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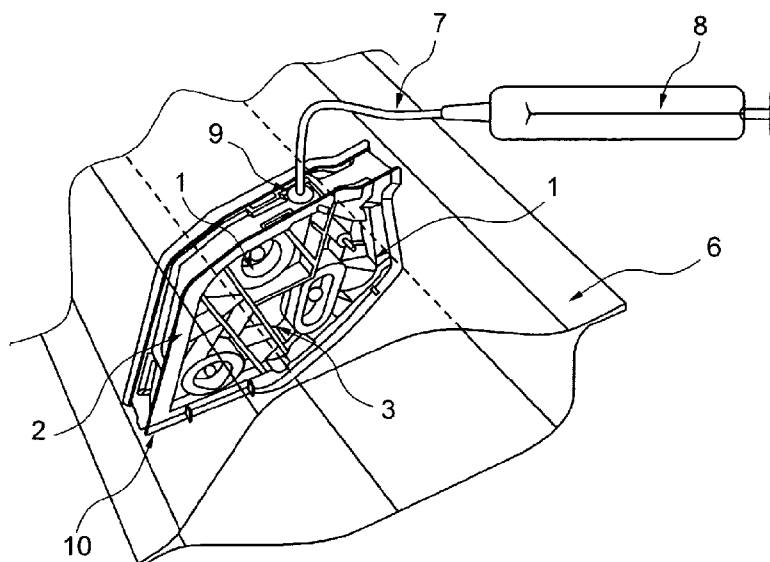


Fig. 5

(57) Abstract: Systems are provided for including, reinforcing or baffling and sealing components in cavities in automobiles particularly during repair of the cavity forming components after accidents; the systems employ an adhesive that is activated at ambient temperature which is injected into a location provided in the reinforcing or baffling and sealing component to retain the adhesive in the location it is required to form a bond between the component and the internal surface of the automobile cavity.

IMPROVEMENTS IN OR RELATING TO AUTOMOBILE COMPONENTS

The present invention relates to improvements in or relating to the provision of components within cavities such as may be found in automobiles. The invention may be used in automobile manufacture and to provide substitute components during accident repair. By substitute component is meant the replacement of a component that was provided during the individual vehicle manufacture.

It is well known to provide components within cavities formed in the bodywork of automobiles. Vehicles are frequently based on frames made from tubular structures such as cavities formed by the welding of metal parts. For example the rails for the vehicle and the A, B and C pillars and the roof support are frequently made from tubular structures. It is also known to provide components within such structures for various reasons. For example baffles may be provided to provide seals and sound insulation or structural components may be provided to strengthen and reinforce the structures at particular points.

The components frequently comprise carriers coated with heat activatable adhesive and are frequently secured within the structure and the adhesive is formulated so that it develops adhesive properties during the baking step employed in the provision of an anticorrosion coating (sometimes known as e coat) during automobile assembly. In some instances the adhesive is also foamable and is formulated to foam at the temperatures at which the adhesive properties are developed this enables the adhesive to be provided on part or all of the surface of the component and the component can be mounted in the cavity in such a way that a gap is provided between the surface of the component and the interior wall of the cavity to allow the interior wall of the cavity to be coated with the anti-corrosion coating. The foamable adhesive may then be activated to foam and fill the gap and at the same time develop adhesive properties to bond to the interior wall of the cavity thus securing the component in the desired location within the cavity.

Examples of such activities are described in many patent publications such as European Patent Applications 1265765 and 1444124.

These techniques can work well when the component is to be provided during the initial manufacture of the automobile. However they are not always applicable during automobile manufacture and they cannot be employed when a vehicle needs to be

repaired such as after an accident where anti-corrosion coating, baking or paint baking are not employed such as in many garages and repair shops.

