key is not pressed. There is also a magnetic switch (25) which short circuits or shunts the hydrophone telephones when the key (28) is released, otherwise the notes would be deafening. The resistance (22) can be adjusted so that own transmission may be read.

D.C. supply to the oscillator field coils is taken from the main supply board through a pair of fuses (33), a D.P. switch (13), across an auxiliary contact of which is fitted the kick coil (30), and an ammeter (37). There is a pair of fuses (36)(37) in the leads of each oscillator. The oscillators (1)(2) are the usual Besençon type (see page M42) and if two are fitted on opposite sides of the ship care should be taken that:-

- The oscillators are symmetrically disposed to facilitate direction finding when receiving.
- The displacement of the diaphragm is not more than 40° from the vertical.
- The horizontal angle between the plane of the diaphragm and the fore and aft line must not exceed 30° .
- The inclination of both diaphragms vertically and horizontally must be the same.

DETAILS OF CONTROL SWITCH (19)

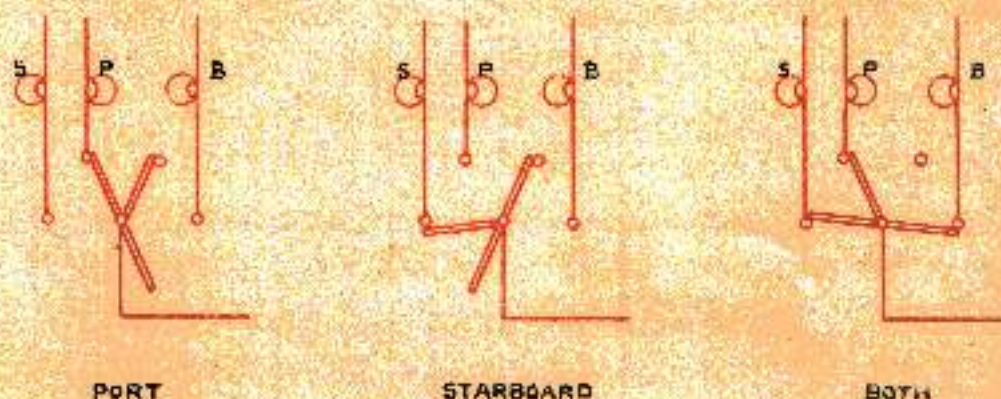


FIG. 6

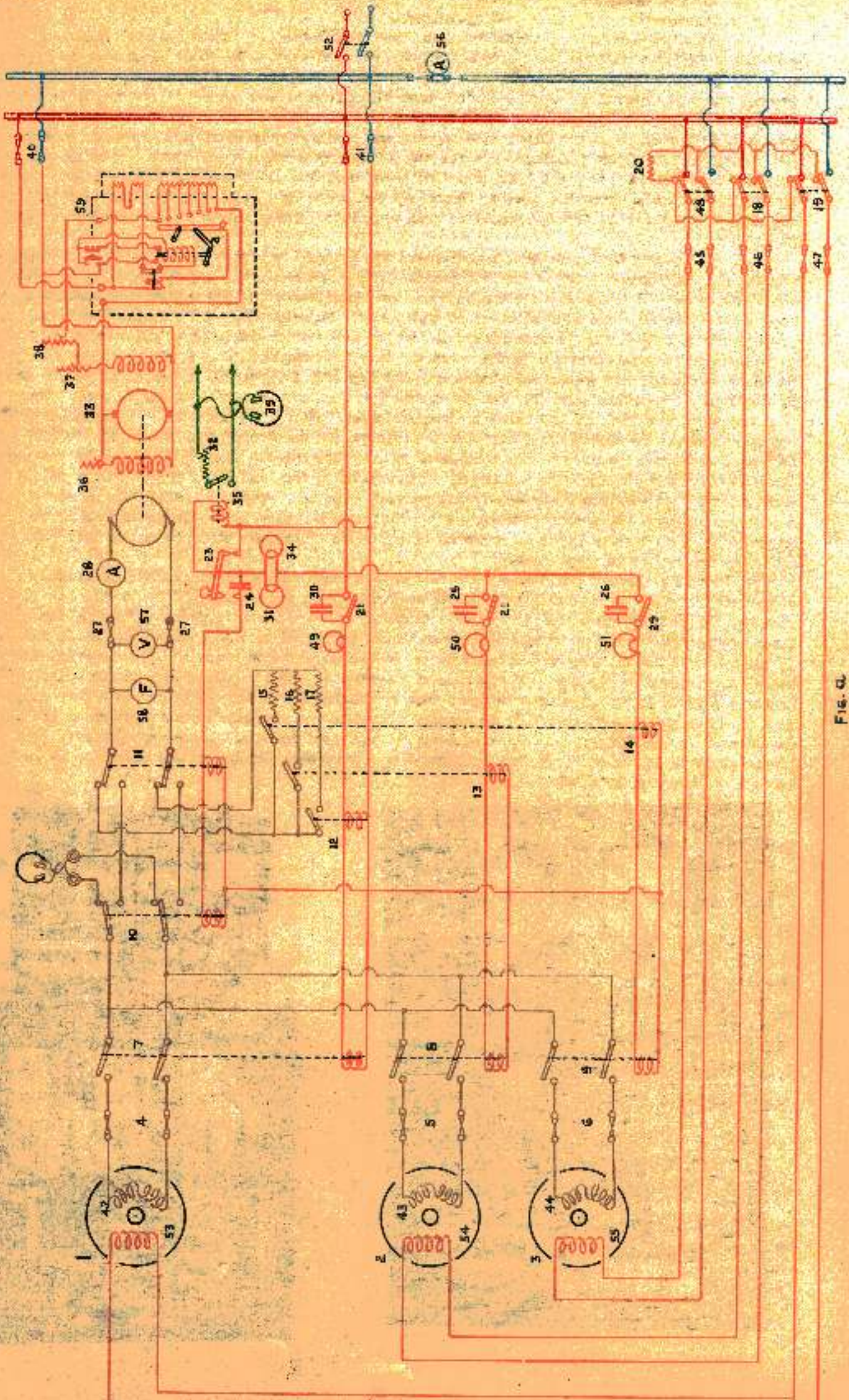


Fig. Q

TYPE 105

UB7

Date of design: 1935
 Frequency: 540 cycles/sec.

This set consists of three Tesla-type oscillators (1)(2)(3) (see page 048) and motor alternator (28), in addition to the usual switchboards and keys. The motor alternator is fitted with a V size automatic starter (29) (see page 027) as well as coarse (37) and fine (32) speed regulators, and alternator field regulator (38) controlled from silent cabinet. A.C. output 240 volts at 15 amps. The power supply is taken from the ring main to the main supply board through a D.P. switch (52) from which it is distributed to main and auxiliary circuits, D.C. and A.C. ammeters (58) (59) being fitted. Each