(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 765 090 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
13.08.2014 Bulletin 2014/33

(51) Int Cl.:
B65D 55/02 *(2006.01)*

(21) Application number: **13425024.0**

(22) Date of filing: **08.02.2013**

(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 RS SE SI SK SM TR
Designated Extension States:
BA ME

(71) Applicant: **Guala Closures S.p.A.**
15122 Alessandria (IT)

(72) Inventors:
- **Mittino, Maurizio**
  15040 Castelletto Monferrato (AL) (IT)
- **Johnson, Stuart**
  Kirkintilloch
  Glasgow G66 1ST (GB)
- **Giovannini, Marco**
  20121 Milan (IT)

(74) Representative: **Bonvicini, Davide et al**
Perani & Partners
Piazza San Babila, 5
20122 Milano (IT)

(54) **Tamper evident closure**

(57) The present invention relates to a tamper evident closure (1) for closing the mouth (11) of a container (10). The closure (1) has an inner part (20), an outer part (30) movable relative to the inner part (20) from a first position, corresponding to the position prior to first opening, to a second position, first reversible attachment means (40), capable of attaching the inner part (20) to the container (10) and second irreversible attachment means (50) capable of locking longitudinally said outer part (30) relative to the inner part (20) in the second position. The second attachment means (50) comprise a deformable annular member (51) housed in the closure (1) and cooperating with the inner part (20) and the outer part (30) to lock the outer part (30) relative to the inner part (20) in the second position.

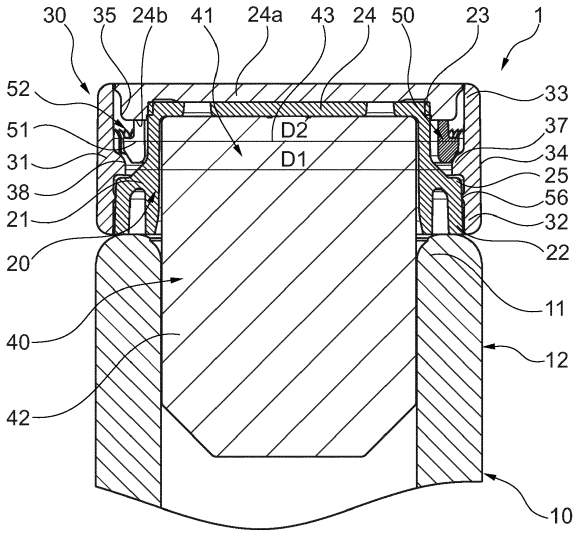

Fig. 2

EP 2 765 090 A1

Description

TECHNICAL FIELD

[0001] The present invention relates to a tamper evident closure, i.e. a closure comprising devices that can provide evidence of first opening.

BACKGROUND OF THE INVENTION

[0002] WO 2011/086407 discloses a tamper evident closure with inner and outer parts, wherein the outer part moves relative to the inner part upon first opening. The inner part may be made of cork, possibly of synthetic nature, or of screw type, adapted to be tightened to a threaded pouring device applied to the neck of the bottle. The outer part is adapted to be grasped by a user to open the closure and move the outer part relative to the inner part from a first position, prior to first opening, to a second position, after first opening. Irreversible attachment means are provided to prevent the outer part to move back to the position prior to first opening once the outer part is in the second position. Various embodiments of the irreversible attachment means are proposed.

[0003] With some embodiments, the attachment means are made integral with the inner part. This has the drawback that the design of the attachment means is bound by the inner part.

[0004] With other embodiments, the attachment means are separate from the inner part but their structure does not guarantee a reliable locking of the outer and inner parts in the second position. Moreover, their arrangement makes difficult to assembly the closure.

[0005] In view of the above prior art, the object of the present invention is to provide a tamper evident closure having a strong locking between outer and inner parts, which can be simply manufactured and which makes available a wide range of choice for designing the attachment means.

SUMMARY OF THE INVENTION

[0006] According to the present invention, this purpose is fulfilled by a tamper evident closure according to claim 1.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] The characteristics and advantages of the present invention will appear from the following detailed description of one practical embodiment, which is given as a non limiting example with reference to the annexed drawings, in which:

- figure 1 shows a closure according to a first embodiment of the invention, applied to a bottle neck, prior to first opening,
- figure 2 shows a sectional view of the closure of figure 1,
- figure 3 shows the closure of figure 1 upon first opening, which is the same configuration it has when it is reclosed,
- figure 4 shows a sectional view of the closure of figure 2,
- figures 5 and 6 show exploded views of the closure of figure 1,
- figure 7 shows a closure according to a second embodiment of the invention, applied to a bottle neck, prior to first opening,
- figure 8 shows a sectional view of the closure of figure 7,
- figure 9 shows the closure of figure 7 upon first opening, which is the same configuration it has when it is reclosed,
- figure 10 shows a sectional view of the closure of figure 9,
- figure 11 shows the sectional view of a closure according to a third embodiment of the invention, applied to a bottle neck, prior to first opening,
- figure 12 shows the closure of figure 11 upon first opening, which is the same configuration it has when it is reclosed,
- figure 13 shows a closure according to a fourth embodiment of the invention, applied to a bottle neck, prior to first opening,
- figure 14 shows a sectional view of the closure of figure 13,
- figure 15 shows a sectional view of the closure of figure 13, with the tear off band removed,
- figure 16 the sectional view of a closure according to a fifth embodiment of the invention, applied to a bottle neck, prior to first opening.

DETAILED DESCRIPTION

[0008] Referring to the figures 1 to 6, there is shown a tamper evident closure 1 according to a first embodiment of the invention.

[0009] The closure 1 is intended to close the mouth 11 of a container 10, e.g. a bottle, such as a glass bottle, e. g. for spirits.

[0010] The container 10 comprises a neck 12 that terminates in the mouth 11.

[0011] The closure 1 extends along a longitudinal direction X-X and comprises an inner part 20 and an outer part 30.

[0012] While the closure 1 in itself may be oriented in any direction, for the purposes of the present direction, conventionally the lower side will be the side of the closure 1 designed to face towards the container 10, and the upper side will be the opposite one.

[0013] The outer part 30 is able to be grasped for opening and closing the closure 1 and is movable relative to the inner part 20 from a first position, corresponding to the position prior to first opening, to a second position.

[0014] The outer part 30 comprises a tubular sleeve

31 extending longitudinally from a lower portion 32 and an upper portion 33. The tubular sleeve 31 has an outer surface 34 able to be grasped for opening and closure the closure 1 and an inner surface 35 facing the inner par 20.

[0015] The outer part 30 is movable relative to the inner part 20 along the longitudinal direction X-X.

[0016] The closure 1 comprises first reversible attachment means 40, capable of attaching the inner part 20 to the container 10 for opening and closing the container 10 and second irreversible attachment means 50 capable of locking longitudinally the outer part 30 relative to the inner part 30 in the second position.

[0017] Prior to first opening, the outer part 30 is, in a first configuration, free to rotate relative to the inner part 20 so that a user is forced to move the outer part 30 longitudinally upward to perform first opening of the closure 1.

[0018] However, as it will be explained with reference to a different embodiment, third attachment means 70 may be provided to prevent longitudinal and/or rotational movement of the outer part 30 relative to the inner part 20 until said third attachment means are released.

[0019] It is also pointed out that figures 1-16 show an unthreaded closure 1 according to different embodiments of the present invention. According to these embodiments, the first attachment means 40 comprise a stopper 41 configured to allow sealable engagement inside the neck 12 of the container 10. Such stopper may be made of cork, synthetic cork or other materials.

[0020] Alternatively, the first attachment means 40 may comprise threads for engagement with threads associated with the container 10. The container may be threaded itself or a threaded pouring device may be fixed to the neck 12 of the container 10.

[0021] The inner part 20 comprises a tubular member 21 firmly attached, longitudinally and rotationally to the first attachment means 40. The tubular member 21 extends longitudinally from a lower portion 22 and an upper portion 23. At the upper portion 23, the tubular member 21 comprises a transverse wall 24 extending substantially perpendicular to the longitudinal directions X-X.

[0022] The lower portion 22 is directly engaged with the upper edge of the neck 12 defining the mouth 11.

[0023] A cover 24a is positioned above the transverse wall 24 and firmly attached to the transverse wall 24, such as by ultrasonic welding, glue or other means able to create a firm bond.

[0024] In the figures 1-6, the upper portion 33 defines a upper opening 33a for accommodating the cover 24a.

[0025] The stopper 41 has a lower part 42 capable of engaging inside the neck 12 of the container 10 and an upper part 43 attached to the tubular member 21, in particular to the transverse wall 24. In order to attach the stopper 41 to the transverse wall 24, ultrasonic welding may be used. Alternatively, glue or other means to create a firm bond may be used.

