Jan. 24, 1933. G. ZECHER ET AL 1,895,361

ELECTRIC DISCHARGE TUBE ENERGIZING CIRCUIT

Filed July 30, 1928

Fig. 1.

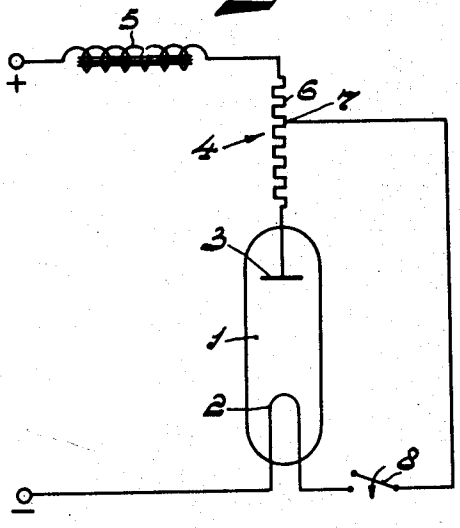
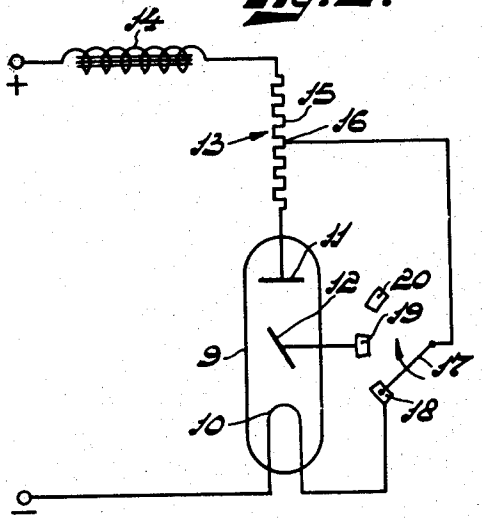


Fig. 2.



Inventors:
Gustave Zecher
and C.H.G. Mellema,

by Lawrence, Perry, Ward & Lawrence

Att'ys.

Patented Jan. 24, 1933 1,895,361

UNITED STATES PATENT OFFICE

GUSTAV ZECHER AND CORNELIS HENRI GERARD MELLEMA, OF EINDHOVEN, NETHERLANDS, ASSIGNORS, BY MESNE ASSIGNMENTS, TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK

ELECTRIC DISCHARGE TUBE ENERGIZING CIRCUIT

Application filed July 30, 1928, Serial No. 296,202, and in the Netherlands and Germany September 2, 1927.

This invention relates to a circuit-arrangement for operating an electric discharge tube with direct current, more particularly to a gas-filled tube in which the incandescent cathode is fed by the same source of tension as the tube itself.

The invention has for its object to facilitate the ignition of an electric discharge tube. This purpose is attained by providing in the circuit of the discharge tube a choking coil which when the filament circuit is broken, causes a self-induction impulse.

When the filament circuit of an electric discharge tube which is fed by the same source of tension as its incandescent cathode, is broken, after a tension has been applied to the anode, the choking coil connected in series produces a tension impulse owing to which the discharge tube is ignited. In some cases, for example when use is made of a long discharge tube, it may be advantageous to provide the tube with one or more auxiliary anodes.

To operate such an electric discharge tube, a tension is applied to the electrode, whereupon the filament heating current is interrupted.

The invention will be more clearly understood by referring to the accompanying drawing in which

Figure 1 represents a direct current circuit arrangement of an electric discharge tube while

Figure 2 represents a direct current circuit arrangement of an electric discharge tube comprising an auxiliary anode.

Referring to Figure 1, an electric discharge tube 1 comprises an incandescent cathode 2 and an anode 3, a resistance 4 being connected in series with the latter. In the circuit of the tube is mounted a choking coil 5 which, if desired, may have an iron core. A portion 6 of the resistance 4 is included in the filament circuit since at 7 there is a branch which leads to a switch 8. When the filament circuit is broken, the choking coil 5 produces a tension impulse on the anode.

Figure 2 represents an electric discharge tube comprising an incandescent cathode 10, an anode 11 and an auxiliary anode 12, a resistance 13 and a choking coil 14 being connected in series with the anode. A portion 15 of the resistance 13 forms also part of the filament circuit. This is obtained by providing at 16 a branch leading to a switch 17. When the switch is moved from the contact piece 18 via 19 to the contact piece 20, the choking coil produces a tension impulse on the anode. The changing over from the contact piece 18 to the contact piece 19 has to be effected very rapidly since the ignition of the tube is produced due to the thermal inertia of the incandescent cathode. After the discharge has been established, the cathode is heated by the discharge sufficiently to emit the quantity of electrons required for the discharge.

In order to operate an electric discharge tube according to the invention, a tension is applied to the main electrodes and the filament circuit is closed, whereupon the incandescent cathode circuit is opened again. When use is made of a discharge tube comprising one or more auxiliary anodes, the auxiliary anode circuit is closed immediately after the filament circuit has been broken, said auxiliary anode circuit being subsequently also broken.

In the Figures 1 and 2, the resistance for the incandescent cathode and those located in the anode- and auxiliary-anode-circuits are partly coincident. It is evident that these resistances may also be provided separately.

In the constructions as above described the self-induction is connected in series before the main anode, but it is evident that instead thereof the self-induction may also be mounted before the incandescent cathode.

What we claim is:

1. A circuit arrangement for operating from a source of direct current a gaseous electric discharge tube provided with an anode and an incandescent cathode, comprising a choke coil serially connected in the anode circuit of said tube, and a heating circuit for said cathode including circuit interrupting means, said heating circuit being in parallel with a portion of said anode circuit including the discharge path of said tube and excluding said choke coil.

2. A circuit arrangement for operating from a source of direct current a gaseous electric discharge tube provided with a main anode, an incandescent cathode, and an auxiliary anode interposed therebetween comprising a choke coil serially connected in the circuit of the main anode, a heating circuit for said cathode in parallel with a portion of the main anode cicuit including the discharge path of said tube and excluding said choke coil, and circuit interrupting means in said heating circuit provided with an auxiliary contact for energization of said auxiliary anode.

3. A circuit arrangement for operating from a source of direct current a gaseous electric discharge tube provided with an anode and an incandescent cathode, comprising a circuit including the anode-cathode circuit of said discharge tube connected to be energized from said source, a circuit for heating said cathode from said source, circuit interrupting means in said cathode heating circuit, and a choke coil in series relation with the cathode heating current and so connected with the anode circuit of said discharge tube that the inductive energy stored therein is effective to initiate a discharge in said tube upon the operation of said circuit interrupting means.

In testimony whereof we have signed our names to this specification.

GUSTAV ZECHER.
CORNELIS HENRI GERARD MELLEMA.