



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
29.12.2010 Bulletin 2010/52

(51) Int Cl.:
B65D 5/74 (2006.01)

(21) Application number: **10165369.9**

(22) Date of filing: **09.06.2010**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK SM TR
Designated Extension States:
BA ME RS

• **Ferrari, Silvia**
26900 Lodi (LO) (IT)

(72) Inventors:
• **Ferrari, Guglielmo**
26900 Lodi (LO) (IT)
• **Ferrari, Silvia**
26900 Lodi (LO) (IT)

(30) Priority: **23.06.2009 IT MI20091112**

(71) Applicants:
• **Ferrari, Guglielmo**
26900 Lodi (LO) (IT)

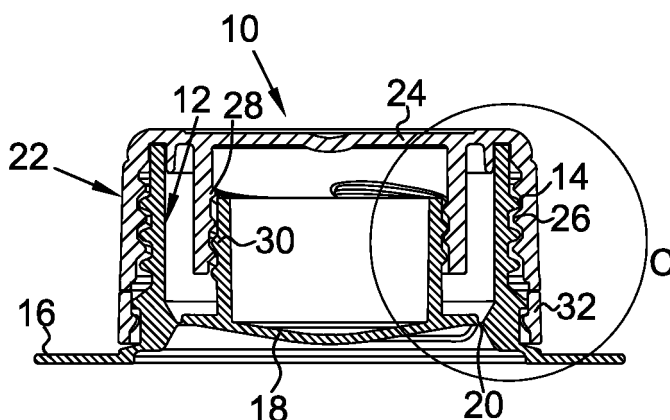
(74) Representative: **Branca, Emanuela et al**
Barzanò & Zanardo Milano S.p.A.
Via Borgonuovo, 10
20121 Milano (IT)

(54) **Closure for a liquid container**

(57) A closure (10) for a liquid container, comprising a dispenser element (12) with an external thread (14) and an annular base (16) to be fixed to the wall of the container at its outlet hole. The element (12) has a breakable circular wall (18) and a cap (22), provided, along its inner side surface, with a first female screw thread (26) coupled with the external thread (14) formed on the outer side surface of the cylindrical dispenser element (12).

Inside the cap (22) there is a second inner female screw thread (28) having a smaller diameter and opposite screwing direction with respect to the diameter and the screwing direction of the first female screw thread (26). The screw thread (28) engages with a screw thread (30) formed integral with the breakable circular wall (18) to lift the cap (22) and to screw the screw thread (30) inside the screw thread (28) in order to detach the wall (18).

Fig. 3



Description

[0001] The present invention refers to a screw cap for recipients containing liquid products, in particular but not necessarily liquid food products.

[0002] In order to close recipients containing drinks or other liquid food products, screw closing devices are known to be used, made up of two elements: a threaded capsule, which actually closes and possibly seals the recipient, and an inner safety seal, arranged below such a capsule. The function of the inner safety seal is that of preserving the integrity of the liquid product contained inside the recipient until the recipient itself has been opened for the first time by the user.

[0003] A first known and common type of this kind of inner safety seal, commonly used on recipients manufactured in plastic or cardboard containing for example milk, fruit juice, infusions or other non-alcoholic drinks, is made up of an aluminium film that is securely connected to the opening of the recipient. In the act of opening the recipient for the first time, the user must manually break or perforate the film, which normally remains partially fixed to the opening of the recipient itself, thus coming into contact with the liquid product.

[0004] Therefore, in order to avoid contact between the inner safety seal, once broken, and the liquid contained in the recipient, breakable walls made of plastic material have been made, fixed to the opening of the recipient and positioned below the closing capsule. Such breakable walls are provided with a holding tab so that the user, after the capsule has been opened for the first time, can completely extract them from the opening of the recipient, breaking their constraints that connect them to the latter. However, even if these walls provided with a tab can be completely extracted from the recipient, they require, in any case, a finger of the user to be inserted into the opening of the recipient itself to remove them, with consequent possibility of contamination of the liquid food product.

[0005] The general purpose of the present invention is therefore that of making a screw cap for recipients containing liquid products, in particular but not necessarily for liquid food products, which is able to solve the aforementioned drawbacks of the prior art in an extremely simple, cost effective and particularly functional manner.

[0006] In particular, one purpose of the present invention is that of making a screw cap for recipients containing liquid products that is able to form a safety seal for the recipient without such a safety seal coming into contact with the liquid product after its removal.

