

Oct. 10, 1939.

H. A. LAYSTROM

2,175,844

LAMP SOCKET ASSEMBLY

Filed April 28, 1937

2 Sheets-Sheet 1

Fig. 1

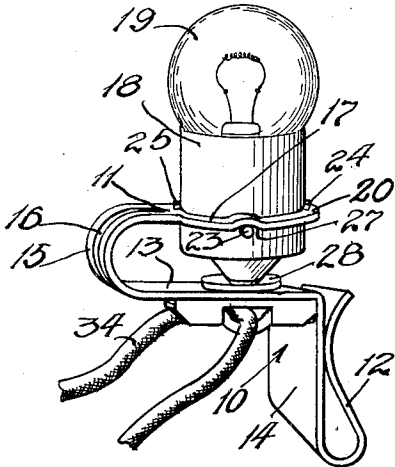


Fig. 2

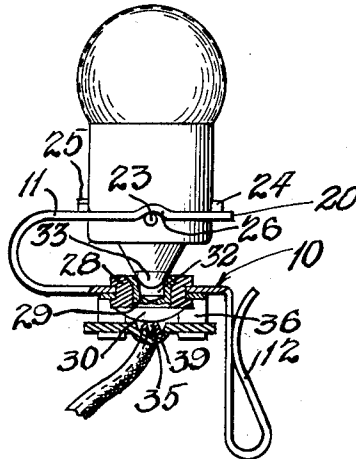


Fig. 3

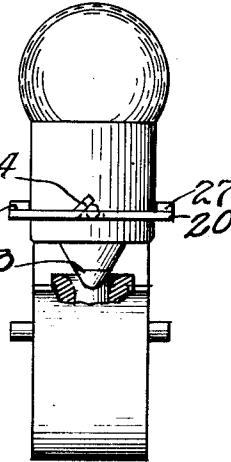


Fig. 4

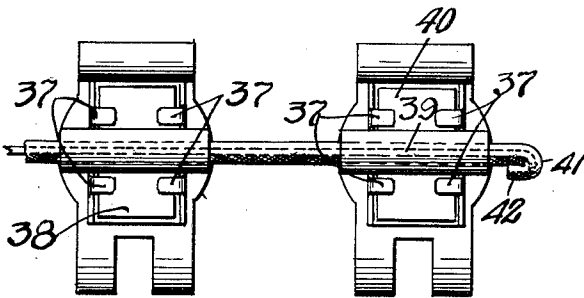
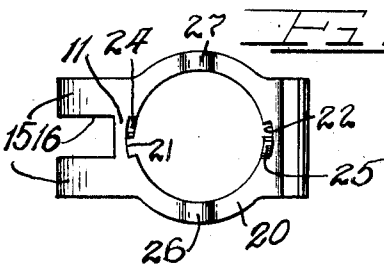


Fig. 5



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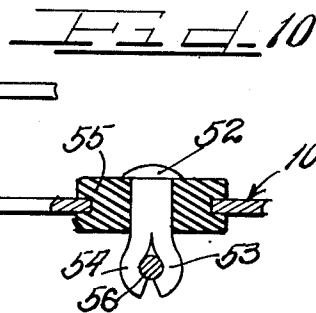
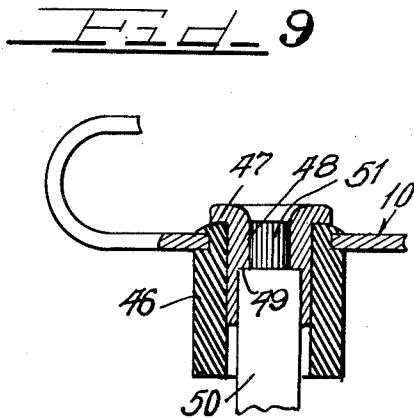
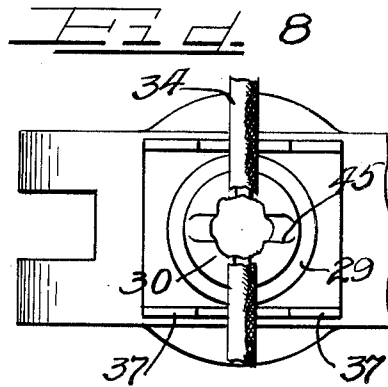
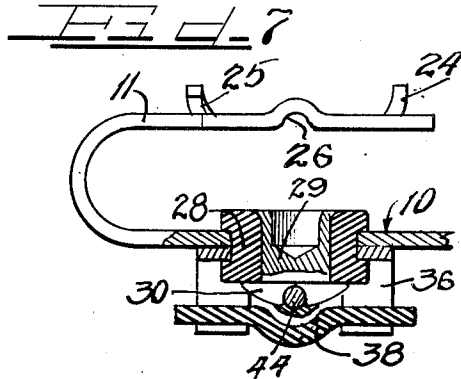
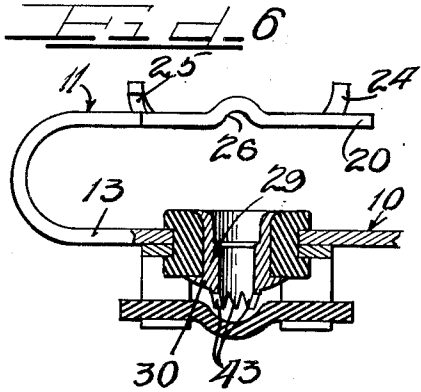
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LAMP SOCKET ASSEMBLY

