



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11)

EP 1 561 701 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
10.08.2005 Bulletin 2005/32

(51) Int Cl.7: **B65D 49/12**, B65D 51/20,
B65D 47/08

(21) Application number: **04002609.8**

(22) Date of filing: **05.02.2004**

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IT LI LU MC NL PT RO SE SI SK TR**
Designated Extension States:
AL LT LV MK

(72) Inventor: **Shu, Anthony
Lagos (NG)**

(74) Representative: **Isler, Jörg
Isler & Isler
Postfach 2402
6342 Baar (CH)**

(71) Applicant: **Rensan Holdings Limited,
c/o Higgs Johnson
Nassau (BS)**

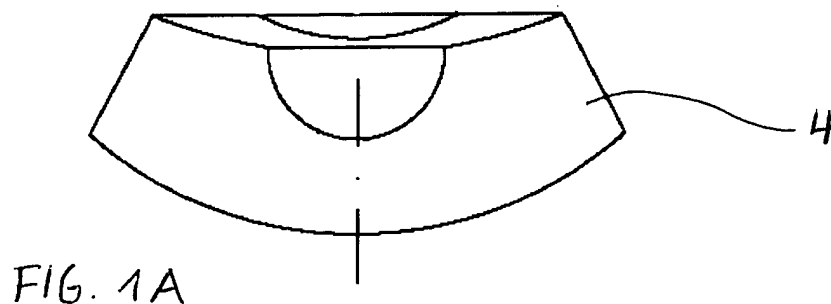
(54) **Tamper resistant container and cap**

(57) A container (1) comprises a container neck (3) with an opening (5) at the end of said neck (3) and a cap (4) which serves to close said opening (5).

The neck comprises breakage means (7) which

causes at least parts of the neck (3) to break off if the cap (4) is removed from said container (1).

Tamper-evidence is shown on the neck of the container, as the neck breaks off at the breakage means if force is applied to remove the cap.



EP 1 561 701 A1

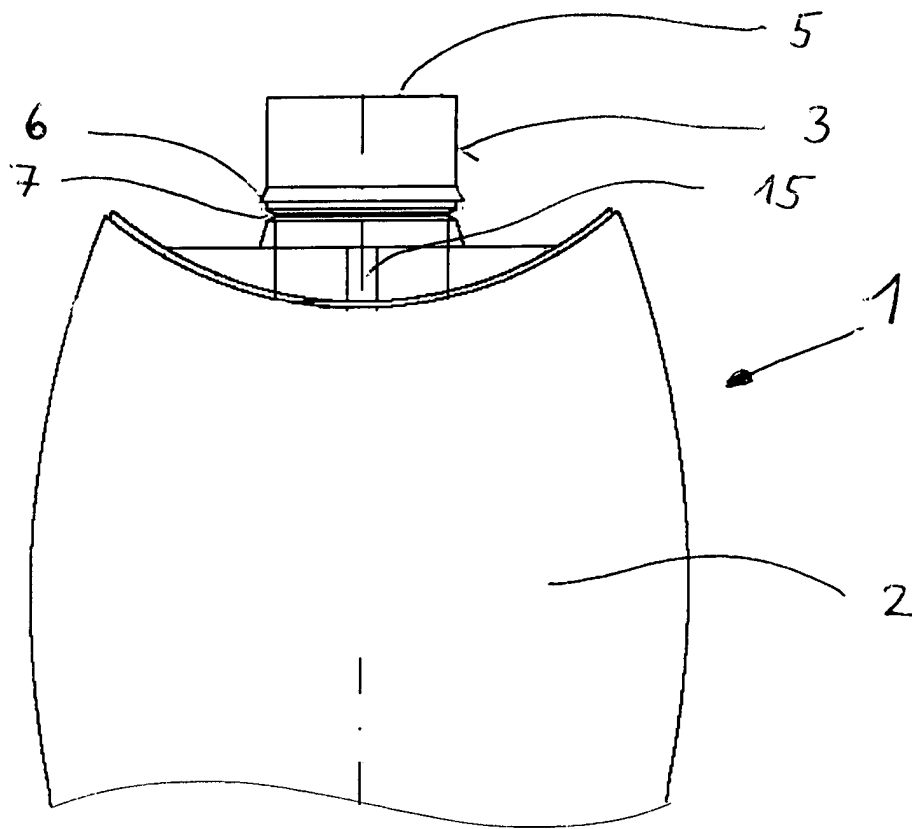


FIG. 1B

Description

TECHNICAL FIELD

[0001] The invention relates to a container and a cap in accordance with the preamble of the first claim. It likewise relates to a container in accordance with the preamble of claim 12 and a cap of claim 16.

