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(54) **Bulb holder.**

(57) A bulb holder (10, 64) for a lamp assembly comprises bulb holding means (14) including electrical bulb contacts (36, 38), connection means (22) (e.g. a mating portion adapted to mate with an electrical connector) including electrical connectors (44, 60, 84, 86) for connecting the bulb contacts (36, 38) to an electric power source, and external circumferential sealing means (28, 34) for forming a substantially watertight seal between the bulb holder (10, 64) and the remainder of the lamp assembly (70). To minimise the circumferential length of the sealing means, the bulb holding means (14) and the connection means (22) are disposed at mutually opposed ends of the bulb holder (10, 64).

This invention relates to a bulb holder and has particular reference to a bulb holder for a lamp assembly, particularly a water resistant vehicle lamp assembly. The invention also embraces a lamp assembly including at least one such bulb holder.

A typical vehicle lamp assembly comprises a reflector, a lens constituting a cover for the reflector and a bulb holder for holding a bulb with its filament positioned substantially at the focal point of the reflector.

In order to protect the bulb and the other electrical components of the lamp assembly from moisture such as precipitation and road-surface spray, a waterproof seal is typically interposed between the lens and the reflector. However, with the advent of automated washing apparatus for vehicles which utilise high-pressure water jets to clean vehicles, there is a general requirement to provide a lamp assembly of improved water resistance which is able to withstand the intrusion of moisture from such jets. This requirement is particularly stringent in the case of lamp assemblies for large vehicle, such as lorries, as the water jets employed in washing apparatus for such large vehicles typically have a hydro-dynamic pressure in excess of 70 lb/in².

In order to meet this requirement, a bulb holder has been proposed which comprises a body portion which is manufactured as a single piece from low density polyethylene and defines first and second recesses disposed side-by-side and oriented in opposite directions one from the other.

The first recess constitutes a bulb recess being provided with appropriate electrical bulb-contacting elements, and opens at a bulb end of the holder. The second recess is a connection recess adapted to receive an electrical connector and opens in a direction opposed to that of the bulb recess.

The connection recess accommodates two spaced connector pins for connection with the electrical connector. These connector pins extend through holes formed in the bulb end of the holder and are connected at the bulb end to the bulb-contacting elements.

The bulb end of the holder is formed with a circumferential flange disposed radially outwardly of the first and second recesses, which flange is formed with a peripheral channel adapted to receive a waterproof O-ring. The flange is also formed with three circumferentially-spaced fingers which extend longitudinally away from the bulb end of the holder, and each finger is provided with a radially outwardly directed lug.

In broad terms, therefore, the proposed bulb holder comprises bulb holding means including electrical bulb contacts, connection means including electrical connectors for connecting the bulb contacts to an electric power source, and external circumferential sealing means for forming a substantially watertight seal between the bulb holder and the remainder of the

lamp assembly.

In use, a bulb is fitted in the bulb recess, and the three fingers are entered through an aperture formed in the reflector, the lugs being entered through corresponding circumferentially-spaced cut-outs formed around the periphery of the aperture. The bulb holder is then pressed against the reflector to compress the O-ring between the flange and the reflector around the periphery of the aperture, and the holder is rotated to displace the lugs from the cut-outs thereby to lock the holder in place with the O-ring compressed to form a seal between the bulb holder and the reflector. An electrical connector is then pressed into the connection recess to connect the bulb to a remote power supply such as a standard 12v car battery.

A disadvantage inherent in the design of the proposed bulb holder is that the connection between the bulb-contacting elements and the connector pins is effected in juxtaposition with the O-ring and the open end of the bulb recess; thus, any moisture which manages to enter the lamp assembly around the O-ring is likely to come into contact with the connector pins and the bulb contacting elements, thereby leading to accelerated corrosion of these electrical components and eventually to failure of the lamp.

