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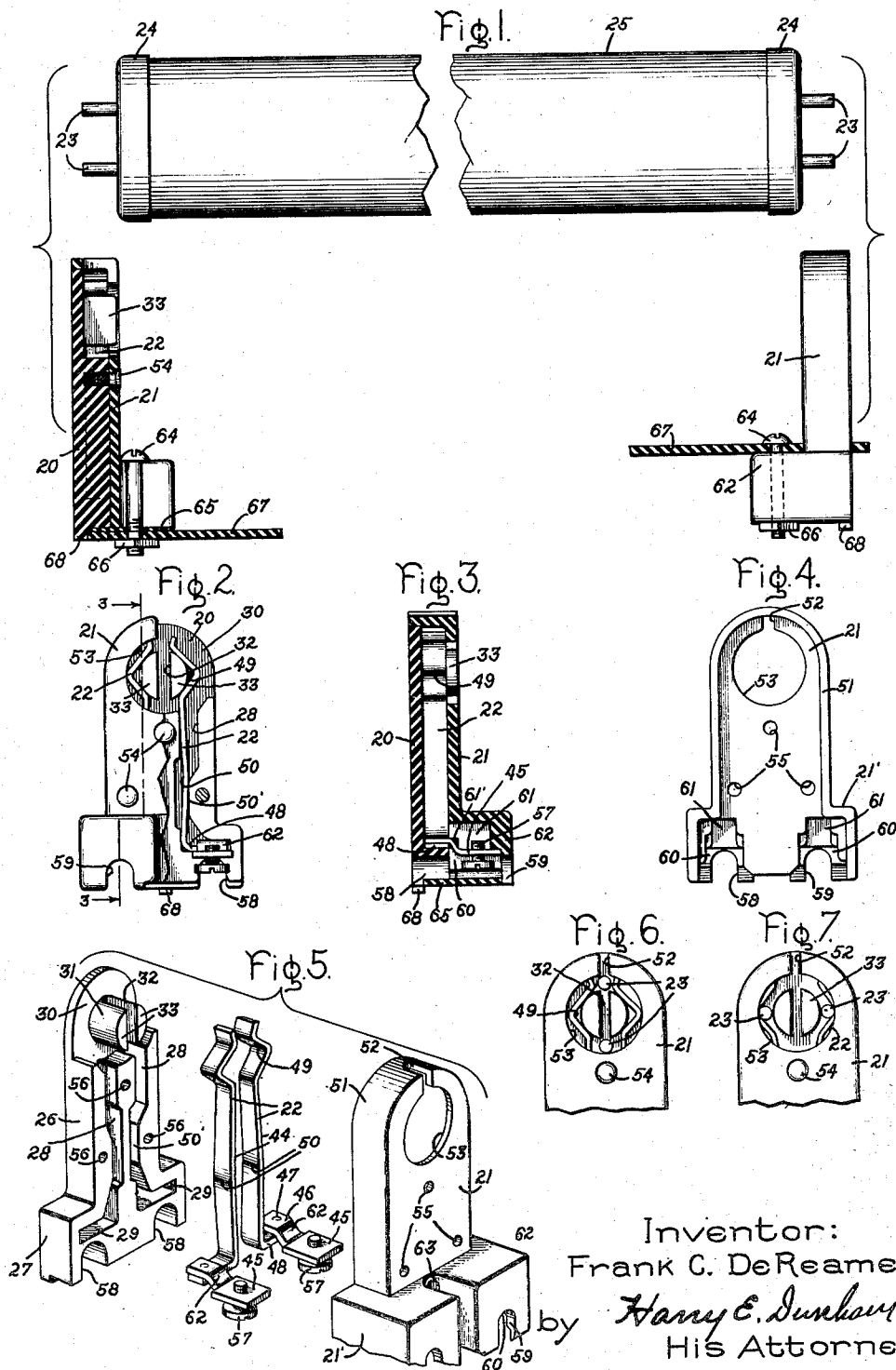
F. C. DE REAMER

