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(54) **Electrical contact for a bulb connector and bulb connector provided with these contacts**

(57) The object of the invention is an electrical contact particularly for an electrical connector for a baseless bulb, comprising a body (60) with means (54) for connection with an electrical cable (52), side walls (64, 66) from each of which is formed by bending a contact blade

(68, 70), a lower wall (62) extending over all the length of said electrical contact, characterized in that the side walls (64, 66) and the bottom wall (62) form a half cage of open U shape.

The invention also covers the connector adapted to receive such half cage contacts.

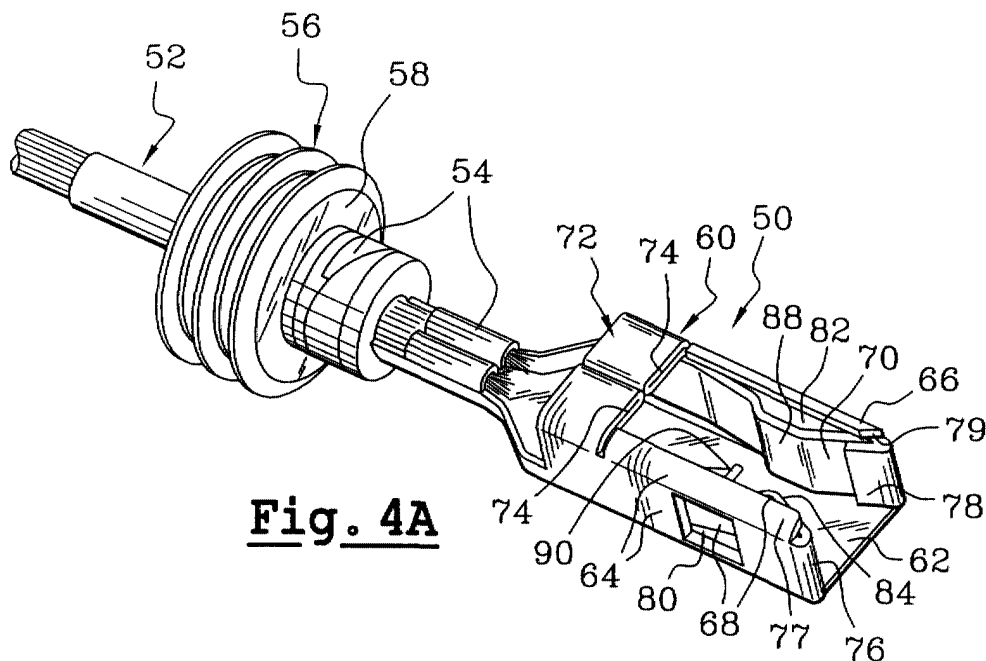


Fig. 4A

Description

[0001] The present invention relates to an electrical contact forming a half cage to connect a bulb, especially a bulb without a base such as that of a flashing turn signal of a vehicle.

[0002] There are known cage contacts, particularly the one described in French patent application FR-A-2 777 706, in the name of the same applicant, which relates to an electric terminal of a monolithic female electric contact.

[0003] The contact comprises a body forming a cage with a lower wall, two upper half walls and two side walls from which are formed by bending and cutting, two contact blades. These two contact blades are one of the floor type without clearance and the other with a resilient return.

[0004] The contact blade of the floor type comprises a flat portion parallel to the side wall, if desired provided with ribs to improve the stiffness and to increase the contact pressure on the male blade provided to come into bearing against this flat portion. The end of this blade is in abutment against the bottom of a flap of the same side wall, so as almost completely to limit its deformation.

[0005] The resilient return type blade comprises a bend permitting mounting in the form of a resilient arm and a projection adjacent its front free end. This projection permits above all to decrease the contact surface and to increase the contact pressure for a same return force. The bending permits the spacing of this blade during introduction of the male blade, whilst maintaining a pressure force and the projection can slightly deform also to permit the passage of the male blade whilst exerting a powerful resilient return force.

[0006] The length of the blade of the resilient return type is such that there remains a play between its end and the bottom of a flap made by bending from the corresponding side wall, so as to permit a certain deformation of this blade of the resilient return type.

[0007] A contact to connect the bulb according to the present invention must satisfy several other requirements. Thus, in addition to a certain electrical quality of the electrical contact as in the electrical contact cage of the prior art, there must also be reliability as to holding and mechanical retention of the bulb so as, for example, not to give rise in the case of a flashing signal on a vehicle, an intervention that is totally disproportionate, between the complexity of access and the repair of the defective bulb connector.

