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(71) Applicant: **COSTER TECNOLOGIE SPECIALI
S.P.A.**

38050 Calceranica al Lago (Trento) (IT)

(72) Inventor: **Geier, Adalberto**

38050 Villazzano, Trento (IT)

(74) Representative: **Popp, Eugen et al**

MEISSNER, BOLTE & PARTNER

Widenmayerstrasse 48

80538 München (DE)

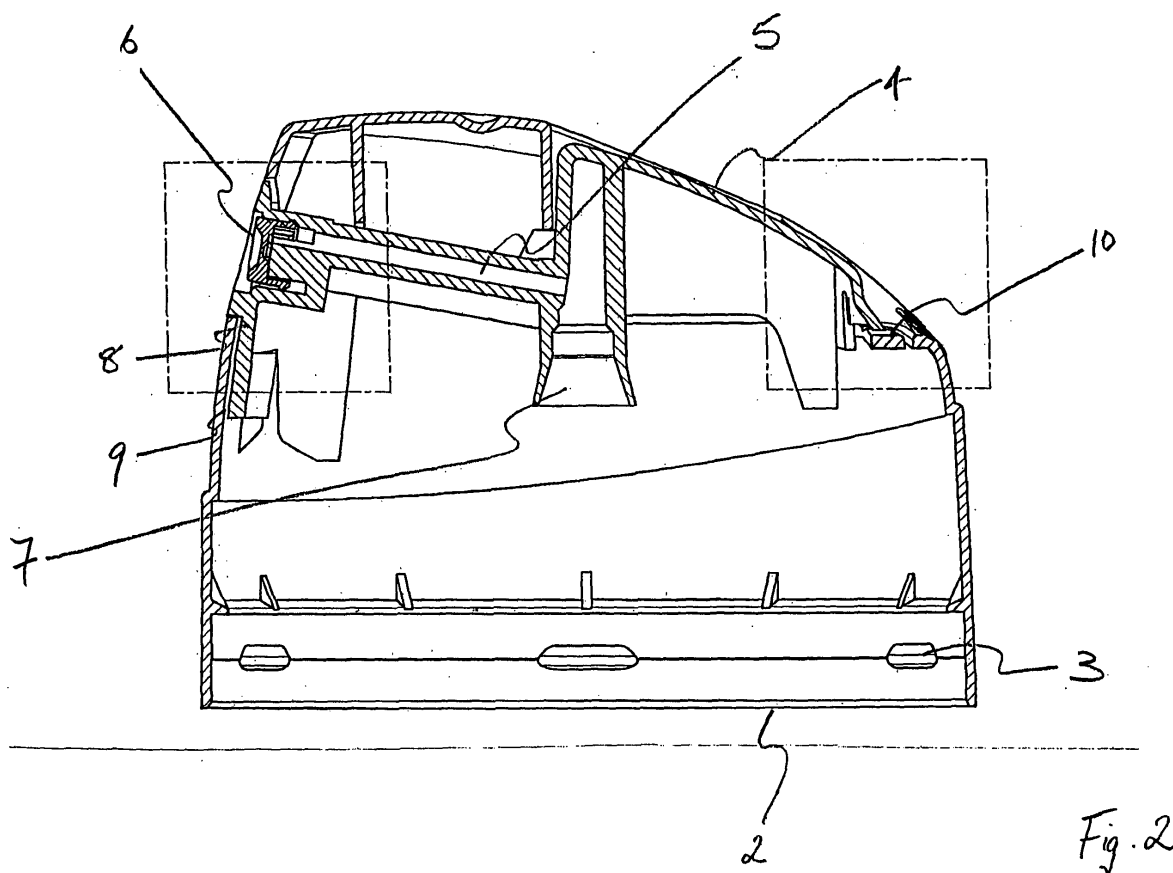
Remarks:

Amended claims in accordance with Rule 86 (2) EPC.

(54) **Tamper-indicating spray cap**

(57) A composite cap (1) is disclosed for attachment to the exit tube end of an aerosol canister. This cap (1) is designed such that a body is provided in which are housed separately formed components for operating the aerosol. Such components include a button (4) for actu-

ating the valve, a fluid passageway (5) which links the exit tube on the aerosol with a spray nozzle (6). Provided on the cap body, is an indicator tab (10) which is positioned in such a place that it lies in the path of the button (4) when it is depressed for actuation of the valve.