2,247,117

LAMP HOLDER

Filed March 7, 1939

2 Sheets-Sheet 1



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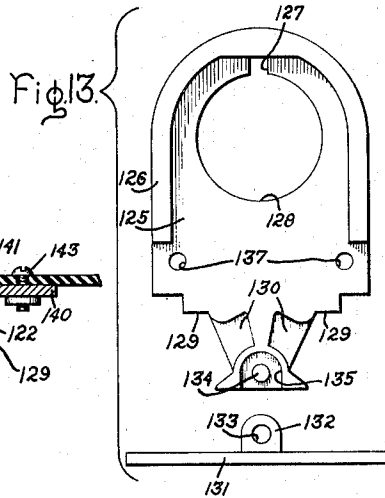
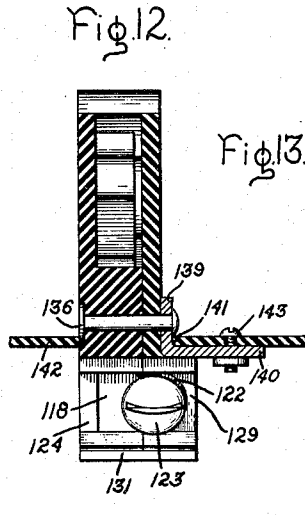
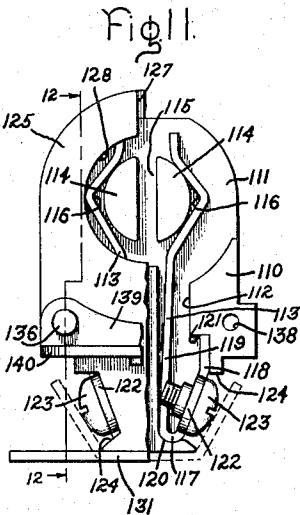
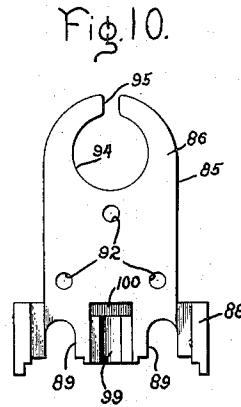
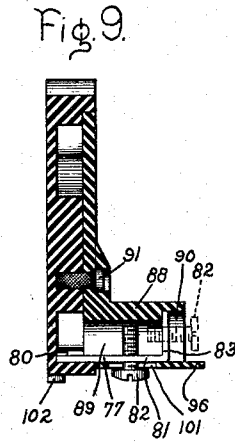
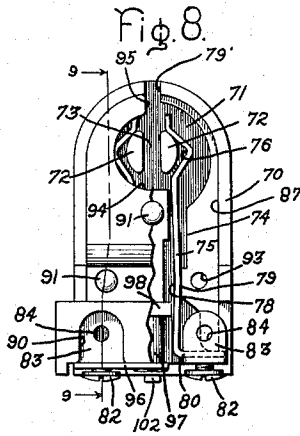
F. C. DE REAMER

2,247,117

LAMP HOLDER

Filed March 7, 1939

2 Sheets-Sheet 2



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## UNITED STATES PATENT OFFICE

2,247,117

## LAMP HOLDER

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Application March 7, 1939, Serial No. 260,295

6 Claims. (Cl. 173—328)

My invention relates to supports for electric lamps, and more particularly to a socket construction for lamps of the double end discharge type such as tubular fluorescent lamps.

My invention relates to lamp sockets of the type described in the patent of Anthony J. Marshaus No. 2,137,174, which is assigned to the same assignee as the instant application.

One of the objects of my invention is to provide a socket construction for double end lamps of the type described in which the socket is adapted for mounting on the surface of a support or for flush mounting of the lamp upon the support, in which position a portion of the socket extends below the support.

Another object of my invention is to provide a socket in which the terminals are concealed thereby obviating the dangers of shock or short circuits.

Still another object of my invention is the provision of an improved means for mounting the socket contact members in the body of the socket and the provision of improved terminal constructions for the contact members for making electrical connections.