[0008] That a connector can receive a bulb, requires two juxtaposed contacts, each to coact with a corresponding conductive region of the bulb, from which a structure suitable to prevent any erroneous introduction of the contact and to resist without twisting insertion efforts in the bulb connector, is required.

[0009] The bulbs adapted to be received in the connector according to the present invention are of known type and an embodiment of this bulb is shown in Figure

1, showing the prior art, in a simplified manner so as to show only the detail of the lower portion of the connection.

[0010] Such a bulb comprises an upper portion forming the illumination bulb 10 properly so-called and the lower connection portion 12. This lower portion has a central portion 14 formed with the envelope of the bulb, which is prolonged laterally by two lateral wings 16 and 18, that are symmetrical, and disposed in a same plane.

[0011] Each of the surfaces of the plane receives a conductive element 20 and 22. These conductive elements are disposed symmetrically diagonally on the wings, which renders the lower portion completely symmetrical.

[0012] Each of these wings 16 and 17 also carries a groove 24 and 26, perpendicular to the direction of introduction of the bulb, at least on the surface opposite that which receives the conductive portion.

[0013] Figure 2 showing the prior art, shows a contact of known type, suitable to receive this type of bulb, also shown in a simplified manner.

[0014] This contact 30 comprises connection means 32 with an electrical cable as well as a lower surface 34 and two lateral surfaces 36 and 38 forming a U.

[0015] The lower surface comprises an insertion corrector 40 and its free end carries a connection tongue 42 made by bending from the lower surface. This tongue permits retaining the cage in the bulb connector 44 which receives it, as shown in Figure 3 of the prior art, which shows a cross-section once the bulb is inserted in said connector.

[0016] The two side surfaces are prolonged beyond the lower surface to constitute themselves contact blades 46 and 48. The first blade 46 is of the floor type and the second 48 is of the resilient return type with a projection. In this case, the projection serves to retain the bulb in the connector, because it coacts with the groove 24, 26 of the blades of the bulb.

[0017] It will be noted that, in such an arrangement, the blades are free and their ends are not protected in any way during introduction of the bulb into the connector, which can give rise to damage to the blades themselves and to the conductive elements of the bulb.

[0018] Moreover, the contact blades come directly into bearing relationship on the insulation of the connector when the bulb is inserted, as shown in Figure 3. This arrangement leaves a certain play between the contact and the connector and hence a play of the bulb in the connector when the latter is inserted. This result is not satisfactory and the mechanical retention of this bulb is weakened.

[0019] The mechanical resistance of the contact itself is limited, because it has no reinforcement of its structure adapted to stiffen it. Its manipulation and its introduction into the connector remain vulnerable.

[0020] The half cage contact according to the present invention overcomes the mentioned drawbacks and permits not only having correct insertion means, but also

an electrical contact of improved type whilst ensuring mechanical gripping overcoming the play in the contacts, which leads to a suitable locking of the bulb in the connector according to the present invention, which is also claimed. Moreover, this half cage contact facilitates the insertion of the bulb without risk of damaging the electrical contact elements and thus improves the resistance to vibration and decreases loss of contact arising from these phenomena.

[0021] To this end, the electrical contact according to the invention comprises in known manner a body with connection means to an electrical cable, side walls of each of which are made by bending a contact blade, a lower wall extending over all the length of said electrical contact, and is characterized in that the side walls and the lower wall form a half cage of open U-shaped profile.

[0022] According to a preferred arrangement, this contact also comprises stiffening flanges made by bending the side walls and if desired a partial upper wall.

[0023] One of the blades is of the type that locks by a projection and the other is of the floor type.

[0024] Moreover, each of the side walls comprises a flap at its end, forming a protection for the free ends of the electrical contact blades.

[0025] The invention also covers the connector suitable to receive at least one electrical contact according to the invention.

[0026] The present invention, as to the half cage associated with the connector, will now be described with respect to a particular embodiment which is non-limiting, with reference to the drawings, which show a particular embodiment that is non-limiting, compared to a contact with the prior art, the different figures corresponding to:

Figure 1, a perspective view of a so-called baseless bulb, of known type,

Figure 2, a perspective view of a prior art contact,

Figure 3, a view of a connector according to the prior art provided with prior art contacts and having a baseless bulb,

Figure 4A, a perspective view from above of the half cage contact according to the present invention,

Figure 4B, a perspective view from below of the half cage contact of Figure 4A,

Figure 5, an exploded perspective view showing two half cage contacts according to the present invention, an associated connector according to the present invention, and a baseless bulb of known type, ready to be introduced into said connector,

Figures 6A and 6B, cross-sectional views on the lines 6A-6A and 6B-6B and in perspective, of an associated connector according to the present invention,

Figure 7A, a view from above of a half cage contact according to the present invention, and

Figure 7B, a view of the half cage contact of Figure 7A after insertion of a baseless bulb.

