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2,343,853

LAMP HOLDER

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Fig. 1.

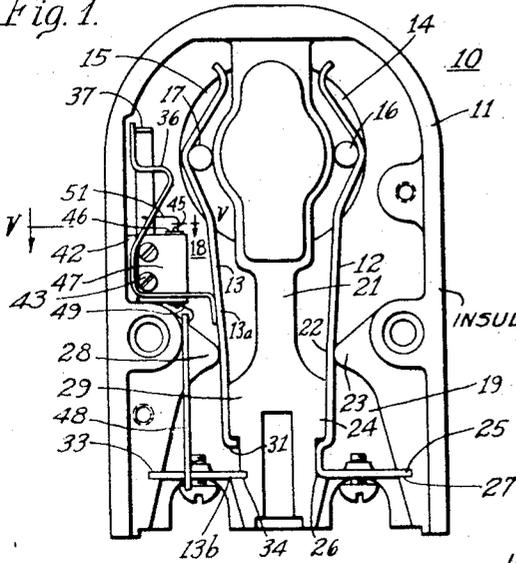


Fig. 2.

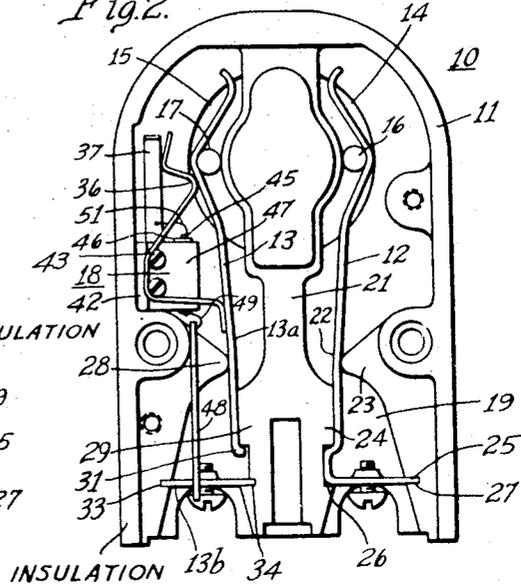


Fig. 3.

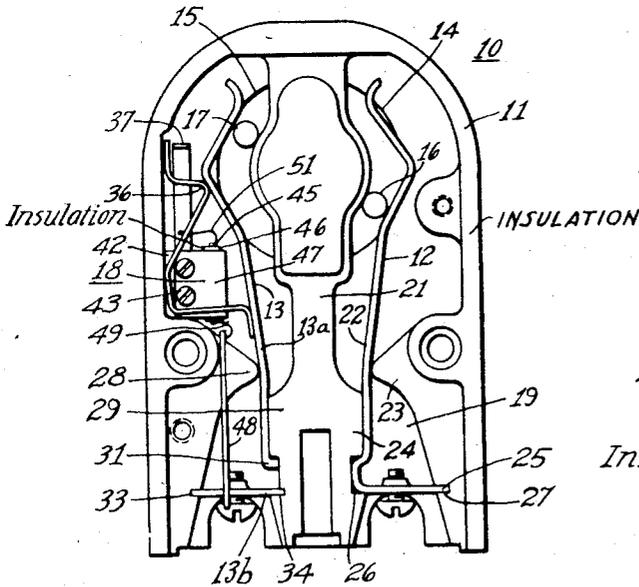


Fig. 4.

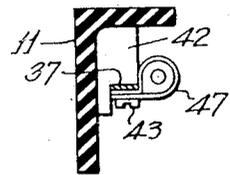
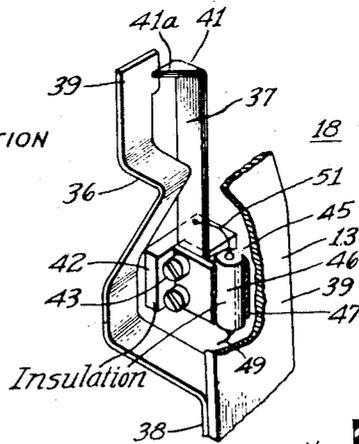


