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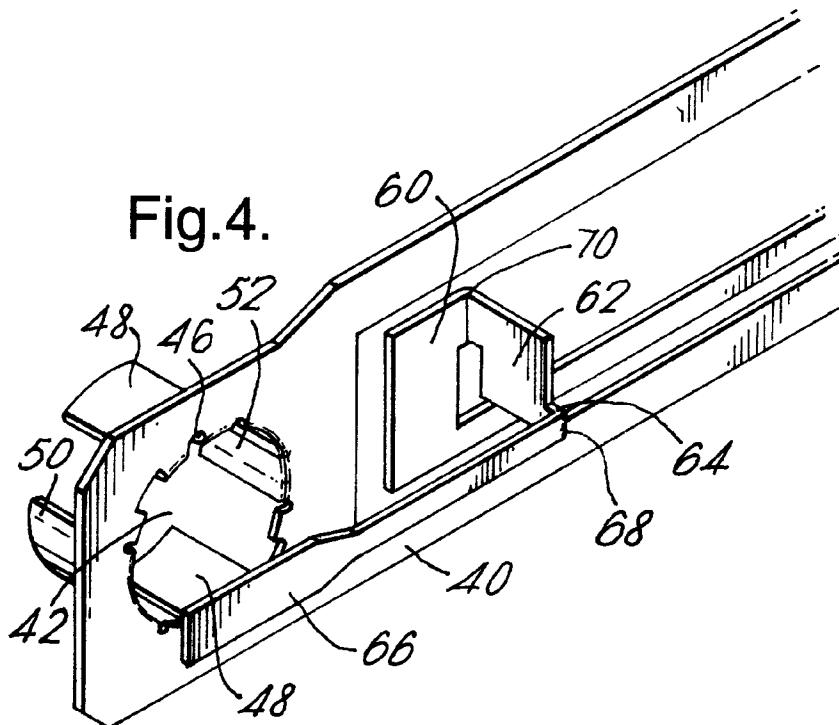
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(54) Bulb holder for a lamp assembly

(57) A bulb holder for a lamp assembly is formed from an electrically conductive sheet (42) having a hole (14) formed therein for receiving a bulb. A strip cut from said sheet (42) has a main portion (60), an end portion (66) bent through 180° so as to lie parallel to but spaced from the sheet (40) in alignment with said hole (42), and an intermediate portion (62) connecting the end portion

(66) of the strip to the main portion (60). Adjacent ends of the fold lines (68, 70) are spaced apart from one another in said direction parallel to the fold lines (68, 70). This permits the bending of the strip (60) along the second fold line (70) to be effected by moving a press tool punch in a direction perpendicular to the main portion (60) of the strip.



Description

This invention relates to a bulb holder for a lamp assembly of the type comprising an electrically conductive sheet having a hole formed therein for receiving a cap of a bulb with its axis of rotation perpendicular to the sheet, formations on the edge of said hole adapted to engage with complementary formations on the bulb cap, a strip cut from said sheet and having a main portion supported on electrically insulating mounting means coplanar with the sheet, an end portion bent through 180° so as to lie parallel to but spaced from the sheet in alignment with said hole, and an intermediate portion connecting the end portion of the strip to the main portion, together with resilient means adapted to urge said end portion into abutment with a centre contact of said bulb, together with resilient means adapted to urge said end portion into abutment with an end of said cap. The invention also relates to a method of manufacturing such a bulb holder.

The invention is particularly applicable to the provision of bulb holders for a rear lamp cluster of a motor car having a plurality of bulbs performing respective functions. In such a lamp assembly, the various bulb holders are formed from a single electrically conductive sheet, for example as described in EP-A-0060016.

In a known bulb holder of this type, the intermediate portion and the end portion initially project away from the hole in the sheet at right angles to the main portion, the intermediate and end portions being aligned with each other so as effectively to form a single laterally projecting portion of the strip. During manufacture, the intermediate portion is bent through 90° relative to the main portion and the end portion is bent through a further 90° relative to the intermediate portion. Thus, the three portions of the strip wrap round the part of the press tool that forms the last bend. This part of the tool must then be removed sideways to allow the pressing to be removed. In addition, since the intermediate and end portions initially project away from the hole for the bulb cap, it is necessary to form the bulb holder from an electrically conductive sheet which, initially, is substantially wider than the finished bulb holder.

