March 23, 1937. H. FEUSSNER 2,074,687

KEYING

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Fig. 1

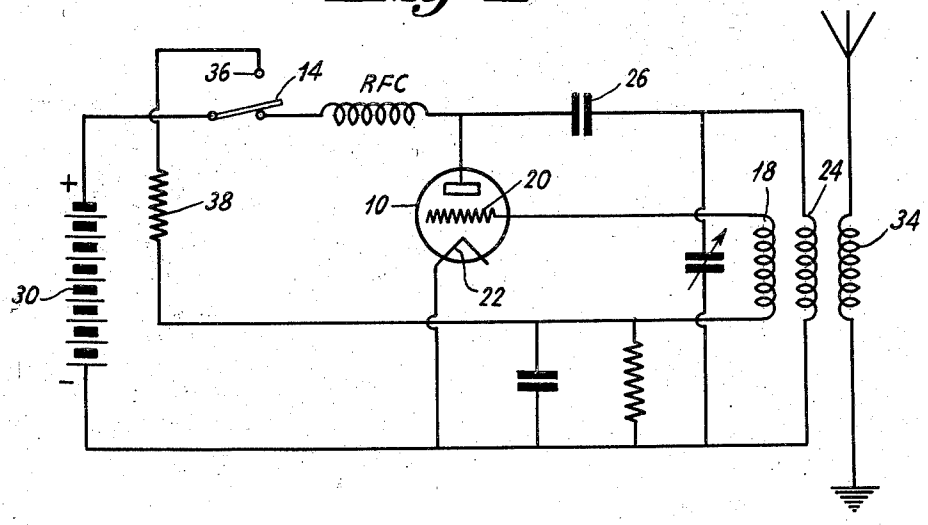
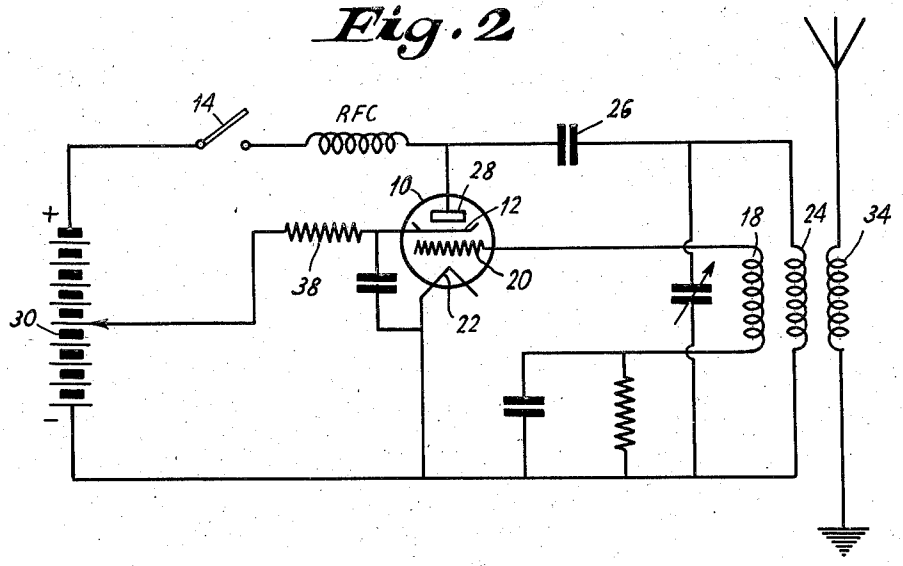


Fig. 2



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KEYING

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3 Claims. (Cl. 250—17)

In the production of high-frequency oscillations by means of self excited glow cathode tubes, connected with oscillatory circuits, it is necessary in order to maintain the frequency constant, that the electrical dimensions of the oscillatory circuits remain invariable or constant during operation. With suitable circuit construction and selection of circuit materials and elements, the invariability of the oscillatory circuits proper relative to all influences especially those produced by changes in temperature can be sufficiently approached in practice.

When electron tubes are used, they form a part of the oscillatory circuits and must likewise be invariable, or substantially constant, as to their electrical dimensions and in relation to all influences. This invariability cannot be attained in the necessary degree in case of electron tubes, since as regards tube structure and choice of material for the tubes, there are certain limitations not readily reckoned with in the manufacture of oscillatory circuits.

