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C. F. LORENZ
INTERMITTENT GLOW LAMP
Filed March 17, 1923

FIG. 1.

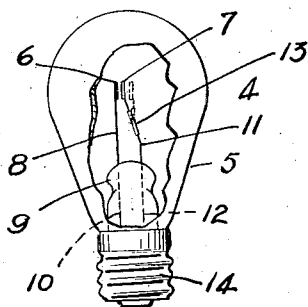
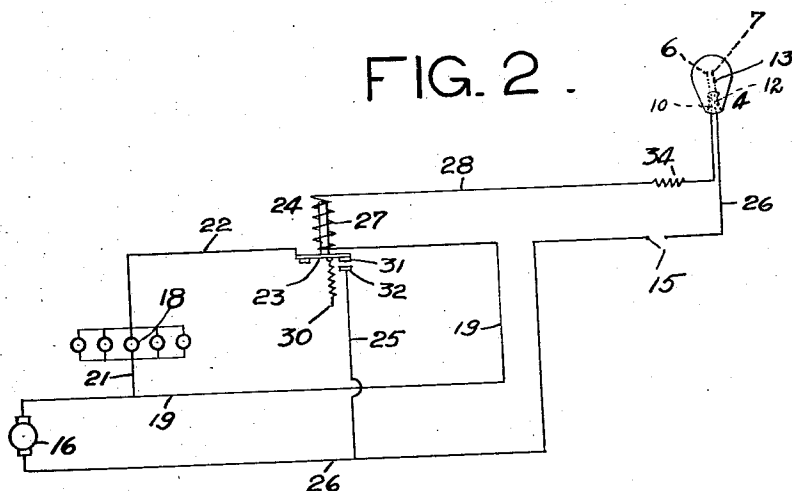


FIG. 2.



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INTERMITTENT GLOW LAMP.

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This invention relates to electrical devices and more particularly to lamps, such as glow or discharge lamps, in which a gas or a mixture of gases constitutes the light-producing medium.

One of the objects of the invention is to provide a simple and practical intermittent glow lamp.

Another object is to provide a glow lamp which may automatically operate to alternately effect a contact and a separation of the cathode and the anode.

A further object is to provide a device to make and break an electrical circuit without the employment of metallic contacts.

Other objects of the invention will be apparent upon a reading of the description.

A glow lamp, as known in the art, usually comprises a sealed envelope containing helium, neon, argon or other gas at suitable pressure. Within the envelope, and properly spaced from each other, an anode and a cathode are so disposed that a comparatively low voltage will produce a discharge causing the cathode to become enveloped in a glow.

Owing to the low wattage attainable in lamps of this character, they are suited for use in connection with advertising devices or other novel forms of colored luminosity. For the purpose of adding to the attractiveness of lamps, particularly when used for advertising purposes, it is proposed to provide for their intermittent operation, that is, to provide a lamp having means incorporated therewith whereby the lamp may be alternately lighted and extinguished.

This intermittent action also serves to cut down the wattage, which result is of economical advantage when the lamp is used, for instance, as a night lamp for domestic service.

My invention, therefore, aims to provide an internal structure for a glow lamp which will operate to make-and-break the circuit, thereby causing an intermittent glow.

Gas lamps of the type to which my invention relates, are operable when the electrodes thereof are disposed in given space relation, the space over which a discharge will travel being generally determined by the nature and pressure of the gas within the lamp. If a lamp is designed to operate on say a 220 volt line with the electrodes at a definite space relation for example 2 mm. apart in

an atmosphere of argon or neon at 10 mm. pressure, it has been found that an increase or a decrease in such space beyond a certain limit as for example 10 mm. will result in a termination of the discharge and, consequently, the glow or light source will be absent.

The present invention takes advantage of this characteristic and provides a movable electrode, preferably the anode adapted to be actuated by the heat created during the discharge to effect a movement of the anode and intermittently change the space relation between the electrodes, thereby causing an intermittent glow. An automatic arrangement for operating the electrode may consist in the incorporation of a section of thermostatic metal in the conductor upon which the anode is mounted.

The normal position of the anode may be such that, when the connection is made to the electric supply line, a discharge between the electrodes will occur. The heat created by and during the discharge then will act upon the thermostatic section which will flex, and the anode will thus be moved from the cathode a sufficient distance to break the circuit and terminate the glow.

Although the heat has caused the thermostatic strip to bend and increase the distance between the cathode and the anode, the current is not stopped immediately but continues to flow until the gap has attained a certain length, the length at which the current ceases being greater than the maximum gap which will allow starting. The anodically connected terminal therefore becomes positioned so far away from the cathode that considerable cooling must occur before the anode is close enough for a discharge to take place. This slightly excessive distance attained between the electrodes provides for on and off time intervals, since short time intervals are required for heating and for cooling.

Although the present invention may be utilized to provide an intermittent glow lamp which may be employed for general illumination or for advertising purposes, other uses may be found for such lamp. For instance, the intermittent glow lamp may be employed as a means for interrupting the current or for operating a relay in connection with relatively large currents. If used for this purpose, it is desirable to

provide the lamp with an atmosphere of either argon, helium or neon, neon being preferable when the lamp is used for display purposes alone.

5 The invention will be more fully understood by reference to the accompanying drawings in which,

Fig. 1 is an elevational view of a lamp embodying the present invention; and

10 Fig. 2 is a diagrammatic illustration of a lamp employed to operate a relay to light intermittently a plurality of lamps.

