July 20, 1943. V. R. DESPARD 2,324,683

SOCKET FOR FLUORESCENT LAMPS

Filed Nov. 20, 1940

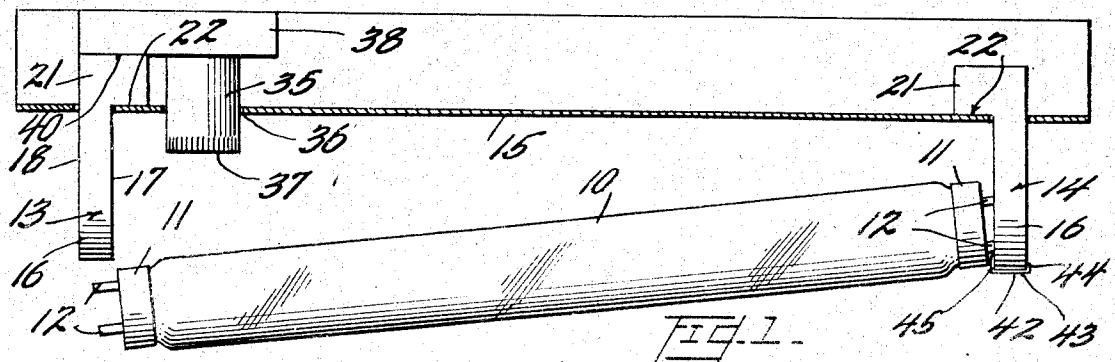


FIG. 1.

FIG. 2.

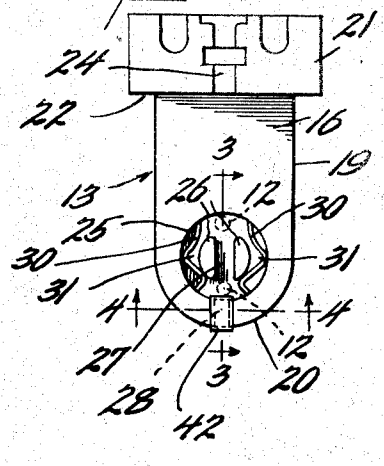


FIG. 3.

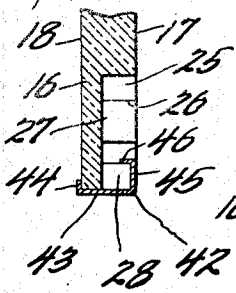


FIG. 4.

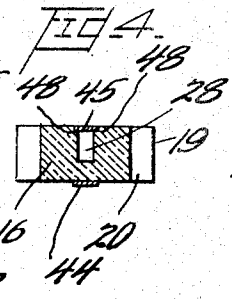


FIG. 5.

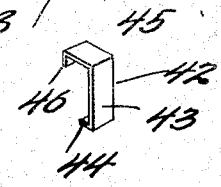


FIG. 6.

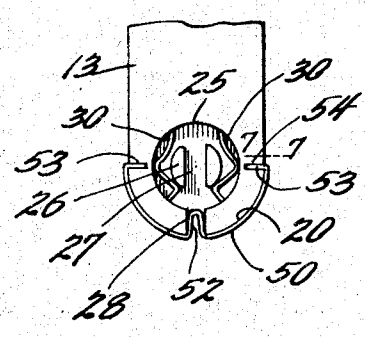


FIG. 7.

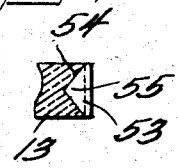
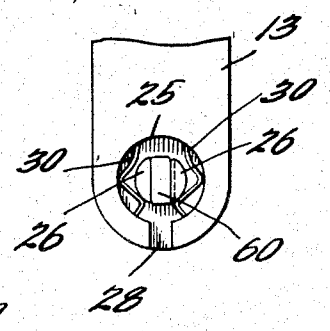


FIG. 8.



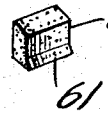


FIG. 9.



FIG. 10.

