

Nov. 8, 1949

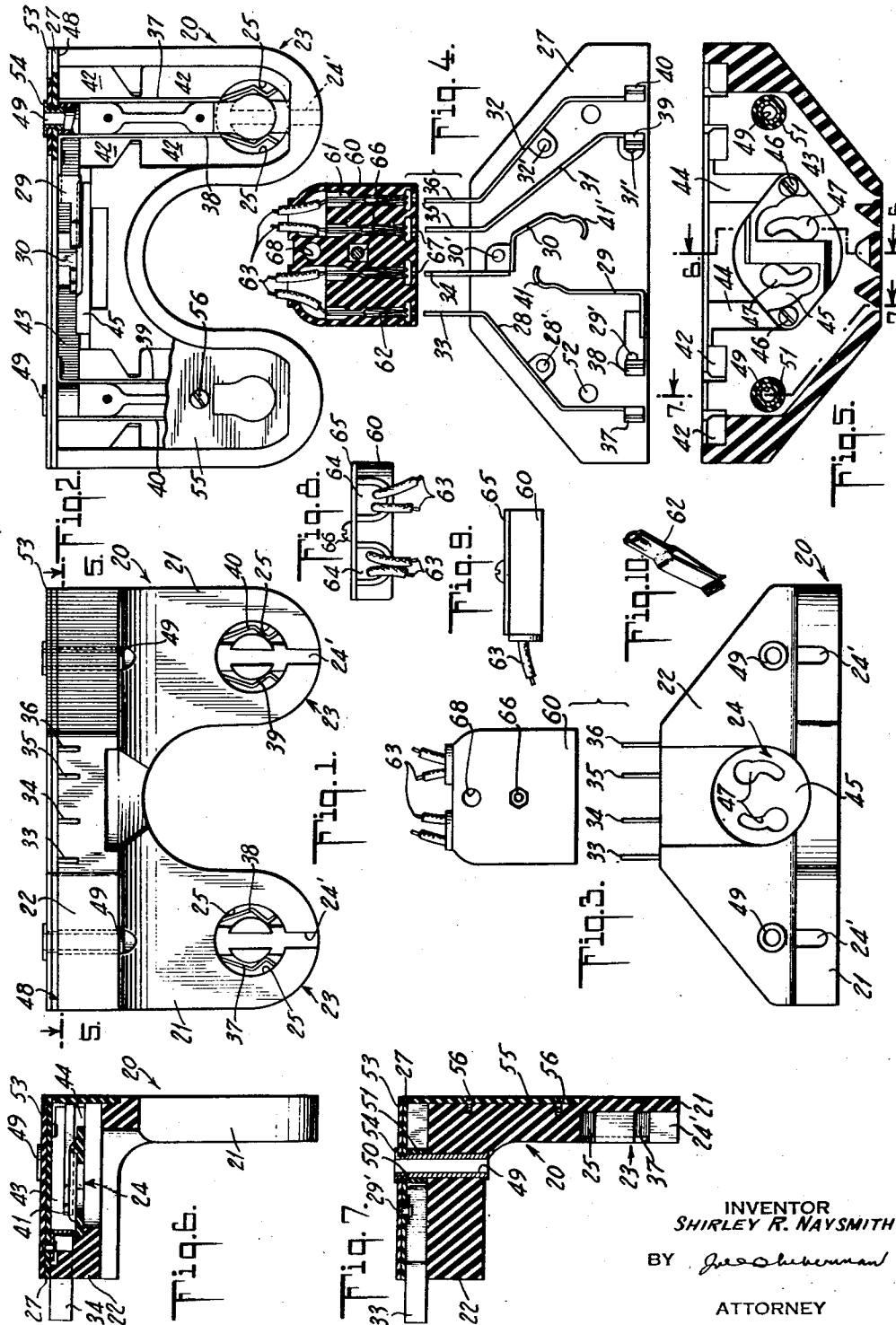
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MULTIPLE LAMP FLUORESCENT LAMP HOLDER