[0007] Another purpose of the invention is that of making a screw cap for recipients containing liquid products in which the removal of the safety seal, after the recipient has been opened for the first time, does not have to be carried out manually by the user.

[0008] These purposes according to the present invention are achieved by making a screw cap for recipients containing liquid products, in particular but not necessarily

liquid food products, as outlined in claim 1.

[0009] Further characteristics of the invention are highlighted in the dependent claims, which are an integral part of the present description.

5 **[0010]** The characteristics and the advantages of a screw cap for recipients containing liquid products according to the present invention shall become clearer from the following description, given as an example and not for limiting purposes, with reference to the attached schematic drawings in which:

figure 1 is a perspective view of a screw cap for recipients containing liquid products according to the present invention;

figure 2 is a top plan view of the cap of figure 1;

figure 3 is a section view, obtained along the line A-A of figure 2, of the cap of figure 1;

figure 4 is an enlarged view of the detail indicated with "C" in figure 3;

10 figure 5 is a perspective view of a first component of the cap of figure 1;

figure 6 is a side elevational view of the first component of figure 5;

20 figure 7 is a top plan view of the first component of figure 5;

figure 8 is a section view, obtained along the line B-B of figure 7, of the first component of figure 5;

figure 9 is a perspective view of a second component of the cap of figure 1;

30 figure 10 is a side elevational view of the second component of figure 9;

figure 11 is a bottom plan view of the second component of figure 9; and

35 figure 12 is a section view, obtained along the line C-C of figure 11, of the second component of figure 9.

[0011] With reference to the figures, a screw cap for recipients containing liquid products according to the present invention is shown, wholly indicated with reference numeral 10. The cap 10 is configured for being applied to a generic recipient for liquid products (not shown), of the type made for example in recyclable cardboard and provided, on its upper wall, with an outlet hole for the liquid contained therein.

40 **[0012]** The cap 10 comprises a first cylindrical dispenser element 12 in the form of a sleeve (figures 5-8), provided with an external threading 14 and with an annular base 16 configured so as to be fixedly connected, for example through heat coupling or through glueing, to the wall of the recipient at the relative outlet hole for the liquid contained therein. The sleeve 12 thus forms a mouth through which it is possible to dispense the liquid contained inside the recipient.

45 **[0013]** The sleeve 12 of the cap 10 is internally obstructed by a breakable circular wall 18, having a perpendicular extension with respect to the rotation axis of the sleeve 12 itself and formed integral with it. The breakable circular wall 18 is connected to the inner side surface

of the sleeve 12 by means of a circumferential weakened line 20. The breakable circular wall 18 thus acts as a safety seal for the cap 10, sealingly obstructing its mouth 12 until the recipient is opened for the first time, as shall be better specified hereafter.

[0014] The cap 10 also comprises a second cylindrical element 22, or covering capsule (figures 9-12), closed by a bottom plate 24 at its upper end. Along the inner side surface of the covering capsule 22 a first female screw 26 is formed, operatively coupled with the external threading 14 formed on the outer side surface of the sleeve 12.

[0015] According to the invention, inside the covering capsule 22 there is a second female screw 28 having a smaller diameter and opposite screwing direction with respect to the diameter and screwing direction of the first female screw 26. The second female screw 28 of the covering capsule 22 is thus capable of engaging with a screw 30 formed integral with the breakable circular wall 18 of the sleeve 12. In turn, also the screw 30, preferably made hollow inside, has a smaller diameter and opposite screwing direction with respect to the diameter and screwing direction of the external threading 14 of the sleeve 12.

[0016] In such a way, when the cap 10 is in its closed configuration before the recipient has been opened for the first time, the outer 26 and inner 28 female screws of the covering capsule are engaged with the external threading 14 and the inner screw 30 of the sleeve 12, respectively, as shown in the section view of figure 3. By acting upon the covering capsule 22 there will thus be the unscrewing and the lifting of the latter with respect to the sleeve 12 and, simultaneously, the screwing of the screw 30 inside the respective inner female screw 28. Consequently, with the same movement with which the unscrewing and the lifting of the covering capsule 22 from the sleeve 12 is obtained, there is also the lifting of the breakable circular wall 18 and its detachment from the sleeve 12, through breaking of the circumferential weakened line 20.

