No. 884,514. PATENTED APR. 14, 1908.

A. H. MILLER.

AUTOMATIC ELECTRIC SWITCH.

APPLICATION FILED MAR. 30, 1903.

Fig. 1.

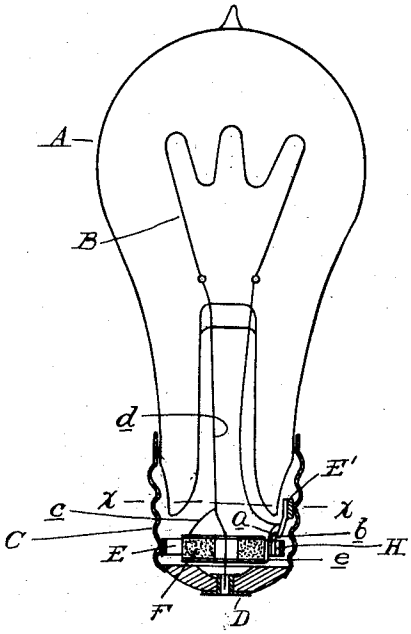


Fig. 2.

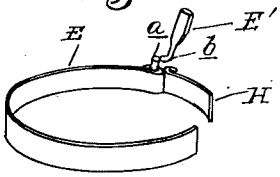


Fig. 3.

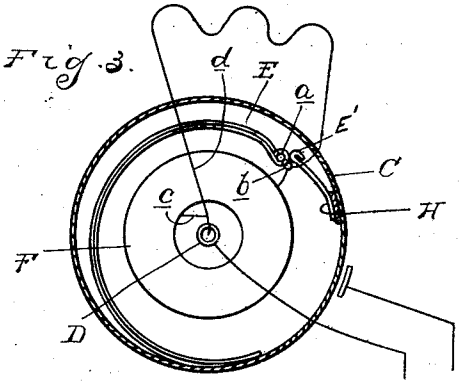


Fig. 4.

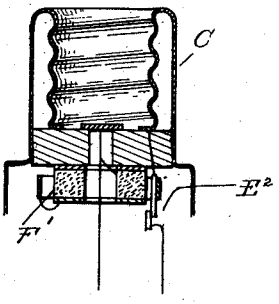
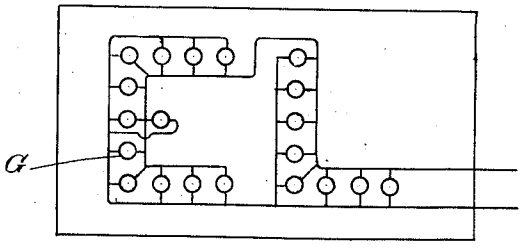


Fig. 5.



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UNITED STATES PATENT OFFICE.

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AUTOMATIC ELECTRIC SWITCH.

No. 884,514. Specification of Letters Patent. Patented April 14, 1908.

Application filed March 30, 1903. Serial No. 150,213.

To all whom it may concern:

Be it known that I, ANDREW H. MILLER, residing at Chesaning, in the county of Saginaw and State of Michigan, a citizen of the United States, have invented certain new and useful Improvements in Automatic Electric Switches, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates to automatic electric switches, and is more particularly designed for use for the periodic opening or closing of electric circuits.

The invention consists in the peculiar construction, arrangement and combination of parts, as hereinafter set forth.

In the drawings, Figure 1 is a section through an incandescent lamp bulb to which my invention is applied. Fig. 2 is a perspective view of a thermo-dynamic switch. Fig. 3 is an enlarged section on line *x x* Fig. 1. Fig. 4 is a section similar to Fig. 1, showing a modification, and, Fig. 5 is a diagram illustrating one application of the invention.

I shall show and describe my invention as used in connection with incandescent electric lamps, but it is obvious that it is equally well adapted for any other use where the periodic opening and closing of an electric circuit is desired.

As shown, A is an electric lamp bulb containing the filament B and provided with the usual terminals C and D, the former constituting a screw threaded cap for engaging the lamp socket. The thermo-dynamic switch which as shown in Fig. 1 is arranged within the cap C and consists of a composite bar of metal E or other material adapted to be flexed by the unequal expansion of its constituent parts.

I preferably employ two dissimilar metals such as brass and tin, strips of which are soldered together to form the composite bar. This bar is preferably of the curved form shown so that it may be conveniently arranged within the lamp socket, and one end is soldered or otherwise secured to the cap C. The opposite end of the bar is preferably provided with a tip *a* of platinum or other non-corrosive metal, and which is adapted to normally contact with a coöperating contact E′. This contact is preferably formed of a strip of metal secured to but insulated from the cap C. Its free end is provided with a tip *b* corresponding to the tip *a* and contacting therewith.