BACKGROUND OF THE INVENTION

[0002] This invention relates to a container and a cap, and in particular to pilfer-proof or tamper-evident systems of containers and caps. Many such systems are known in the art.

[0003] For example one method of forming a tamper-evident connection between a container, in particular a bottle, and a cap is to use a threaded bottle cap which includes a ratchet ring having internal ratchet teeth in combination with a bottle neck having external ratchet teeth. When the bottle cap is screwed on the bottle neck, the ratchet teeth of the bottle cap ride over the mating ratchet teeth on the bottle neck, thereby enabling the bottle cap to be fully tightened on the bottle neck. However, when a user attempts to unscrew the bottle cap using low-to-medium twisting force, the ratchet teeth of the bottle cap positively engage the mating ratchet teeth of the bottle neck, thereby preventing unthreading and unsealing of the cap. When higher levels of twisting force are applied to the bottle cap in the direction of unscrewing, the ratchet ring breaks away from the bottle cap and the bottle cap may be unscrewed from the bottle neck. In this manner, removal of the ratchet ring from the bottle cap serves as visual evidence that the bottle has been opened.

[0004] While the combination of a bottle cap with a tamper evidencing ring and a bottle neck with ratchet teeth provides for an acceptable tamper-evident connection, this combination does have its limitations. Specifically, it may be possible for a person to pull the lower edge of the ratchet ring outward and then upward toward the cover of the bottle cap in order to defeat the locking action of the ratchet teeth of the bottle cap and bottle neck. It would then be possible to unscrew the bottle cap without breaking the ratchet ring away from the bottle cap and to screw the bottle cap back on the bottle neck. If this were to occur, there may be little visual evidence that the cap has been unscrewed and subsequently screwed back on the bottle neck. This would also be possible with other tamper-evident connection known. Therefore, present tamper-evident connections between a bottle cap and bottle neck may not provide optimum tamper resistance in certain circumstances.

[0005] For some tamper-evident systems it is also possible to refill the bottle after use and put on a new cap with an untampered tamper evidence ring. Such a bottle can then be resold and it will not be possible for the buyer to detect, that the bottle was refilled.

[0006] For the foregoing reasons, there is a need for improved tamper resistant systems which further limit the ability of a person to tamper with the contents of a container.

SUMMARY OF THE INVENTION

[0007] Accordingly, one object of the invention is to provide an improved tamper resistant container and / or cap.

[0008] According to the invention, this is achieved by the features of the first claim.

[0009] The core of the invention is therefore that the container neck comprises breakage means which causes at least parts of the neck to break off if the cap is removed from said container.

[0010] The advantages of the invention can be seen, inter alia, in the fact that tamper-evidence is shown on the neck of the container, as the neck breaks off at the breakage means if force is applied to remove the cap. After the breakage of the neck, no new cap can be fitted onto the container. Therefore the breakage of the neck provides the evidence of the attempt to tamper with, pilfer or imitate the contents of the container.

[0011] Further advantageous embodiments of the invention emerge from the subclaims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] A more complete appreciation of the invention and many of the attendant advantages thereof will be readily obtained as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings, wherein:

- Fig. 1A shows in a side view part of a bottle cap;
- Fig. 1B shows in a side view part of a bottle;
- Fig. 2A shows a detailed, partial cross section view of the bottle neck;
- Fig. 2B shows a detailed, partial cross section view of the bottle neck of Fig. 2A from a different view;
- Fig. 3 shows the bottle cap in more detail;
- Fig. 4A shows another bottle cap in more detail;
- Fig. 4B shows the bottle cap of Fig. 4A in top view.