[0026] Upon first opening, the inner part 20 remains longitudinally stationary with respect to the container 10 and the outer part 30 moves relative to the inner part 20 and the container 10 from the first position to the second position. In the second position, the second attachment means 50 lock longitudinally the outer part 30 relative to the inner part 20 so that the outer part 30 cannot be moved back to the first position.

[0027] When the second part 30 reaches the second position, the first reversible attachment means 40 can be released to remove the closure 1 from the container 10.

[0028] In other words, the second attachment means 12 allow the outer part 30 to move relative to the inner part 20 from the first position to the second position and lock irreversibly the outer part 30 relative to the inner part 20 in the second position once the outer part 30 has reached the second position.

[0029] Upon reclosing the container 10 and reapplying the closure 1 to the neck 12, the outer part 30 cannot be moved back to the first position and a lower portion of the inner part 20, such as the lower portion 22, is visible thereby giving evidence that the container 10 has been opened. This visible portion of the inner part 20 represents a first tamper evident feature of the closure 1. It is pointed out that, in order to perform the tamper evident function, the visibility of the lower portion 22 - visible in the second position - has to be prevented in the first position.

[0030] According to the embodiment of figures 1-6, the closure 1 has a top surface defined by a portion of the inner part 20 and a portion of the outer part 30. In the figures, the portion of the inner part 20 is the cover 24a and the portion of the outer part 30 is the upper portion 33 of the tubular sleeve 31. In particular, prior to first opening, the cover 24a is substantially flush with the upper portion 33. When the outer part 30 is in the second position, the cover 24a is lowered relative to the upper portion 33 so that an upper portion 35a of the inner surface 35 of the outer part 30 is visible through the upper opening 33a. This represents a second tamper evident feature of the closure 1.

[0031] The second attachment means 50 comprise a deformable annular member 51 housed in the closure 1 and cooperating with the inner part 20 and the outer part 30 to lock the outer part 30 relative to the inner part 20 in the second position. The annular member 51 is separate from the inner part 20 and the outer part 30.

[0032] Since the annular member 51 is a separate element from the inner part 20 and the outer part 30, it can be made of any material, even different from the material of the inner and outer parts. Furthermore, the annular member 51 may undergo elastic deformations independently of the inner part 20 and outer part 30. This further improves the reliability and strength of the locking between these two parts.

[0033] Advantageously, the locking surface made available by the annular member 51 develops substantially over an entire circumference thereby improving the locking strength.

[0034] According to one embodiment, upon first opening, the annular member 51 remains longitudinally stationary with respect to the inner part 20 and the container 10 and the outer part 30 moves relative to the annular member 51 from the first position to the second position. In the second position, the annular member 51 engages a locking surface 36 of the outer part 30. To this purpose, the annular member 51 comprises a locking surface 52 intended to engage the locking surface 36 of the outer part 30 in the second position.

[0035] The locking surface 36 is defined by a lower surface of an annular protrusion 37 formed on the inner surface 35 of the outer part 30.

[0036] According to one embodiment, the annular member 51 is positioned in a annular seat 25 formed between the inner part 20 and the outer part 30. Therefore, the inner part 20 and the outer part 30 delimit radially the annular seat 25. The annular seat 25 is closed on the lower side by an upper portion 38 of the annular protrusion 37 and on the upper side by the cover 24a. In the example, the annular member 51 has a lower portion 55 resting on the upper portion 38 of the annular protrusion 37 and an upper portion 56 on which a lower surface 24b of the cover 24a rests. By this way, the annular member 51 can be easily positioned within the annular seat 25 during the manufacturing process. Then the annular seat 25 can be closed on the upper side by placing the cover 24a.

[0037] Upon first opening, the outer part 30, and therefore the annular protrusion 37, moves relative to the inner part 20 and the annular member 51. The minimum diameter D1 of the annular protrusion 37 is smaller than the maximum diameter D2 of the annular member 51. Due to the fact that the annular member 51 is deformable, it deforms inwardly in order to let the annular protrusion 37 to pass over longitudinally. As soon as the annular protrusion 37 passes over the annular member 51, the locking surface 52 of annular member 51 engages beneath the locking surface 36 of the outer part 30. The engagement of the locking surfaces 52,36 is irreversible so that any disengagement of these locking surfaces 52,36, following an effort of a forger to recover the position of the outer part 30 prior to first opening, such as by pressing downwards the outer part 30, is prevented.

[0038] In order to avoid any downward movement of the annular member 51 after first opening, when the outer part 30 is in the second position, the lower portion 55 engages an annular groove 56 formed in the inner surface 35 of the outer part 30.

[0039] According to a preferred embodiment, the annular member 51 is at least radially deformable.

[0040] In the example shown in the figures, the annular member 51 is a split ring having two separate ends 53,54.

[0041] Advantageously, the annular protrusion 37 exhibits a continuous locking surface 36 developing circumferentially aver substantially the entire length of the split ring 51.

[0042] Alternatively, the annular member 51 may be a closed ring. In this case, it is advantageous to provide a plurality of protrusion and a plurality of depressions in the outer part 30. During first opening, portions of the annular member 51 may pass through corresponding depressions of the outer part 30 to allow passage of the remaining portions of the annular member 51 over corresponding protrusions of the outer part 30.

[0043] Advantageously, in the second position, the outer part 30 becomes also rotationally locked relative to the inner part 20. To this purpose, the inner part 20 comprises longitudinal ridges 26 adapted to engage longitudinal ridges 39 formed on the inner surface 35 of the outer part 30.

[0044] The second embodiment of figures 7-10 will be now described with the assumption that the differences with the first embodiment will be only mentioned, whereby all that is not expressly described as different may be intended to be provided in a similar or identical manner.

[0045] In this embodiment, prior to first opening, a portion 25 of the cover 24a is offset relative to the upper portion 33. When the outer part 30 is in the second position, this portion 25 of the cover 24a is flush with the upper portion 33.

[0046] According to the third embodiment of figures 11,12, an outer capsule 60 is arranged around the outer part 30. The outer capsule 60 comprises a tubular element 61 extending longitudinally between a lower portion 62 and an upper portion 63 and closed on the upper side by a transverse wall 64 at the upper portion 63. The tubular element 61 is attached rotationally and longitudinally to the tubular sleeve 31 while the transverse wall 64 is positioned above the cover 24a and it is longitudinally movable relative to the cover 24a together with the outer part 30. In other words, the cover 24a and the transverse wall 64 are unbound.

[0047] With this embodiment, the top surface of the closure 1 is defined by the top surface of the outer capsule 60, that is by the transverse wall 64. When the outer part 30 is in the second position, the cover 24a is lowered relative to the upper portion 33 and relative to the transverse wall 64. In case the transverse wall 24 is partially transparent, an upper portion 35a of the inner surface 35 of the outer part 30 is visible through the upper opening 33a as for the first embodiment.

[0048] According to the fourth embodiment of figures 13-15, third attachment means 70 are provided to prevent longitudinal and/or rotational movement of the outer part 30 relative to the inner part 20 until said third attachment means are released.

[0049] In the figures, the third attachment means 70 comprise a tear off band 71 connected with the outer part 30 by a frangible portion 72, in the example a plurality of bridges. When the tear off band 71 is torn, the frangible portion 72 breaks and the outer part 30 can be moved longitudinally away from the inner part 20 to open the closure 1.

[0050] According to the fifth embodiment of figure 16, the tear off band 71 is connected with the inner part 20

by a frangible portion 72 which breaks when the tear off band 71 is torn.

[0051] The way in which the invention has been described shall not be intended to limit its operation and implementation in any manner.

[0052] It will be appreciated that the closure of the present invention fulfills the intended purposes. Also, the present closure combines the advantages of simple manufacturing process with strength and simplicity of use and handling.

[0053] Those skilled in the art will obviously appreciate that a number of changes and variants may be made to the arrangements as described hereinbefore to meet incidental and specific needs.

[0054] For example, unless otherwise imposed by evident technical limitations, any feature described in a preferred embodiment may be clearly used in another embodiment, with appropriate adaptations.

[0055] Likewise, the continuity of the closure components may be broken in any manner, provided that no functional alteration to the relevant component is caused thereby. Also, slight tapers may be imparted to the portions described above as having an annular, cylindrical shape, in response to technological requirements.

[0056] All the changes will fall within the scope of the invention, as defined in the following claims.

