Fastening Means for Securing a Fluorescent Lampholder to a Panel

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The present invention relates to a means for supporting and retaining a wiring device such as an electric lampholder in a thin panel, and is particularly applicable to a fastening means for supporting and retaining a fluorescent lampholder in a panel aperture.

For assembling prior art lampholders, such as fluorescent lampholders, in lighting fixtures, fastening hardware, such as screws and nuts, commonly has been utilized. The use of this fastening hardware for mounting the fluorescent lampholder, entails an additional material and labor cost which has proven to be restrictively expensive for certain fixture applications. To obviate the increased cost involved in employing the fastening hardware, specially constructed fluorescent lampholders have been provided. These specially constructed lampholders are specifically adapted to cooperate with apertures formed in a thin panel and to position the lampholder in the fixture. However, it has been found that these specially constructed lampholders of the prior art, due to the peculiarities of their design, are relatively inflexible in their application. For example, the vast majority of these special lampholders are restricted by their structure so that they can only be mounted in a supporting panel with a single fastening technique. It has therefore been considered desirable to provide an improved means for simply and expeditiously fastening a fluorescent lampholder to a panel aperture without requiring a restrictive lampholder structure and involving the use of an improved lampholder which may be alternatively mounted by a different and more conventional technique.

An important object of this invention is to provide an improved fastening means for mounting a lampholder in secure engagement with an aperture located in a supporting panel.

Another important object of this invention is to provide an improved lampholder which may be efficiently and conveniently fastened to a thin supporting panel by either of two different techniques.

An additional object of the present invention is to provide an improved fluorescent lampholder which readily lends itself to convenient and secure cooperative mounting engagement with apertures formed in supporting panels of varying thicknesses.

A further object of this invention is to provide an improved fluorescent lampholder constructed in such a manner as to enhance its flexibility of usage for mounting applications, the lampholder also being relatively inexpensive to manufacture.

In carrying out one aspect of the present invention, in one form thereof, there is provided a fastening means for positioning and supporting an improved fluorescent lampholder in a generally rectangular aperture of a panel. This fluorescent lampholder has an L-shaped insulating body with an enlarged recess therein. A pair of resilient contact members are positioned in this recess and arranged to resiliently engage and seat pins of a bi-pin fluorescent lamp. The insulating body has an L-shaped profile in that it includes a supporting section, and an upright section extending outwardly from a transverse wall of the supporting section. The upright section includes parallel front and rear faces in perpendicular relationship with opposed parallel sides. At the juncture of the upright section and the transverse wall of the supporting section, a pair of oppositely disposed parallel slots are formed in the opposite sides of the upright section. These slots each open at one end into the front face of the insulating body and terminate at the other end between the front face and the rear face of the insulating body. An integral and upright rib-like step is thus formed in each side of the insulating body between the inner end of the slot and rear face of the upright section. The slots of the insulating body are slidably cooperative with an appropriately dimensioned rectangularly configured aperture of a thin panel to position and support the insulating body in the panel without requiring the use of fastening hardware.

When the lampholder of the present invention is mounted in the panel without fastening hardware (i.e., by cooperation between the slots and the aperture), to provide additional simplified securement for the lampholder in the panel aperture, a lanced tongue of L-shaped configuration may also be formed in the panel. This tongue enters into a conventional fastener mounting recess formed in the supporting section of the lampholder and frictionally engages this recess to provide an additional point of engagement between the lampholder and the panel.

In the event that it becomes desirable to position and fasten the improved lampholder of the present invention in a panel aperture dimensioned for lampholders of rectangular configuration by using conventional fastening hardware, the aforementioned structure of the lampholder readily lends itself to such an application. For such an application, the rib-like steps of the upright section of the lampholder then engage the sides of the aperture to position the lampholder in the panel for attachment thereby to the conventional fastening hardware. Our improved lampholder may thus alternatively be effectively positioned and supported in appropriately dimensioned panel apertures either with or without the use of supplemental fastening hardware.

By a further aspect of the present invention, there is provided a simple and effective means for conveniently securing the lampholder in panels of different thicknesses without requiring any supplemental hardware. More particularly, to enable the mounting slots of the improved lampholder to readily accommodate panel thicknesses of varying dimensions and, at the same time, establish a secure fastening engagement therewith, each slot has a tapered transverse wall section which provides a gradually diminishing thickness. The tapered wall sections allow the same lampholder to effectively slidably cooperate with supporting panels of varying gages, thereby enhancing the flexibility of application for the lampholder.

