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LAMP SOCKET UNIT

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2 Sheets-Sheet 1

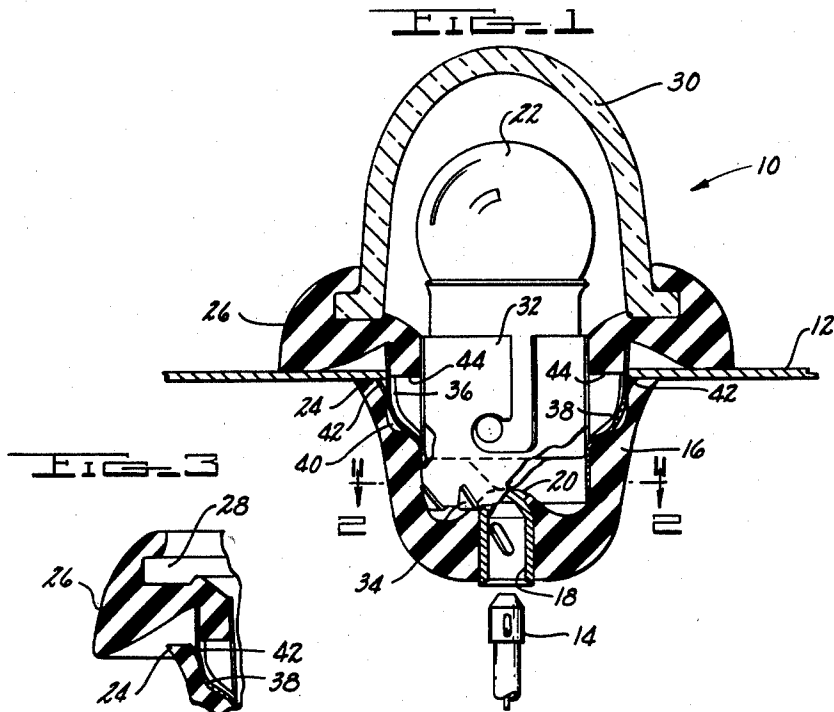


FIG. 3

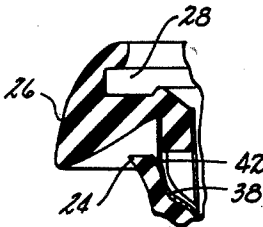


FIG. 2

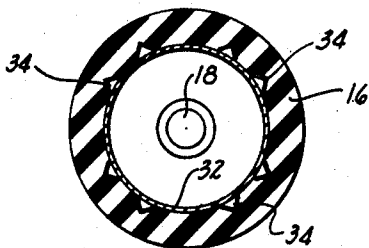


FIG. 4

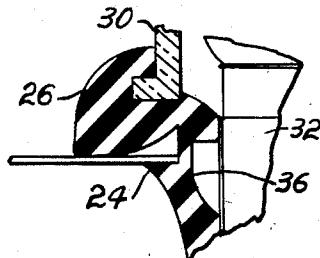
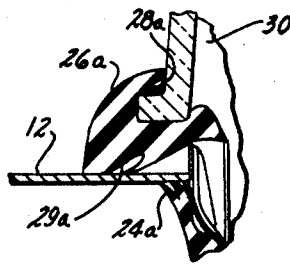


FIG. 4A

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2,860,233

LAMP SOCKET UNIT

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The present invention relates to lamps, and more particularly to an assembly of elements which can be united in self-retaining relationship after which the assembly can be mounted in an apertured panel in a self-retaining position.

There has been a long felt need in various industries such as in automotive, aircraft, marine and similar fields, for an improved lamp assembly which can be mounted in an apertured plate for effectively lighting the immediate surrounding area. It has been common practice to mount lamps in apertures of panels, but such lamps have not proved to be entirely satisfactory from either the cost or the operational standpoint. Thus, as one of their many uses lamp assemblies are mounted in panels associated with rear license plates of automobiles, and it is found that such assemblies which can pass the required tests from the operation standpoint are more costly than is desired or is believed necessary.