[0013] Only those elements that are essential for an understanding of the invention are shown.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0014] Referring now to the drawings, wherein like reference numerals designate identical or corresponding parts throughout the several views, in Figure 1A and 1B a bottle 1 comprising a bottle body 2, a bottle neck 3 and a cap 4 is shown. Through an opening 5 of the bottle,

the bottle can be filled with different contents. The contents may be in numerous forms, such as liquid, powder, granules or pellets, and others. The cap 4 can be fitted onto the bottle 1 in a relatively easy manner, by pushing the cap 4 vertically onto the bottle, manually or via a mechanical device. Preferably the cap and the bottle are made from plastic material, for example the cap from PP Polypropylene and the bottle from HDPE High Density Polyethylene. It is clear that numerous other materials can be used for the bottle and the cap. The cap is usually manufactured by an injection molding process. The bottle is manufactured by a blow molding process. This process comprises melting the plastic raw materials, resins of various types, processing the material inside an extruder and then forming the material into a tube. Then compressed air is blown into the tube of still molten plastic to inflate it into a mold with the shape of a bottle. The so obtained bottle, which is still hot and deformable, is then cooled into a rigid form.

[0015] According to Figure 2A and 2B at the neck 3 of the bottle retaining means, for example a retaining ring 6 is arranged. This retaining ring 6 of the bottle will retain the cap 4 on the bottle 1, the cap will be described in more detail below. The retaining ring 6 has a tapered shape with a portion nearest to the opening 5 of the bottle smaller than the base portion of the ring 6. There can be only one ring or multiple rings at the bottle neck. The ring or rings can also have different shapes than shown and be made throughout the circumference of the neck or only part of the circumference. Most important is that the retaining means, for example the retaining ring 6, functions to retain the cap on the bottle neck.

[0016] Below the retaining ring 6, further away from the bottle opening, breakage means, for example a breakage band 7, is arranged. At this breakage band, the neck portion of the bottle is made with one or more areas intentionally thinner than the regular neck thickness. The breakage band or bands 7 may be made throughout the circumference of the neck of the bottle, or part of the circumference. If force is applied on the bottle neck 3, the bottle neck will break off at the breakage means.

[0017] Figure 3 shows the cap 4 of the bottle in more detail. The cap comprises a cap base 8 and a cap top 9 which are connected by a joint 10. Through the joint the top 9 can be closed with a snap onto the base of the cap.

The base 8 of the cap has retaining means 11, for example a retaining ring which is arranged inside the cap on the part that is pushed onto the neck of the bottle. This ring inside the cap base 8 is tapered in shape, with the portion nearest to the bottom of the bottle larger than the other portion. This retaining ring 11 of the cap will interact with the retaining ring 6 of the bottle. Once the cap 4 is pushed onto the bottle neck 3, these rings 6, 11 will interlock with each other and hold the cap on the bottle. The retaining means 11 of the cap and the retaining means 6 of the bottle will be shaped accordingly to

guarantee a proper interlock.

Therefore also the retaining means 11 of the cap 4 can be only one ring or multiple rings. The ring or rings can also have different shapes than shown and be made throughout the circumference of the cap or only part of the circumference. Most important is that the retaining means, for example the retaining ring 11, functions to retain the cap on the bottle neck.

[0018] To further reinforce the pilfer-proof or pilfer-evident feature of the cap and bottle combination, an outlet hole 12 of the cap may be closed by a sealing layer 13. Such a sealing layer may be made with a thin layer of plastics already molded, or made with a location where a paper foil, aluminum foil, plastic foil, or a foil made with a combination of materials may be either heat-sealed, or glued onto the cap to seal-off the outlet hole 12. A user of the product will need to puncture this sealing layer 12, before the contents of the bottle may be dispensed. This sealing layer is optional and used depending on the nature of the contents of the product and the desire of marketer or manufacturer of the product.

[0019] After the cap 4 is inserted onto the bottle 1 and the retaining rings of the cap 11 and bottle 6 are slipped into and just past each other, the cap is interlocked with the bottle. If a person intentionally tries to remove the cap 4 by force, manually or mechanically, the force will break the thinner portion(s) of the neck 3 of the bottle at the breakage band 7. The breakage of the neck of the bottle provides the evidence of the attempt to tamper with, pilfer or imitate the contents. After breakage of the neck it is not possible to attach another cap onto the bottle.