To generate the heat for operating this thermo-dynamic switch, an electric heater F is employed. This is shown to be formed in the shape of a ring composed of some material of high resistance. A suitable substance for this purpose may be formed of powdered carbon mixed with some cementitious non-conducting material, the proportions being such as to obtain the proper resistance in the composite body.

The ring F is preferably of a size so that its outer edge is in proximity to the bar E leaving sufficient clearance for the free movement of said bar. The heater F is connected to the terminal of the lamp preferably in shunt with the filament B, and as it is of high resistance, a small portion only of the current is diverted therethrough. The current in both the heater and in the filament is controlled by the switch and to this end one terminal *c* of the heater and one terminal *d* of the filament are connected to the terminal contact D. The opposite terminals *e* and *f* of the heater and filament respectively are connected to the contact E′, which contact is normally in engagement with the contact on the bar E, the latter being connected to the terminal contact C.

In operation when the lamp is secured in its socket the current will pass through the switch and will then be divided, a portion passing through the filament B and another portion through the heater F. The resistance of the latter will cause the generation of heat which is communicated to the composite bar E and after a definite period of time will cause the warping of said bar so that it will break contact with the coöperating member E′. To prevent sparking a spring catch H is preferably arranged to temporarily arrest the movement of the contact *a* until sufficient tension is placed on the bar E to spring out of engagement with said catch. The contact *a* will then disengage from the contact *b* by a quick movement which will prevent the forming of an arc.

The opening of the contact will break the circuit in both the filament and the heater. This will stop the generation of the heat and after a definite period of time the contraction of the bar will again throw the contacts *a* against the contacts *b*. It is evident from this description that the circuit will be periodically opened and closed and will thus produce a flashing of the lamp.

Instead of placing the heater and switch

within the cap of the lamp bulb they may be placed in the lamp socket as illustrated in Fig. 4, in which F′ is a heater, E² is the switch, the connections being similar to those shown in the other arrangement.

In Fig. 5 is shown a display board having a series of lamps G placed therein, each of which is provided with the thermo-dynamic switch of the character described so that the lamps will be periodically flashed.

What I claim as my invention is:

1. The combination with an electric lamp and a circuit therefor, of means for periodically flashing said lamp comprising an electric heater independent of the lamp filament and operated by said circuit, and a thermo-dynamic switch operated by said heater and controlling said circuit.

2. The combination with an electric lamp and a circuit therefor, of means for periodically flashing said lamp, comprising an electric heater independent of the lamp filament and operated by said circuit, a thermo dynamic switch operated by said heater and controlling said circuit, and means for inclosing and protecting said heater and switch from external influences.

3. The combination with an electric lamp and a circuit therefor, of means for periodically flashing said lamp, comprising an electric heater independent of the lamp filament and operated by said circuit, a thermo dynamic switch operated by said heater and controlling said circuit, and means associated with said lamp for protecting said heater and switch from external influences.

4. An electric lamp having a filament, a switch comprising coöperating contacts, an actuating device for one of said contacts and comprising a composite bar formed of a plurality of members having unequal co-efficient of expansion, an electric heater adjacent to said bar connected to the terminal of the lamp, means for inclosing said actuating device and heater, and electric connections whereby said heater is included in circuit when said contacts are closed and is cut out by the opening of said contacts.

5. The combination with an electric lamp having a filament, and its socket, of a thermo-dynamic switch, a coöperating electric heater arranged to close and open said lamp circuit to periodically cause a flash, and means for mounting the switch and heater within the socket whereby the same are inclosed and protected.

6. The combination with a filament, of an electric lamp and the circuit therefor, of an electric heater independent of the filament, a thermo-dynamic switch operated by said heater, means for inclosing said switch and heater, and a catch on said inclosing member for temporarily arresting movement of said switch, whereby it will finally snap open with a quick movement.

7. The combination with an electric lamp, of an electric heater in shunt therewith, a thermo-dynamic switch, operated by said heater, a protective cap or casing for the heater and switch, and means therewithin for temporarily arresting movement of said switch whereby it will open with a quick movement.

8. The combination with an electric lamp bulb, a filament within the bulb, an electric circuit therefor, a socket for the bulb having a contact included in said circuit, a switch within the socket for opening and closing the circuit through the filament, and a thermo-dynamic actuating device for said switch, including a heater within said socket and independent of said filament.

In testimony whereof I affix my signature in presence of two witnesses.

ANDREW H. MILLER.

Witnesses:

L. W. EVARTS,

ERASTUS WIERMAN.