Claims

1. A tamper evident closure (1) for closing the mouth (11) of a container (10) having a mouth (11), said tamper evident closure (1) extending along a longitudinal direction (X-X) and comprising:

- an inner part (20),
- an outer part (30) able to be grasped for opening and closing the closure (1), said outer part (30) being movable relative to said inner part (20) from a first position, corresponding to the position prior to first opening, to a second position,
- first reversible attachment means (40), capable of attaching said inner part (20) to said container (10) for opening and closing the container,
- second irreversible attachment means (50) capable of locking longitudinally said outer part (30) relative to said inner part (20) in said second position,

wherein:

- upon first opening, said inner part (20) remains axially stationary with respect to the container (10) and said outer part (30) moves relative to the inner part (20) and the container from the first position to the second position,
- when said outer part (30) is in said second position, said first reversible attachment means (40) can be released to remove the closure (1) from the container,

characterized in that

- said second attachment means (50) comprise a deformable annular member (51) housed in said closure (1) and cooperating with said inner part (20) and said outer part (30) to lock said outer part (30) relative to said inner part (20) in said second position.

2. A tamper evident closure (1) according to claim 1, wherein said deformable annular member (51) is at least radially deformable.

3. A tamper evident closure (1) according to claim 1 or 2, wherein said deformable annular member (51) is a split ring having two separate ends (53,54).

4. A tamper evident closure (1) according to any of preceding claims, wherein, upon first opening, the annular member (51) remains longitudinally stationary with respect to the inner part (20) and the container (10) and the outer part (30) moves relative to the annular member (51) from the first position to the second position.

5. A tamper evident closure (1) according to claim 4, wherein the annular member (51) comprises a locking surface (52) intended to engage, in the second position, a locking surface (36) of the outer part (30).

6. A tamper evident closure (1) according to claim 5, wherein the outer part (35) has an inner surface (35) and an annular protrusion (35) formed on the inner surface (35), the locking surface (36) of the outer part (30) being defined by a lower surface of said annular protrusion (37).

7. A tamper evident closure (1) according to claim 6, wherein:

- the annular protrusion (37) has a minimum diameter (D1) and the annular member (51) has a maximum diameter (D2), where D1<D2,
- upon first opening, the annular protrusion (37) of the outer part (30) moves relative to the inner part (20) and the annular member (51) so that the annular member (51) deforms inwardly to allow the annular protrusion (37) to pass over longitudinally.

8. A tamper evident closure (1) according to claim 7, wherein, in the second position, the locking surface (52) of annular member (51) engages beneath the locking surface (36) of the outer part (30).

9. A tamper evident closure (1) according to any of preceding claims, wherein, the annular member (51) is positioned in a annular seat (25) formed between the inner part (20) and the outer part (30).

10. A tamper evident closure (1) according to any of preceding claims, wherein, in the second position, the outer part (30) becomes rotationally locked relative to the inner part (20).

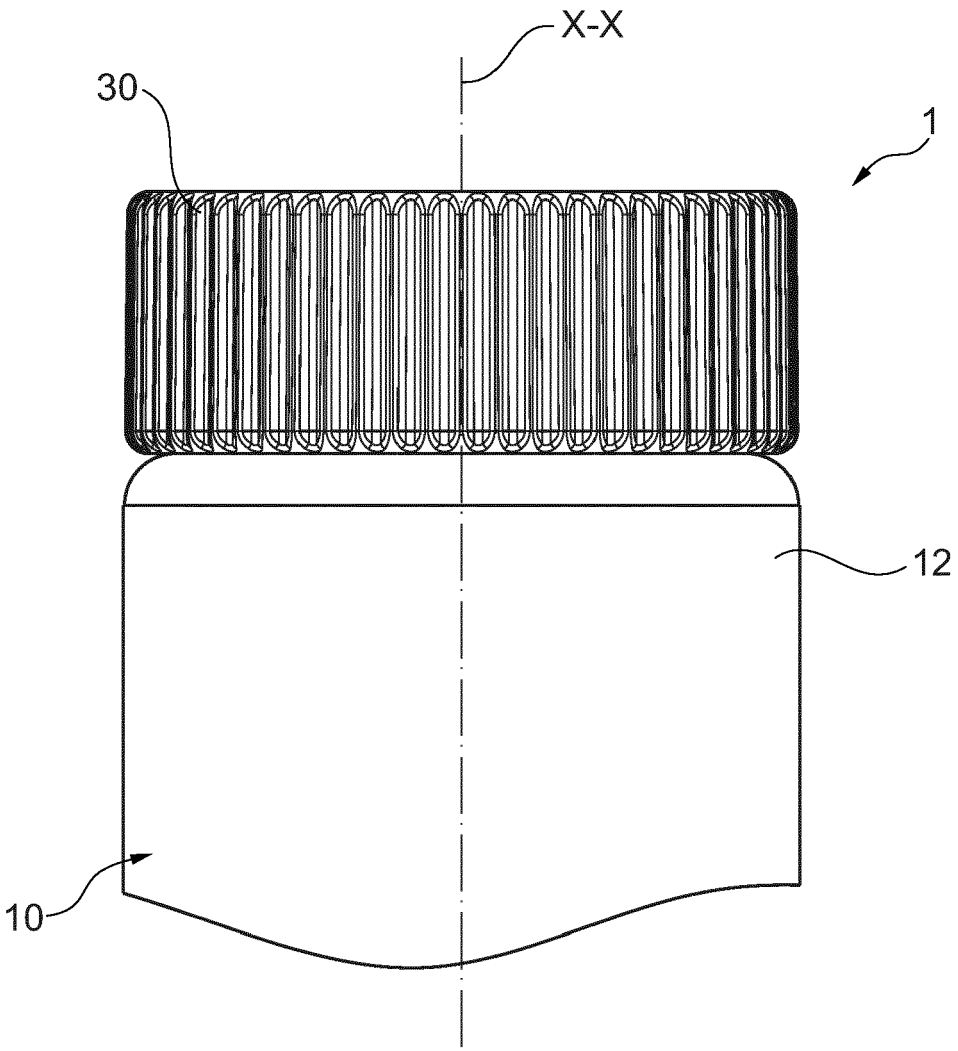

Fig. 1

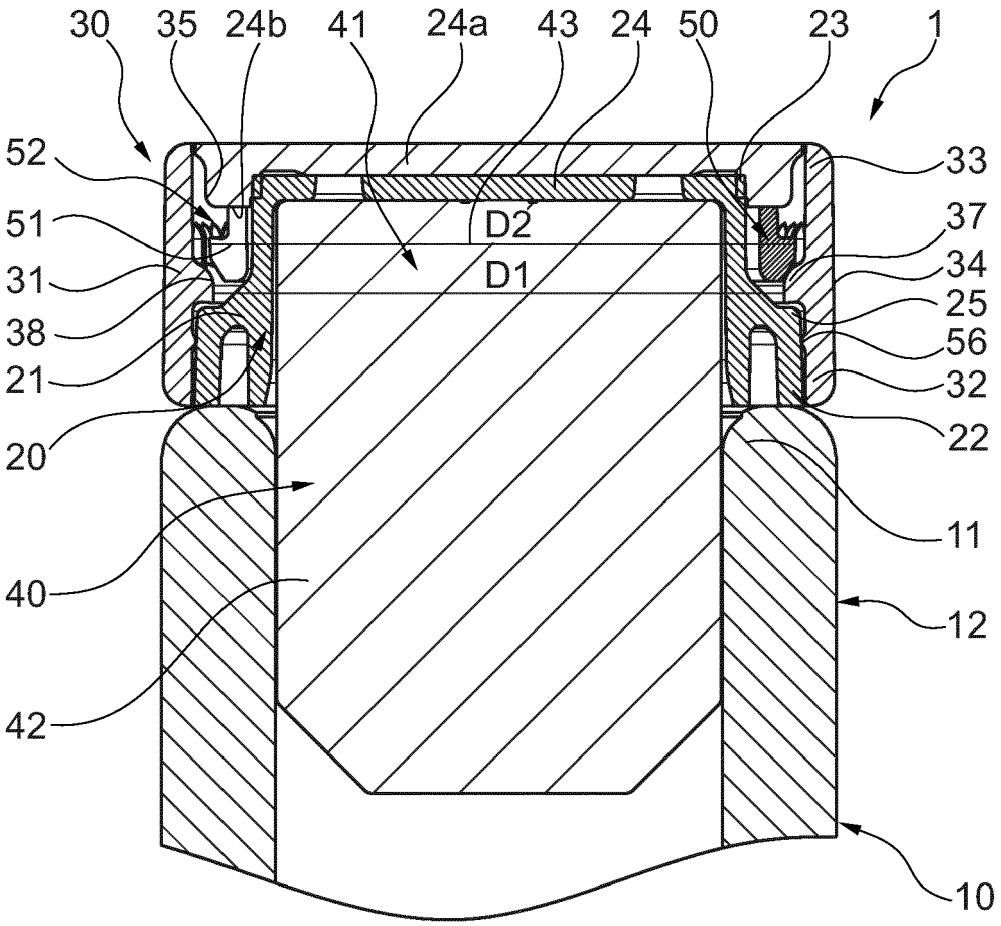
30
35
24b
41
24a
43
24
50
23
1
52
51
31
38
21
20
40
42
33
37
34
25
56
32
22
11
12
10
D2
D1