[0017] Therefore, after the recipient has been opened for the first time, the circular wall 18, separated from the sleeve 12, and the relative screw 30 remain inserted inside the covering capsule 22, without needing any manual intervention by the user to remove the safety seal, consisting of the circular wall 18 itself, and without such a safety seal accidentally being able to fall into the recipient and sink into the liquid contained therein, thus contaminating it. Preferably, in order to obtain the complete lifting and the consequent removal of the breakable circular wall 18 from the sleeve 12 at a different time with respect to that in which the complete unscrewing of the covering capsule 22 from the sleeve 12 itself is obtained, the threading 14 of the sleeve 12 and that of the outer female screw 26 can be made with a different pitch and/or length with respect to those of the threading of the screw 30 and of the inner female screw 28. In particular, based upon the example embodiment illustrated in the figures,

the pitch of the threading of both the screw 30 and of the inner female screw 28 of the covering capsule 22 is longer and equal to double the pitch of both the threading 14 of the sleeve 12 and the threading of the outer female screw 26 of the covering capsule 22.

[0018] The length of all the threadings present inside the cap 10 can vary according to the specific needs. Based upon the example embodiment illustrated in the figures, the length of the threading of both the screw 30 and of the inner female screw 28 of the covering capsule 22 is considerably smaller than the length of both the threading 14 of the sleeve 12 and the threading of the outer female screw 26 of the covering capsule 22, so as to allow the complete lifting and the consequent removal of the circular wall 18 from the sleeve 12 before obtaining the complete unscrewing of the covering capsule 22 from the sleeve 12 itself.

[0019] The covering capsule 22 can be connected, at its lower edge, to an anti-tampering ring 32 through a plurality of breakable bridge elements 34. The first time the cap 10 is opened, it will thus be characterised, apart from by the detachment of the circular wall 18 from the sleeve 12, also by the breaking of the bridge elements 34, caused by the rotation and by the lifting of the covering capsule 22 and by the consequent detachment of such a covering capsule 22 from the underlying anti-tampering ring 32, held by a projecting lip 36 formed below on the outer surface of the sleeve 12.

[0020] In detail, on the inner surface of the anti-tampering ring 32 there are one or more wedge-shaped elements 38, preferably arranged evenly along the circumference of such an anti-tampering ring 32, which project radially inwards towards the sleeve 12. The function of the wedge-shaped elements 38 is that of making it possible for the anti-tampering ring 32 to engage with the projecting lip 36 foreseen on the outer surface of the sleeve 12, so as to limit the axial movement of such an annular ring 32 with respect to the covering capsule 22 when it is screwed onto the sleeve 12 itself and the cap 10 is still sealed.

[0021] Finally, on the inner surface of the bottom plate 24, that is to say, the surface facing towards the opening of the sleeve 12, an annular sealing lip 40 can be formed projecting downwards (figure 4), intended to be inserted inside the upper edge of the sleeve 12 itself to improve the seal of the cap 10. Of course, the diameter of the annular sealing lip 40 is shorter than the diameter of the sleeve 12 in the respective contact area.

[0022] It has thus been seen that the screw cap for recipients containing liquid products according to the present invention achieves the previously highlighted purposes.

[0023] The screw cap for recipients containing liquid products of the present invention thus conceived can in any case undergo numerous modification and variants, all covered by the same inventive concept; moreover, all the details can be replaced by technically equivalent elements. In practice the materials used, as well as the

shapes and sizes, can be any according to the technical requirements.

[0024] The scope of protection of the invention is thus defined by the attached claims.

Claims

1. Screw cap (10) for recipients containing liquid products comprising:

- a cylindrical dispenser element (12) in the form of a sleeve, provided with an external threading (14) and with an annular base (16) configured to be fixedly connected to the wall of the recipient at the relative outlet hole for the liquid contained therein, said cylindrical dispenser element (12) being internally obstructed by a breakable circular wall (18) connected to the inner side surface of said cylindrical dispenser element (12) by means of a circumferential weakened line (20), and

- a cylindrical covering capsule (22), closed by a bottom plate (24) at its upper end and provided, along its inner side surface, with a first female screw (26) able to be operatively coupled with said external threading (14) formed on the outer side surface of the cylindrical dispenser element (12),

characterised in that inside said cylindrical covering capsule (22) there is a second inner female screw (28) having a smaller diameter and opposite screwing direction with respect to the diameter and screwing direction of said first female screw (26), said second inner female screw (28) being able to engage with a screw (30) formed integral with said breakable circular wall (18), said screw (30) having a smaller diameter and opposite screwing direction with respect to the diameter and screwing direction of said external threading (14) formed on the outer side surface of the cylindrical dispenser element (12), so as to simultaneously obtain both the unscrewing and the lifting of the cylindrical covering capsule (22) with respect to the cylindrical dispenser element (12), and the screwing of the screw (30) inside the respective inner female screw (28) and the consequent detachment of the breakable circular wall (18) from the cylindrical dispenser element (12) through breaking of the circumferential weakened line (20).

