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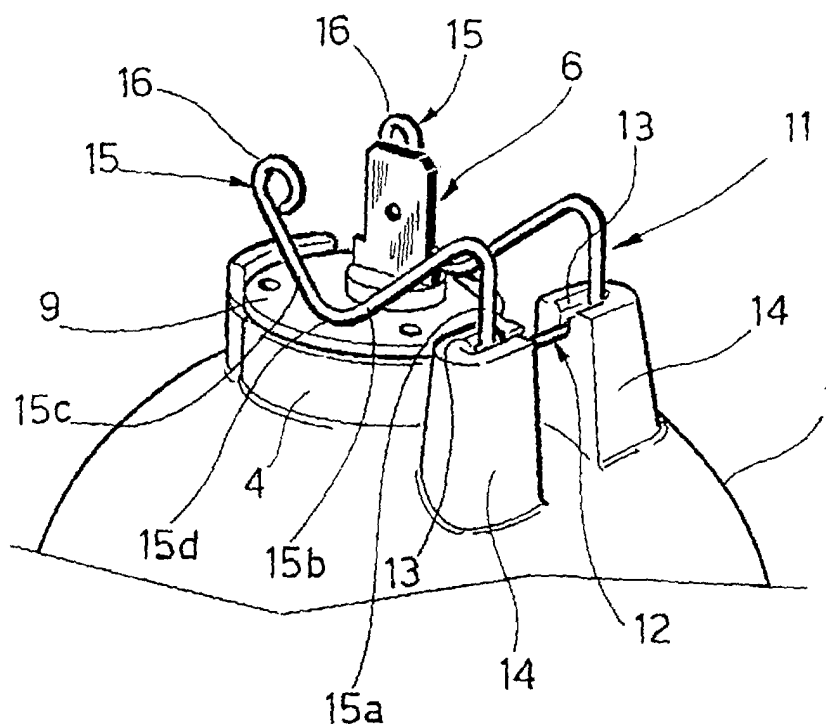
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(54) **Lamp holding device for a headlight or light of a motor-vehicle**

(57) The lamp (6) of a headlight or similar light of a motor vehicle is withheld in the mounted condition by means of a retention spring (11) made of a metal wire substantially bent to form a U, with a central portion (12), rigidly connected to the body of the reflector dish (1),

and two branches (15) having their opposite ends completely free, the said branches being designed to cause a resting element (9) forming part of the body of the lamp (6) to press elastically against a contrast surface (10) formed at the rear on the body of the reflector dish (1).

FIG. 4



Description

[0001] The present invention relates to lighting devices for motor vehicles, such as headlights or the like, of the type comprising:

a reflector dish having a substantially concave body with a reflecting front surface and a rear surface, said body having an opening;
a light source consisting of at least one lamp mounted inside said reflector dish through said opening, the aforesaid lamp having a bulb and a body provided with a resting element in contact with a contrast surface formed on the rear side of the body of the reflector dish; and
a retention spring consisting of a substantially U-shaped metal wire, with a central portion connected at the rear to the body of the dish, adjacent to the opening for receiving the lamp, and two branches extending from the ends of the aforesaid central portion, for pressing the resting element of the lamp body against the corresponding contrast surface of the body of the dish.

[0002] Devices of the type indicated above are, for example, illustrated in the document US-A-4 614 997 and in its equivalent EP-A-0 145 556, as well as in US-A-4 811 178, EP-A-0 306 687, and DE-A-197 39 116.

[0003] In all the known devices illustrated in the above-cited documents, the aforesaid U-shaped retention spring has one of its ends connected in an articulated way to the body of the dish, so that the spring is free to rotate between an inoperative position, in which its opposite end is set at a distance from the body of the dish, and an operative position, in which the said opposite end is engaged in a retention element integrated in the dish, or obtained using auxiliary components, in such a way that the spring causes the aforesaid resting element of the lamp body to press elastically against the corresponding contrast surface of the body of the dish.

[0004] All the known solutions referred to above present the drawback of being relatively complicated and costly, in that it is necessary to provide both the above-mentioned articulated connection of the spring to the body of the dish and the above-mentioned retention element which can be integrated or provided on the body of the dish, the said retention element having the function of withholding the spring in its operative condition.