In the accompanying drawings Fig. 1 is an elevational view showing the various ways of mounting the sockets and a view of a double-end lamp just prior to mounting in the sockets; Fig. 2 is an elevational view partly in cross-section of a preferred form of a socket constructed in accordance with my invention; Fig. 3 is a sectional view through the socket taken along the line 3—3 of Fig. 2; Fig. 4 is a view of the interior of the cover employed in the construction of Fig. 3; Fig. 5 is an exploded view of the elements of the preferred form of socket construction; Figs. 6 and 7 illustrate the position of the lamp contact pins during insertion of the lamp in the socket; Fig. 8 is a modified form of the socket construction shown by Fig. 3; Fig. 9 is a sectional view along the line 9—9 of Fig. 8; Fig. 10 is an elevational view of the rear of the cover employed in the socket construction of Fig. 8; Fig. 11 is a view of a third modification of my socket construction in which the socket is particularly designed for flush mounting; Fig. 12 is a sectional view along the line 12—12 of Fig. 11, and Fig. 13 is an exploded view showing the cover, and the insulating plate for the socket construction of Fig. 11.

Referring to the drawings and more particularly to Figs. 1 to 7, inclusive, my socket comprises a base 20, a cover 21 and contact members 22. The contact members cooperate with and

engage the contact pins or prongs 23 extending from a base 24 at each end of a tubular lamp 25, such as a fluorescent lamp. The base 20 and cover 21 are made of any suitable insulating material such as a phenolic condensation product and filler.

The base member 20 is formed with a comparatively narrow extended portion 26, which provides a supporting structure for the lamp 25, and also with a comparatively wider base portion 27, the sides of which are flared outwardly from the extension 26 to provide a support for the socket structure. Disposed longitudinally of the base extension 26 are two channels 28 which receive the contact members 22. At one end the channels are provided with laterally extending grooves 29 and at the other end the channels merge into a recess 30. As shown more particularly by Fig. 5, the recess forms a portion of the socket body having a thickness reduced from that of the extension 26. Upstanding from the face of the recess 30 is a cylindrical boss 31 provided with a diametrical slot 32 which divides the boss into two semi-circular segments 33 for a purpose to be described later.

The contacts 22 are provided with elongated shank portions 44 which are seated within the channels 28. At one end of each of the shank portions is secured a terminal member or plate 45 having an extension 46 spot welded, as shown at 47, to a laterally extending projection 48 formed integrally with the contact member 22. Manifestly, other securing means may be employed. When the shank portions 44 of the contact members 22 are seated in the longitudinal channels 28 the projections 48 and the terminal extensions 46 rest in the slots 29, as shown more particularly by Fig. 2. The other end of each of the contacts is formed with a recess 49 providing a contact surface for engaging the contact pin 23 of a tubular lamp. The recessed portion of the contact extends around the segment 33 of the upstanding boss 31 and is normally biased into engagement with the segment due to the fact that the shank portion of the contact is bowed slightly at the point 50. Each of the contact members 22 is held securely within the longitudinal channels 28 by the close fitting engagement of the terminal extension 46 within the slot 29 and also by the fact that the contact is biased against the segment 33 in the manner indicated; this means that a portion of the contact bears against an abutment 50' forming part of the wall of the longitudinal channel 28. When the lamp is inserted within a socket the contact

is flexed about this abutment in a manner to be described later.

The cover member 21 is formed with a comparatively narrow extending portion and a comparatively wider base portion 21' conforming to the contour of the body member 20. It is provided with an integral flange 51 extending around the periphery thereof so that when the cover member is placed over the base member a totally enclosed structure is provided for the contacts. In addition, the flange encloses the recess 30. In order to provide for entry of the lamp contact pins in the contacts 22 the cover member is provided with a slot 52 which is in alignment with the diametrical slot 32 formed in the boss 31. The slot 52 merges with an opening 53 formed in the front wall of the cover member which exposes the contact surfaces 49 and the segments 33 for engagement with the contact end of the lamp. The cover is secured in position on the base member by means of a plurality of rivets 54 which pass through openings 55 in the cover member and are driven into corresponding recesses 56 formed in the base member 20. Manifestly, other means may be provided for securing these elements together.