2. Cap (10) according to claim 1, **characterised in that** the external threading (14) formed on the outer side surface of the cylindrical dispenser element (12) and the threading of the first female screw (26) are made with a different pitch with respect to the pitch of the threading of the screw (30) and of the threading of the second inner female screw (28).

3. Cap (10) according to claim 2, **characterised in that** the pitch of the threading both of the screw (30) and of the second inner female screw (28) is longer than the pitch both of the external threading (14) formed on the outer side surface of the cylindrical dispenser element (12) and of the threading of the first female screw (26).

4. Cap (10) according to any one of claims 1 to 3, **characterised in that** the external threading (14) formed on the outer side surface of the cylindrical dispenser element (12) and the threading of the first female screw (26) are made with a different length with respect to the length of the threading of the screw (30) and of the threading of the second inner female screw (28).

5. Cap (10) according to claim 4, **characterised in that** the length of the threading both of the screw (30) and of the second inner female screw (28) is shorter than the length both of the external threading (14) formed on the outer side surface of the cylindrical dispenser element (12) and of the threading of the first female screw (26).

6. Cap (10) according to any one of the previous claims, **characterised in that** said covering capsule (22) is connected, at its lower edge, to an anti-tampering ring (32) through a plurality of breakable bridge elements (34).

7. Cap (10) according to claim 6, **characterised in that** said anti-tampering ring (32) is provided, on its inner surface, with one or more wedge-shaped elements (38) that project radially inwards towards said cylindrical dispenser element (12), said wedge-shaped elements (38) allowing the engagement of said anti-tampering ring (32) with a projecting lip (36) provided on the outer surface of said cylindrical dispenser element (12).

8. Cap (10) according to any one of the previous claims, **characterised in that** on the inner surface of said bottom plate (24) an annular sealing lip (40) is formed that projects downwards, intended to be inserted in the upper edge of said cylindrical dispenser element (12) to improve the seal of the cap (10), the diameter of said annular sealing lip (40) being shorter than the diameter of said cylindrical dispenser element (12) in the respective contact area.

