May 26, 1931. J. W. OWENS 1,807,430

CUT-OUT FOR SERIES INCANDESCENT STREET LIGHTING CIRCUITS AND THE LIKE

Filed March 26, 1930

Fig. 1.

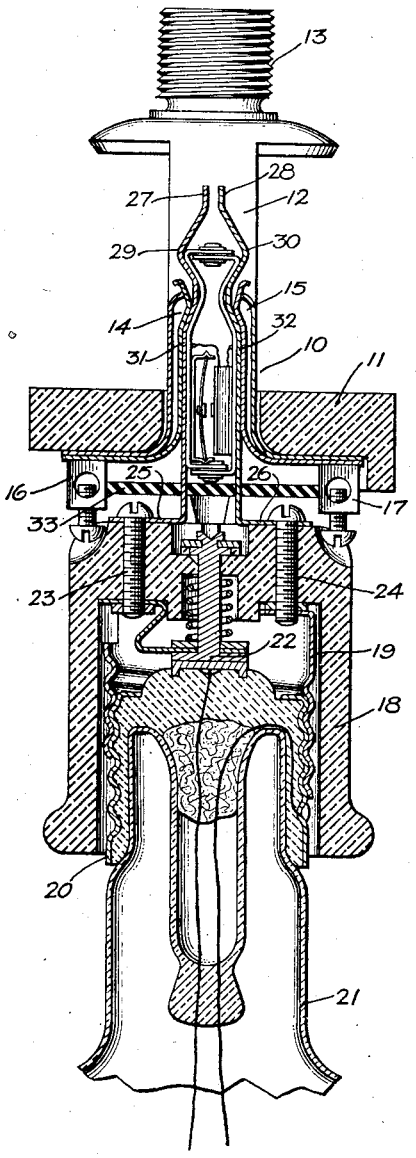


Fig. 2.

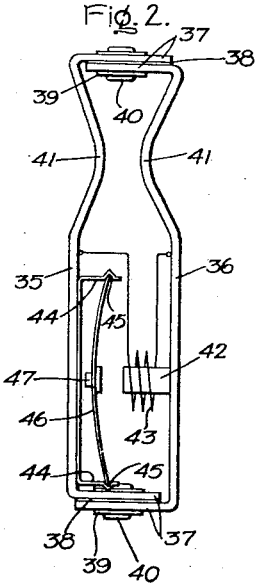
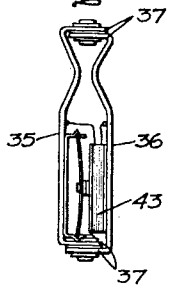


Fig. 3.



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UNITED STATES PATENT OFFICE

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CUTOUT FOR SERIES INCANDESCENT STREET LIGHTING CIRCUITS AND THE LIKE

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The present invention relates to cutouts for electric circuits such as are used in connection with series incandescent street lighting, whereby in case the circuit becomes interrupted at any one of the lamps in series, the cutout serves automatically to provide a new or shunt circuit about the point of interruption. This serves to permit current to pass through the other or unruptured lamps in the series so that the breaking down of one or more of a number of lamps in a series will not interfere with the proper functioning of the remaining lamps.

More recently there has come into use what are termed low voltage series street lighting circuits, and in connection with such circuits difficulty has been experienced with known types of cutouts in providing a uniform product which would function at a lower operating voltage. At the present time, failure of a cutout to function, while it is objectionable because of extinguishing the lights in the series circuit, has now become increasingly objectionable because of radio interference.

The object of my invention is to provide an improved cutout which can be used in standard series street lighting sockets and which is thoroughly reliable in operation on either high voltage or low voltage circuits.

For a consideration of what I believe to be novel and my invention, attention is directed to the following description and the claims appended thereto.

In the drawings, Fig. 1 is a sectional view of a series street lighting socket provided with a cutout embodying my invention; Figs. 2 and 3 are detail sectional views illustrating the operation of the cutout, Fig. 2 being of a more or less diagrammatic character and on a larger scale than Fig. 3 in order better to illustrate the construction.

Referring to the drawings, 10 indicates a receptacle having a base 11 and a bracket 12 provided with a threaded end 13 adapted to be connected to a lamp post bracket. Carried by base 11 are two opposed spring contacts 14 and 15 to which are connected binding posts 16 and 17, which receive the series line terminals. 18 indicates a lamp socket having a threaded shell 19 adapted to receive the threaded end 20 of an incandescent lamp 21. Shell 19 forms one terminal connection for the lamp, the other terminal connection being formed by central contact 22. Contact 22 and shell 19 are connected by screws 23 and 24 to spring contacts 25 and 26 which are adapted to be inserted between spring contacts 14 and 15 to form the circuit connections for connecting the lamp into the series circuit, and also to form a supporting means for the lamp socket. Spring contacts 25 and 26 have parallel outer ends as indicated at 27 and 28, below which are bowed out portions 29 and 30. Below bowed out portions 29 and 30 the contacts have long, straight, substantially parallel portions 31 and 32. 33 is an insulating plate which surrounds contacts 25 and 26 at their lower ends. The construction so far described is that of a standard series street lighting lamp socket and is the construction in connection with which my invention is particularly intended for use, although the invention is not limited necessarily to use with this specific type of socket structure.

In using the usual types of cutouts, termed usually "film" or "disk" cutouts, with series sockets of the type illustrated, the cutout is located between the flat ends 27 and 28 of spring contacts 25 and 26, thus serving to open the shunt circuit around the lamp filament. In case the lamp burns out the cutout is ruptured due to increased voltage applied to it, whereupon a shunt path around the burned out lamp is established.

