March 16, 1948. A. H. LAIDIG 2,438,012

LAMP HOLDERS

Filed July 20, 1945

Fig. 1.

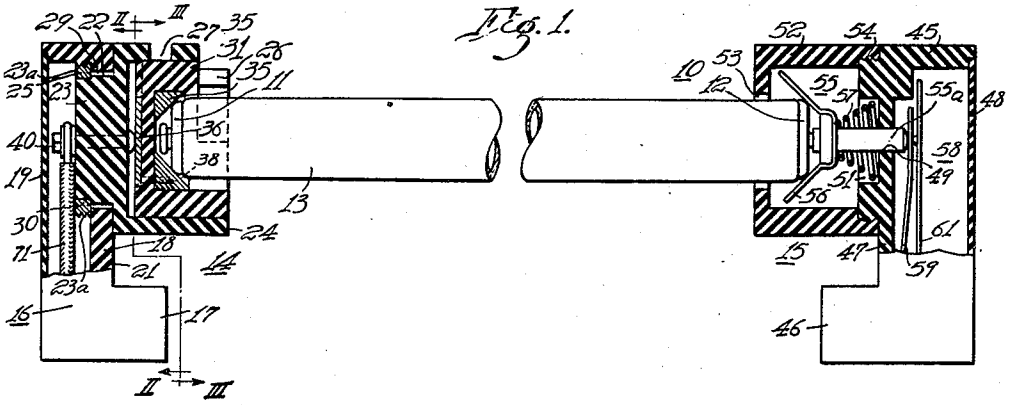


Fig. 2.

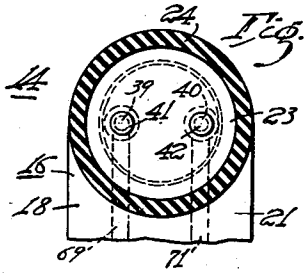


Fig. 3.

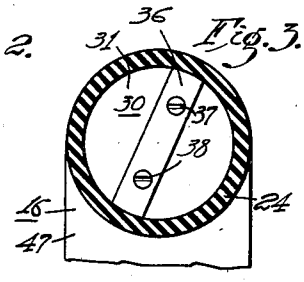


Fig. 4.

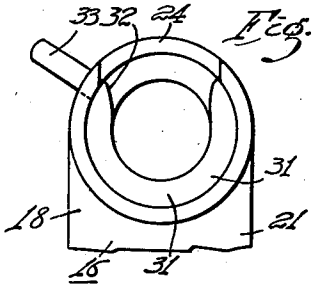


Fig. 5.

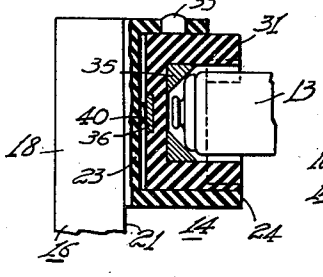


Fig. 6.

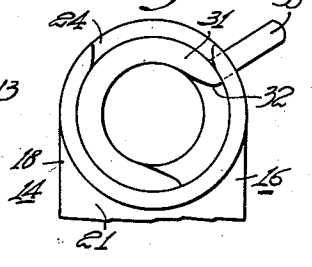
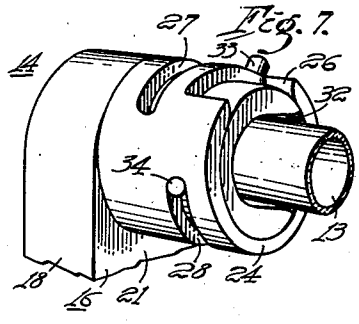


Fig. 7.



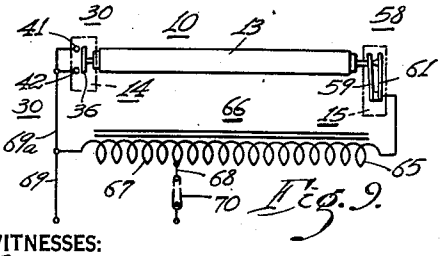
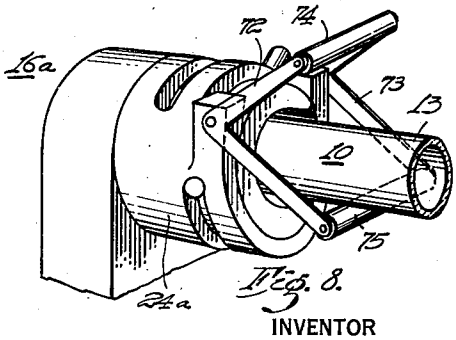


Fig. 9.

