Jan. 16, 1968 H. A. ELLIOTT 3,364,456

CONSTRUCTION FOR A PANEL LAMP SOCKET ASSEMBLY

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FIG. 1.

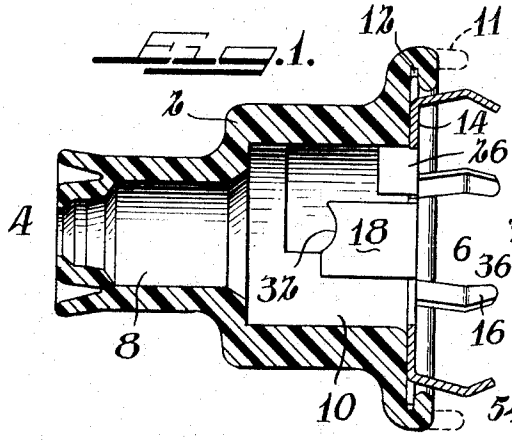


FIG. 2.

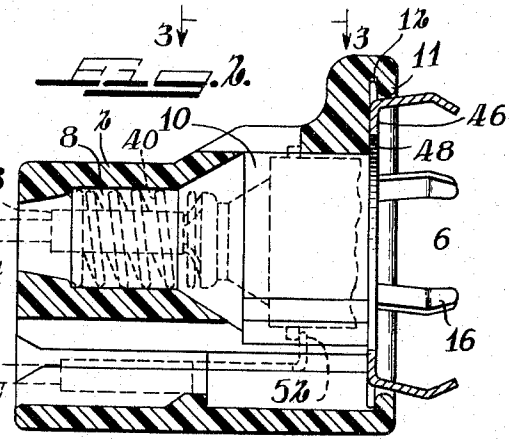


FIG. 3.

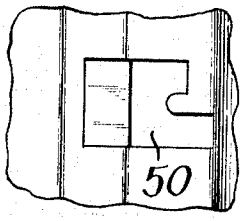


FIG. 4.

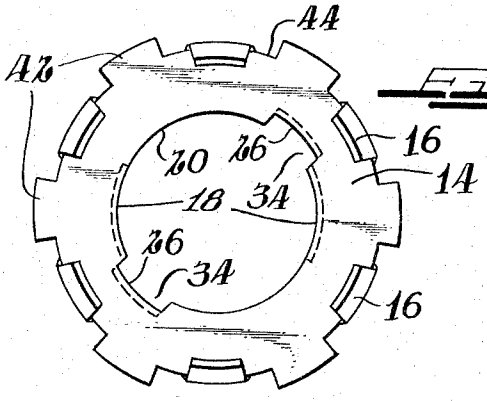


FIG. 6.

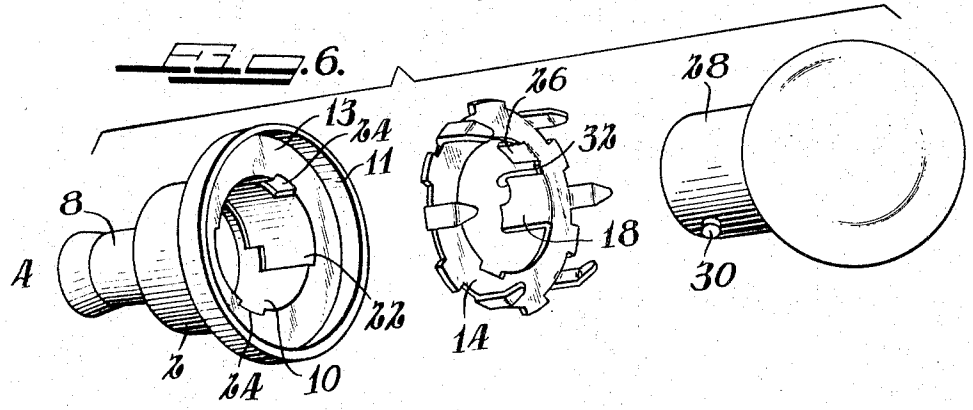
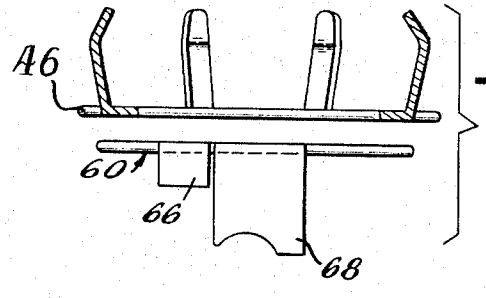


FIG. 5.