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SOCKET FOR FLUORESCENT LAMPS

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Application November 20, 1940, Serial No. 366,494

6 Claims. (Cl. 173—328)

This invention relates to lamp sockets and more particularly to sockets for tubular electric lamps, which sockets are used in pairs, one cooperating with each end of the lamp.

It is a general object of the present invention to provide a novel and improved lamp socket.

More particularly it is an object of the invention to provide a novel and improved combination of lamp, sockets and a lamp retaining member removably engaging one socket and adapted to cooperate with portions of one end of the lamp to retain it in position while the other end is removed from its socket.

Another object of the invention consists in the provision of a removable clip or guard member adapted to obstruct the entering slot, in a socket, adapted for double-ended double-pin conductor lamps of the tubular type, whereby the pins cooperating with that socket are prevented from falling out even though the other end of the lamp is removed from its socket for certain purposes.

An important feature of the invention consists in the arrangement of a removable member adapted to cooperate with walls of portions of a socket to form a closure or stop for the straight, pin-entering slot whereby the pins on one end of a lamp may be prevented from moving radially out from their socket.

Other and further objects and features of the invention will be more apparent to those skilled in the art upon a consideration of the accompanying drawing and following specification wherein are disclosed several exemplary embodiments of the invention with the understanding that such changes, combinations and modifications of the same may be made as fall within the scope of the appended claims without departing from the spirit of the invention.

In said drawing:

Figure 1 is a side elevation partly in vertical section of a lamp, sockets, supporting base and starter assembly showing one of the sockets equipped with one embodiment of the present invention;

Figure 2 is an inner face view of the right hand socket of Figure 1 showing the device of the same embodiment of the invention in position thereon;

Figure 3 is a vertical section taken on line 3—3 of Figure 2;

Figure 4 is a horizontal section taken on line 4—4 of Figure 2;

Figure 5 is a perspective view of the slot closing clip of the first embodiment;

Figure 6 is a fragmentary view similar to Figure 2 but showing a different type of lamp holding clip in position;

Figure 7 is a fragmentary section on line 7—7 of Figure 6;

Figure 8 is a view similar to Figure 6 showing a further embodiment;

Figure 9 is a perspective view of the attachment as used in the embodiment of Figure 8; and

Figure 10 is a view similar to Figure 2 showing a further embodiment of the barrier.

Tubular electric lamps, particularly those of the type known as fluorescent, are commonly manufactured in diameters of from one to one and one-half inches and in lengths from eighteen inches to four feet or longer and require, for their operation under normal conditions, the application of current to each end thereof. For starting purposes two conductors must be associated with each end of the lamp so that the conventional construction thereof includes a pair of contact pins extending longitudinally from each end of the lamp, the axes of all four pins lying in the same plane.

The type of socket used to receive each end of the lamp is so constructed that the lamp may be moved in the plane passing through these pins, and laterally of the pins, to introduce them into slots in the sockets after which the lamp is rotated about its axis for 90°, engaging each pin with a separate contact spring which is given such a configuration as to retain the lamp in this position.

The operation of assembling a short lamp into its sockets is relatively simple, but in the larger sizes, particularly where ready access to both sockets is not available, difficulty is sometimes experienced in holding both ends of the lamp in position until the same is rotated for locking.

It is the present practice in alternating current installations to make an increasing use of so-called automatic starter devices for these lamps which provide the proper current for heating the filaments at opposite ends of the same for a brief interval and then disconnecting the filaments and using them only as terminals for the current providing the ultra-violet light source for energizing the fluorescent inner coating on the lamps. These automatic starters are conveniently housed in a small cylindrical casing having a pair of pins on one end adapted to be introduced into a socket and secured therein by bayonet connections. It has been found convenient to combine the starter socket with one of the lamp sockets and to permit the face of the starter to project out just beneath the lamp tube.

The starters are subject to service difficulties which sometimes require their renewal and for this purpose one end of the lamp must be removed from its socket for access to the starter to change the same.