According to one aspect of the invention, in a bulb holder of the type described above, a connecting portion of the strip between the first fold line and the second fold line extends in a direction parallel to the fold lines so that adjacent ends of the fold lines are spaced apart from one another in said direction parallel to the fold lines.

According to another aspect of the invention, a method of forming a bulb holder of the type described above comprises forming a hole dimensioned to receive a cap of a bulb with its axis of rotation perpendicular to the sheet, providing formations on the edge of said hole adapted to engage with complementary formations on the bulb cap, cutting a strip from said sheet, said strip being separate from the hole and having a main portion and an end portion extending radially relative to the hole,

bending said strip through 90° along a first fold line located between the main portion and the end portion and extending perpendicular to the end portion, bending said strip through 90° along a second fold line parallel to the first fold line and located between the first fold line and the main portion so that the end portion is parallel to the sheet and in alignment with the hole, wherein a connecting portion of the strip between the first fold line and the second fold line extends in a direction parallel to the fold lines so that adjacent ends of the fold lines are spaced apart from one another in said direction parallel to the fold lines, the bending of the strip along the second fold line being effected by moving a press tool punch in a direction perpendicular to the main portion of the strip.

An embodiment of the invention will now be described, by way of example, with reference to the accompanying drawings, in which:

20 Figure 1 is a perspective view of a known bulb holder of the type described in the first paragraph above; Figure 2 is a perspective view of the electrically conductive sheet and strip of a bulb holder in accordance with the invention prior to formation of the bends in the strip; Figure 3 is a perspective view, similar to Figure 2, but after a first bend has been formed in the strip; Figure 4 is a perspective view, similar to Figure 3, but after both bends have been formed in the strip; Figure 5 is a cross-sectional view through a press tool for forming the second-formed bend illustrated in Figures 3 and 4 taken perpendicular to the plane of the main parts of the press tool; and Figure 6 is a cross-sectional take on the line 6-6 in Figure 5 and showing the section line 5-5 on which Figure 5 is taken.

Referring to Figure 1, a bulb holder for a bulb 10 comprises a sheet 12 of electrically conductive material 40 having a hole 14 for receiving the cylindrical cap 16 of the bulb 10. Diametrically opposed slots 18, only one of which is visible in Figure 1, are provided to allow passage for the bayonet pins 20 of the bulb 10. Part of the material cut away when the hole 14 was formed is bent 45 downwardly to provide lugs 22 for receiving the bayonet pins 20.

A strip cut off one edge of the sheet 12 provides an electrical connection for the centre contact of the bulb 10. This strip has a main portion 24 coplanar with and 50 parallel to one edge of the sheet 12, together with an intermediate portion 26 and an end portion 28. When the strip is first cut from the sheet 12, the intermediate portion 26 and the end portion 28 are coplanar with the main portion 24 and project away from the hole 14. The 55 next stage of manufacture is to form a 90° bend 30 between the end portion 28 and the intermediate portion 26 and a similar bend 32 between the intermediate portion 26 and the main portion 24. After these bends have

been formed, the portion of the tool round which the last bend was formed lies between the main portion 24 and the end portion 28. Consequently it cannot be withdrawn in the direction perpendicular to the plane of the sheet 12 but has to be withdrawn sideways.

In the completed lamp holder, the end portion 28 is urged into engagement with the centre contact of the bulb by a coil spring similar to the spring 34 which, together with the other electrically conductive components of the bulb holder, is mounted in an electrically insulating moulded plastics body as described in EP-A-0060016.

Figure 2 shows a blank for forming a bulb holder in accordance with the invention. An electrically conductive sheet 40 has a hole 42 formed therein for receiving the cap 16 of the bulb 10 (Figure 1) with the bulb on the opposite side of the sheet 40 from that visible in the drawings. The bayonet pins 20 engage in slot 44 and 46. Projecting tabs 48, 50 and 52 stabilise the bulb cap 16 in the hole 42 with its axis perpendicular to the plane of the sheet 40.

In order to provide an electrical connection for the centre contact of the bulb 10, a strip having a main portion 60, an intermediate portion 62, a connecting portion 64 and an end portion 66 is cut out of a central part of the sheet 40. The end portion 66 is adjacent and parallel to the main portion 60 and consequently no significant increase in the overall width of the sheet 40 is necessary to make provision for the contact strip.

