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MEANS FOR INDICATING THE DERANGEMENT
OF ELECTRICAL ILLUMINATING APPARATUS
Original Filed June 25, 1929

1,868,689

Fig. 1.

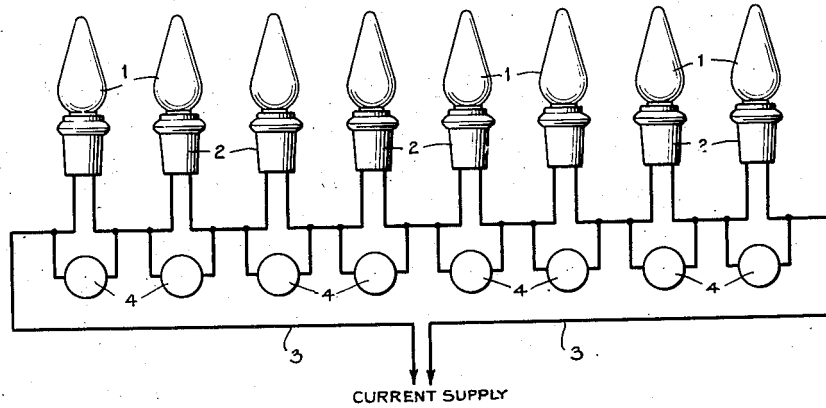


Fig. 2.

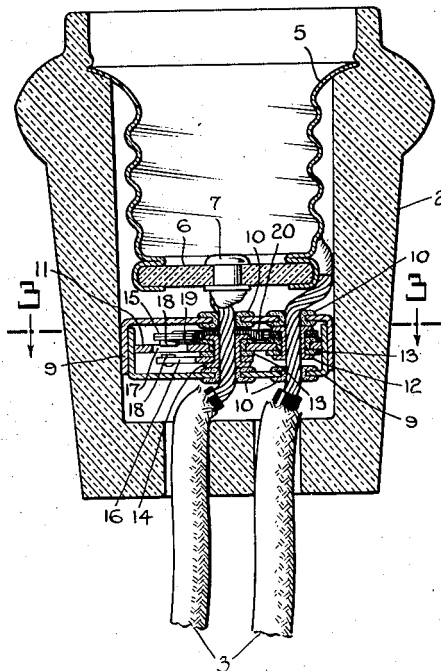
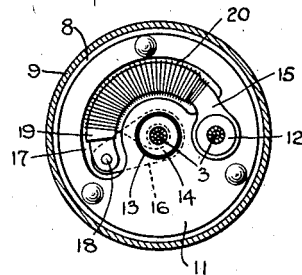


Fig. 3.



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MEANS FOR INDICATING THE DERANGEMENT OF ELECTRICAL ILLUMINATING APPARATUS

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This invention relates to improvements in means for indicating the derangement of electrical illuminating apparatus; and more especially to devices for producing a signal in case of the burning out of an incandescent lamp connected in circuit with other lamps; so that the lamp which has been deranged can be detected at once and replaced with a new one.

The invention is particularly adapted for use with a group of incandescent bulbs such as are employed to light up Christmas trees, i. e., Christmas lighting sets, and for similar purposes on occasions when the effect of brightness and festivity is desired. Such bulbs are usually sold in sets of eight, for example, with a flexible conductor that unites the lamps in series. If the filament of one of the lamps is destroyed, the entire string is extinguished; and the dead lamp must then be ascertained by trial and a spare one substituted by insertion into the same socket before the set can be again put into operation.

An object of this invention is to provide simple and inexpensive means which can be included in the circuit of a set of incandescent lamps of this kind and which is designed not only to cause the remaining lamps to indicate that one is burnt out, but also to identify the precise lamp which is burnt out. The defective lamp can thus be located at once and the string restored to immediate serviceable condition.

A further object of the invention is to provide indicating means which, whenever an incandescent lamp is thus irreparably damaged, will cause the circuit to be opened and closed in succession, so that the other lamps will flash repeatedly. The damaged lamp will give no illumination whatever, and its identity and condition will thus be revealed.

The nature and advantages of the invention will be more fully set forth in the following description, and the novel features pointed out in the appended claims. But the disclosure is of course explanatory only, and I may resort to changes in details of structure that are not necessarily illustrated herein, but are nevertheless within the princi-

ple of the invention and do not exceed its scope.