[0005] A purpose of the invention is to provide a device of the type indicated at the beginning of the present description which is of a simple structure consisting of a small number of components, and hence economically advantageous to manufacture, and which is moreover light and which finally enables carrying-out of the operations of installation and removal of the lamp in a simple and rapid way. A further purpose of the invention is to provide a device of the type referred to above which is

suitable to being applied on any type of lighting device in an easy and economical way and without introducing any limitation in the design of the headlight or similar light.

[0006] With a view to achieving these and further purposes, the subject of the invention is a device of the type referred to at the beginning of the present description, characterized in that the aforesaid retention spring is rigidly connected to the body of the reflector dish, adjacent to its central portion, and in that the two branches of the spring have their opposite ends free, the said branches being shaped and arranged in such a way that, in the condition of installation of the lamp, they are elastically deformed with respect to their resting condition so as to press the aforesaid resting element of the lamp against the corresponding contrast surface on the rear side of the body of the dish.

[0007] Consequently, the principle underlying the present invention is aimed in a direction opposite to a technical prejudice that may be found in the known solutions mentioned above. In these solutions, there was in any case taken for granted the need to connect the retention spring to the body of the reflector dish at both of its ends in order to withhold the lamp in its mounted condition. In the case of the present invention, instead, the retention spring is connected (rigidly, and not in an articulated way) to the body of the dish only on its central portion (for example, at least in an area corresponding to the ends of the central portion), whilst the opposite ends of the two branches of the spring are completely free, i.e., not engaged in a retention element of any type provided on the body of the dish. Withholding of the lamp in its mounted condition is thus obtained by exploiting the elastic deformation to bending of the two branches of the spring (and/or possibly a torsional deformation of the ends of the central portion of the spring which occurs when the lamp is inserted into its seat and the aforesaid branches of the spring are engaged against the resting element of the lamp).

[0008] According to a preferred embodiment, the aforesaid two branches of the retention spring extend in two planes which are substantially parallel to one another and perpendicular to the central portion of the spring. Each branch has a substantially S-shaped configuration, with a bend or elbow in contact with the resting element of the lamp.

[0009] Again in the case of the aforesaid preferred embodiment, the central portion of the spring has its ends driven into seats made in two appendages projecting from the rear surface of the body of the dish and made of one piece with the latter.

[0010] According to a further preferred characteristic, the retention spring is electrically insulated with respect to the terminals of the lamp, so that it does not perform the function of terminal in addition to the mechanical function of retention of the lamp. Preferably, the lamp is of a type in itself known, provided at the rear with a connector that also comprises, integrated therein, the earth

contact.

[0011] A further important possibility afforded by the conformation described above lies in the fact that the two branches of the retention spring may be deformed in such a way as to cause them to diverge, and so that they depart from the two parallel planes in which they are set when the spring is undeformed. In this divaricated condition, the two branches of the spring can be rested against two lateral surfaces adjacent to the opening for receiving the lamp in such a way as to leave the said opening free to enable easy insertion of the lamp into the reflector dish or easy removal therefrom. Once the lamp has been inserted and its resting element has been set in contact with the corresponding contrast surface, the two branches can be brought back into their parallel condition in which they cause the resting element of the lamp body to press elastically against the aforesaid contrast surface, withholding the lamp securely in its mounted condition. Consequently, the deformability of the two branches of the spring in a direction perpendicular to the two planes of lie of the branches themselves is exploited when it is necessary to divaricate the branches in order to facilitate installation and removal of the lamp. At the same time, the elastic deformability of the branches of the spring in a direction orthogonal to the previous one is exploited in order to obtain application of the force for withholding the lamp in its mounted condition.

[0012] From the foregoing description it is evident that the device according to the invention enables a plurality of advantages to be achieved. First of all, withholding of the lamp in the mounted condition is obtained without providing, on the body of the reflector dish, any supplementary elements of engagement in addition to the connection provided in the area corresponding to the central portion of the spring. As has been seen, this involves the advantage of rendering fabrication of the device simpler and more economical, reducing the components thereof. In the case of the present invention, retention of the lamp in the mounted condition is obtained by exploiting only the elastic characteristics of the material making up the spring and the configuration of the latter. In addition, as has been seen, the spring is shaped in such a way as to render the operations of installation and removal of the lamp extremely simple and fast. The device built according to the invention is able in any case to meet the international requirements contemplated for lighting devices for motor vehicles. Furthermore, the invention is compatible with any conformation of motor-vehicle headlight or similar light, including the new-generation headlights, which adopt a clear and smooth external diffuser, i.e., one of the type without any optical faceting. The device, in fact, does not involve the arrangement of aesthetically unattractive elements that might be visible from outside through the clear and un-faceted diffuser.

