Jan. 10, 1939. R. J. KEMP 2,143,379

SWEEP CIRCUIT

Filed June 11, 1935

Fig. 1

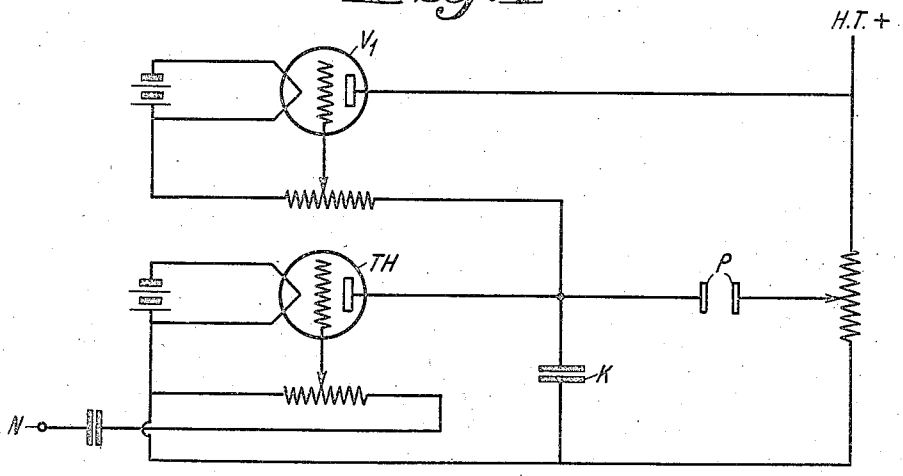
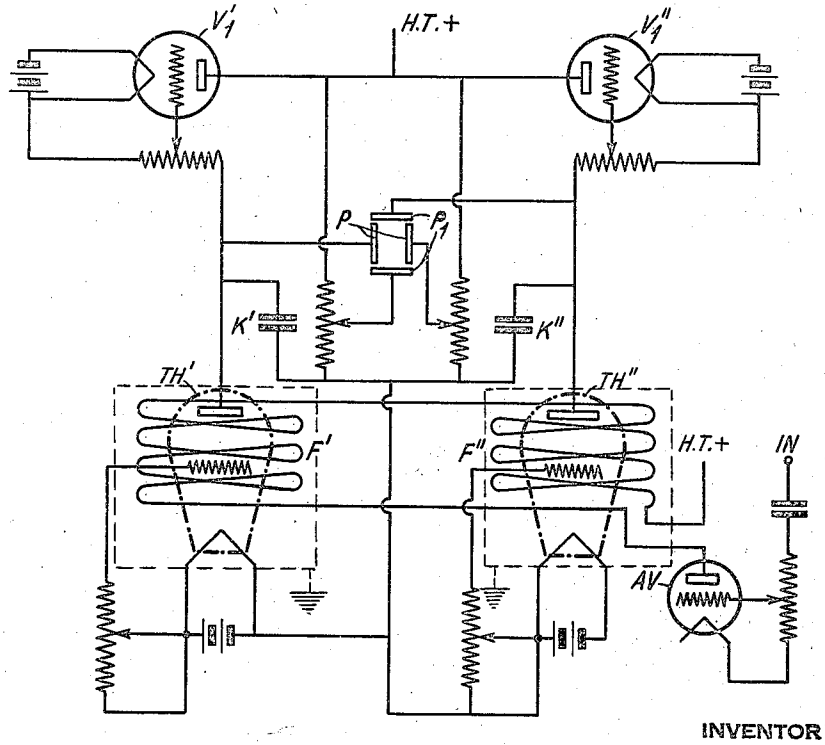


Fig. 2



INVENTOR
ROLAND J. KEMP
BY
ATTORNEY

Patented Jan. 10, 1939

2,143,379

UNITED STATES PATENT OFFICE

2,143,379

SWEEP CIRCUIT

Roland John Kemp, Chelmsford, England, assignor to Radio Corporation of America, a corporation of Delaware

Application June 11, 1935, Serial No. 25,981
In Great Britain June 14, 1934

12 Claims. (Cl. 178—7.7)

This invention relates to electrical time base circuit arrangements and more specifically to time base circuit arrangements of the synchronized type and suitable for use in connection with cathode ray tube television and like apparatus for securing properly timed operation as regards the "scanning line" and "framing" frequencies.

It is well known to employ electric discharge devices of the grid glow type, commonly known under the registered trade-mark "Thyratrons" in connection with electrical time base circuit arrangements for cathode ray tube television and like apparatus and one of the difficulties met with in such arrangements is that of obtaining exact synchronism. The normal requirements of a television apparatus in this connection involve the use of two time bases, one for the scanning line frequency and the other for the framing frequency and the usual practice adopted at the present time in time base circuits where grid glow tubes are employed is to seek to obtain the required synchronism by coupling the grid point of one grid glow tube to the anode point of another through a condenser. Although this coupling method in effect "interlocks" the time bases, it is not sufficiently positive to prevent one or other "drifting" in frequency over a period of time and so destroying the accuracy of the scanning action required to be obtained and which is obtained if the two circuits are properly synchronized.