Further features and objects of the invention will be more fully understood from the following detail description of the accompanying drawing, in which

Fig. 1 is a schematic view of a circuit including several incandescent lamps and indicating means pursuant to my invention;

Fig. 2 is a central sectional view of a socket for receiving a lamp, the socket being positioned with the indicating means pursuant to my invention; and

Fig. 3 is a section on the line 3—3 in Fig. 2.

The same numerals identify the same parts throughout.

The incandescent bulbs 1 are mounted in the sockets 2, to which lead the conductors 3, connected to any suitable source of electrical supply. All the lamps are in series, and with ordinary apparatus of this sort, if one of the lamps burns out, the others are at once extinguished; but in the practice of my invention, the circuit includes a number of devices 4, one for each lamp and in multiple therewith, and capable of functioning so as to afford the desired results. These devices are preferably disposed inside the sockets 2; although, for the sake of clearness they are illustrated in the schematic view of Fig. 1 as if separated from the sockets.

Each socket 2 is made of insulation, and is hollow, with one end open, as appears in Fig. 2. Into the open end is inserted the usual threaded metallic shell 5, so that the threaded neck or base of the lamp can be screwed into engagement with the socket, the shell 5 is held fast within the socket 2 in any suitable way. The conductors 3 are passed through openings in the closed end of the socket, and one is united directly to the shell 5. The inner end of the shell is closed by an insulating disk 6, with a central contact stud 7 for connection with the remaining conductor 3. Between the disk 6 and the closed end of the socket is one of the indicating devices 4, the construction and operation of which will now be explained.

Each of these devices comprises an enclos-

ing casing of two parts consisting of a body with upturned rim 8 and a lid or closure 9 within a rim into which the rim of the body 8 telescopes. The conductors 3 pass through both parts 8 and 9. This casing may be made of metal, and the two parts thereof have apertures bearing insulating bushings 10 for the conductors 3. Within the body 8 is a transverse web or partition 11, in the form of a disk parallel to and spaced from the bottom of the part 8; this disk 11 may be of metal to have the necessary strength and stiffness. It has openings registering with the opening of the parts 8 and 9, to enable the conductors 3 to pass through it; and one of these openings contains an insulating bushing or sleeve 13, encircling a metallic bushing 12 which is in contact with the conductor 3 which passes therethrough. The other conductor 3 is surrounded in the opening through which it passes through the disk 11 by a similar metal bushing 14, which is insulated from the disk 11 by a similar insulating sleeve 13.

The bushing or eyelet 12 passes through an opening in one end of a curved conductive element 15, and the ends of this bushing are expanded, so that the element 15 is held fast against the insulating sleeve 13 surrounding this bushing; and is thus prevented from making electric contact with the disk 11. The element 15 is preferably disposed above the disk 11 and held fast by the bushing or eyelet 14. On the lower side of the disk is an arm 16 to cooperate with the element 15. The positions of these parts 15 and 16 could of course be reversed. The disk 11 is cut out as appears in Fig. 1, to provide an arc-shaped recess beneath the element 15; and the arm or member 16 and element 15 carry contact points 18. Over the greater part of its length the element 15 is enveloped by an insulating sleeve 19, and around this sleeve is wrapped a high resistance wire 20. Normally the contacts 18 are separated but the element 15 is made up of two layers of metal, capable of responding in different degrees to changes of temperature. The top layer will have the greater coefficient of expansion, so that when the temperature rises, the element 15 is warped in the direction to move its contact 18 to engage the contact 18 of the arm 16 through the arc-shaped recess, above referred to. One end of the wire 20 is connected directly to the element 15 adjacent the bushing 12, and the other end to the metallic bushing 14.

So long as the lamps remain operative, current flows through them by way of the conductors 3, shell 5 and stud 7 of each. Although the resistance wire 20 in each socket short-circuits the lamp therein, the resistance of this wire is relatively high and practically no current flows through it, when the lamp in the socket is illuminated. But the instant

a lamp burns out, current in larger quantity flows through the wire 20, from the one conductor 3, metal eyelet 12, element 15, wire 20 and bushing 14 to the other conductor, and the heat generated in the wire 20 causes the element 15 to warp and close the circuit through the contacts 18. Current now flows from one conductor 3 to the other through the element 15, arm 16 and bushing 14 directly, and the other lamps are thus illuminated. As very little current now passes through the wire 20, the element 15 cools, and presently the contacts 18 separate. All the lamps now go out but current again flows through the wire 20, heating the element and bringing the contacts 18 again into engagement. Thus the other lamps flash repeatedly, and the flashing signifies that one of the lamps has been deranged. The dead lamp remains dark and the observer has only to look for the lamp which does not flash with the rest to find the one which should be replaced. Of course the operation will be the same if more than one lamp is burnt out at a time.