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2 Sheets-Sheet 2



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LAMP SOCKET ASSEMBLY

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12 Claims. (Cl. 173—328)

This invention relates to lamp socket assemblies and more particularly to lamp socket assemblies of the type which are particularly suitable for relatively small lamps such for example as the six to eight volt pilot lamps commonly used on radio receiving equipment of the present time.

In the design and manufacture of lamp socket assemblies it is important that the construction be economical to manufacture, be of such a type that an insulated conductor may be quickly and inexpensively connected thereto, that it be of such a character that the lamp may be quickly and easily mounted therein, and that its insulating characteristics be such that it comes within the acceptable standard for electrical apparatus laid down by the Fire Underwriters Laboratory. A wide variety of designs have been proposed and used in the past. Possibly the most common form for relatively small lamps is a socket, the base of which is provided with a centrally disposed insulated contact element which extends through the base to the rear side and to which a conductor is to be electrically connected. The insulating material about the conductor must be cut back opposite the central contact element and the conductor soldered to the latter. While on the face of things this is not a difficult operation, it will be well understood by those skilled in the art that because of the time element and the number of steps involved the operation is a relatively costly one from the manufacturing standpoint.

It is an object of the present invention to provide a lamp socket assembly which overcomes the objectionable point discussed above and includes all of the highly desirable results indicated above.

Another object of this invention is to provide a novel lamp socket and lamp socket assembly which is economical to manufacture, economical to assemble, and rugged and reliable in use.

A further object of this invention is to provide a novel lamp socket construction which is adapted to resiliently hold the base of a lamp in desired position in a novel manner.

A still further object of this invention is to provide a novel lamp socket construction having a central contact element, one end of which is adapted to pierce the insulation of an insulated conductor thereby to electrically engage the conductor.

Another and further object of this invention is to provide a novel means for electrically connecting the central contact element of a lamp socket assembly to an insulated conductor and to a novel means for insulating the arrangement at the point where the central contact element engages the insulated conductor.

Another and still further object of this invention is to provide a novel socket arrangement

for receiving and holding a lamp of the type having bayonet projections thereon.

The novel features which I believe to be characteristic of my invention are set forth with particularity in the appended claims. My invention itself, however, both as to its organization and manner of construction, together with further objects and advantages thereof, may best be understood by reference to the following description, taken in connection with the accompanying drawings, in which:

Figure 1 is a perspective view of a lamp socket assembly including a lamp mounted therein and an electrical conductor connected thereto;

Figure 2 is a side elevational view partly in cross section of the lamp socket assembly as shown in Figure 1;

Figure 3 is an end view of the lamp socket assembly showing the lamp in the process of being mounted therein;

Figure 4 is a bottom plan view of two lamp socket assembly units mounted on an insulated conductor;

Figure 5 is a top plan view of the lamp socket;

Figure 6 is a side elevational view partly in cross section of a modified form of central contact elements in which a plurality of circumferentially disposed projections are adapted to pierce the insulating material of an insulated conductor to make an electrical contact with the conductor proper;

Figure 7 is a fragmentary elevational view partly in cross section of a different embodiment of the invention wherein the central contact element is arranged to be soldered to the electrical conductor;

Figure 8 is a bottom plan view of the embodiment shown in Figure 7 with the insulator removed;

Figure 9 is a fragmentary elevational view partly in cross section of a still further embodiment of the invention; and

Figure 10 is a fragmentary elevational view partly in cross section of another embodiment of the invention.