Further aspects of the present invention will become apparent hereinafter and the specification concludes with claims particularly pointing out and distinctly claiming the subject matter which we regard as our invention. The invention, however, as to organization and method of operation, together with other objects and advantages thereof, may best be understood by reference to the following description when taken in conjunction with the accompanying drawing, in which:

FIG. 1 is a fragmentary perspective view showing an improved fluorescent lampholder embodying the present invention, the lampholder being fastened to a panel aperture without requiring separate fastening hardware and supporting the base of a fragmentarily shown lamp; FIG. 2 is a front elevational view of the lampholder of FIG. 1; FIG. 3 is a sectional view taken generally along the line 3—3 of FIG. 2; FIG. 4 is a side elevational view of the lampholder of FIG. 1; FIG. 5 is a plan view of the lampholder positioned and
supported within the panel aperture of FIG. 1, without requiring any additional fastening hardware;

FIG. 6 is a sectional view taken generally along the line 6-6 of FIG. 2;

FIG. 7 is a sectional view of the panel aperture of FIG. 6 taken along the line 7-7 of FIG. 6;

FIG. 8 is an enlarged partially sectioned fragmentary view showing the configuration of a mounting slot of the improved lampholder and an associated edge of a panel aperture in cooperation with the tapered cross section of the slot; FIG. 9 is a plan view of a panel aperture suitably operable with the tapered cross section of the mounting slots of the lampholder, as shown in FIG. 8;

FIG. 10 is a plan view of our improved lampholder positioned in a panel aperture and supported therein by supplementary fastening hardware; and

FIG. 11 is a plan view of the panel aperture shown in FIG. 10.

Referring first to FIG. 1 of the drawing, there is shown one end of a conventional bi-pin fluorescent lamp 1 positioned in a fluorescent lampholder 3 constructed in accordance with the present invention. The lampholder 3 is positioned in and supported by cooperative engagement with a reflective panel 5, which forms part of a lighting fixture or the like. The lamp 1 has a tubular glass envelope 7 provided with a pair of bases 9, such as the one shown in FIG. 1. Base 9 houses a pair of contact pins (not shown) to be supported in lampholder 3.

Turning now to a consideration of the lampholder 3, attention is first directed toward FIGS. 1-4, which illustrate the over-all construction thereof. To afford maximum simplicity, as best shown by viewing FIGS. 2 and 3, lampholder 3 comprises only five basic parts. These parts include insulating body 11, two contact members 13, cover member 15, and fastening clip 17. The insulating body 11 is molded from some suitable insulating material, and its profile is of generally L-shaped configuration (FIG. 4), having the enlarged recess 19 therein (FIG. 2). To provide a compact and sturdy support for the contact pins of each lamp base, body 11 is of one-piece molded construction and, as viewed in FIG. 4, includes a generally box-shaped base portion 21 with smooth bottom and top walls 21a and 21b, respectively, and an upright portion 23 that extends outwardly and upwardly from top wall 21b.

To close recess 19 of insulating body 11 and also furnish a supporting surface for contact members 13 therein, insulating cover 15 has been provided. Cover 15 is securely and conveniently attached to the open rear of body 11 by means of U-shaped fastening clip 17. More particularly, the bent over ends 17a and 17b of clip 17 are pushed through apertures 25 and 27 of cover 15 and then forced into molded openings 29 and 31 of body 11 (as shown in FIG. 3), to fasten cover 15 to body 11.

As shown in FIG. 4, the upright portion 23 of body 11 is characterized by thinness in size, i.e., the distance between the front surface 33 and back surface 35 of the upright portion, thus enhancing the over-all space economy of the lampholder 3. To roll or slide the contact pins of a bi-pin fluorescent lamp 1 into the lampholder 3, the upper end wall 37 of body 11 (as seen in FIG. 2) has an uprightly guided and inwardly inclined converging section 39 which are rounded and turned downwardly to establish an entry slot 41 for movement of the lamp pins into the socket. For guiding the pins of a bi-pin fluorescent lamp within the lampholder 3, there are provided two intersecting arcuate grooves 43 in the front wall of upright portion 23. Grooves 43 are separated and formed in part by a cordate boss 45. Boss 45 has its front surface coplanar with front surface 33, and the apex of the boss is directed toward entry slot 41. The grooves 43 thus open into and intersect entry slot 41 so that the pins (not shown) of a bi-pin lamp may be passed into the arcuate grooves and guided into engagement with associated lamp pin seats of the resilient contacts 13 (FIG. 2).