5 Additional problems previously encountered with repair is that if the substitute component is identical to the original component and carries the adhesive that is activated to foam and develop adhesive properties, when heated the adhesive cannot be readily activated in a repair shop. Furthermore if a standard shaped component is employed as the substitute component and an activatable adhesive is used to adhere the component to the interior surface of the cavity the adhesive can
10 flow in an uncontrolled manner resulting in the requirement for excess adhesive and furthermore the adhesive may not be retained at the location where it is required to form the bond. A further concern with both vehicle manufacture and repair is that bonding of the component to the inside walls of the cavity may be required to take place at temperatures below those experienced in traditional automobile manufacture
15 and perhaps at ambient temperature.

The present invention therefore provides a means whereby components can be secured within cavities with a reduction in the waste of adhesive materials and in particular provides means whereby substitute components can be provided within
20 vehicle cavities during vehicle repair.

The invention therefore provides a process for the provision of a component in a cavity in a vehicle element wherein the component is provided with one or more areas where adhesive is to be located wherein the component is located within the
25 cavity and an adhesive activatable at ambient temperature is injected into the one or more areas and activated to bond the component to the interior wall of the cavity.

The invention is particularly useful for the provision of substitute components wherein the areas where adhesive is to be located correspond to the areas on the original
30 component where adhesive was located during vehicle manufacture.

The invention further provides a repair kit for replacing an automobile structural element comprising a cavity containing a component adhering to the inner surface of the cavity comprising

- 35
- (i) a replacement structural element defining a cavity
 - (ii) a substitute component
 - (iii) an adhesive

wherein the adhesive is activatable at ambient temperature, the substitute component is provided with locator means for retaining the adhesive in one or more desired locations on the carrier and the replacement structural element is adapted to allow the adhesive to be inserted into the desired locations following the mounting of the substitute component within the structural element.

In the present invention the component is preferably shaped so that it has locator cavities for the retention of the adhesive in the locations where it is required to form the bond between the component and the interior of the structural element. Where the invention is used for repairing these cavities may correspond to the locations in the original component where the activatable adhesive was provided. Alternatively new locations may be selected if a bond in a different location is required for the repair. The locations may be provided by forming a cap on a shape corresponding to the original component which can be put in place over the shape to provide the locations for the adhesive. The cap may be integrally moulded with the shape corresponding to the original component and hinged so it can be clipped onto the shape.

The systems of the present invention allow the activatable adhesive to be applied at the required location on the component to form the bond after insertion of the substitute component into the cavity of the replacement element. This may be achieved by providing a hole in the cavity forming materials at the location where the adhesive is to be applied or alternatively the adhesive may be applied through a flexible tube that can be used to deliver it to the required location which is typically a cavity formed in the surface of the component.

The invention therefore allows a component to be placed in a vehicle during manufacture or to be replaced during repair of a vehicle. In repair the substitute component will usually be the same size and shape as the original component and the adhesive will take the place of the heat activatable and optionally foamable adhesive employed with the original component during the vehicle manufacture. The component may be of metal or plastic such as injection moulded polyolefine or polyamide. It may be of the same material as the original component it replaces, or it may be different as the assembly during repair does not require the paint bake or e coat bake temperatures required for assembly during the initial vehicle manufacture. However, for repair the component should provide the properties such as reinforcement strength, acoustic baffling provided by the original component.

The adhesive used in the present invention is preferably an adhesive that will flow and cure at ambient temperature. When such an adhesive is used it can be injected to between the outer surface of the component and the interior wall of the cavity in the element and will cure at that location to bond the component to the interior wall of the cavity. In a preferred embodiment the adhesive is foamable and curable at ambient temperature. In one embodiment the adhesive can be a foamable material and the use of such an adhesive enables the adhesive to foam and ensure that it bridges the gap between the surface of the substitute component and the interior wall of the cavity and also cures to provide a strong bond between them.

Examples of preferred foamable and curable adhesives that may be used include 2 component epoxy based foams such as those available from L & L Europe as L-0506 and L-0507. Polyurethane foamable adhesives may also be used.

The present invention is illustrated but in no way limited by reference to the accompanying figures in which:

Figure 1 shows a component used for reinforcing automobile cavities in a form suitable for use during original automobile manufacture.