Filed July 7, 1944

3 Sheets-Sheet 1



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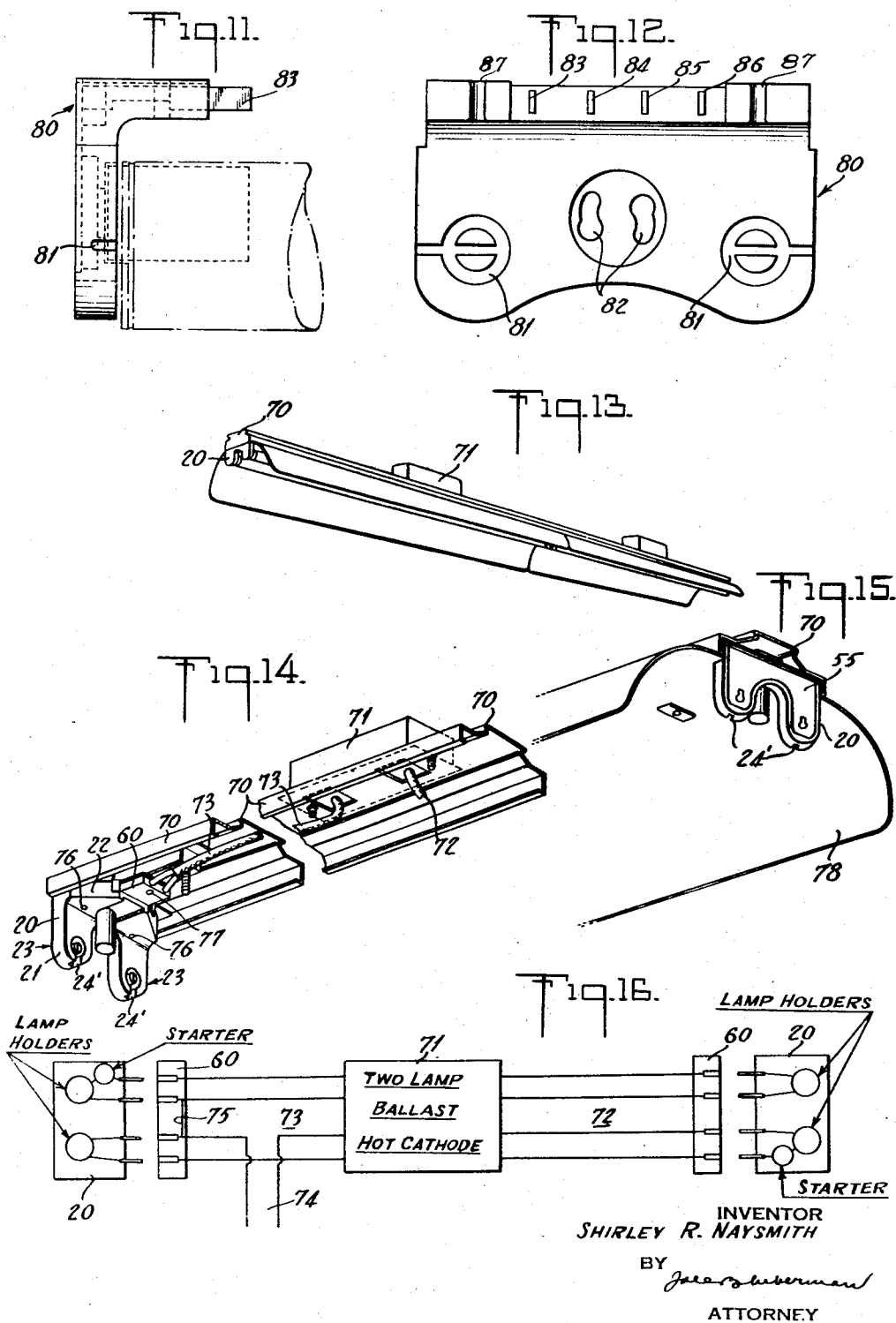
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MULTIPLE LAMP FLUORESCENT LAMP HOLDER