Turning now to a very important aspect of the present invention, as shown in FIGS. 2, 4, and 8, it will be noted that opposed elongated sides 46 of upright portion 23 each have an interrupted slot 47 formed at the bottom thereof. The slots 47 are oppositely disposed relative to each other (FIG. 2) and face outwardly or sideways from the sides 46 of upright portion 23. More particularly, each interrupted slot 47 opens at one of its ends into front face 33 of portion 23 (FIG. 4) and terminates at its other end between front face 33 and back face 35, at inner vertical wall 49 (FIG. 4). Inner wall 49 of slot 47 forms the frontal part of an upright rib-like step 51 interposed between the inner end of the slot and the back of insulating body 11. (See also FIG. 5.) The purpose of the ribs 51 shall become apparent hereinafter.

Considering now in further detail the structure of the interrupted slots 47 of lampholder 3, attention is directed to FIGS. 6 and 8. As shown in FIGS. 6, 7, and 8, the slots 47 essentially form part of the smooth top wall 21b of base portion 21, elongated vertical wall 53, tapered ceiling section 55 and horizontal ceiling section 56. The outer surfaces of walls 21a, 53 and sections 55, 56 extend between front face 33 and end wall 49, and are recessed from side 46 to form slot 47. As also shown in FIG. 8, the vertical wall 53 forming the bottom of the slot is conterminous and perpendicular at its lower end, with top wall 21b. Tapered ceiling section 55 is conterminous at its inner end to the top end of vertical wall 53, and at its outer end, the section 55 is conterminous with the inner end of horizontal ceiling section 56 (again viewing FIG. 8). The outer end of horizontal ceiling section 56 is conterminous and perpendicular with side 46.

For efficiently and simply fastening the improved lampholder 3 of the present invention to a panel 5 without the necessity of utilizing any supplementary hardware such as screws and nuts, as shown in FIG. 6, a specially configured aperture 57 has been formed in the panel. Aperture 57 is recessed from a relatively straight outer edge 59 of panel 5 and has a generally T-shaped configuration. More specifically, aperture 57 includes a pair of opposed relatively short edges 61, a pair of opposed elongated edges 63 separated by the horizontal center (viewing FIG. 6) of the aperture 57, and a pair of opposed elongated inner edges 65 stepped inwardly toward the horizontal center (viewing FIG. 6) of the aperture from edges 63. The edges 61, 63, and 65 are all parallel to each other and perpendicular to outer edge 59, being also perpendicular to shoulders 67, which connect the edges 61 to edges 63, and perpendicular to shoulders 69, which connect edges 63 to edges 65.

When forming the aperture 57 in panel 5, a tongue 71 is lanced outwardly from the thin panel material between the opposed edges 63 and 65. Tongue 71 is formed into an L-shaped configuration (FIG. 7) to include a dependant limb 73 and horizontal leg 75. Limb 73 extends downwardly (viewing FIG. 7) in perpendicular fashion from the main planar surface of panel 5, and the main portion of leg 75 extends upwardly (viewing FIG. 7) from the bottom end of limb 73 at a small angle relative to parallelism with panel 5. The free end of leg 75 is curved so that it presents a convex projective surface 77, as shown in FIGS. 3 and 7.

The base portion 21 of lampholder body 11 has a recess 78 formed therein. (See FIG. 2.) Recess 78 extends transversely inwardly from the front wall of portion 21 (viewing FIG. 3) toward the back face 35. In prior art lampholders, recess 78 has served to receive a nut which threads into engagement with a fastening screw for mounting the lampholder to a panel by means of supplementary hardware. In the lampholder of the present invention, the recess 78 not only is...
capable of performing such a function, but also may provide another important function in that it cooperates with tongue 71 to enhance the securement of lampholder 3 in panel aperture 57 without the requirement of supplemental material. The mode of cooperation between tongue 71 of the panel aperture 57 and nut slot 78 shall be set forth in further detail hereinafter.