Referring now to Figures 1 to 4 of the drawings, a lamp socket assembly is illustrated therein which includes a generally L-shaped base portion 10, the end portions 11 and 12 of each leg 13 and 14 of the L being bent back upon themselves as is shown in Figures 1 and 2. The bent portion 15 of leg 13 is longitudinally slotted as at 16 in order to reduce the rigidity of the material at this point and to make the free end portion 11 more readily yieldable. As will presently be understood, the base member 10 of the lamp socket assembly is preferably formed of some suitable resilient material such for example as spring steel. Near the outer end of end portion 11 an aperture 17 is provided through which 60

the base 18 of a lamp 19 may extend. The ring-shaped portion 20 formed by aperture 17 in end portion 11 of leg 13 is slotted along one diameter as at 21 and 22 for the purpose of permitting the bayonet projection 23 on base 18 of lamp 19 to pass through ring portion 20. Inclined tabs 24 and 25 are struck out of the material in portion 20 adjacent slots 21 and 22 respectively for a purpose which will be presently explained. Along another diameter, for example, a diameter displaced 90° from the one defined by slots 21 and 22 two grooves 26 and 27 are formed on the underside of ring portion 20. These grooves 26 and 27 are of such dimension that they may readily receive the bayonet projections 23 of lamp 19.

Leg 13 of base 10 is provided with an insulator 28 and a central contact or contact seat 29. Central contact seat 29 includes a head portion 30 and a main body part, the latter being arranged to extend through a suitable aperture in insulator 28 in the manner shown in Figure 2. The upper end of the central contact seat 29 is recessed as at 32 for the reception of the central contact button 33 on the base 18 of lamp 19. As is well understood by those skilled in the art, the electrical connections to lamp 19 are made through the central contact seat 29 which engages the central contact button 33 of the lamp 19, and the metallic base portion 10 (which is preferably connected to the source through ground) which engages the other terminal of the lamp through ring portion 20 and bayonet projection 23. As is the usual practice, one side of the electrical energization circuit is grounded, and as shown in the drawings it is to be understood that the base portion 10 is grounded and that only one insulated conductor need be connected to the lamp socket assembly.

The novel manner in which an insulated conductor 34 is connected to the insulated central contact seat 29 will now be described. Head 30 of central contact seat 29 is provided with a downwardly depending relatively sharp projection 35 which is adapted to pierce the insulating material on conductor 34 and directly engage the conductor within. In order to retain conductor 34 in desired engagement with downwardly depending projection 35, a clamping bracket 36 is mounted on insulator 28 in the manner shown in Figure 2. Clamping bracket 36 is provided with a plurality of tangs or tabs 37 which are adapted to be pressed over the edges of a wire guide 38 composed of insulating material. Wire guide 38 includes a central portion 39 which is adapted to fit snugly over conductor 34 and center it with respect to the central contact button 29 and particularly the projection 35 on central contact 29. The wing portions 40 of wire guide 38 are arranged to extend away from the conductor between oppositely disposed tangs 37 of the clamping bracket 36. As may be seen best in Figure 4 of the drawings, the tangs 37 are bent down over wings 40 of wire guide 38 thereby securely retaining wire guide 38 and conductor 34 in desired position against projection 35 and head 30 of central contact seat 29.

Leg 14 of base 10 is bent back as at 12 to form a convenient fastening clip for detachably securing the lamp socket assembly to a metallic shelf, ledge, bracket, or the like.

The manner of assembling the lamp socket assembly unit just described is as follows:

An insulator conductor 34 is disposed opposite

the end of the sharp projection 35 on central contact seat 29 and the wire guide 38 is disposed thereover. Preferably by a single pressing operation conductor 34 is pressed into engagement with projection 35 and simultaneously tangs 37 of clamping bracket 36 are pressed down over the wing portion 40 of wire guide 38. It will thus be readily understood that by a simple, economical, and quick operation, electrical connection is made between an insulated conductor 34 and the central contact seat 29 of the lamp socket assembly. Thereafter leg 14 of base 10 may be slipped over a ledge or bracket (not shown) from which the lamp socket assembly is to be supported.

