



- (51) International Patent Classification:  
*B65D 41/28* (2006.01) *B65D 55/02* (2006.01)
- (21) International Application Number:  
PCT/EP2014/057551
- (22) International Filing Date:  
14 April 2014 (14.04.2014)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:  
1307034.7 18 April 2013 (18.04.2013) GB
- (71) Applicant: **OBRIST CLOSURES SWITZERLAND GMBH** [CH/CH]; Romerstrasse 83, CH-4153, Reinach (CH).
- (72) Inventor: **MCPHERSON, Alexander Donald Meiklem**; 16 McKell Court, Falkirk Central Scotland FK1 5PW (GB).
- (74) Agents: **BRYERS LLP** et al.; 7 Gay Street, Bath Bath and North East Somerset BA1 2PH (GB).

- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: TAMPER-EVIDENT CLOSURE

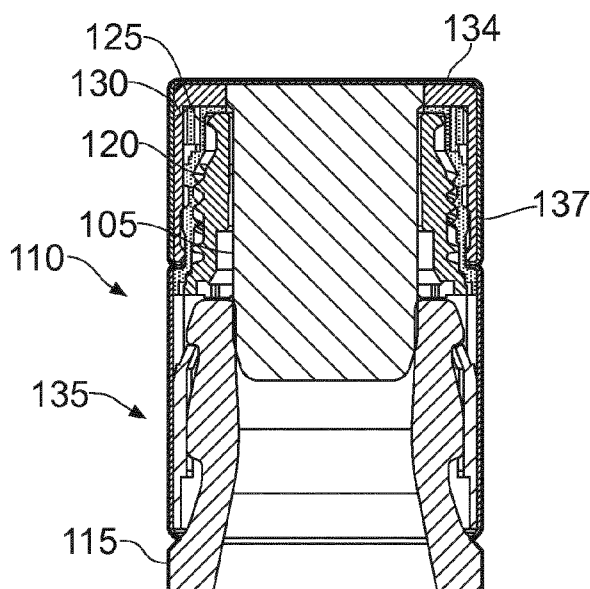


FIG. 10

(57) Abstract: A tamper-evident closure (10) for a container. The closure (10) comprises a first portion (25, 30, 37) including inner and outer parts (25, 30), and a second portion (20, 36). The outer part (30) is rotatable relative to the inner part (25) from a first position in which at least part of the first and second portions are adjacent each other to a second position in which there is a gap (G) therebetween. The first portion (25, 30, 37) comprises locking means for irreversibly locking the closure (10) in the second position upon first opening so that the gap (G) cannot be closed, in which the first portion (25, 30, 37) comprises a compressible stopper (105) for sealing the second portion (20, 36) and/or the container. A tamper-evident closure (10) in combination with a container.



---

**Published:**

— with international search report (Art. 21(3))

— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

## TAMPER-EVIDENT CLOSURE

### Field of the Invention

The present invention relates generally to a closure for a container and  
5 particularly to a closure with means for indicating that a closure has been opened  
at least once.

### Background of the Invention

There is an increasing demand for tamper-indicating systems which ensure that a  
10 container is not re-filled with non-original contents. Whilst it is relatively easy to  
produce some form of tamper-evidence, it is much more difficult to provide  
tamper-evidence which cannot be either overcome without causing the tamper-  
evidence system to activate, or activate and then return to a virtually visually  
identical state so as to appear non-activated.

15

A particularly useful method of providing tamper-evidence is to use a system in  
which a closure is initially located in a first position, but once removed can only  
be returned to a second position which is visually distinct from the first.

20 US 5,738,231 describes a closure with a part which is moved during the opening  
process so that following opening it cannot pass back over projection on a  
container finish. The result is that the closure can only return to position which is  
axially displaced with respect to its original position.

WO 02/096771 describes a closure in which two parts are initially adjacent each other and during the opening process the structure of the closure is changed so that a gap is generated between the two parts as a visual indication that the  
5 closure has been opened at least once.

WO 2005/049443 and WO 2006/117505 also describe closures which generate a gap to indicate they have been opened at least once. In this case the gap is unobstructed. In other words, two parts of the closure are held apart  
10 without the requirement an obstruction.

Such tamper-evident systems are only effective if they cannot be reversed. For example, in systems which use an obstructing member to hold two parts apart it is possible to cut the obstruction member to allow a gap to be closed. WO  
15 2005/049443 and WO 2006/117505 describe closures which generate unobstructed gaps following relative rotation of one part with respect to another. The closures are provided with some internal mechanism for preventing the two parts from being rotated back to their original relative positions. For example, ratchet arrangements present on the side walls of the parts can be used to  
20 prevent unwanted rotation. Such “lateral” ratchet arrangements have been found to be defeatable if sufficient reverse turning torque is applied.

An additional requirement for some closures is to provide a seal to preserve the contents of an associated container.

## Summary of the Invention

According to the present invention there is provided a tamper-evident closure for a container, the closure comprising: a first portion including inner and outer  
5 parts; and a second portion; the outer part is rotatable relative to the inner part from a first position in which at least part of the first and second portions are adjacent each other to a second position in which there is a gap therebetween, the first portion comprises locking means for irreversibly locking the closure in the second position upon first opening so that the gap cannot be closed, in which  
10 the first portion comprises a compressible stopper for sealing the second portion and/or the container.