The force to break off the neck of the bottle, that means the design and thickness of the breakage band, has to be in such a way, that during the normal use of the bottle the neck will not break off. The force to break off the neck of the bottle also has to be less than the force that is needed to push the retaining ring of the cap over the retaining ring of the bottle to remove the cap.

[0020] The cap base can have additionally a spline 14 which interacts with a groove 15 of the bottle, see Fig. 1B and 2A. This unique shape of bottle and cap fits properly in such way to prevent the twisting action of the cap from the bottle. This helps further to prevent the removal of the cap from the bottle without breaking the neck of the bottle.

[0021] Figure 4A and 4B show another cap 4 of the bottle. This cap has six outlet holes 12 which may be also closed by sealing layers 13. Otherwise this cap has the same characteristics as the cap described in Figure 3.

[0022] The invention is of course not restricted to the exemplary embodiments shown and described. For example instead of the bottle shown in the figures any form or shape of container may be used. Also the design of the caps shown may be altered and adapted to the specific needs.

[0023] Obviously, numerous modifications and varia-

tions of the present invention are possible in light of the above teachings. It is therefore to be understood that within the scope of the appended claims, the invention may be practiced otherwise than as specifically described herein.

LIST OF DESIGNATIONS

[0024]

- 1 container / bottle
- 2 bottle body
- 3 bottle neck
- 4 cap
- 5 bottle opening
- 6 retaining ring bottle
- 7 breakage band
- 8 cap base
- 9 cap top
- 10 joint
- 11 retaining ring cap
- 12 outlet hole cap
- 13 sealing layer
- 14 spline
- 15 groove

Claims

- 1. A container (1) comprising a container neck (3) with an opening (5) at the end of said neck (3) and a cap (4) which serves to close said opening (5), wherein the neck comprises breakage means (7) which causes at least parts of the neck (3) to break off if the cap (4) is removed from said container (1).
- 2. A container and cap as claimed in claim 1, wherein the breakage means (7) has at least an area thinner than the regular neck (3) thickness.
- 3. A container and cap as claimed in claim 1 or 2, wherein said neck (3) has retaining means (6) to retain said cap (4).
- 4. A container and cap as claimed in claim 1, 2 or 3, wherein said cap (4) has retaining means (11) to retain said neck (3).
- 5. A container and cap as claimed in claim 3 and 4, wherein said neck retaining means (6) and said cap retaining means (11) are interlocked to each other after the cap (4) is inserted onto the container neck (3).
- 6. A container and cap as claimed in claim 3 or 5, wherein said neck retaining means (6) are at least a tapered ring with the portion nearest to the container opening (5) smaller than the base portion of

the ring.

- 7. A container and cap as claimed in claim 4 or 5, wherein said cap retaining means (11) is at least a tapered ring with the portion nearest to the container bottom larger than the other portion of the ring.
- 8. A container and cap as claimed in one of the preceding claims, wherein said neck retaining means (6) is arranged closer to the container opening (5) than the breakage means (7).
- 9. A container and cap as claimed in one of the preceding claims, wherein said container (1) and said cap (4) have means (14, 15) to prevent twisting the cap from the container.
- 10. A container and cap as claimed in one of the preceding claims, wherein said container (1) and / or cap (4) are made from plastic.
- 11. A container and cap as claimed in one of the preceding claims, wherein said container is a bottle.
- 12. A container (1) comprising a container neck (3) with an opening (5) at the end of said neck (3), wherein the neck comprises breakage means (7).
- 13. A container as claimed in claim 12, wherein the breakage means (7) has at least an area thinner than the regular neck (3) thickness.
- 14. A container as claimed in claim 12 or 13, wherein said neck (3) has retaining means (6) to retain a cap (4).
- 15. A container as claimed in claim 12, 13 or 14, wherein said retaining means (6) is arranged closer to the container opening (5) than the breakage means (7).
- 16. A cap (4) which serves to close said opening (5) of the container neck (3) as claimed in claim 11 to 13, wherein said cap (4) has retaining means (11) to retain said neck (3).