Figure 2 shows the carrier element of the component shown in Figure 1.

Figure 3 shows an additional component added on the carrier element of the Figure 2 according to the invention.

Figure 4 shows the substitute components, Figure 3 with the cap closed onto the carrier element.

Figure 5 shows how the activatable adhesive can be supplied into a cavity found in the carrier element through a flexible tube if there is no appropriate hole provided in the replacement automobile cavity forming element.

Figure 6 shows an alternate method of supplying the adhesive.

Figure 1 shows an original component (1) comprising a carrier (2) provided with a ribbed structure (3) and a heat activatable foamable adhesive (4) located in the

carrier. A fastener (5) is provided to enable the component to be secured within a vehicle cavity during assembly. The heat activatable foamable adhesive material may be activated during paint bake or e coat bake so that it foams and bonds to the interior of the cavity within a hollow vehicle element (not shown).

5

Figure 2 shows the same component as shown in Figure 1 but without the heat activatable foamable material.

Figure 3 shows a carrier element similar to Figure 2 provided with a material locator component (13) made of plastic and thermoformed to obtain the areas where the adhesive can be located. The adhesive locator component includes attachment means (12) to secure the cap on the carrier without the need to change the design of the carrier.

Figure 4 shows the cavity (10) created by the adhesive locator component and the carrier will receive the adhesive material. These components are creating a reinforcing element bonded by adhesive material (4) in a structural cavity (6). (4 and 6 not shown).

Figure 5 shows how during the repair the carrier shown in Figure 3 can be secured as a substitute component (1) within a replacement hollow vehicle element (6) and a foamable adhesive activation at ambient temperature (7) may be injected from a container (8) through a hole (9) formed in the element (6) into the locations on the substitute component (1) corresponding to where the heat activated adhesive (4) was located in the original component.

Figure 6 shows an alternative means of introducing the adhesive through the open end of the hollow vehicle element (6).

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CLAIMS

1. A process for the provision of a component in a cavity in a vehicle element wherein the component is provided with one or more areas where adhesive is to be located and an adhesive activatable at ambient temperature is injected into the one or more of the areas and activated to bond the component to the interior wall of the cavity.
2. A process according to Claim 1 in which the component is a substitute component and the areas where adhesive is to be located correspond to the areas on the original component where adhesive was located during vehicle manufacture.
3. A process according to Claim 1 wherein the component comprises a shape corresponding to the original component together with a locator member which can be attached to the component to provide locations for the adhesive.
4. A process according to any of the preceding Claims in which the component comprises a cavity designed for location away from the cavity walls to provide a gap there between and an adhesive locator component to maintain the adhesive in a position for filling the gap and bonding the component.
5. A process according to any of the preceding Claims wherein the adhesive is applied through a flexible tube.
6. The process of any of the preceding Claims wherein the adhesive is an adhesive that will flow and cure at ambient temperature.
7. The process of any of the preceding Claims wherein the adhesive is a 2 component epoxy based adhesive.
8. A repair kit for replacing an automobile structural element comprising a cavity containing a component adhering to the inner surface of the cavity comprising
 - a replacement structural element defining a cavity
 - a substitute component
 - an adhesive

wherein the adhesive is activatable at ambient temperature, the substitute component is provided with means for retaining the adhesive in one or more desired locations and the replacement structural element is adapted to allow the adhesive to be inserted into the desired locations following the mounting of the substitute component within the replacement structural element.

9. A repair kit according to Claim 8 in which the means for retaining the adhesive is provided by a cap which fits over a shape corresponding to the original component.

10. A repair kit according to Claim 8 or Claim 9 wherein the component is shaped so that it has cavities for the retention of the adhesive in the locations where it is required to form the bond between the component and the interior of the replacement structural element.

11. A repair kit according to Claim 10 wherein the cavities correspond to the locations in the original component where the activatable adhesive was provided.