[0027] In Figures 4A and 4B, there is shown in detail the half cage contact 50 according to the present invention which is secured to an electrical cable 52 by connection means 54. Moreover, sealing means 56 are provided for the same connection means 54 so as to immobilize the joint 58 which constitutes the essence of these sealing means.

[0028] The half cage contact properly so called comprises a body 60 forming a half cage with a lower wall 62 and two side walls 64 and 66 from which are formed by bending and cutting two contact blades 68 and 70. These two contact blades 68 and 70 are one of the locking type with a projection with resilient return, and the other of the floor type, respectively, with the possibility of clearance for each.

[0029] The body 60 thus has a generally U-shaped configuration, upwardly open.

[0030] A partial upper wall 72 is held adjacent the connection means 54, which is to say at the rear relative to the direction of introduction of the bulb as will be explained later, so as further to stiffen the body of the half cage. The partial upper wall is comprised of tongues 74 made by cutting and bending directly from the side walls 64 and 66 to which they are attached.

[0031] The side walls are bent at their ends and constitute flaps 76 and 78 for protecting the free ends of the contact blades 68 and 70, whilst leaving a possibility of clearance. These side walls are also each provided with a window 80 and 82. Moreover, the upper edge of each side wall is bent over a very small width, thus forming a longitudinal wing 77 and 79, so as further to improve the stiffness of these side walls whilst also ensuring minimum protection of the contact blades from above.

[0032] The blade 68 of the projection type with resilient return, comprises, as is better seen in Figures 7A and 7B, on the one hand a pronounced projection 84 of a shape congruent to that of the throat 24 of the corresponding wing 16 or 18 of the bulb, this projection being located adjacent the free end, and on the other hand, a flat bearing region 86 which follows the projection 84, in the direction of introduction 28 of the bulb. This blade 68 has clearance.

[0033] The blade 70 of the floor type also has a free end to permit a certain deformation during introduction of the bulb 10.

[0034] Nevertheless, this blade 70 comprises a floor region 88 permitting a contact over a large surface and with mechanical engagement. To ensure absorption of the forces, this floor region 88 is disposed substantially facing the flat bearing region 86 of the blade 68 with a projection.

[0035] The lower wall 62 is prolonged substantially into alignment with the flaps 76 and 78, over all the length of the body 60 of the half cage contact 50.

[0036] This lower wall 62 also has a deformation made by stamping, which constitutes a lug 90 for orientation and for abutment, ensuring proper insertion.

[0037] The associated connector 92, adapted to re-

ceive a pair of half cage contacts 50 according to the invention, and described above, is shown in Figures 5 and 6A/6B.

[0038] This connector comprises two recesses 94 and 96 of a shape that mates with that of the contacts, in which are formed by molding locking fingers 98 and 100 adapted to coact with the windows 80 and 82 of the half cage contacts so as to immobilize said contacts when they are completely inserted into these recesses.

[0039] A central region 102 forms a cradle to receive the central portion 14 of the baseless bulb.

[0040] The two recesses are separated by an intermediate wall 104 which isolates the two recesses from each other and which ensures the reception of the sealing means 56.

[0041] The connector 92 also carries retaining lugs 106 for ultimate mounting in a support, not shown, depending on the destination of this connector.

[0042] As to Figures 7A and 7B, the manner of insertion of the bulb 10 and the advantages which flow from the arrangement of the half cage contact according to the invention will be better understood.

[0043] In Figure 7A, the blades 68 and 70 are in ready position with their free ends held below the corresponding flaps 76 and 78 with the possibility of clearance.

[0044] During introduction of the half cage contacts according to the invention, the body 60 can be introduced easily thanks to its high stiffness, particularly arising from the fact that it is provided with a partial upper wall 72 and by the presence of side walls entirely forming a rigid and monolithic half cage, reinforced by the lateral flanges. The contacts are introduced in a suitable manner into the connector thanks to the orientation and abutment lug 90, which avoids insertion the wrong way and which permits, by coming into abutment, an engagement of the locking fingers 98 and 100 of the connector in the windows 80 and 82 of the side walls.

[0045] The blades 68 and 70 are disposed in the body 60 and can work autonomously within the interior of this cage without being subjected to forces other than those of the insertion of the bulb. The blades are protected from the connector walls particularly because they do not have any contact with these walls, only the external surfaces of the body coming into contact with the internal walls of the recesses 94 and 96 of the connector.

