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CONNECTOR ATTACHMENT COMPONENT

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FIELD OF INVENTION

The present invention relates to a connector attachment component wherein a wedge base bulb is attached to an attaching member together with a conductive reflecting plate via a connector and heat-resistant flat holder.

BACKGROUND OF THE INVENTION

An example of a small lamp using a wedge base bulb of the prior art is described in Japanese Examined Utility Model Publication No. 53-1825.

This example of the prior art is a small interior lamp for automobile use equipped with a lens located in the opening of a housing, a holder attached to said housing, and a wedge base bulb supported in said holder. Said holder is composed of a holder body, formed by bending a conductive metal strip into the shape of the letter "U", and an attachment piece integrated into a single unit with said holder body and extending in the opposite direction from said U-shaped conductive metal strip. Together

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with forming an engaging indentation with the holder body in said housing, a center piece and left and right side pieces are provided in opposition at an interval protruding from the top and bottom of said engaging indentation, and the U-shaped portion of said holder body is clamped said center piece and said left and right side pieces by fitting into said engaging indentation wherein said holder body is formed in said housing. In this state, the attachment piece of said holder body is fixed in said housing together with a conducting strip for connection.

Since the prior art described above comprises an interior lamp by forming a wedge base bulb portion in a portion of an interior lamp housing and inserting a connector, looseness occurs due to thermal deformation of the bulb holder caused by the generation of heat accompanying lighting of the above-mentioned bulb. Although the above-mentioned bulb holder portion should be molded with heat-resistant plastic together with a large-volume housing in order to prevent this loosening, this results in the first disadvantage of the prior art wherein the use of heat-resistant plastic is both expensive and difficult to mold, thus resulting in high costs.

In addition, the prior art also had the disadvantage of the connector peripheral members, such as the above-mentioned bulb

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holder, having a complex structure, which together with requiring post-processing such as caulking, made automated insertion of the connector as well as automated assembly of the interior lamp by automated wiring extremely difficult. Moreover, since the prior art also has no light beam reflecting plate, it also had the disadvantage of having low light utilization efficiency.

SUMMARY OF THE INVENTION

In order to eliminate each of the above-mentioned problems, the object of the present invention is to obtain an inexpensive and heat-resistant structure by being able to attach a wedge base bulb to a relatively large non-heat-resistant member via a relatively small heat-resistant holder, as well as allow automation of mounting of the above-mentioned holder to an attaching member, including attachment of a connector to said holder, by having a conductive reflecting plate also serve as a portion of said connector.

The above-mentioned object of the present invention is accomplished by composing a bulb holder used by attaching a bulb to said bulb holder, to which a connector is attached, wherein projections are protruding from opposing surfaces of an

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insulating base, formed with heat-resistant plastic into roughly the shape of square cylindrical frame, two connectors respectively having a pair of clamps, consisting of a resilient conductive strip formed into roughly the shape of the letter "U", and an insertion connection piece, formed on a rising base of its side edge, integrated into a single unit, are respectively mounted in parallel between said opposing surfaces via said projections at an attachment hole formed in the base portion of said clamps; and, a conductive reflecting plate is fastened to the upper surface of said bulb holder and current is able to flow to a connector via said conductive reflecting plate by tightly inserting said conductive reflecting plate, placed flat on the upper surface of said bulb holder, into the insertion connection piece of said connectors by means of its conductive projecting piece.

Furthermore, opposing pieces may also be formed separated from the inner surface of the side by side relief holes.

A conductive reflecting plate having an attaching portion that matches its contour can be mounted on the upper surface of an insulating base by inserting into a connector of its conductive projecting piece.

As a result of forming an insertion connection piece, having

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a pair of clamps and an insertion connection piece, into a single unit with a single connector, a wedge base bulb can be used by tightly clamping with a pair of clamps, and a tab terminal and BUS bar can be connected by inserting a conductive projecting piece of a conductive reflecting plate into one insertion connection piece and tightly inserting said tab terminal and BUS bar into another connection piece.

Since the connector itself within the bulb holder is surrounded by a heat-resistant insulating base, two connectors can be mounted with favorable compatibility via this insulating base irrespective of conductive plates and non-heat-resistant insulating plates.

In claim 2, when the outer surfaces of the locking tabs of the insulating base are pressed between the edges of the mounting hole of the attaching body, after the above-mentioned edges are pushed in the direction in which the side relief holes become narrower in opposition to their resiliency, said sides are locked with a single snapping action as they return to their original state as a result of the locking tabs being released from the edges of the mounting hole, thus allowing the bulb holder to be easily mounted to the attaching body at its mounting hole.