Fig. 8.



WITNESSES:

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LAMP HOLDERS

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10 Claims. (Cl. 176—32)

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My invention relates, generally, to electric discharge tube or lamp circuits and apparatus and, more particularly, to lamp holders and lamp-holder arrangements for use with tubular discharge lamps of which the well known fluorescent lamp is one example.

In the application of fluorescent lamps, for example, it is desirable to use lamp holders and lamp-holder arrangements of such nature that there is no danger from shock during insertion and removal of the lamp, the ends of the lamp are securely locked into the holders, the holders be readily adaptable for use with lamps of different sizes or diameters, the holders support the lamps with a minimum of masking off of the light produced, provide for opening the supply circuit to the lamp or the lamp circuit itself, or both, and be not affected by vibration and shock.

The object of my invention, generally stated, is to provide lamp holders and lamp-holder arrangements of simple and durable construction for readily and economically effecting the foregoing results.

A more specific object of my invention is to provide a lamp holder of the character described which shall function to securely lock the end of the lamp into the holder and control the lamp circuit.

Another object of my invention is to provide a lamp holder wherein the movement of a rotatable locking element is utilized to actuate a control switch for controlling the lamp circuit.

A further object of my invention is to provide a lamp holder wherein the movement of a movably mounted contact element effects the operation of a switch within the holder to control the lamp circuit.

A still further object of my invention is to provide a lamp holder of the character described embodying a control switch which functions to open the energizing or primary circuit of the lamp in response to the operation of the holder to release or unlock the end of the lamp therefrom.

A further object of my invention is to provide a lamp holder having a spring-biased contact element operable when moved by the insertion of the end of the lamp into the holder to close the circuit to the lamp terminal.

Another object of my invention is to provide a lamp holder wherein the end of the lamp is inserted into and removed from the holder by sidewise movements through a slot in a socket portion of the holder and ejected from the socket portion by a lever mechanism mounted thereon.

Another object of my invention is to provide

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for supporting and conducting current to a tubular discharge lamp by means of a pair of lamp holders, at least one of which functions to lock the associated end of the lamp into the holder and open and close an energizing circuit to the lamp in accordance with unlocking and locking operations, respectively, of the holder.

Another object of my invention is to provide for supporting and conducting current to a tubular discharge lamp by means of a pair of spaced lamp holders, at least one of which has a movable contact element which actuates switch means within the holder to open and close the circuit to the lamp terminal in response to the removal from and insertion of the lamp into the holders.

These and other objects of my invention will become more apparent from the following detailed description of a preferred embodiment thereof when read in connection with the accompanying drawing, in which:

Figure 1 is a side elevational view, partly in section, showing a preferred embodiment of my lamp-holder arrangement for use with a tubular discharge lamp or tube;

Fig. 2 is a sectional view taken along lines II—II of the left-hand lamp holder of Fig. 1;

Fig. 3 is a similar view taken along lines III—III;

Fig. 4 is a partial end elevational view of the left-hand lamp holder of Fig. 1 in its unlocked position;

Fig. 5 is a view, partially in elevation and partially in section, of the left-hand lamp holder showing the control switch in its closed position as distinguished from the open position as shown in Fig. 1;

Fig. 6 is a view similar to that of Fig. 4 showing the holder in its locked or lamp locking position;

Fig. 7 is a perspective view of the upper portion of the left-hand holder of Fig. 1;

Fig. 8 is a view similar to that of Fig. 7 of a modification of the holder with a lamp kickout or ejecting lever attached thereto; and

Fig. 9 is a diagrammatic view of a typical lamp circuit showing how the switches in the holders are utilized to control the primary and secondary circuits of the lamp.