oscillator has its own D.C. supply through a D.P. switch (18)(19)(49) and pair of fuses (45)(46)(47), one kick coil (30) being used for all three oscillators. A.C. supply is fed to this board through a pair of fuses (22) and there is also a pair of fuses (4)(5)(6) on the magnetic keyboard in the A.C. supply to each oscillator, these latter being arranged to blow first.

D.C. supply to the motor alternator and to the auxiliary circuits is taken each through its own pair of fuses (40)(41). The D.C. ammeter (53) registers total current taken by the oscillator field coils. The magnetic key and magnetic switches connecting the appropriate portion of the back shunt resistance are also situated in this board. Magnetic keyboard contains the listening through switch (30) for oscillator reception and the magnetic switches (7)(8)(9) completing the A.C. supply to the oscillators. In the cabinet, there is a magnetic switch (35) which short circuits or starts the hydrophone telephones when the key (24) is pressed, otherwise the noise would be deafening. The resistance (22) can be adjusted so that own transmission may be read. There is also the Morse key (29) and the three control switches (21)(22)(23) and indicating lamps (48)(50)(51) for oscillators. On making these switches the appropriate section of back shunt (15)(16)(17) is connected and the A.C. supply to the oscillator is completed at the magnetic keyboard by the magnetic switches (12)(13)(14). The A.C. supply is connected to the back shunt by the action of the magnetic key (11) when the Morse key is not pressed. The back shunt consists of three sections of resistance arranged in parallel (15)(16)(17). They are connected to the back contacts of the magnetic key (11) through magnetic switches (12)(13)(14) which make when the appropriate control switch in the silent cabinet is made.