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When in this mounted state, the movement in the vertical direction of the insulating base with respect to the attaching body is restricted since the opposing hook edges of the pair of locking tabs are making contact with the respective upper and lower surfaces of the attaching body, thus preventing the occurrence of rattling. In addition, horizontal movement of the insulating base is restricted with the peripheral edges of the mounting hole of the attaching body, thus also preventing rattling.

In addition, in the case opposing pieces are formed separated from the inside of the side edges of the bulb holder by side relief holes, together with the side edges being easily deflected, the side opposing pieces of the connector can be cooled by the flow of air through the above-mentioned holes.

Moreover, in the present invention, the wedge base bulb and so forth can be lit by allowing current to flow to the conductive reflecting plate via a BUS bar and so forth projecting out towards its rear portion.

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BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is an exploded perspective view of the apparatus of the present invention.

Fig. 2 is a cross-sectional overhead view of the apparatus of the present invention.

Fig. 3 is a cross-sectional view taken along line A-A of Fig. 2.

Fig. 4 is a cross-sectional view taken along line B-B of Fig. 2.

Fig. 5 is a cross-sectional view taken along line C-C of Fig. 2.

Fig. 6 is a rear perspective view showing partial assembly of the apparatus of the present invention.

Fig. 7 is a perspective view following assembly of the apparatus shown in Fig. 6.

Fig. 8 is a perspective view of the essential portion showing another example of the locking tabs.

Fig. 9 is a partial cross-sectional view showing an example of locking of the above.

Fig. 10 is a perspective view showing another example of a bulb holder.

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Fig. 11 is a perspective view showing another example of that shown in Fig. 1.

Fig. 12 is a cross-sectional view showing another example of that shown in Fig. 2.

Fig. 13 is an enlarged cross-sectional view taken along the line shown in Fig. 12.

DETAILED DESCRIPTION OF THE PREFERRED EXEMPLARY EMBODIMENTS

The following provides an explanation of the embodiments of the present invention with reference to the drawings.

First, with respect to the basic constitution of the present invention, in the composing of a connector attachment component used for attaching a bulb to a bulb holder to which a connector is attached, for example 2 pairs for a total of 4 locking tabs 2 are molded with a known three-way opening and closing mold as shown in Fig. 1 onto the top and bottom of left and right sides 3 of insulating base 1 formed from a heat-resistant plastic such as Nylon 66 into an inverted T-shaped square cylindrical frame as is also shown in Fig. 1.

Furthermore, upper and lower locking tabs 2 may be formed

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together with rear surface relief hole 2a on the rear surface of base 1 as necessary as shown in Fig. 4, and the rear portion of said base 1 may lock resiliently with the hole edge of attaching body 11 as shown in Figs. 4 and 6.

Together with projections 4 protruding from opposing surfaces 1a on the top and bottom of the above-mentioned insulating base 1 as shown in Fig. 3, two connectors 7, respectively equipped with a pair of clamps 5, wherein resilient conductive strips made of phosphor bronze and so forth are formed into roughly the shape of the letter "U" as shown in Fig. 1, and eyeglass-shaped insertion connection piece 6 formed on rising base 6a on its side edge, integrated into a single unit, are clamped within the above-mentioned insulating base 1 as shown in Figs. 3 through 5.

Namely, bulb holder 9 is composed at this time by inserting rising base 6a of connection piece 6 into base side groove 6b while inserting the above-mentioned clamps 5 between opposing surfaces 1a while becoming narrower in opposition to their resiliency, fitting the above-mentioned projections 4 into attachment holes 8 formed in the connection piece base with the snapping action of their resilient return, and respectively mounting the above-mentioned connectors 7 on both sides between base opposing surfaces 1a as shown in Fig. 3.

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Furthermore, by using a constitution that provides two protruding ribs 7a on the above-mentioned connectors 7 as shown in Fig. 1, clamping resiliency is strengthened and heat radiation is improved.

Moreover, in the present invention, by making available conductive reflecting plate P as shown in Figs. 1 and 6 equipped with conductive projecting piece P1 facing downward so as to be inserted into insertion connection piece 6 of the above-mentioned connector 7, current is allowed to flow simultaneous to inserting and fixing this conductive projecting piece P1 of reflecting plate P into the above-mentioned connection piece 6.