Referring to Fig. 1 of the drawing, there is shown a lamp-holder arrangement for supporting and conducting current to a fluorescent lamp 10 of the cold cathode type having contact elements in the form of metal disks 11 and 12 attached to the ends of the tubular envelope 13. It is to be understood, however, that the holders

shown may also be used with lamps having contact elements of a different type, as, for example, contact pins extending from an insulating base or cap attached to the ends of the envelope.

The holders 14 and 15 are disposed in spaced relation to receive the lamp therebetween in the usual manner and are so constructed as to permit the lamp to be readily inserted and removed.

The lamp holder 14 at the left-hand end of the lamp is of the locking type which functions to securely lock the end of the lamp into the holder. The embodiment shown comprises a hollow or shell-type housing member 16 of insulating material having a base or mounting portion 17 and an upright body portion 18. The housing member is open at the back and provided with a cover plate 19.

The front face 21 of the body portion is provided with an opening 22 adjacent its upper end to receive the neck or mounting portion 23 of a socket member 24. This opening 22 may be circular in shape and provided with longitudinal grooves or flutes 29. The neck portion 23 of the socket member also may be provided with complementary longitudinal grooves or flutes so that the socket member cannot rotate within the opening 22. This socket member is of a cup-like formation and is mounted on the front of the body portion to receive the end of the lamp.

The socket member 24 may be secured to the body portion 21 in any suitable manner, such as by means of a nut 25 engaging the threaded end portion 23a of neck portion 23. This permits socket member 24 to be readily detached and turned to any desired position, as will be referred to hereinafter. Any other suitable means may be used to secure the socket member 24.

As shown best in Fig. 7, the socket portion 24 is provided with an open-sided slot 26 at its outer or exposed end. This slot is for the purpose of receiving the end of the lamp when inserted into the holder by a sidewise or transverse movement with respect to the holder. The socket member 24 is also provided with a pair of guide slots 27 and 28 for a purpose which will be described more in detail hereinafter.

In order to provide for locking the end of the lamp into the holder, a cup-shaped member 31 is rotatably mounted within the socket member 24 and is also provided with an open-sided slot 32 at its outer or exposed end of generally the same shape as the slot 26 so that these slots may be moved into and out of registering position to open and close the slot 26 in the socket member 24.

The cup-shaped member 31 may be actuated in any suitable manner, such as by means of the lever 33 disposed to move within the slot 27. This slot may be of such length and so positioned with respect to the slot 26 that the rotational movement of the cup-shaped member 31 is properly defined. If desired, the cup-shaped member 31 may be provided with a guide pin 34 which travels in the slot 28.

The cup-shaped member 31 is provided with a ring-shaped contact element 35, as shown best in Fig. 1, disposed to engage the lamp terminal regardless of its form.

In view of the foregoing, it will be apparent that the cup-shaped member 31 has a limited rotational movement with respect to the socket member 24, and that this movement may be utilized in actuating switch means within the holder for controlling the lamp circuit. In this instance, the switch means 30 is comprised of a movable contact element or bar 36 attached to the back face of the cup-shaped member 31 by means of a pair of screws 37 and 38 which engage the contact element 35 and a pair of contact terminals 39 and 40 mounted in the base or neck portion 23 of the socket member 24.

As shown best in Fig. 1, the head portions 41 and 42 of these contact terminals are disposed in an exposed position on the bottom of the socket member 24 in cooperative relation with the contact bar 36. It will be understood that when the cup-shaped member 31 is rotated into and out of its locking position, the exposed head portions 41 and 42 of contact terminals 39 and 40 are bridged or unbridged, as the case may be, to close and open the circuit.

Fig. 3 shows the switch means 30 in its open position such as results when the cup-shaped member 31 is in its unlocked position to receive the end of the lamp, as shown in Fig. 4. Fig. 5 shows the switch means 30 in its closed position such as when the cup-shaped member 31 is in its locking position, as shown in Fig. 6.

Referring now to the right-hand lamp holder of Fig. 1, it will be apparent that this holder likewise comprises a hollow or shell-type housing member 45 having a base portion 46 and an upright body portion 47 which is open at the back and provided with a cover plate 48.