[0013] Further characteristics and advantages of the invention will emerge from the ensuing description with reference to the attached drawings, which are provided

purely by way of a non-limiting example, and in which:

Figure 1 is a rear view of a motor-vehicle headlight according to the invention;

Figure 2 is a cross-sectional view of the same headlight as in Figure 1 taken along the line II-II;

Figure 3 illustrates, at an enlarged scale, an item of Figure 2; and

Figures 4 and 5 are two perspective views illustrating the two branches of the retention spring of the device according to the invention, respectively in the operative condition in which the lamp is withheld, and in a divaricated condition in which the said two branches may be placed temporarily to facilitate introduction or extraction of the lamp.

[0014] With reference to Figures 1 and 2, the number 1 designates, as a whole, the reflector dish which forms part of a headlight for a motor vehicle. The drawings do not illustrate the element which is connected to the front part of the headlight and which is typically formed by a casing designed to guarantee the water tightness of the device, the said casing presenting an internal surface provided with optical prism-like facets, or else, according to a more recent trend, a completely clear and smooth surface, i.e., without any optical prism-like facets, in such a way as to be completely transparent and to make the lamp of the headlight visible from outside. The body 1 of the reflector dish has a substantially concave conformation, typically that of a paraboloid, with a front surface 2, provided with a metallized reflecting layer, and a rear surface 3. According to traditional techniques, in its central part the body of the dish 1 has a neck 4 defining an opening 5 through which is installed the light source which consists of a lamp 6 of any known type used in lighting devices for motor vehicles. The lamp 6 has a bulb and a supporting body 8 which is mounted through the opening 5 from the rear side of the dish 1. Again according to traditional techniques, the body 8 is provided with a resting disk 9 which is pushed up against a contrast surface 10 formed on the rear side of the dish 1.

[0015] In the case of the present invention, the lamp 6 is kept in its mounted condition by a retention spring 11 consisting of a metal wire, typically made of spring steel, bent substantially into the shape of a U. The spring 11 has a central portion 12 the ends of which are rigidly connected, by being driven, inside two seats 13 formed in appendages 14 made of a single piece with the reflector dish 1. From the ends of the central portion 12 of the spring 11 there extend two branches 15 that are set in two planes that are substantially parallel to one another and perpendicular to the central portion 12 (see also Figure 1). The ends of the branches 15 that are adjacent to the central portion 12 are also fixed inside the seats 13 of the appendages 14. The opposite ends are, instead, completely free and bent to form a curl in such a way as to define two end gripping elements 16.

As emerges clearly from Figures 3, 4 and 5, each branch 15 has a basically S-shaped configuration, with a portion 15a that branches off at right angles from the central portion 12, and two subsequent portions 15b, 15c, set to form a V, which define a bend or elbow 15d that presses the resting disk 9 of the body of the lamp against the contrast surface 10 of the reflector dish.

[0016] Figure 3 of the attached drawings shows by a dashed line the configuration that each branch 15 of the spring assumes in the resting condition. As may be seen, when the lamp is installed and the spring is in its operative condition, as illustrated in Figures 3 and 4, each branch 15 is deformed by bending in such a way that its elastic reaction determines application of a force pressing the resting disk 9 against the contrast surface 10 of the reflector dish. When it is necessary to remove the lamp or to install it, in order to prevent the two branches 15 from hampering operations, the two branches are deformed in such a way as to cause them to diverge so that they depart from their respective planes of lie until they reach the condition illustrated in Figure 5, in which they are set laterally divaricated against the wall of the neck 4 of the body of the reflector dish. In this condition, the two branches 15 do not obstruct the opening 5, so that insertion or extraction of the lamp can be carried out easily and quickly. Once a lamp has again been mounted, the branches 15 can be brought back from the condition illustrated in Figure 5 into the condition illustrated in Figure 4, in which they withhold the lamp in position. Consequently, in order to bring the branches into the temporary condition illustrated in Figure 5, to facilitate insertion or extraction of the lamp, the deformability of the branches 15 in a direction perpendicular to the respective planes of lie is exploited. In the operative condition of retention of the lamp, instead, the deformability of the branches in a direction orthogonal to the previous one is exploited.