The next stage of manufacture is to form a 90° bend along a fold line 68 between the end portion 66 and the connecting portion 64 as shown in Figure 3. Finally, a second 90° bend is formed along a second fold line 70 between the main portion 60 and the intermediate portion 62. The intermediate portion 62 and the connecting portion 64 remain coplanar with one another, as shown in Figure 4.

Referring to Figures 5 and 6, in order to form the final bend 70, the partly shaped blank as illustrated in Figure 3, is placed on a die 80 and held in place by a clamp 82 having a hole 84 for accommodating the already formed upstanding tabs 48, 50 and 52. The blank is positioned with the end portion 66 of the contact strip in alignment with a slot 86 in the die 80 and the required position for the bend 70 on an edge 88 of the die, as shown in chain dotted lines in Figure 5. A punch 90 is then lowered to form the bend 70, the end portion 66 being displaced into the slot 86. During this operation, the clamp 82 and punch 90 have merely moved parallel to one another in the vertical direction, as illustrated in Figures 5 and 6. This is possible because of the offset between the two bends 68 and 70 provided by the connecting portion 64. After the clamp 82 and die 90 have been raised, the completed product can be lifted off the die 80 in the vertical direction.

In the completed lamp holder, the end portion 66 is urged into engagement with the centre contact of the bulb by a coil spring similar to the spring 34 of Figure 1.

The various electrically conductive components of the bulb holder are mounted in an electrically insulating moulded plastics body as described in EP-A-0060016.

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Claims

1. A bulb holder for a lamp assembly comprising an electrically conductive sheet (42) having a hole (14) formed therein for receiving a cap (16) of a bulb (10) with its axis of rotation perpendicular to the sheet, formations (44, 46) on the edge of said hole (14) adapted to engage with complementary formations (20) on the bulb cap, a strip cut from said sheet (42) and having a main portion (60) supported on electrically insulating mounting means coplanar with the sheet (42), an end portion (66) bent through 180° so as to lie parallel to but spaced from the sheet (40) in alignment with said hole (42), and an intermediate portion (62) connecting the end portion (66) of the strip to the main portion (60), together with resilient means (34) adapted to urge said end portion (66) into abutment with a centre contact of said bulb (10), together with resilient means (34) adapted to urge said end portion (66) into abutment with an end of said cap (16), characterised in that a connecting portion (64) of the strip (60) between the first fold line (68) and the second fold line (70) extends in a direction parallel to the fold lines (68, 70) so that adjacent ends of the fold lines are spaced apart from one another in said direction parallel to the fold lines (68, 70).
2. A bulb holder according to claim 1, wherein the intermediate portion (62) of the strip is connected to the end portion (66) thereof by a connecting portion (64) extending in the plane of the sheet (42) at right angles both to the intermediate portion (62) and the end portion (66), so that the end portion (66) is parallel to but out of alignment with the intermediate portion (62).
3. A method of forming a bulb holder for a lamp assembly from a sheet (40) of electrically conductive material, comprising forming a hole (42) dimensioned to receive a cap (16) of a bulb (10) with its axis of rotation perpendicular to the sheet, providing formations (44, 46) on the edge of said hole (14) adapted to engage with complementary formations (20) on the bulb cap, cutting a strip (60, 66) from said sheet (40), said strip being separate from the hole (14) and having a main portion (60) and an end portion (66) extending radially relative to the hole (42), bending said strip (60) through 90° along a first fold line (68) located between the main portion (60) and the end portion (62) and extending perpendicular to the end portion (66), bending said strip (60) through 90° along a second fold line (70) parallel to

the first fold line (68) and located between the first fold line (68) and the main portion (60) so that the end portion (66) is parallel to the sheet (42) and in alignment with the hole (42), characterised in that a connecting portion (64) of the strip (60) between the first fold line (68) and the second fold line (70) extends in a direction parallel to the fold lines (68, 70) so that adjacent ends of the fold lines are spaced apart from one another in said direction parallel to the fold lines (68, 70), the bending of the strip (60) along the second fold line (70) being effected by moving a press tool punch (90) in a direction perpendicular to the main portion (60) of the strip.

4. A method according to claim 3, wherein the main portion (60) of the strip is L-shaped, having a first arm extending parallel to the end portion (66) and a second arm connecting the first arm to the second fold line (70).