Fig. 6

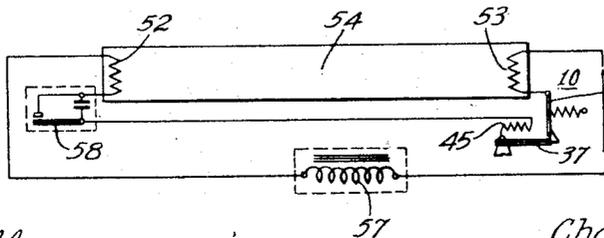


Fig. 5.

WITNESSES:

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LAMP HOLDER

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11 Claims. (Cl. 200-122)

My invention relates, generally, to lamp holders or sockets of the type commonly used with double-ended electric discharge lamps such as fluorescent lamps, and more particularly to lamp holders of this general type embodying a cutout switch for automatically interrupting the circuit of the lamp in response to some unusual operating condition, such as may be encountered when a lamp becomes deactivated and fails to start upon repeated attempts.

The object of my invention, generally stated, is to provide a lamp holder for electric discharge devices, such as lamps, which shall be of simple and economical construction and which shall function to automatically disconnect the lamp from the supply circuit in response to repeated attempts of the lamp to start.

Another object of my invention is to provide a lamp holder of the character described which embodies a cutout switch operable to interrupt the circuit to the lamp in response to repeated unsuccessful attempts of the lamp to start.

A further object of the invention is to provide a lamp holder of the character described with a protective device which is automatically reset to a normal operating position, after it has operated to disconnect the lamp from the circuit, in response to the rotation or other predetermined movement of the lamp pins within the holder, such as may result from the removal of the lamp which has failed or the insertion of a new lamp.

Another object of my invention is to provide a lamp holder wherein a thermal cutout switch forms a part of the internal electrical circuit of the holder and operates to automatically interrupt the lamp circuit in response to repeated unsuccessful attempts of the lamp to start and to retain the circuit open until the lamp is moved from its normal operating position within the holder.

A more specific object of the invention is to provide for incorporating a protective device in a lamp holder of the character described which shall function to automatically interrupt the lamp circuit in response to excessive current flow therein resulting from repeated unsuccessful attempts of the lamp to start.

These and other objects of my invention will become more apparent from the following detailed description when considered in conjunction with the accompanying drawing, in which:

Figure 1 is a side elevational view of a lamp holder embodying my invention with the cover plate of the housing removed to show the details

of the current-carrying elements, and also showing the cutout switch in its normal operating position;

Fig. 2 is a similar view showing the cutout switch in its tripped or operated position;

Fig. 3 is a view similar to Figs. 1 and 2 showing the cutout switch being actuated to its reset or closed position by its associated contact member of the lamp holder as the lamp pins are rotated within the holder;

Fig. 4 is a partial perspective view of the cutout switch showing details thereof;

Fig. 5 is a schematic view of a lamp circuit illustrating the manner in which the invention is used; and

Fig. 6 is an enlarged partial view in section along line V—V of Fig. 1 showing the details of the mounting for a portion of the cutout switch.

Referring to the drawing, and particularly to Figs. 1 to 4, which illustrate one embodiment of my invention, there is shown a lamp holder or socket 10 for use with double-ended discharge lamps having a pair of contact pins at each end thereof for supporting and conducting current to the lamp in a well known manner.

Since my invention relates primarily to a combined lamp holder and cutout switch, or in other words, to a lamp holder embodying a cutout switch, the detailed construction of the lamp holder itself is of no particular importance so long as it embodies the necessary elements to function with a cutout switch.

As shown, the socket 10 comprises, generally, a hollow or shell type housing 11 of molded insulating material or the like, containing a pair of elongated contact members 12 and 13 in the form of flat spring fingers anchored therein in such relation to suitable openings or slots 14 and 15 in the face of the housing (the rear of the housing as viewed in the drawing) as to receive and lock the contact pins 16 and 17 of the lamp when they are inserted into the lamp holder and rotated a predetermined amount. It is to be understood that the lamp is supported by two holders, one of which may be of conventional design and the other constructed in accordance with my invention.