By combining gap generator closure with a compressible stopper an improved seal can be provided.  
15

The stopper may be formed, for example, from natural and/or synthetic material such as cork and/or a synthetic cork-like material.

The inner part may include a line of weakness which breaks if the outer part is  
20 reverse rotated relative to the inner part.

The line of weakness may consist of a plurality of frangible bridges.

The line of weakness may transversely split the inner part.

The inner part and/or outer part may include a top plate and part of the locking means may be carried on or by the plate/s.

- 5 The locking means may comprise or include a ratchet arrangement.

The second portion may incorporate a pourer.

The closure may further comprise an outer shell.

10

The stopper may extend through the second portion and into the bore of a container neck.

The stopper may depend from a top region of the first portion.

15

The first portion may include a top plate region and the stopper depends and/or extends from and/or through the region.

The stopper may extend into the inner and/or outer part of the first portion.

20

In one embodiment both inner and outer parts of a first portion have respective top plates which include corresponding ratchet parts that engage to prevent relative rotation of the parts. This type of ratchet arrangement may be referred

to as a longitudinal ratchet arrangement, as opposed to known lateral arrangements which are positioned on side walls.

The second portion may be adapted to be connected to a container and the first  
5 portion may comprise a cap. Certain industries demand closures with a first portion comprising a cap and a second portion comprising a sleeve which is connected to a container; for example the spirits industry.

The closure may further comprise a fitment such as a non-return fitment, for  
10 example a ball and float. Alternatively the first portion may be adapted to engage a fitment associated with the container. Certain industries, in particular the spirits industry, demand additional measures to prevent tampering. In-bore fitments, such as non-return fitments, are often fitted to containers to prevent re-filling regardless of other tamper-proofing measures.

15

The closure may include means for preventing the inner part from moving relative to the second portion until it has reached the second position.

The gap may be unobstructed. This means that the closure would not have to  
20 rely on an obstructing member becoming trapped. By forming an unobstructed gap it is not possible to defeat the tamper-evidence by a simple cutting operation. The gap may be formed at the respective adjacent peripheries of the portions. The inner part may include a section which extends beyond the outer part

towards the second portion in the second position; the part may be positioned so as to be visible through the gap.

The second portion may be permanently fixed in its position on the container.

- 5 This can be used to prevent the second portion from being moved to close the gap.

- The first portion may further include a lateral ratchet arrangement for locking the inner and outer parts in the second position. This provides increased resistance  
10 to re-setting.

- The first portion may include engagement formations and the lateral ratchet arrangement is located above the formations. The first portion may include formations, such as screw threads, for engaging the container or in-bore fitment.  
15 In such cases the ratchet arrangement or other locking mechanism may be located above the formations so as to increase the difficulty in accessing and tampering with the locking arrangement.

- Different aspects of the invention may be used separately or together.  
20

Further particular and preferred aspects of the present invention are set out in the accompanying independent and dependent claims. Features of the dependent claims may be combined with the features of the independent claims as appropriate, and in combination other than those explicitly set out in the claims.



### Brief Description of the Drawings

The present invention will now be more particularly described, by way of example, with reference to the accompanying drawings, in which:

5

**Figure 1** is a section of a closure formed according to the present invention in a first, unopened position and shown attached to a container neck;

10

**Figure 2** is a side elevation of the closure of **Figure 1** shown prior to attachment to a container neck;

**Figure 3** shows the closure of **Figure 1** after a first opening stage;

15

**Figure 4** shows the closure of **Figure 2** after a first opening stage;

**Figure 5** shows the closure of **Figure 4** after a second opening stage;

**Figure 6** shows the closure of **Figure 5** after a top cap has been re-fitted;

20

**Figure 7** shows the closure of **Figure 1** following an attempt at reverse opening;

**Figure 8** is a perspective view of the closure of **Figure 7**;

Figure 9 is a side elevation of a closure formed according to the present invention;

Figure 10 is a section of the closure of Figure 9;

5

Figure 11 is a side elevation of the closure of Figures 9 and 10 shown following an opening event;

Figure 12 is a perspective section view of a top cap component of the closure of Figures 9 to 11; and

10

Figure 13 is a side elevation of the closure of Figure 11 when re-closed.

### Description

15 In Figures 1 to 8 a gap generation principle is first described. The principle is applicable to the present invention although it will be appreciated that incorporation of a compressible stopper feature would be required in order to form part of the present invention.

20 Referring first to Figures 1 and 2 there is shown a closure generally indicated 10. In Figure 1 the closure 10 is shown secured onto a container neck 15. The structure and arrangement is similar to that described in WO2009/010722.

The closure 10 comprises a main pourer body 20, an inner part 25 and an outer part 30. A metal shell 35 forms an outer casing to the closure and is divided into a cylindrical lower part 36 and a cup-shape second part 37. The parts 36, 37 are separated at a split line 40 formed by a cutting process once the shell 35 has  
5 been applied to the first and second portions of the closure.

Together the body 20 and the shell part 36 comprise a second portion and the inner and outer parts plus the shell part 37 comprises a cap-like first portion.

10 In this embodiment the upper and lower shell parts 36, 37 are initially joined along the split line 40 by a plurality of frangible bridges which will break if either:  
i) the lower shell part 36 is rotated before initial opening; or ii) an attempt is made to pull the top part of the closure off without unscrewing.