Most fluorescent lamps are mounted with the sockets inverted so that the pin introducing slots are vertical and pointed downwardly. If the lamp should be rotated 90° to release the pins it would tend to fall out of the sockets by gravity. One end, that adjacent the starter only need be released, but the other end will also be released upon this rotation and it is the purpose of the present invention to provide means to hold the pins at the far end within the socket while yet permitting them to be rotated without hindrance when desired. Such means may be permanently built into one socket, but since the sockets at the opposite ends are otherwise identical it is more convenient to make them from the same mold and to subsequently apply a device in accordance with the present invention to act as a pin retaining means.

For a more complete understanding of the present invention reference should be had first to Figure 1 of the drawing wherein 10 illustrates the central tubular glass portion of a fluorescent lamp equipped with end caps 11 from which protrude the rod-like contact pins 12, two from each end, these four pins all lying with their axes in the same plane as clearly seen in the drawing. Socket members 13 and 14 are provided for each end of the lamp and in the approved manner such sockets are shown mounted protruding through a sheet metal base or canopy 15 adapted to be mounted against a ceiling, wall, part of a fixture, or on other and perhaps ornamental surfaces. The base or canopy 15 in most cases supports a trough-like reflector partly surrounding the lamp, but this has been omitted from the illustration for the sake of clearness.

The two sockets 13 and 14 for the opposite ends of the lamp are preferably identical in construction and each includes a main or body portion 16 substantially rectangular in horizontal section having a flat inner face 17, a parallel outer face 18, and a connecting edge 19, semi-circular at the bottom as shown at 20. The main portion of the socket projects from a larger base 21 adapted to be housed within the canopy and having a flat front, or downwardly projecting face, 22 adaped to abut against the inner face of the bottom wall of this canopy. A suitable fastening screw, not shown, is received in the slot 24 in the base for securing the socket to the canopy. An appropriate opening in the canopy just slightly larger in size than the cross-section of the main portion 16 of the socket permits this part to be passed through the canopy as shown in Figure 1.

In order to receive and hold the two pins on the end of the lamp tube, each socket, of the type shown for example in Figure 2, is equipped with an annular recess 25 deeply cut into the main portion thereof from the inner face 17. The diameter and width of this recess are such that it loosely receives for rotation therein the spaced pins 12 on the end of the lamp. The central stud, of insulating material like the main portion of the socket, projects up through this annular recess and is divided into two laterally spaced parts 26 by a radial slot 27 vertically arranged as viewed in Figure 2. An extension 28 of slot 27 leads from the recess to the rounded lower edge 20 of the socket to permit the introduction of the pins by moving the lamp so that these pins follow one another through this extension 28 and the slot 27 to come to a stop as shown in dotted lines in Figure 2 by engagement of one of them with a wall of the annular recess. Thereafter a rotation of 90° will cause them to press apart the contact springs 30 and come to a stop in the bights 31 thereof where they are tightly held and electrically contacted, being pressed against the central portions 26 by the springs. The construction of such a socket is more fully shown and described in the patent to Marshaus 2,137,174, patented November 15, 1938 and the present invention contemplates improvements therein. The invention is likewise adaptable to sockets constructed for similar uses in which the central stud is unslotted, where it is entirely absent or where it has no specific pin guiding function.

It will be understood that the two sockets 14 are identical and that their recesses face each other as mounted on the canopy. A starter 35, for convenience in putting the lamp in operation, is adapted to be partially housed in the canopy and to project through the circular aperture 36 therein. This starter is protected by a cylindrical metal casing as shown, and mounted so that only a minor portion of the same extends beyond the opening 36, permitting the lamp to be placed in position without engaging the flat upper end 37 of the starter casing. The starter is received and held by means of bayonet joints, not shown, in a recess in the relatively flat starter socket 38 which is conveniently assembled by being attached with suitable screws and contact devices, not shown, to the bottom 40 of one of the sockets, 13, as clearly seen at the left of Figure 1.

In order to remove the starter for replacement, it is necessary to drop one end of the lamp to the position illustrated in that figure, grasp the head of the starter by the knurled portion and rotate the same for about 45° whereupon it may be withdrawn and replaced by another.