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Description

[0001] This invention relates generally to the field of aerosol can tops, and in particular to providing one which indicates whether the can has been partially discharged or not.

Background to the Invention

[0002] The use of aerosol cans is extremely widespread, with such cans being used for dispensing of a great many fluids from spray-on deodorant to paint. These products are maintained in the can under high pressure, along with an inert gas propellant. A valve positioned within the body of the can connects the interior to the exterior, and when actuated allows the propellant gas to expand and push out the deodorant, or the like, which is contained within. Usually the valve comprises a rigid hollow plastic tube extending from the body of the can, which upon application of a downward force will actuate the valve and allow the contents to escape there through.

[0003] In order that the escaping product can be directed as desired, a cap is typically fitted to the valve tube. This cap commonly provides a fluid passageway from the exit tube comprising a 90° bend, to direct the fluid in a more controlled manner. Furthermore, it is usual for the cap to be provided with a spray nozzle which produces a fine mist of fluid droplets to give an even spread of deodorant, paint or the like from the can. The cap is generally designed to be used by pressing downward with one finger, thus actuating the valve and allowing fluid to flow out of the can and through the nozzle.

[0004] The caps for aerosol cans can either be formed as a single unit, which simply slots over the exit tube from the valve, and is held in place by friction between the cap and the tube, or as a composite structure which is attached to the canister itself, with a section which integrates with the exit tube of the valve. Such composite caps have certain advantages, in that they can be designed such that only a directed force downward will trigger the valve, whereas with a single cap attached to the exit tube, it is possible for a force directed sideways to actuate the valve.

[0005] Aerosol cans are necessarily fabricated from rigid materials, that can withstand the high pressures required for housing the propellant; usually, this material is metal. Unfortunately, metal canisters are opaque, and it is not possible to determine whether the can has been used and if much of the fluid content remains. Whilst shaking the can will indicate that there is some paint, deodorant or the like, still contained within, no suggestion is given as to whether any of the original quantity has been used or not.

[0006] Previous attempts to overcome this problem have centred on providing a breakable fixing point between the cap and the can, to indicate whether any tampering has occurred. Unfortunately, all that these devices

show, is that the cap has been moved with respect to the canister: a potential purchaser of such a can is unaware whether the cap has been moved so as to discharge some of the contents, or whether it has been moved without discharging any of the content. That is, if the cap has been pulled upward, the seal will be broken, but none of the content will have been used. Such a broken seal will lead to a consumer discarding the item, as he or she is unsure whether the can has been used or not, which ultimately leads to wastage of cans which have not necessarily been partially emptied.

[0007] It is therefore an object of the current invention, to provide a system which is both simple in design and which allows the straightforward detection of whether the aerosol has been discharged or not, so that a customer can avoid purchasing an aerosol can that has been partially emptied.

Summary of the Invention

[0008] The above problem is solved by the composite spray cap according to claim 1, with further embodiments making up the dependent claims thereof. The cap for an aerosol comprises: a cap body for attachment to the top of an aerosol can inside which is an interface, which is provided separately from the cap body, and is designed to interact with, and slide over, the exit tube of the aerosol can. A fluid passageway, which is also formed separate to the cap body and is disposed within, provides a fluid tight connection between the interface and a spray nozzle. A button is provided which is separate from the cap body too, and which fits within a hole provided in the body, is disposed in such a manner that upon depression into the cap body it interacts with the valve of the aerosol can to actuate it. An indicator tab is provided, which is attached to the cap body in such a location that when the button is depressed in order to actuate the aerosol valve, a part of it must pass through the location of the indicator tab.

Description of the Figures

[0009]

Fig. 1: illustrates two diagrammatic drawings of an aerosol cap in accordance with the current invention. Fig. 2: shows a cross sectional view of an aerosol cap.

Fig. 3: is a close up of the spray nozzle region in the cap.

Fig. 4: has three close up diagrams indicating the tamper indication tab, and its interaction with the cap button.