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Fig.1.

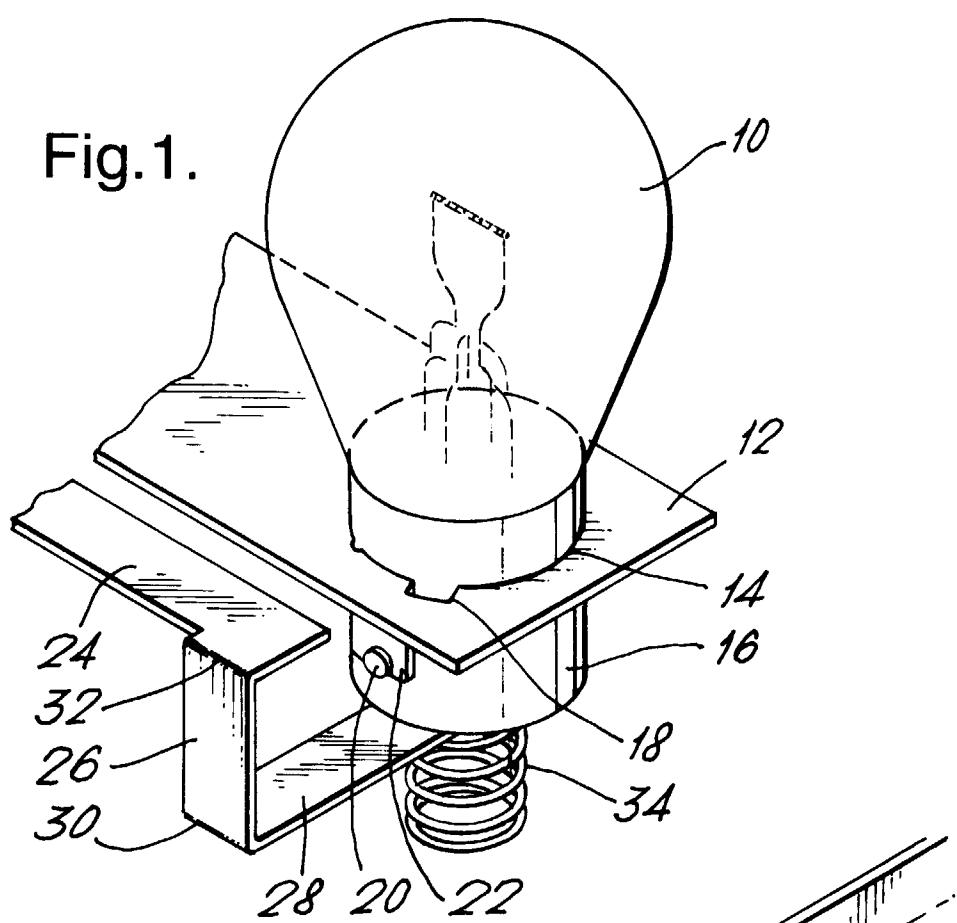


Fig.2.