According to my invention, I provide a unitary structure comprising a means for permanently holding the contact ends 27 and 28 spaced apart, and an electromagnetic means for establishing electrical connection between the spring contacts 25 and 26 in case the lamp burns out, the electromagnetic means including a spring member operated by the increased voltage applied in case of the burning out of the lamp, to provide a shunt circuit around the burned out lamp.

Referring particularly to Figs. 2 and 3, wherein is illustrated one embodiment of my invention, the cutout structure is shown as

comprising a rectangular frame formed from two metal bars 35 and 36 provided with over-lapping inturned ends as indicated at 37, which are insulated from each other by an insulating plate 38, and an insulating bushing 39 through which extends a fastening rivet 40. Adjacent its upper ends the frame is provided with indentations 41 which adapts the frame to be located between the spring contacts 25 and 26, the indentations 41 coinciding with the inwardly projecting parts of spring contacts 25 and 26 located just below the bowed out portions 29 and 30. When in position, the frame serves to hold contact ends 27 and 28 separated from each other as shown in Fig. 1.

Connected to metal bar 36 is the core 42 of an electromagnet, the winding 43 of which has its terminals connected to metal bars 35 and 36 respectively. Attached to metal bar 35 and projecting therefrom are spaced spring arms 44 provided with recesses 45 in which are located the ends of a spring strip 46. Spring strip 46 is of a length such that when located between the arms 44 it takes a somewhat bowed position, as shown in Figs. 2 and 3. Carried by the central portion of spring strip 46 is an armature 47 which cooperates with the electromagnet comprising core 42 and winding 43. The armature 47 is electrically connected to bar 35 through spring arms 44. Similarly, the core 42 is electrically connected to metal bar 36.

In operation, the cutout, which is a unitary structure in itself, as shown particularly in Fig. 3, is inserted between the spring contacts 25 and 26 as shown in Fig. 1, the spring strip 46 being in the position shown in Figs. 1 and 2, that is, bowed away from the end of core 42. The metal bars 35 and 36 hold the contact ends 27 and 28 separated as shown in Fig. 1, whereby the spring contacts 25 and 26 are disconnected electrically from each other, the metal bars 35 and 36 being insulated from each other as already stated. The resistance of the winding 43 of the electromagnet is so high compared to the resistance of the lamp filament, that but a very small current passes through it, practically all the current passing through the lamp filament. Under these circumstances, the electromagnet is not sufficiently energized to move armature 47 into engagement with the end of the core against the action of the spring strip 46 and the spring arms 44, so that the parts will remain in the positions shown in Figs. 1 and 2. In case the filament of the lamp is ruptured, the increased current which flows through the winding of the electromagnet will energize it sufficiently to pull armature 47 from the position shown in Fig. 2 to the position shown in Fig. 3, wherein the armature is directly in engagement with the end of core 42, the bowed spring moving across dead center. This establishes a shunt path around the ruptured filament by way of spring contact 25, metal bar 35, spring arms 44, spring strip 46, armature 47, core 42 and metal bar 36, to spring contact 26. There is formed also a shunt circuit around the winding 43 of the electromagnet but due to the fact that the spring strip 46 is now bowed in the opposite direction, as shown in Fig. 3, it will remain in this position, thus maintaining the shunt circuit closed. When the lamp is renewed, it is merely necessary to remove the socket 18, insert a new lamp, move the spring strip 46 back to its Fig. 2 position, and then replace socket 18. The construction is then ready to again function as a film cutout.

By my invention it will be seen that I provide a cutout which is magnetically operated and which comprises but a single very simple moving part, i. e., the spring strip 46. As a result, the structure is reliable in operation and can be manufactured at a low cost. At the same time, it can be made to operate at any desired voltage.

In accordance with the provision of the patent statute, I have described the principle of operation of my invention, together with the apparatus which I now consider to represent the best embodiment thereof; but I desire to have it understood that the apparatus shown is only illustrative and that the invention may be carried out by other means.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A unitary cutout structure for use with a lamp socket having a pair of contact arms for bridging the socket terminals, comprising a frame adapted to fit between the contact arms and hold them separated, opposite sides of said frame being insulated from each other, an electromagnet carried by the frame and having its winding connected to opposite sides of the frame, and an armature carried by the frame and adapted to be moved to a position wherein it effects the electrical connection of the two sides of the frame to each other when the electromagnet is energized.

2. A unitary cutout structure for use with a lamp socket having a pair of contact arms for bridging the socket terminals, comprising a pair of spaced contact bars insulated from each other and adapted to fit between the contact arms and hold them separated, an electromagnet carried by one of said bars, a bowed spring strip carried by one of said bars, and means whereby when the electromagnet is energized the bowed spring strip is moved to effect the electrical connection of said bars.

3. A unitary cutout structure for use with a lamp socket having a pair of contact arms for bridging the socket terminals, comprising a pair of spaced contact bars insulated from each other and adapted to fit between the contact arms and hold them separated, an

electromagnet carried by one of said bars, a bowed spring strip carried by the other of said bars, and means whereby when the electromagnet is energized the bowed spring strip is moved across dead center to effect the electrical connection of said bars.

4. A unitary cutout structure for use with a lamp socket having a pair of contact arms for bridging the socket terminals, comprising a pair of spaced contact bars insulated from each other and adapted to fit between the contact arms and hold them separated, an electromagnet carried by one of said bars and having its core electrically connected thereto, a bowed spring strip carried by and electrically connected to the other of said bars, and an armature carried by said spring strip, said armature being moved into engagement with said core when the electromagnet is energized and being held in engagement therewith by the bowed spring.

In witness whereof, I have hereunto set my hand this 25th day of March, 1930.

JOSEPH W. OWENS.