Description of one way of implementing the Invention

[0010] Fig. 1 shows two perspective views of a spray

cap (1) for fitting to the top of an aerosol, according to the present invention. The cap (1) is designed to fit over the top of an aerosol canister, with the valve tube being contained within. The bottom of the cap (2) is shaped so as to be a little larger than the diameter of the can, and is possessed of fixing means on the inner side of the cap which engage with the canister and hold the cap (1) in place. The simplest method of achieving this, is to provide small bumps (3) around the inside edge at the bottom of the cap (2), which interact with the either a ridge or indents provided on the aerosol. Clearly, however, many other methods exist for attaching the cap (1) to the canister. Obviously, the diameter of the cap bottom (2), and indeed the size of the cap (1) itself, can be changed depending upon the size of the aerosol can to which it will be attached.

[0011] At the top of the cap (1) is provided a button (4), which when depressed interacts with the valve tube on the aerosol and opens the valve. Fluid exits the aerosol can and is transported by an internal passageway (5) to the spray nozzle (6); this can be best seen in Fig. 2, which shows a half cut away diagram of the cap (1). The exit tube from the valve region of the aerosol is positioned within an interface (7), to form a tight seal such that the escaping fluid is directed through the passageway (6) and on to the nozzle (6).

[0012] As can be seen from Fig. 2, the button (4), passageway (5) and interface (7) are all formed as a single integrated piece. In so doing, the part count of the device is limited to only the cap body (1), the button/passageway/interface (4, 5, 7) unit and the nozzle (6), which is attached to the external end of the passageway (5). Furthermore, the process of assembling the complete cap (1) is simplified, as fewer components require connecting. Clearly, however, it is possible to provide the cap (1) with a separately formed button (4), fluid passageway (5) and interface (7), and the above integrally formed unit is not intended as a limiting design to this feature. As can be more clearly seen in Fig. 3, the nozzle end of the fluid passageway (5) is provided with an extended portion (8) which is designed to interact with slots (9) provided on the inside of the cap (1). The extended portion (8) is positioned within the slots (9), and this acts both to align the nozzle end of the passageway (5) with an appropriate hole provided within the cap (1) body, and also to provide a pivot point for the passageway unit (4, 5, 7).

[0013] In operation, when the button (4) is depressed, the passageway unit (4, 5, 7) rotates around the fixing point formed by the extended portion (8) and the slots (9), and the interface (7) is forced into the aerosol can exit tube to actuate the valve. The combination of the point of attachment at the exit tube and the fixing point by means of the extended portion (8), ensures that the nozzle end of the passageway (5) remains in correct alignment with the hole through the cap body when the button (4) is depressed. Furthermore, upon release of the button (4), the extended portion (8) provides a returning force to push the button (4) back to its rest position,

as the extended portion (8) unbends. This restoring force is also coupled with the return spring associated with the aerosol can valve, which additionally ensures that the button (4) is reliably returned to its rest position by rotation around the fixing point.

[0014] This two point fixing of the passageway unit (4, 5, 7), means that in operation the button (4) is restricted to moving substantially only up and down, that is: in the same direction as the axis of the aerosol tube. Whilst there is a slight rotation around the fixing point at the nozzle (7), this is negligible over the distance the button (4) travels when depressed. Such an arrangement allows for the provision of a tamper indicator in the form of a tab (10).

[0015] Shown in Fig. 4, are three close-up views of the button (4) and tamper indicator tab (10) arrangement, these are close-up views of the region highlighted by the right hand box in Fig. 2. As can be seen in the diagrams, the tab (10) is attached to the cap (1) in two places by thin, readily breakable, connections (11). The tab (10) is positioned at a region of the cap (1), such that when the button (4) is depressed, a lip (12) extending from the back of the button (4) has to pass through the location of the tamper indicator tab (10). When the button (4) is depressed for the first time, the lip (12) pushes against the tab (10) and will break the two connections (11) holding it in place, and the tab (10) will break off from the cap (1). In this manner, the tamper indicator (10) will only indicate that the aerosol has been tampered with when the button (4) is depressed, and the aerosol has been used. Such an indication is a clear improvement over other tamper indicators, which merely show that the relative positions between the button (4) or cap (1) have been changed, but without showing whether the aerosol was in any way discharged. It is not necessary, however, to provide the lip (12) on the button (4), all that is required is that the button (4) passes through the location of the tab (10) upon depression. Another clear advantage to providing the indicator tab (10) formed integrally with the cap body, is that the manufacture of the constituent parts is made substantially more straightforward. Providing the tab (10) on the cap body means that the body with tamper indicator (10) can be readily, and more reliably, formed than other prior art aerosol caps.