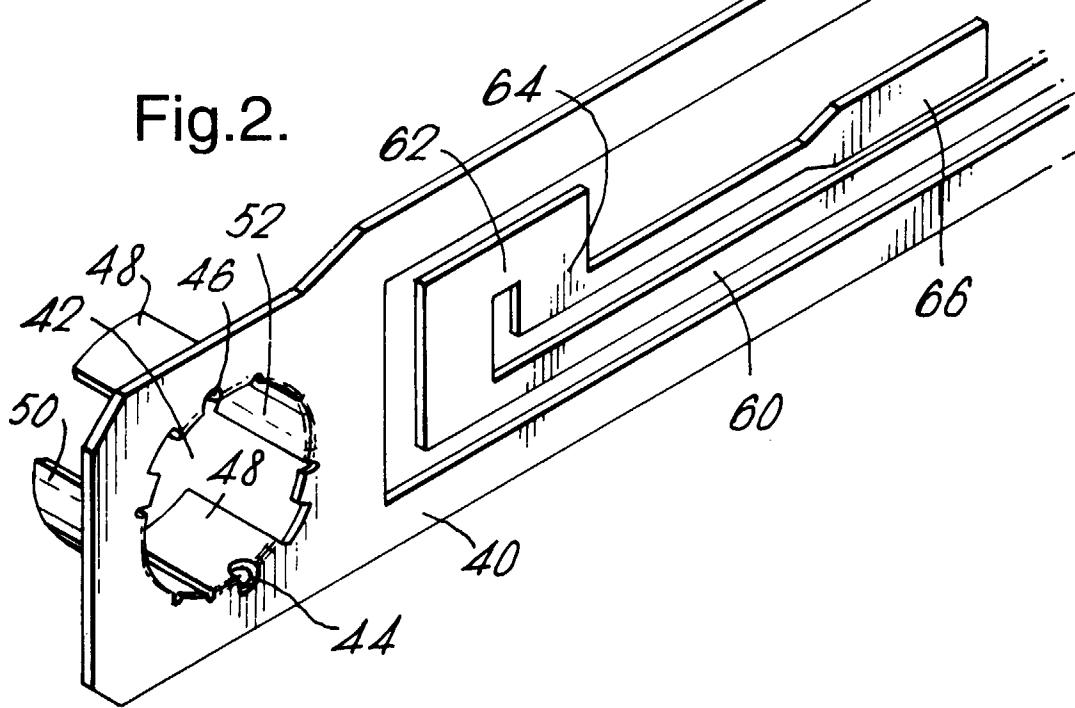


Fig.3.

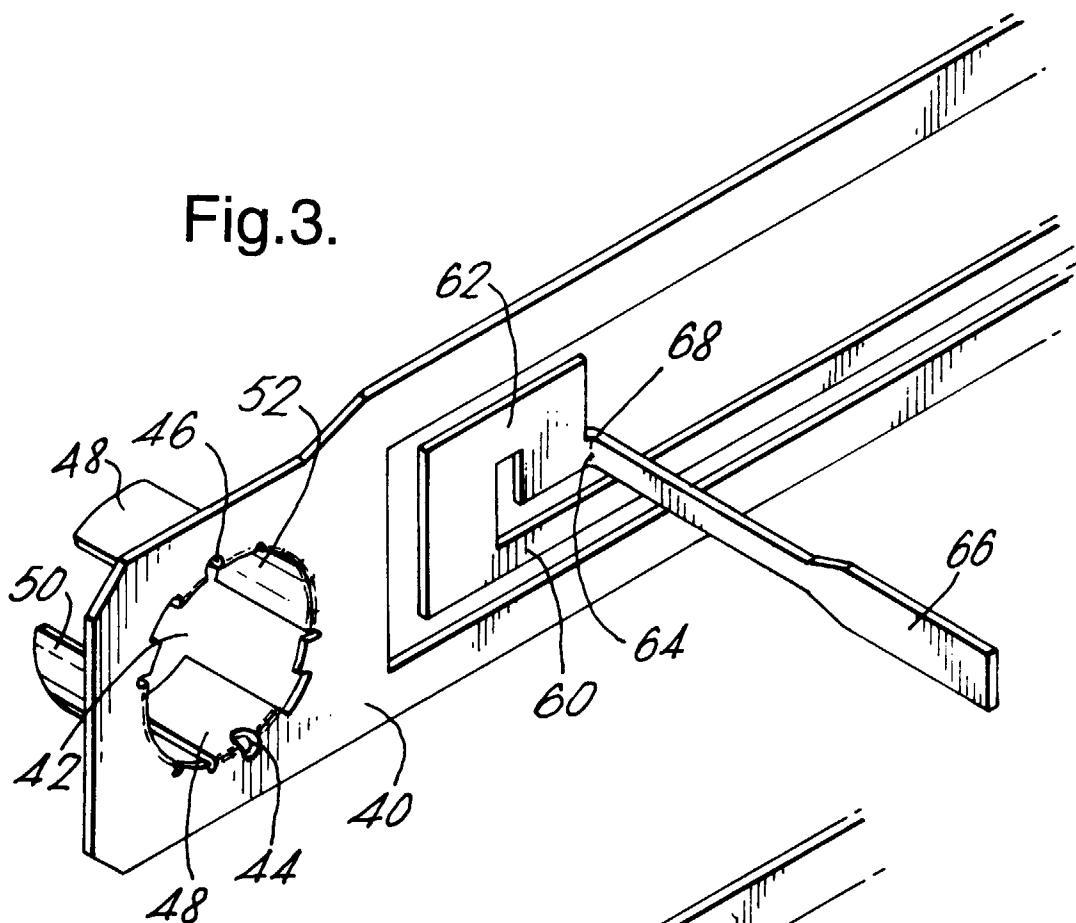


Fig.4.