Fig. 2

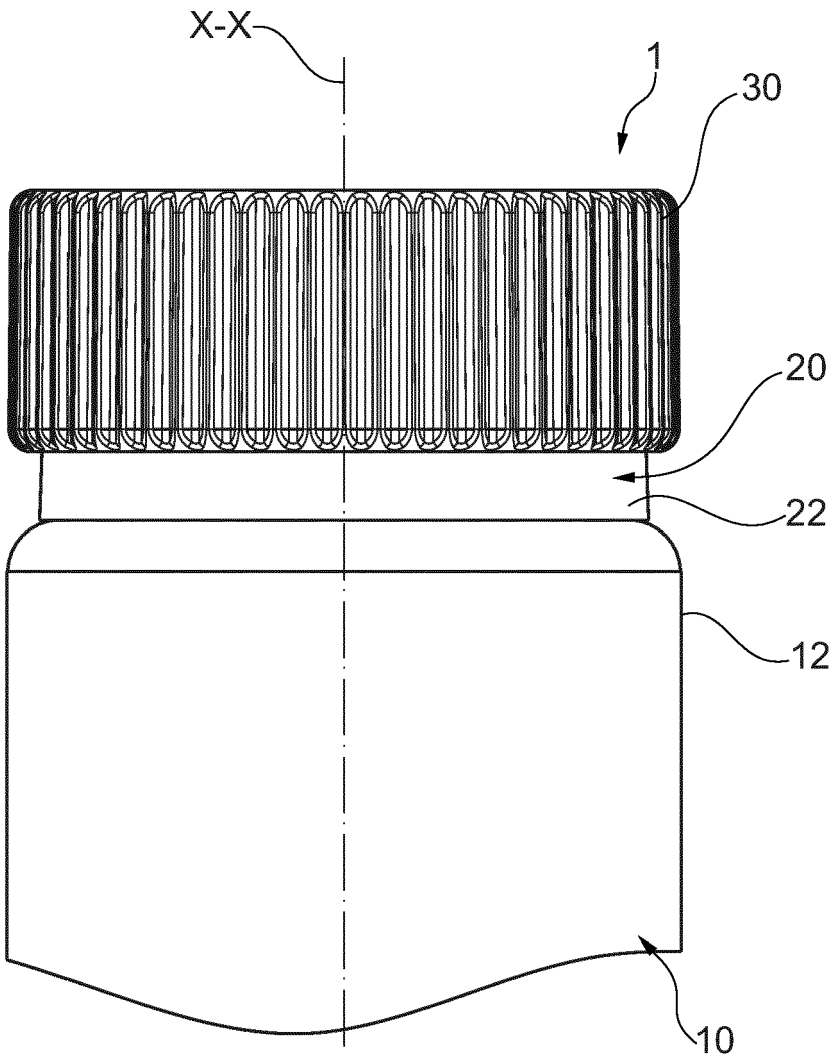

Fig. 3

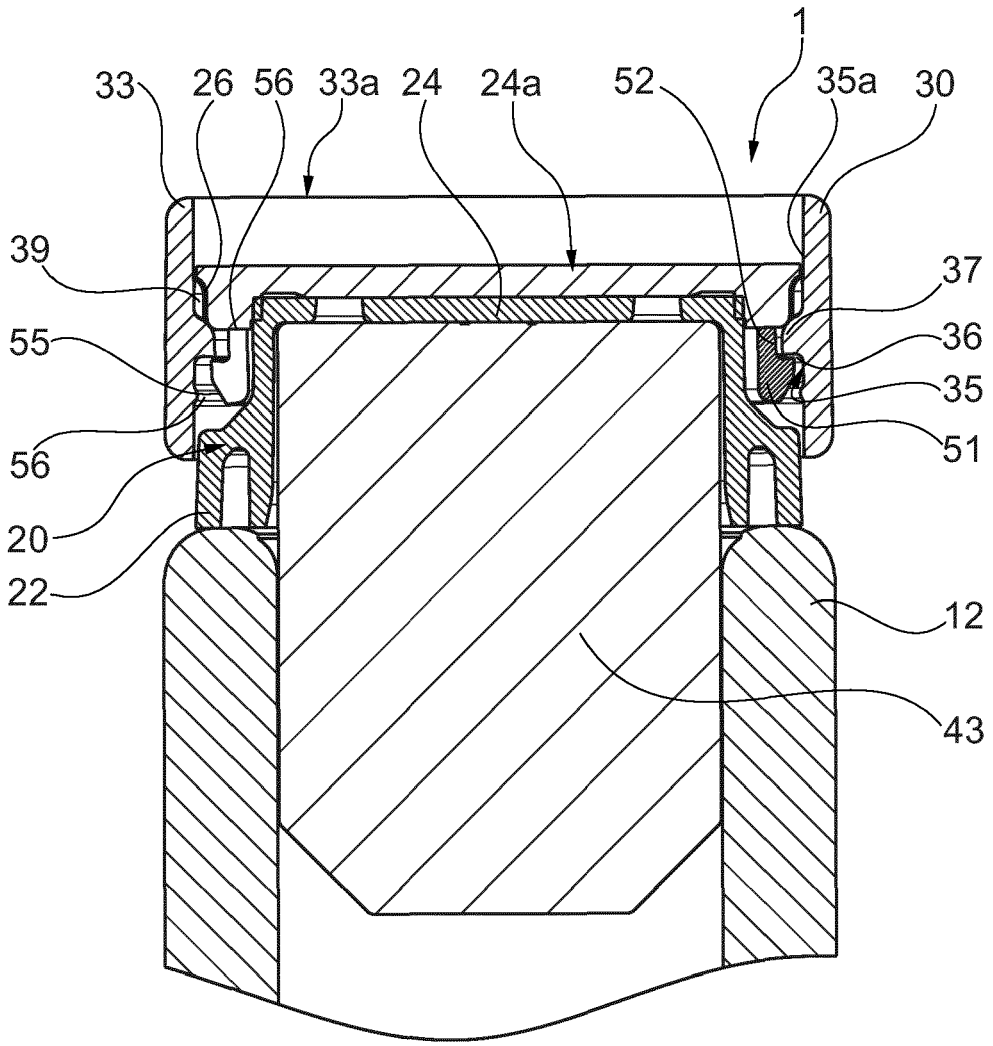

Fig. 4

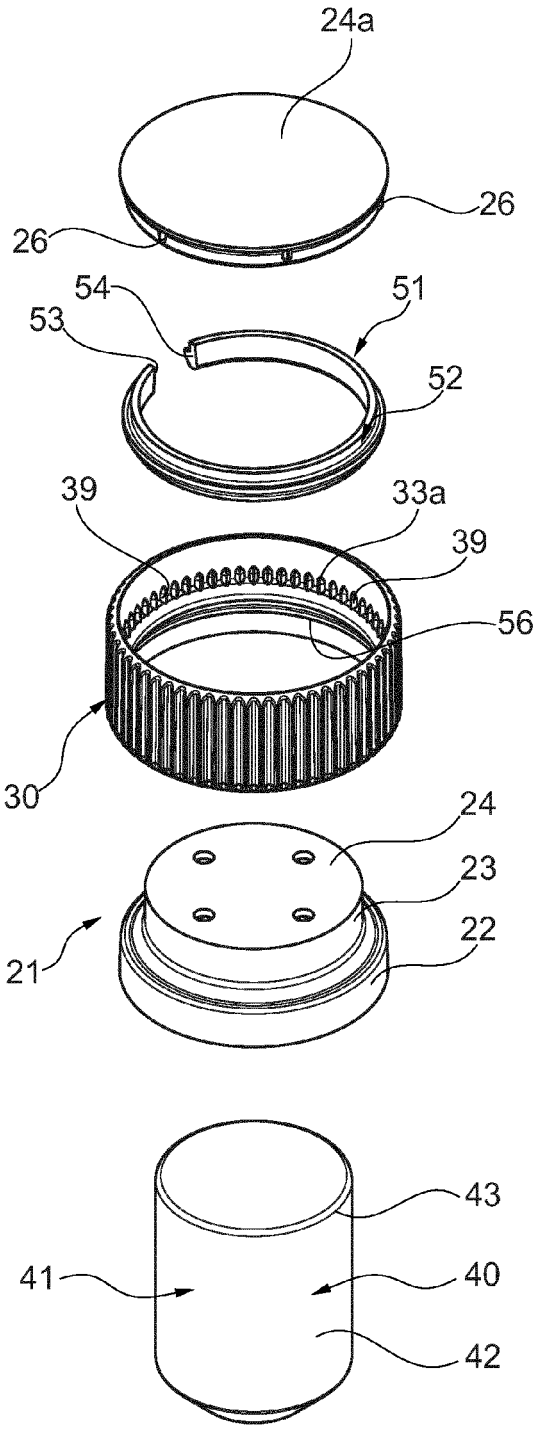
24a
26
26
54
51
53
52
39
33a
39
56
30
24
23
21
22
43
41
40
42