[0017] As emerges clearly from the foregoing description, the ends 16 of the branches 15 are completely free, in contrast to the known solutions, in which the said ends engage corresponding retention elements provided on the reflector dish, with a consequent constructional complication. On the opposite side, the central portion 12 of the spring is simply driven into the corresponding seats 13 made in the body of the reflector dish, instead of being connected in an articulated way to the latter, as is the case in known solutions, with a consequent further constructional simplification.

[0018] The spring 15 is electrically insulated from the terminals of the lamp, which are both integrated, in the case of the example illustrated, in the lamellar connector provided on the rear part of the body of the lamp according to a technique which is of itself known.

[0019] Of course, without prejudice to the principle of the invention, the details of construction and the embodiments may vary widely with respect to what is described and illustrated herein purely by way of example, without thereby departing from the scope of the present inven-

tion.

Claims

1. A lighting device for motor vehicles comprising:

a reflector dish (1) having a substantially concave body with a reflecting front surface (2) and a rear surface (3), said body (1) having an opening (5);
a light source consisting of at least one lamp (6) mounted inside said reflector dish (1) through said opening (5), the aforesaid lamp (6) having a bulb (7) and a body (8) provided with a resting element (9) in contact with a contrast surface (10) formed on the rear side of the body of the reflector dish (1); and
a retention spring (11) consisting of a substantially U-shaped metal wire, with a central portion (12) connected at the rear to the body of the dish (1), adjacent to the opening (5) for receiving the lamp (6), and two branches (15) extending from the ends of the central portion (12), for pressing the resting element (9) of the body (8) of the lamp (6) against the contrast surface (10) of the body of the dish (1),

characterized in that said retention spring (11) is rigidly connected to the body of the reflector dish (1), adjacent to its central portion (12), and **in that** the two branches (15) of the spring have their opposite ends free, the said branches (15) being shaped and arranged in such a way that, in the condition of installation of the lamp (6), they are elastically deformed with respect to their resting condition so as to press said resting element (9) of the lamp (6) against the corresponding contrast surface (10) on the rear side of the body of the dish (1).

2. A device according to Claim 1, **characterized in that** said branches (15) extend in two planes that are substantially parallel to one another and perpendicular to the central portion of the spring.

3. A device according to Claim 2, **characterized in that** each branch (15) has basically an S configuration, with a bend or elbow (15d) in contact with the resting element (9) of the lamp.

4. A device according to Claim 3, **characterized in that** the free end of each branch (15) of the spring (11) is bent to form a curl in order to define a gripping element (16).

5. A device according to Claim 1, **characterized in that** the central portion (12) of the spring (11) has its ends driven into seats (13) made in two append-

ages (14) projecting from the rear surface (3) of the reflector dish (1).

6. A device according to Claim 5, **characterized in that** said appendages (14) are made of a single piece with the reflector dish (1). 5
7. A device according to Claim 2, **characterized in that** the two branches (15) of the spring (11) are elastically deformable in a direction orthogonal to their respective planes of lie in such a way that said branches may be set divaricated at the two sides of the aforesaid opening (5) on the body of the reflector (1) so as not to obstruct said opening during the operation of insertion or extraction of the lamp (6). 10 15