The ingress of water into a lamp assembly is a serious problem because the assembly constitutes a substantially closed environment; the seals between the bulb holder and the reflector, and between the reflector and the lens, are designed to present a barrier to the passage of water vapour as well as liquid water. Thus, any water which manages to enter the lamp assembly cannot readily escape and so may remain in contact with the electrical components of the lamp assembly for long periods; this exacerbates the corrosion problem.

A further disadvantage of the abovementioned bulb holder is that its diameter and hence its circumference are relatively large; the O-ring is of correspondingly large circumference, which presents a longer boundary at risk to the ingress of water.

In our efforts to solve these problems, we have devised a bulb holder as broadly described above but characterised in that the bulb holding means and the connection means are disposed at mutually opposed ends of the bulb holder.

This aspect of our invention greatly reduces the overall circumferential length of the sealing means in comparison with the side-by-side bulb recess and connection recess of the prior art. Accordingly, the invention substantially reduces the likelihood of ingress of moisture.

A partition may be disposed between the bulb holding means and the connection means, the connectors each being connected respectively to an associated bulb contact through the partition. The partition serves to protect the bulb contacts from the external environment and may also locate the connec-

tors if each connector extends through the partition and locates the associated bulb contact.

The circumferential sealing means suitably comprises an external circumferential flange, which flange is suitably in juxtaposition with or an extension of the partition and is situated mid-way along the body of the bulb holder.

For optimum sealing, it is preferred that an O-ring is associated with the flange, the O-ring being located by an external circumferential groove. For simplicity, the groove may be bounded by the flange and, for optimum location of the O-ring, may be bounded also by an external circumferential ridge.

A shielding means is preferably provided, this being positioned to shield the bulb contacts from the region of the sealing means and thus to deflect any moisture that may pass the seal away from the bulb contacts. To this end, the bulb holding means may comprise a tubular wall defining a bulb recess formed in a bulb end of the bulb holder, the bulb contacts being accommodated substantially within the bulb recess and the tubular wall serving as the shielding means.

Similarly, the connection means preferably defines a connection recess formed in a connection end of the bulb holder, the electrical connectors being accommodated substantially within the connection recess.

The connectors suitably comprise at least two spaced pins and may be adapted for separable or permanent connection to power supply leads. If the connection is separable, the connection recess advantageously defines a mating portion adapted to mate with an electrical connector.

For compactness and simplicity, it is preferred that the bulb recess and the connection recess are substantially symmetrical about a common longitudinal plane. Further, the bulb recess and the connection recess may have central longitudinal axes which are substantially parallel.

One of the bulb contacts may be an earth contact shaped to define a bayonet-fixing slot. It is preferred that this bulb contact co-operates with an internal indentation associated with the bulb holding means, these components defining a path for the bayonet-fixing lug of a bulb leading to the bayonet-fixing slot and thus facilitating insertion of the bulb.

Another of the bulb contacts may be a live contact adapted to contact an end contact terminal of a bulb.

For electrical integrity and reliability, the bulb contacts are suitably insulated and spaced from each other by an insulating protrusion. An insulating washer may be shaped to define the insulating protrusion.

To facilitate turning of the bulb holder about its longitudinal axis during insertion or withdrawal, external longitudinal formations may be provided. At least one of these formations may be a radially-extending web.

Engaging means may be provided to engage with the remainder of the lamp assembly for securing the bulb holder therein. It is preferred that the engaging means is adapted for bayonet fixing and so comprises a plurality of circumferentially spaced lugs, indentations or cut-outs.

The bulb holder may comprise a moulded body defining the bulb recess, the connection recess, the partition and the flange, which body is moulded as a unitary construction from a thermoplastic material. The thermoplastic material may be a nylon material, typically nylon-66.

In order that this invention may be readily understood, reference is now made to the accompanying drawings. For the purposes of illustrating the invention, there are shown in the drawings embodiments which are presently preferred, it being understood, however, that the invention is not limited to the specific arrangements disclosed.

