GD6

WAVEMETER G57

Date of design:- 1938
Frequency range:- 100 - 24,000 kc/s.
Valves used:- 1 NR27 (coupling).
1 NR31 (detector).

Wavemeter G57 has been produced for use with all transmitters which require a wavemeter as part of the set, and is designed for panel mounting. To prevent the wavemeter case being in direct contact with the negative lead of the ships D.C. supply, the wavemeter is suspended by insulators from an outside panel, which is bolted to the metal frame work of the transmitter. The ship's voltage has been utilized to supply the H.T. to the indirectly heated valves, a filter (see figure d.) being supplied which enables the wavemeter to be used in either a 100 volt or 220 volt ship. The filament supply to the valves is taken from the secondary of a step down transformer, fitted on the filter, the primary of the transformer being supplied from the filament machines of the transmitter. The filaments of the valves are connected in series. The instrument is enclosed in an aluminium box, and an additional screen (31) (see figure e.) is fitted between the valves, which can be opened to facilitate the removal or insertion of a valve.

The circuit consists of the coupling valve (1) and detector valve (2), a tuned circuit consisting of the coil(16) and the variable condenser(19), and a series of coupling condensers (4) (11)(12)(13)(14). The range switch (15) selects the appropriate tuning coil and coupling condenser for the frequency range required. The wavemeter tuning is indicated by the deflection of the needle of the milliammeter (26), in the anode lead of the detector valve (2). The milliammeter (26) will show a maximum reading when the wavemeter is in resonance with the transmitter.

The frequencies covered, together with the coupling condenser used, in each position of the range switch (15), are shown in the following table:-

Range Switch position.	Frequency kc/s.	Coupling condenser.
1. 2.	100 - 400	14
3. 4.	400 - 1600	13
5. 6.	1600 - 6000	12
7.	6000 - 12000	11
8.	12000 - 24000	4 and 11

Coupling to the transmitter is made by a single lead from the coupling terminal (30) to some point of high potential in the H/F circuit on the transmitter, to which it is loosely coupled by a very small capacity. This condenser is fitted in the transmitter and is not part of wavemeter G57. With a powerful transmitter, the stray capacity of a few inches of lead is sometimes sufficient without making direct connection to the transmitting circuit, in which case the additional condenser is not required. A fixed condenser (3) of very small capacity is connected in the grid lead of the coupling valve (1) to limit any changes of the effective capacity of the wavemeter circuit, which would be caused by any change of capacity to earth of the coupling lead from the terminal (30) to the transmitter. Coupling between valve (1) and the tuned circuit (16 - 19) is effected by means of fixed condensers. These are shown as condenser (17) in figures b. and c. and one selected by the range switch from the group 11, 12, 13 and 14, the values of which are 200, 300, 600 and 1500 micro-micro-farads respectively. The tuned circuit (16)(19) is coupled to the detector valve (2) by means of a capacity potentiometer consisting of the fixed condensers (18)(20). To prevent V.H/F harmonics being produced in the coupling valve (1) when measuring frequencies above 12,000 kc/s it is necessary to couple the transmitting circuit directly to the tuned grid circuit (16)(19) of valve (2) instead of the grid of valve (1). The coupling is obtained by the range switch (15), which, in position eight, connects the 0.03 jar condenser (4) between the grid and anode of valve (1) (see figure c.). The coupling terminal (30) will then be connected through condensers (3)(4) and (17) to the tuned grid circuit (16)(19) of valve (2). The 1000 ohm resistance (5) is an additional preventative against the production of V.H/F harmonics on the higher frequencies.

Automatic grid bias for the coupling valve (1) is provided by the 600 ohm resistance (7) the 0.1 mfd by-pass condenser (8) being fitted as an R/F by-pass.

The valve (2) is a detector and anode bend rectification is used. Grid bias is provided to prevent grid current flowing in normal use.

A potentiometer consisting of the resistances (22)(24)(25) provides the grid bias for the detector valve (2) and is controlled by the switch (10). By increasing the grid bias on valve (2) a stronger signal is required on the grid to give a deflection on the milliammeter (26). This provides a coupling control in the wavemeter. The R/F choke (9) is screened, and the screen connected to the casing of the instrument. R/F by-pass condensers (23)(27)(28)(29) are all connected to the casing of the instrument. The grid leak resistances (6)(21) are 30,000 and 250,000 ohms respectively. For accurate readings the variable condenser (19) is fitted with a slow motion device, the condenser scale being sub-divided into thousandths. The plates of the condenser are so shaped that the greatest possible accuracy is obtained when reading the calibration curves.

