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GLOW LAMP CIRCUIT

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Fig. 1

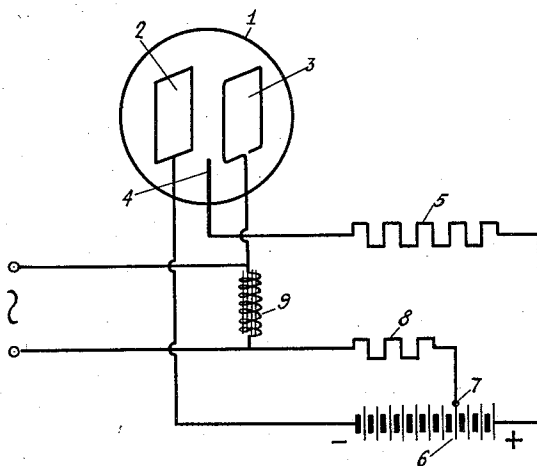
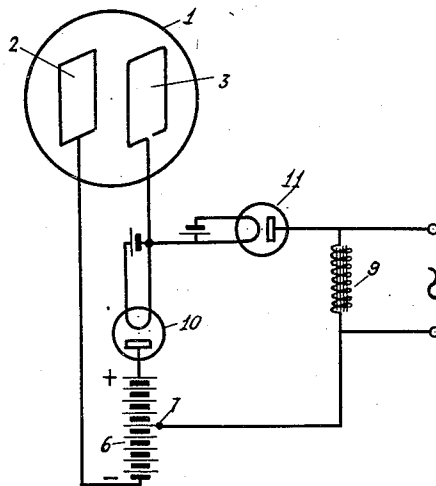


Fig. 2



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GLOW LAMP CIRCUIT

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When a discharge tube with independent discharge, for example a neon tube, is used for converting electric current variations into light-variations, one is sometimes, namely when the gaseous filling is not or no longer pure, troubled by a certain inertia in the ignition of the tube, i. e. the tube is only ignited a short moment after the tension has reached its value of ignition. It is evident that with rapidly succeeding current variations such as occur, for example, in the so-called television, this phenomenon of inertia is very troublesome.

According to the invention, this undesirable phenomenon can be avoided by entertaining in the tube a continuous auxiliary discharge of low intensity. In this case use may be made, if desired, of one or more auxiliary electrodes arranged in the tube.

The discharge tube with independent discharge which is to be used in that case, may comprise in addition to a cathode and an anode at least one auxiliary anode which is preferably arranged outside the main discharge path and which need only have small dimensions.

According to the invention, the circuit-arrangement for operating a tube of this construction is such that the auxiliary anode is connected through a high resistance in series with a source of current to the cathode of the tube.

The invention will be more clearly understood by referring to the accompanying drawing which represents by way of example two diagrams of execution. In the drawing:

Figure 1 gives an example of the use of an auxiliary anode; and,

Figure 2 shows an example in which the auxiliary discharge is produced between the same electrodes as the main discharge.

Within a bulb 1 which is provided with a suitable gaseous filling are arranged a plate-shaped cathode 2, an anode 3 in the shape of a wire-frame and an also wire-shaped auxiliary anode 4. (Figure 1.) The latter anode is connected through a high resistance 5 (from 5 to 50 megohms) to the plus pole of a battery 6 which has a voltage of for example 400-500

volts, the minus-pole of the said battery being connected to the cathode 2.

A tapping-point 7 of the battery 6 is connected through a resistance 8 whose value, for example 1000 ohms, is considerably smaller than that of the resistance 5 and through a choke coil 9 to the main anode 3.

The current variations which are to be converted into light pass through the said choke coil and produce across its ends voltage fluctuations which cause the main discharge of the tube to vary accordingly.

In fact, the alternate voltages induced in the coil 9 are superposed on the direct voltage of the part of the battery 6 which is located between the minus-terminal and the point 7. The resulting voltage consequently is variable and is liable to fall now and then below the extinguishing voltage at which the main discharge is interrupted. However, when the voltage of the battery 6 is so chosen as to be sufficiently high the auxiliary discharge between the auxiliary anode 4 and the cathode 2 will be entertained. Due to the high value of the resistance 5 the intensity of the auxiliary discharge current will be however so small that the glow remaining on the cathode is too feeble to be troublesome. On the other hand, in two respects the presence of this continuous feeble auxiliary discharge has a favorable influence. First, the tube will be ignited without "inertia" as soon as the voltage between 2 and 3 has reached the ignition-value and secondly the difference between the ignition voltage and the extinguishing voltage will be less.

With the circuit-arrangement shown in Figure 2 the main discharge passes through the following circuit: cathode 2, anode 3, valve-tube 11, choke coil 9, part of battery 6 back to the cathode 2. The function of the valve 11 will appear below. The ohmic resistance of the valve 11 added to the ohmic resistance of the coil 9 is usually sufficient to stabilize the main discharge. If not, an extra-resistance has to be inserted.

The auxiliary discharge takes the following path: cathode 2, anode 3, current limiter 10, battery 6 and back to the cathode 2. The limiter 10 may also be replaced with an ohmic resistance.

The valve-tube 11 prevents the upper part of the battery 6 from continually discharging itself over the limiter 10 and the branch which comprises the choke coil 9.

5 The accompanying drawing and specification shows by way of example one of the several forms which the invention may assume, but I believe myself to be entitled to make and use any and all modifications such as would
10 readily suggest themselves to those skilled in the art, and such as would fall fairly within the spirit and scope of the invention as set forth in the claims.

15 Having now described my invention, what I claim and desire to secure by Letters Patent is the following:

1. In a circuit arrangement for operating a glow discharge tube, an envelope enclosing a plurality of electrode elements between
20 which a main and an auxiliary glow discharge takes place, means for connecting the cathode of the glow discharge lamp through a plurality of parallel paths with the second electrode of the lamp to produce glow discharge,
25 one of said parallel paths comprising a source of direct current and a thermionic current limiting device and the other of said parallel paths comprising a portion of the source of direct current for actuating the lamp, a source
30 of controlling oscillations and a series connected resistance element.

2. A system for operating glow discharge tubes which comprises a gas-filled envelope containing a plurality of electrodes, means
35 for initiating an auxiliary discharge between two electrodes, said means comprising a source of current and a thermionic current limiting device series connected between the electrode elements, and means for producing
40 within said elements also a main glow discharge, said means comprising a source of current, a source of oscillations and a series connected vacuum tube resistance element, said second glow discharge initiating means
45 being connected in parallel with said first glow discharge initiating means.

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