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(54) **Light bulb support assembly.**

(57) A light bulb support assembly comprises a tubular socket (20) having connecting wires (51) extending therein. A connector (30) can be removably inserted in the socket (20) and supports the light bulb (50) in use. The light bulb (50) is connected to the connecting wires (51) when the connector (30) is inserted in the socket (20). The connector (30) has an outwardly extending flange (33) which, when the connector (30) is fully received in the socket (20), is spaced from the socket whereby the connector can be separated from the socket by grasping the flange.

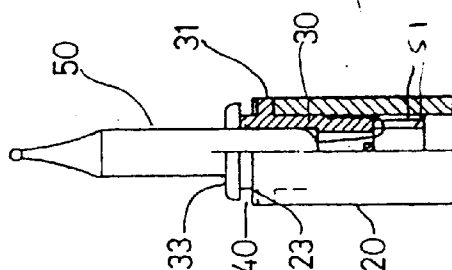


FIG. 4

The invention relates to a light bulb support assembly, particularly for use with strings of lights which are used on christmas trees and the like.

The light strings have been widely used to decorate christmas trees and the like because it brings a warming feeling to the family and passers by. During this season, it brings joy to children as well as adults.

Inclement weather such as snow and wind can cause light bulbs on the christmas trees situated outside to drop down from the bulb sockets after dangling in the wind. Hence the warm atmosphere is likely to be harmed. The replacement and repair of said light bulbs is difficult in such cold weather. Hence, some improvements to decrease this problem have been proposed.

In Taiwan Utility Patent No.78210590, the inventor provided a novel connecting mechanism for a light bulb and bulb socket. The inventor used a clipping plate having a hole thereon provided on the light bulb which locks to a button equipped on the outer wall of the bulb socket. No doubt the locking engagement of clipping plate and button suitably prevent the drop down of the light bulb from the bulb socket.

But it has the following shortcoming.

Because the cold weather requires the wearing of a heavy glove, the use can not separate the two easily for replacement of bulb even if there is a clipping plate and button attached thereon. If he wants to use some tool such as a screw driver to separate them, he cannot find a fulcrum for the tool. This problem becomes serious when the bulb portion on the light bulb is broken.

Besides, the manufacture of such a clipping plate is quite expensive because the attachment of said clipping plate to the socket is difficult to control, hence causing the clipping plate to detach from said bulb socket easily.

In Taiwan Utility Patent Application 79205791 now abandoned, the inventor provided another kind of locking mechanism for a light bulb and bulb socket. Again it has the difficulty like the above-mentioned proposal of the inability to easily separate the two elements. Its structure also can not find a fulcrum for applying a tool.

In accordance with the present invention, a light bulb assembly comprises a tubular socket having connecting wires extending therein; and a connector which can be removably inserted in the socket and which supports the light bulb in use, the light bulb being connected to the connecting wires when the connector is inserted in the socket, and the connector having an outwardly extending flange which, when the connector is fully received in a socket, is spaced from the socket whereby the connector can be separated from the socket by use of the flange.

In contrast to the prior proposals, we have devised a new type of support assembly in which, when the connector is mounted in the socket, a groove is

defined between the flange and the socket which enables the flange itself to be grasped and/or a tool such as a screwdriver to be inserted into the groove in order to separate the two components.

In one case, the flange on the connector could be maintained at a preselected distance from the socket by means of a force fit between the two components. Alternatively, an internal flange could be provided in the socket against which the connector locates, the internal flange being positioned such that the flange on the connector is spaced from the socket. Preferably, however, the socket and connector have one each of a cooperating projection and open ended slot which engage when the connector is inserted in the socket so as to maintain the flange at a preselected distance from the socket. Typically, the slot will be provided on the socket and the projection on the connector. More than one pair of cooperating projections and slots could be provided.

Some examples of light bulb support assemblies according to the invention will now be described with reference to the accompanying drawings, in which:-

Figure 1 is an exploded view of a first example;

Figure 2 illustrates the components of the Figure 1 example during assembly;

Figure 3 illustrates the components of the Figure 1 example when fully assembled;

Figure 4 is a partial longitudinal section through the assembled components of Figure 3;

Figure 5 illustrates a second example of a socket; and,

Figure 6 is an exploded view similar to Figure 1 but of a third example.

The example shown in Figures 1 to 4 comprises a cylindrical bulb socket 20 of known type within which are provided electrical connecting wires 51 (Figure 4). A pair of slots 22 are provided in the upper surface 23 of the socket 20 arranged opposite one another. As can be seen more clearly in Figure 2, the upper section of each slot 22 includes inwardly projecting portions 222.

