Oct. 20, 1936. J. L. REINARTZ 2,058,260

OSCILLATION GENERATOR

Filed Jan. 10, 1935

Fig. 1

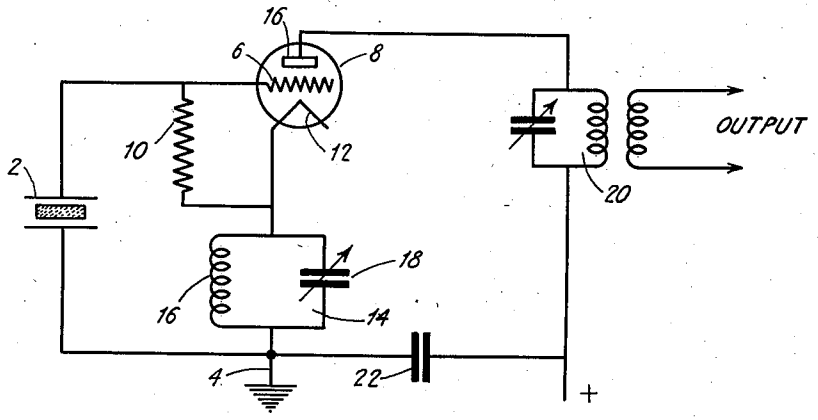
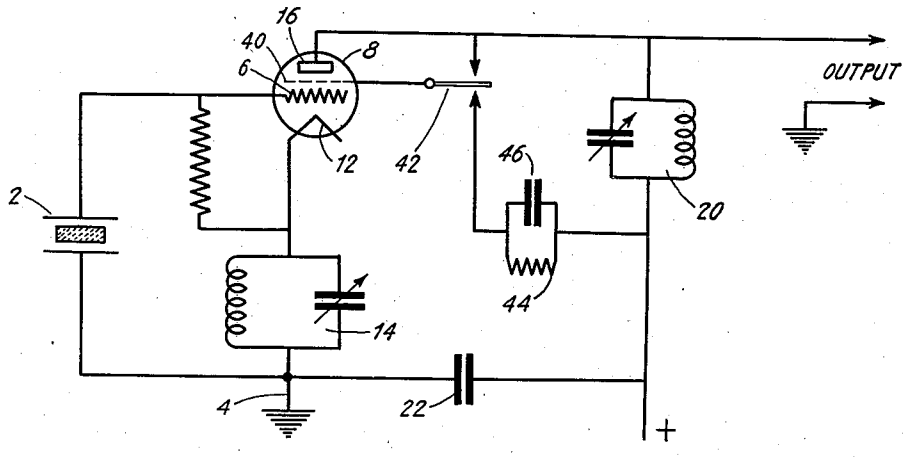


Fig. 2



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Patented Oct. 20, 1936 2,058,260

UNITED STATES PATENT OFFICE

2,058,260

OSCILLATION GENERATOR

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Application January 10, 1935, Serial No. 1,086

5 Claims. (Cl. 250—36)

My present invention relates to a crystal controlled oscillation generator.

One object of my invention is to provide a crystal controlled circuit which will readily go into oscillation under crystal control and which shall be of high efficiency and which shall provide relatively high power output.

Other objects of my present invention will appear as the description thereof proceeds.

In the accompanying drawing Figure 1 illustrates one form of my present invention utilizing a three element tube, and Figure 2 is a modification thereof.

Turning to Figure 1, a crystal 2 is connected between ground 4 and grid 6 of vacuum tube 8. A leak resistance 10 is connected across grid 6 and filament 12. Filament 12 may be the cathode of a heater type tube, in which case the heater is grounded and the cathode is left floating at a radio frequency potential with respect to ground. In series with the filament or cathode 12 there is connected a tuned circuit 14 having a coil 16 and variable condenser 18. The circuit 14 is, therefore, interposed between the cathode and ground, and is tuned to one half of the frequency of operation of the crystal 2. At that frequency the inductive reactance of circuit 14 is made to predominate. Between the plate 16 and ground 4 there is connected tuned plate circuit 20 which is tuned to the crystal frequency. By-passing condenser 22 is provided in shunt with the plate source of potential, not shown. The output taken from the circuit 20 is at the crystal frequency.

When the circuit is in operation, the cathode 12 swings at a radio frequency potential, the crystal has an effective inductive reactance, and the circuit 14 is of relatively high impedance, as is also the tuned circuit 20.

The modification shown in Figure 2 is similar to that shown in Figure 1. However, the output is taken conductively from the plate circuit 20 as shown, and also tube 8 is provided with a screen grid 40 which may be connected directly to the plate 16 by moving switch 42 to its upper position or which may be connected to the voltage dropping resistor 44 and by-pass condenser 46 to the lower grounded end of the tuned circuit 20.

Having thus described my invention, what I claim is:

1. A crystal controlled oscillator comprising a tube having a cathode and a plurality of other electrodes, a crystal connected between a pair of electrodes of said tube, a circuit tuned to the frequency of operation of said crystal connected to a pair of electrodes of said tube, and still another circuit tuned to substantially half of the crystal frequency connected between the cathode of said tube and ground.

2. A crystal controlled oscillator comprising a tube having a cathode, a grid and a plate, a crystal connected between the grid and ground, a circuit tuned to half of the crystal frequency connected between ground and the cathode, and an output circuit connected between said anode and ground.

3. In an oscillator, an electron discharge tube having a cathode, a grid and an anode, a piezoelectric crystal connected between said grid and ground, an output circuit connected between said anode and ground and tuned substantially to a natural frequency of said crystal, and means including a tuned circuit between the cathode and ground for offering a predominantly inductive reactance to oscillations of the crystal frequency, the last said circuit being tuned to substantially one half the crystal frequency.

4. The combination as set forth in claim 3 and including a screen grid in said electron discharge tube, a voltage dropping resistor in shunt with a capacitor, and switching means in circuit with said screen grid for connecting the same in one position directly to the anode of said tube and in the other position through said voltage dropping resistor to a point in circuit between ground and the tuned portion of said output circuit.

5. In an oscillator, an electron discharge tube having a cathode, a grid and an anode, a resonant circuit tuned to a predetermined frequency connected between said grid and ground, an output circuit connected between said anode and ground and tuned substantially to said predetermined frequency, and means including a tuned circuit between the cathode and ground for offering a predominately inductive reactance to oscillations of said predetermined frequency, the last said circuit being tuned to substantially one-half of said predetermined frequency.

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