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3 Sheets-Sheet 2



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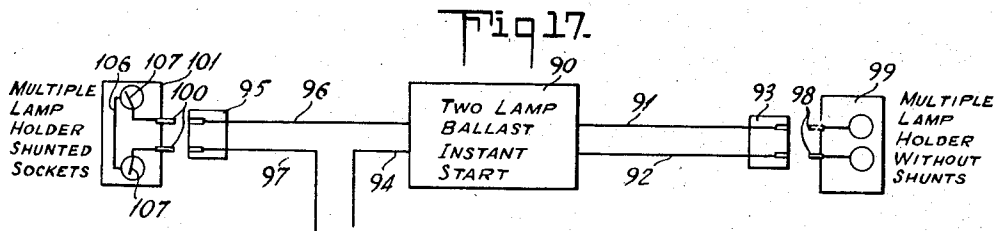
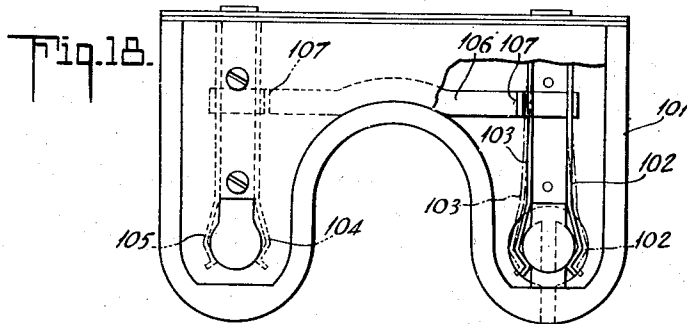
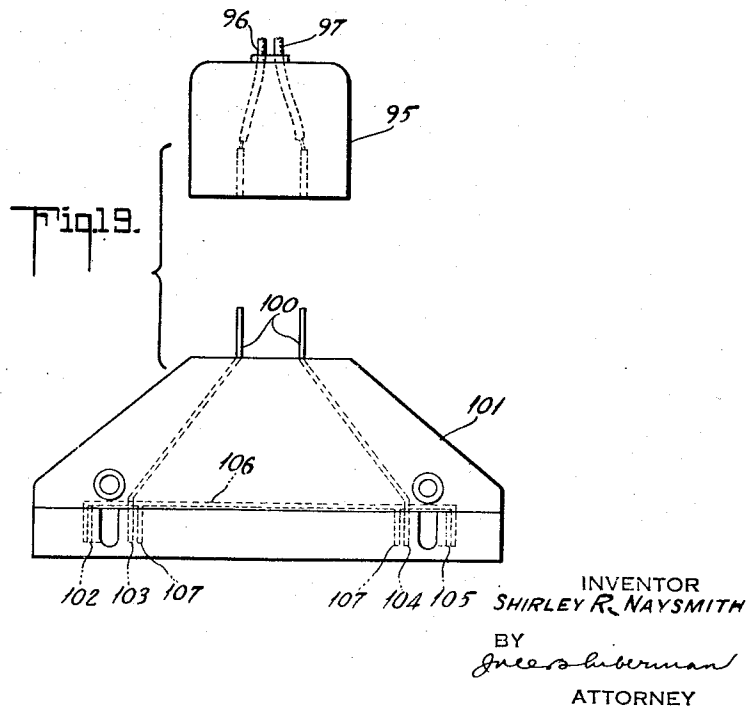
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3 Sheets-Sheet 3



UNITED STATES PATENT OFFICE

2,487,467

MULTIPLE LAMP FLUORESCENT LAMP
HOLDER

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8 Claims. (Cl. 240—51.11)

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The present invention relates to multiple lamp fluorescent lamp holders, and is more particularly directed toward holders for lamps with pin type terminals.