[0016] Whilst this improved indication is discussed as an embodiment where a single piece integrally formed passageway unit (4, 5, 7) which is held at two points to restrict the movement of the button (4) is used, it is clear that this is not the only solution to the problem. Further designs of caps (1) are possible, which will allow the disclosed improved indicator: the key requirement is that the indicator tab (10) is placed separately from the button (4), in such a position that it is only affected when the button (4) moves in the direction required to actuate the aerosol valve. As such, any design of the button (4), passageway (5) and exit tube interface (7) which yields the above requirement is considered as being a design within the scope of the skilled man.

[0017] It is intended that the cap body and the passageway unit (4, 5, 7) be formed from a polymeric material, and the two items fabricated by injection moulding. The polymer can be any one of: polyethylene or polypropylene. Further, it is possible to provide the caps (1) in nearly any colour of choice, such that they can match the intended final product. Additionally, as the two components are formed separately, it is possible to provide the cap body in a different colour from that of the passageway unit (4, 5, 7), if desired.

[0018] While various features and embodiments of the invention are described above, they can readily be combined with each other resulting in further embodiments of the invention.

Claims

1. A composite spray cap (1) for an aerosol canister, comprising:

a cap body for attachment to the top of an aerosol can;

an interface (7) which is provided separate from the cap body and housed therein, which is designed to interact with and slide over the exit tube of the aerosol can;

a fluid passageway (5) formed separately from the cap body and is disposed within the body, and provides a fluid tight connection between the interface (7) and a spray nozzle (6);

a button (4) separate from the cap body, which fits within a hole provided in the body and is disposed in such a manner that upon depression into the cap body it interacts with the valve of the aerosol can to actuate it; wherein,

an indicator tab (10) is provided attached to the cap body in such a location that when the button (4) is depressed in order to actuate the aerosol valve, a part of it must pass through the location of the indicator tab (10).

2. The cap (1) of claim 1, wherein, the cap body is provided with a further hole through it, which is positioned so as to align with the nozzle (6) at the end of the fluid passageway (5).

3. The cap (1) of either of claims 1 or 2, wherein, an extended portion (8) is provided at the end of the fluid passageway (5) adjacent the nozzle (6), this extended portion (8) providing a flange for interacting with slots (9) provided on the inside surface of the cap body near the hole there-through for the nozzle (4).

4. The cap (1) of claim 3, wherein, the slots (9) and extended portion (8) provide a fixed point, this fixed point providing a means around

which rotation of the fluid passageway (5) and the interface (7) is made possible.

5. The cap (1) of any of the preceding claims, wherein, the button (4), the fluid passageway (5) and the interface (7) are formed as a single integral piece.

6. The cap (1) of any of the preceding claims, wherein, the size of the cap (1) and relative disposition of the button (4), the fluid passageway (5) and the interface (7) can be chosen dependent upon the final size of aerosol can to which it is to be fitted.

7. The cap (1) of any of the preceding claims, wherein, the indicator tab (10) is fixed to the cap body via at least two narrow, readily breakable connections (11).

8. The cap (1) of any of the preceding claims, wherein, a lip (12) is provided on the button (4) in the specific location for interacting with the indicator tab (10).

9. The cap (1) of any of the preceding claims, wherein, the cap body, the button (4), the fluid passageway (5) and the interface (7) are all formed from polyethylene or polypropylene.

10. The cap (1) of any of the preceding claims, wherein, the colour of the cap (1) can be varied.

Amended claims in accordance with Rule 86(2) EPC.

1. A composite spray cap (1) for an aerosol canister, comprising:

a cap body for attachment to the top of an aerosol can;

an interface (7) which is provided separate from the cap body and housed therein, which is designed to interact with and slide over the exit tube of the aerosol can;

a fluid passageway (5) formed separately from the cap body and is disposed within the body, and provides a fluid tight connection between the interface (7) and a spray nozzle (6);

a button (4) separate from the cap body, which fits within a hole provided in the body and is disposed in such a manner that upon depression into the cap body it interacts with the valve of the aerosol can to actuate it; wherein,

an indicator tab (10) is provided attached to the cap body in such a location that when the button (4) is depressed in order to actuate the aerosol valve, a part of it must pass through the location of the indicator tab (10),

characterized in that

the indicator tab (10) is further provided at a location on the internal perimeter of the hole, and in such a manner that it is also positioned within the periphery of the cap body.