The lamp 4 shown in the drawing may comprise an envelope 5 having the usual cathode 6 and anode 7 properly disposed therein. The cathode may be of any desirable configuration and may be supported upon a suitable member 8 secured in a press 9 of the lamp and connected to a leading-in conductor 10. The anode may be supported on a conductor 11 which may be connected to a leading-in conductor 12.

For the purpose of automatically moving the anode 7, a strip 13 of thermostatic metal may be disposed between the support member 11 and the anode proper. Thus, the thermostatic metal may constitute a portion of the support member, but, by reason of its flexure during variations in temperature, operates to move the anode to and from the cathode. The lamp may be provided with the usual screw plug 14 for attachment to the standard socket in the customary manner.

The normal space relation of the electrode may be such that a discharge will occur when a switch or key 15 (see Fig. 2) is actuated and a current is permitted to flow from any suitable source, as, for instance, a generator 16 and thus a glow will be produced. The thermostatic element will bend by reason of the effect of the heat upon the two metals, of which the element is composed, which have different coefficients of expansion.

The thermostatic element, being positioned with the side having the greater coefficient of expansion toward the cathode, will bend the anode away from the cathode until a sufficient distance has been attained to terminate the discharge, whereupon a reverse action will take place as the element cools.

A make-and-break is thus provided in the circuit without the necessity of any engagement between the electrodes, thus, the disadvantage of slight arcing and, the deterioration because of pitting and sticking by welding which attends other make-and-break devices, is avoided. As shown in Fig. 2, this intermittent circuit breaker may be applied to increase or decrease the luminosity of a plurality of lamps, as, for instance, the lamps of an advertising sign. As illustrated, several lamps 18 may be connected, by what may be termed a subsidiary circuit, to the electrical source 16. Such circuit may

comprise conductors 19 and 21 and conductor 22 which is connected to an armature 23 of a relay 24, the armature 23 being adapted to make contact with a return conductor 25 connected to conductor 26.

The lamp 4 may be disposed in what may be termed a main circuit, and one electrode, as, for instance, the electrode 7 of the lamp 4, may be connected to the source of electrical energy 16 by the conductor 26. The other electrode 6 of the lamp may be connected to one end of the coil 27 of the relay 24 by a conductor 28, the other end of the coil being connected to the source of electrical energy by the conductor 19. Thus when the current flows through the coil 27 and thence through the lamp, creating a discharge and glow, the coil 27 is energized, and the armature 23 is moved to separate contact surface 31 thereof from a contact surface 32 connected to the conductor 25. The circuit for the supply of energy to the lamps 18 is thus broken.

When the discharge has sufficiently heated the thermostat 13, and the anode 7 is moved to break the circuit of the discharge lamp, the armature 23 is released and a spring 30 actuates to make contact between the members 31 and 32, and thus complete the circuit for the lamps. The thermostatic metal will then, by reason of the drop in temperature, move to position for a repetition of the discharge, whereupon the coil will be energized and the subsidiary or lamp circuit be broken.

The operation of intermittently lighting a plurality of lamps is thereby automatic and of an efficient and practical nature. Although the lamp 4 is shown as operating to actuate a relay, it is obvious that on low-current circuits it may operate directly to control certain electrical devices. The lamp, as shown, may be operated on a lighting circuit, in conjunction with a suitable resistance 34 which is provided as indicated.

Although the foregoing description and accompanying drawings set forth and illustrate a preferred embodiment of the invention, it is obvious that other modifications may be made therein without departing from the spirit and scope of the appended claims.

What is claimed is:

1. A discharge lamp comprising an envelope, a pair of electrodes supported in said envelope in a normal predetermined space relation, a gas in said envelope at such pressure that a relatively low voltage will cause a discharge between said electrodes when disposed in said normal spaced relation, and means for automatically increasing the space between said electrodes a distance sufficient to terminate said discharge.

2. A discharge lamp comprising an envelope having two electrodes, support mem-

bers for normally maintaining said electrodes in a predetermined space relation, a gas in said envelope at such pressure that a relatively low voltage will cause a discharge between the electrodes, and means associated with one of said support members for automatically moving the electrode mounted thereon to increase the space between said electrodes sufficiently to terminate the discharge therebetween.

3. A glow lamp having a cathode, means for supporting said cathode in a given position, an anode normally positioned in such proximity to said cathode as to permit a discharge therebetween, and means associated with said anode affected by the heat during the operation of said lamp to move the anode a sufficient distance from the cathode to terminate said operation.

4. A discharge lamp comprising an envelope, a pair of electrodes supported in said envelope in a normal predetermined space relation, a gas in said envelope at such pressure that a relatively low voltage will cause a discharge between said electrodes when disposed in said normal spaced relation, and a thermostat for automatically increasing

the space between said electrodes a distance sufficient to terminate said discharge.

5. A discharge lamp comprising an envelope having two electrodes, support members for normally maintaining said electrodes in a predetermined space relation, a gas in said envelope at such pressure that a relatively low voltage will cause a discharge between the electrodes, and a thermostat associated with one of said support members for automatically moving the electrode mounted thereon to increase the space between said electrodes sufficiently to terminate the discharge therebetween.

6. A glow lamp having a cathode, means for supporting said cathode in a given position, an anode normally positioned a predetermined distance from said cathode, and a thermostat associated with said anode in such manner that heat during the operation of said lamp causes the anode to move a sufficient distance from the cathode to terminate said operation.

In testimony whereof, I have hereunto subscribed my name this 16th day of March, 1923.

CHARLES FREDERICK LORENZ.