The lamp assemblies which have proved to be most satisfactory in use have generally been fabricated from parts which are riveted or screwed together, and similar fastening means may have been used to secure the assembly to the panel. Such units not only are costly from the standpoint of initial cost, but also from the standpoint of the installation costs which are incurred on the automobile assembly lines when the various lamps and wiring harnesses are installed.

It is an object of the present invention to provide a lamp assembly which is designed to overcome the shortcomings of the prior art devices, and which is characterized by the optimum results obtained from its use while at the same time being relatively low in cost.

It is another object of the present invention to provide a lamp assembly of the type adapted to be mounted in an apertured plate, such assembly being constructed and arranged so that the various component parts can be joined together quickly and easily to form a single unit, such unit then being insertable into the aperture of a plate where it will remain in a self-retaining position.

It is another object of the present invention to provide a lamp assembly of the foregoing character wherein a resilient rubber-like body portion is provided for housing a lamp socket, and a lens is carried by said body portion, the latter being constructed and arranged so that it will hold the complete assembly in the apertured plate and at the same time will assure a weather tight seal around the edge of the lens and also around the edge of the aperture.

It is still another object of the present invention to provide a lamp assembly of the foregoing character wherein the rubber-like body portion is constructed and arranged so that the assembly can be quickly and easily drawn partially through the aperture into a self-retaining position in the plate without damage to the internal parts of the assembly.

It is still another object of the present invention to provide a lamp assembly of the foregoing character which

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is constructed and arranged to provide a novel means for grounding the lamp socket so that a good contact with the apertured plate is made, and a novel arrangement is provided for inserting a terminal into said body portion to provide a unique electric connection whereby a tight electric contact with the lamp will always be assured.

Still another object of the present invention is to provide an improved means for mounting the lamp socket within the body portion of the lamp assembly.

Other objects of this invention will appear in the following description and appended claims, reference being had to the accompanying drawings forming a part of this specification wherein like reference characters designate corresponding parts in the several views.

In the drawings:

Figure 1 is a section through one embodiment of a self-retaining lamp assembly mounted in an apertured panel;

Figure 2 is a section taken on the line 2—2 of Figure 1;

Figure 3 is a fragmentary section of the lamp assembly of Figure 1 when in an unstressed condition prior to being mounted in an apertured panel;

Figure 4 is a section similar to that of Figure 3 of a modified form of the invention;

Figure 4A is a fragmentary section taken ninety degrees out of the plane of the section of Figure 1;

Figure 5 is a section through another embodiment of a self-retaining lamp assembly mounted in an apertured panel;

Figure 6 is a section taken on the line 6—6 of Figure 5; and

Figure 7 is a section of still another form of the present invention with the lamp and lens removed.

Before explaining the present invention in detail, it is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawings, since the invention is capable of other embodiments and of being practiced or carried out in various ways. Also, it is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation.

Referring now to Figures 1 to 3 a more detailed description of the illustrated embodiment will be given. The lamp assembly 10 is shown mounted in an apertured plate 12, and a bullet type male terminal 14 is shown in position to be plugged into the lamp assembly 10. The latter includes a body portion 16 which is preferably made from any suitable plastic or rubber-like material having di-electric and resilient properties. The body portion 16 will normally be made by a molding operation with the female bullet terminal 18 formed integrally therein during such molding operation. Terminal 18 is open at the outer end for receiving the male terminal 14, and its inner ends projects into the interior of the body portion 16 so that the base 20 of lamp 22 can contact the same. By virtue of this arrangement a hermetically tight joint will exist between the terminal 18 and the body portion 16 and the latter will also act on the former to urge it into a good electric contact with the lamp 22 as will be described presently.