Such fluorescent lamps used for illumination purposes are of the hot cathode type requiring in the auxiliary equipment a starter for each lamp, or the instant start type using no starter but having auxiliary equipment adapted to give a very high voltage kick to start the arc in the tube. In multiple lamp luminaires a common auxiliary with both reactive and capacitive elements is employed and two starters are required for the two lamp hot cathode lamp circuit. The wiring of the latter type of luminaire involves the running of separate wires between the reactor or ballast, the lamp socket terminals and the starter socket terminals, and in order that the fixture can be completely assembled and tested at the factory it is necessary that all this wiring be taken care of before the fixture may be shipped. Hence all the parts going to make up the luminaire must be assembled at the factory of the fixture manufacturer, then be assembled completely, tested and packed for shipment. The instant start circuit having no starters requires less wiring but special shunting type sockets at the line side of the fixture. The wiring however is done in a similar manner.

The present invention contemplates unitary lamp holders each provided with projecting terminals, usually blades, for plugging contact with receptacles carrying cooperative contacts and wired to the ballast, and adapted to support the adjacent ends of two fluorescent lamps and conduct current from the blade terminals to the pin contacts of the lamps. In the hot cathode type of construction each lamp holder also has one fluorescent lamp starter interposed between one of the lamp holders and one of the four terminal blades. Only two blades are required for the multiple lamp holders used with instant start.

Inasmuch as all the wiring connections in the lamp holder can be made in the plant manufacturing the lamp holder without any likelihood of erroneously wiring the device, it is possible to ship these lamp holders to the point of destination and complete the wiring by a simple plugging operation. Furthermore the avoidance of completely assembling the fixtures before shipment eliminates the hazards of breakage, particularly breakage of the individual lamp holders customarily in use for they project from the wiring channel and breakage is very common.

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Other and further objects will hereinafter appear as the description proceeds.

The accompanying drawings show, for purposes of illustrating the present invention, three embodiments in which the invention may take form, it being understood that the drawings are illustrative of the invention rather than limiting the same.

In these drawings:

Figure 1 is an elevational view of one form of lamp holder for two hot cathode fluorescent lamps, the view being taken from the side of the lamp holder toward the lamps which it supports;

Figure 2 is an elevational view of the lamp holder of Figure 1 taken in the opposite direction with parts broken away to show interior construction and parts in section;

Figure 3 is an inverted plan view of the lamp holder of Figure 1, together with the cooperable receptacle adapted for plugging connection with the lamp holder;

Figure 4 is an inverted plan view of the contact carrying plate of the lamp holder, with assembled contacts and showing in section the cooperable receptacle;

Figure 5 is a sectional view on the line 5—5 of Figure 1, the contact parts all being omitted;

Figure 6 is a sectional view on the line 6—6 of Figure 5 showing the contacts and contact supporting plates in place;

Figure 7 is a sectional view on the line 7—7 of Figure 5, showing other contacts and contact supporting plates in place;

Figures 8 and 9 are end and side elevational views of the receptacle;

Figure 10 is a detached view showing a receptacle contact;

Figures 11 and 12 are side and face elevational views of a modified form of lamp holder for hot cathode lamps;

Figure 13 illustrates a completed luminaire employing the lamp holder of Figures 1—10;

Figure 14 is a perspective view illustrating the lamp holder assembled on a fixture body and connected with the ballast;

Figure 15 is a perspective view illustrating the lamp holder assembled on the fixture body and associated with the reflector;

Figure 16 is a wiring diagram of the hot cathode two lamp luminaire;

Figure 17 is a wiring diagram for an instant start installation; and

Figures 18 and 19 illustrate diagrammatically a lamp holder similar to that of Figures 1—10 but modified for the instant start circuit.

The two-lamp lamp holders shown in Figures 1 to 10, inclusive, and Figures 14-16 have a normally inverted L-shaped molded insulating body 20 with downwardly extending portion 21 and laterally extending portion 22. It is preferably a solid unitary piece of molded insulating material. The depending portion 21 has two sockets or holders typically used for the pin terminals of fluorescent lamps and indicated generally at 23, 23. Intermediate these lamp holders is a starter socket indicated generally at 24. Here the starter socket is in the horizontal portion 22 and has a vertical axis.