12. A repair kit according to any of Claims 8 to 11 wherein the replacement structural element is provided with means which allows the activatable adhesive to be applied at the required location on the component after insertion of the substitute component into the cavity of the replacement element.

13. A repair kit of Claim 12 comprising a hole in the replacement structural member at the location where the adhesive is to be applied.

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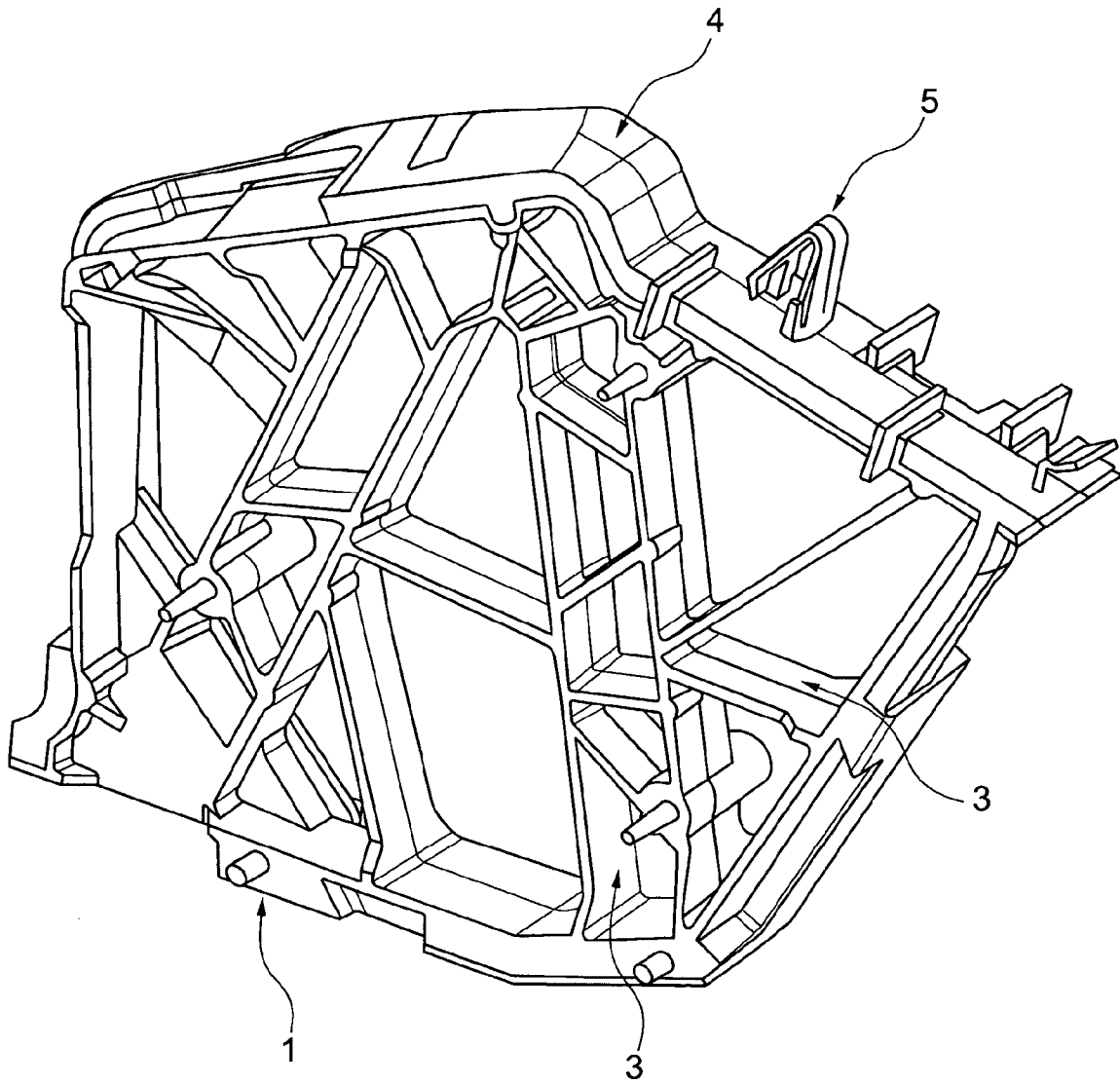