The body portion 16 has a hollow interior as can be seen and has a peripheral elastic fastening means for attaching the complete lamp assembly to the panel 12. A relatively small shoulder 24 extends around the entire periphery of the body portion 16 and a second, but larger shoulder or overhanging lip 26 is similarly disposed in axially spaced relation. Thus, a circumferential recess or groove is formed in the outer surface of the body portion 16 between the lip 26 and the shoulder 24. The lip

26 is inclined outwardly and toward the closed end of the body portion 16 so that when the latter is in an unstressed condition the free end of the lip depends below the plane of the circumferential recess or groove formed between the lip 26 and the shoulder 24. This can be seen in Figure 3. The upper and inner edge of the lip 26 terminates in a lens receiving rim 28 in which the lens 30 will be securely held.

When the lamp assembly 10 is inserted into the apertured plate 12, the lip 26 having a relatively thick cross section will be urged upwardly by the plate 12 and the latter will be clamped between shoulder 24 and lip 26. The upward pivoting action on the lip 26 will also serve to urge the rim 28 more tightly around the edge of the lens 30 thereby assuring a weather tight joint around the lens 30 as well as around the aperture in plate 12.

The lip and rim construction shown in Figures 1 and 3 have proved to be very satisfactory for effecting weather tight joints. Another arrangement that can be used is shown in Figure 4. Here, the shoulder 24a, the lip 26a and the rim 28a have slots, as at 29a which provide a double edge for effecting a tight seal. In other respects, this modification is the same as that of Figures 1 to 3, or it can be used in conjunction with any of the other embodiments shown in Figures 5 to 7.

Referring again to Figures 1 to 3, one means for securing the socket 32 in place will be described. The socket 32 will normally be formed from sheet metal in the conventional manner, except that it will have a plurality of outwardly turned barbs 34 around its lower periphery. The body portion 16, being formed of rubber-like material will yield along its inner wall to allow the socket 32 to be pressed therein, but the barbs 34 will thereafter hold the socket 32 firmly in place.

The present invention is not limited to this means for securing the socket in place. Another very satisfactory arrangement is shown in Figures 5 and 6 wherein the socket 32b has an outturned flange 34b which is received in the annular recess 35b in the inner wall of the body portion 16b. This is a particularly advantageous arrangement because it assures that the socket will always be positioned in uniformly the same place, which in turn will assure that a good connection will exist between the lamp 22 and the terminal 18. In other respects the embodiment of Figures 5 and 6 is the same as that of Figures 1 to 3 to which attention is again directed.

The inner wall of the body portion 16 will generally have an annular groove 36 positioned inwardly from the shoulder 24. This is a desirable feature, because, as is well known, rubber is an incompressible substance, and by virtue of this construction and arrangement the shoulder 24 can be collapsed inwardly when the body portion 16 is being drawn into the apertured plate 12. Thereafter, when the body portion has been drawn sufficiently far into the aperture, the shoulder 24 can return to its normal position and will then fit under the plate 12, thereby, in conjunction with lip 26, clamping onto plate 12. Not only will the annular groove 36 aid in protecting shoulder 24 from being damaged, but it will have the same tendency to protect the lamp 22 and socket 32 from being damaged during the operation of inserting the lamp assembly 10 in place.

The present invention also has an improved arrangement for assuring an effective ground connection to the plate 12. For this purpose the socket 32 has two diametrically opposed resilient fingers 38 which fit into vertical slots 40 in the internal wall of the body portion 16. The slots 40 are open to the recess formed between the lip 26 and shoulder 24 so that the free ends of fingers 38 can extend thereinto, thereby making contact with the edge of plate 12. The fingers 38 also may have barbs 42 for engaging and abutting against the under side of plate 12. This arrangement assures a good contact being made, because the resilient characteristics of the body portion 16 will urge the barbs 42 into tight contact with

the plate 12, and additionally, the resilient characteristics of the fingers 38 will maintain them in contact with the edge of the aperture in plate 12. In order to assure that the fingers 38 will always remain in contact with the aperture edge, the body portion 16 has depending segments 44 which fit between the fingers 38 and the body of the socket 32 urging them apart. This result follows because of the resilient properties of the material forming body portion 16.