Each of the terminal plates 45 is provided with a terminal screw 57 so that an electrical conductor may be connected to the contacts 22 through the medium of the terminal structure. The base 27 of the socket member is provided with grooves 58 upstanding from the bottom thereof for receiving the insulated conductor. Similarly, the front face of the cover 21 is provided with upstanding grooves 59 which, when the cover member is assembled on the base, are in axial alignment with the groove 58. In order to secure the terminal members within the housing of the socket the cover plate 21 is provided with recesses 60 which receive the terminal members 45. Extending upwardly from the recesses 60 are slots 61 which receive the screws 57 and which provide a bearing surface 61' for engaging the offset portion 62 formed on the terminal members 45 to hold the terminal members securely within the socket, as shown more particularly by Fig. 3. The slots 60 and 61 are formed in a forward extension 62 of the base 21' of the cover member, as shown in Figs. 3, 4 and 5. This structure provides a housing for the terminal members. The cover member 21 is provided with a slot 63 extending through the base portion 21' of the cover member and which is adapted to receive any suitable means for mounting the socket upon a support, such as the bolt 64, shown by Fig. 1. A plate of insulating material 65, for example, fiber, or the like, is placed over the grooves 58 and the slots 60, as shown by Fig. 3, and is held in place by the bolt 64 and a nut 66. The plate protects the terminal screws 57.

In use one of the socket members is mounted to be engaged by each end of the tubular lamp as shown by Fig. 1, and the lamp is then moved downwardly into engagement with the socket by passing the pins 23 through the slot 52 in the cover member and the slot 32 in the boss 31, so that the pins take the position shown by Fig. 6. Thereafter the lamp is rotated to an angle of approximately 90 degrees in either direction. During this movement the pins deflect the contact members 22 so that they are guided into the contact recesses 49 where they are held securely by the segmental members 33. This is the final position of the lamp contact pins and is illustrated by Fig. 7. In rotating the lamp prongs to final

position they are guided by the circular rims of the segments 33. The contacts 22 are flexed about the abutment 50 so that in final position they are biased to force the contact pins into electrical pressure contact with the contact recesses 49. It should be noted that in final position the lamp cannot be withdrawn from the socket without first rotating it to the position shown by Figs. 1 and 6, because even though the contacts 22 could be deflected to permit upward movement of the contact pins 23 the latter would still engage the perimeter of the opening 53 formed in the cover member, thereby preventing removal of the lamp from the socket.

According to my invention the contact members 22 are held securely within the channels of the body member by the close fitting engagement of the terminal members within the groove 29 and also by the cover member 21 which bears against the terminal plates 45 and locks them securely within the base member 20. By providing the channel abutment member 50', which bears against the shank of the contact member at a point intermediate the contact recess 49 and base projection 48, it is possible to secure a very strong and even pressure upon the contact pin due to the fact that the lever arm about which the contact is flexed during mounting of the lamp contact pin is materially reduced. The bowed portion 50 biases the contact toward the segment 33 giving firm grip on the lamp prong. When the recess 30 is closed by the flange 51 on the cover member a chamber is formed having semi-circular slots on each side of the boss 31 to receive and house the contact pins of the lamp.

The lamp sockets may be mounted upon the surface of a supporting plate or panel 67 in either of two ways, as shown by Fig. 1. To the left of Fig. 1, the socket is shown as "surface" mounted on the top of the plate, in which position a tang 68 depending from the lower face of the base 27 provides a means for accurately locating the position of the socket member in accordance with the length of the lamp with which the socket is to be used. The socket is held in position by the bolt 64 which extends through the slot 63 and an opening in the plate 67 and is threaded into the nut 66 on the underside of the plate. In mounting the socket, the nut 66 is first unthreaded from the bolt 64 permitting removal of the insulating plate 65 to give access to the terminals 45. After connection of the conductors, the plate is replaced and the nut threaded on the bolt beneath the plate 67 in the manner indicated. Alternatively, the socket member may be "flush" mounted in a manner to position the tubular lamp flush with the surface of the supporting means, as shown to the right of Fig. 1. This means that an opening is formed in the supporting means 67 to receive the extension of the socket member 21 which then extends above the surface of the supporting means while the base portion 21' is maintained below the supporting means for connection to the conductors of an electrical circuit. The socket is secured in position on the supporting plate by means of the bolt 64 which clamps the plate between the head of the bolt and the base portion 21'. This means that the wiring to the lamp is concealed beneath the supporting means. When the socket is "surface" mounted, as shown to the left of Fig. 1, the wiring is exposed.