In the drawings:

Figure 1 is an exploded side view of a bulb holder constructed in accordance with one embodiment of the present invention;

Figure 2 is a sectional side view through the bulb holder of Figure 1, when assembled;

Figure 3 is a sectional exploded side view of a bulb holder constructed in accordance with another embodiment of the present invention;

Figure 4 is a sectional side view through the bulb holder of Figure 3, when assembled; and

Figure 5 is a sectional view of the assembled bulb holder taken from a side orthogonal to that of Figure 4, showing the bulb holder received within an aperture in a lamp housing and engaged to the lamp housing.

Referring to Figures 1 and 2 of the drawings, a bulb holder 10 comprises a body 12 which is moulded as a single piece from nylon-66.

The body 12 comprises a cylindrical wall 14 which defines a bulb recess 16. The bulb recess 16 is open at a bulb end 18 of the body 12 and the other end of the bulb recess 16 is closed by one side of a generally disc-shaped internal partition 20 disposed near-centrally with respect to the body 12.

The body 12 further comprises a tubular wall 22 of generally rectangular cross section which defines a connection recess 24. The connection recess 24 is open at a connection end 26 of the body 12 and the other end of the connection recess 24 is closed by the other side of the internal partition 20.

In juxtaposition with the internal partition 20, the body 12 is formed with a circumferential external flange 28 having an annular radially-extending surface 30. At its junction with this surface 30, the outer surface of the cylindrical wall 14 is formed with a circumferential groove 32 which is adapted to accommodate an O-ring 34, for example of silicone rubber.

To allow the bulb holder 10 to be engaged by bay-

onet fixing within a complementary aperture provided in the reflector portion of a lamp housing (not shown), the outer surface of the cylindrical wall 14 bears a diametrically-opposed pair of indentations (not shown), which indentations are adapted to receive a complementary pair of lugs facing inwardly from the edges of the aperture. For this purpose, the indentations define a path along which the lugs pass, the path having a longitudinal portion extending at one end to the bulb end 18 of the body 12 and terminating at its other end in a circumferential leg.

The bulb recess 16 is adapted to receive the base portion of a conventional bayonet-type bulb, not shown, and accommodates two bulb-contacting elements, the first being an earth contact 36 and the second being a live contact 38.

The earth contact 36 is a strip of pre-galvanised mild steel which is formed generally into the shape of a U having two parallel arms 40 (only one shown) joined at their bases by a cranked connecting member 42. The connecting member 42 has a hole drilled or punched centrally therein, this hole being aligned during assembly of the bulb holder 10 with a corresponding hole which penetrates the partition 20 and is offset from the central longitudinal axis of the bulb recess 16.

The earth contact 36 is held in place within the body 12 by an elongate connector pin 44 of tin-plated brass which extends from the bulb recess 16 through the aligned holes in the connecting member 42 and the partition 20 and terminates in the connection recess 24. The end of the connector pin 44 in the bulb recess 16 is expanded over or riveted to the earth contact 36 and the connector pin 44 is secured in the partition 20 by an interference fit between a circumferential knurled portion 46 formed on the outer surface of the connector pin 44 and the inner surface of a cylindrical sleeve 48 extending into the connection recess 24 from the partition 20. The sleeve 48 terminates near the free end of the connector pin 44 in the recess 24, leaving a short free-end portion of the connector pin 44 exposed as shown.

Each arm 40 of the earth contact 36 has an intermediate cut-out portion 50 within which a bayonet-fixing lug of a bulb can engage, and the free end of each arm 40 is tapered. Diametrically-opposed indentations 52 formed in the inner surface of the cylindrical wall 14 of the body 12 accommodate the arms 40 and, together with the tapered ends of the respective arms 40, define tapering guides to lead the bayonet-fixing lugs of a bulb into engagement with the cut-out portions 50.

The live contact 38 comprises a resilient strip of spring steel bent on itself to form two arms 54 and 56 connected by a cranked intermediate portion 58. The arm 54 of the live contact 38 has a hole (not shown) drilled or punched near its free end; during assembly of the bulb holder 10, this hole is aligned with a sec-

ond hole penetrating the partition 20 of the body 12, this second hole being spaced from the first-mentioned hole formed in the partition 20 and being similarly offset from the central longitudinal axis of the bulb holder 10.