The lamp holder of my invention differs from the conventional design in that one of the contact members, in this instance, member 13, is so modified as to cooperate with a cutout switch designated by the numeral 18 to control the lamp circuit in such manner as to open the circuit and maintain it open in response to repeated attempts

of the lamp to start, such as may occur when a lamp of this character becomes deactivated.

In this instance, the contact member 12 is mounted within the housing in the recess 19 formed by the longitudinal rib 21, with its shank portion 22 positioned between the abutments 23 and 24, and its bent-over terminal portion 25 disposed in the transverse slots 26 and 27 in the housing.

In order to utilize the cutout switch 10 to control the lamp circuit, the contact member 13 is formed in two parts as shown, the shank or finger portion 13a being mounted in opposed relation to the contact member 12 between the abutments 28 and 29 with its lower end 31 bent over to engage the lower edge of the abutment 29. The terminal portion 13b of this contact member is formed separately and may be positioned in transverse slots 33 and 34 similar to the slots 26 and 27.

As will be readily understood, the contact members 12 and 13 and other parts are covered and secured within the housing by means of a separate removable cover plate, not shown, attached to the open face of the housing in a well known manner.

In this instance, the cutout switch is connected between the parts 13a and 13b of the contact member 13 so as to be disposed in the lamp circuit. It is not only utilized to control the lamp circuit but it is so constructed as to be responsive to the lamp current.

The cutout switch 10 may be of any suitable type, but in this instance it is illustrated as a thermal switch so constructed that it is normally in a closed or circuit making position, as shown in Fig. 1, and operable in response to repeated attempts of the lamp to start to open the lamp circuit by breaking the electrical connection between parts 13a and 13b of the contact member 13. It is to be understood, however, that the cutout switch may be connected in any other suitable manner so long as it functions to produce the result desired.

The cutout switch 10 is also so constructed that it may be automatically reset to its normal circuit making position by removal or insertion of the lamp or, for that matter, by rotation of the lamp pins 16 and 17 to or from their normal operating position.

In this particular embodiment of the invention the cutout switch 10 comprises a pair of cooperating contact elements 36 and 37. Contact element 36 is in the form of a Z-shaped spring member having its lower end 38 attached directly to the finger portion 13a of contact member 13. Its free upper end portion 39 is so disposed that it is movable toward and away from the finger portion 13a. Element 36 of the switch is preferably formed of a flat spring member and is so constructed as to move away from its cooperating contact element 37 in a snap action when released thereby.

The contact element 37 is preferably formed of a bimetal and is provided with a bent-over end portion 41 disposed in the path of movement of the free end portion 39 of element 36. Contact element 37 may be mounted within the housing on an insulating block 42 attached to the inner walls of the housing in any suitable manner, the lower end of element 37 being rigidly secured thereto by suitable screws 43. In this instance the screws 43 extend through the block 42 and engage threaded openings in the front wall of the housing 11 and thus also serve to support

the block 42. The nature and position of contact element 37 is such that when it is heated a predetermined amount, it pulls back out of engagement with the end portion 39 of contact element 36 and returns to its normal locking position therewith when sufficiently cooled.

The heating of contact element 37 is effected in this instance by the heater coil or element 45 enclosed by a piece of ceramic tubing 46 which is supported by a suitable clip 47 of conductive material attached directly to the contact element 37 by the supporting screws 43.

The circuit from the terminal portion 13b through the heating element and cooperating contact elements 36 and 37 is completed by means of a connector 48 one end of which is attached to the terminal portion 13b and the other end of which is attached by means of a flexible lead 49 to one end of the heater coil 45, as shown. The other end of the heater coil is attached directly to the contact element 37 by a flexible lead 51. The circuit then continues through the contact element 36 and finger portion 13a to the lamp pin 17.