To assemble the lamp 19 in proper engagement in the lamp socket assembly, the base 18 of lamp 19 is passed through aperture 17 of ring portion 20, the bayonet projections 23 being disposed opposite slotted portions 21 and 22. As the central electrical contact or button contact 33 of lamp 19 engages central contact seat 29, the bayonet projections 23 are just in the process of passing through the slotted portions 21 and 22 as is shown in Figure 3. If lamp 19 is now rotated in a clockwise direction (looking down on it), bayonet projections 23 will ride down the inclined undersurfaces of the struck out portions 24 and 25. Since the spacing between the bayonet projections 23 and the central contact seat 29 is fixed by virtue of the fact that the central contact button 33 of lamp 19 is in engagement with central contact seat 29, rotational movement of the lamp forces the end portion 11 upwardly against its inherent resiliency. After the lamp 19 has been rotated approximately 90°, the bayonet projections 23 fall into grooves 26 and 27. It is to be understood that when the bayonet projections 23 are in grooves 26 and 27 the end portion 11 of base member 10 is still slightly sprung outwardly from its normal position and that in consequence thereof a downward biasing force is applied to the lamp 19 through the bayonet projections 23 which constantly urges the lamp 19 into tighter engagement with the central contact seat 29. The grooves 26 and 27 prevent subsequent accidental rotation of lamp 19 in its mounting. However, to remove lamp 19 from the lamp socket assembly, it is simply necessary to rotate the lamp 90° in either direction, thereby placing the bayonet projections 23 opposite slots 21 and 22.

As will readily be understood by those skilled in the art, any number of lamp socket assembly units may be mounted on a given conductor, and they may be spaced as close together or as far apart as desired. Two lamp socket assembly units are illustrated as being connected to a single conductor in Figure 4 of the drawings, one of the units being connected approximately at the end of the conductor. Where a lamp socket assembly unit is connected at approximately the end of a conductor, it is desirable to sever the conductor proper a slight ways back within the insulating material as is indicated at 41 and the insulation 42 folded back on itself to prevent any short circuit or other accidental discharge.

In Figure 6 of the drawings I have shown a modified form of my invention as to the form of central contact seat employed. Those elements of the lamp socket assembly which are similar to corresponding elements in Figures 1 to 5 have been given the same reference numerals. In this form of the invention instead of providing the head 30 of the central contact seat 29 with a single centrally disposed projection, a plurality

of circumferentially disposed projections 43 have been substituted. It has been found that with certain types of conductors this form of insulation puncturing means is preferable to the single puncturing means shown in the preferred embodiment of the invention. The remaining portion of the lamp socket assembly unit is the same in this form of the invention as that previously described.

10 In the embodiment of the invention illustrated in Figures 7 and 8 of the drawings, the novel bayonet engaging portion of the lamp socket assembly unit is the same as that illustrated as the preferred embodiment of the invention, but the manner in which electrical engagement is made between the central contact seat and the electrical conductor is different. The head 30 of the central contact seat 29 instead of being provided with a downwardly depending sharp projection, is provided with a groove 44, into which a portion of the electrical conductor 34 from which the insulation has been removed is adapted to be disposed and then soldered. An auxiliary groove 45 at right angles to groove 44 may be provided in the head 30 if desired for the purpose of permitting the electrical conductor to extend across the head portion in either of two directions.

The lamp socket unit of this form of the invention is preferably provided with an insulator or wire guide 38 and a clamping bracket 36 similar to the wire guide and insulator illustrated in connection with the preferred embodiment of the invention. It will thus be observed that a solder connection has been substituted for the connection made by the sharp depending projection as shown in the preferred embodiment of the invention the connection is nevertheless thoroughly and adequately insulated. Figure 8 of the drawings shows the wire which has been bared of the insulation and soldered to the head 30, the clamping bracket 36 being shown with its integral tangs or tabs 37 in position prior to the time when the wire guide or insulator 37 is inserted in place and the tangs 37 bent down thereover.