15 The inner part 25 of the closure extends beyond the split line 40 and the open end of the outer part to provide a dog-leg shape terminal portion 90 which rests on a shoulder 20a on the main body 20 so that one half 92 of the terminal portion fits beneath the upper end of the lower shell part 36 and the other half 94 fits in the upper shell part 37. Above the shell split line 40 a plurality of  
20 frangible bridges (not shown) are formed in the inner part 25 to form a split line 85.

The inner part 25 also has a line of weakness 26 provided approximately half way along its side skirt formed by a plurality of frangible bridges 27. This divides the part into a first portion 28 and a second portion 29.

- 5 The main body 20 is fixed onto the container neck 15 by clips 45 which project inwardly and engage under a shoulder 50.

A valve housing 55 is clipped into the main body 20 and includes a sealing lip 57 which seals against the top surface 16 of the container neck 15.

10

A float valve 65 is housed in the housing 55 and can seal against a valve seat 60 to prevent re-filling of the container. A valve control ball 70 is located on top of the float valve 65.

- 15 In normal operation the second part 37 of the shell 35 is rotated anti-clockwise and the unscrewing action breaks the bridges on the split line 40.

- The outer part unscrews together with the second part 37 whilst the inner part remains held on the main body. The unscrewing continues to the position shown  
20 in Figures 3 and 4 until a ratchet locking mechanism locks the outer part to the inner part 25.

With the outer and inner parts locked together the inner part 25 can then be unscrewed from the main body 20. Because the terminal portion 92 is held

under the shell part 36, when the inner part rotates it breaks along the split line 85. The result is that the terminal portion 90 of the inner part remains held on the body so that the half 94 produces a visible upstanding band as shown in Figure 5.

5

When the cap (shell part 37, outer part 30, inner part 25) is screwed back onto the main body 20, a gap G is formed between the first and second shell parts 36, 37. This is because the outer part 30 cannot be screwed completely back down onto the inner part 25 by virtue of the locking mechanism. In addition, the band 10 94 of the inner part 25 projects above the shell part 36 so as to be visible in the gap G as shown in Figure 6.

The gap G formed between the shell parts 36, 37 is unobstructed in the sense that there is no obstruction member trapped between the parts 36, 37.

15

In Figures 7 and 8 the closure of Figures 1 and 2 is shown following an attempt to overcome the tamper evidence by reverse opening.

If the shell part 37 is rotated clockwise the inner part first portion 28 is caused to 20 rotate relative the second portion 29, which causes the bridges 27 to break. The inner part 25 splits along the line 26 and the shell part can be removed with the outer part and the inner part first portion. In other words, if the closure is deliberately (or accidentally) rotated in the direction opposition to that required for

normal operation, in which the gap is generated, then the inner part is caused to break so that thereafter normal operation of the closure is not possible.

There are no internal screw threads on the first portion 28 so the top cap cannot  
5 be screwed back on the main body 20.

The break will occur if reverse opening is attempted (deliberately or accidentally) either before or after the gap is generated.

10 Other gap generation mechanisms are possible in conjunction with the stopper feature of the present invention.

Referring now to **Figures 9 and 10** there is shown a closure 110 formed according to the present invention.

15

The closure 110 is similar to the closure 10 shown in Figures 1-8. Accordingly, an outer shell 135 houses a pourer body 120 and inner 125 and outer parts 130.

20 In this embodiment the pourer 120 is a through bore leading directly to the container neck 115 (as opposed to the pourer body 20 which includes a flow regulation feature). In addition, a generally cylindrical stopper 105 is provided on the top cap component, in this embodiment depending from the top plate 134 of the upper shell part 137. In Figure 10 the stopper 105 is shown to extend

through the bore of the pourer 120 and into the mouth of the neck 115 so as to seal the contents of the container.

In **Figure 12** the stopper 105 is shown forming part of the top cap and extending  
5 from the shell top plate 134 and through the top plate 130 of the outer part 130. The inner part 125 is not shown for clarity. The top plate 131 of the outer part 130 is formed with a central opening 132 for receiving the head 133 of the stopper, with the stopper shank 138 extending away from the head. In some embodiments the outer part may comprise a holding feature (such as a rib  
10 or clip) for locating the stopper. The outer part and stopper can then together be assembled into the shell and, for example, secured using adhesive.

In use, the top cap, including the stopper 105 is grasped and turned. This activates the gap generation mechanism already described in relation to Figures  
15 1-8 so that the cap can be removed as shown in **Figure 11**. When the cap is subsequently replaced the gap G is generated and the band 194 of the inner part 125 projects so as to be visible in the gap, as shown in **Figure 13**. In this position the stopper 105 has re-engaged into the mouth of the neck 115. Because the stopper 105 is formed from a compressible material, such as cork,  
20 an effective seal of the contents of the container is provided.

Other gap generator mechanisms may be used in conjunction with the compressible stopper feature, for example a mechanism as described in US 5,738,231, WO 2005/049443 or WO 2006/117505.

Although illustrative embodiments of the invention have been disclosed in detail herein, with reference to the accompanying drawings, it is understood that the invention is not limited to the precise embodiments shown and that various  
5 changes and modifications can be effected therein by one skilled in the art without departing from the scope of the invention as defined by the appended claims and their equivalents.