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2. The cap (1) of claim 1, wherein, the cap body is provided with a further hole through it, which is positioned so as to align with the nozzle (6) at the end of the fluid passageway (5).

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3. The cap (1) of either of claims 1 or 2, wherein, an extended portion (8) is provided at the end of the fluid passageway (5) adjacent the nozzle (6), this extended portion (8) providing a flange for interacting with slots (9) provided on the inside surface of the cap body near the hole there-through for the nozzle (4).

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4. The cap (1) of claim 3, wherein, the slots (9) and extended portion (8) provide a fixed point, this fixed point providing a means around which rotation of the fluid passageway (5) and the interface (7) is made possible.

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5. The cap (1) of any of the preceding claims, wherein, the button (4), the fluid passageway (5) and the interface (7) are formed as a single integral piece.

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6. The cap (1) of any of the preceding claims, wherein, the size of the cap (1) and relative disposition of the button (4), the fluid passageway (5) and the interface (7) can be chosen dependent upon the final size of aerosol can to which it is to be fitted.

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7. The cap (1) of any of the preceding claims, wherein, the indicator tab (10) is fixed to the cap body via at least two narrow, readily breakable connections (11).

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8. The cap (1) of any of the preceding claims, wherein, a lip (12) is provided on the button (4) in the specific location for interacting with the indicator tab (10).

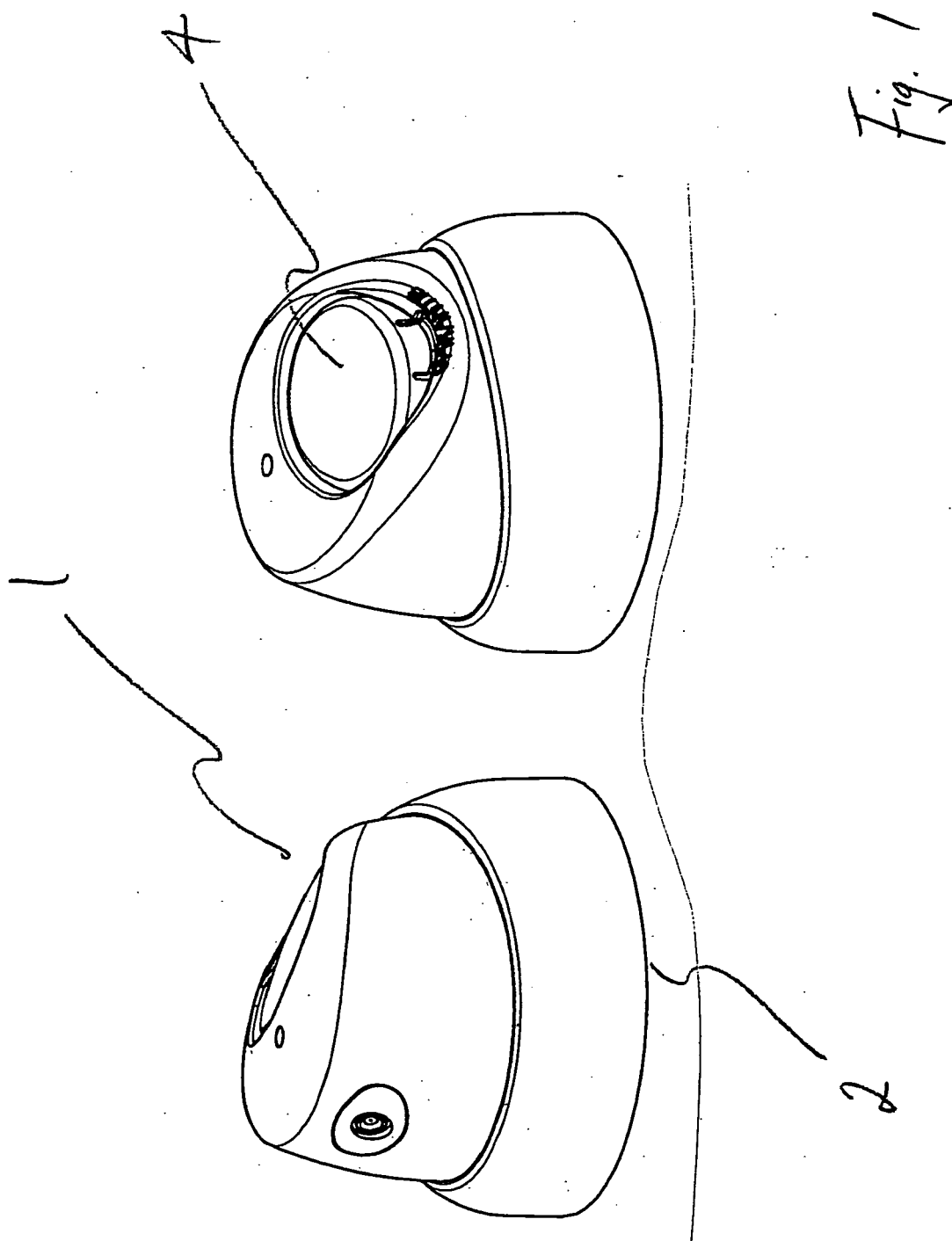
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9. The cap (1) of any of the preceding claims, wherein, the cap body, the button (4), the fluid passageway (5) and the interface (7) are all formed from polyethylene or polypropylene.