45 In Figure 9 of the drawings, an arrangement is shown in which no solder is employed. An insulator 46 extends through the bottom of the lamp socket 10 in the same manner as described in connection with the preferred embodiment of the invention, but the insulator in this case extends further below the bottom of the lamp socket 10 than that previously described. Extending partially through insulator 46 is a central contact element 47 which is centrally apertured as at 48 and provided with an inner shoulder 49. The end of an insulated conductor 50 which is to be electrically connected to the central contact element 47 has the insulation cut away near its end leaving the conductor wire 51 bare for a short ways back from the end. This bared end of wire 51 is adapted to extend snugly up into the centrally apertured portion 48 of the central contact element 47, and the end of the insulating material is adapted to abut the shoulder 49. After the conductor 50 has been inserted in place, the central contact element 47 is squeezed below the lamp socket 10 until the bared end of wire 51 makes a good electrical connection with central contact element 47 and until the conductor 50 is firmly and securely held in place. It will be noted with this type of connection that no additional insulating means is necessary since no part of the exposed conductor wire 51 nor central contact element 47 remains uninsulated below the lamp socket 10.

In Figure 10, a somewhat different arrangement is shown in which the central contact element 52 is in the form of a split rivet or the like, the split portion forming a pair of downwardly extending arms 53 and 54 which extend below the insulator 55 of the lamp assembly unit. An insulator conductor 56 is bared opposite the end of the split rivet 52 and the legs of the split rivet 53 and 54 are spread apart to extend on opposite sides of conductor 56. The lower ends of arms 53 and 54 are then squeezed or bent under conductor 56 until a good electrical connection is made therebetween and until the conductor 56 is firmly and securely held in desired position. Although the legs 53 and 54 of the split rivet are shown as being of such a length that they just barely extend about the lower side of conductor 56, it is obvious that longer legs may be employed so that the ends of the legs will be overlapped after the wire has been disposed in desired position.

While I have shown particular embodiments of my invention, it will, of course, be understood that I do not wish to be limited thereto, since many modifications may be made, and I, therefore, contemplate by the appended claims to cover all such modifications as fall within the true spirit and scope of my invention.

I claim as my invention:

1. As an article of manufacture, a lamp mounting element comprising a lamp socket member, an insulated fastening and contact element extending into said lamp socket for engagement with a complementary contact on a lamp, said element having an outer conductor engaging portion including a plurality of relatively sharp projections which are adapted to pierce the insulation of an insulated conductor, thereby to electrically engage said conductor, an insulating cover adapted to cover said conductor, and means secured by said fastening and contact element for holding said cover.
2. A lamp socket assembly comprising a base with a hole therein, a clamping bracket having a portion with a hole therein lying flat against said base with said holes in registry, an insulating bushing extending through said holes and overlying said base and said bracket, a conducting element extending through the bushing and having a sharp pin on one end, and a support of insulating material extending over the point of the pin and adapted to hold an insulated wire impaled on the point with the point piercing the insulation and making a contact with the conductor in the wire, said bracket having securing portions bent over said support, and said base being provided with means to hold a lamp with one contact thereof against the other end of said conducting element.
3. A lamp socket assembly comprising a base with a hole therein, a clamping bracket having a portion with a hole therein lying flat against said base with said holes in registry, an insulating bushing extending through said holes and overlying said base and said bracket, a conducting element extending through the bushing, one end of said conducting element being formed to make contact with a contact on a lamp base and the second end thereof being formed to make contact with a wire, and an insulated support extending over said second end of said conducting element and adapted to hold a wire in contact therewith, said bracket having securing portions bent over said support, and said base being provided with means to hold a lamp with

one contact thereof against said second end of said conducting element.

4. A lamp socket assembly comprising a base, a clamping bracket having a portion lying flat against said base, an insulating member passing through said base and said bracket and having portions bearing against outwardly facing surfaces on said base and said bracket for securing them together, conducting means extending through said insulating member for making an electrical connection to a wire at one end of said insulating member, and means secured by said clamping bracket for holding said wire against one end of said conducting means, the other end of said conducting means serving as a contact for a lamp.