When thus aligned, the live contact 38 is attached to the body 12 with the arm 56 resiliently supported within the bulb recess 16 to make electrical contact with a bulb. The method of attachment of the live contact 38 is essentially the same as employed for the earth contact 36, i.e. by an elongate connector pin 60, identical to the connector pin 44, which extends from the bulb recess 16 through aligned holes in the arm 54 of the live contact 38 and the partition 20 and terminates in the connection recess 24. Again, this connector pin 60 is partially shrouded by a sleeve 48 which leaves a short free-end portion of the connector pin 60 exposed.

Between the two holes in the partition 20 is a longitudinally-extending protrusion 62 formed integrally with the partition 20. The protrusion 62 spaces and insulates the earth contact 36 and the live contact 38 from each other, and also helps to locate those components during assembly of the bulb holder 10.

The connection recess 24 is shaped to receive a free end of an electrical connector housing (not shown) so as to form a tight, substantially water-resistant fit therewith. The electrical connector housing is formed of a cross-linked silicone material and is attached opposite its free end to a length of two-core wire which is connected in turn to a remote power supply, e.g. a 12-volt car battery, via a switch means.

The free end of the connector housing is formed with two spaced, longitudinal cylindrical recesses therein, each cylindrical recess being lined with a generally cylindrical electrical contact lining conductively attached to a respective one of the cores of the two-core wire. In use, the free end of the electrical connector housing is pressed into the connection recess 24 of the bulb holder 10 such that each of the connector pins 44 and 60 is received in a corresponding one of the spaced cylindrical recesses. The connector pins 44 and 60 thus come into contact with the contact linings so as to connect the earth contact 36 and the live contact 38 to the remote power supply when suitably switched by the switch means.

Means can be provided to latch the connector housing to the connection recess 24; for example, a lug may be formed on the outer surface of the wall 22 to engage with a complementary formation associated with the connector housing.

A bulb is fitted in the bulb recess 16 and its bayonet-fixing lugs engaged in the cut-outs 50 such that the side contact of the bulb touches the earth contact 36 while the end contact of the bulb touches the live contact 38. The bulb holder 10 is then inserted, bulb first, through an aperture formed in a reflector or other bulb holder support forming part of a lamp as-

sembly, inwardly-facing bayonet-fixing lugs associated with the aperture entering the longitudinal portions of the aforementioned indentations formed in the outer surface of the cylindrical wall 14.

When the bulb holder 10 has been advanced into the aperture as far as it will go, i.e. when it is pushed against the reflector or other bulb holder support to compress the O-ring 34 between the flange 28 and the reflector or support, the bulb holder 10 is turned about the longitudinal axis of the wall 14. This causes the bayonet-fixing lugs associated with the aperture to engage with the circumferential portions of the indentations formed in the outer surface of the cylindrical wall 14, which locks the bulb holder 10 in place with the O-ring 34 in a compressed state.

The aperture in the reflector or other bulb holder support and the bulb holder are dimensioned with a tight tolerance so that the aperture forms the closest practicable fit around the outer surface of the cylindrical wall 14.

It will be appreciated by those skilled in the art that, when the bulb holder 10 is locked in place as described above, the cylindrical wall 14 shields the electrical components housed within the bulb recess 16 from the ingress of any moisture that may penetrate the O-ring seal. Furthermore, by disposing the bulb recess 16 and the connection recess 24 at opposing ends of the bulb holder 10, the circumferential length of the O-ring 34 is minimised for a given size of bulb and this minimises the possibility of moisture penetrating the O-ring seal.