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10. The cap (1) of any of the preceding claims, wherein, the colour of the cap (1) can be varied.

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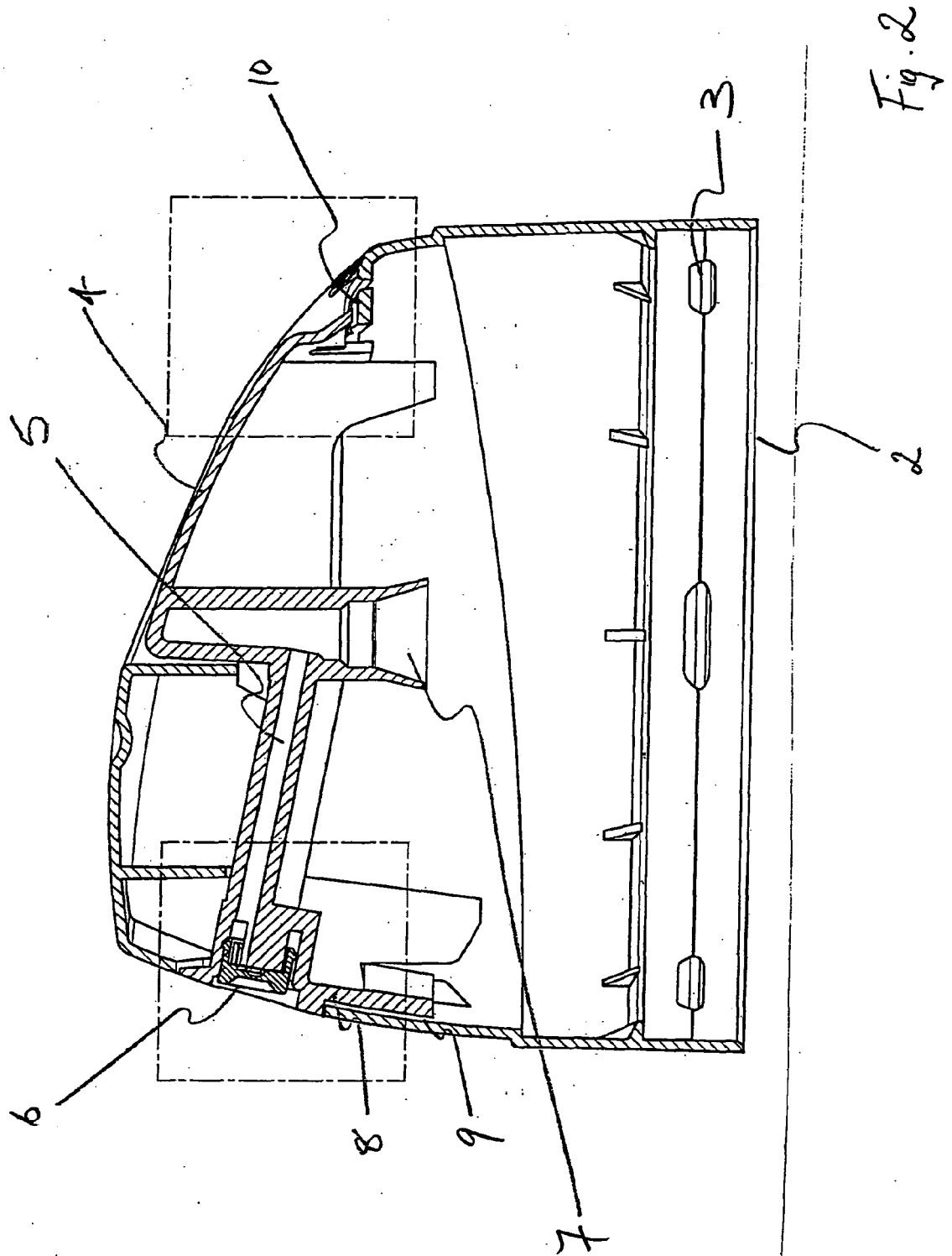
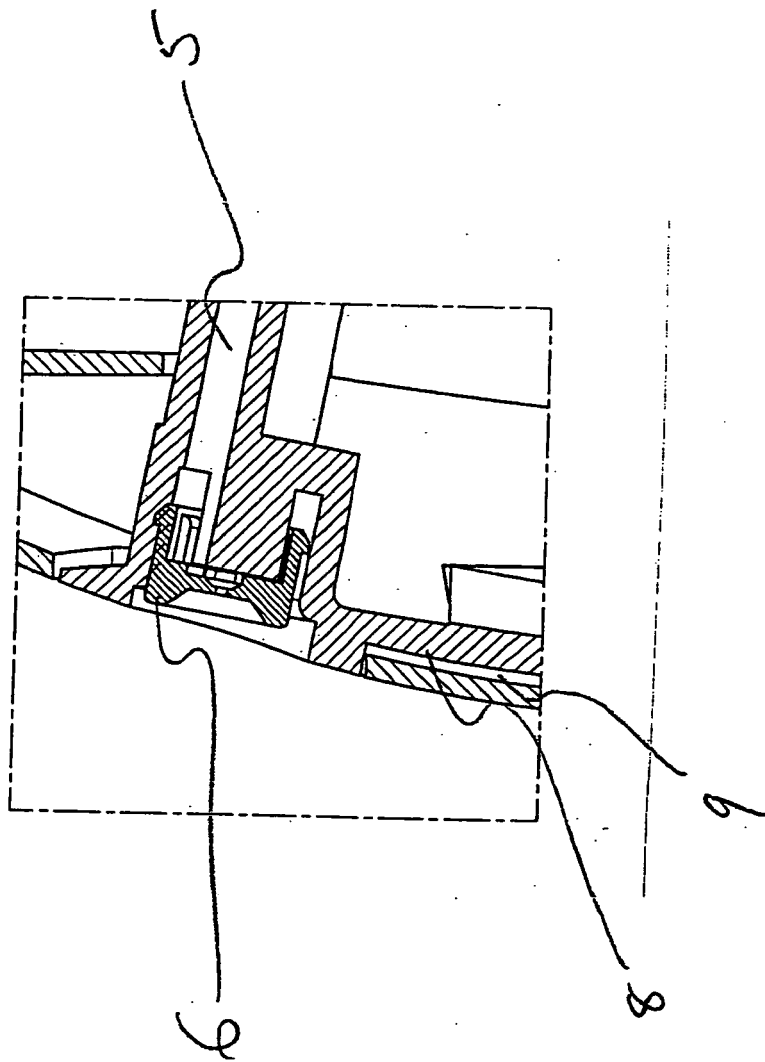