The molded insulating body 20 has at its inner face, as shown in Figure 1, entrance slots 24', 24' for the conductor pins usually used on fluorescent lamps, and each of these slots 24' connects with an annular slot 25 of the usual contour to permit turning the lamp 90° on its axis after the two lamp pins have been inserted.

All the electrical conductors necessary for interconnecting the two lamp sockets, and the starter socket to the extraneous circuits for the adjacent ends of the two lamps are carried by a single plate of laminated insulating material indicated more clearly at 27 in Figure 4. This flat plate of insulating material carries five conductor strips 28, 29, 30, 31 and 32 secured in place by rivets indicated at 28', 29', 30', 31' and 32'. The conductor strips 28, 30, 31 and 32 have contact blades 33, 34, 35 and 36 arranged parallel with one another and asymmetrically spaced. The conductor strip 28 has a downwardly extending contact spring 37 which, together with the downwardly extending resilient spring 38 forming part of the conductor strip 29, provides contacts for the left lamp socket of Figure 1. The contact strips 31 and 32 have downwardly extending resilient portions 39 and 40 forming contacts for the right hand lamp socket of Figure 1. The strips 29 and 30 have resilient contacts 41 and 41' for the starter socket.

The molded insulating base or body 20 has suitable recesses 42 on its outer face, as shown in Figures 2 and 5, to accommodate the downwardly extending conductor strips 37, 38, 39 and 40, and the latter are held in proper position by the formations given these recesses.

The upper face of the body member is recessed, as indicated at 43 in Figures 2 and 5, so as to provide room for the conductor strips 28, 29, 30, 31 and 32. It is also recessed, as indicated at 44 in Figures 5 and 6, to receive a small insulating plate 45 which may be held in place by screws indicated at 46, 46. This insert plate 45 has openings 47, 47 of the usual shape to receive the terminals of a fluorescent lamp starter.

The upper face 48 of the insulating body is flat and the lower face of the plate 27 is adapted to rest on this upper face when the parts are in position. The contacts carried by the plate 27 are therefore confined within the boundaries of the insulating body.

To facilitate the securement of the plate 27 in place and the insulating of the rivets 28', 29', 30' and 31' which hold the contacts to this plate, the body 20 is provided with two metallic tubular members 49, 49 which are preferably inserts in the molded body. These tubular inserts have shoulders 50 at the same level as the upper face 48 of the insulating body and the portions of the inserts 49 are projecting up through the recess 43 in the insulating body 20 and are surrounded by insulating sleeves 51. These tubular inserts pass through holes 52, 52 in the plate 27 and

through similar holes in a similarly shaped cover plate 53, after which the ends of the tubular members are swaged over as indicated at 54.

The contacts 37, 38, 39 and 40 which extend down through the recess in the outer face of the insulating body are covered by a sheet of insulating material 55 secured in place by screws 56, so that when the two-lamp lamp holder is completed, as shown in Figures 1, 2, 3, 6, 7 and 14, there is provided a unitary article having provisions to receive the pin terminals of two horizontal fluorescent lamps, also the terminals of a fluorescent lamp starter, and it has four accessible blades 33, 34, 35 and 36 which extend horizontally out of the horizontal upper portion of the inverted L-shaped body. Two of the two-lamp lamp holders such as described above will be employed for each fluorescent lighting fixture.

As each two-lamp lamp holder will normally be associated with a receptacle, such a receptacle is shown herein in Figures 3, 4, 8, 9, 10 and 14 and will now be described. The receptacle has a molded insulating body 60 provided with four sets of slots or notches 61 adapted to receive four spring contact receptacles 62. Each of these is adapted to be connected to an insulated conductor 63 and these conductors are paired and extend out through openings 64, 64 in the insulating body 60. The spring contacts are held in place by a cover plate 65 fastened to the body 60 of the receptacle by a small bolt indicated at 66. The insulating body 60 is provided with openings 67 so that the receptacle 60 and the two-lamp lamp holder can be joined by plugging the parts together, and a hole 68 is provided for a mounting screw.