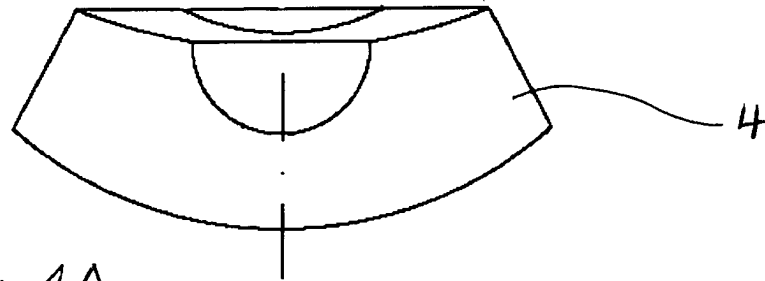


FIG. 1A

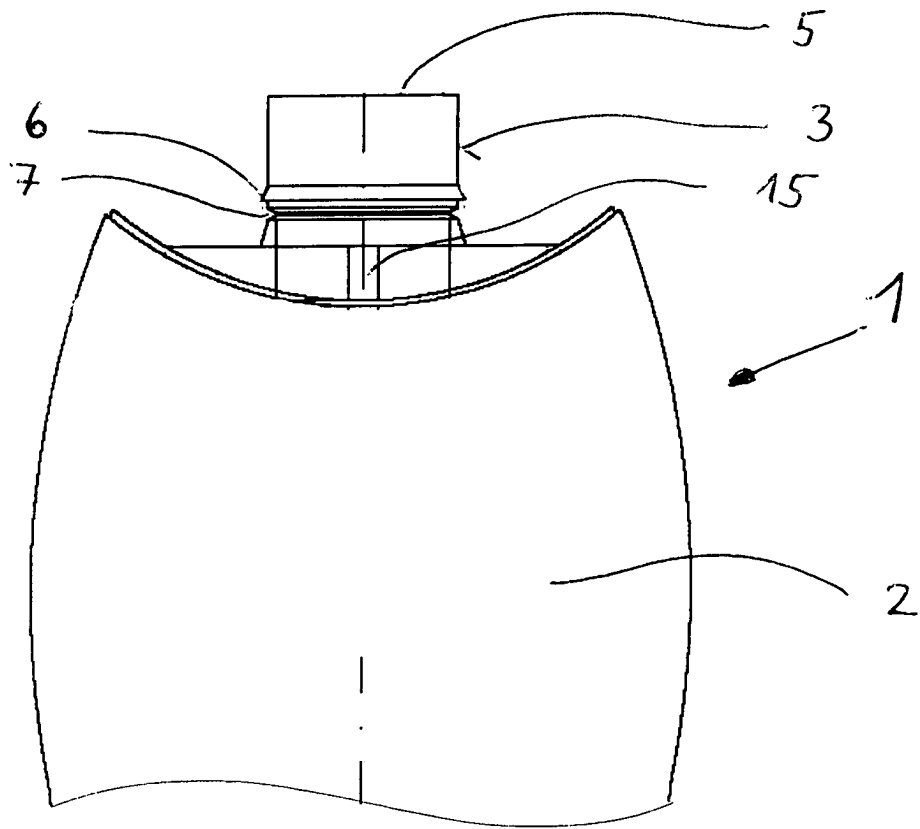


FIG. 1B