Fig. 3



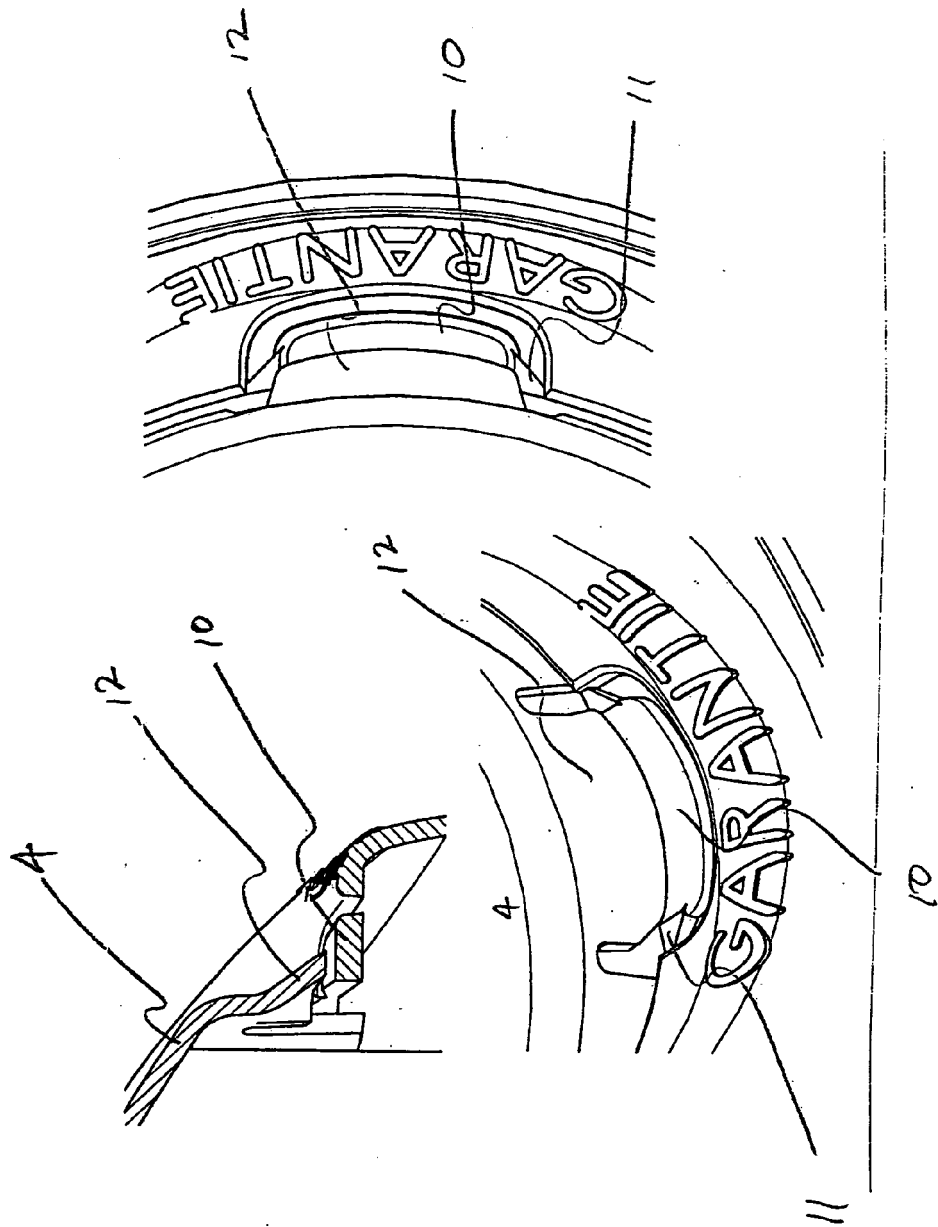


Fig. 4



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 05 01 1137

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	FR 2 673 608 A (CHANEL) 11 September 1992 (1992-09-11) * page 4, line 14 - page 5, line 3; figures 1,5,6 *	1,2,6-10	B65D83/16
Y	* page 6, line 17 - line 33 * -----	3-5	
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A	WO 01/40078 A (COSTER TECNOLOGIE SPECIALI S.P.A; DALSANT, GIUSEPPE) 7 June 2001 (2001-06-07) * figures 1,2 * -----	1	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.7) B65D B05B
Place of search The Hague		Date of completion of the search 18 October 2005	Examiner Bridault, A
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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EPO FORM 1503 03.82 (P04/C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 05 01 1137

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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18-10-2005

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