The two forward oscillators are fitted in symmetrical and corresponding positions on either side of the ship to facilitate direction finding when receiving. If the oscillators are inclined the angle between the planes of the diaphragm and the vertical plane containing the centre line of the ship is not to exceed 10°. They should be placed so that access from inside the ship is easy. The after oscillator is placed facing stern so that the plane of this diaphragm cuts the vertical plane of the fore and aft line of the ship at right angles, its function being to transmit signals in the direction astern. This oscillator may either be placed in a keel compartment in which case its diaphragm is in contact with water in a flooded compartment or in the superstructure. In this latter case the oscillator is contained in a portable watertight box. The former position is, however, preferable because of its greater depth when the submarine is on the surface or at periscope depth.

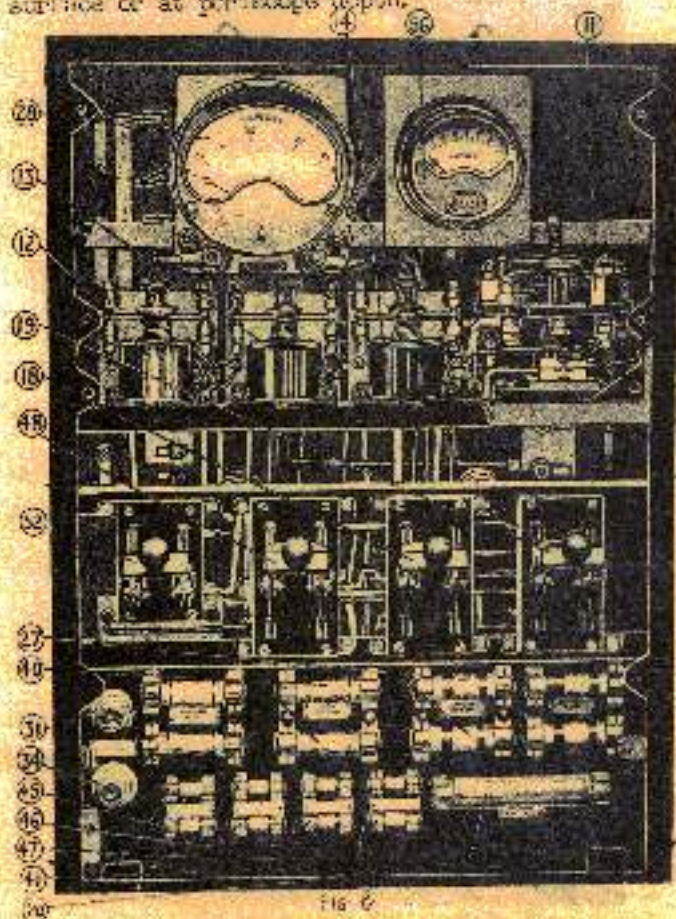


Fig. 6

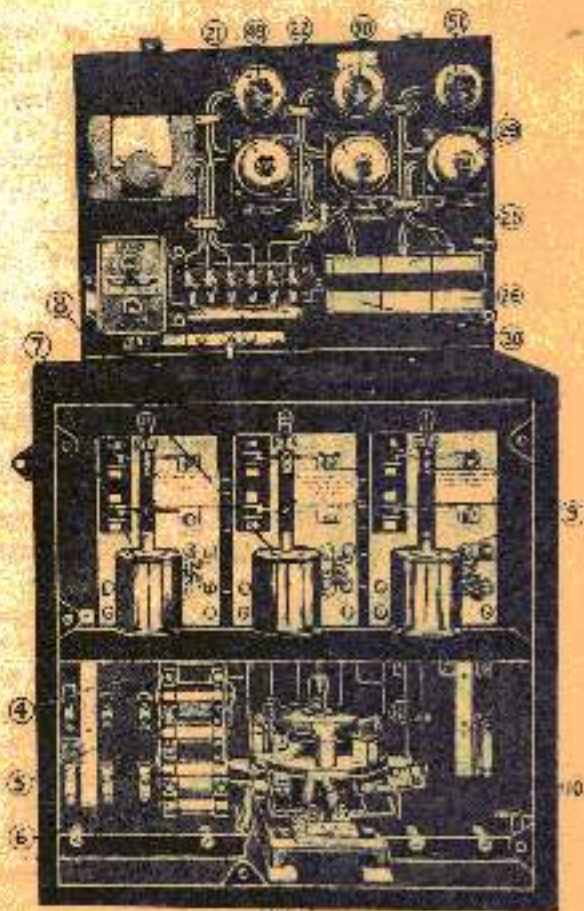


Fig. 7

TYPE 105A

Date of design:- 1937.
Frequency:- 1000 cycles/sec.