Figures 3, 4 and 5 illustrate a second embodiment of the invention, namely a bulb holder 64, which shares many of the features of the bulb holder 10 illustrated in Figures 1 and 2. Accordingly, common reference numerals are used for like parts. For example, the O-ring 34, the earth contact 36 and the live contact 38 are substantially identical to their counterparts in Figures 1 and 2. Similarly, the bulb holder 64 has an integrally-moulded body 12 having tubular walls 14 and 22 defining a bulb recess 16 and a connection recess 24 respectively, these recesses 16 and 24 being separated by a partition 20. Further, the partition 20 is juxtaposed to a circumferential external flange 28 having an annular radially-extending surface 30. However, in the bulb holder 64, the wall 22 is of approximately circular cross-section to define a cylindrical connection recess 24 as opposed to the generally rectangular cross-section of the corresponding wall 22 of the bulb holder 10.

As in the bulb holder 10, a groove is located adjacent to the surface 30 of the flange 28 to accommodate the O-ring 34. However, in the bulb holder 64, the groove is bounded and defined by a circumferential ridge 66 which more positively locates the O-ring 34.

The improved location of the O-ring 34 provided by the ridge 66 is required where sealing depends to a substantial extent upon the O-ring 34 being

squeezed radially inwardly against the outer surface of the wall 14 as opposed to being squeezed longitudinally against the surface 30 of the flange 28. Such a sealing arrangement is shown in Figure 5, in which an aperture in a lamp housing structure 68 is defined by a frusto-conical surface 70 so that the aperture progressively narrows when entering the lamp housing. It will be appreciated that the O-ring 34 is squeezed inwardly with progressively greater force as the bulb holder 64 is pressed into the aperture, this forcing the O-ring 34 along the frusto-conical surface 70.

Figure 5 shows another feature of the bulb holder 64 not shared by the bulb holder 10, namely a pair of diametrically-opposed lugs 72 extending outwardly from the outer surface of the wall 14. These lugs perform the task of locking the bulb holder 10 in place within the aperture in the lamp housing structure 68 in a bayonet-fixing arrangement and are, in essence, an inversion of the bayonet-fixing formations described above in relation to the bulb holder 10. That is to say, the bulb holder 64 has protrusions for bayonet fixing to the lamp housing whereas the bulb holder 10 has indentations.

When the bulb holder 64 is locked in place within the aperture in the lamp housing structure 68 as shown in Figure 5, the lugs 72 engage with a flange 74 that extends inwardly with respect to the aperture. The flange 74 is interrupted by diametrically-opposed gaps (not shown) which admit the lugs 72 when the bulb holder 64 is held at a suitable angle during insertion into the aperture, the bulb holder 64 then being turned about the longitudinal axis of the wall 14 to engage the lugs behind the flange 74.

To remove the bulb holder 64, if, for example, the bulb 76 fails and so must be replaced, the bulb holder 64 should be turned back to align the lugs 72 with the gaps in the flange 74 and then withdrawn from the aperture.

To facilitate the turning movements required during insertion or withdrawal of the bulb holder 64, the body 12 is provided with webs 78 which extend radially outwardly from the wall 22 to the height of the flange 28 and extend longitudinally from the flange 28 along the entire length of the wall 22. Knurling or ribs may be applied to the outer surface of the wall 22 and/or the surfaces of the webs 78, further to improve the user's grip on the bulb holder 64.

The bulb holder 64 is permanently connected to a length of two-core wire 80 which may be connected in turn to a remote power supply, e.g. a 12-volt car battery, via a connector 82. The respective cores of the wire 80 are stripped at their ends and then conductively attached to respective crimp pins 84 and 86 of tin-plated brass, the connection finally being potted with a liquid resinous or polymeric compound (not shown) which substantially fills the connection recess 24 and sets to an impervious hard or rubbery

state to exclude moisture.

The crimp pins 84 and 86 are counterparts to the connector pins 44, 60 of Figures 1 and 2. Thus, the earth contact 36 and the live contact 38 are held in place within the body 12 by the crimp pins 86 and 84 respectively which each extend from the connection recess 24 respectively through holes 90 and 88 in the partition 20 and into the bulb recess 16. The ends of the crimp pins 84 and 86 in the bulb recess are expanded over or riveted to the respective contacts 36 and 38 and are secured to the partition 20 by an interference fit between a circumferential knurled portion formed on the outer surface of each crimp pin 84 and 86 and the inner surface of each hole 88 and 90.

