

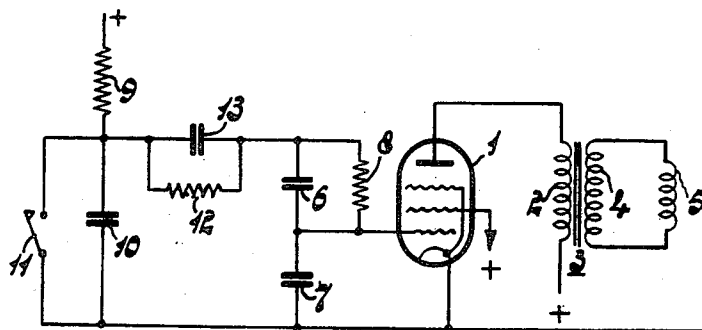
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CIRCUIT ARRANGEMENT FOR PRODUCING A SAWTOOTH CURRENT

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CIRCUIT ARRANGEMENT FOR PRODUCING A SAWTOOTH CURRENT

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5 Claims. (Cl. 315—27)

The invention relates to a circuit arrangement for producing a sawtooth current in a coil which is fed through the secondary winding of a transformer, of which the primary winding, included in the anode circuit of a discharge tube, has an inductance such that the direct anode current traversing the tube is substantially at a minimum, the control-grid circuit of this tube having fed to it a sawtooth voltage through a distorting network which has a substantially dual relationship with the system included in the anode circuit of the tube.

Such known circuits are often used for producing sawtooth currents for deflection in the direction of the image, i. e. for vertical deflection, in television receivers. Owing to the aforesaid choice of the inductance and of the primary winding of the transformer the anode current of the tube must be constituted by a sawtooth component and a parabolic component.

If the anode-current-grid voltage characteristic curve of the tube is straight, the grid voltage must, consequently, have a sawtooth component and a parabolic component. If the sawtooth voltage is assumed to be substantially linear, this grid voltage is obtained by means of the distorting network, which has a substantially dual relationship with the system included in the anode circuit of the tube.

In these known circuit arrangements it has hitherto not been taken into consideration that the anode-current-grid-voltage characteristic curve of the tube is not straight, but on the contrary curved, particularly in the proximity of the cutting-off point of the characteristic. In television receivers in which the known circuit arrangement is used a comparatively large deviation therefore occurs from the velocity with which the cathode-ray beam is deflected at the beginning of the stroke of the sawtooth current.

The invention has for its object to mitigate this drawback and has the feature that the sawtooth voltage is supplied through the parallel combination of a resistor and a capacitor to the dual network.

The invention will now be described with reference to the accompanying drawing.

Referring to the figure reference numeral 1 designates the discharge tube arranged in an amplifier stage, the anode circuit of which includes the primary winding of a transformer 3. To the secondary winding 4 of the transformer is connected the deflection coil 5.

The substitute diagram of the complete system included in the anode circuit of the tube is found to be constituted in practice by the parallel combination of the primary inductance L_p of the transformer and the resistance of the deflector R_s , transformed to the primary side, the parasitic inductances and the resistances of the transformer and the inductance of the conventional deflector being found to have in practice no considerable effect, so that they are negligible.

It has been proved before that the direct anode current of the tube is at a minimum, if the primary inductance L_p of the transformer is chosen to be $0.29R_sT$,

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wherein T is the duration of the stroke of the sawtooth current across the coil 5.

In practice the inductance will differ in general not more than a factor 2 from the value of $0.29R_sT$, which means that then the direct anode current differs less than 20% from the minimum value.

With the said choice of the value of the primary inductance it is found that for obtaining a linear sawtooth current across the current 5 the anode current of the tube must be constituted by a sawtooth current component and a parabolic current component. If the characteristic curve of the tube 1 is straight, this is achieved with the aid of a dual network in the grid circuit of the tube.

In the embodiment shown this network comprises capacitors 6 and 7 and a resistor 8. The sawtooth voltage is derived from a circuit known per se, which is shown here for the sake of simplicity by a resistor 9, a capacitor 10 and a switch 11, connected in parallel there with and opening and closing periodically, the sawtooth voltage occurring at the capacitor 10. In the known circuit arrangement the capacitor 10 is connected directly in parallel with the series combination of the capacitors 6 and 7, which brings about that owing to the curvature of the characteristic of tube 1 a non-linear deflection current flows across the coil 5.

According to the invention the voltage across the capacitor 10 is supplied to the dual network 6, 7, 8 through the parallel combination of the resistor 12 and the capacitor 13.

With the curvatures of the anode-current-grid voltage characteristic of the tube 1, usually a pentode occurring in practice, it is found to be desirable to choose the capacity of the capacitor 13 to be about five to ten times higher than the capacity of the capacitor 6, whilst the time constant of the network 12, 13 is about equal to $\frac{1}{2}$ of the duration T of the stroke of the sawtooth current across the coil 5.

What is claimed is:

1. A circuit for producing a sawtooth current in a coil, comprising a transformer having a secondary winding connected to said coil and having a primary winding, an amplifier stage comprising an electron discharge tube having an input electrode and an output electrode, means to supply current through said primary winding to said output electrode, said primary winding being connected to receive signals from said output electrode and having a value of inductance to minimize the direct current in said tube, a distorting network connected to said input electrode, a source of sawtooth voltage, and a parallel combination of a resistor and a capacitor connected between said source of sawtooth voltage and said distorting network.

2. The circuit in accordance with claim 1, in which the values of said resistor and capacitor are chosen to give said parallel combination a time constant equal to substantially one-fifth of the duration of the stroke of said sawtooth current.

3. A circuit for producing a sawtooth current in a coil, comprising a source of sawtooth voltage, an amplifier stage comprising an electron discharge tube having input and output electrodes and a common electrode, a first combination of parallel-connected resistance and capacitance, a second combination of parallel-connected resistance and capacitance, said combinations being connected in series between said source of sawtooth voltage and said input electrode, a condenser connected between said input electrode and said common electrode, a transformer having a primary winding connected to said output electrode and having a secondary winding connected to said coil, and means connected to supply current through said primary winding to said output electrode, said pri-

mary winding having a value of inductance to minimize the direct current in said tube.

4. The circuit in accordance with claim 3, in which the value of capacitance in said first combination is between five and ten times larger than the value of capacitance in said second combination. 5

5. The circuit in accordance with claim 3, in which the values of resistance and capacitance in said first combination are chosen to give said first combination a time constant equal to substantially one-fifth of the duration 10 of the stroke of said sawtooth current.

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