The operation of replacing the starter necessitates dropping at least one end of the lamp to the position shown in Figure 1. Such lamps are relatively fragile and in the longer sizes are somewhat difficult to handle especially in crowded quarters or when standing on a ladder, so it is desirable to permit one end to remain in its socket during the operation. With the usual inverted mounting, as shown in the drawing, the rotation of the lamp to align the pins with the slots 27, 28 would permit the lamp to drop out by gravity, but in accordance with the present invention means is provided for obstructing one of the slots 27 or 28 to prevent this while at the same time permitting the lamp to be rotated to release the pins from their contacts and entirely from the socket at the opposite end where access must be had to the starter.

The sockets 13 and 14 are identical in construction and are preferably molded from a suitable artificial resin or other plastic. In accordance with the present invention it is not necessary that different types of sockets be provided for the opposite lamp ends in order to achieve the benefits of the improvement. The same mold may be used for making all sockets and the slot 28 closed, for instance, by the device 42 shown in Figure 5. This is a clip formed of a strip of any desired material, but best of metal and bent to have a central or main portion 43 of a length just slightly greater than the distance between the front and back faces 17 and 18 of the socket. A small locking tab 44 extends at

right angles from one end thereof and from the other end a portion **45** extends at right angles and has a length approximately equal to the distance between the curved surface **20** and the outer wall of the annular recess **25**. On the end of this there is a short tab **46** at right angles thereto and substantially parallel to the main portion **42**. This tab **46** is adapted to be hooked against the outer wall of the annular recess as shown in Figure 3, with the part **45** lying against the inner face **17** of the socket, and then the tab **44** is snapped over the rear face **18** bringing the main portion **43** down against the curved edge **20**.

The width of the strip forming the clip **42** is somewhat greater than the width of the slot **28** so as to ensure closing it entirely. In order to prevent the clip from moving laterally, since the surface **20** is substantially parallel to the outer wall of the annular slot, the edges of the slot portion on the face **17** are re-entrane as at **48**, providing a counter-slot of a width just slightly greater than the width of the strap forming the clip and of a depth about that of the thickness of the metal strap. Thus the portion **45** assumes a position with its outer face substantially flush with the face **17**, and lateral movement is prevented. The clip is easily snapped on or off manually as desired and when in position the portion **46** forms a closure for the inner end of slot **28** preventing the pins, when in the position shown in dotted lines in Figure 2, from falling out or being moved out through this slot. The end of the lamp, then, engaged in the socket containing the clip can be supported by the socket as shown in Figure 1 even though the other end of the lamp is removed from its socket.

In the embodiment disclosed in Figure 6 the structure of the socket is the same as that just explained, but a semi-annular spring clip **50** is arranged to fit over the curved surface **20** at the lower end of the socket and has a re-entrant folded portion **52** closing the whole extension of the radial slot as clearly seen in the figure. The ends **53** of the clip are bent inwardly toward each other and substantially radially to the arc of the clip and are adapted to be fitted in slots **54** in the edges of the socket. If the ends of the spring are formed pointed as shown at **55** in Figure 7 and the slots are made to the same configuration, any possibility of the spring slipping out by movement in the direction of the length of the slots is prevented.

In Figures 8 and 9 is shown a further embodiment wherein a suitable plug or stopper **60**, which may be of spring metal or some resilient material such as rubber or the like, is used to close the radial slot between the portions **26** of the central insulation extension. It may thereby cooperate with the upper pin, when in the dotted line position as shown in Figure 8 to prevent the lamp end from dropping out of the socket which is equipped with the invention. The device **60** may be held in frictionally in or without the aid of suitable cooperating ribs and shoulders as may be provided for the purpose such as shown at **61** in Figure 9.

A further embodiment of the invention is illustrated in Figure 10, where a socket quite similar to that illustrated in Figure 2 is shown, but in this particular construction the central guiding stud has been omitted since the socket may function satisfactorily in its absence. In fact, the main recess **70** in this construction need not be circular in conformation except for convenience. If it is other than circular the contact springs **71** may be slightly changed in configuration to properly accommodate the two pins on the lamp. The recess **70** is connected to the edge of the socket by the conventional entrance slot **72**.