Fig. 5

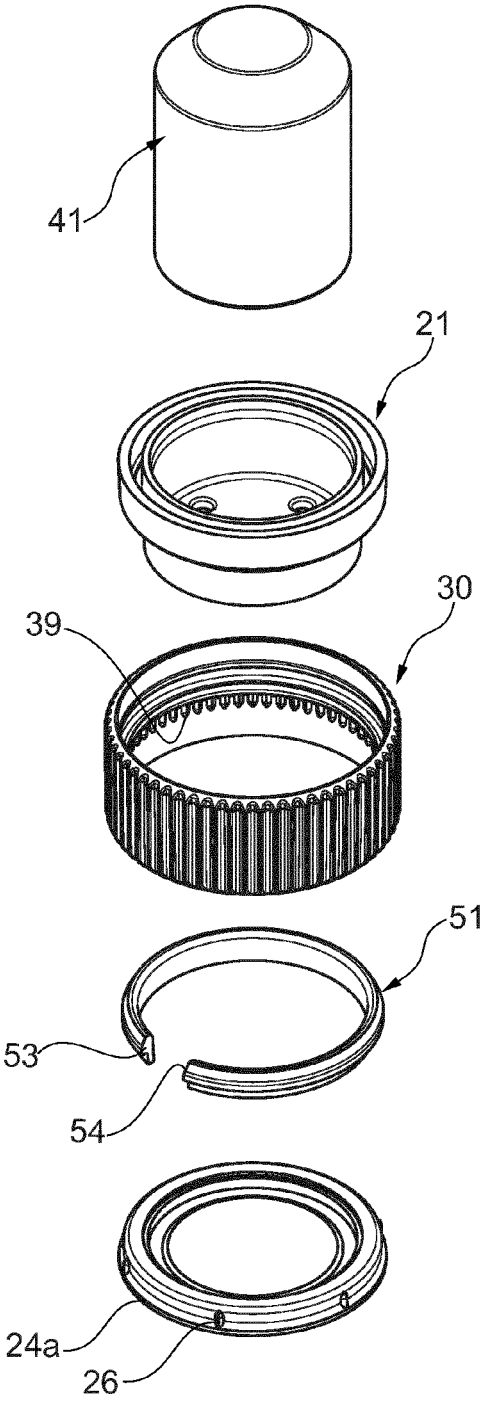
41
21
30
39
51
53
54
24a
26

Fig. 6

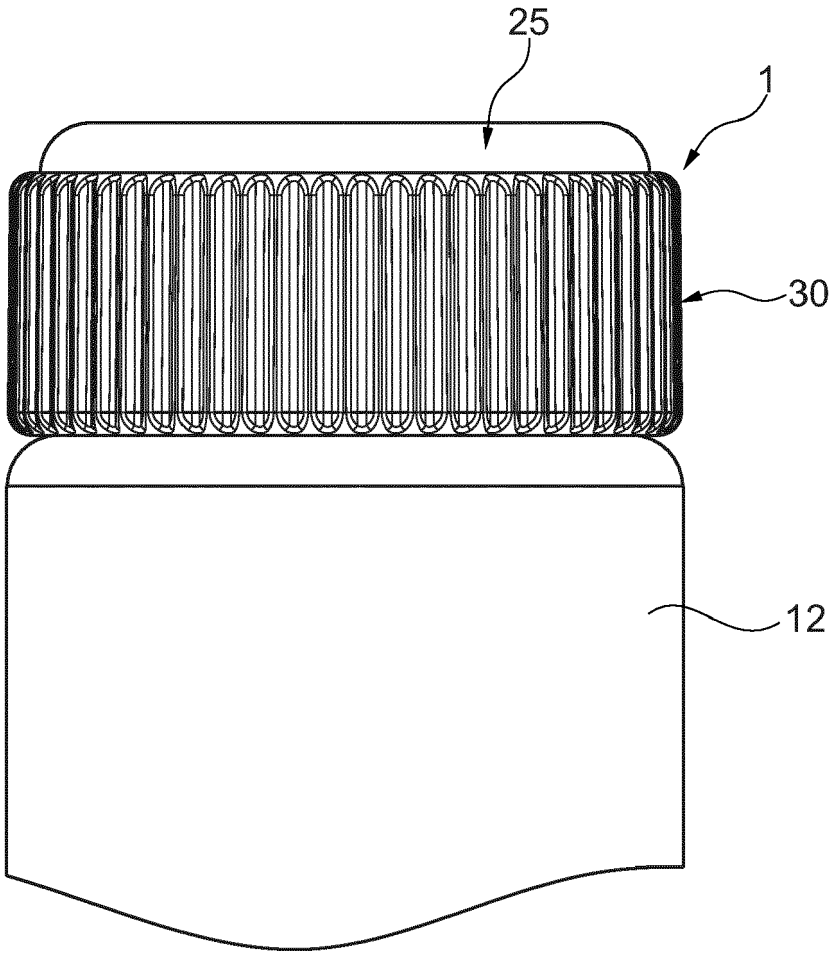

Fig. 7

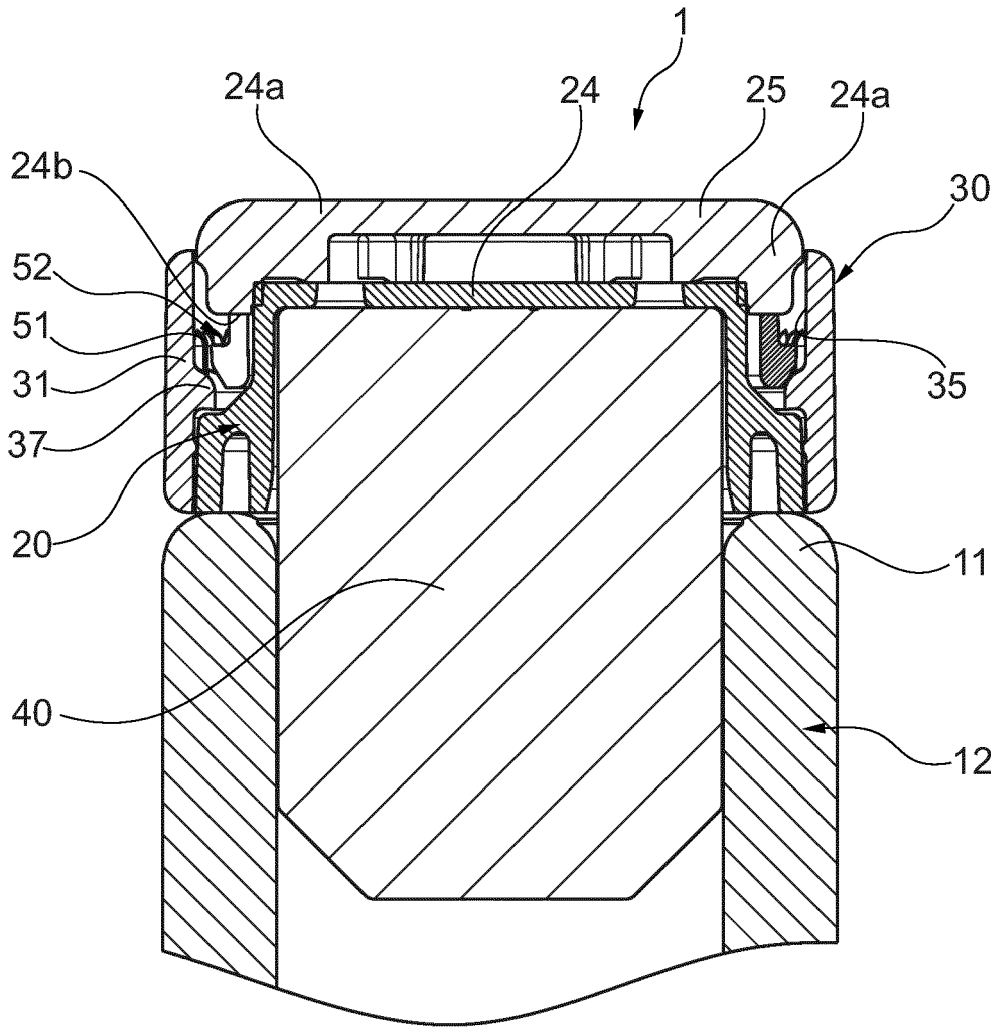

Fig. 8

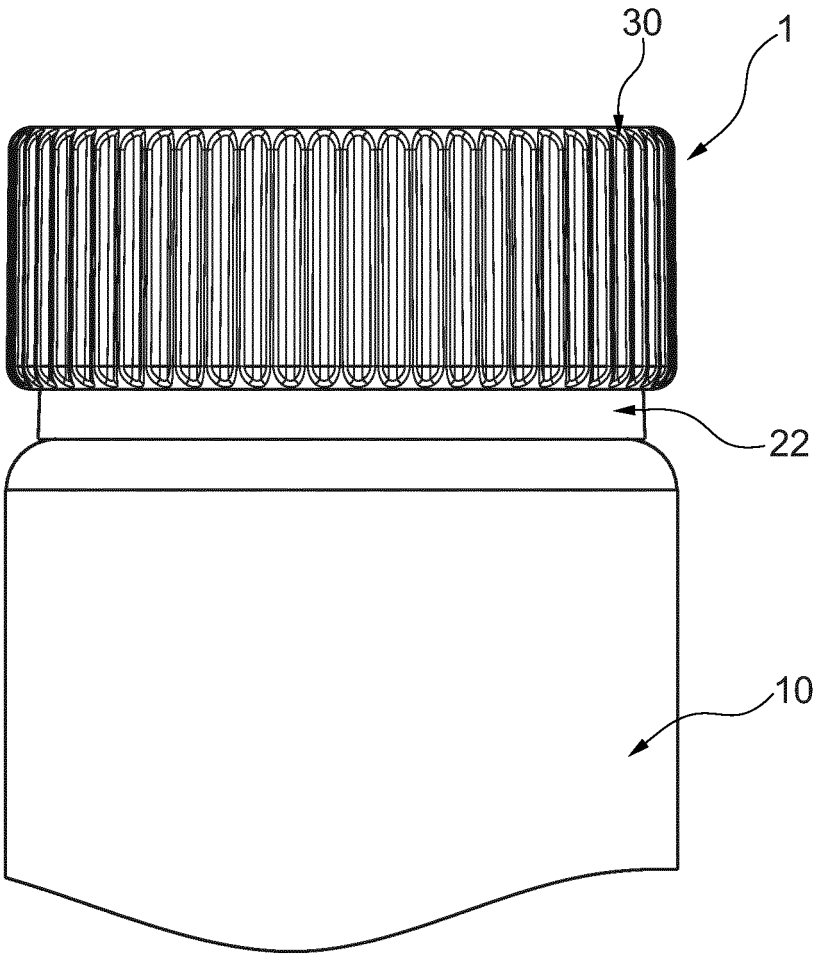

Fig. 9

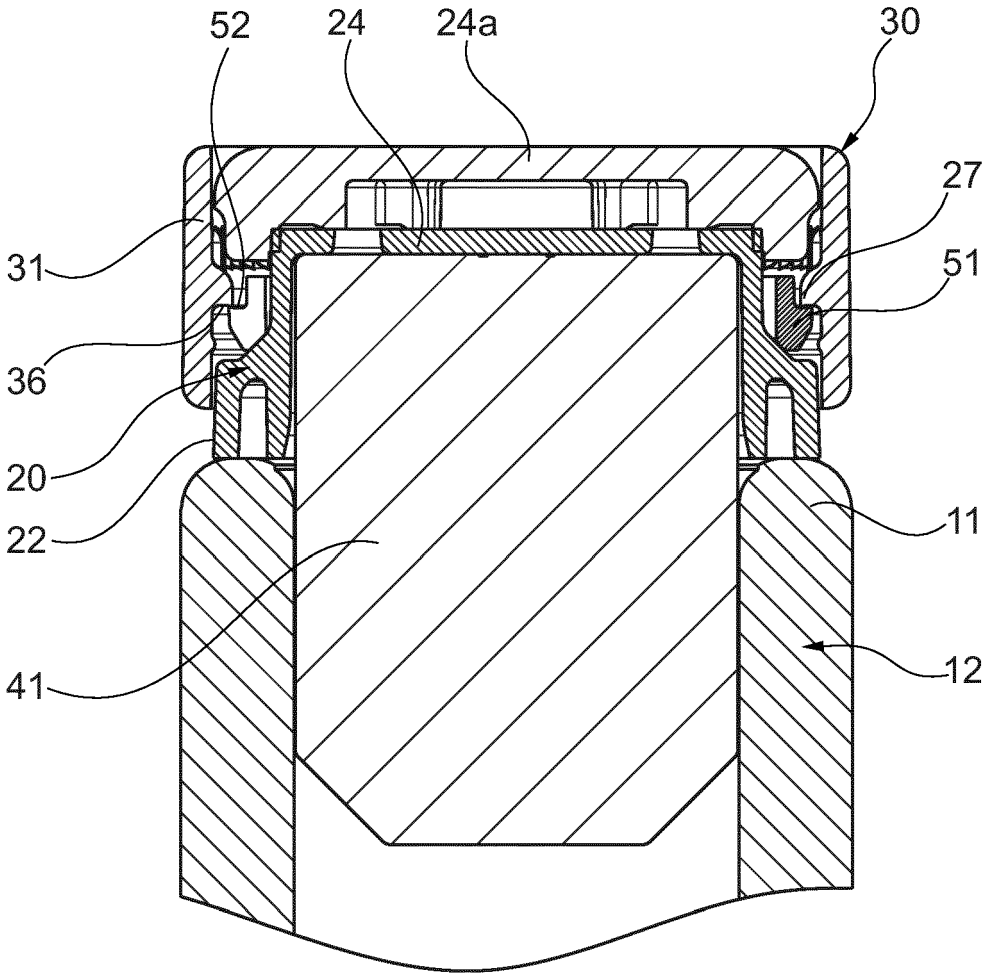

Fig. 10

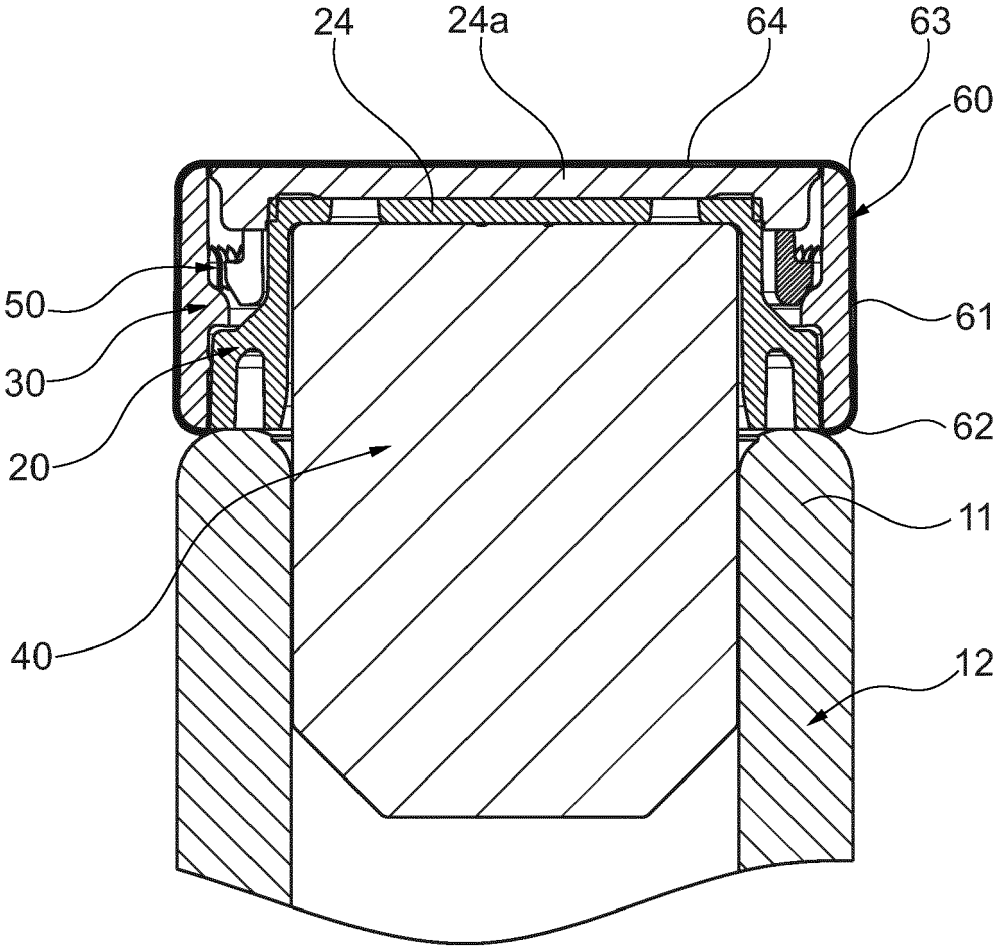

Fig. 11

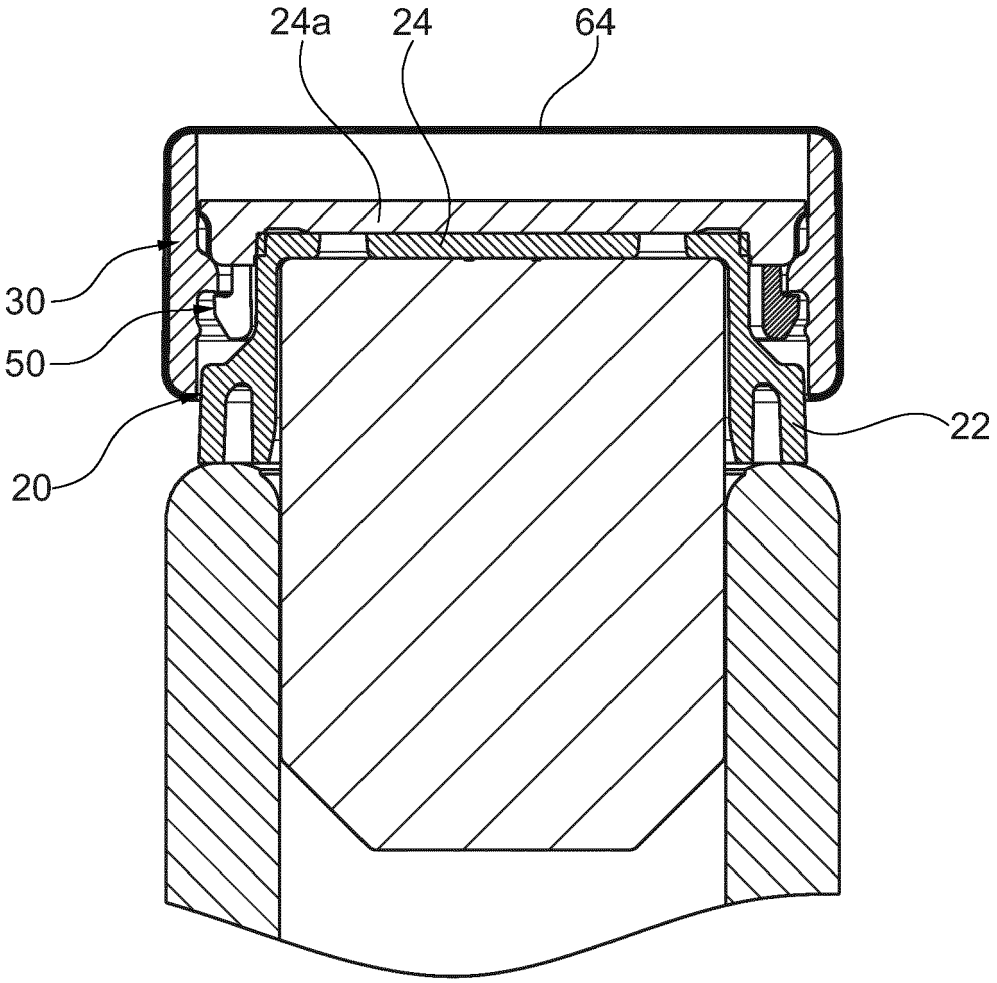

Fig. 12

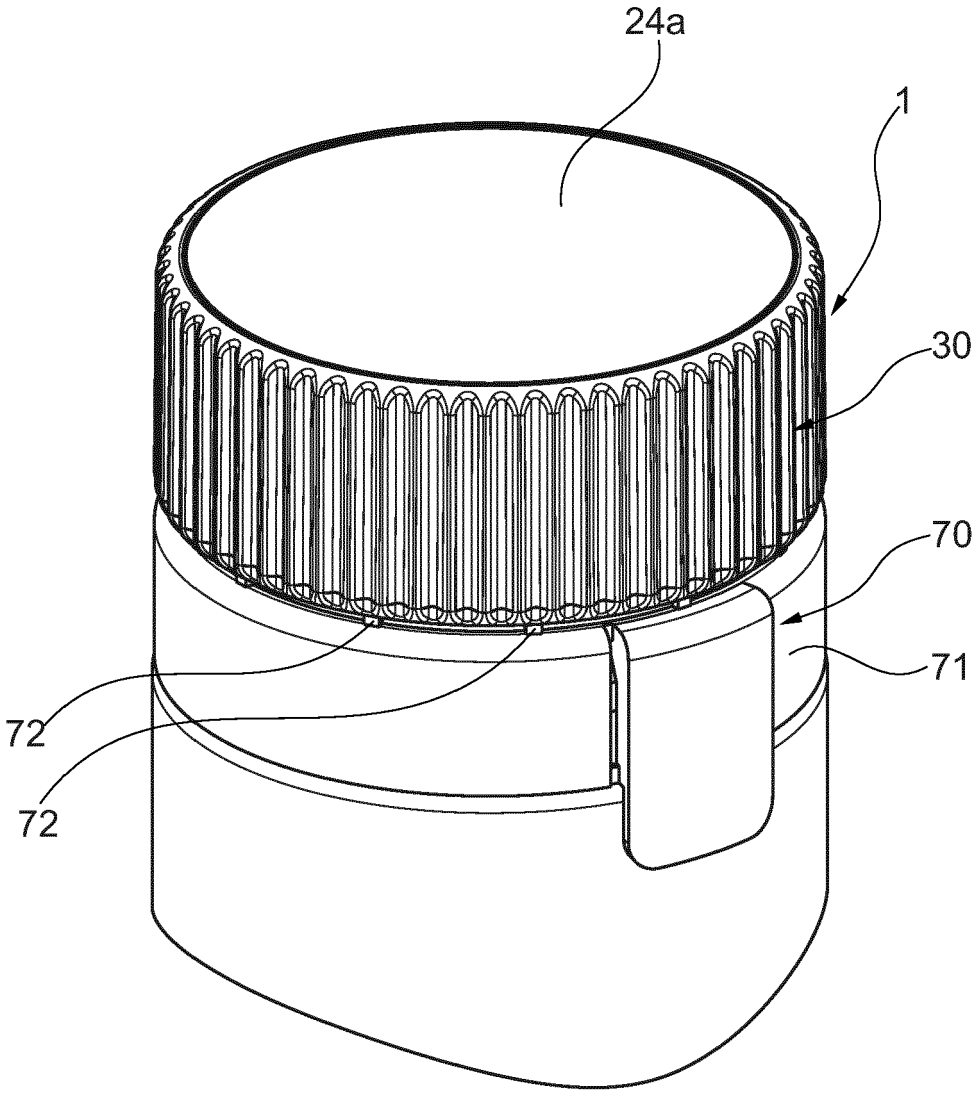

Fig. 13

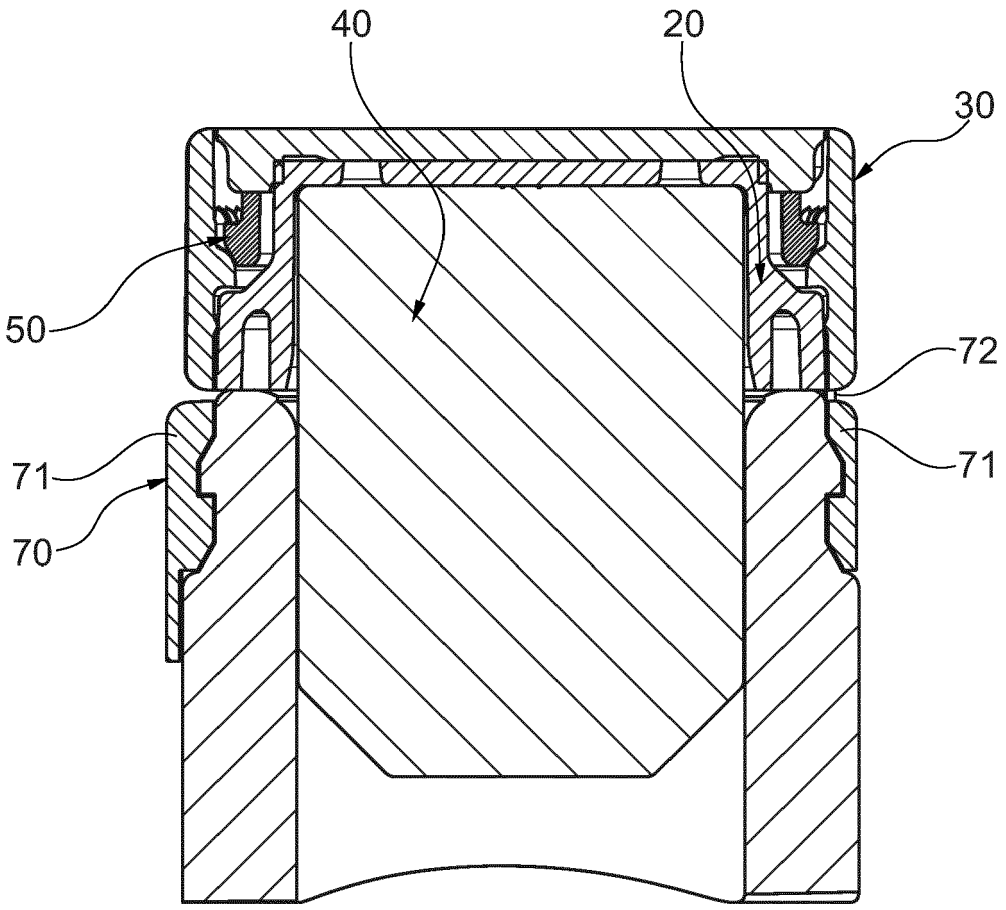