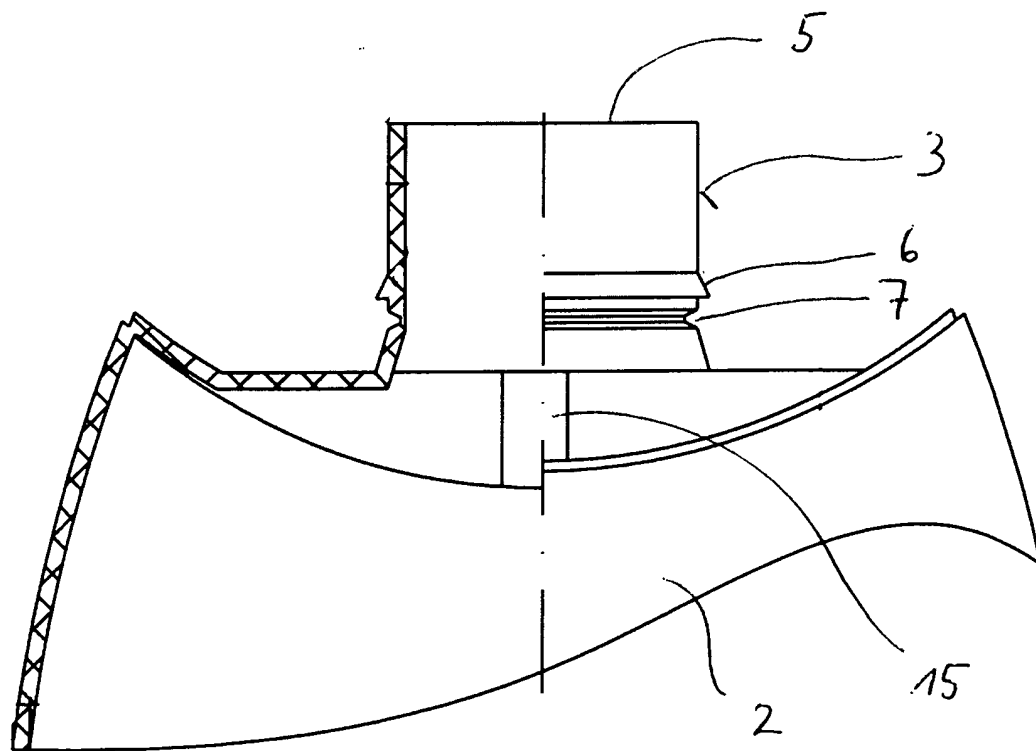


FIG. 2A

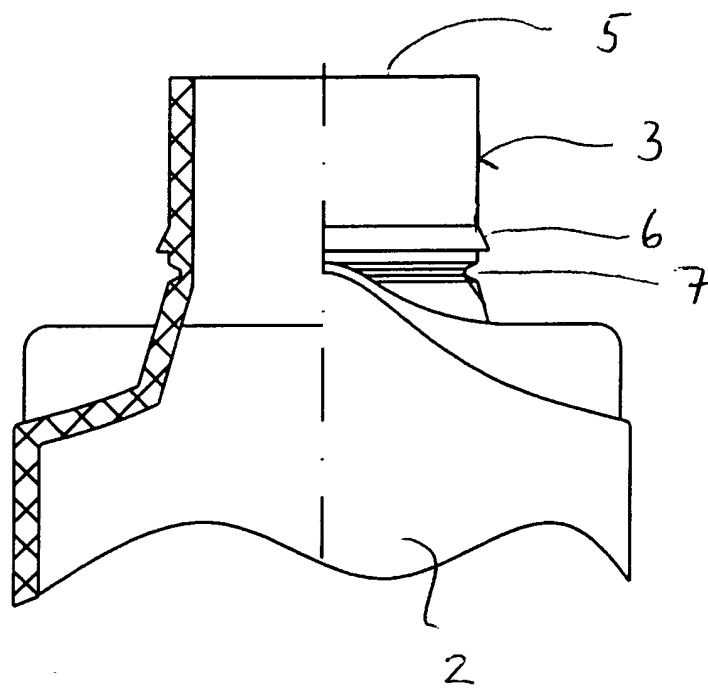


FIG. 2B