[0046] On the other hand, it will be noted that the walls are perfectly held in the recesses 94 and 96, by eliminating any play, independently of the position of the blades and in the presence or absence of the bulb.

[0047] In Figure 7B, a bulb is inserted into the half cage contact.

[0048] In this position, the body 60 is not directly concerned with the introduction of the bulb 10, but the blades are stressed.

[0049] During introduction, the lower connection portion 12 cannot be accidentally damaged by the blades, because the ends of the latter are protected by the flaps 76 and 78, at the same time that these flaps ensure the

initial guidance and promote the introduction.

[0050] Correspondingly as the bottom connection part 12 is inserted, the blades are spaced thanks to their resilience. The ends are translated thanks to the clearance that is provided, and come into abutment with the bottom of the flaps 76 and 78. One of the conductive elements, in this case the element 20, comes into contact with the floor 78 of the corresponding blade 70. During its introduction, the friction due to translation ensures a high quality electrical contact.

[0051] When the bulb is totally inserted, the locking blade 68 with a projection moves away until this projection is located in line with the groove 24. Then, as a result of the resilient return force, the blade 68 is pressed against the opposite surface of the wing in question. The projection 84 enters said groove and the bearing region 86 bears against the wing, ensuring a locking.

[0052] Thus the bulb is mechanically held over a substantial length on opposite sides of each surface of the wing in question of the bulb.

[0053] The bulb will be held in the connector by its two wings and on its two surfaces, which leads to a stable retention of the bulb inserted in the connector by only the half cage contacts, themselves intimately received in said connector. Play is thus limited to the greatest extent possible.

Claims

1. Electrical connector particularly for electrically connecting a baseless bulb, comprising a body (60) with connection means (54) with an electrical cable (52), side walls (64, 66) from each of which is formed by bending a contact blade (68, 70), a lower wall (62) extending over all the length of said electrical contact, **characterized in that** the side walls (64, 66) and the lower wall (62) form a half cage of open U-shape.
2. Electrical contact according to claim 1, **characterized in that** it comprises stiffening flanges (77, 79) made by bending from the side walls (64, 66).
3. Electrical contact according to claim 1 or 2, **characterized in that** it comprises a partial upper wall (72) disposed adjacent the connection means (54).
4. Electrical contact according to claim 3, **characterized in that** this partial upper wall (72) is comprised by tongues (74) made by cutting out and bending directly from the side walls (64, 66) to which they are attached.
5. Electrical contact according to any one of the preceding claims, **characterized in that** one (68) of the blades is of the type that locks by a projection (84).

6. Electrical contact according to claim 5, **characterized in that** the blade (68) that locks by a projection, has clearance.
7. Electrical contact according to claim 5 or 6, **characterized in that** the blade (68) of the type that locks with a projection comprises, in addition to the projection, a bearing region (86). 5
8. Electrical contact according to any one of the preceding claims, **characterized in that** one (70) of the blades is the type with a floor. 10
9. Electrical contact according to claim 8, **characterized in that** the blade (70) of the type with a floor has clearance. 15
10. Electrical contact according to any one of the preceding claims, **characterized in that** each of the side walls (64, 66) comprises a flap (76, 78) at its end, forming a protection for the free ends of the electrical contact blades. 20
11. Electrical contact according to any one of the preceding claims, **characterized in that** it comprises means (80, 82, 90) for mounting in a connector, these means comprising at least one window (80, 82) adapted to receive a locking finger (100) of the connector receiving said contact. 25
12. Electrical contact according to claim 11, **characterized in that** these mounting means comprise a lug (90) for orienting an abutment, ensuring proper insertion. 30
13. Connector adapted to receive an electrical contact (50) according to any one of the preceding claims, **characterized in that** it comprises at least one recess (94, 96) of a profile complementary to that of the contact, and provided with a locking finger (98, 100) adapted to coact with windows (80, 82) to immobilize said contacts when they are completely inserted into these recesses. 35
14. Connector according to claim 13, **characterized in that** it comprises two recesses separated by an intermediate wall (104) which isolates said recesses from each other and ensures the reception of the contact and unitary contact sealing means (56). 40