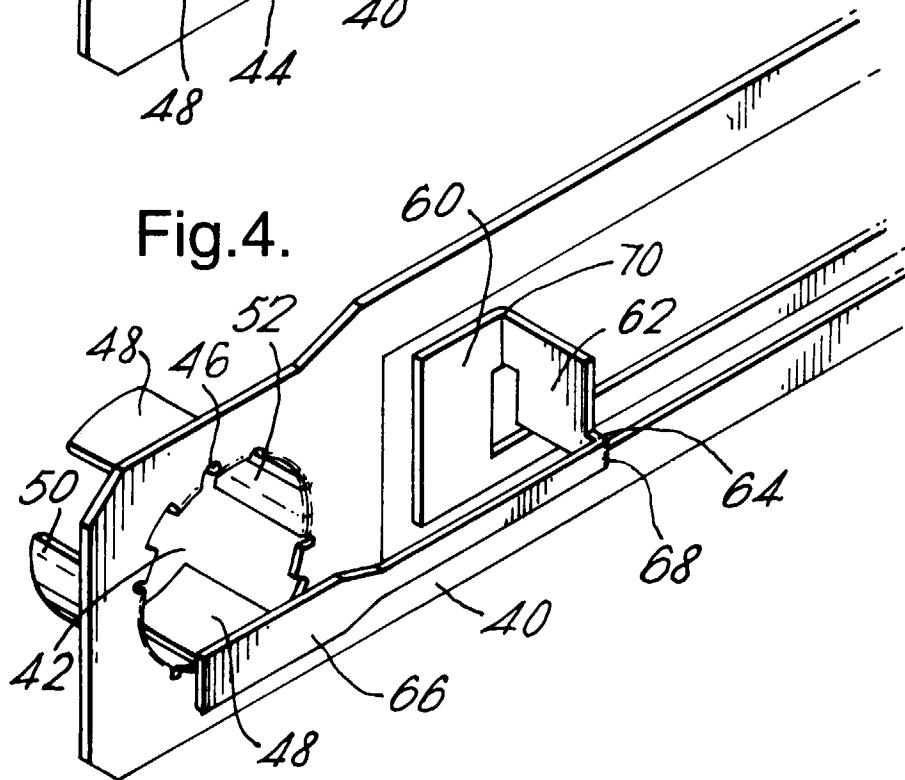


Fig.5.