Fig. 1

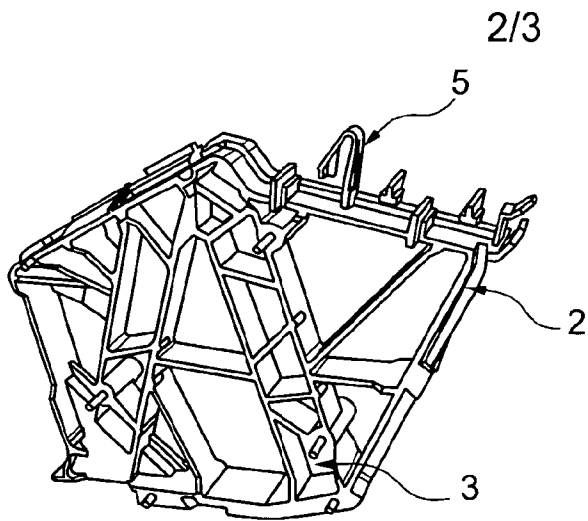


Fig. 2

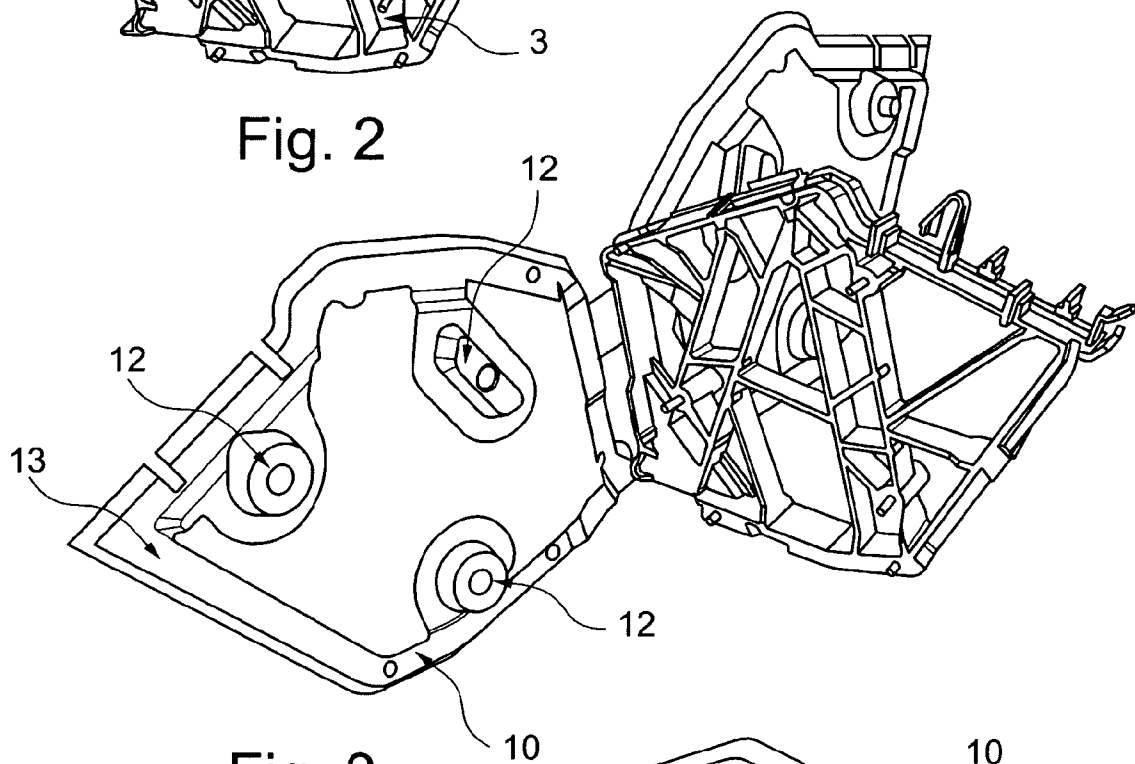


Fig. 3

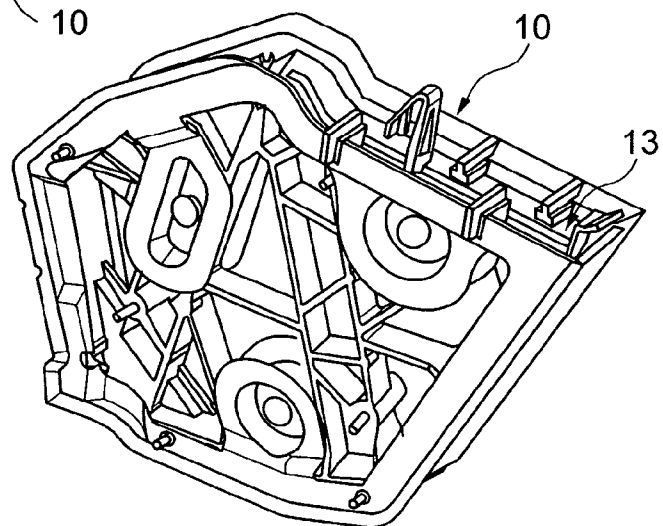


Fig. 4

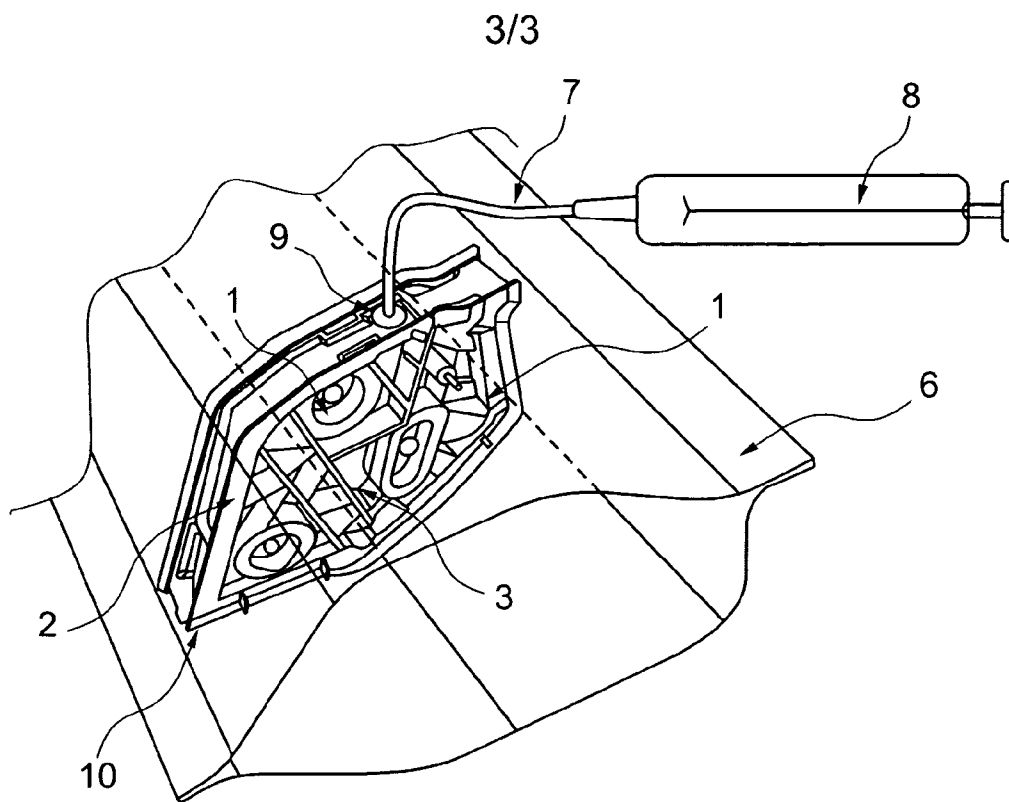


Fig. 5

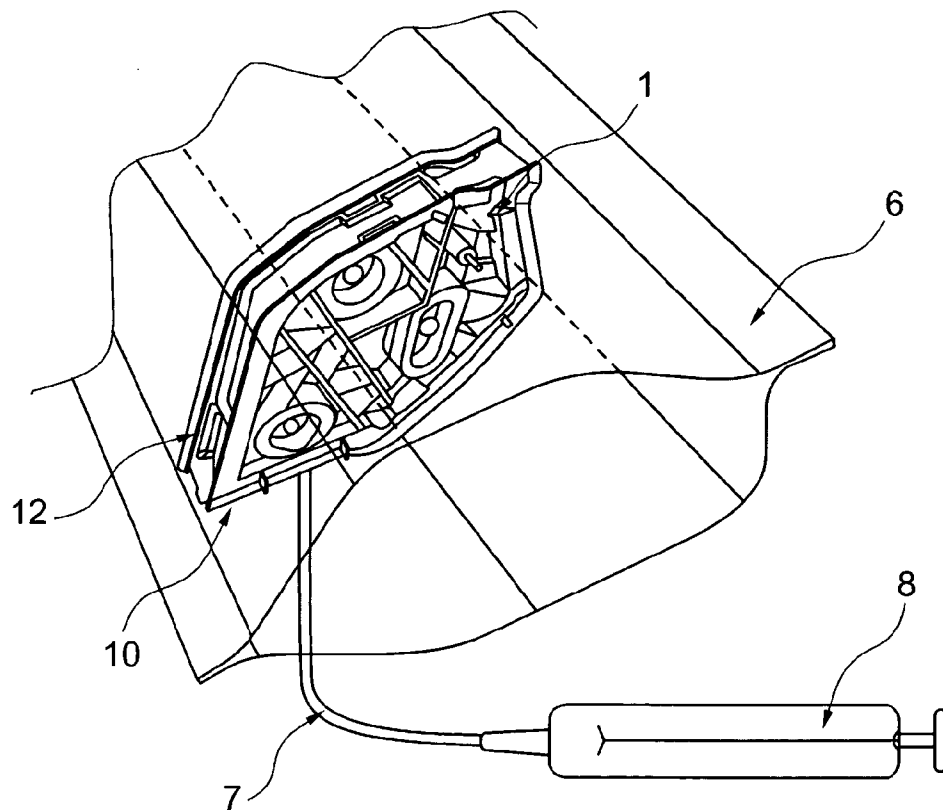


Fig. 6

INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2011/001971

A. CLASSIFICATION OF SUBJECT MATTER

INV. B62D29/00

ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B62D B29C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 610 836 A (WYCECH JOSEPH S [US]) 9 September 1986 (1986-09-09) columns 3-6; figures 1-5 -----	1
X	US 2004/255546 A1 (SOPHIEA DANIEL [US] ET AL) 23 December 2004 (2004-12-23) paragraph [0022]; figure 2 -----	1
A	US 6 321 793 B1 (CZAPLICKI MICHAEL J [US] ET AL) 27 November 2001 (2001-11-27) column 1; figures 1-6 -----	1-13
A	US 2005/082872 A1 (RICH JONATHAN E [US] ET AL) 21 April 2005 (2005-04-21) abstract; figures 1-4 -----	1-13
	-/--	

☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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Date of the actual completion of the international search

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INTERNATIONAL SEARCH REPORT

International application No

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2008/065049 A1 (HENKEL KGAA [DE]; MONNET JEAN-PIERRE [FR]; LECLERC DELPHINE [FR]; MAGN) 5 June 2008 (2008-06-05) abstract; figures 1-5 -----	1-13

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2011/001971

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