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REGENERATIVE OSCILLATOR

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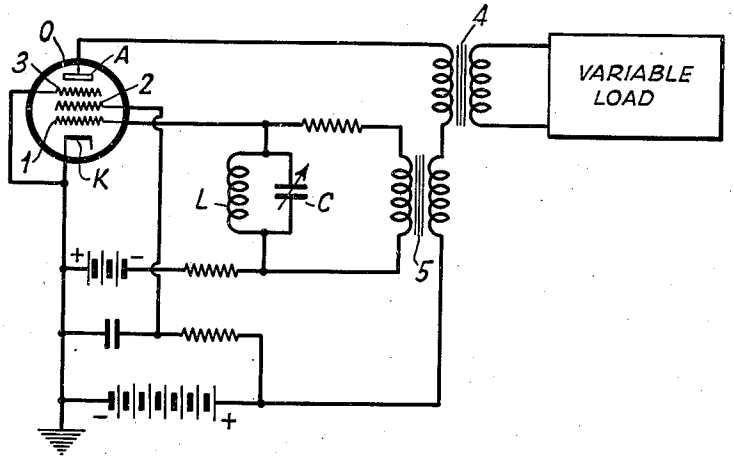

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REGENERATIVE OSCILLATOR

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3 Claims. (Cl. 250—36)

In most of the regenerative oscillators in use today, more particularly as far as they are employed in the carrier current field, the load circuit and the feed-back circuit are coupled to the plate circuit across the same transformer. The load fluctuations, therefore, produce an unfavorable affect upon the value of the feed-back energy.

The present invention relates to a return-coupled tube generator in which the load and the feed-back are connected in series. Tube generators having such series connection are known in connection with the use of triodes. These known arrangements are not suited for obtaining a decoupling between the load and the feed-back. In order to obtain a high power the inner tube resistance in the known arrangement is matched with the load resistance. The output circuit of the tube was coupled to the load through a transformer the design of which is such that the inner tube resistance was made equal to the transformer load resistance. In the heretofore known circuit arrangement, however, it was found very difficult or impossible to provide sufficient decoupling between load and feed-back, and fluctuations of the load resistance adversely affected the feed-back circuit.

In accordance with the present invention in a return-coupled tube generator in which the load and the feed-back are connected in series, the load resistance is matched with a value lying considerably below the inner resistance of the generator tube. The inner tube resistance, therefore, is chosen very high as compared with the transformer load resistance. When using triodes there exists the disadvantage of a loss in power resulting from such an insufficient matching. In order to provide more favorable conditions as regards power, in accordance with a further feature of the present invention a multi-grid tube and more particularly a pentode is used as a generator. Multi-grid tubes including pentodes have, of course, been used in the past for this purpose. However, the known generator arrangements comprising multi-grid tubes lack the series connection of the load and feed-back circuit. The requirement according to the present invention that the load resistance shall not be fully matched with the inner tube resistance in a series connection of load and feed-back can, when using a pentode, be readily brought in conformity with the requirement as regards the most favorable power matching.

The invention will be further described by reference to the accompanying drawing, the sole figure of which shows an example of construction of a preferred oscillator circuit. The generator tube O is represented by a pentode comprising the grids 1, 2 and 3, the cathode K and the anode A. The inner resistance of the pentode preferably has a value equal to 1 megohm. The load is connected across the transformer 4 the secondary terminals of which are shown connected to a variable load. The oscillatory input circuit L, C is connected between the grid 1 and the cathode K. The feed-back from the output circuit is applied to the input circuit by means of a transformer 5. The primary windings of the transformers 4 and 5 are in series. Hence the load is in series with the feed-back. The load resistance on the primary side of the transformer 4 may be, for instance, equal to 50,000 ohms while the feed-back resistance is made equal to 5,000 ohms. With such insufficient matching a series connection of load and feed-back provides a practically complete decoupling because the voltage variations at the transformer 4 no longer affect the plate current and consequently the voltage at the transformer 5 is substantially independent of the load.

I claim:

1. An oscillation generator circuit arrangement comprising an electron discharge tube having a cathode, an anode and a plurality of grids, including a control grid, a screen grid and a suppressor grid, a resonant input circuit connected between the cathode and said control grid, an output circuit connected from the cathode through a source of potential to the anode, the overall impedance of said output circuit being substantially equivalent to the impedance of said tube, means including said source for rendering said screen grid positive with respect to the cathode, a direct connection between the cathode and said suppressor grid, a transformer having a highly resistive primary in said output circuit and a secondary in circuit with a variable load, a second transformer having a relatively low resistance primary in said output circuit for deriving feed-back therefrom, and means including a secondary winding in the last said transformer for applying said feed-back energy to said input circuit substantially free from effects of variation of said load.

2. An oscillation generator system comprising an electron discharge tube having a cathode, an anode, and a control grid, an output circuit connected between the anode and cathode and including series-connected primary windings of two separate transformers, one of said trans-

formers having a relatively high impedance primary and a secondary for feeding energy to a variable load of relatively low impedance compared with the internal resistance of said tube, the other of said transformers having a relatively low impedance primary and a secondary which forms part of a feed-back circuit connected between the cathode and control grid, the difference in impedance values of the two said primaries being such that the feed-back potentials are substantially independent of load variations, and means in said tube including at least one other grid which is so biased with respect to the cathode that an optimum impedance match is obtained between the space path of electrons in said tube and the external impedances of said output circuit.

3. An oscillation generator comprising a pentode discharge tube in which the cathode and first grid are interconnected by a tuned input circuit, the cathode and anode are interconnected by an output circuit, the cathode and screen grid are capacitively intercoupled, and the suppressor grid is directly connected to the cathode; operating potential means connected to the several electrodes of said tube, two separate transformers having their primaries series connected in said output circuit, one of said transformers having a secondary feeding to a variable load of relatively low impedance value, the primary of said transformer having an ohmic resistance value which is low relative to the internal resistance of said tube and high relative to the resistance of the primary in the other transformer, said other transformer having a secondary in shunt with a portion of said input circuit; said generator being characterized in that the energy fed back to the input circuit is substantially independent of load variations.

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