5. A lamp socket assembly comprising a sheet metal base, a sheet metal clamping bracket having a portion lying flat against a portion of the base, an insulating bushing extending through holes in said portions, a rivet extending through the bushing and cooperating therewith to hold the bracket onto the base, one end of the rivet having a hollow therein and the other end having a sharp point, a wire support of insulating material extending over the point and adapted to hold an insulated wire impaled on the point with the point piercing the insulation and making a contact with the conductor in the wire, the clamping bracket having portions bent over the wire support to hold said wire support in place and the base being provided with resilient means for holding a lamp with the contact thereof in the hollow end of the rivet.

6. In a socket for a lamp having a base and a contact on one end, said socket comprising a sheet metal base member having a flat portion with a hole and a second portion for embracing said lamp base and holding said contact towards said flat portion, the combination of a clip having a flat portion with a hole, said two flat portions lying flat against each other with said holes in registry, an insulating bushing extending through said holes and having flanges extending over portions of the outer surfaces of said flat portions, a rivet extending through said bushing, the end of said rivet towards said lamp-embracing portion of said base being hollow and flared out over the end of said bushing and the other end of said rivet having a head carrying a sharp pin, and a support of insulating material extending over the point of the pin and adapted to hold an insulated wire impaled on the point with the point piercing the insulation and making a contact with the conductor in the wire, said clip having lugs bent over said support and adapted to hold it against said wire.

7. In a lamp socket, a sheet metal base having a hole, a sheet metal clip having a hole, said clip lying flat against said base with said holes in registry, an insulating bushing extending through said holes and having flanges bearing on said base and clip around said holes, a rivet extending through said bushing and having one flared hollow end and a head at the other end bearing against the ends of said bushing, an electric wire extending past said rivet head and in electrical contact therewith, and a wire support of insulating material on the opposite side of said wire from said rivet head, said clip having lugs bent over said wire support to hold it against said wire.

8. In a lamp socket, a sheet metal base having a hole, a sheet metal clip having a hole, said clip

lying flat against said base with said holes in registry, an insulating bushing extending through said holes and having flanges bearing on said base and clip around said holes, a rivet extending through said bushing and having one flared hollow end and a head at the other end bearing against the ends of said bushing, said head having a projecting point, an insulated electric wire extending past said rivet head and impaled on said point, said point making an electric contact with said wire, and a wire support of insulating material on the opposite side of said wire from said rivet head, said clip having lugs bent over said wire support to hold it against said wire.

9. In a lamp socket, a sheet metal base having a hole, a sheet metal clip having a hole, said clip lying flat against said base with said holes in registry, an insulating bushing extending through said holes and having flanges bearing on said base and clip around said holes, a rivet extending through said bushing and having one flared hollow end and a head at the other end bearing against the ends of said bushing, an insulated wire extending past said rivet head and having a bare portion soldered thereto, and a wire support of insulating material covering said rivet head and said bare portion of the wire, said clip having lugs bent over said wire support to hold it against said wire.

10. In combination, a U-shaped lamp socket having two portions spaced from each other and resiliently connected, one portion having an opening in which is located a hollow insulating rivet, a hollow metal rivet within the insulating rivet and having one end expanded to secure it therein and having an integral spear on the other end adapted to pierce the insulation of a stranded wire cable so as to make electrical connection therewith, the said one end of the metal rivet being adapted to make electrical contact with the center electrode of an incandescent lamp, the other portion serving to hold the lamp in contact with the hollow portion of the rivet and to make contact with the outer electrode, and means for retaining the cable on the spear.

11. In combination, a U-shaped lamp socket having two portions spaced from each other and resiliently connected, one portion having a hollow member insulated therefrom for making electrical contact with the center electrode of an incandescent lamp, the other portion serving to hold the lamp in place against the hollow member and to make electrical contact with the other lamp electrode, and a spear carried by the hollow member and adapted to pierce the insulation of a stranded wire cable so as to make electrical connection therewith, and means for retaining the cable on the spear.

12. In combination, a U-shaped lamp socket having two portions spaced from each other and resiliently connected, one portion having a hollow member insulated therefrom for making electrical contact with the center electrode of an incandescent lamp, the other portion serving to hold the lamp in place against the hollow member and to make electrical contact with the other lamp electrode, a spear carried by the hollow member and adapted to pierce the insulation of a stranded wire cable so as to make electrical connection therewith, an insulating shield for retaining the cable on the spear, and ears carried by the lamp socket for holding the shield in retaining position.

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