Turning now to a discussion of the mounting technique utilized for fastening the improved lampholder 3 of the present invention to an aperture 57 in panel 5, attention is directed to FIGS. 1, 5, and 6. For positioning and securing the lampholder 3 to the panel 5, the unmounted lampholder is first arranged with front face 33 in spaced panel adjacency. The upper edge 86a of panel 5, and the smooth top wall 210 of the lampholder body 11 is located just underneath the principal surface of panel 5 (viewing FIG. 1). The interrupted slots 47 of lampholder body 11 are then aligned with edges 63 of the aperture and slid into engagement with the aperture 57, as shown in FIG. 6. More particularly, the slots 47 of lampholder 3 are thrust into engagement with the panel aperture so that the edges 63 are disposed within the slots.

When the slots 47 of the lampholder body 11 are slid into engagement with the panel aperture 57, as shown in FIG. 5, the generally flat leg 75 of tongue 71 enters nut receiving recess 78 of the panel 5, thereby effecting engagement of the securement of the lampholder in the panel aperture 57. It will then be seen, that lampholder 3 of the present invention cooperates with aperture 57 of panel 5, so that the corners formed by shoulders 67 and edges 63 of aperture 57 engage the inner ends of slots 47 at or near the steps 51 of the lampholder to provide two secure points of engagement near rear face 35 of the lampholder. The frictional engagement of leg 75 of the tongue 71 with the upper surface 79 of the nut slot 78 provides a third point of engagement for the lampholder with the panel. This third point of engagement serves to expeditiously assure the desired angular relationship between the principal plane of panel 5 and top wall 210 of the lampholder body. (See FIG. 4.) An efficient three-point securement of the lampholder 3 to panel 5 is thus simply and economically achieved without the necessity of any additional hardware such as the commonly utilized screws and nuts of the prior art.

Turning now to a further aspect of this invention, to enable the lampholder 3 to slidably cooperate with apertures formed in panels of different thicknesses, and thereby considerably enhance the flexibility of application of this lampholder, as shown in FIG. 8, the interrupted slots 47 each include the aforementioned tapered ceiling section 55. Section 55 provides a gradually diminishing thickness between horizontal ceiling section 86 and vertical wall 53 which readily accommodates panel thicknesses of varying dimension. Thus, a variety of gages of thin panel material may be utilized in the fixture, with the distance between opposed edges 80a of a generally rectangular aperture 80, such as is shown in FIG. 9, being appropriately dimensioned to provide the desired fit. For example, if it is desirable to provide a close fit for the lampholder with the panel aperture, as shown in FIG. 8, the distance between edges 80a of the panel aperture may be dimensioned relative to the panel thickness so that the inner edges 80a just engage tapered section 55. With this arrangement, the inner edges 80a of the panel aperture 80 and the tapered surfaces 52 of slots 47 will provide a secure engagement between the lampholder and the panel. On the other hand, if a loose fit between the lampholder and panel aperture is desirable so that the lampholder will be primarily supported by three-point engagement provided by tongues 71 and shoulders 67 of the panel aperture, the edges 80a may be spaced farther apart to allow a suitable spacing from tapered section 55.

Turning now to another important aspect of the present invention, one of the salient advantages of the structure of the improved lampholder 3 is that such an application is not limited to a panel aperture, such as aperture 57 or aperture 80. In the event that it becomes desirable to use the improved lampholder of the present invention for mounting arrangement in a conventionally utilized panel aperture of the prior art, the structure of lampholder 3 readily lends itself to such an application. More particularly, lampholder 3 may be conveniently positioned in a rectangularly configured aperture 81 such as is shown in FIG. 11. Aperture 81 includes an elongated edge 83 which is in parallel relationship to an outer edge 87 of the panel 5a and is stepped inwardly therefrom by oppositely disposed side edges 85. The edges 85 thus open in perpendicular fashion into outer edge 87 of the panel. A fastening aperture 89 is also formed in panel 5, as shown in FIG. 11. The distance between the side edges 85 of rectangular aperture 81 is slightly more than the distance between the outer side surfaces of upright ribs 51 of the lampholder body 11. (See also FIG. 10.)