In this embodiment, as well as in those previously discussed, it is not essential to the invention that this entrance slot or the slot **27** between the two parts of the central stud be completely closed or shut off, but it need only be obstructed or restricted in cross-sectional area to such an extent as to prevent the passage of the lamp contact pins. It is conceivable that such an obstruction may be of a resilient nature permitting the pins to be forced by the same upon the use of sufficient force which, however, should be considerably less than that which would endanger the lamp or its contacts.

In the construction shown in Figure 10, the side walls **73** of the slot **72** are each slitted as at **74**, these slits being in alignment and facing each other and being adapted to receive the outturned ends **75** of the arms of a spring **76** of generally U-shape. This spring constitutes a barrier and is positioned by sliding the outturned ends into the slits **74**. It is of such a size that its bottom forms a substantial continuation of the recess wall thus providing a stop for the lamp pin which, however, does not obstruct its rotation within the recess.

Obviously the invention is not restricted to the several embodiments shown but is directed broadly to means for retaining the pins in position in one socket while the other one is removed for any purpose whatsoever. Such a device may have a more or less permanent mounting on the one socket, for when lamps are to be renewed or replaced the pins for engagement in the socket which is closed by the clip may be introduced longitudinally when the other end of the lamp is positioned as shown at the left in Figure 1. Then the left end of the lamp may be lifted to introduce its pins into its socket and the whole rotated to locking position.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. In combination, a tubular lamp having parallel terminals at an end thereof, a supporting socket having a single straight passageway through which the two terminals may be inserted for entrance to a widened chamber in which the terminals may be turned, and spring contacts in said chamber to engage the terminals when turned from the entrance position and normally hold the lamp in the socket, a barrier insertable into the straight passageway to close the same against removal of the terminals and spring means extending in two directions from the barrier and having means cooperating with the socket to hold the barrier in position.

2. In a socket for tubular electric lamps, in combination, a member of insulating material having a face adapted for positioning normal to the axis of a lamp, said face having a recess and a slot extending therefrom to an edge of said face, and a spring clip snapped over the said edge of said member, said clip being shaped to engage in said recess and to close one end of the said slot.

3. In a socket for tubular electric lamps, in combination, a member of insulating material having a face adapted for positioning normal to the axis of a lamp, said face having a recess and a slot extending therefrom to an edge of said

face, a spring clip covering said slot in said face and edge, and shoulders on said member cooperating with said clip to position the same against lateral movement along the member.

4. In a socket for tubular electric lamps, in combination, a member of insulating material having substantially parallel front and rear faces and a connecting edge substantially normal thereto, one of said faces having a deep recess spaced from said edge, a slot extending through said edge and intersecting said recess and a spring clip snapped over portions of and engaging said faces and edge at the sides of the slot for positioning the clip and to close off said slot.

5. In a socket for tubular electric lamps, in combination, a member of insulating material having substantially parallel front and rear faces and a connecting edge substantially normal thereto, one of said faces having a deep recess spaced from said edge, a slot extending through said edge and intersecting said recess and a spring clip snapped over portions of said faces and edge to close off said last mentioned slot, said clip comprising a length of springy metal strip slightly wider than said slot and having an intermediate portion of a length substantially equal to the thickness of said member and engaging said edge, a back face engaging portion extending at right angles to said intermediate portion, and a front face engaging portion having a length equal to the distance from the edge to the recess, and a tab on the free end of said last mentioned portion engaging the outer wall of the recess to hold the clip in position.

6. The combination with a socket for fluorescent lamps having a member of insulating material with substantially parallel front and rear faces and a connecting edge substantially normal thereto, with a deep recess in one face spaced from said edge and connected thereto by a slot, of a spring clip in snap engagement with said socket to close off the slot, said clip comprising a length of springy metal strip having an intermediate portion closing the entrance to said slot and recess through said edge, and end portions in cooperative engagement with the said edge and the wall of said recess to retain the strip in position.

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