During assembly, the earth contact 36 is fixed in place within the bulb recess 16 and a generally disc-shaped insulating washer 92 of nylon is laid over the earth contact before the live contact 38 is fixed in place. The washer 92 is penetrated by a hole 94 corresponding to the hole 88 provided in the partition 20 to accommodate the crimp pin 84 which connects to the live contact 38. This crimp pin 84 is longer than the other crimp pin 86, which connects to the earth contact 36, to allow for the thickness of the washer 92. The washer 92 also has a longitudinally-extending protrusion 62 which corresponds to the identically-numbered feature of Figures 1 and 2 and has the same functions.

The washer 92 can be bonded or welded to the partition 20 or can simply be held against the partition 20 by the live contact 38.

The washer 92 extends to the full width of the bulb recess 16, ensuring that the earth contact 36 and the live contact 38 are separated either by the insulating material of the washer or, at least, by a substantial air gap between the sides and the centre of the bulb recess as best shown in Figure 5. This maximises the electrical integrity and reliability of the bulb holder 64 even if dirt or moisture should enter the bulb recess 16.

The present invention may be embodied in many other forms without departing from the inventive concept. For example, fixings other than bayonet fixings, such as screw fixings, may be employed to secure the bulb to the bulb holder or to secure the bulb holder to a lamp assembly. Accordingly, reference should be made to the appended claims and general statements herein rather than to the foregoing specific description as indicating the scope of the invention.

Claims

1. A bulb holder (10, 64) for an electrical lamp assembly (68), the bulb holder (10, 64) comprising bulb holding means (14) including electrical bulb contacts (36, 38), connection means (22) including electrical connectors (44, 60, 84, 86) for con-

necting the bulb contacts (36, 38) to an electric power source, and external circumferential sealing means (28, 34) for forming a substantially watertight seal between the bulb holder (10, 64) and the remainder of the lamp assembly (68), characterised in that the bulb-holding means (14) and the connection means (22) are disposed at mutually opposed ends of the bulb holder (10, 64).

2. A bulb holder (10, 64) according to claim 1, wherein a partition (20) is disposed between the bulb holding means (14) and the connection means (22), the connectors (44, 60, 84, 86) each being connected respectively to an associated bulb contact (36, 38) through the partition (20).
3. A bulb holder (10, 64) according to claim 2, wherein each connector (44, 60, 84, 86) extends through the partition (20) and locates the associated bulb contact (36, 38).
4. A bulb holder (10, 64) according to any preceding claim, wherein the circumferential sealing means (28, 34) comprises an external circumferential flange (28).
5. A bulb holder (10, 64) according to claim 4 when appendant to claim 2 or claim 3, wherein the flange (28) is in juxtaposition with or an extension of the partition (20).
6. A bulb holder (10, 64) according to claim 4 or claim 5, wherein an O-ring (34) is associated with the flange (28) and is located by an external circumferential groove (32).
7. A bulb holder (10, 64) according to claim 6, wherein the groove (32) is bounded by the flange (28) and optionally also by an external circumferential ridge (66).
8. A bulb holder (10, 64) according to any preceding claim, including shielding means (14) positioned to shield the bulb contacts from the region of the sealing means (28, 34).
9. A bulb holder (10, 64) according to claim 8, wherein the bulb holding means (14) comprises a tubular wall (14) defining a bulb recess (16) formed in a bulb end (18) of the bulb holder (10, 64), the bulb contacts (36, 38) being accommodated substantially within the bulb recess (16) and the tubular wall (14) serving as the shielding means (14).
10. A bulb holder (10, 64) according to any preceding claim, wherein the connection means (22) defines a connection recess (24) formed in a con-

nection end (26) of the bulb holder (10, 64), the electrical connectors (48, 60, 84, 86) being accommodated substantially within the connection recess (24).

11. A bulb holder (10, 64) according to claim 9 or claim 10, wherein the bulb recess (16) and the connection recess (24) are substantially symmetrical about a common longitudinal plane.