For mounting the improved lampholder 3 within aperture 81, the upright portion 23 of the lampholder is placed through the aperture, as shown in FIG. 10. Front surface 33 of the upright portion 23 of the lampholder is positioned to engage edge 83 of aperture 81, and the outer side surfaces of rib-like steps 51 engage smooth side edges 85 of the aperture 81. Front surface 33 and the sides of steps 51 of the lampholder thus serve to position the lampholder in rectangular aperture 81. For securely fastening the lampholder 3 to the panel 5a, a screw 91 is then extended downwardly (viewing FIG. 10) through frontal slot 93 of base portion 21. Screw 91 is threaded into engagement with a nut 95 (FIG. 10) positioned in nut slot 78. It will thus be understood that the rib-like steps 51 of the improved lampholder enable the lampholder body 11 to be properly positioned and mounted within rectangular apertures 81 for secure attachment to a panel by means of conventionally utilized fastening hardware.

It will now therefore be seen that the new and improved fluorescent lampholder of the present invention readily lends itself to an efficient and simplified fastening arrangement for securing the lampholder to an associated aperture of a supporting panel both with or without requiring the use of special fastening hardware. It will further be seen that a sturdy three-point fastening arrangement has been obtained for securing the improved lampholder to a cooperating panel aperture without requiring any extra hardware. It will be additionally understood that the tapered sections of the mounting slots of the improved lampholder enable the lampholder to expeditiously cooperate with and accommodate panels of varying thicknesses, thereby further enhancing the flexibility of application for the lampholder.

While in accordance with the patent statutes, we have described what at present is considered to be the preferred embodiment of this invention, it will be obvious to those skilled in the art that various changes and modifications may be made therein without departing from the present invention, and we, therefore, aim in the following claims to cover all such equivalent variations as shall be within the true spirit and scope of this invention.

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

1. A fluorescent lampholder, and a supporting means for slidably mounting said lampholder thereto, comprising a thin supporting panel having an aperture formed therein, a tongue formed in said panel adjacent said aperture, said lampholder including an insulative casing of L-shaped configuration, said casing having a base portion with a front face disposed thereon and an upright portion extending outwardly from the base portion, the front face of said base portion having a recess therein, said tongue of said panel being arranged to cooperate with the recess of said
base portion thereby to provide a first point of engagement of said lampholder with said panel, said upright portion including front, rear, and side faces, said side faces including a pair of oppositely disposed parallel slots facing outwardly in opposite directions, said slots each opening at one end into one face of said casing and terminating at the other end at an interruptive step between said one face and the other face of said casing, said slots of said casing being arranged to slidably cooperate with the side edges of said panel aperture to provide second and third points of engagement of said lampholder with said panel, said panel with said interruptive steps limiting the insertion of said lampholder into said aperture, whereby said lampholder slidably cooperates with and is effectively secured to the aperture of said panel at three points of engagement.

2. For use with a relatively thin panel having an aperture located therein, a lampholder including an insulative body with front, rear, and side faces and formed of non-resilient material, said side faces including a pair of oppositely disposed parallel slots facing outwardly in opposite directions, said slots each opening at one end into one face of said casing and terminating at the other end at an interruptive step between said one face and the other face of said casing, said slots of said casing being arranged to slidably cooperate with the panel aperture, said side faces of said casing arranged for slidably cooperation with said panel aperture, whereby said lampholder slidably cooperates with said panel aperture to effectively position and support the lampholder in secure engagement with said panel.

3. For use with a relatively thin panel having an aperture located therein, a lampholder including an insulative casing with front, rear, and side faces arranged in a rectangular configuration, said side faces including a pair of oppositely disposed parallel slots facing outwardly in opposite directions, said slots each opening at one end into one face of said casing and terminating at the other end at an interruptive step between said one face and the other face of said casing, said slots of said casing being arranged for slidably cooperation with said panel aperture in said panel, each of said slots having a cross section of gradually diminishing thickness with the height of said slots being smaller at the bottom thereof than at the side faces of said casing thereby to accommodate panel thicknesses of varying dimensions, whereby said lampholder slidably cooperates with the aperture of said panel to effectively position and support said lampholder in secure engagement with said panel.