The employment of the two-lamp lamp holders of Figures 1 to 10, inclusive, is illustrated in Figures 13 to 15, inclusive. The two-lamp lamp holders such as above described in detail are secured to a suitable wiring channel indicated at 70. This channel also carries a conventional two-lamp lamp ballast 71 with permanently connected lead cables 72 and 73. Each lead cable has four wires and is connected to the four receptacle contacts of the receptacle 60. One of the lead cables has line connection leads 74 and the receptacle adjacent this line connection is provided with a jumper 75. The lamp holders are secured in place by screws 76, 76 passing through the bushings 49, 49. The receptacle 60 is held in place by a screw 77 passing through the hole 68 in the receptacle.

The arrangement of the ballast unit with lead cables, wiring and means for supporting two-lamp lamp holders and the receptacles and the reflector form the subject matter of my copending application Serial No. 543,824, filed July 7, 1944.

In the modified form of construction shown in Figures 11 and 12 the two-lamp lamp holder 80 is also an inverted L-shaped device. Its sockets 81, 81 are designed for side entrance of the lamps and have openings 82, 82 for the terminals of the fluorescent lamp starter. The blade contacts are indicated at 83, 84, 85 and 86. Each of these blade contacts is connected with contact strips (not shown in detail) leading to the lamp sockets and starter socket and another strap connects one of the lamp sockets with one of the terminals of the starter socket so that the wiring arrangement inside the lamp starter is the same as shown and described above in detail. In this construction the starter socket is horizontal instead of

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vertical and is held in place by screws in slots 87.

The lamp holder and circuit of Figures 17, 18 and 19 are for instant start lamps. Here the ballast or auxiliary 90 has two wires 91 and 92 connected to a two-contact receptacle 93, a wire 94 connected to the line, and a wire 95 connected with one contact of a similar two-contact receptacle 96. The other line wire 97 is connected to the receptacle 96. The receptacle 93 is cooperative with the blades 98—99 of a two-lamp lamp holder 99. The receptacle 95 is cooperative with the blades 100—100 of a two-lamp lamp holder 101 having shunted sockets. As the lamp holders are not alike, the plugging contact arrangements are preferably such that an improper connection cannot be made.

The lamp holders 99 and 101 and the receptacles 93 and 95 may resemble those above described, but they contain a different arrangement of wiring. The shunted socket lamp holder 101 shown also in Figures 18 and 19 has four springs 102, 103, 104 and 105 which correspond with 37—40 of Figures 1—10, and physically support the lamp pins in the same way. Springs 102 and 105 are permanently connected together by strap 106, while springs 103 and 104 are each connected with a blade contact 100. Shunts 107—107 are arranged between 102 and 103 and 104 and 105, respectively, so that only when the lamp pins are in and the springs spread, current can flow from the line wire 97 to the ballast. The lamp holder 99 omits the shunting of the sockets.

Since it is obvious that the invention may be embodied in other forms and constructions within the scope of the claims, I wish it to be understood that the particular forms shown are but a few of these forms, and various modifications and changes being possible, I do not otherwise limit myself in any way with respect thereto.

What is claimed is:

1. A fluorescent lamp holder for use with two normally horizontal parallel, pin type terminal, fluorescent lamps energized by a two-lamp fluorescent lamp ballast provided with multiple contact receptacles and comprising a normally inverted L-shaped insulating body whose upper portion is provided with openings for mounting screws whereby it may be secured below a fixed support, the inner face of the vertical portion being slotted to admit the contact pins at the corresponding ends of two lamps, pin contact terminals engageable with the inserted pin terminals and adapted to electrically contact said pin terminals and support the ends of the lamps, a plurality of plugging contacts extending horizontally from the inner face of the upper or horizontal portion of the body for cooperation with one of the receptacles, and body carried conductors interconnecting the plugging contacts and the pin contact terminals for completing the circuit connections for the adjacent ends of the two lamps.