## CLAIMS

1. A tamper-evident closure for a container, the closure comprising:  
a first portion including inner and outer parts; and  
5 a second portion;  
the outer part is rotatable relative to the inner part from a first position in  
which at least part of the first and second portions are adjacent each other to a  
second position in which there is a gap therebetween, the first portion comprises  
locking means for irreversibly locking the closure in the second position upon first  
10 opening so that the gap cannot be closed, in which the first portion comprises a  
compressible stopper for sealing the second portion and/or the container.
2. A tamper-evident closure as claimed in claim 1, in which the  
second portion incorporates a pourer.
- 15
3. A tamper-evident closure as claimed in claim 1 or claim 2, in which  
the closure further comprises an outer shell.
4. A tamper-evident closure as claimed in any of claims 1 to 3, in  
20 which the compressible stopper is formed from cork.

5. A tamper-evident closure as claimed in any of claims 1 to 3 in which the compressible stopper is formed from a synthetic cork-like material.

6. A tamper-evident closure as claimed in any preceding claim, in which the locking means comprise a ratchet arrangement.

7. A tamper-evident closure as claimed in any preceding claim, in which the second portion is adapted to be connected to a container and the first portion comprises a cap.

10

8. A tamper-evident closure as claimed in any preceding claim, in which the closure further comprises a non-return fitment.

9. A tamper-evident closure as claimed in any preceding claim, in which the closure includes means for preventing the inner part from moving relative to the second portion until it has reached the second position.

15

10. A tamper-evident closure as claimed in any preceding claim, in which the gap is unobstructed.

20

11. A tamper-evident closure as claimed in any preceding claim, in which the second portion is permanently fixed in its position on a container.

12. A tamper-evident closure as claimed in any preceding claim, in which the first portion includes a lateral ratchet arrangement for locking the inner and outer parts in the second position.

5 13. A tamper-evident closure as claimed in claim 12, in which the first portion includes engagement formations and the ratchet arrangement is located above the formations.

14. A tamper-evident closure as claimed in any preceding claim, in  
10 which the gap is formed at respective adjacent peripheries of the portions.

15. A tamper-evident closure as claimed in any preceding claim, in which the inner part includes a part which extends beyond the outer part towards the second portion in the second position, the part is positioned so as to be  
15 visible through the gap.

16. A tamper-evident closure as claimed in any preceding claim, in which the closure includes a metal shell.

20 17. A tamper-evident closure as claimed in claim 16, in which the shell is associated with the first and second portions and in which the gap is formed within the shell.

18. A tamper-evident closure as claimed in any preceding claim, in which the inner part includes a line of weakness which breaks if the outer part is reverse rotated relative to the inner part.

5 19. A tamper-evident closure as claimed in claim 18, in which the line of weakness transversely divides the inner part.

20. A tamper-evident closure as claimed in any preceding claim, in which the stopper extends through the second portion and into the bore of a  
10 container neck.

21. A tamper-evident closure as claimed in any preceding claim, in which the stopper depends from a top region of the first portion.

15 22. A tamper-evident closure as claimed in any preceding claim, in which the first portion includes a top plate region and the stopper depends and/or extends from and/or through the region.

23. A tamper-evident closure as claimed in any preceding claim, in  
20 which the stopper extends into the inner and/or outer part of the first portion.

24. A wine or spirits closure comprising or including a tamper-evident closure as claimed in any preceding claim.

25. A malt whisky closure comprising or including a tamper-evident closure as claimed in any preceding claim.

26. A tamper-evident closure as claimed in any preceding claim in  
5 combination with a container.

27. A tamper-evident closure substantially as hereinbefore described with reference to, and as shown in, the accompanying drawings.