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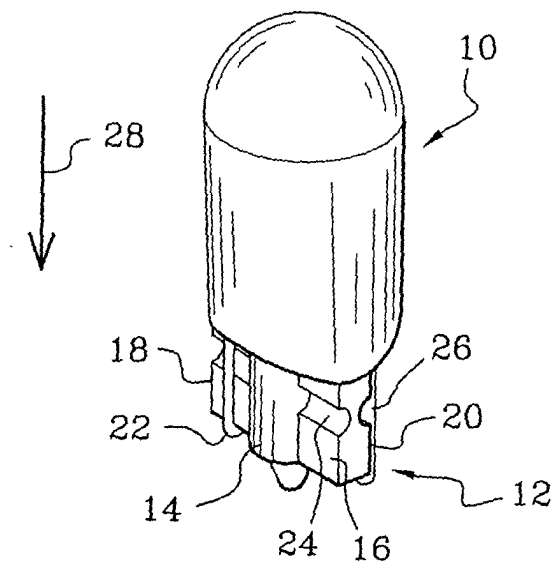


Fig. 1
PRIORT ART

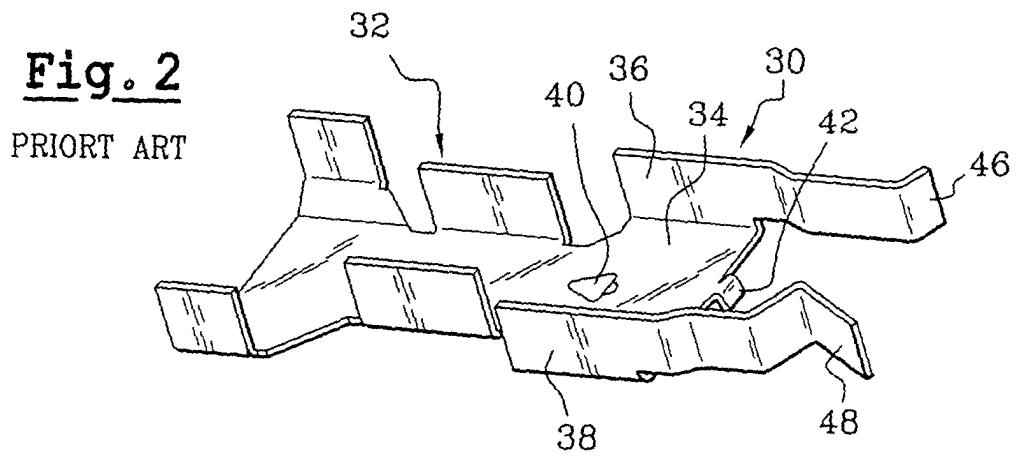