The chief feature of this set is the introduction of a 1000 cycle alternator and oscillator. In all other respects this set is similar to Type 105 (see page UH7).

Water noises have a frequency approximately equal to the resonant frequency of the diaphragm of a Resonance oscillator (see page UAG) i.e., about 800 cycles per second. Ship noises due to such things as machinery running on board usually have frequencies of 500 - 600 cycles per second. By using 1000 cycles/sec as the transmitted frequency it is much easier for the operator to differentiate between the incoming signal and such noises. In addition this note is less tiring to read. To get the most efficient results it is necessary that the resonant frequency of the oscillator shall be the same as the alternator frequency and this resonant frequency is controlled by the stiffness of the clamping discs (see page UAG figure a.). The production of a 1000 cycle oscillator is therefore only a matter of fitting heavier clamping discs.

In this set the frequency meter is supplied from a small magneto mechanically driven from the motor alternator instead of being wired in parallel with the A.C. voltmeter as in earlier sets.

TYPE 106

Date of design:- 1937.
Frequency:- 400 cycles/sec.

In this type, which uses the lightweight double diaphragm oscillator (see page UM), no D.C. field current is necessary.

A.C. supply is provided by a 4 kW motor alternator (29) with 2 wire automatic starter (12) (see page UAG) and motor and alternator field regulators (29)(30). Resistance (38) is fitted to bring the frequency of the alternator down to 400 cycles. A.C. output is adjusted to give 10 amperes to the two coils of the oscillator in parallel (5 amperes to each coil). This will occur at an A.C. voltage of about 150 volts.

A.C. supply is taken from the ring mains through a C.F. switch (44) and pair of fuses (46), and is used to energize the holding of the magnetic switches (18)(19) and magnetic key (15). Indicating lamps (30)(31), and control switches (32)(33) with condensers (34)(37) across them are connected in series with the holding of the magnetic switches.

A back shunt circuit is fitted to maintain the load as constant as possible so as to prevent variations of frequency. The back shunt coils (40)(41) are fitted, one for each oscillator and are of approximately the same inductance as the oscillator field coils (40)(41) and (42)(43). The magnetic switches (18)(19) complete one lead to each oscillator and its appropriate back shunt inductance (40)(41) (18) (19). Across the contacts of these switches 5,000 ohm resistances (6)(7) are fitted to prevent arcing.

The magnetic key (15) completes the second lead either to the oscillators or to the appropriate back shunt. Across the contacts of the magnetic key 1000 ohm resistances (5)(6)(7)(8) are fitted to prevent arcing.

As in earlier types a magnetic switch (18) short circuits or shunts the hydrophone telephones (39) when the key (15) is pressed, otherwise the noise would be deafening. The resistance (32) can be adjusted so that can transmission may be read.

A lamp (22) prevents a dead short across the mains.

Listening on the oscillators is not possible in this type.