A light bulb connector 30 is provided having a tubular body 32 into which can be mounted a light bulb 50. The connector 30 includes electrical connecting wires (not shown) which enable the bulb 50 to be electrically connected to the wires 51 mounted in the socket 20. The connector 30 has a pair of outwardly projecting, cylindrical bosses 31 positioned on opposite sides of the body 32 which, when the connector is inserted into the socket 20 (Figures 2-4) locate in respective slots 22 in the connector 20. During insertion, the bosses 31 will slightly force apart the projections 222 which then close around the bosses 31 so as to retain them within the slots 22.

The top surface of the connector 30 is defined by an outwardly projecting flange 33 formed of two arcuate segments 33A and 33B. Spaces 331 are defined between the ends of the segments 33A, 33B.

Once the connector 30 has been inserted into the socket 20 (Figures 3 and 4) the bosses 31 will hold the connector 30 at a position relative to the socket 20 such that a groove 40 is defined between the flange 33 and the upper surface 23 of the socket 20.

In order to separate the connector 30 from the socket 20, for example in order to replace the damaged bulb 50, the user can either grasp the flange 33 with one hand and the socket 20 with the other and draw them apart or insert a tool or his fingers into the groove 40 which acts as a fulcrum in order to force the two components apart.

Providing the flange 33 in two segments with gaps 331 positioned above the bosses 31 simplifies manufacture of the connector.

Since said grasping plate or flange 33 has a larger diameter than the bulb 50, during the replacement, the fingers will not contact on said bulb 50. Since most of the force is located on said grasping plate 33, the bulb 50 will not be broken by excess force. Besides, even if said bulb 50 is broken grasping plate 33 will still make the replacement of said light bulb 50 safely and easily.

Figure 5 illustrates an alternative form of socket 20' in which slots 22' are provided having inwardly extending projections 222' which are positioned spaced from the upper surface 23' of the socket 20'. Between the upper surface 23' and the projections 222' is defined a V-shaped entry slot 224.

Figure 6 illustrates a third example which is similar to the Figure 1 example except that the socket 20'' has an internal and external generally tapered form, the connector 30' having a body 32' which is also tapered so as to cooperate with the internally tapered bore of the connector 20''.

3. An assembly according to claim 2, wherein the slot (22) is provided on the socket (20) and the projection (31) is provided on the connector (30).

5 4. An assembly according to claim 2 or claim 3, wherein the slot includes a projection (221) which extends partially across the entrance to the slot so as to retain the projection (31) on the connector within the slot when the connector (30) is inserted within the socket (20).  
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15 5. An assembly according to any of claims 2 to 4, wherein the cross-sections of the projection (31) on the connector (30) and the slot (22) are substantially the same.

6. An assembly according to claim 5, wherein the cross-sections are substantially circular.

20 7. An assembly according to any of claims 2 to 4, wherein the slot is V-shaped.

25 8. An assembly according to any of claims 2 to 7, wherein the projection (31) on the connector (30) extends through and beyond the slot (22) when the connector (30) is inserted in the socket (20).

30 9. An assembly according to any of the preceding claims, wherein the flange is defined by at least two arcuate segments (33A, 33B).

35 10. An assembly according to any of the preceding claims, wherein the facing surfaces of the flange (33) and the socket (20) have substantially the same general dimensions.

## Claims

1. A light bulb support assembly comprises a tubular socket (20) having connecting wires (51) extending therein; and a connector (3) which can be removably inserted in the socket (20) and which supports a light bulb (50) in use, the light bulb being connected to the connecting wires when a connector is inserted in the socket, and the connector having an outwardly extending flange (33) which, when the connector is fully received in the socket, is spaced from the socket whereby the connector can be separated from the socket by use of the flange.  
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2. An assembly according to claim 1, wherein the socket (20) and connector (30) have one each of a cooperating projection (31) and open ended slot (22) which engage when the connector is inserted so as to maintain the flange (33) at a preselected distance from the socket.  
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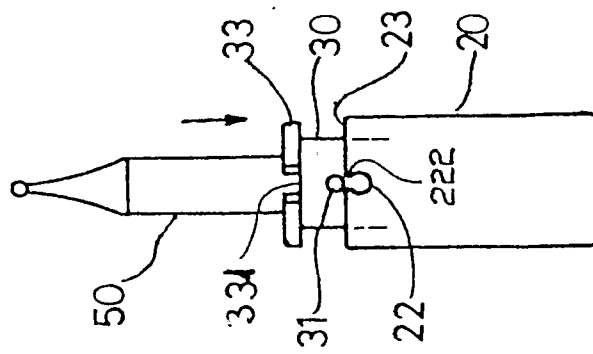