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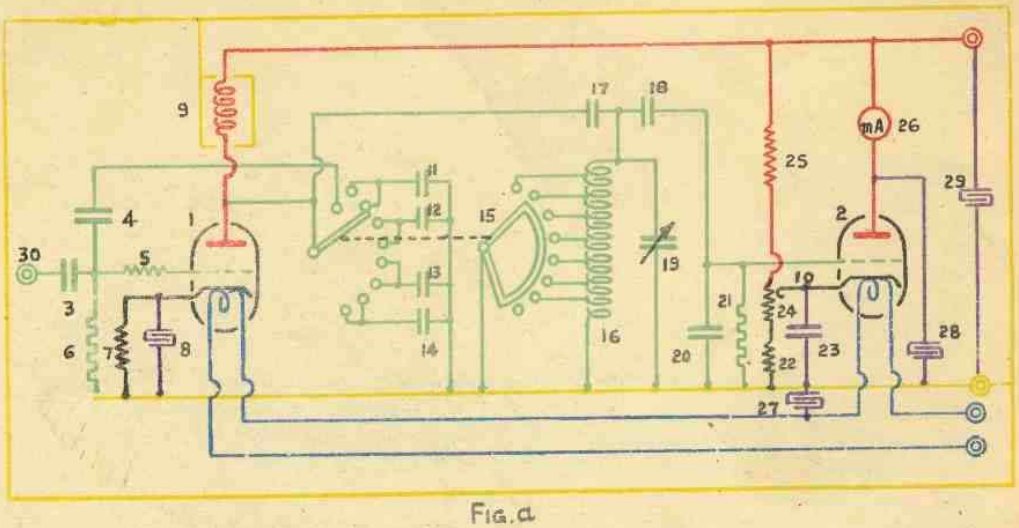
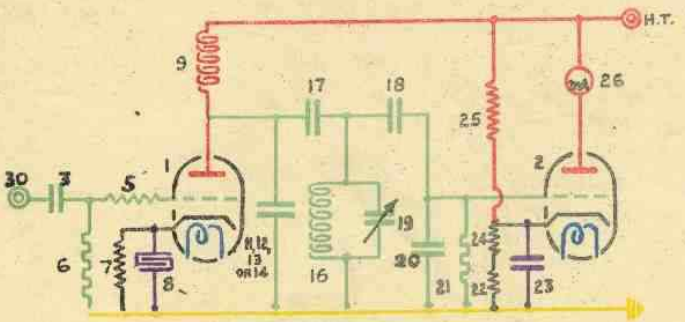
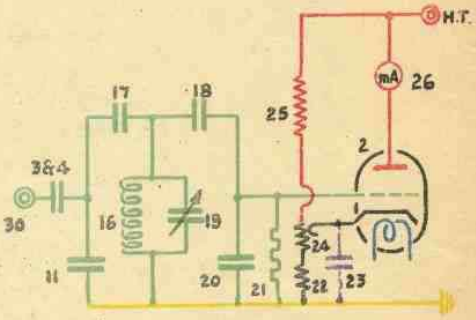


Fig.a



SWITCH POSITIONS 1 TO 7.
Fig.b.



SWITCH POSITION 8.
Fig.C.

FILTER BOARD FOR WAVEMETER G57.

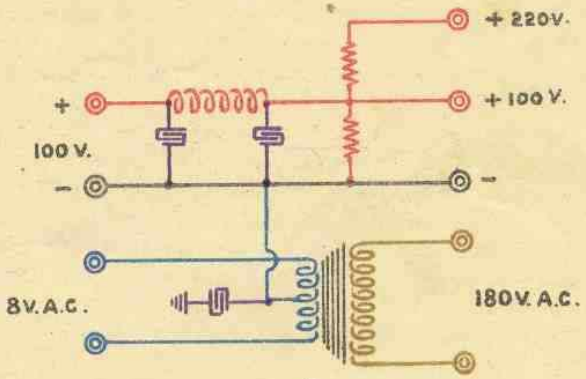


Fig.d.

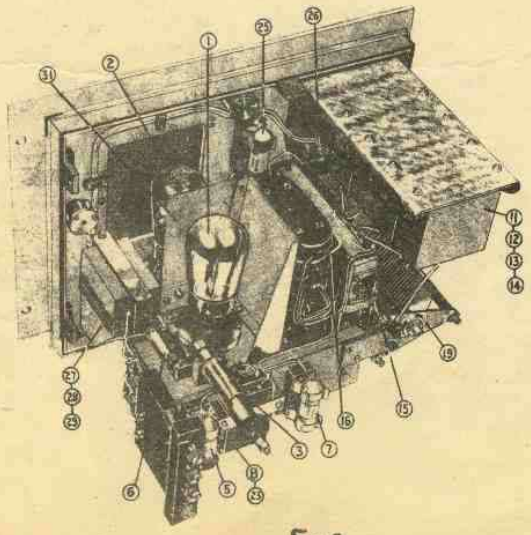


Fig.e.

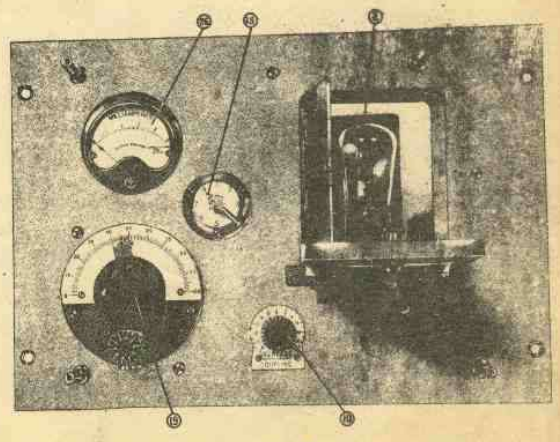


Fig.f