March 26, 1935. W. SCHEPPMANN 1,995,624

MEANS FOR GENERATING ELECTRIC OSCILLATIONS

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Fig.1

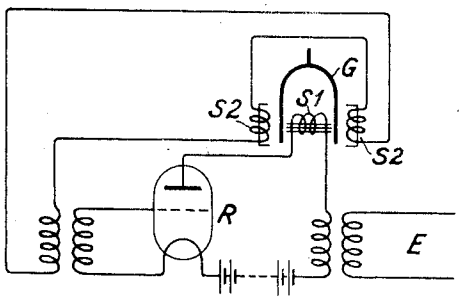


Fig.2

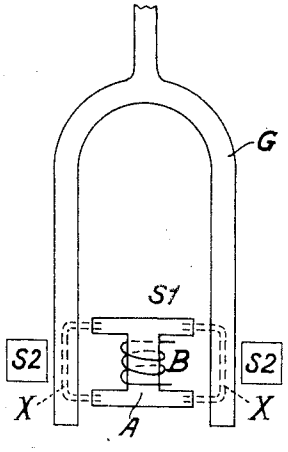
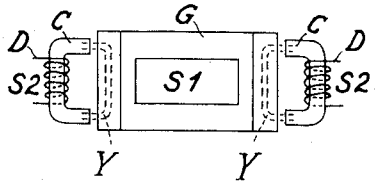


Fig.3



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MEANS FOR GENERATING ELECTRIC OSCILLATIONS

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4 Claims. (Cl. 250—36)

This invention relates to devices for the generation of electrical oscillations by means of tuning forks. Such devices are employed for various purposes in the electrical art where a certain frequency is to be maintained constant. One of these fields of use is in single wave broadcasting, that is, broadcasting in which several transmitters operate with waves of the same length. Another field of use is to be found in picture telegraphy in which, for example, special oscillation generators are employed for synchronizing purposes.

In the single wave broadcasting the problem occurs of transmitting a certain frequency from a central station by means of cable lines to various single wave transmitters and there to energize tuning forks which are tuned to the same control frequency, that is, to the frequency which is generated in that central station. The local transmitter is controlled by the tuning fork which is thus energized from the distant station over the cable. This intermediate connection of the tuning fork has the object of rendering ineffective disturbances, which may be produced in cable lines of certain lengths by other frequencies, for example, by crosstalk from adjacent wires or cables and particularly by switching operations which are effected during the operation of the cable.

The conditions are similar if the control frequency is transmitted over the same line as that over which the operator's communications are conveyed. Even with the most careful design and arrangement of the electrical switches, the control frequency cannot be so cleanly selected that disturbances are avoided. Therefore there must be provided at the end of the cable a device which ensures that only the desired frequency, but not disturbances, influence the control of the local transmitter.

A similar problem exists, for example, in picture telegraphy. Here tuning forks are employed at the transmitting and receiving stations, in order to ensure the synchronism of the transmitting and receiving devices. The tuning forks for this purpose are operated in suitable circuits. Previously the grid and anode circuits of an electron tube have been back coupled over the tuning fork. This arrangement, however, has the disadvantage that the valve also oscillates when the tuning fork is not energized, since the coupling between grid and anode circuit over the tuning fork is very tight. For this reason it has been suggested to arrange the tuning fork outside this coupling in the grid or anode circuit. Such an arrangement, however, also does not facilitate the perfect control by the tuning fork.

The arrangement according to this invention, however, permits the generation of oscillations in a most efficient manner with a direct coupling of the grid and anode circuit over the tuning fork.

The invention, which is not limited to the fields before mentioned, but may also be applied for similar purposes, consists in the feature that the energizing system and the energized system are magnetically neutralized. By this means transmission from the energizing system to the energized system can only take place when the tuning fork has already been struck, that is, is already in the vibrating condition.

An embodiment of the invention is shown diagrammatically in the accompanying drawing.

Fig. 1 shows a known form of circuit using an electron valve R, which is back coupled over a tuning fork. Fig. 2 is an elevation of the tuning fork and the associated parts arranged according to the invention. Fig. 3 is an end elevation of Fig. 2.

A tuning fork G serves as a vibrating member. The back coupling takes place over this tuning fork and two systems S1 and S2, of which the first is the energizing system and the second is the energized system. These two systems are mutually neutralized. The manner in which neutralization takes place is shown in Figs. 2 and 3.

The system S1 consists of a double T-shaped iron member A and a winding B situated thereon. The lines of force of this system follow closed paths X as shown by dash lines in Fig. 2, over the tines of the tuning fork G and run substantially parallel thereto.

The system S2 consists of two U-shaped iron members C each provided with a winding D. Its lines of force also follow closed paths Y over the tines of the tuning fork as shown by dash lines in Fig. 3. They run substantially across its tines, that is perpendicularly to the lines of force of system S1.

In this way neutralization of the two systems is obtained to a high degree.

In the case of single wave broadcasting the system S1 would be connected with the incoming line E, Fig. 1, and the system S2 with the frequency multiplying device of the transmitter, or vice versa. This multiplying device is not shown.

As long as the fork G does not vibrate, nothing is transmitted from the system S1 to the system S2. Only in the vibrating condition of the fork is the flow of current in the energized system S2

varied by the alterations of the air gaps, so that oscillations occur.

The arrangement explained has the advantage in single wave broadcasting that interference frequencies are effectively excluded. In picture telegraphy the valve arrangement only oscillates when the tuning fork vibrates. Thereby in both cases perfect operation is ensured by the exceedingly free coupling.

What is claimed is:

1. In a device for generating electric oscillations, a tuning fork, an energizing system therefor consisting of a double T-shaped magnetic core with a winding thereon, an energized system consisting of two U-shaped magnetic cores each having a winding thereon, said cores being so positioned with respect to the fork tines that each tine forms part of the magnetic path of two of said windings and the cores being so positioned one with respect to another that the magnetic paths containing the same tine are mutually perpendicular.

2. In a device for generating electric oscillations, a tuning fork, an energizing system therefor consisting of a double T-shaped magnetic core with a winding thereon and positioned between said tines, an energized system consisting of two U-shaped magnetic cores each having a winding thereon, said U-shaped cores being positioned substantially parallel one to the other and at substantially right angles to and opposite said double T-shaped core outside said tines, whereby the magnetic paths of said second mentioned windings respectively include as a part thereof said fork tines and are at substantially right angles to the magnetic path of the first mentioned winding having as parts thereof both tines.

3. A generator of electric oscillations comprising a tuning fork, a driving coil therefor having a double T-shaped core of magnetic material disposed between the tines of said fork, two other coils each having a E-shaped core of magnetic material disposed respectively outside said tines with the axes thereof in substantially the same plane which is normal to the plane containing the axis of said double T-shaped core, a transformer having a primary winding connected in series with the coils positioned outside said tines, and an electron tube having an input circuit containing the secondary winding of said transformer and an output circuit containing the coil on the double T-shaped core.

4. A generator of electric oscillations comprising a tuning fork, a driving coil therefor having a double T-shaped core of magnetic material disposed between the tines of said fork, two other coils each having a E-shaped core of magnetic material disposed respectively outside said tines with the axes thereof in substantially the same plane which is normal to the plane containing the axis of said double T-shaped core, an electron tube having an input circuit and an output circuit, and means for connecting the windings on the E-shaped cores to one of said circuits and the winding on the double T-shaped core to the other of said circuits.

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