FIG. 2

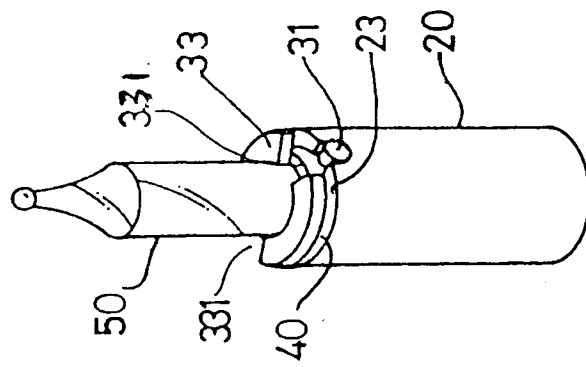


FIG. 3

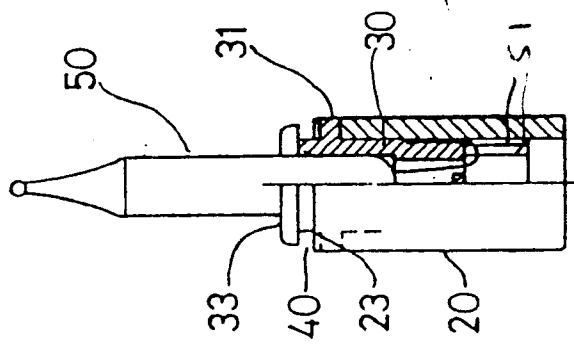


FIG. 4

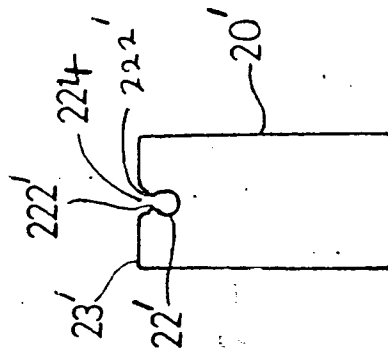


FIG. 5

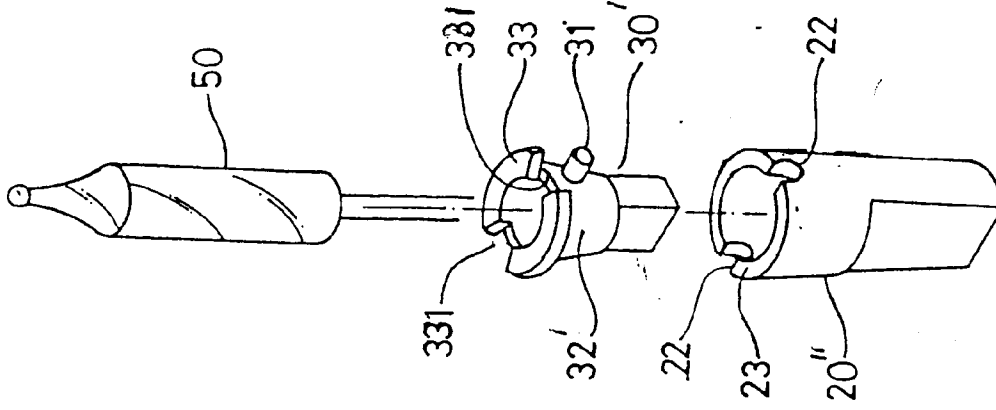


FIG. 6

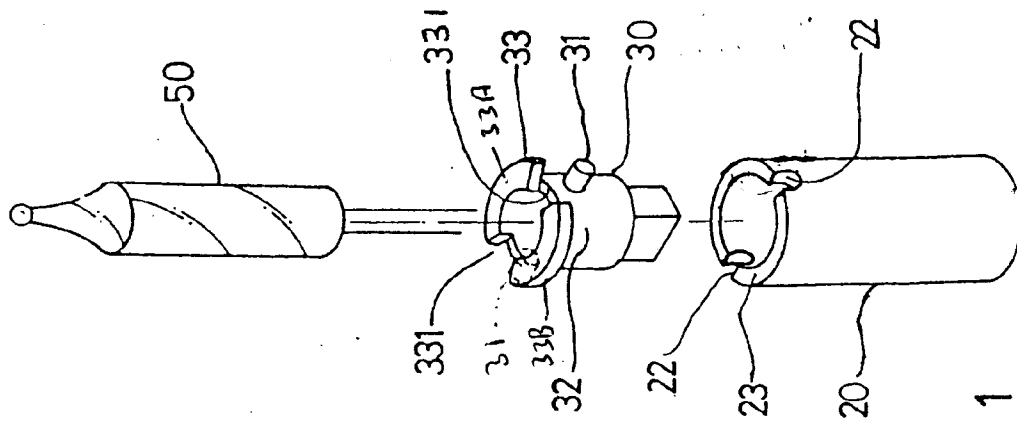


FIG. 1