The object of the present invention is to improve known time base circuit arrangements of the grid glow tube type in the direction of obtaining synchronism in a more positive and stable manner and providing an arrangement which is little likely to be disturbed by mutual effects as between the time base circuits.

According to this invention correct synchronous action of an electrical time base circuit arrangement of the grid glow tube type is obtained by utilizing magnetic fields energized in dependence upon synchronizing control signals and arranged to control the ionization in the grid glow tubes. In this connection it may be remarked that a magnetic field may be employed to quench in a very definite and sudden manner the glow discharge in an ionized discharge tube such as a grid glow tube.

The invention will be better understood upon reference to the drawing accompanying the specification in which Figure 1 shows a known time base arrangement of the grid glow tube type and Figure 2 a modified arrangement in accordance with this invention.

In Figure 1, V_1 is a valve which may be an actual diode but which in any case operates as a diode and which is arranged to impart a rectilinear rate of charge to a condenser K which is arranged to be suddenly discharged at known intervals by means of a "Thyratron" TH to whose control grid circuit are applied synchronizing signals fed thereto from the terminal IN. In Figure 1 P represents one of the usual mutually perpendicular pairs of deflecting plates of a television cathode ray tube apparatus and HT+ is the operating source of D. C. potential. Of course, a similar arrangement to that shown in Figure 1 is provided in association with the other pair of deflecting plates the arrangement shown in Figure 1 being for securing, for example, the "scanning line" deflection, a similar arrangement (operating, however, at a much slower periodicity) being employed for giving the "framing" action.

In the arrangement according to this invention and shown in Figure 2 the circuits necessary for both "scanning line" and "frame" deflections are shown.

In Figure 2, V_1' and V_1'' are two valves acting as diodes and corresponding to the valve V_1 of Figure 1, one valve V_1' being utilized in connection with securing the "scanning line" action and the other being utilized in connection with obtaining the "framing" action. The usual mutually perpendicular pairs of deflecting plates of the cathode ray tubes are shown at P and P_1 respectively and the grid glow tubes are shown at TH' and TH'' respectively.

The condensers which are discharged by the grid glow tubes at the proper times are shown at K' and K''. The envelope of each grid glow tube is surrounded by a field coil F' or F'' the field coils being enclosed in metal screening boxes with their respective associated grid glow tubes and being situated adjacent the anodes of their respective grid glow tubes said field coils being connected in series in the plate circuit of an amplifier valve AV to whose grid circuit synchronizing signals are applied from IN. Arrangements as shown in Figure 2, like arrangements as shown in Figure 1, will generate waves of saw-tooth form and the feature of the invention, namely the provision of the field coils for controlling the ionization of the grid glow tubes enables very positive and stable interlocking and synchronizing to be obtained.

Having thus described the invention, what is

claimed and desired to secure by Letters Patent is the following:

1. In a cathode ray apparatus wherein there is included means for providing horizontal and vertical movement of the cathode ray beam in timed sequence to transmission apparatus, a pair of independent electric storage means, means for charging said electric storage means, means for discharging current from said storage means upon the attainment of a predetermined charge, said latter means comprising ionizable gaseous discharge means, and magnetic means for controlling the ionization of said discharge means.

2. In a cathode ray apparatus wherein there is included means for providing horizontal and vertical movement of the cathode ray beam in timed sequence to transmission apparatus, a pair of independent electric storage means, means for charging said electric storage means, means for discharging current from said storage means upon the attainment of a predetermined charge, said latter means comprising ionizable gaseous discharge means, and magnetic means operable upon the receipt of electric impulses from the aforementioned transmission apparatus for controlling the ionization of said discharge means.

3. In a cathode ray apparatus wherein there is included means for providing horizontal and vertical movement of the cathode ray beams in timed sequence to transmission apparatus, independent electric storage means for each movement, means for charging each of said electric storage means, said charging means comprising a diode and a resistance element connected in the anode circuit thereof, means for discharging current from said storage means upon the attainment of a predetermined charge, said latter means comprising ionizable gaseous discharge means, and magnetic means for controlling the ionization of said discharge apparatus.

4. In a cathode ray apparatus wherein there is included means for providing horizontal and vertical movement of the cathode ray beam in timed sequence to transmission apparatus, independent electric storage means for each movement, means for charging each of said electric storage means, said charging means comprising a diode and a resistance element connected in the anode circuit thereof, means for discharging current from said storage means upon the attainment of a predetermined charge, said latter means comprising ionizable gaseous discharge means, and magnetic means operable upon the receipt of electric impulses from the aforementioned transmission apparatus for controlling the ionization of said discharge means.