INVENTOR
HOWARD A. ELLIOTT
BY Bair, Freeman & Molinare Attys.

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CONSTRUCTION FOR A PANEL LAMP SOCKET ASSEMBLY

Howard A. Elliott, Detroit, Mich., assignor to Essex Wire Corporation, Fort Wayne, Ind., a corporation of Michigan

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ABSTRACT OF THE DISCLOSURE

A panel lamp socket assembly made up of a molded plastic socket housing, a spring-loaded central contact member carried in one end of the housing and connected to an electrical supply conductor, and a ring insert carried in a recess at the other end of the plastic housing. The ring insert is provided with outwardly extending, resilient, panel-gripping fingers which are radially spaced from the lamp bulb. A flange for retaining the bulb bayonet base extends axially inward from the inner circumference of the inserted ring.

The present invention relates generally to a method and construction for a panel lamp socket assembly and more particularly to a new and improved lamp socket assembly and method using a metal insert in a socket of moldable plastic material.

One object of my invention is to provide an easily and economically assembled panel lamp socket which uses a minimum of parts and provides a sturdy socket assembly and lamp receptacle.

Another object of my invention is to provide an improved panel lamp socket capable of economical assembly utilizing modern methods of production, and particularly an improved socket construction which permits the use of heat forming tools to spin over a moldable plastic to permanently affix the separate parts in the assembly.

A further object of my invention is to provide a panel lamp socket having an insert ring of unique configuration which may be easily inserted in a molded tubular socket and which provides optimum lamp holding characteristics together with optimum panel gripping characteristics.

Prior panel lamp socket assemblies have provided ring type inserts having panel gripping fingers extending therefrom and lamp engaging detents formed thereon. Those skilled in the art will appreciate that several weaknesses are inherent in the old type constructions. In contrast to the prior devices, the present invention provides a sturdy multi-point support for the lamp held in the socket without utilizing the mounting board tension fingers for support. This permits the mounting board tension fingers to be formed, tempered and plated to the right spring tension for performing their sole function—rigidly fastening the lamp socket assembly to the panel.

In accordance with one advantageous feature of the present invention, the tension fingers are always spatially isolated from the bulb or lamp so that the bulb or lamp does not interfere with the flexing movement of the tension fingers. This assures ease of insertion into the panel board and yet permits a firm union between the panel and the lamp socket assembly. Furthermore, the use of a unitary ring type insert having lamp bayonet locking arms and mounting panel tension fingers formed thereon permits rapid and economical assembly with a moldable plastic tubular member, such as by means of spinning with a heating form tool as is more fully set forth below.

Another illustrative embodiment of the invention permits use of a unitary ring insert having mounting panel tension fingers extending therefrom and utilizes receptacles defined in the walls of the plastic tubular member

itself to lock the lamp bayonets in place. In this embodiment, the inner portion of the lamp base chamber wall cooperates with the bayonet receptacles to minimize axial and lateral movement of the bulb in the socket.

As set forth in the following description, several additional objects of the invention are particularly important and include specific details of construction and steps of assembly. With these and other objects in view, my invention consists in the construction, arrangement and combination of the various parts of my panel lamp socket assembly, as well as the method for providing the same, whereby the objects above contemplated are obtained as hereinafter more fully set forth, pointed out in my claims and illustrated in detail on the accompanying drawing, wherein:

FIG. 1 is a sectional side view of a panel lamp socket assembly showing one illustrative embodiment of the invention;

FIG. 2 is a sectional side view of another illustrative type of panel lamp socket assembly embodying the invention and showing a variation of grounding means;

FIG. 3 is a top view of a portion of FIG. 2, along the lines 3—3, showing a lamp base bayonet receptacle defined in the wall of the tubular member;

FIG. 4 is an axial view of a washer type metallic ring insert which is preferably used in the embodiment of the invention shown in FIG. 1;

FIG. 5 shows a variation of FIG. 4, with the top portion of FIG. 5 showing a washer type metallic ring insert which is preferably used in the embodiment of the invention shown in FIG. 2 and FIG. 3; and

FIG. 6 is an exploded view of the FIG. 1 embodiment, showing a lamp, the ring of FIG. 4, and a socket in alignment for assembly.