Fig. 3

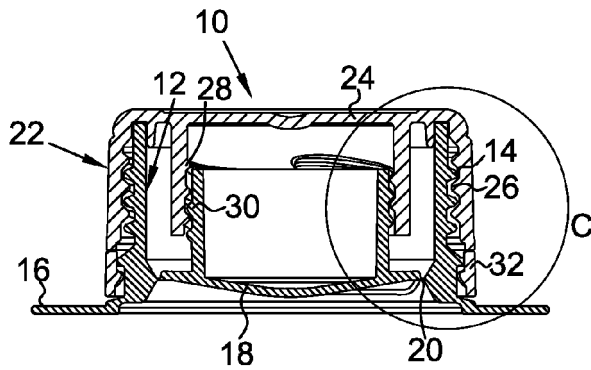


Fig. 4

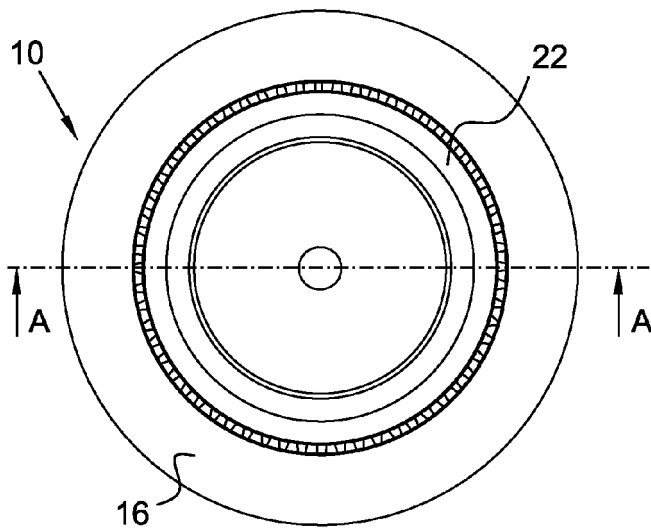
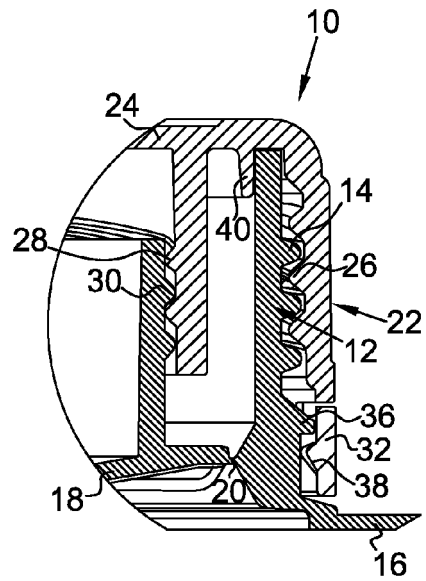
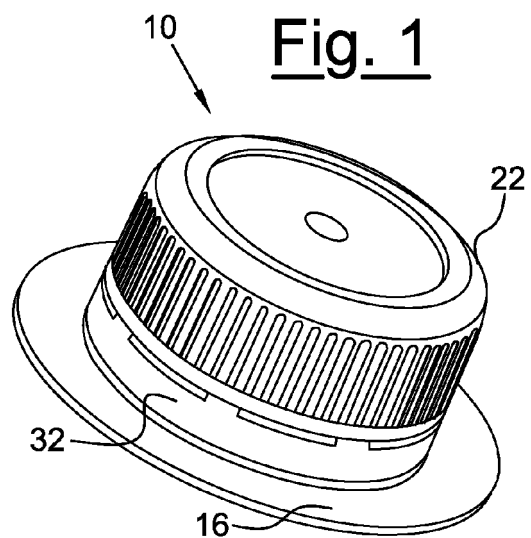