Fig. 2
PRIORT ART

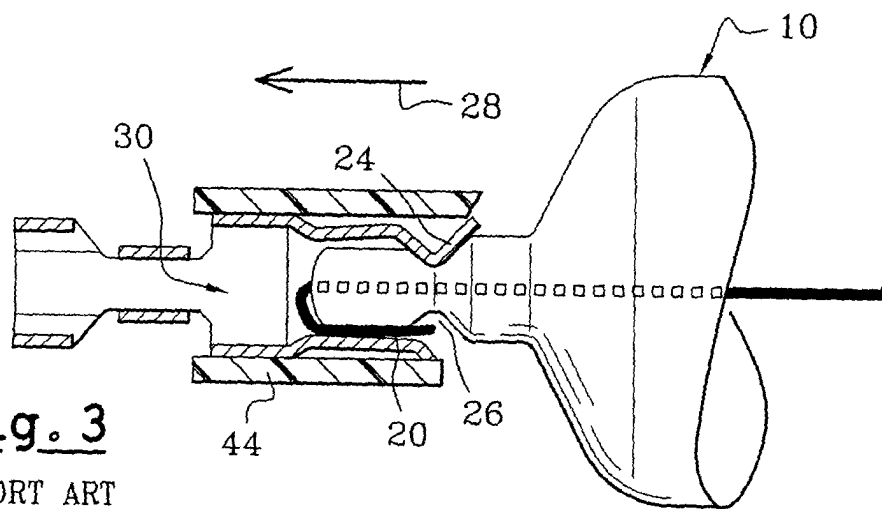
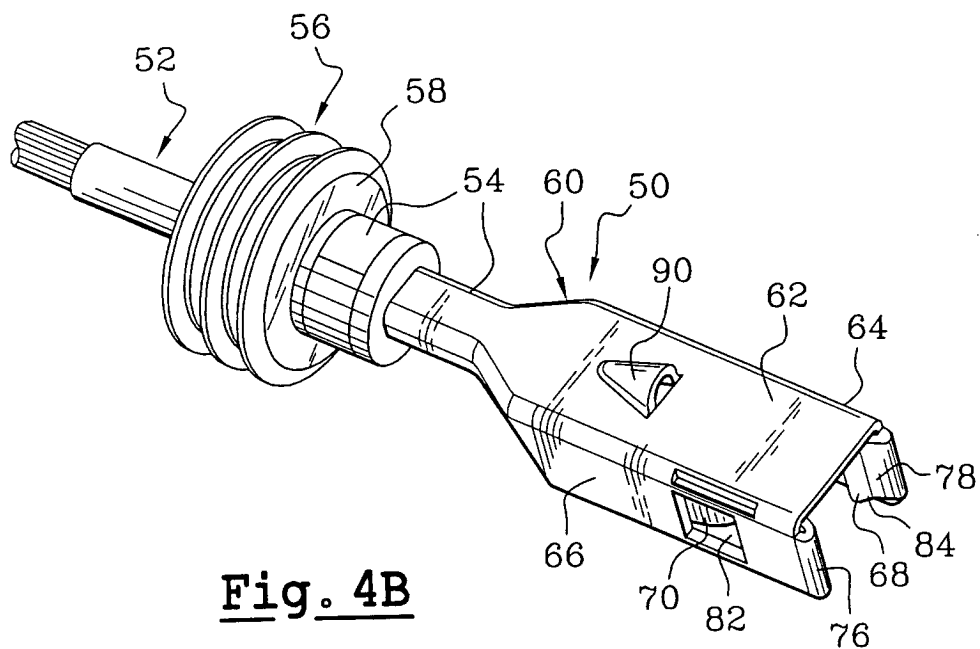
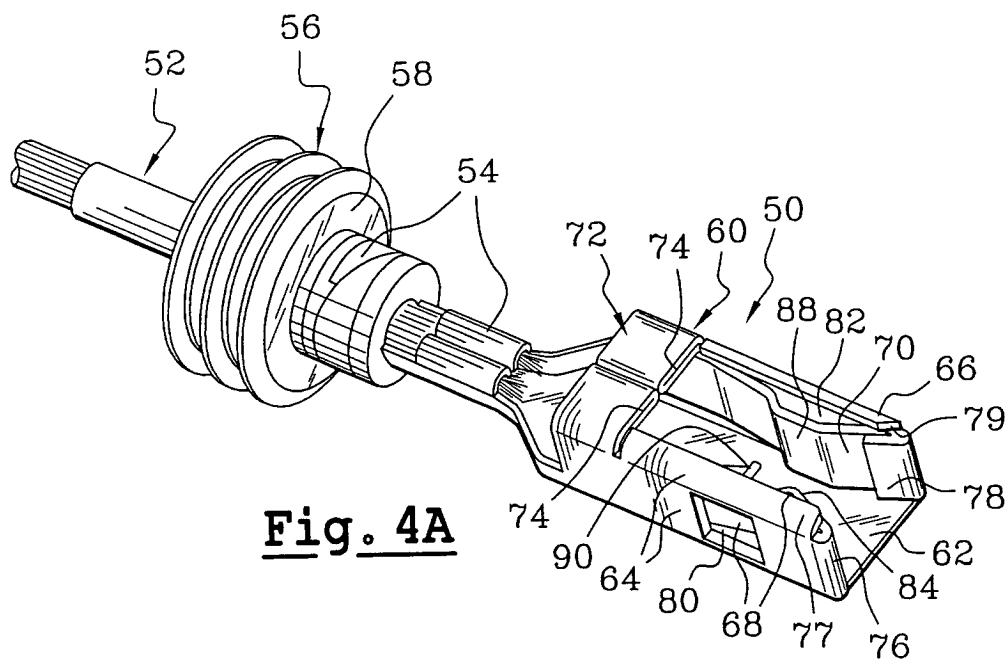


