

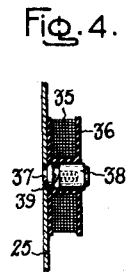
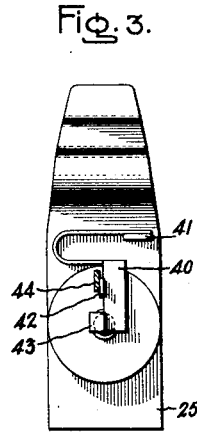
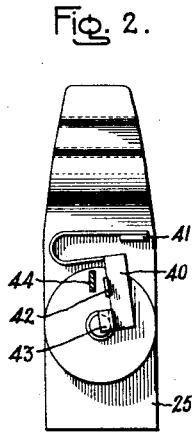
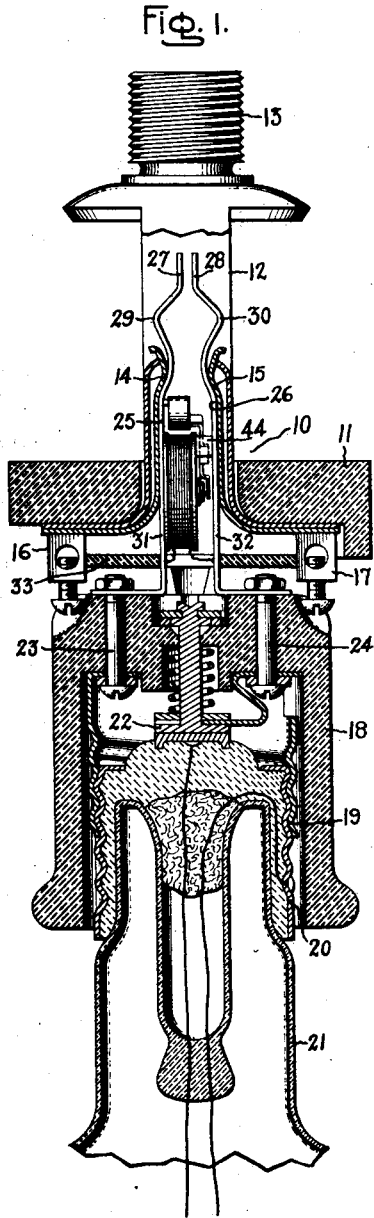
May 26, 1931.

H. R. CRAGO

1,807,389

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

Filed May 15, 1930



Inventor:
Harry R. Crago,
by *Charles V. Tuller*
His Attorney.

UNITED STATES PATENT OFFICE

HARRY R. CRAGO, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK

CUTOUT FOR SERIES INCANDESCENT STREET LIGHTING CIRCUITS AND THE LIKE

Application filed May 15, 1930. Serial No. 452,790.

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 a breakdown of one or more of a number of lamps in the 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 the lower operating voltages. At the present time, failure of a cutout to function, while it is objectionable because of extinguishing all the lamps in a 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 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 specification 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 views illustrating the operation of the cutout, and Fig. 4 is a detail sectional view through an electromagnet which forms a part of the cutout.

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 re-

ceive the threaded end 20 of an incandescent electric lamp 21. Shell 19 forms one terminal connection for the lamp, the other terminal connection being formed of a 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 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 means for permanently holding the contact ends 27 and 28 spaced apart and an improved electromagnetic means for establishing electrical connection between the spring contacts 25 and 26 in case the lamp filament burns out, the electromagnetic means being operated by the increased voltage applied to it caused by the burning out of the lamp.

In carrying out my invention, I provide an electromagnet comprising a winding mounted on an insulating spool 36, the spool being connected directly to the spring contact 25 by a rivet 37. The terminals of wind-

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ing 35 are connected directly to spring contacts 25 and 26. At the center of the spool is a plunger 38 mounted to move axially relatively to the spool and biased to an outward position as shown in Fig. 4 by a light spring 39. The outer end of plunger 38 normally projects beyond the plane of spool 36 which forms a stop or abutment for a spring contact 40. At one end spring contact 40 is connected to spring contact 25 as is indicated at 41, the spring contact 40 being thus carried by and electrically connected to the spring contact 25. Spring contact 40 is provided with a struck-up contact ear 42 and with a bent-up head 43. Head 43 has a right angular portion adapted to engage the side of plunger 38 and an end which projects over the end of plunger 38. Carried by spring contact 26 is a projecting contact ear 44 which may be struck out from the material of contact 26 or which may be a separate piece suitably fastened to contact 26. Contact ear 44 is of a length such that it is adapted to engage the face of spool 36 to hold contact ends 27 and 28 from engagement with each other, as shown in Fig. 1. Also, it is positioned so as to be engaged by struck-up contact ear 42 when spring contact 40 is released by the solenoid plunger 38.

