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M. OSNOS

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FREQUENCY STABILIZATION

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Fig. 1

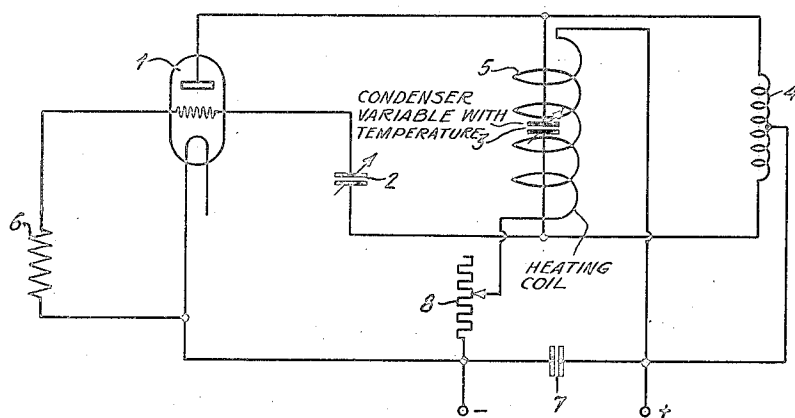


Fig. 2

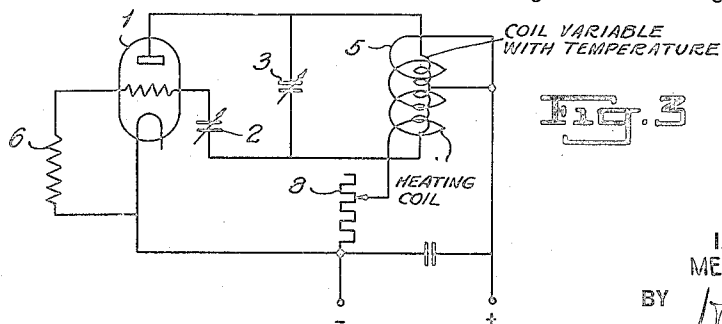
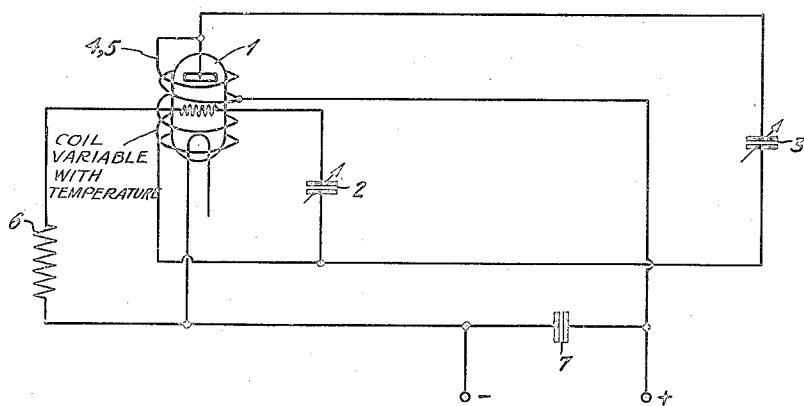


Fig. 3

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FREQUENCY STABILIZATION

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Application December 7, 1932, Serial No. 646,092
In Germany December 29, 1931

3 Claims. (Cl. 250—36)

It is known that the transmitter wave of a vacuum tube which is not subject to control by a quartz crystal, experiences very marked variations with variations in the value of the plate and the filament potentials or currents. It has been necessary for this reason to provide quartz crystals for the purpose of stabilizing the wave. The purpose of the invention is to eliminate entirely or to a major degree the dependence of the wave upon these potentials or currents.

This end is attained with the aid of the plate or the filament current or potential by warming or heating the tuning means of the transmitter (condensers, coils) in such manner that the capacity or inductance thereof, in the presence of alterations of the potential or the current or the temperature, is changed in a sense so that the alteration in the wave length occasioned by the tube itself is wholly or partly eliminated.

A better understanding of this invention may be had by referring to the accompanying drawing, wherein Figures 1 to 3 show three embodiments by way of example.

Referring to Figure 1, 1 is the transmitter valve, 2 the neutralizing condenser, 3 the tuning condenser, 4 the tuning coil, 5 the winding for heating the tuning condenser, 6 the grid leak circuit, 7 the plate blocking condenser, and 8 the rheostat for adjusting a suitable heating current.

The tuning condenser preferably is of the type in which the temperature characteristic is adjustable ad libitum, such as, for instance, a condenser of the kind disclosed in United States Patent No. 1,616,622, granted February 8, 1927, to Horton.

Owing to an increase in the heating or the temperature the current flowing through the heater coil and thus also the temperature of the condenser increases. Now, if we assume that without the heater winding 5 the length of the communication transmitter wave increases with increase in plate potential, then the tuning condenser must be so set that the value of its capacity will decrease with increasing temperature.

In the opposite case, i. e., if the transmitter wave decreases as the plate potential grows, the tuning condenser 3 should be so adjusted that the value of its capacity will increase with increasing temperature. If the condenser 3 and the heater winding 5 and the regulating rheostat

8 are properly and suitably designed and dimensioned, conditions can be made so that the outgoing wave, within certain limits, will be wholly or practically independent of the plate potential.

With the same end in view also the heating or filament potential or current or the plate current could be analogously used.

By ways and means as hereinbefore disclosed also the tuning coil 4 could be warmed similarly, particularly by so designing the said coil that the inter-relation or dependence of inductance and temperature can be adjusted at will. This is shown in Figure 3.

Also both the tuning coil and the tuning condenser could be warmed or heated in a way as hereinbefore suggested.

For very small transmitters (e. g., free-balloon transmitter equipments) in which the chief desiderata are low weight and low energy consumption, a separate heater winding could be dispensed with according to this invention by acting directly upon the tuning coil 4 by the heat radiated off by the tube itself (Figure 2).

Also in this instance it is preferable to design coil 4 in such a way that the dependence of its inductance upon the temperature is adjustable at will. Reference is made to my Patent No. 1,959,543, granted May 22, 1934.

I claim:

1. In combination, an electron discharge device comprising an anode, a cathode and a control electrode, a tuned output circuit comprising two reactance elements of opposite sign connected in parallel between said anode and cathode at least one of which has its reactance value variable with temperature, a source of potential for said anode, a heater winding connected across said source for heating said reactance which is variable with temperature whereby a change in frequency occurring in said electron discharge device due to variations in potential of said source is compensated at least partially by a variation in the reactance of said one element due to temperature changes therein.

2. A combination in accordance with claim 1, characterized in this, that said one reactance element is an inductance coil.

3. In combination, an electron discharge device comprising an anode, a cathode and a control electrode, a tuned output circuit comprising two

reactance elements of opposite sign connected in parallel between said anode and cathode at least one of which has its reactance value variable with temperature, a source of potential for one of said
5 electrodes, a heater winding connected across said source for heating said reactance whose value is variable with temperature whereby a change in

frequency occurring in said electron discharge device due to variations in potential of said source is compensated at least partially by a variation in the reactance of said one element due to temperature changes therein.

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