Each of the preferred embodiments of my invention shown in the drawings advantageously comprises a panel lamp socket assembly having a moldable plastic tubular member **2** defining a lead end **4** and a lamp receiving end **6**. The tubular member **2** preferably is formed with a lead and lead spring chamber **8**, a lamp base chamber **10**, and a ring insert means recess **12**. The ring insert means recess **12** is adapted to receive a metallic annular flat ring insert **14**. As illustrated in the embodiment of FIGS. 1, 4 and 6, the ring insert **14** may be formed with mounting board tension fingers **16** depending axially in one direction therefrom and elongated bayonet locking arms **18** depending axially in the opposite direction.

One of the purposes of my invention is to provide a stable positioning socket assembly for a lamp, without having the mounting board tension fingers **16** normally come in contact with the lamp positioned in said socket. In successfully solving this problem, I have found that the depth of the bayonet locking arms **18** directly related to the stability of the lamp supported thereby. Commercially available socket lamps have a predictable range of lamp base diameters and by taking the inner diameter **20** of the ring insert **14** as a reference, adequate stability of the lamp is assured in the use of this embodiment of my invention if the bayonet locking arms **18** have a length in excess of one-fourth (¼) the inner diameter **20** of the ring insert **14**.

With respect to the embodiment of my invention illustrated in FIGS. 1, 4 and 6, it can be seen that the lamp base chamber **10** has defined in its walls the circumferential depressions **22** and **24** which are adapted respectively to receive and mate with the elongated bayonet locking arms **18** and positioning lug means **26** on the ring insert **14**. The positioning lug means **26** cooperate with the elongated bayonet locking arms **18** to prevent rotation of the ring insert **14** when a lamp base **28** is inserted in the assembled socket and rotated in a clockwise manner

to engage the lamp bayonets 30 with the bayonet recesses 32 defined in the elongated bayonet locking arms 18. In addition to the positioning function of the lug means 26, said lug means 26 serve to define radial recesses 34 in the inner diameter 20 of the ring insert 14. These radial recesses 34 provide bayonet channels for the insertion of a lamp base 28 into the socket.

In the illustrative embodiment of my invention shown in FIG. 6, it can be seen that the ring insert chamber wall 11 has a circumferential junction with an annular radial flange 13 connecting the lamp base chamber 10 with said ring insert chamber wall 11.

After the metallic ring insert 14 is formed, tempered and plated to the right spring tension, it is assembled into the nylon or other moldable plastic tubular member 2 so as to be circumferentially abutting the radial flange 13. The positioning lugs 26 and the bayonet arms 18 of the insert 14 are mated with corresponding depressions 22 and 24 in the lamp base chamber wall 10. Advantageously, in accordance with one feature of the invention, the plastic ring insert chamber wall 11 then is spun over with a heating form tool. This can either be done by heating the tool to a temperature of 500° to 600° F., or the heat can be developed by spinning the tool and bringing the heat up by friction only. As shown in FIG. 1, the spun over portion of the ring insert chamber wall 11 forms a ring insert recess 12 that securely confines the ring insert 14 in place.

In operation, my lamp socket assembly functions electrically in a manner similar to that of other panel lamps. The lead and lead spring chamber 8 houses a lead wire 36 and a lead contact 38 which is surrounded by a lead contact spring 40 (such as are illustrated in FIG. 2). The lead contact spring 40 keeps the lead contact 38 in abutting engagement with a contact on the base of a lamp 28 inserted in the socket. The lamp 28 is electrically grounded in the illustrative embodiment of my invention shown in FIGS. 1, 4 and 6 by an electrical path formed by the circuit comprising lamp bayonet 30, the bayonet locking arms 18, the annular flat ring insert 14, the mounting board tension fingers 16, and thence into an electrically conductive mounting board which is returned to electrical ground.

One primary object of my invention is to provide a novel socket assembly having optimum lamp holding characteristics together with optimum panel gripping characteristics. The present invention permits control of the spring tension of the mounting board tension fingers 16. This control is desirable so that the insertion pressure necessary to insert the assembly into a mounting panel will not be excessive, while at the same time the tension will be sufficient to prevent dislodging of the assembly from the mounting panel by vibration or bumping. Control of side-to-side pressure characteristics in the tension fingers 16 may be made by changing the shape or temper of the tension fingers. To prevent the heat spinning operation from affecting the tension fingers 16, as by forcing the ring insert chamber wall 11 into abutting engagement with the fingers, one feature of my invention is to provide a plurality of protrusions 42 extending radially from the outer circumference 44 of the annular flat ring insert 14. The protrusions 42 permit the ring insert chamber wall 11 to be spun over without its coming into contact with the tension fingers 16. This advantageous feature is shown in FIGS. 1 and 2 of the drawing.