For this reason, the relative influence of the tubes upon the frequency generated is at first maintained small by observing precautions in dimensioning the oscillatory circuits. However, in case of very high frequency, such appropriate dimensioning meets with limitations in that at the higher frequencies these precautions are no longer effective to insure production of constant frequency oscillations, and yet especially in case of these higher frequencies, an increasing relative constancy of the frequency of the produced oscillations is required.

Hence, it is necessary especially at high frequencies, to protect the tubes against exterior influences.

Temperature changes cause very great disturbances in the tubes, since the capacity of the electrodes and that of the lead-ins thereof varies greatly with changes in temperature of the tube and circuits.

Therefore, the load of the tubes (which is one of the causes of heating) is in accordance with my invention to be maintained uniform and as small as possible.

The heating of the tube is due primarily to the heating energy and anode loss energy. If as is ordinarily the case, the plate current is interrupted through keying (for undamped telegraphy) at the rhythm of the telegraphic signals, this change in energy consumption represents the most unfavorable case of a greatly changing load.

The heat dissipating capacity of the tube is so small that the short telegraphic signal intervals cause a highly disturbing frequency variation thereby rendering proper operation difficult or even impossible.

In describing my invention in detail, reference will be made to the attached drawing wherein Figs. 1 and 2 show the essential features of a telegraphy system of a simple form, and each system includes novel means for keeping the load on the tube constant during operation.

The present invention, as illustrated in Figs. 1 and 2, has for its purpose to maintain constant the entire energy lost in the tube 10 by placing a load on another electrode in the discharge tube during spacing intervals. This auxiliary electrode and the potential applied thereto are so dimensioned that during the pauses of keying, a load is consumed by said auxiliary electrode corresponding to the plate loss energy. In case of screen grid tubes, an auxiliary electrode can be omitted, since the screen grid electrode 12 can take over the function of said auxiliary electrode.

During the keying of telegraphic signals the auxiliary electrode should not consume an appreciable energy and in some types of tubes must therefore be disconnected. In case of screen grid tubes of ordinary construction, such as shown in Fig. 2, such disconnection is not required, since in applying the plate potential by closing key 14, the electron current passes automatically from the screen grid to the plate.

The tube 10 may be connected in an oscillation generator circuit comprising an inductance 18 connected in a circuit between the grid 20 and cathode 22, and, coupled to an inductance 24 coupled by a blocking condenser 26 to the anode 28 of tube 10 at one end, and connected to the cathode 22 at the other end. When the key 14 is closed, potential from a source 30 is applied by way of a choking inductance to the anode 28 and oscillations are generated and radiated from aerial 34. When the key 14 is open, the screen grid draws current, thus placing a more constant load on the tube.

In the arrangement of Fig. 1, the key 14 places a positive biasing potential from the source 30 on the control grid 20. During keying intermissions or spaces, the positive potential applied through 14 and contact 36 on the grid 20 causes the grid to draw current and the load on the tube and consequently the heating of the tube remains constant.

The resistance 38 of the arrangement of Fig. 2 limits the screen grid current to protect the tube.

What is claimed is:

1. In an arrangement for maintaining a con-

stant load on a thermionic device having a plurality of electrodes including an anode and a cathode connected in high frequency circuits, a source of direct current potential having one terminal connected to said cathode, a key, and a contact cooperating with said key in signalling position for connecting a point on said source of potential to said anode to key said tube, an additional electrode in said tube, and a second contact cooperating with said key for connecting a point on said source to said additional electrode in said tube when said key is in non-signalling position to produce a flow of current to said additional electrode when the potential is removed from said anode.

2. An arrangement as recited in claim 1 wherein said additional electrode is the control grid and wherein said key and second contact connects said control grid to said point on said source of direct current potential when said key and contact disconnect said source from the anode of said tube.

3. In a telegraphy system, an electron discharge device having a cathode and a plurality of auxiliary electrodes, an alternating current circuit connected between at least one of said auxiliary electrodes and said cathode, a source of direct current potential, a connection between a point on said source and the cathode of said device, a key, a contact connected with one of said auxiliary electrodes and cooperating with said key to connect said auxiliary electrode to a point on said source when signals are to be sent out, and a second contact connected with another of said auxiliary electrodes and cooperating with said key for connecting said last named auxiliary electrode to a point on said source during intervals between signals.

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