Fig. 2

Fig. 1



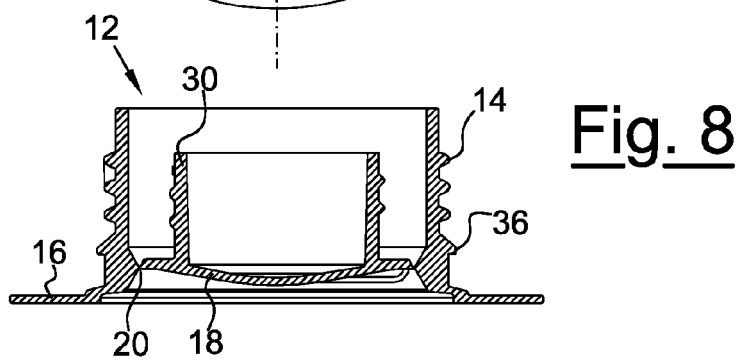
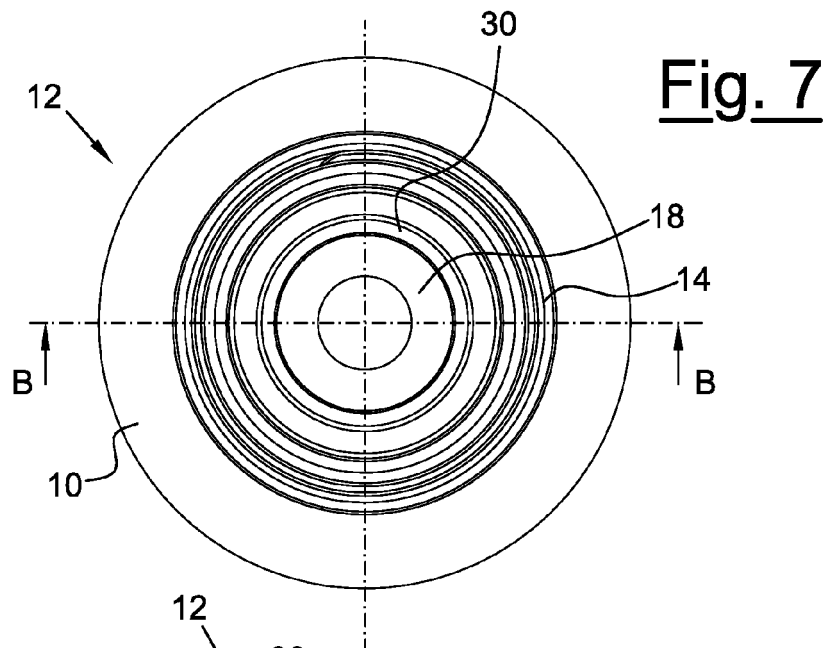
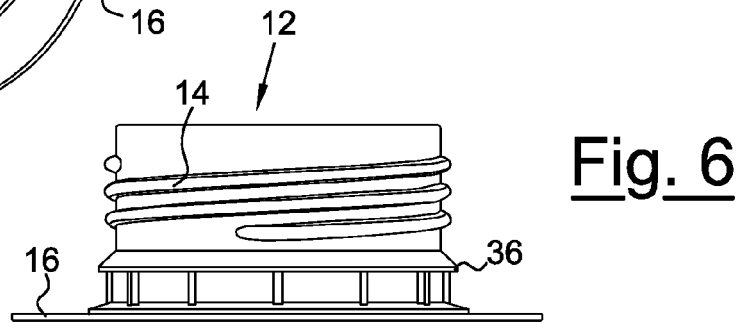
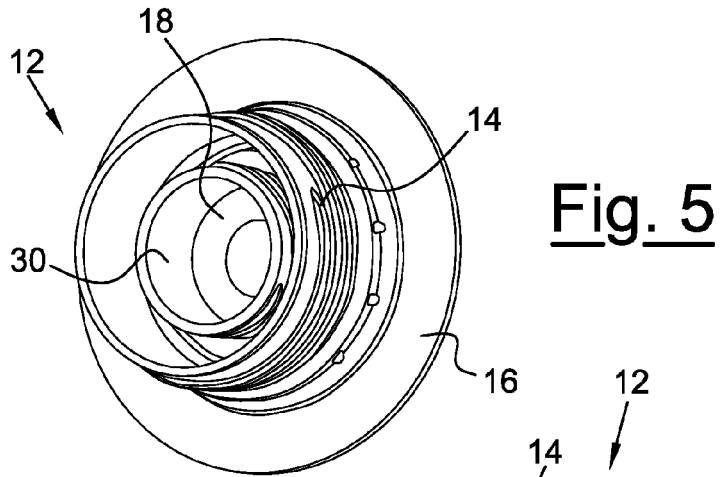