Another type of ground connection that may be employed, if desired, is shown in Figure 7. Here, a conventional socket 32c is shown, and a ground connection is made with the plate 12 by means of a separate flat spring 46 which extends through the side wall of the body portion 16c. When the lamp assembly is pulled through the aperture in the plate 12, the outer end of the spring will contact the latter causing a pivotal action of such spring whereby the inner end will be pivotally urged against the socket 32c.

From the foregoing description it is believed clear that a novel and unique lamp assembly has been developed having many features which can be used in lamp assemblies or other similar devices. These novel features contribute in providing an improved assembly which is superior in operation and has certain cost advantages over the prior art devices. It is believed clear from the above description that the component parts can be assembled and will be held together without need of rivets, screws or other fastening devices. Furthermore, the parts will cooperate to provide the best electrical connections. Thus, when the lamp 22 is inserted into the socket, the lamp base will press against the contact surface 20, and the resilient characteristics of the body portion 16 will hold the contacting surfaces together. Not only does this assure a permanent contact, but it eliminates the need for elements such as the spring 48, Figure 7, which is used in prior art devices. This is a saving from the standpoint of material cost as well as labor installation cost.

The present lamp assembly also is very effective for use in all weather conditions because of the tightly sealed joints that is provided in all separable parts. Similarly, it has distinct advantages over prior art devices because of the ease with which it can be handled and installed on automobile assembly lines where speed and accurate work are of the essence.

Having thus described my invention, I claim:

1. In an assembly adapted to be mounted in self-retaining position in an apertured plate, a unitary body portion of resilient rubber-like material having a chamber open at its one end with the latter forming a lens receiving rim, the outer surface of the body portion having a circumferential recess for receiving the edge of the aperture in said plate, the circumferential recess being formed from an annular shoulder with a flat upper surface normal to the axis of the circumferential recess and an axially spaced lip, the latter when in an unstressed condition extending through the plane of said flat upper surface so that when the body portion is inserted into the aperture the edges forming the latter will be clamped between said shoulder and lip.

2. In an assembly adapted to be mounted in self-retaining position in an apertured plate, a unitary body portion of resilient rubber-like material having a chamber open at its one end with the latter forming a lens receiving rim, the outer surface of the body portion having a circumferential recess for receiving the edge of the aperture in said plate, the circumferential recess being formed from an annular shoulder with a flat upper surface normal to the axis of the circumferential recess and an axially spaced lip between which the edges of the aperture can be clamped, the wall of said chamber having a hollowed out portion radially inwardly of said shoulder to allow the latter to be pressed inwardly while the body portion is being inserted into said aperture and when the edges are in said recess the shoulder

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will return to its normal position thereby clamping the edges between the lip and the flat upper surface of the shoulder.

3. In an assembly adapted to be mounted in self-retaining position in an apertured plate, a unitary body portion of resilient rubber-like material having a chamber open at its one end with the latter forming a lens receiving rim, the outer side of said chamber having a recess extending therearound axially inward of said rim for receiving the apertured edge of said plate, and a relatively thick lip projecting from said rim radially outwardly and axially inwardly through the plane of said recess when in an unstressed condition so that when the body portion is pressed into the aperture in said plate the lip will press against the plate and by virtue of the internal resilient characteristics of said body portion the plate will be clamped between said lip and the opposite edge of said recess.

4. A lamp assembly adapted to be mounted in self-retaining position in an apertured plate comprising a unitary body portion of resilient rubber-like material having a lamp socket chamber open at its one end, the outer surface of the body portion adjacent said open end having peripherally arranged means for receiving the edge of the aperture in said plate, said means including an axially facing shoulder adapted to seat against one side of said apertured plate and an axially spaced lip between which the edges of the aperture can be clamped, said lip when in an unstressed condition extending through said plane so that when the body portion is inserted into the aperture the edges of the latter will be clamped between said shoulder and said lip, and a lamp socket having retaining means urging the side walls of said lamp socket chamber radially outwardly while being inserted thereinto and for retainingly engaging said side walls when completely inserted into said chamber.