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FIG. 2

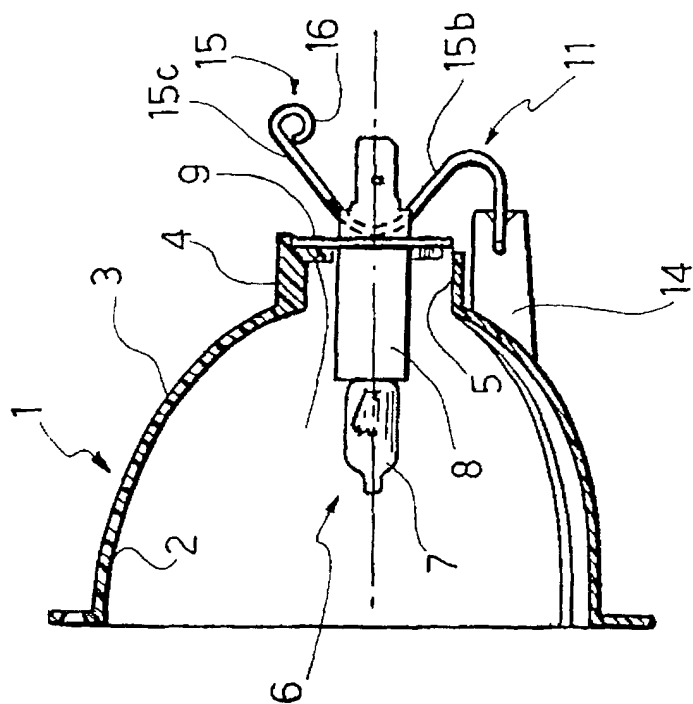


FIG. 1

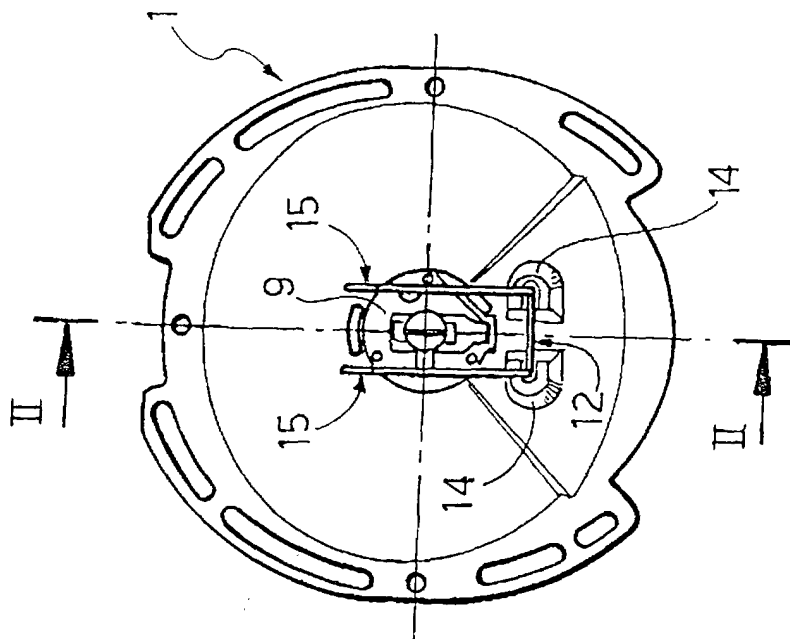


FIG. 4

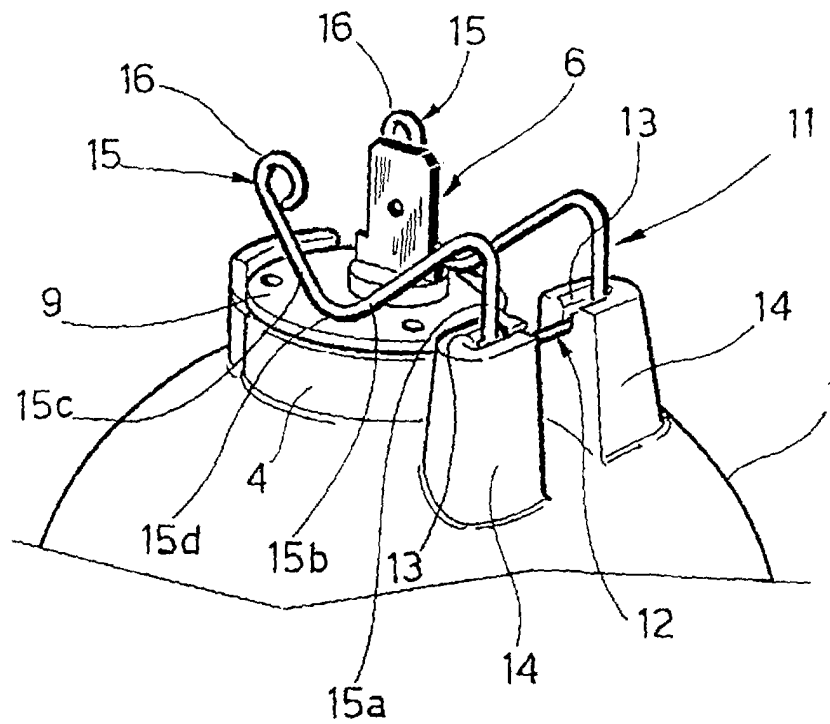


FIG. 3

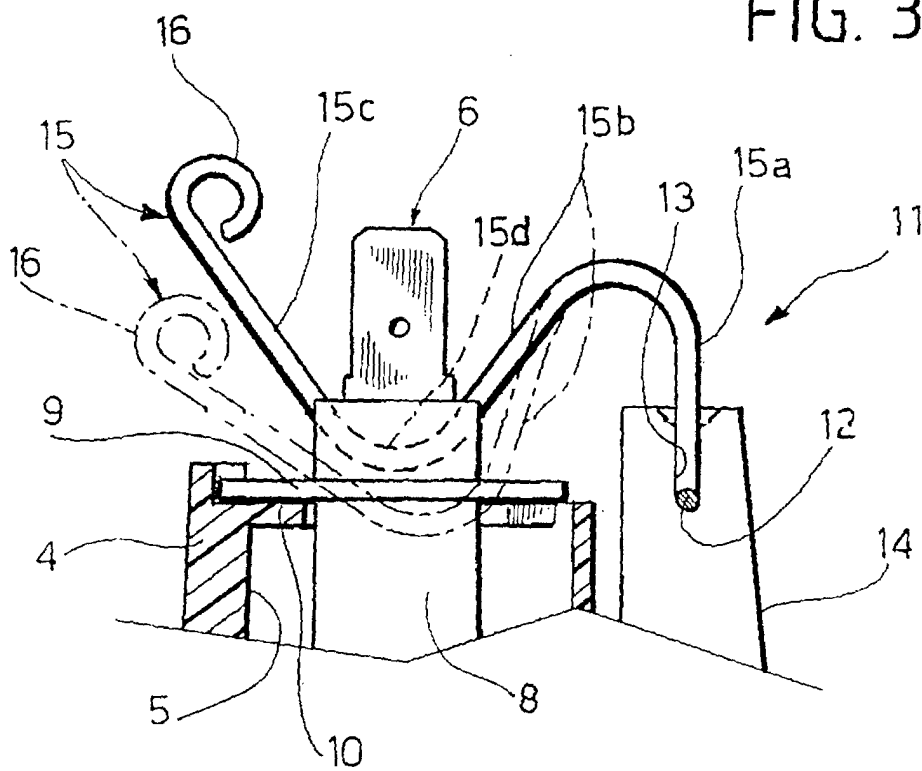
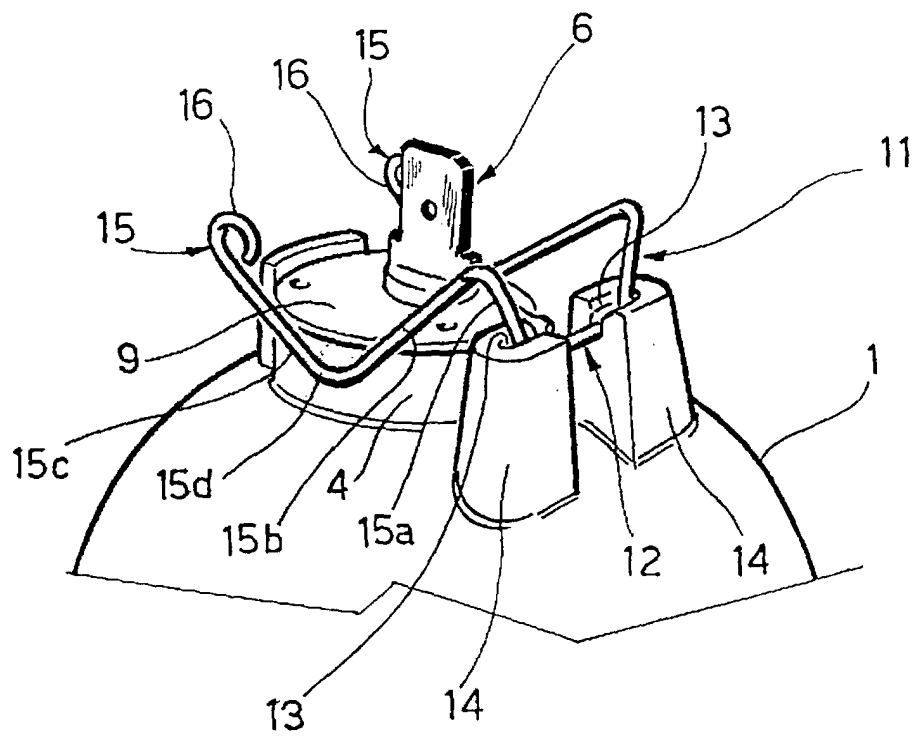


FIG. 5





European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 00 83 0856

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
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			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
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The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 27 August 2001	Examiner Busto, M
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03 82 (P04/001)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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