Fig. 14

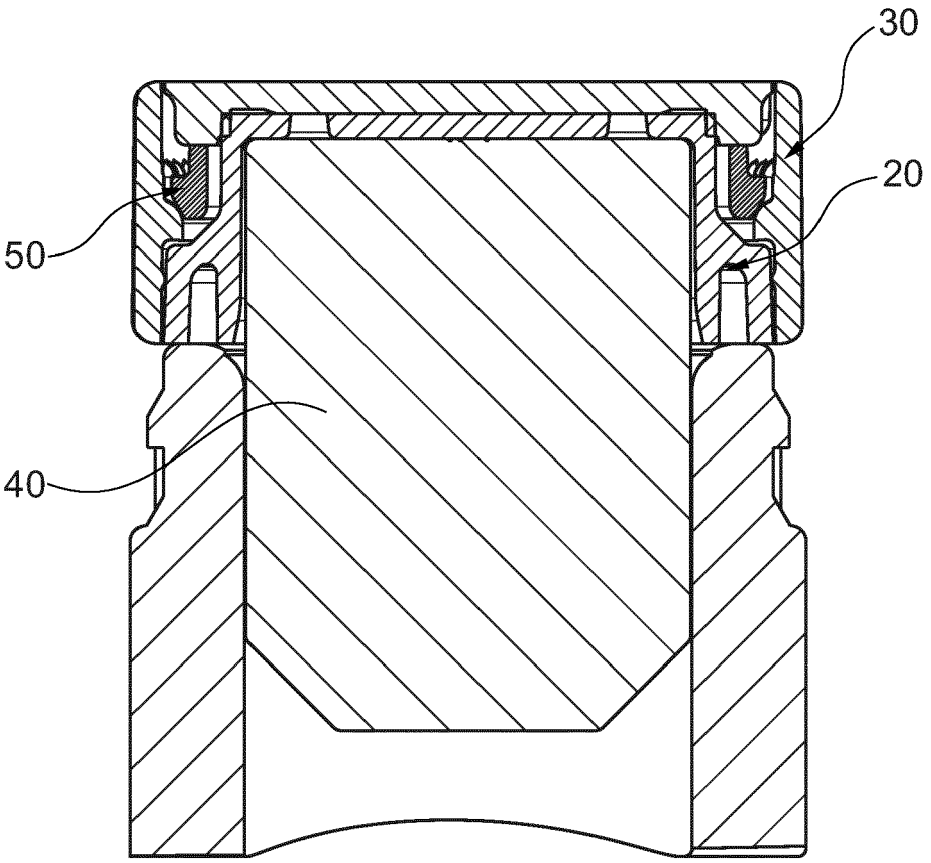

Fig. 15

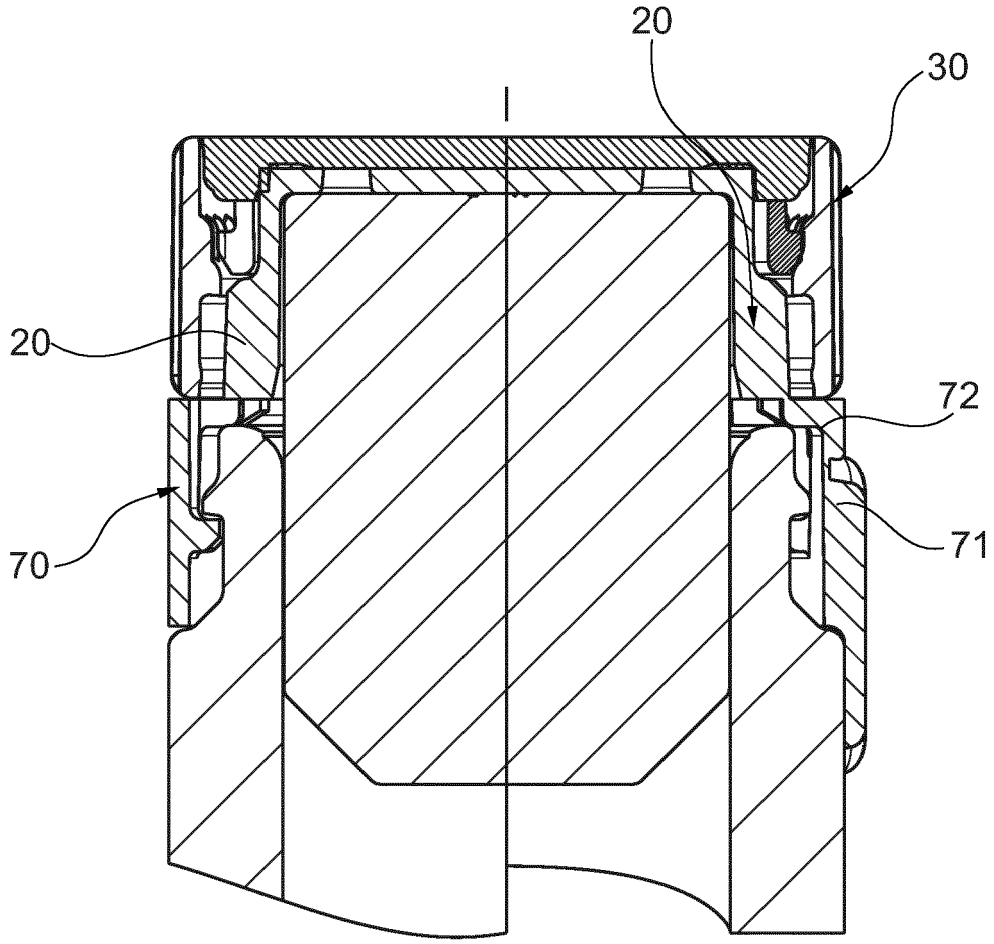

Fig. 16

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 13 42 5024

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	FR 2 688 762 A1 (CHAUVEAU JOEL [FR]; SALE MICHEL [FR] CHAUVEAU JOEL; SALE MICHEL) 24 September 1993 (1993-09-24) * page 8, line 22 - line 24 * * page 10, line 12 - line 29 * * page 11, line 7 - line 20 * * page 11, line 34 - page 12, line 7 * * figures 1-3 *	1-4,9,10	INV. B65D55/02
A,D	WO 2011/086407 A2 (CREATIVE GCL S R L [IT]; GIOVANNINI MARCO [IT]; VIALE LUCA [IT]) 21 July 2011 (2011-07-21) * figures 3a-3c *	1	
A	TW 514 615 B (SUNLOT BOTTLE STOPPER CO LTD [TW]) 21 December 2002 (2002-12-21) * figure 8 *	1,4	

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	11 June 2013	Bridault, Alain

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

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 13 42 5024

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.

11-06-2013

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
FR 2688762 A1	24-09-1993	NONE	
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
TW 514615 B	21-12-2002	TW 467850 B	11-12-2001
		TW 506933 B	21-10-2002
		TW 514615 B	21-12-2002
		TW 514616 B	21-12-2002
		TW 515773 B	01-01-2003

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- WO 2011086407 A **[0002]**