In operation, the cutout structure is mounted between the spring contacts 25 and 26 of the lamp socket as is illustrated in Fig. 1, the contact ends 27 and 28 being separated, and held separated by the engagement of contact ear 44 with the face of spool 36. The spring contact 40 is moved to and stands in the position shown in Fig. 2 wherein the side of plunger 38 engages head 43 thereby holding contact ears 42 and 44 separated from each other. The portion of head 43 which lies over the end of plunger 38 serves to hold plunger 38 in place. This is illustrated in Fig. 2.

The resistance of the winding 35 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 draw in the plunger 38 against the action of the spring 39, so that the parts remain in the Fig. 2 position. In this position of the parts the spring 40 is under tension, it being biased to a position in engagement with contact ear 44. The lamp burns in the usual manner. 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 plunger 38 inward against the action of spring 39, thereby releasing spring contact 40 and permitting it to move into contact with contact ear 44. The parts then occupy the position shown in Fig. 3, in which position the free end of contact spring 40 lies

over the end of plunger 38 holding it in its drawn-in position against the action of spring 39. When contact ear 42 engages contact ear 44, there is established a shunt path around the ruptured filament by way of the spring contact 25, spring contact 40, contact ears 42 and 44, and spring contact 26. There is formed also a shunt circuit around the winding 35 of the electromagnet, thereby de-energizing the winding, but this does not effect the position of the parts as shown in Fig. 3 because the end of spring contact 40 has moved over the end of plunger 38. When the lamp is renewed it is necessary merely to remove the socket 18, insert a new lamp, move spring contact 40 away from contact ear 44, whereupon plunger 38 will be moved by spring 39 back to its Fig. 2 position, where it holds contact ears 42 and 44 separated, and then replace socket 18. Spring contact 40 need be only a relatively light structure so that it is easily moved from its Fig. 3 position to its Fig. 2 position.

By my invention it will be seen that I provide a cutout which is magnetically operated whereby it can be constructed to operate accurately at any desired voltage, it being only necessary to properly proportion the winding 35 for the operating voltage desired.

The construction has the important advantage that it forms a permanent part of the lamp socket structure 18 and may be embodied as a part of a standard lamp socket structure such as is now in use in connection with series lighting circuits, without change in the structure of the socket itself. This is an important consideration because series lighting sockets of this type are well standardized, and a very large number are in use. This means that my invention may be applied to existing structures without change.

The invention has the further advantage that it is simple in structure, reliable in operation, and capable of being manufactured at low cost.

In accordance with the provision of the patent statutes, 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. The combination with a lamp socket having lamp terminal connections and a pair of contact arms electrically connected to said terminal connections, of a cutout located between said contact arms, comprising an electromagnet mounted on one of said arms and having its winding connected to said arms, a movable plunger for said magnet, a

spring contact carried by one of said arms, and a contact carried by the other arm and adapted to be engaged by said spring contact, said spring contact being normally held from engagement with said other contact by
5 said plunger and being brought into engagement therewith when the electromagnet is energized and the plunger is moved to release the spring contact.

10 2. The combination with a lamp socket having terminal connections and a pair of contact arms electrically connected to said terminal connections, said contact arms having ends adapted to engage each other, of a
15 cutout located between said contact arms comprising an electromagnet mounted on one of said arms, a contact carried by the other arm and engaging said electromagnet to hold the ends of the contact arms separated, a plunger for said electromagnet, and
20 a spring contact connected to said one contact arm and adapted to engage said contact, said spring contact being held normally from engagement with said contact by said
25 plunger.

3. The combination with a lamp socket having terminal connections and a pair of contact arms electrically connected to said terminal connections, said contact arms having ends adapted to engage each other, of
30 a cutout located between said contact arms comprising an electromagnet mounted on one of said arms and having its winding connected to said arms, a contact carried by
35 the other arm and engaging said electromagnet to hold the ends of the contact arms separated, a plunger for said electromagnet, and a spring contact connected to said one contact arm and adapted to engage said
40 contact, said spring contact being held normally from engagement with said contact by said plunger, and said spring contact overlying the end of said plunger to hold it in position.

45 In witness whereof, I have hereunto set my hand this 14th day of May, 1930.

HARRY R. CRAGO.

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CERTIFICATE OF CORRECTION.

Patent No. 1,807,389.

Granted May 26, 1931, to

HARRY R. CRAGO.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, line 7, for the word "which" read and; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office:

Signed and sealed this 7th day of July, A. D. 1931.

(Seal)

M. J. Moore,
Acting Commissioner of Patents.