Referring now to Figs. 8 to 10, inclusive, I have shown a modified form of my invention in which the construction of the insulated body member is different from that shown in the preferred

form in that the contact members are provided with a terminal means more particularly adapted for both flush and surface mounting of the device, and the cover member takes the form of a plate fitting within a recess in the base member. In the modified form of the socket, the base member 70 is provided with two semi-circular recesses 71 which are separated by the upstanding segmental bosses 72 spaced by a diametrical slot 73. Each of the semi-circular slots 71 merge with a corresponding longitudinal channel 74 formed in the base member 70. Contact members 75 are seated within the channels. Each of the contact members is provided at one end with a recessed portion 76 forming a contact surface cooperating with the segmental boss 72 in a manner and for the purpose described in connection with the showing of the socket of Fig. 2. At the other end, each of the contact members 75 is provided with a terminal member or plate 77. The contact member 75 is bowed at a point 78 midway between the terminal end and the contact end in a manner such that the contact is normally biased to bring the contact surface 76 into close contact with a lamp contact pin 23 which will be located between the segment and contact surface. This means that the contact will pivot about the abutment 79 formed in a wall of the channel 74 when flexed upon insertion of the contact pins of a tubular lamp in the socket. To provide for insertion of the lamp contact pins the base member is provided with a slot 79'.

The terminal plate 77 is spot welded or otherwise secured to a lateral extension 80 formed integrally with the contact member 75. The terminal plate has an elongated base 81 adapted to receive a screw 82 and also is formed with an upstanding end 83 bent substantially at right angles to the base and provided with a threaded opening 84 to receive the screw 82 in an alternative position.

A cover 85 holds the contacts in position on the base. The cover is formed at one end with a flat extension 86 fitting within a recess 87 formed in the base member 70 and at the other end with an enlarged base portion 88 surrounding the bottom portion of the body member 70 and providing a housing for the terminals 77. The base portion 88 extends in front of the flat extension 86, as shown by Fig. 9, and is provided with two transverse grooves 89 to receive the terminal base 81 and the screw 82. At their outer ends the grooves are provided with enlarged recesses 90 which receive the upstanding ends 83 of the terminal members. When the screws are threaded into the ends of the terminal members, as shown in dotted line by Fig. 9, they remain seated within the recesses 90.

The cover is secured to the body member by means of a plurality of pins 91 which pass through openings 92 in the cover extension 86 and are frictionally retained in the holes 93 formed in the body member. In this manner the cover is held securely within the recess 87 maintaining the contact members in assembled relationship on the base. The cover extension is provided with an opening 94 so that the contact surfaces 76 and segmental members 72 are exposed for engagement by the lamp pins. A slot 95 merges with the opening 94 and is in alignment with the slot 79' to permit insertion of the contact pins in the recesses 71.

The grooves 89 in the base of the cover are closed by a plate of insulating material 96, for example, sheet fiber, which also serves to protect

the terminal members 77. The insulating plate is secured to the base by means of a hollow rivet 97 having a rectangular head 98; the rivet passes through a longitudinal groove 99 formed in the base of the cover and the head 98 is seated within a slot 100 of a configuration corresponding to that of the head. This means that the rivet cannot be rotated in the base and the inside of the rivet may be threaded to receive a mounting screw. The insulating plate 96 is provided with openings 101 in line with the terminal screws 82 so that they receive the heads of the screws. In order to provide a means to locate accurately the position of the socket upon a mounting panel a lug 102 is formed on the base member. The lug may be seated in a notch in the supporting panel member.

The modified form of socket member, shown by Figs. 8, 9 and 10 may be either "flush" or "surface" mounted in the manner described in connection with the preferred embodiment, as shown by Fig. 1. When "surface" mounted, the socket is mounted on the upper surface of a panel support, similar to the showing of the left of Fig. 1, and a securing bolt or screw may be passed through or threaded into the hollow rivet 97 to hold the socket in position. Since the base portions of the terminal members are now hidden by the mounting panel, the screws 82 are moved to the end positions, as shown in dotted lines by Fig. 9, and are threaded into the openings 84 in the end portions of the terminal members. Connections to electrical conductors are easily made at this point. When mounted in "flush" position, similar to the showing to the right of Fig. 1, a portion of the socket extends above the panel with the base of the socket remaining beneath the panel and being held in position by any suitable securing means threaded into the hollow rivet. In this position electrical connections are made to the base portions of the terminal members and the screws 82 are threaded into the base of the terminals, as shown in full lines by Fig. 9. The modified form of socket has the advantage that electrical connections may be made when the socket is mounted in "surface" position, similar to showing to the left of Fig. 1, without removing the socket from the mounting panel. This is accomplished by using the ends 83 of the terminal members.