2. A holder as claimed in claim 1, wherein two plugging contacts are present and the conductors include one which extends from a plugging contact to one pin contact terminal for one lamp, and one which extends from the other plugging contact to one pin contact terminal for the other lamp and additional conductors shunting the respective terminals for each lamp.

3. A holder as claimed in claim 1, wherein two plugging contacts are present and the conductors include one which extends from a plugging contact to one pin contact terminal for one

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lamp, one which extends from the other plugging contact to one pin contact terminal for the other lamp, additional conductors shunting the respective terminals for each lamp, and a third conductor normally in open circuit relation with all said conductors but engageable with one of each pair of conductors when brought into connection with the corresponding pin contact terminals by insertion of the lamp whereby the third contact is connected in series with one of each of the first pair of spring contacts.

4. In a fluorescent lamp holder, a normally inverted L-shaped insulating body whose upper or horizontal portion is provided with openings for mounting screws whereby it may be secured below a fixed support, the inner face of the vertical portion of the body being slotted to admit the contact pins of two horizontal fluorescent lamps, two pairs of pin contact terminals one pin for each lamp, the inner face of one of the portions of the body having openings to admit the terminals of a fluorescent lamp starter, starter socket contacts opposite the openings, four plugging contacts extending horizontally from the inner end of the upper or horizontal portion of the body whereby they are accessible for connection to a receptacle, three conductors each interconnecting a plugging contact with one of the pin contact terminals, a fourth conductor connecting the other plugging contact with one starter socket contact, and a fifth conductor connecting the other socket contact with the remaining pin contact terminal.

5. A fluorescent lamp holder comprising a normally inverted L-shaped insulating body having contact receiving recesses in its outer side face and in its upper face, slots in its inner side face to admit the contact pins of two horizontal fluorescent lamps, slots in one of its inner faces to admit the terminals of a fluorescent lamp starter, four conductor strips projecting horizontally away from the inner end of the top or horizontal portion and also entering into the upper recess, three of the strips being extended down the side recess and terminating opposite the slots in the side face and forming terminals for cooperation with the lamp contact pins, the other of said strips extending opposite one of the starter terminal openings, a fifth conductor strip extending from opposite the other slot in the side face to the other starter terminal opening, top and side covers for the recesses, and tubular metallic screw receiving bushings extending through the horizontal portion of the insulating body.

6. A fluorescent lamp holder comprising a normally inverted L-shaped insulating body having slots in its inner side face to admit the contact pins of two horizontal fluorescent lamps, an aperture in its upper inner face to receive the end of a fluorescent lamp starter, and contact receiving recesses in its outer side face and its upper outer face, an insulating insert carried by the body above the aperture therein and provided with openings to receive the terminals of a fluorescent lamp starter, an upper cover plate secured across the upper recess and carrying five conductor strips, one of which extends from opposite one contact pin slot to opposite one starter terminal opening, another of which extends from opposite the other starter terminal opening through the upper end of the body to form a contact blade and the other three of which extend from the other contact pin openings out through the upper end of the body to form three contact blades,

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parallel with the first mentioned contact blade, and a side cover plate closing the side recess and covering the conductor strips in the side recess.

7. A fluorescent lamp holder for use with two normally horizontal parallel fluorescent lamps of the instant start type having two parallel pins at the ends thereof, comprising a normally inverted L-shaped insulating body having slots in the inner face of its vertical portion to admit the contact pins of two such lamps, two spring contacts opposite each lamp pin receiving slot and engageable with the pins of the lamp and spread thereby when the lamp is turned to bring the pins against the contacts, whereby the lamp end is supported and its electrode connected to the contacts, two plugging contacts extending horizontally from the upper or horizontal portion of the body for cooperation with a two contact receptacle, and a conductor leading from each plugging contact to one only of one of the spring contacts cooperable with the pin terminals of a lamp.

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8. A lamp holder as claimed in claim 7, having a third conductor normally in open circuit relation with the other conductors but engageable with each pair of conductors when spread by the lamp pins whereby the third conductor is connected in series with one of each of the first pair of conductors.

SHIRLEY R. NAYSMITH.

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