

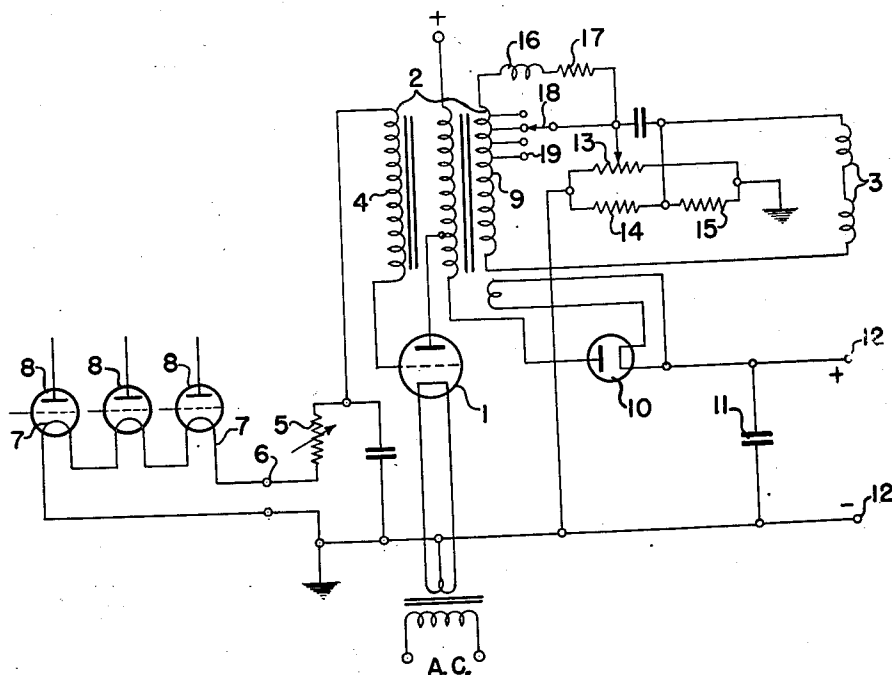
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SCANNING CURRENT GENERATOR

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SCANNING CURRENT GENERATOR

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1 Claim. (Cl. 250—27)

This invention relates to scanning current generators particularly for television apparatus in which a saw-tooth current is produced for deflecting the cathode ray of a cathode ray tube. Generators of this type usually contain a thermionic tube in combination with a transformer having coils connected in the anode and grid circuits of the tube.

It is an object of the present invention to provide a circuit arrangement for a scanning current generator of high efficiency and in which particularly a loss of energy in the grid circuit is avoided. It is a further object to insert into the grid circuit a current consuming element which has at the same time another useful purpose in the complete arrangement. The biasing potential for the grid is produced in such a manner that in spite of large grid currents a loss of energy in the grid circuit resistance is avoided.

According to the invention at least an essential part of the grid resistance is formed by a current consumer, for example, by the filament of one or more amplifier tubes, cathode ray tubes, diodes etc. arranged in other parts of the complete circuit. A small adjustable resistance is arranged in series with the current consumer. This adjustable resistance uses up only a small amount of energy. It is used for controlling the grid bias of the generator tube and thereby the frequency of the generator.

Further particulars and advantages will be described in connection with the drawing showing by way of example an embodiment of the invention.

The figure shows a circuit arrangement of a saw-tooth current generator of the transformer type in which the tube 1 co-operates with the transformer 2 in such a manner that saw-tooth currents are produced flowing through the deflecting coils 3. The transformer has three windings, whereof the winding 4 is connected to the grid of the tube, the central winding of the anode, and winding 9 is inductively coupled with the anode coil and the grid coil. The other end of the grid coil is connected to an adjustable small resistance element 5 and by way of the terminal 6 to a number of heating filaments 7 of tubes 8. These tubes are arranged in another part of the television apparatus for example a receiver circuit. The circuits of these tubes may be of conventional type and are not shown in the drawing. The grid resistance formed by resistance element 5 and the heating elements 7 is arranged in parallel to a condenser and connected to the negative pole of a source of potential.

The operation of this device is similar to that of known scanning generators with the exception that the grid current flowing through the resistance element 5 and the heating elements 7 is not wasted but is consumed for a useful purpose, namely for heating the filaments 7. This has the advantage that the energy consumption of the whole receiver containing this circuit is lowered.

It is preferable to make the coupling between the output coil 9 and grid coil 4 as close as possible, for example, by winding the wires of both coils in parallel so that the grid-cathode space of tube 1 in combination with the biasing arrangement lies practically parallel to the deflecting coils 3. This produces a more linear rise of the saw-tooth current flowing through the deflecting coils 3.

The drawing shows furthermore that the anode potential for the cathode ray tube is produced from the high voltage peaks occurring during the back-stroke of the saw-tooth current. A diode 10 and a smoothing condenser 11 is arranged for this purpose; the high potential is taken off at the terminals 12. This feature is disclosed and claimed in copending application Serial No. 254,593, filed February 4, 1939.

In order to enable a shifting of the scanning pattern on the screen of the cathode ray tube a bridge circuit is arranged consisting of a potentiometer 13 and the resistances 14 and 15. By moving the contact of potentiometer 13 it is possible to control the direction and amount of the D. C. component flowing through the deflecting coils. The output winding 9 has furthermore a number of contact points 19. The movable contact 18 can be connected with one of these contacts so that a smaller or larger part of the coil 9 is shunted across the series combination of coil 16 and resistance 17. This arrangement allows a control of the amplitude of the saw-tooth current without changing the anode potential. This manner of controlling the position and size of the scanning pattern is of particular importance in connection with the form of grid circuit described above. It is preferable to arrange the current consuming elements on the cathode side of the grid coil 4. This arrangement would not allow a shifting of the scanning pattern if the grid coil and output coil would be connected galvanically because in this case the potential at the ends of the grid coil would be kept at a certain value and a shifting of the whole scanning pattern would not be possible. It is therefore essential that the deflecting arrange-

ment containing a current consumer connected to the cathode side of the grid coil has separate grid and output windings and an adjusting bridge in the output circuit.

The invention is not limited to this particular type of a scanning generator, but it can be used in all arrangements containing a grid circuit carrying a large grid current so that energy is lost in the grid resistance.

In case the television apparatus contains a cathode ray tube provided with a concentrating coil it is advantageous to insert this concentrating coil into the grid circuit of the scanning generator so that the grid current is flowing through this coil. This arrangement is particularly useful in television receivers but it can also be used in connection with television transmit-

ters and other devices including a saw-tooth current generator.

What I claim is:

In a television receiver a saw-tooth current-wave generator including an electron discharge tube having an anode, a control grid and a cathode, a grid circuit and an anode circuit mutually coupled, and a frequency-determining element connected in said grid circuit, a second electron discharge tube having a filament, said frequency-determining element comprising a resistance element connected in series relation with said filament, and a condenser connected in parallel relation with said resistance element and said filament for providing said control grid with the proper operating bias.

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