A third form of my invention is illustrated by Figs. 11, 12 and 13. This socket is provided with a simplified form of terminal construction but is one which, at the same time, insures a highly effective electrical contact between the lamp terminal prongs and the socket contacts. This socket is particularly adapted for "flush" mounting.

A body member 110 is provided with a recess 111 of reduced thickness which merges with a plurality of channels 112 each adapted to receive a contact member 113. Two segmental members 114 project from the recess 111 and are separated by a channel or slot 115. These members cooperate with the contact recess 116 formed in one end of the contact members 113 to grip the contact pins of a tubular lamp in the manner described in the embodiment of Fig. 2. Each of the contact members is provided at the other end with a bent back portion forming a substantially U-shaped bend 117 having an extending arm 118 substantially parallel to the shank portion 119 of the main body of the contact member. Since the contact members are formed of resilient material, such as a spring bronze, the arm 118 may be

flexed relative to the shank portion 119. The channel 112 is formed with a semi-circular end wall 120 to receive the U-bend 117 and also with a lateral recess or slot 121 to receive the arm 118. The channel 112, bend 120 and slot 121 are so formed in size that in order to mount the contact member upon the base, it is necessary to flex the arm 118 toward the shank portion 119 so that the contact member may be slipped into the channel. This means that the shank portion 119 is normally biased to force the contact surface 116 into close engagement with the segment 114 so that when a contact pin is disposed between the contact surface and segment it will be held securely insuring an excellent electrical connection between the two elements. The contact member pivots about the bend 117 upon insertion of the lamp prong. The end of the arm 118 abuts the edge of the slot 121 and prevents movement of the contact within the body member.

Each of the contact members is provided with a terminal construction comprising a projection or tab 122 formed integrally with the arm 118 and receiving a terminal screw 123. The tab extends laterally of the contact member. As shown by Fig. 11, the tabs 122 and screws 123 extend at a slight angle to the vertical on opposite sides of the body member and are seated within recesses 124.

A cover member 125 provided with a flange 126 fits over the body member so that the flange encloses the recess 111 forming semi-circular housings for the contact surfaces 116. A slot 127 is formed in the cover in alignment with slot 115 separating the segmental members and the slot 127 merges with an opening 128 in the cover member which gives access to the contact members. The cover member is provided with recesses 129 in line with the recesses 124 formed in the body member and the recesses merge with slots 130 which receive the ends of the terminal screws. An insulating plate 131 is secured to the base of the socket by means of a tab 132 which is provided with an opening 133 to fit over a pin 134 formed on the cover member. The tab rests in a recess 135 so that the cover member may lie flush against the body member. The cover member is secured in position by any suitable fastening means such as the rivets 136 which pass through openings 137 and 138 formed in the cover and body member, respectively. The rivets also engage a flange 139 of a mounting plate 140.

In mounting, the socket extends through an opening 141 in a supporting panel 142 until the mounting plate engages the lower surface of the panel. A bolt 143 is used to secure the mounting plate upon the panel. In this position the socket is "flush" mounted with the contacts above the panel for reception of a lamp. The terminal construction is below the panel so that the wiring system is hidden from view. After connection of the conductors to the terminal screws the ends of the insulating plate are bent upwardly at an angle, as shown by dotted lines in Fig. 12, to protect and insulate the terminal connections against accidental contact such as might damage or short circuit the wiring system.

With a socket constructed in accordance with either of the embodiments of my invention, it is possible to mount a lamp flush with the surface of a supporting panel; if the supporting panel comprises a reflecting surface, this means that a highly effective light source is obtained. The wiring is totally concealed with this method

of mounting. In some situations it may be desirable to provide a continuous line of tubular lamps. This may be easily done simply by mounting two of the sockets back to back.