12. A bulb holder (10, 64) according to any of claims 8 to 11, wherein the bulb recess (16) and the connection recess (24) have central longitudinal axes which are substantially parallel.

13. A bulb holder (10, 64) according to any preceding claim, wherein one of the bulb contacts (36) is an earth contact shaped to define a bayonet-fixing slot (50).

14. A bulb holder (10, 64) according to claim 13, wherein the bulb contact (36) cooperates with an internal indentation (52) associated with the bulb holding means (14) to define a path for a bayonet-fixing lug of a bulb leading to the bayonet-fixing slot (50).

15. A bulb holder (10, 64) according to any preceding claims, wherein one of the bulb contacts (38) is a live contact adapted to contact an end contact terminal of a bulb.

16. A bulb holder (10, 64) according to any preceding claim, wherein the bulb contacts (36, 38) are insulated and spaced from each other by an insulating protrusion (62).

17. A bulb holder (10, 64) according to claim 14, wherein an insulating washer (92) is shaped to define the insulating protrusion (62).

18. A bulb holder (10, 64) according to any preceding claim, having external longitudinal formations (78) adapted to facilitate turning of the bulb holder (10, 64) about its longitudinal axis, wherein the longitudinal formations (78) include at least one radially-extending web (78).

19. A bulb holder (10, 64) according to any preceding claim and comprising engaging means (72) adapted to engage with the remainder of the lamp assembly (68, 74) for securing the bulb holder (10, 64) therein.

20. A bulb holder (10, 64) according to claim 19, wherein the engaging means (72) is adapted for bayonet fixing and comprises a plurality of circumferentially spaced lugs (72), indentations or

cut-outs.

21. A lamp assembly comprising reflector means, lens means constituting a cover for said reflector means, and at least one bulb holder (10, 64) as defined in any preceding claim.

Figure 1

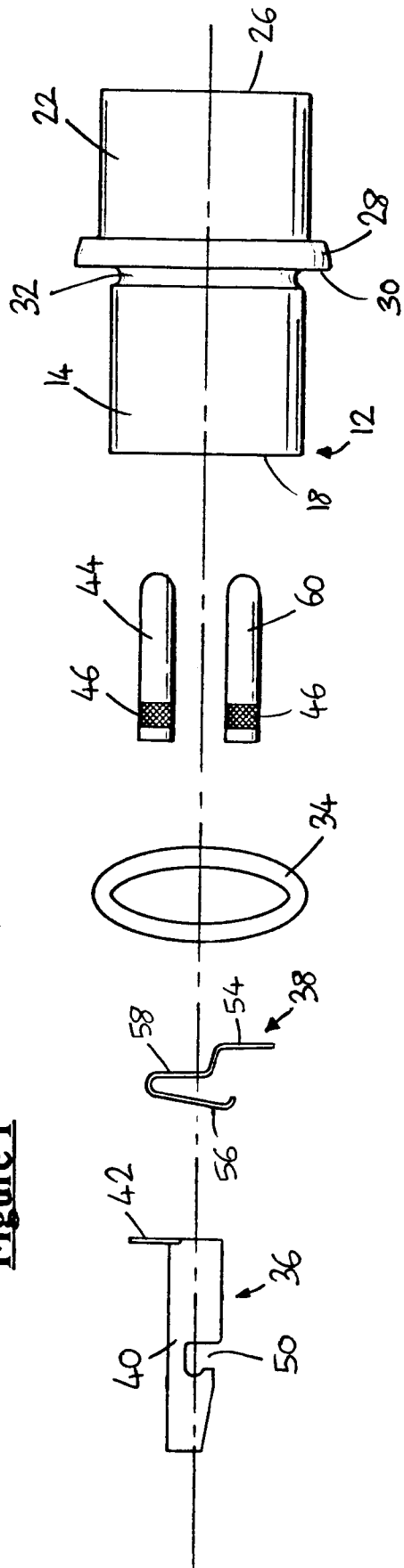


Figure 2