5. A lamp assembly as defined in claim 4 wherein said means comprises a plurality of radially outwardly bent barb-like fingers formed in said socket so that the fingers will not materially oppose insertion of the socket into said chamber, but when removal is attempted the barb-like fingers will bite into the wall of said chamber.

6. A lamp assembly as defined in claim 4 wherein said chamber has a groove formed in the wall of said chamber, and said means includes a radially outwardly turned flangelike portion fitting into said groove.

7. A lamp assembly adapted to be mounted in self-retaining position in an apertured plate comprising a unitary body portion of resilient rubber-like material having a lamp socket chamber open at its one end, the outer surface of the body portion having a circumferential recess for receiving the edge of the aperture in said plate, said recess being formed from at least one laterally extending annular shoulder of larger diameter than the aperture in said plate, and a lamp socket retained in said chamber, the wall of said chamber radially inwardly of said shoulder having a hollow space into which said shoulder can be collapsed when said body portion is being inserted into its self-retaining position in said apertured plate.

8. A lamp assembly as defined in claim 7 including at least one spring finger deflected laterally outwardly from said socket and extending through said wall so that it will be in engagement with said plate when the lamp assembly is in its self-retaining position.

9. A lamp assembly adapted to be mounted in self-retaining position in an apertured plate comprising a unitary body portion of resilient rubber-like material having a lamp socket chamber open at its one end, the outer surface of the body portion having a circumferential recess for receiving the edge of the aperture in said plate,

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said recess being formed from two spaced annular shoulder formations of larger diameter than the aperture in said plate, the inner wall of said chamber having two axially spaced circumferential grooves one of which is radially inward of one of said shoulder formations so that the latter can be collapsed into such groove to allow the body portion to be inserted into said plate, and a socket in said chamber having a radially outwardly extending protuberance fitting into the other groove for holding the socket in place.

10. A lamp assembly formed from a plurality of elements adapted to be held together by resilient self-retaining means of an easy-together, hard-separating type comprising a unitary body portion of resilient rubber-like material having a lamp socket chamber open at its one end with the latter forming an internal resilient lens receiving rim, the closed end of said body portion containing an integral female electric terminal with a contact surface extending into said chamber, the outer surface of the body portion having a circumferential recess for mounting the assembly in an apertured plate, said recess being formed from two spaced annular shoulder formations for resiliently gripping the opposite sides of said plate around said aperture, the inner wall of said chamber having two axially spaced circumferential recesses one of which is radially inwardly of one of said shoulder formations so that the latter can be collapsed into such recess to allow the body portion to be inserted into said plate, a socket in said chamber having an outwardly extending protuberance fitting into the other recess for holding the socket in place, a lamp held in said socket with the resilient closed end of the body portion urging the female electric terminal into engagement with said lamp, and a lens held in said rim.

11. In an assembly adapted to be mounted in self-retaining position in an apertured plate, a unitary body portion of resilient rubber-like material having an open end, the outer surface of the body portion adjacent said open end having peripherally arranged means for receiving the edge of the aperture in said plate, said means including an axially facing shoulder adapted to seat against one side of said apertured plate and an axially spaced lip between which the edges of the aperture can be clamped, said lip when in an unstressed condition extending through the plane containing said shoulder so that when the body portion is inserted into the aperture the edges of the latter will be clamped between said shoulder and said lip.

12. In an assembly adapted to be mounted in self-retaining position in an apertured plate, a unitary body portion of resilient rubber-like material, the outer surface of the body portion having peripherally arranged means for receiving the edge of the aperture in said plate, said means including an axially facing shoulder adapted to seat against one side of said apertured plate and an axially spaced lip between which the edges of the aperture can be clamped, said lip when in an unstressed condition extending through the plane containing said shoulder so that when the body portion is inserted into the aperture the edges of the latter will be clamped between said shoulder and said lip.

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