5. Cathode ray control apparatus wherein there is included means for providing horizontal and vertical movement of the cathode ray beam in timed sequence to transmission apparatus, comprising a pair of independent electric storage means, means for charging said electric storage means, means for discharging current from said storage means upon the attainment of a predetermined charge, said latter means comprising grid glow vacuum tubes, and magnetic means for controlling the ionization of said discharge apparatus.

6. In a cathode ray apparatus wherein there is included means for providing horizontal and vertical movement of the cathode ray beam in timed sequence to transmission apparatus, a pair of independent electric storage means, means for independently charging said electric storage means, means for independently discharging current from said separate storage means upon the attainment of a predetermined charge in each storage means, said latter means comprising grid glow vacuum tubes, and magnetic means operable upon the receipt of electric impulses from the aforementioned transmission apparatus for controlling the ionization of said discharge apparatus.

7. In a cathode ray apparatus wherein there is included means for providing horizontal and vertical movement of the cathode ray beam in timed sequence to transmission apparatus, independent electric storage means for each movement, means for charging each of said electric storage means comprising the series combination of a diode and a resistance connected in the anode circuit thereof, and a magnetically controlled grid glow discharge tube for discharging current from said storage means upon the attainment of a predetermined charge upon the independent storage means.

8. A sweep circuit for providing horizontal and vertical movement of the cathode ray beam in timed sequence to transmission apparatus in accordance with the supplied control impulses comprising independent electric storage means for controlling the movement of a developed cathode ray pencil in each of two mutually perpendicular planes, means for charging each of said electric storage means comprising a diode and a resistance connected in the anode circuit thereof, means for discharging current from said storage means upon the attainment of a predetermined charge, said discharged means comprising an independent grid glow vacuum tube connected with each storage means, and magnetic means operable upon the receipt of electric impulses from the aforementioned transmission apparatus for controlling the ionization of said discharge apparatus.

9. In a cathode ray apparatus wherein there is included means for providing horizontal and vertical movement of the cathode ray beam in timed sequence to transmission apparatus, a pair of independent electric storage means, means for charging said electric storage means, means for discharging current from said storage means independently upon the attainment of a predetermined charge, said latter means comprising grid glow vacuum tubes, and magnetic means for controlling the ionization of said discharge apparatus, said latter means comprising magnetic coils wound about each gaseous discharge medium, an amplifier having its input circuit connected with a source of control signals and its output circuit connected with said coils to vary the ionization within said discharge means.

10. In a cathode ray apparatus wherein there is included means for providing horizontal and vertical movement of the cathode ray beam in timed sequence to transmission apparatus, independent electric storage means for each movement, means for charging each of said electric storage means comprising a diode with a resistance connected in the anode circuit, grid glow tube means for discharging current from said storage means upon the attainment of a predetermined charge, said latter means comprising ionizable gaseous discharge means, and magnetic means for controlling the ionization of said discharge apparatus, said latter means comprising magnetic coils wound about each gaseous discharge medium, an amplifier having its input circuit connected with a source of control signals

and its output circuit connected with said coils to vary the ionization within said discharge means, said magnetic coils being connected in the output circuit of a vacuum tube, the input circuit of said tube being arranged to respond to impulses from the aforementioned transmission apparatus.

11. In a cathode ray apparatus wherein there is included means for providing horizontal and vertical movement of the cathode ray beam in timed sequence to transmission apparatus, a pair of independent electric storage means, means for charging said electric storage means, means for discharging current from said storage means upon the attainment of a predetermined charge, said latter means comprising grid glow vacuum tubes, magnetic means for controlling the ionization of said discharge apparatus, said latter means comprising magnetic coils wound about each gaseous discharge medium, an amplifier having its input circuit connected with a source of control signals and its output circuit connected with said coils to vary the ionization within said discharge means, said magnetic coils being connected in the output circuit of a vacuum tube, the input circuit of said tube being arranged to respond to impulses from the aforementioned transmission apparatus, and a shielding member substantially enclosing the tube and its associated magnetic ionization control coil for preventing interaction between grid glow tubes.

12. In a cathode ray apparatus, means for providing horizontal and vertical movement of the cathode ray beam in timed sequence to transmission apparatus, independent electric storage means for each movement, means for charging each of said electric storage means comprising a diode and a resistance connected in the anode circuit, means for discharging current from said storage means upon the attainment of a predetermined charge, said latter means comprising ionizable gaseous discharge means, magnetic means for controlling the ionization of said discharge apparatus, said latter means comprising magnetic coils being connected in the output circuit of a vacuum tube, the input circuit of said tube being arranged to respond to impulses from the aforementioned transmission apparatus, and means for preventing interaction between grid glow tubes comprising a shielding member substantially enclosing the tube and its associated magnetic ionization control coil.

ROLAND JOHN KEMP.