The front wall or face of the body portion 47 is provided with an opening 49 and a front recess 51. A socket portion 52 is attached to the front face of the body portion, as shown, and is provided with an opening 53 to receive the end of the lamp. This socket portion may be attached to the body portion in any suitable manner, such as by means of the threaded connection indicated at 54.

In this instance, the holder is provided with a movable contact element 55 which comprises a stem portion 55a disposed in the opening 49 carrying a V-shaped contact member 56 which is disposed to engage the lamp terminal.

Since it is the purpose of this holder to urge the lamp endwise into the opposed holder 16, the contact element 55 is normally biased to an outer position by means of the coil spring 57 seated in the recess 51 and engaging the contact member 56, as shown. It will be apparent when the end of the lamp is inserted into the holder, the contact element 55 may be moved against the force exerted by the spring 57.

If desired, the holder 15 may be provided with switch means 58 in the form of a pair of contact springs 59 and 61 suitably anchored within the base portion of the housing member and extending upwardly within the housing member with their upper ends normally in spaced relation. The upper ends of these contact springs are so positioned as to be actuated into engagement by the stem portion 55a of the contact element 55 when it is moved sidewise in response to the insertion of the lamp. The switch means 58 may be utilized to connect the lamp terminal 12 to the energizing circuit as well as to provide for automatically opening this circuit when the lamp is removed from the holder.

The lamp holders 15 and 16, as shown in Fig. 1, may be connected into the lamp circuit, as shown schematically in Fig. 9. The switch means 58 of the holder 15 is shown connected to one end of the secondary winding 65 of the autotransformer 66. The primary winding 67 has one terminal connected through conductor 68 and switch 70 to one side of the source and its other terminal connected through conductor 69 to the

other side of the source. This terminal of the primary winding 67 is also connected to the switch means 30 of holder 16 through conductor 69a. Accordingly, it will be apparent that, when the holder 16 is unlocked to release the lamp, this side of the lamp circuit will be interrupted by the switch means 30, and that when the lamp is removed from the holders, the switch means 58 will function to open the other side of the lamp circuit.

While the lamp holders shown are each provided with a control switch or switch means, it is to be understood that the switch means 58 of the holder 15 is not a necessary element as the switch means of holder 16 functions to effectively interrupt and deenergize the lamp circuit when this holder is in its unlocked position.

Referring now to Fig. 8 which shows a modification 16a of the locking holder 16, it will be observed that the structure of the holder is generally the same except that it is provided with a kickout lever, indicated generally at 71. This lever is for the purpose of lifting the end of the lamp 10 from the socket portion of the holder when in its unlocked position. It is particularly useful where the holder is mounted in such position that there is very little, if any, room at the sides thereof to permit the removal of the lamp.

By means of this device, which is operable from above the lamp, it is possible to lift the lamp out of the holder without reaching down into a constricted space.

In this instance, the device 71 is comprised of a pair of V-shaped side members 72 and 73 pivotally mounted upon the socket portion 24a of the holder and connected together by means of cross members 74 and 75. The cross member 75 is positioned beneath the lamp in such manner that when the device is rotated upon its pivots, the end of the lamp is lifted upwardly out of the holder.

In view of the fact that the socket portion 24 of the holder 16 is rotatably mounted within the body portion 18, it may be turned so that the slot 26 therein is placed in any desired position. As illustrated, the slot is in its upper position so that the lamp is inserted from above the holder. If desired, the slot 26 may be positioned at some desired spacing from that shown in order that the lamp may be inserted from the side or from the bottom, as desired. When this is done, the operation of the switch means in the holder is not interfered with in any way as the contact terminals 39 and 40 as well as the contact bar 36 are always maintained in proper relationship in view of the manner in which the socket portion 24 and cup-shaped member 31 are related.