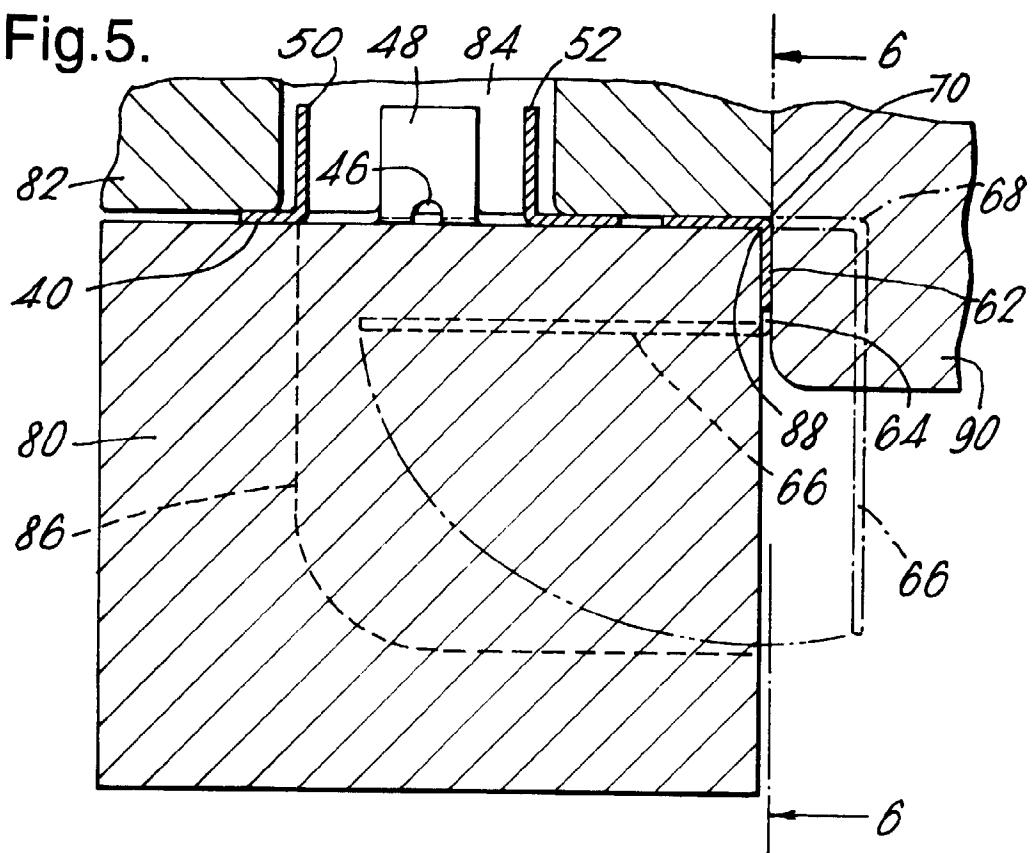
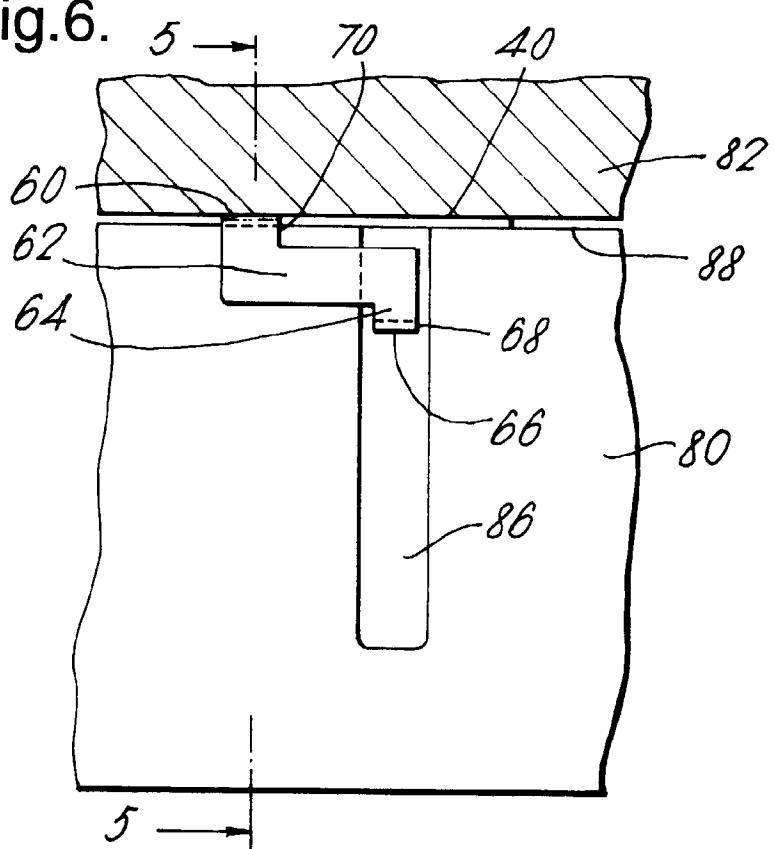


Fig.6.





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EUROPEAN SEARCH REPORT

Application Number
EP 98 30 0942

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.6)
A	EP 0 024 579 A (HUECK & CO) 11 March 1981 * page 4, line 25 - page 5, line 9; figures 2-4 *	1,3	H01R33/46 F2101/00
A	FR 2 556 513 A (PEUGEOT) 14 June 1985 * page 3, line 9 - line 24 * * page 5, line 27 - page 6, line 11; figures 1-6 *	1,3	
D,A	EP 0 060 016 A (BRITAX VEGA) 15 September 1982 * page 4, line 1 - line 34; figures 1-3 *	1,3	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)			
H01R F21Q			

The present search report has been drawn up for all claims			
Place of search	Date of completion of the search		Examiner
BERLIN	12 May 1998		Alexatos, G
CATEGORY OF CITED DOCUMENTS		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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