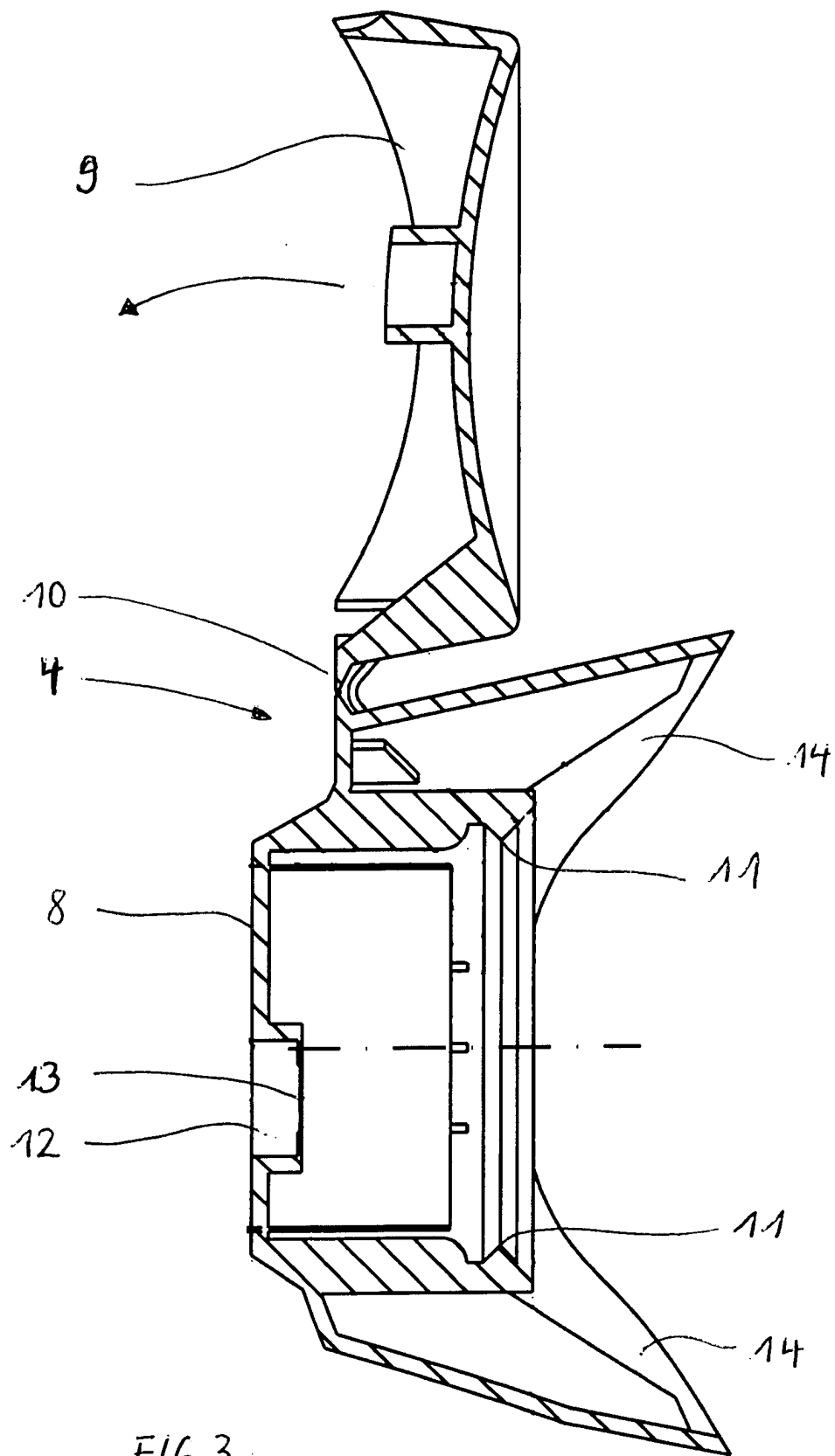
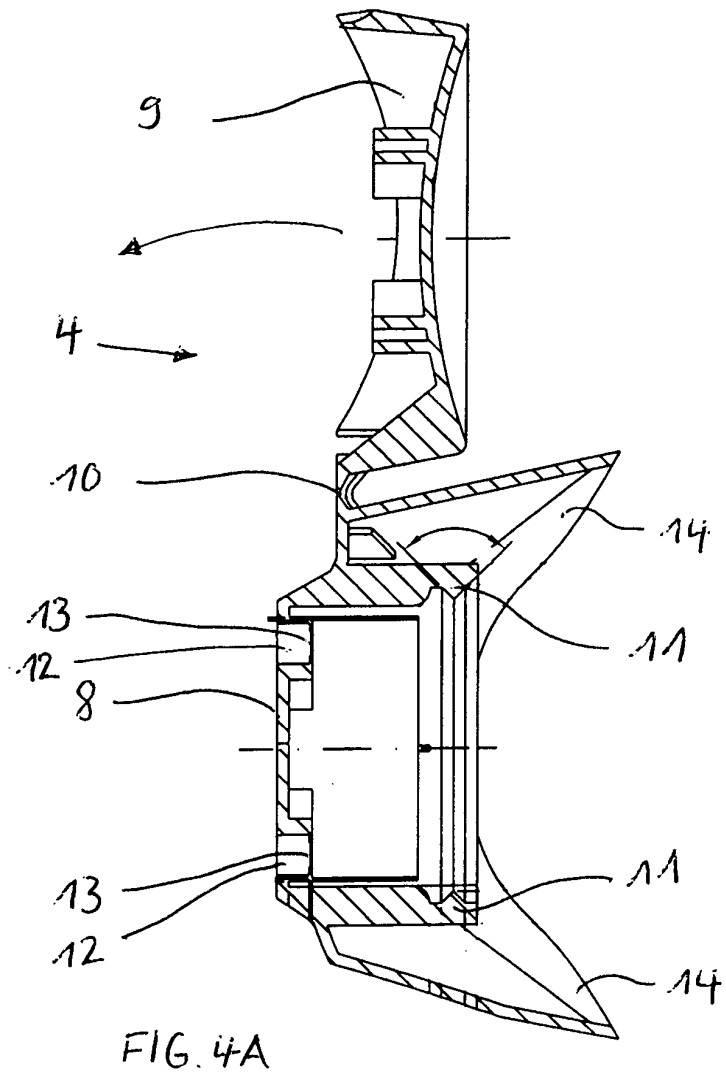
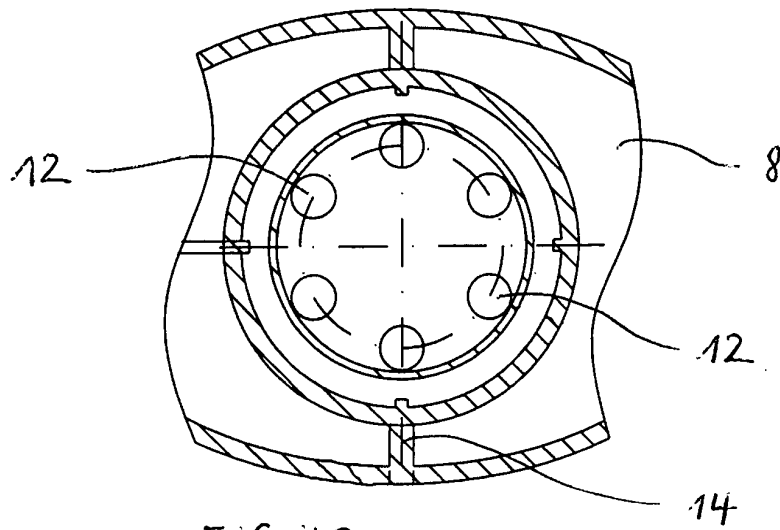