4. A lampholder having a main casing including front and rear faces and being arranged for mounting to a supporting panel with or without supplemental fastening means, said lampholder including a pair of oppositely disposed parallel slots on opposite sides of said casing, said slots each opening at one end into one face of said casing and terminating at the other end at an interruptive step disposed between said one face and the other face of said casing, said slots of said casing being spaced apart a predetermined distance, a lampholder including an insulative casing having front, rear, and side faces arranged in a rectangular configuration, said side faces including a pair of oppositely disposed parallel slots facing outwardly in opposite directions, said slots being formed in the side faces of the upright portion at the juncture of the upright portion and the base portion, and an adjacent wall of the base portion forms a part of each slot.

5. The lampholder and supporting means described in claim 1 wherein the slots are formed in the side faces of the upright portion at the juncture of the upright portion and the base portion, and an adjacent wall of the base portion forms a part of each slot.

6. A fluorescent lampholder and a supporting means for slidably mounting said lampholder thereto, comprising a thin panel having a recess formed in said panel, whereby said lampholder is slidably attached thereto by supplemental fastening means, whereby said lampholder may be held in place by engagement of said steps with a panel aperture in conjunction with supplemental fastening means.

7. The lampholder and supporting means described in claim 1 wherein the slots are formed in the side faces of the upright portion at the juncture of the upright portion and the base portion, and an adjacent wall of the base portion forms a part of each slot.

8. A fluorescent lampholder and a supporting means for slidably mounting said lampholder thereto, comprising a thin panel having a recess formed in said panel, whereby said lampholder is slidably attached thereto by supplemental fastening means, whereby said lampholder may be held in place by engagement of said steps with a panel aperture in conjunction with supplemental fastening means.
the upright portion and the base portion with an adjacent wall of the base portion forming a part of each slot, the slots each opening at one end into the front face of said casing and terminating at the other end at an interruptive step disposed between said front face and the rear face of said casing, said step including a side wall coplanar with the side face of said upright portion, said slots of said casing being spaced apart a predetermined amount to fit over and engage the edges of an aperture of a particular width in a first panel thereby to position and support said lampholder in a panel without additional fastening means, the side walls of said interruptive steps of said casing being spaced apart farther than the bottoms of said slots and forming linear surfaces for engaging the edges of an aperture in a second panel greater in width than said aperture of said first panel thereby to position said casing in a panel for attachment thereto by supplemental fastening means, whereby said lampholder may be held in place by engagement of said slots with a panel aperture or by engagement of said steps with a panel aperture in conjunction with supplemental fastening means.

9. A lampholder in combination with a relatively thin supporting panel having an aperture located therein, the lampholder including an insulative body with front, rear, and side faces and formed of non-resilient material, said side faces including a pair of oppositely disposed parallel slots facing outwardly in opposite directions, said slots each opening at one end into one face of said body and terminating at the other end at an interruptive step disposed between said one face and the other face of said body, said slots of said body being arranged to slidably cooperate with said aperture of said panel, said interruptive steps each including first and second conterminous surfaces disposed in perpendicular relationship, said first surface being coplanar with a side face of said lampholder and said second surface forming the inner end of one of said slots, said panel aperture being shaped to include a first pair of opposed parallel edges disposed for close association with said first surfaces of the interruptive steps, a second pair of opposed parallel edges stepped inwardly from the first pair of parallel edges and connected thereto by respective shoulders, said second pair of edges being disposed for cooperable engagement with said lampholder slots, said interruptive steps being arranged to engage said panel to limit the sliding movement of said lampholder in said aperture whereby said lampholder slidably cooperates with the aperture of said panel to effectively position and support said lampholder in secure engagement with said panel.

References Cited in the file of this patent

UNITED STATES PATENTS

368,740 Trimble Aug. 23, 1887
2,011,861 Kniewitz Aug. 20, 1935
2,231,289 Judisch et al. Feb. 11, 1941
2,277,468 Welch Mar. 24, 1942
2,291,674 Alden Aug. 4, 1942
2,563,146 Wise Aug. 7, 1951
2,663,852 Kershaw Dec. 22, 1953
2,748,185 Brunke May 29, 1956
2,932,870 Williams Apr. 19, 1960
3,025,391 Colko Mar. 13, 1962
3,065,343 Zurawski Nov. 20, 1962