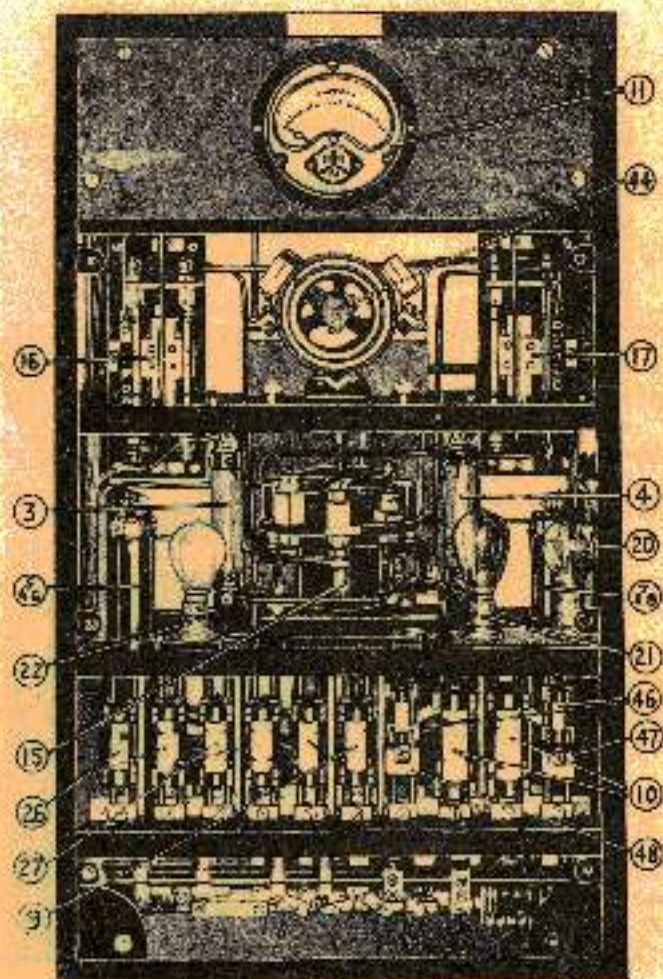


Fig 6

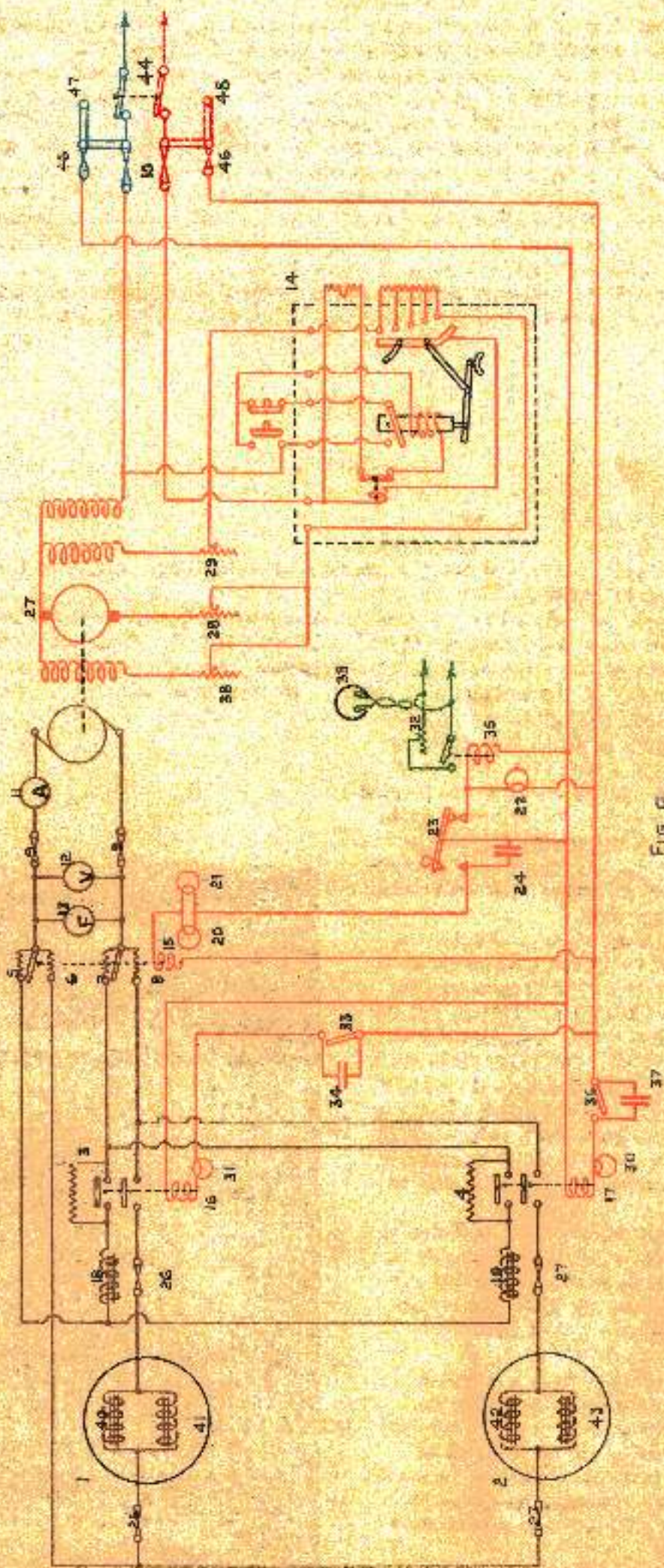


FIG. C