In addition, reflecting plate P can also be attached and mounted as shown in Figs. 3, 4 and 7 on the upper surface of insulating base 1 with resilient locking tabs P2 equipped facing downward on both of its sides.

Furthermore, in the above-mentioned mounting, conductive projecting piece P1 may be attached to connection piece 6 by insertion and fixing, fastening with screws or adhesion and so forth while omitting resilient locking tabs P2.



Moreover, the connector attachment component according to the present invention is then composed by mounting the above-mentioned bulb holder 9 to attaching body 11, in which is formed mounting hole 10, slightly larger than the planar contour of the above-mentioned insulating base 1, and auxiliary hole 10a, provided in conjunction with this mounting hole 10 as shown in Fig. 6, at said mounting hole 10 in attaching body 11 by the above-mentioned locking tabs 2 by utilizing their tapered surfaces and so forth as shown in Fig. 6 and each of the above-mentioned drawings.

Furthermore, bulb holder 9 may also be mounted in attaching body 11 as shown in Fig. 9 with hood-shaped projection 2 for the upper tabs of locking tabs 2, and lower projection 2 in opposition to this projection 2 as shown in Fig. 8.

The following provides an explanation of an example of use of the present invention.

Although a known wedge base bulb as shown in Fig. 1 is inserted into bulb holder 9 at its base portion from the state indicated by the broken line of Fig. 4 as shown by the solid line of that same drawing as well as Figs. 3 and 5, at this time, bulb 12 can be inserted into holder 9 in parallel with the lower

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surface of conductive reflecting plate P by first inserting until bulb base 12b makes contact with holder ledge 9a while pushing apart clamps 5 of connectors 7 at lead portions 12a of bulb 12 in opposition to their resiliency.

Next, wedge base bulb 12 can be lit by tightly inserting curved portions 13a of BUS bars 13, arranged along the surface of attaching body 11 as shown in Figs. 2 and 7, into insertion connector piece 6 of one of connectors 7 of bulb holder 9, and supplying current to conductive reflecting plate P having conductive projecting piece P1, which is inserted in advance into the other connection piece 6 as described above, through BUS bar P3 of its rear portion.

Furthermore, support 9A, which provides support by engaging with the rounded portion of a wedge base bulb 12 and so forth as shown in Fig. 10, may be formed on the front surface of bulb holder 9.

Moreover, a bulb holder, in which opposing pieces 3b are formed separated from the inner surface of the above-mentioned side 3 by narrow, long side relief holes 3a as shown in Fig. 11, may be used by similarly attaching to attaching body 11 as shown in Figs. 12 and 13.

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As a result of having the composition as explained above, the present invention offers the advantages described below.

In the case of using to attach a bulb to a bulb holder, to which a connector is attached, by composing bulb holder 9, wherein projections 4 are protruding from opposing surfaces 1a of insulating base 1, formed with heat-resistant plastic into roughly the shape of square cylindrical frame, two connectors 7 respectively having a pair of clamps 5, consisting of a resilient conductive strip formed into roughly the shape of the letter "U", and an insertion connection piece 6, formed on rising base 6a of its side edge, integrated into a single unit, are respectively mounted in parallel between said opposing surfaces 1a via said projections 4 at attachment hole 8 formed in the base portion of said clamps 5, and moreover, conductive reflecting plate P is fastened to the upper surface of said bulb holder 9 and current is able to flow to connectors 7 via said conductive reflecting plate P by tightly inserting said conductive reflecting plate P, placed flat on the upper surface of said bulb holder 9, into insertion connection piece 6 of said connectors 7 by means of its conductive projecting piece P1, the number of parts can be reduced and mounting of the reflecting plate to the bulb holder can be simplified when the above-mentioned conductive projecting



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piece P1 both fastens the reflecting plate and serves as a conductor for current to the connectors, the offering the first industrial advantage of being able to promote automation of assembly.

Moreover, in the present invention, by forming a reflecting portion and conductive projecting piece into a single unit in a single reflecting plate, and respectively forming an insertion connection piece 6, having a pair of clamps 5 and an insertion connection portion, into a single unit with a single connector 7, reduce costs can be achieved as a result of saving on space and resources. Moreover, together with being able to use a wedge base bulb and so forth by tightly clamping with a pair of clamps 5, by being able to insert conductive projecting piece P1 of conductive reflecting plate P into one of the insertion connection pieces 6 and tightly inserting a tab terminal and BUS bar directly into the other connection piece 6 to make connection, the present invention offers a second advantage of eliminating the need for caulking tools and so forth at the site of automobile production, which were required in the above-mentioned prior art, thus enabling automated assembly while also allowing connection work to be performed easily even in dark or confined locations such as an automobile engine room.