The ceramic tubing 46 is utilized to support the heater coil primarily for the purpose of providing a certain amount of thermal mass in order to prevent premature operation of the cutout switch. This tubing also functions to electrically insulate the heater coil from other live parts of the device. The heat developed by the coil is conducted to the metallic clip 47 and then to the contact element 37 of the cutout switch. This contact element 37 not only serves as a temperature responsive latch but also as a portion of the circuit through the lamp holder.

In Fig. 1 the lamp holder is shown in its normal operating condition in which the cutout switch is closed and the lamp pins 16 and 17 are also in their normal operating position. In Fig. 2 the lamp holder is shown in the condition which results after the cutout switch 10 has operated to interrupt the lamp circuit. In this view the lamp pins 16 and 17 are still in their normal operating position. Fig. 3 shows the condition of the lamp holder such as results when the lamp pins are rotated therein in the operation of either removing the damaged lamp or inserting a new lamp. It will be observed that this operation forces the contact members 12 and 13 apart and moves the contact member 13 sidewise to a sufficient distance to again effect the engagement of the contact elements 36 and 37 of the cutout switch. It will be understood that this engagement occurs only after the contact element 37 has cooled a sufficient amount that it has returned to such position that it can interlock with the free end portion 39 of element 36.

It will be observed that the bent-over end portion 41 of element 37 has a sloping face 41a and that this face portion 41a faces toward the free end portion 39 after it has been released as shown in Fig. 2. This facilitates the resetting of the cutout switch when the contact element 36 is being actuated toward its reset position by the member 13.

The manner in which the lamp holder of my invention may be utilized is shown in Fig. 5, which is a schematic view of a conventional circuit for operating an electric discharge lamp. As shown the filaments 52 and 53 of the lamp 54 are connected to the current source indicated by conductors 55 and 56 through the usual ballast 57 and starting switch 58 which may be of any suitable type. The cutout switch 10 is also con-

nected in this circuit as shown at the right end of lamp 54, and in this instance, is so connected that it is subjected to the starting current of the lamp and is disconnected by means of the starting switch 58 after the lamp has started so as not to be subjected to the operating current. It is to be understood, however, that any other suitable connections may be made and that the cut-out switch may be so connected as to be subjected to the operating current of the lamp, which may be a desirable arrangement, as it eliminates the necessity of polarizing the lamp holders and the small amount of heat developed by the operating current of the lamp will not cause the cut-out switch to function to disconnect the lamp.

In view of the foregoing description, it will be apparent that I have provided a combination lamp holder and cutout switch which is of simple and compact construction and which will function to effectively protect the elements of the starting circuit against damage due to repeated attempts of a deactivated lamp to start. The cut-out switch has been combined with the lamp holder in such manner as to eliminate the use of a separate device and the cutout switch provided by my invention may be readily combined with almost any lamp holder of the conventional type having a pair of contact members for engaging the lamp pins in response to some predetermined movement of the lamp when inserting and removing it from the socket.

While the cutout switch has been described as being in the form of a thermal switch, it is to be understood that any other suitable type of switch may be utilized so long as it functions in response to the starting current of the lamp. It is believed, however, that a thermal switch is the best type to use for an application of this kind as it readily provides the necessary time delay in opening the lamp circuit.

While I have shown and described a specific embodiment of my invention, it will be apparent to those skilled in the art that modifications and changes may be made therein without departing from the principles of the invention.

I claim as my invention:

1. A holder for double-ended electric discharge devices comprising, a housing containing a pair of contact fingers disposed to be engaged by the contact pins of the device, and switch means mounted within the housing and operable in response to repeated attempts of the device to start to interrupt the circuit to the device.

2. A holder for double-ended discharge devices comprising, a housing containing a pair of contact fingers disposed to be engaged by the contact pins of the device, and switch means mounted within the housing and operable in response to current flow in the circuit of the discharge device resulting from repeated attempts of the device to start to interrupt the circuit to the device.

3. A holder for double-ended discharge devices comprising, a housing containing a pair of contact fingers disposed to be engaged by the contact pins of the device, and thermal switch means mounted within the housing and operable to interrupt the circuit to the device in response to repeated attempts of the device to start.