The contact members are so constructed and arranged within the socket housing that they firmly grip the lamp contact pins and make an effective electrical connection therewith. The sockets may be used to suspend lamps from ceilings inasmuch as it is impossible for the lamps to drop out of the sockets. To remove the lamps they must first be rotated to bring the contact pins in alignment with the slots in the socket and thereafter the lamps may be lifted out of the sockets.

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

1. A socket comprising a member provided with spaced channels, contact members mounted in said channels, abutment elements carried by said member and being spaced from each other to form a slot for receiving the contact pins of the lamp, said contact members being formed at one end with contact portions cooperating with said elements to grip lamp contact prongs, the other ends of said contact members being bent in the form of a U within said channel, terminal means mounted on the bent ends of said contact members and a cover plate mounted on said base enclosing said channels to hold said contact members in position, said cover plate being provided with recesses for receiving said terminal means.

2. A socket comprising a base provided with spaced channels therein, contact members mounted in said channels, abutment elements carried by said base and being spaced from each other to form a slot, said contact members being formed at one end with contact portions cooperating with said elements to grip lamp contact pins between said portions and elements, the other ends of said contact members being bent back upon themselves to form a U bend within said channels, each of said bent ends being provided with an integral lateral projection extending outside said channel, a cover plate mounted on said base enclosing said channels to hold said contact members in position, said cover plate being provided with recesses to receive said lateral projections, and a terminal screw mounted on each of said projections.

3. In combination, a lamp socket comprising a base provided with spaced channels, contact members mounted in said channels, segmental abutment elements carried by said member and being spaced from each other to form a slot, said contact members being formed at one end with contact portions cooperating with said elements to grip lamp contact ends, the other ends of said contact members being bent in the form of a U in said channels, the bent ends of said contact members being provided with lateral projections, a cover plate mounted on said member and closing said channels to maintain said contact members in position, terminal screws carried by each of said projections, and a plate of insulating material carried by said base, the ends of said insulating plate being bendable to protect said terminal screws.

4. In combination, a base provided with walls forming spaced channels, said walls being broken away adjacent one end of said base to form a flat portion of reduced thickness providing a recess, contact members disposed in said channels and having contact surfaces extending into said

recess, abutment elements extending from the bottom of said recess and being spaced from each other to form a slot to receive lamp contact pins, said elements cooperating with said contact surfaces to grip the lamp contact pins, a cover 5 mounted on said base and being provided with a lateral peripheral flange surrounding the recess formed by the flat reduced portion to enclose said contact surfaces, said cover being provided with a slot in alignment with said first-mentioned 10 slot, and terminal means secured to the other ends of said contact members.

5. A lamp socket comprising a base provided with walls forming spaced channels, said walls being broken away adjacent an end of said base 15 to form a flat portion of reduced thickness providing a recess, segmental abutment elements extending from the bottom of said recess and being spaced from each other to form a slot, contact members mounted in said channels, said contact 20 members being formed at one end with contact surfaces extending into said recess and cooperating with said segmental abutment elements to grip lamp contact prongs, a cover mounted on said base, said cover being provided with a pe- 25 ripheral flange to enclose the recess formed by the flat reduced portion of said base, said cover being provided with a slot in alignment with said

first-mentioned slot, the other ends of said contact members being provided with lateral projections, and terminal means carried by said projections.

6. A socket comprising a base provided with walls forming spaced channels, said walls being broken away adjacent an end of said base to form a flat portion of reduced thickness providing a recess, segmental abutment elements extending from the bottom of said recess and being spaced from one another to form a slot, contact members mounted in said channels and being provided at one end with contact surfaces extending into said recess and cooperating with said segmental abutment elements to grip lamp contact pins, the other ends of said contact members being bent back upon themselves, the bent ends of said contact members being provided with terminal means, a cover mounted on said base and being provided with a peripheral flange surrounding the recess formed by the flat reduced portion of said base and enclosing said contact surfaces, said cover having a slot in axial alignment with said first-mentioned slot, and a mounting plate carried by said assembly for mounting said socket on a support.

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