Fig. 9

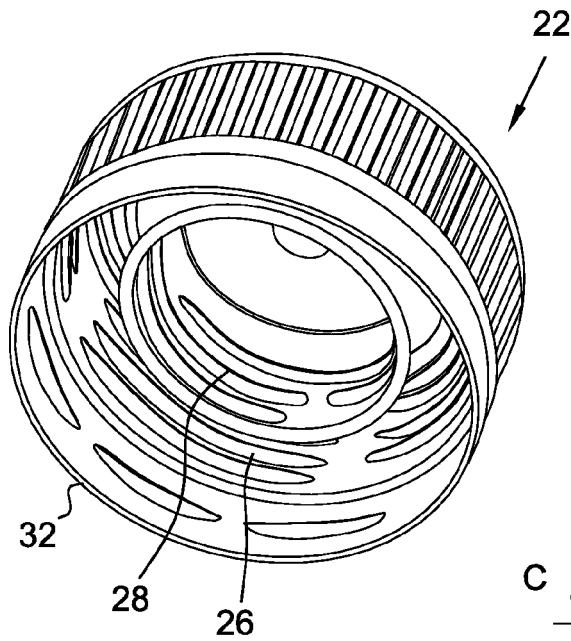


Fig. 11

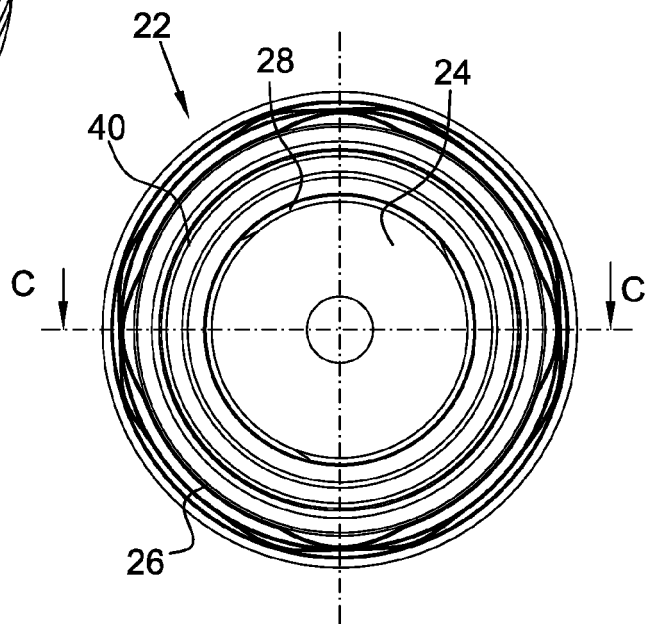


Fig. 10

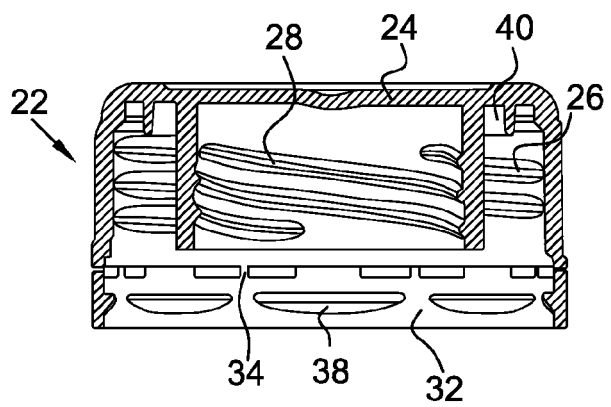
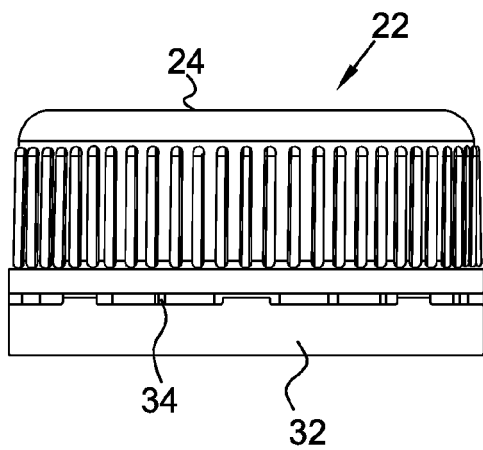


Fig. 12



EUROPEAN SEARCH REPORT

Application Number
EP 10 16 5369

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	EP 2 020 385 A (TOKAN KOGYO) 4 February 2009 (2009-02-04) * column 10, paragraph 45 - column 13, paragraph 16; figures 1-3 *	1,2,4-8	INV. B65D5/74
Y	US 2001/015355 A1 (ADAMS ET AL) 23 August 2001 (2001-08-23) * page 2, paragraph 40 - page 3, paragraph 46; figures 1-4 *	1,2,4-8	
A	WO 99/42375 A (ELOPAK) 26 August 1999 (1999-08-26) * page 7, line 39 - page 10, line 4; figure 1 *	1	
A	FR 2 770 832 A (SOC. LORRAINE DE CAPSULES METALLIQUES) 14 May 1999 (1999-05-14) * page 6, line 6 - page 7, line 27; figures *	1	
			TECHNICAL FIELDS SEARCHED (IPC)
			B65D
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		16 September 2010	Newell, Philip
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			

1
EPO FORM 1503 03.82 (P04C01)

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

EP 10 16 5369

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.

16-09-2010

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 2020385	A	04-02-2009	WO 2007126062 A1	08-11-2007
			KR 20090051004 A	20-05-2009
			RU 2008146985 A	10-06-2010
			US 2009308834 A1	17-12-2009

US 2001015355	A1	23-08-2001	NONE	

WO 9942375	A	26-08-1999	AT 231461 T	15-02-2003
			AU 744831 B2	07-03-2002
			AU 2527599 A	06-09-1999
			BR 9908012 A	24-10-2000
			CA 2322527 A1	26-08-1999
			CN 1297411 A	30-05-2001
			DE 69905015 D1	27-02-2003
			DE 69905015 T2	27-11-2003
			DK 1056650 T3	12-05-2003
			EP 1056650 A1	06-12-2000
			ES 2189389 T3	01-07-2003
			HU 0102897 A2	28-11-2001
			JP 4182389 B2	19-11-2008
			JP 2002503599 T	05-02-2002
			MX PA00008060 A	06-08-2002
			US 6382462 B1	07-05-2002

FR 2770832	A	14-05-1999	NONE	