4. A lamp holder for double-ended discharge lamps comprising, a housing containing a pair of contact fingers disposed to be engaged by the contact pins of the lamp, and switch means mounted within the housing and operable in response to repeated attempts of the lamp to start to interrupt the circuit to the lamp, said switch means

being disposed for actuation to its normal circuit making position in response to a predetermined movement of the lamp within the socket.

5. A lamp holder for double-ended discharge lamps comprising, a housing containing a pair of contact springs adapted to engage the lamp pins, a first contact terminal connected to one of said contact springs, a second contact terminal, and switch means connected between said second contact terminal and the other contact spring operable to interrupt the circuit to the lamp in response to repeated attempts of the lamp to start.

6. A lamp holder for double-ended discharge lamps comprising, a housing containing a pair of contact springs adapted to engage the lamp pins, a first contact terminal connected to one of said contact springs, a second contact terminal, and switch means connected between said second contact terminal and the other contact spring operable to interrupt the circuit to the lamp in response to repeated attempts of the lamp to start, said switch means being operable to a reset circuit making position in response to a predetermined movement of one of the lamp pins in the holder.

7. A lamp holder for use with double-ended discharge lamps comprising, a housing containing a pair of contact fingers mounted therein for engagement with the contact pins of the lamp, and current-responsive switch means mounted in the housing and connected in series circuit relation with one of said contact fingers operable to interrupt the current flow through said finger, said switch means comprising relatively movable contact elements disposed to become disengaged in response to predetermined current flow there-through and to become reengaged to circuit making position in response to a predetermined movement of one of said contact fingers.

8. A lamp holder for use with double-ended discharge lamps comprising, a housing containing a pair of contact fingers mounted therein for engagement with the contact pins of the lamp, and thermal switch means mounted within the housing having relatively movable and normally engaged contact elements operable to a disengaged position to interrupt the flow of current through one of said contact fingers in response to predetermined current flow there-through, one of said contact elements of the switch means being carried by said one contact finger whereby it is actuated into engagement with the other contact element in response to predetermined movement of said contact finger.

9. A lamp holder for use with double-ended discharge lamps comprising, a housing containing a pair of contact fingers mounted therein for engagement with the contact pins of the lamp, and thermal switch means mounted within the housing for controlling the flow of current through one of said contact fingers, said switch means comprising normally engaged contact elements biased to a disengaged circuit interrupting position and a heater element responsive to predetermined current flow there-through for effecting disengagement of said contact elements.

10. A lamp holder for electric discharge lamps comprising, a housing containing contact members disposed to be engaged by the contact pins of a lamp, one of said contact members having a separate terminal portion, a resilient contact element carried by said one contact member, a bimetallic contact member mounted on the housing adjacent the resilient contact element, said bimetallic contact element normally engaging the

resilient contact element and operable when heated to disengage the resilient contact element to interrupt a circuit extending therethrough, and a heater element connected between the separate terminal portion of the said one contact member and the bimetallic contact element, said cooperating resilient and bimetallic contact elements and the heater element functioning as a thermal switch in the lamp circuit operable in response to predetermined current flow in said circuit to interrupt the lamp circuit.

11. A lamp holder for electric discharge lamps comprising, a housing containing contact members disposed to be engaged by the contact pins of a lamp, one of said contact members having a separate terminal portion, a resilient contact element carried by said one contact member, a bimetallic contact member mounted on the housing

adjacent the resilient contact element, said bimetallic contact element normally engaging the resilient contact element and operable when heated to disengage the resilient contact element to interrupt a circuit extending therethrough, and a heater element connected between the separate terminal portion of the said one contact member and the bimetallic contact element for controlling the operation of the bimetallic contact element in response to predetermined current flow therethrough, said resilient contact element being disposed for actuation by its associated contact member to a reset position in engagement with the bimetallic contact element in response to movement of the contact pin of the lamp in engagement with the said associated contact member.

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