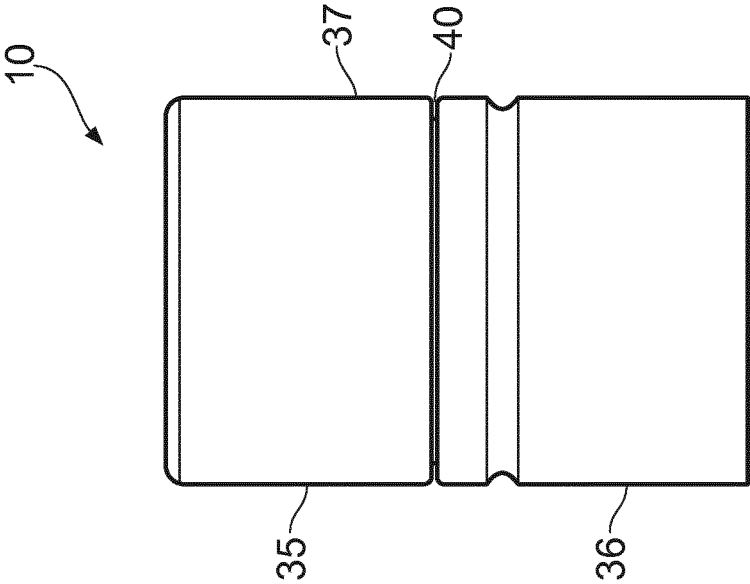


FIG. 2

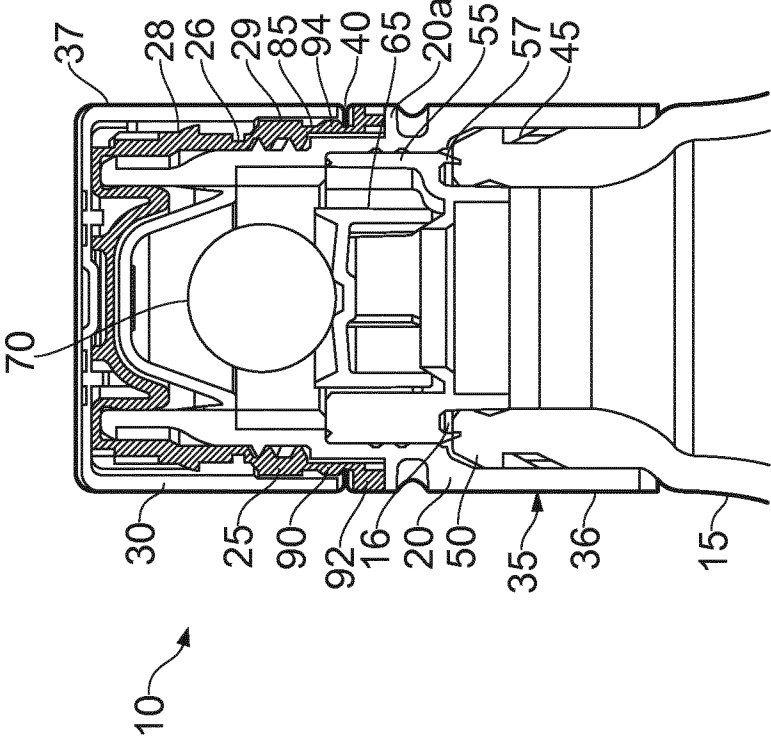


FIG. 1

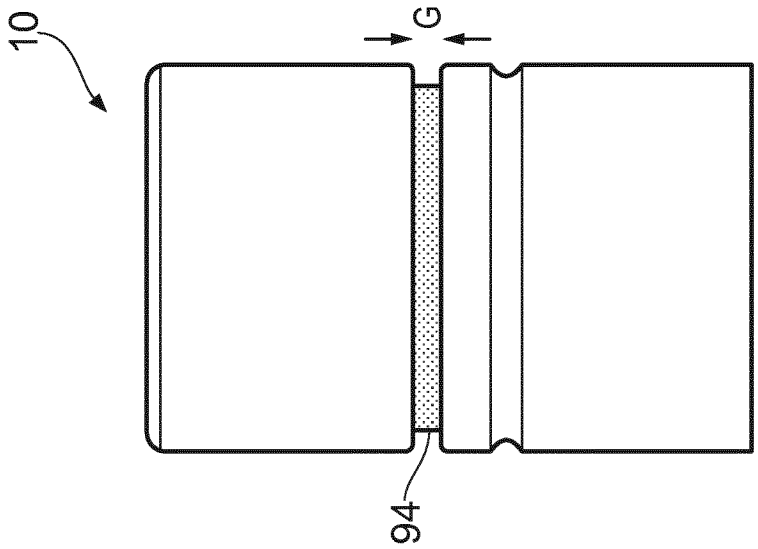


FIG. 4

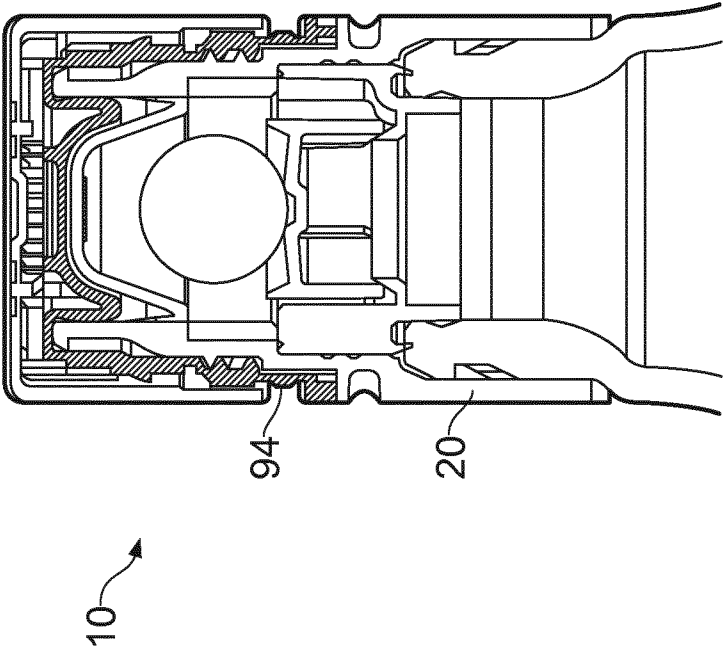


FIG. 3

3/6

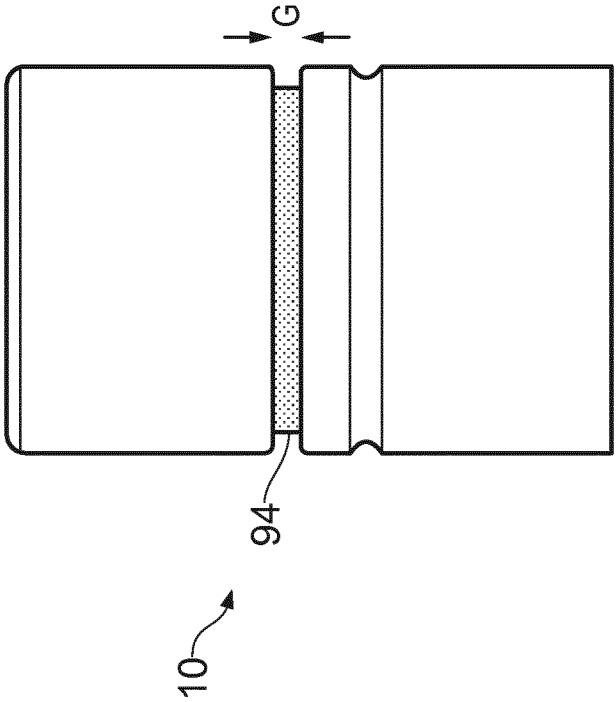


FIG. 6

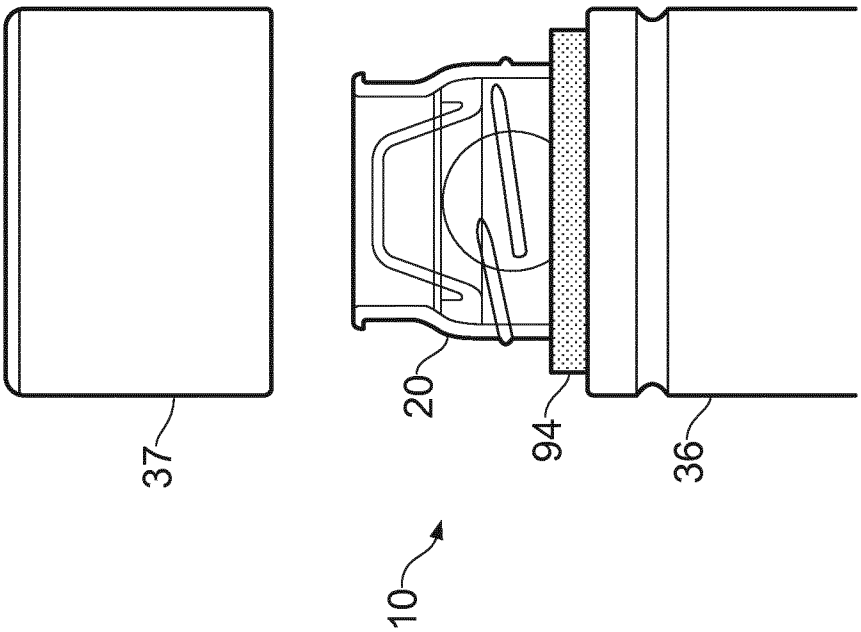


FIG. 5



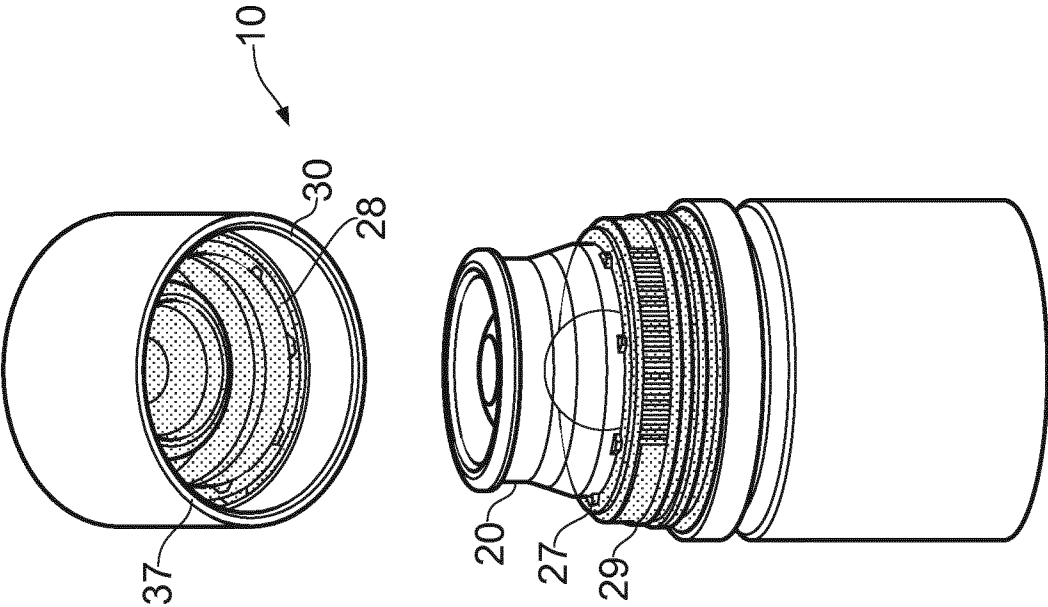


FIG. 8

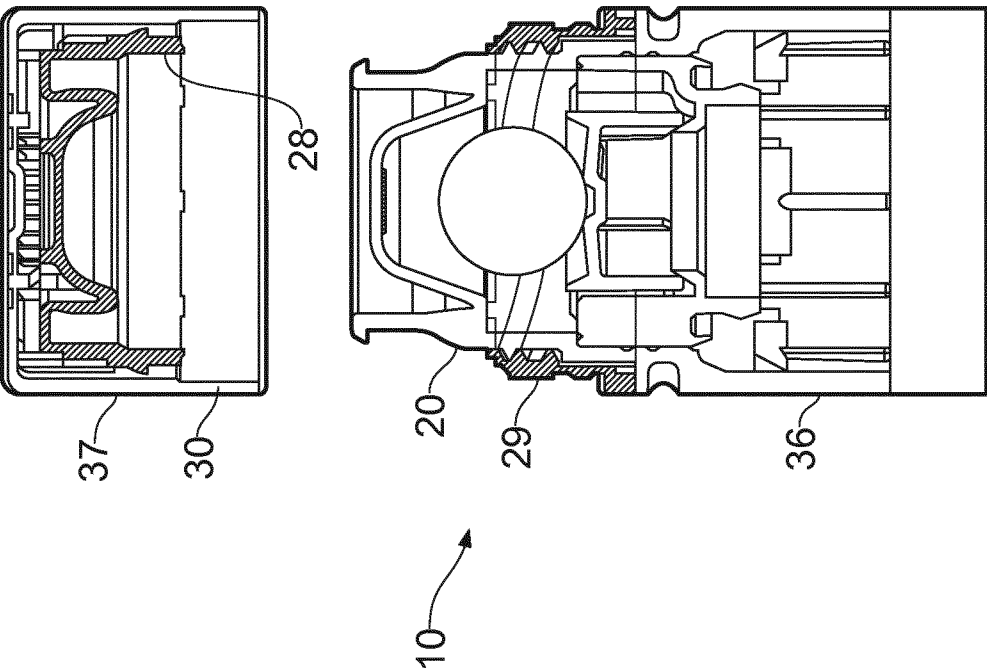


FIG. 7

5/6

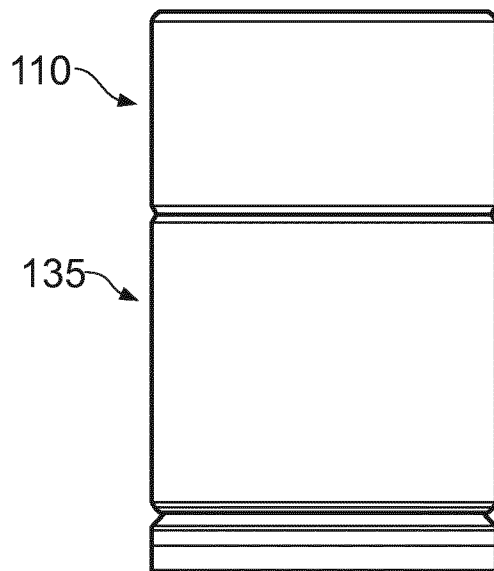


FIG. 9

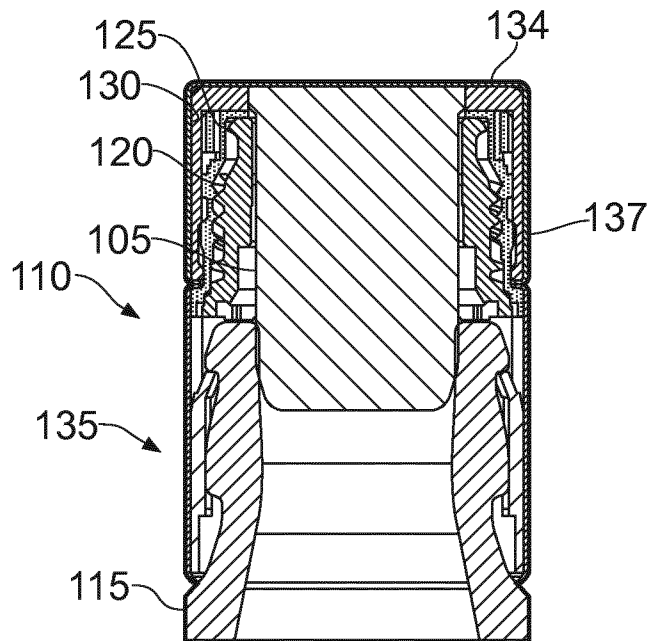


FIG. 10

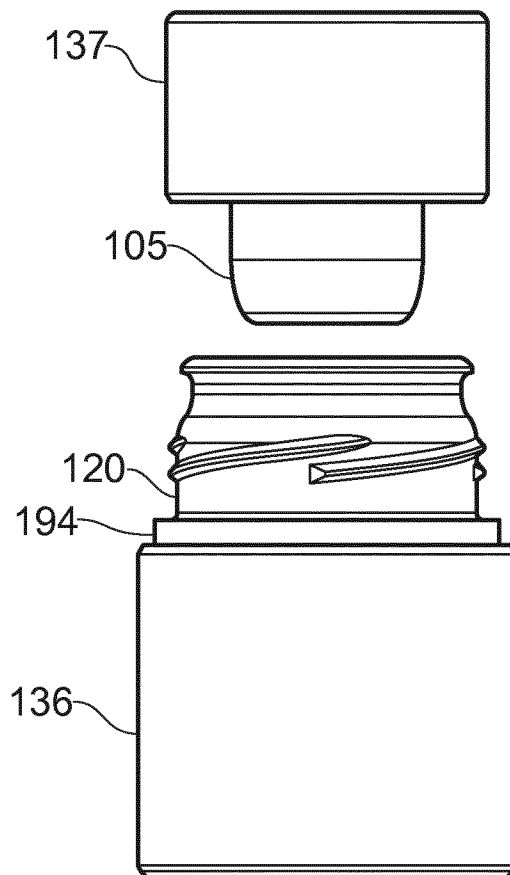


FIG. 11

6/6

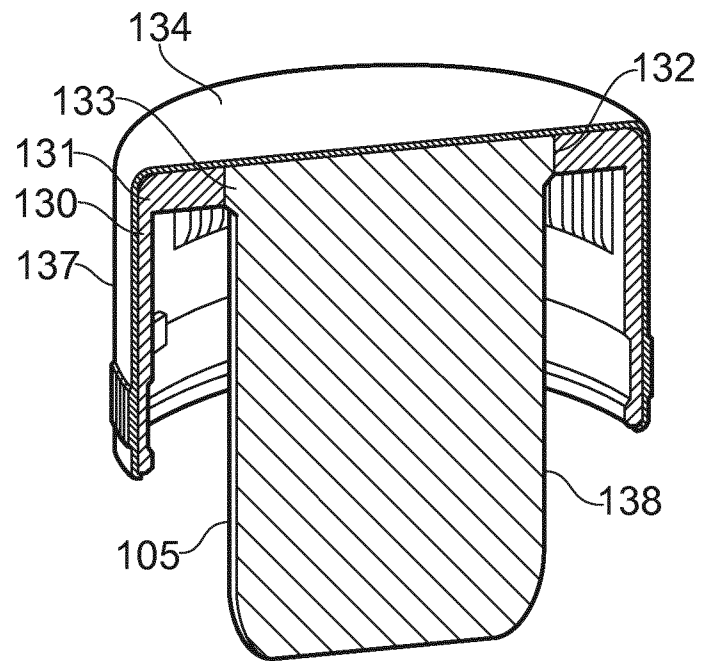


FIG. 12

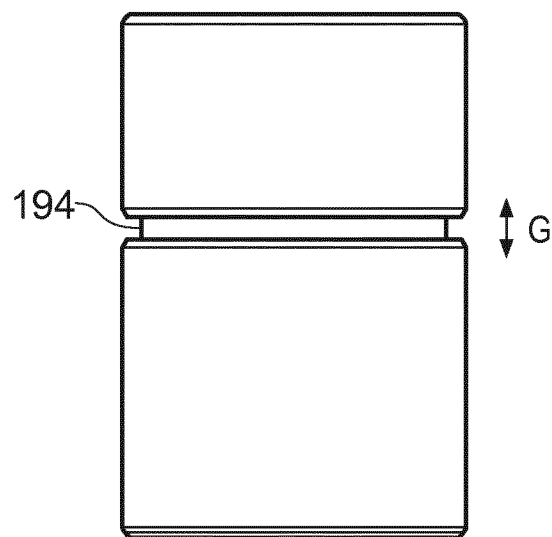


FIG. 13

# INTERNATIONAL SEARCH REPORT

International application No  