Fig. 3
PRIORT ART



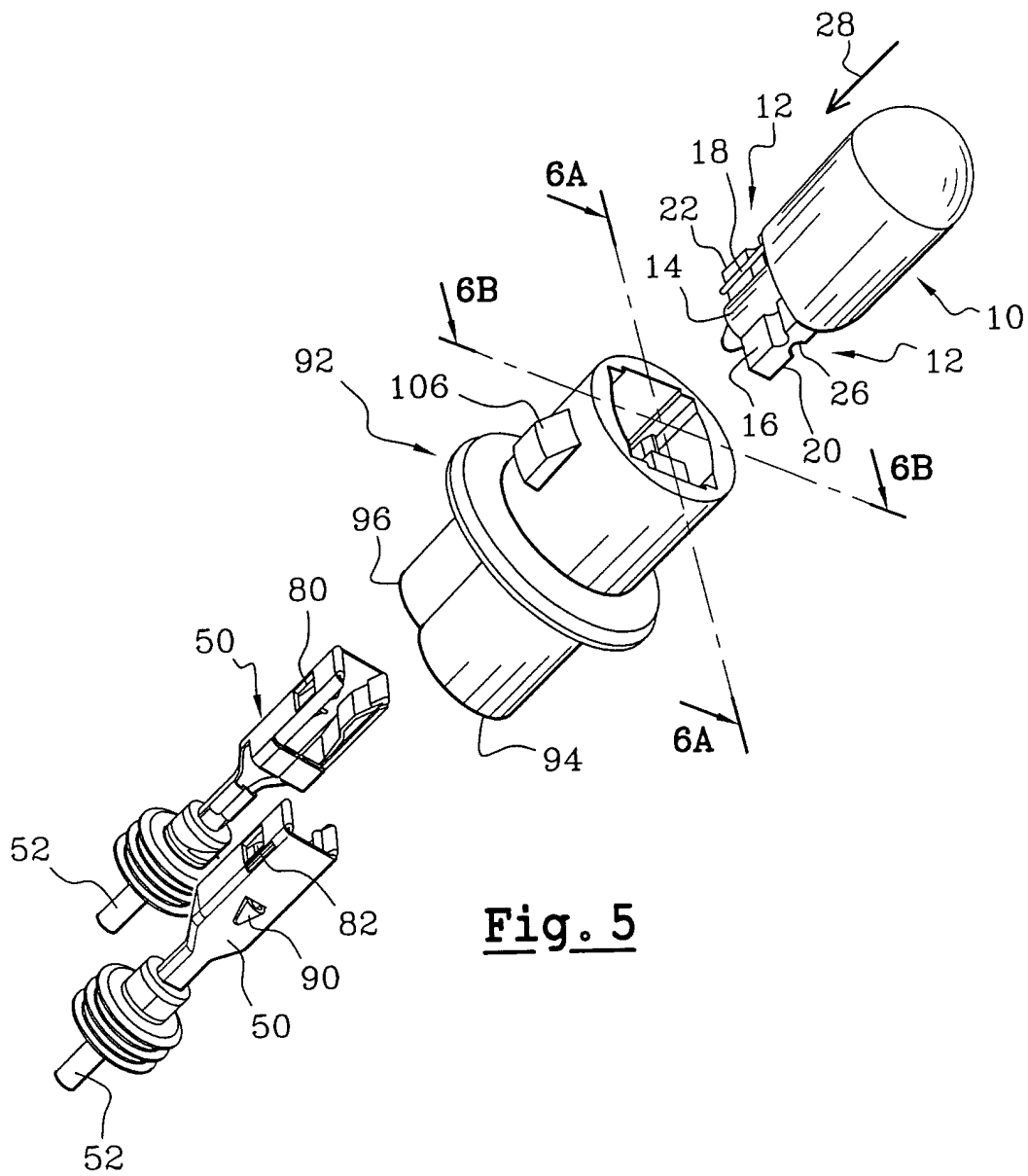


Fig. 5

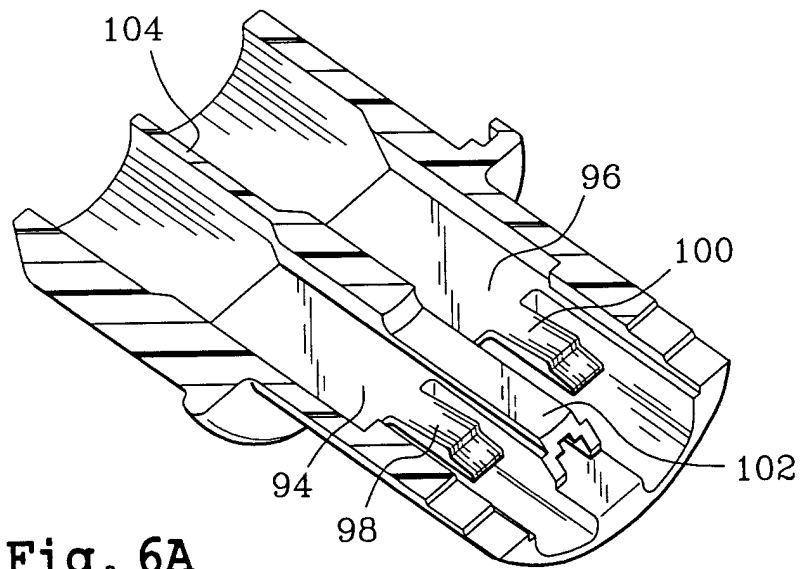


Fig. 6A

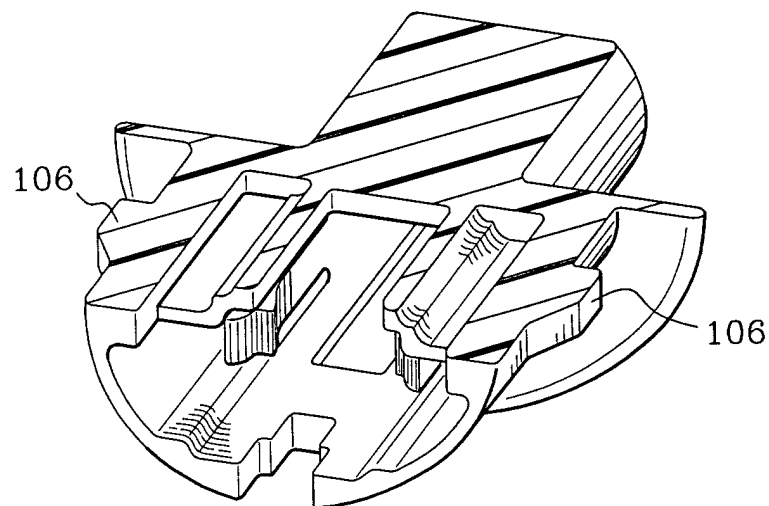


Fig. 6B

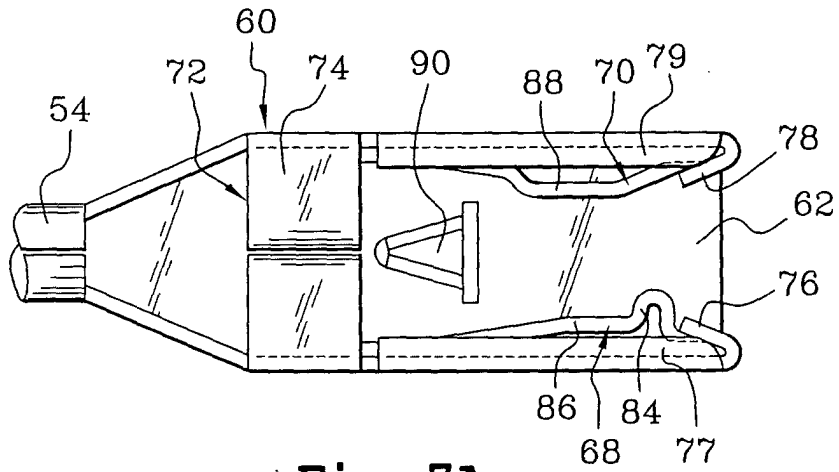


Fig. 7A

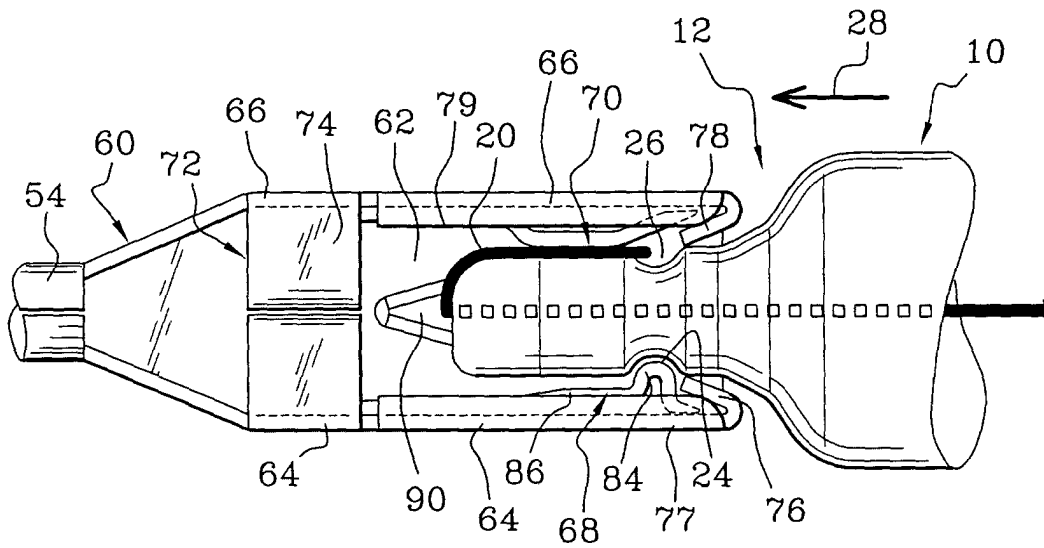


Fig. 7B



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 01 45 0008

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	US 4 902 251 A (GRZENA KARL R) 20 February 1990 (1990-02-20)	1,2,5-7	H01R33/09
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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		Date of completion of the search	Examiner
THE HAGUE		19 July 2001	Bertin, 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			

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**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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