In view of the foregoing description of a preferred embodiment of my invention, it will now be apparent that the holder arrangement shown has many advantages over devices now in use. It eliminates danger from shock during insertion and removal of the lamp. The position of the slots to receive the ends of the lamp may be readily shifted by rotating the socket portion of the holder. The socket portions are for the most part standard for all lamp sizes with the exception of the cup-shaped member 31 of the holder 16 which may be readily exchanged to accommodate lamps of different sizes or ranges of size. The lamp holders are of such construction that the lamp is so supported that very little of the radiated light is lost by being masked off by the holders. The lamp electrodes or terminals

operate at a lower temperature for the reason that the ends of the lamps are not buried in long sockets. The locking socket 16 is so constructed that vibration and shock cannot affect the opening of the lamp socket. The lamp-holder arrangement as a whole utilizing one holder with a yieldable contact element functioning to urge the opposite end of the lamp into the other holder which is of the locking type, provides an arrangement which is safe and which provides for adequately supporting and conducting current to the lamp under the most adverse operating conditions.

While I have shown and described a preferred embodiment of my invention, it will be understood that changes and modifications may be made therein without departing from the principles thereof.

I claim as my invention:

1. In a discharge tube lighting system, the combination with a gaseous discharge tube having a contact element at each end thereof, of a pair of lamp holders for supporting and conducting current to the tube, one of said lamp holders having a receptacle portion disposed to receive one end of the tube and operable to mechanically lock the end of the tube in said holder and embodying a switch actuated by said receptacle portion for controlling the energizing circuit for the tube, and the other of said lamp holders embodying a switch actuated to its closed position when the other end of the tube is inserted into the holder for controlling the tube circuit.

2. In a discharge tube lighting system, the combination with a gaseous discharge tube having at least one contact element at each end thereof, of a pair of lamp holders for supporting and conducting current to the tube, one of said holders embodying a spring-biased movable contact member and a normally-open switch actuated thereby when one end of the tube is engaged in the holder, and the other of said holders having a rotatable locking member receiving the other end of the tube and operable to mechanically lock the tube in the end of the holder and embodying a switch actuated to closed and opened positions in response to the operation of the rotatable locking member to locking and unlocking positions, respectively, for controlling the energizing circuit for the tube.

3. A lamp holder for a tubular discharge lamp comprising, a housing member of hollow construction having an opening in one face thereof, a separate socket member detachably mounted in said opening, said socket member having a circumferentially extending slot therein adjacent its outer end of such width as to receive the end of the lamp, a pair of stationary contact members mounted on the bottom of the socket member, a cup-shaped member having a contact element therein mounted in the socket member to receive the end of the lamp, said cup-shaped member having a slot therein corresponding generally in shape and size to the slot in the socket member and being rotatable within the socket member to open and close the slot therein, and a contact member mounted on the bottom of the cup-shaped member and electrically connected with the contact member therein operable to bridge said stationary contact members when the cup-shaped member is rotated to close the slot in the socket member.

4. A lamp holder for use with tubular discharge lamps and tubes comprising, a hollow housing member having a side opening, a socket portion attached to the side of the housing mem-

ber over the side opening and having an opening in the face thereof opposite said side opening to receive the end of the lamp, a contact member movably mounted in the socket portion and having a stem portion extending into the housing member through the side opening, said contact member being disposed to be engaged by the end of the lamp, a spring mounted on the stem portion for biasing the contact member outwardly toward the opening in the face thereof, and switch means comprising a pair of normally disengaged contact members mounted in the housing member opposite said side opening disposed to be actuated into engagement by the endwise movement of the stem portion of the contact member when the end of the lamp is inserted into the socket portion into engagement with the contact member.

5. A lamp holder for use with tubular discharge lamps comprising, a hollow housing member having a socket portion at one side thereof, said socket portion having an open-sided slot at the end thereof of such length as to receive the end of a lamp, a cup-shaped member rotatably mounted in the socket portion and having an open-sided slot at the end thereof which may be moved into registering position with said other slot to receive the end of the lamp and out of registering position to lock the lamp in the holder, contact means mounted in the cup-shaped member to engage the lamp terminal, spaced stationary contact members mounted in the bottom of the socket portion having terminal portions exposed within the housing member for connection to the supply circuit for the lamp and having contact making portions exposed on the inside face of the socket portion, and a contact member carried by the cup-shaped member and electrically connected with the contact means therein operable to bridge said contact making portion of the stationary contact means in the socket portion and connect the contact means in the cup-shaped member thereto when the cup-shaped member is in locking position.