FIG. 3





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 04 00 2609

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	EP 1 103 478 A (OREAL) 30 May 2001 (2001-05-30)	1-6,8-16	B65D49/12 B65D51/20 B65D47/08
Y	* paragraph [0031] - paragraph [0041]; figures 1-3 *	7	
Y	----- DE 100 25 265 A (SEAQUIST LOEFFLER KUNSTSTOFFWE) 19 July 2001 (2001-07-19) * column 5, line 48 - line 55; figures 1,4 *	7	
X	----- GB 461 311 A (PAUL EDWARD OLIVER) 15 February 1937 (1937-02-15) * page 1, line 76 - page 2, line 32; figures 1-3 *	1-5,8,9, 11-16	

The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			B65D
Place of search		Date of completion of the search	Examiner
Munich		12 July 2004	Augustin, W
<p>CATEGORY OF CITED DOCUMENTS</p> <p>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</p> <p>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</p>			

3

EPO FORM 1503 03.82 (P04001)

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

EP 04 00 2609

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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

12-07-2004

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 1103478 A	30-05-2001	FR 2801568 A1	01-06-2001
		AT 228957 T	15-12-2002
		DE 60000910 D1	16-01-2003
		DE 60000910 T2	24-04-2003
		EP 1103478 A1	30-05-2001
		ES 2188491 T3	01-07-2003
DE 10025265 A	19-07-2001	DE 10025265 A1	19-07-2001
		AU 4048301 A	03-07-2001
		WO 0146032 A2	28-06-2001
		DE 20009203 U1	07-06-2001
GB 461311 A	15-02-1937	NONE	