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According to claim 2, since heat resistance requirements around the lamp can be satisfied even if only the small-volume bulb holder 9 is made of expensive heat-resistant plastic while the large attaching body 11 is made of inexpensive plastic, a considerable reduction in cost can be achieved over the above-mentioned prior art, thus making the present invention more economical. In addition, when the outer surfaces of locking tabs 2 of insulating base 1 are pressed between the edges of mounting hole 10 of attaching body 11 by utilizing the tapered surfaces of locking tabs 2, after the above-mentioned edges are pushed in the inside direction in opposition to their resiliency, said sides 3 are locked with a single snapping action as they return to their original state as a result of locking tabs 2 being released from the edges of mounting hole 10, thus offering the additional advantage of allowing bulb holder 9 to be easily mounted in mounting hole 10 of attaching body 11.

In claim 2 in particular, in the case a large number of wedge base bulbs or flat fuses and so forth are mounted in concentrated fashion in a confined location, since insulating base 1, to which two connectors are already attached, can be easily arranged and mounted in an orderly fashion in mounting hole 10 of attaching body 11 with its locking tabs 2, high-density mounting is possible, thus offering another advantage of

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the present invention.

According to claim 3, by providing side relief holes 3a in bulb holder 9, together with bulb holder 9 being able to be easily mounted in attaching body 11 side edges 3 are able to be even more easily deflected, the present invention offers the additional advantage of improved radiation of heat for bulb holder 9 since air flows through the above-mentioned holes 3a.

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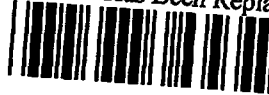
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CLAIMS

WHAT IS CLAIMED IS:

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1. A connector attachment component used for attaching a bulb to a bulb holder, to which a connector is attached, comprising: an insulating base 1, formed with heat-resistant plastic into roughly the shape of square cylindrical frame; projections 4 protruding from opposing surfaces 1a of said insulating base 1; two connectors 7 each having a pair of clamps 5, consisting of a resilient conductive strip formed into roughly the shape of the letter "U", and insertion connection piece 6, formed on rising base 6a of its side edge, integrated into a single unit; and, bulb holder 9 wherein said two connectors 7 are respectively mounted in parallel between said opposing surfaces 1a via said projections 4 by means of attachment holes 8 formed in the base portion of said clamps 5; wherein, conductive reflecting plate P is fastened to the upper surface of said bulb holder 9 and current is able to flow to connector 7 via conductive reflecting plate P by tightly inserting conductive reflecting plate P, placed flat on the upper surface of said bulb holder 9, into insertion connection piece 6 of said connectors 7 by means of its conductive projecting piece P1.

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2. The connector attachment component as set forth in claim 1 wherein said bulb holder 9 is attached to attaching body 11 at the edges of mounting hole 10 by protruding locking tabs 2 formed on sides 3 of said insulating base 1.
3. A connector attachment component used for attaching a bulb to a bulb holder, to which a connector is attached, comprising: an insulating base 1, formed with heat-resistant plastic into roughly the shape of square cylindrical frame; opposing pieces 3b formed separated from the inner surface of said side 3 by narrow, long side relief holes 3a, respectively, on both sides in the direction of width of said insulating base 1; projections 4 protruding from opposing surfaces 1a on the top and bottom of said insulating base 1 between said opposing pieces 3b; two connectors 7 each having a pair of clamps 5, consisting of a resilient conductive strip formed into roughly the shape of the letter "U", and insertion connection piece 6, formed on rising base 6a of its side edge, integrated into a single unit; and, bulb holder 9 wherein said two connectors 7 are respectively mounted in parallel between said opposing surfaces 1a via said projections 4 by means of attachment holes 8 formed in the base portion of said clamps 5; wherein, conductive reflecting plate P is fastened to the upper surface of said bulb holder

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9 and current is able to flow to connector 7 via conductive reflecting plate P by tightly inserting conductive reflecting plate P, placed flat on the upper surface of said bulb holder 9, into insertion connection piece 6 of said connectors 7 by means of its conductive projecting piece P1.