FIGS. 2 and 3 show a variation of my invention adapted for use in a completely insulated mounting assembly. In the FIG. 2 embodiment, the annular flat ring insert 46 has an inner diameter 48 greater than the inner diameter of the lamp base chamber 10. This difference in diameter prevents electrical contact between a lamp base 28 and the annular flat ring insert 46. Lamp bayonet receptacles 50 are defined in the lamp base chamber wall as shown in FIG. 3. The variation shown in FIG. 2 has a ground contact 52 which also serves to retain a lamp bayonet 30. The ground contact 52 is connected to a ground wire 54 which is insulated from the main tubular member 2.

The annular flat ring insert 46 shown in FIGURE 2 has no bayonet locking arms or positioning lug means since the annular flat ring 46 is spatially and electrically insulated from a lamp base 28. The spun down portion of the ring insert chamber wall 11 securely holds the annular flat ring insert 46 in position. The ring insert 46 is not subjected to any twisting action when a lamp is inserted in the socket and hence there is no need for positioning lugs. If desired, adhesives of various types may be used to more firmly bond the ring insert 46 in the ring insert recess 12.

FIGURE 5 shows a further embodiment of the invention wherein a flat annular ring insert 46 of the type shown in FIGURE 2 is employed in conjunction with a washer-type metallic ring 60 provided with positioning lug means 66 and elongated bayonet locking arm means 68. The combination of insert 46 and ring 60 may be substituted for the ring insert 14 shown in FIGURES 1, 4 and 6.

While the invention is susceptible to various modifications, two preferred embodiments have been shown in the drawing and have been described in considerable detail, as to both the construction and the method for making the same. It should be understood that there is no intention to limit the invention to the specific forms disclosed, but, on the contrary, the intention is to cover all modifications and alternative constructions falling within the spirit and scope of the invention as expressed in the appended claims.

I claim as my invention:

1. A panel lamp socket assembly comprising a moldable plastic tubular member having a lead end and a lamp receiving end, said tubular member defining a lead and lead spring chamber, a lamp base chamber, a ring insert member recess for receiving a metallic annular flat ring insert member, said ring insert member having mounting board tension fingers depending axially in one direction therefrom and elongated bayonet locking arms depending axially in the opposite direction, and said elongated bayonet locking arms being of a length greater than one-fourth (¼) the inner diameter of said ring insert member.

2. The panel lamp socket assembly of claim 1 wherein said annular flat ring insert member has positioning lug means depending axially in the direction of said bayonet locking arms, said positioning lug means being adapted to mate with corresponding circumferential depressions on the inner wall of said lamp base chamber.

3. In a panel lamp socket assembly of the class comprising a moldable tubular member defining a lead chamber and a lamp base chamber, a spring-loaded central contact member in said tubular member, an electrical conductor connected to said contact member, and a plurality of resilient tension fingers depending axially outward from said lamp base chamber portion of said tubular member, said fingers being adapted to engage with an opening on a panel,

the improvement wherein said fingers extend axially outward from the outer circumference of a flat, annular ring member, said ring member further including protrusions which extend radially outward from said outer circumference into a recess in said plastic tubular member, said recess surrounding said lamp base chamber portion of said tubular member, said ring member further comprising a plurality of elongated bayonet locking arms extending axially from said inner circumference in a direction opposite to that of said tension fingers.

4. The improvement as set forth in claim 3 wherein said ring member includes elongated bayonet locking arms depending axially inward from said ring member, said locking arms being of a length greater than one-fourth (¼) the inner diameter of said ring member, and

means including said ring member and said panel-gripping fingers for grounding said bayonet locking arms.

5. The metallic ring member of claim 3 wherein said mounting board tension fingers are disposed alternately with said radially extending protrusions.

6. The improvement as set forth in claim 3 wherein said ring member includes elongated bayonet locking arms of a length greater than one-fourth (¼) the inner diameter of said ring member.

7. The improvement as set forth in claim 3 wherein said ring member comprises a pair of superimposed rings, said fingers extending from one of said rings axially in said outward annular direction and said bayonet locking arms extending from the other of said rings axially in said opposite direction.

8. The panel lamp socket assembly of claim 1 wherein said ring insert member comprises a pair of superimposed rings, said tension fingers depending from one of said

rings axially in said one direction and said bayonet locking arms depending from the other of said rings axially in said opposite direction.

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MARVIN A. CHAMPION, *Primary Examiner.*

PATRICK A. CLIFFORD, *Examiner.*