With such a device associated with each lamp, and mounted in the socket thereof, the maintenance of the set in operative condition at full capacity is greatly simplified, because a dead lamp can be replaced with a live one in an instant without any trouble whatsoever, while the number of visible parts are not increased and the cost of the set is practically very little higher. If one desires the lamps to operate by flashing, instead of burning with a steady glow, he need only unscrew in part one of the lamps 1 in its socket 2, and the remaining lamps will then flash till the disconnected lamp is screwed back and reconnected to the circuit of the conductors 3.

It will now be apparent that I have devised a very simple and effective appliance which fully serves the purposes of this invention, and which can be readily incorporated into illuminating lamp sets of this general type, for either changing the illumination from the steady glow to the flashing effect, or to locate and remove any one of the lamps which has been put out of action.

The socket 2 is provided with one or more ventilating openings to effect efficient venting of the interior of the socket into the surrounding atmosphere.

My invention is applicable for wholly or partial series circuit relation of any two or more lamps, as in automobile circuits of headlights, and/or tail lights and pilot lights, and other suitable light indicating consumption devices, as in audio tubes, and other filament provided devices, by incorporation of "flicker" means suitably disposed within or without the socket in electrical multiple relation therewith.

Whereas, I have described my invention by reference to specific forms thereof, it will be understood that many changes and modifica-

tions may be made without departing from the spirit of the invention.

I claim:—

1. The combination of a plurality of lamps, a circuit to supply electric current to said lamps in series connection, and means operative in the event that one of said lamps burns out for automatically causing another of said lamps to flash repeatedly till the burnt-out lamp is replaced.

2. The combination of a plurality of lamps, a circuit to connect said lamps in series and supply electric current thereto, and means in parallel with each lamp for automatically intermittently closing the circuit, if one lamp burns out, and causing the other lamps to flash till the circuit is restored to its original condition.

3. The combination of a plurality of lamps, a circuit to supply electric current to said lamps in series connection, and means associated with each lamp and comprising a resistance wire and a thermally responsive element controlled by the wire, operative in the event that a lamp burns out for automatically causing flashing of the remaining lamps.

4. The combination of a plurality of lamps, a circuit to supply electric current to the lamps in series connection with one another, a socket for each lamp, and means substantially concealed in each socket comprising a resistance wire and a thermally responsive element controlled by the wire and operative in the event that a lamp is destroyed for automatically causing flashing of the other lamps.

5. The combination of a plurality of lamps, a circuit connecting said lamps in series to supply current thereto, sockets for the lamps, and means in each socket in multiple with the lamp therein, and comprising a resistance wire and a thermally responsive element controlled by the wire for automatically alternately closing and opening the circuit, in the event that a lamp burns out.

6. The combination with a lamp socket, of a casing therein with openings through which conductors can pass to the terminals of the socket, a thermally responsive element in the casing connected to one conductor, a member attached to the other conductor, a resistance wire bridging the conductors and encircling said element, whereby on the passage of sufficient current through the resistance wire the element will be actuated to engage said member to automatically alternately connect and disconnect said conductors through said element and said member.

7. The combination of a lamp socket, a casing in said socket having a body and a closure therefor, the body and the closure having openings with insulating bushings therein for the passage of electric conductors, a disk in the body of the casing, metallic bushings passing through the disk, insulation for said bushings, a thermally responsive

element on one side of said disk attached to one bushing, an insulating sleeve on said element, a resistance wire encircling said sleeve and connected at one end to said element and at its opposite end to the other bushing, the disk having an opening, and a member connected to the other bushing, the ends of said element and said member being adapted to engage in said opening upon the passage of sufficient current through said wire.

In testimony whereof I have signed this specification this 18th day of June, 1929.

WILLIAM BRANDER.

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