

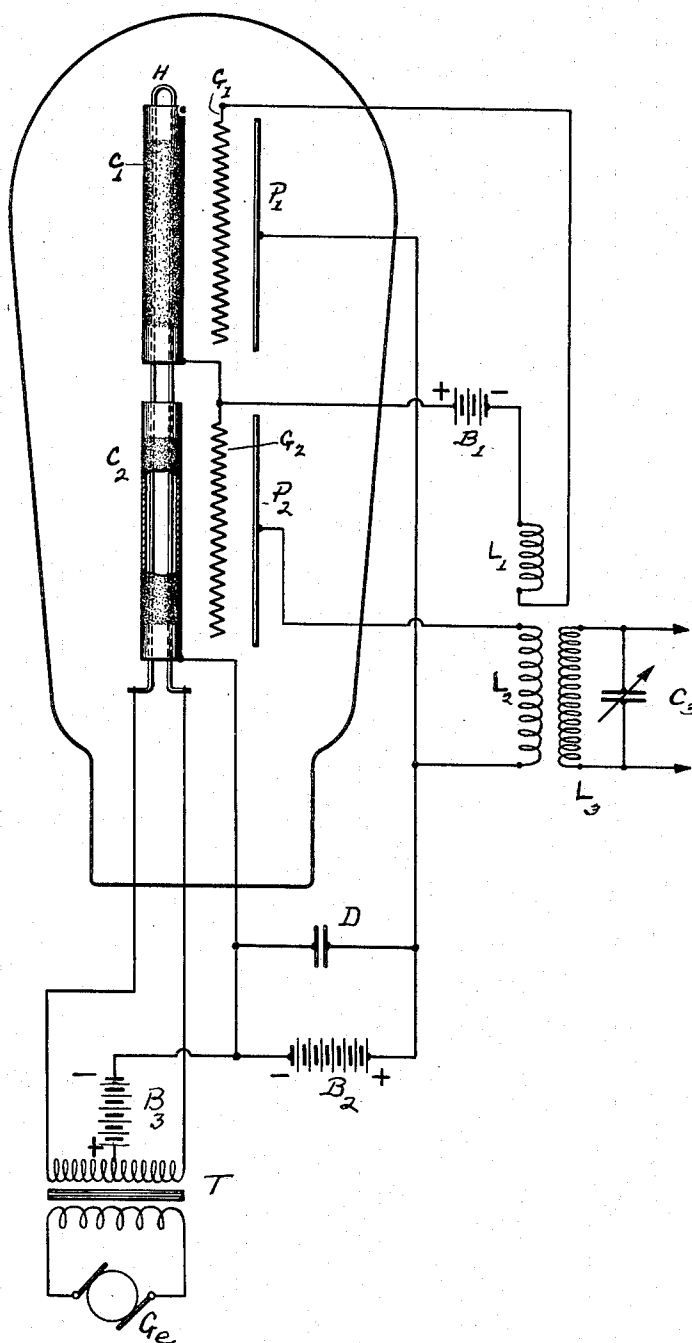
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1,991,175

OSCILLATOR CIRCUIT

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1,991,175

OSCILLATOR CIRCUIT

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5 Claims. (Cl. 250—36)

This invention relates to an oscillator circuit, and more particularly it relates to an arrangement of the elements in a circuit, one of which elements is a vacuum tube of the general type described and illustrated in my United States Reissue Letters Patent 18,367, and in my co-

pending applications filed July 25, 1931 and December 10, 1931, and numbered respectively 553,052 and 580,020.

One of the objects of this invention is the provision of an efficient oscillator circuit. Because of the high power sensitivity and transconductance properties of the tube to which I have referred, it is adapted for use as an oscillator when connected in a circuit such as that hereinbelow described.

The output or positively biased grid G_2 is connected to the control emitter C_1 , and can be internally or externally connected.

D is a condenser for by-passing high frequency oscillations, it being of sufficient capacity to allow a low reactance to high frequencies and therefore acting as a by-pass.

Broadly, my invention consists of a circuit employing a tube of the type containing two sets of triodes, each comprising an electron emitter, a grid and an anode, one being in the input or control triode, the other the output triode, and so arranged and connected that the output current of one triode is directly controlled by the output of the other triode, and so connected in a circuit that the commonly used forms of coupling are not required. In the circuit with the tube an inductance connected in the grid circuit of the control triode is coupled to an inductance in the circuit of the other triode, such devices being a means provided for feeding back to the control triode any energy changes in the plate circuit of the output triode.