6. A lamp holder for use with tubular discharge lamps comprising, a hollow housing member having a socket portion on one side thereof with stationary spaced contact members therein, said socket portion having a circumferential slot therein intermediate its ends, a cup-shaped member mounted within said socket portion to receive the end of the lamp and having a contact element disposed therein to be engaged by the lamp terminal, said socket portion and cup-shaped member having open-sided slots therein adjacent their outer ends to receive the end of the lamp when in registering position and to lock the lamp into the holder when in non-registering position, a contact element mounted on the back of the cup-shaped member and electrically connected with the contact element therein operable to bridge the said stationary spaced contact members in the socket portion when the cup-shaped member is actuated to bring said slots into non-registered locking position, and an actuating member attached to the cup-shaped member and extending outwardly therefrom through the circumferential slot in the socket portion.

7. A lamp holder for use with tubular discharge lamps comprising, a hollow housing member having an opening in the front face thereof, a first cup-shaped socket member mounted on the front face of the housing member, said socket member having a base portion extending through said opening in the front face of the housing member, a pair of spaced contact members mounted in said base portion with their terminal portions disposed within the housing member for connection to electrical conductors and their opposite contact making portions terminating on the inside face of the base portion within the socket member, a second cup-shaped socket member rotatably mounted within the first socket member, said second socket member being of such size as to receive the base and end portion of the lamp and having therein a contact element disposed to be engaged by the contact element of the lamp, and a bridging contact member mounted on the face portion of the base of the second socket member electrically connected with the said contact element within said second socket member operable in response to a predetermined amount of rotation of said second socket member to bridge the contact making portions of the spaced contact members in the base of said first socket member.

8. A lamp holder for use with tubular discharge lamps comprising, a housing member of hollow construction having a socket portion at one side thereof, said socket portion having an open-sided circumferential slot at its outer end of such size as to receive the base and adjacent end portion of the lamp, a pair of spaced stationary contact members extending through the bottom of said socket portion with their terminal portions disposed within the housing and their contact making portions exposed on the inside of the socket portion, a cup-shaped member mounted in the socket portion for limited rotational movement and having an open-sided circumferential slot adjacent its outer end of such size as to receive the base and adjacent end portion of the lamp whereby when the cup-shaped member is rotated in one direction the slots are in registering relation to receive the end of the lamp and when rotated in the opposite direction the slot in the socket portion is closed to lock the lamp in the holder, a contact element mounted within the cup-shaped member to be engaged by the lamp terminal, and a switch member mounted on the bottom of the cup-shaped member and electrically connected with said contact element within the cup-shaped member disposed to engage and disengage the contact making portions of said spaced stationary contact members when the cup-shaped member is actuated into and out of locking relation with the socket portion.

9. A lamp holder for use with a tubular discharge tube or lamp having a contact element at each end thereof comprising, a hollow housing member having a relatively small side opening in the front face thereof, a cup-shaped member attached to the face of the housing member over said side opening and having an opening in its bottom portion to receive the end of the lamp, a movable contact member mounted in the cup-shaped member and including a stem portion extending into the housing member through its side opening, a spring biasing said contact member away from the face of the housing toward the opening in the bottom portion of the cup-shaped member so as to be engaged and moved back away from said opening when the end of a lamp is inserted into the cup-shaped member, and a pair of normally disengaged contact springs mounted in the housing member in front of the side opening to be actuated into engagement by the endwise movement of the stem portion of the contact member.

10. A lamp holder for use with tubular discharge lamps or tubes comprising, a hollow housing member having a side opening in the front face thereof, a socket portion attached to the front face of the housing member over said side opening and having an opening in the outer end thereof to receive an end of the lamp, a contact member movably mounted in said socket portion in front of the end opening to be directly engaged by the lamp terminal and moved away from said end opening upon insertion of the end of the lamp into the socket portion, said contact member having a stem portion extending into the housing member through its side opening, and normally open switch means mounted in the housing member disposed to be actuated to closed position by the movement of the stem portion of the contact member when moved by the end of the lamp.

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