PCT/EP2014/057551

A. CLASSIFICATION OF SUBJECT MATTER  
INV. B65D41/28 B65D55/02  
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)  
B65D

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 practicable, search terms used)

EP0-Internal, WPI Data

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2005/049443 A1 (CROWN PACKAGING TECHNOLOGY INC [US]; CROWN PACKAGING UK PLC [GB]; RAMS) 2 June 2005 (2005-06-02) cited in the application the whole document	1-27
A	WO 2011/086407 A2 (CREATIVE GCL S R L [IT]; GIOVANNINI MARCO [IT]; VIALE LUCA [IT]) 21 July 2011 (2011-07-21) page 4, line 18 - page 10, line 24; figures 1-2	1
A	WO 02/096771 A1 (MONTGOMERY DANIEL & SON LTD [GB]; THOMSON DAVID WILLIAM [GB]; MEZZADRA) 5 December 2002 (2002-12-05) abstract; figures 1-7	1



Further documents are listed in the continuation of Box C.



See patent family annex.

\* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

22 July 2014

Date of mailing of the international search report

08/09/2014

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040,  
Fax: (+31-70) 340-3016

Authorized officer

Mans-Kamerbeek, M

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2014/057551

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2005049443 A1	02-06-2005	AT 387382 T	15-03-2008
		BR PI0416014 A	02-01-2007
		DE 602004012149 T2	12-03-2009
		EP 1694576 A1	30-08-2006
		ES 2302040 T3	01-07-2008
		HK 1094438 A1	13-06-2008
		MY 137973 A	30-04-2009
		PT 1694576 E	27-05-2008
		SI 1694576 T1	31-08-2008
		TW 1331118 B	01-10-2010
		US 2007090110 A1	26-04-2007
		US 2013206765 A1	15-08-2013
		WO 2005049443 A1	02-06-2005
-----			
WO 2011086407 A2	21-07-2011	CN 102725203 A	10-10-2012
		CO 6561834 A2	15-11-2012
		EA 201201020 A1	30-01-2013
		EP 2523865 A2	21-11-2012
		KR 20120109628 A	08-10-2012
		US 2012279940 A1	08-11-2012
		WO 2011086407 A2	21-07-2011
-----			
WO 02096771 A1	05-12-2002	AT 305420 T	15-10-2005
		BR 0210018 A	10-08-2004
		CN 1524053 A	25-08-2004
		DE 60206374 T2	13-07-2006
		EP 1392575 A1	03-03-2004
		ES 2249582 T3	01-04-2006
		GB 2377699 A	22-01-2003
		MX PA03010696 A	07-03-2005
		PL 367335 A1	21-02-2005
		US 2004129729 A1	08-07-2004
		WO 02096771 A1	05-12-2002
-----			