The potential sources are shown as batteries but the use of resistances for voltage drop can be employed as described in my copending application bearing Serial No. 553,052.

While it is considered practicable to use two indirectly heated cathodes as the electron emitters, the output electron emitter may be of the directly heated type, such as a nickel ribbon coated with an alkali earth oxide, or the heating current can directly pass through the thin walls of the electron emitters to heat them.

For a better understanding of the invention reference is made to the accompanying drawing of an arrangement of the electrical circuit.

The indirectly heated electron emitters in devices constructed according to the design illustrated, are nickel tubes, diameter .060" coated with strontium and barium oxide; molybdenum wire grids, .004" in diameter and coiled in 48 turns to the inch with a coil diameter of .115" about the upper or control emitter C_1 , the lower grid being composed of molybdenum wire of like dimensions in a coil .150" in diameter having 40 turns to the inch. The plate elements are carbonized nickel cylinders $\frac{3}{8}$ " in diameter and 1" long. But the dimensions are governed by the amount of power to be discharged.

In the drawing, C_1 represents an electron emitter, G_1 the grid and P_1 the plate element of the control triode, C_2 , G_2 and P_2 being respectively the electron emitter, grid and plate element of the output triode. At L_1 is a feed back inductance and at B_1 a source of potential for biasing grid G_1 ; and at L_2 is an inductance connected in the output or plate P_2 circuit. Inductance L_3 and condenser C_3 represent a tuned circuit for obtaining a maximum output from inductance L_2 . B_2 represents the source of plate potential for both triodes, variable according to the output desired, and B_3 is a source of potential to positively bias the common heater element H to prevent emission therefrom. Transformer T , is in the circuit for heating element H , and indirectly the emitters C_1 and C_2 . The generator supply source is at G .

In a tube of the design and dimensions described having 2.5 watts output with a 5 volt grid swing, a change of one volt on the control grid G_1 causes a 25 milliamper change in the output plate P_2 , circuit. Thus, by coupling inductance L_2 in the output circuit to the feed back inductance L_1 it is possible to maintain continuous oscillations with a minimum expenditure of oscillations for re-generation.

What I claim is:

1. An oscillator circuit in which is connected a vacuum tube containing two triodes consisting of a control triode having an emitter, a grid and an anode, and an output triode having an emitter, a grid and an anode, the grid of the output triode

In the operation of this device there are three discharges in the tube, the first or control dis-

being connected with the emitter of the control triode, and a source of potential for biasing the control grid as to its emitter, and an inductance in the control grid circuit in series with the said source of potential, said inductance being coupled to an inductance in the plate circuit of the output triode.

2. An oscillator circuit in which is connected a vacuum tube containing two triodes, consisting of a control triode having an emitter, a grid and an anode, and an output triode having an emitter, a grid and an anode, the grid of the output triode being connected with the emitter of the control triode, and a source of potential for biasing the control grid as to its emitter, and an inductance in the control grid circuit in series with said source of potential, said inductance being coupled to an inductance in the plate circuit of the output triode, said coupling being the means for indirectly feeding back to the control triode energy changes in the plate circuit of the output triode.

3. An oscillation circuit having an envelope containing two triodes, a control triode and an output triode, each consisting of a cathode, a grid and an anode, a heater element for indirectly heating said cathodes, the grid of the output triode being directly connected with the cathode of the control triode, a source of potential for biasing the control grid, connected in series with an inductance in the control grid circuit, the cathode of the control triode being electrically in-

sulated from the cathode of the output triode, and an inductance in the anode circuit of the output triode inductively coupled to the grid circuit of the other triode, said coupling being a means for re-generatively discharging plate oscillations of the output triode to the input circuit of the other triode.

4. An oscillation circuit having a vacuum tube containing two triodes, a control triode having an emitter, a grid and an anode, and an output triode having an emitter, a grid and an anode, the grid of the output triode being directly connected with the emitter of the other triode, and a source of potential and an inductance being connected in series between the two grids, the inductance being coupled to an inductance in the anode circuit of the output triode.

5. An oscillation circuit having a vacuum tube containing two triodes, a control triode having an emitter, a grid and an anode, and an output triode having an emitter, a grid and an anode, the grid of the output triode being connected with the emitter of the other triode, and a source of potential and an inductance being connected in series between the two grids, the inductance being coupled to an inductance in the anode circuit of the other triode, said coupling comprising means for indirectly feeding back to the control triode energy changes in the plate circuit of the other triode.

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