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(72) Inventors:
• **Pakhomov, Dmitry Ivanovich**
246032 Gomel (BY)
• **Birucov, Hicolai Petrovitch**
246050 Gomel (BY)

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(74) Representative: **Benatov, Emil Gabriel et al**
Dr. Emil Benatov & Partners, Bl. 36B,
Liuliakova gradina Str.
1113 Sofia (BG)

(71) Applicant: **Inostrannoye Chastnoe**
Proizvodstvennoye
Unitarnoye Predpriyatiye "Belkeps"
246015 Gomel (BY)

(54) **Closure**

(57) The technical solution relates to the closures for containers, essentially for bottles with elite alcohol beverages preventing refilling thereof, particularly to the closures having tamper-evident means.

The closure comprises an outer cap (1) threadedly engaged with the internal screw sleeve (2), a discharge element (5) with a means for fastening on the bottleneck, a cylindrical casing (4) sealingly fixed to the discharge

element (5), a threaded joint between the discharge element and the internal sleeve for the cap to be screwed on and unscrewed, a base (6) having a means for tight fastening in the bottleneck and adjoining the discharge element, aforesaid closure being additionally fit with a unit for visual control of the first opening of the bottle, providing thereby irreversible change of color of the casing once the cap has been unscrewed.

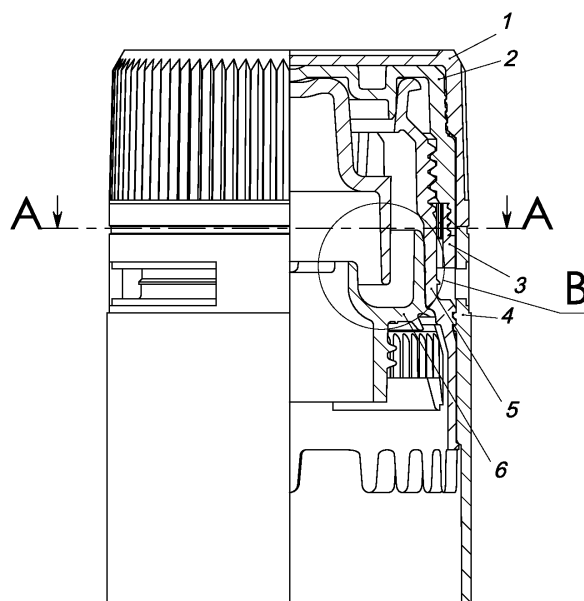


Fig. 3

Description

[0001] The technical solution relates to the closures for containers, mainly for bottles with elite alcohol drinks preventing refilling thereof, particularly to closures with tamper-evident means.

[0002] Known in the art closures fit with tamper-evident means to indicate unauthorized opening of the bottle have been described at length in both home and foreign literature.

[0003] Among known in the art analogues are "A closure unit for bottles with high-quality alcohol drinks" RU patent 2232116, IPC B 65 D 41/34, published 10.07.2004; "Closure" RU patent 2150417, IPC B 65 D 49/02, published 2000; "Tamper-proof cap for containers" GB patent 2219570, IPC B 65 D 49/02, published 13.12.1989.

[0004] Above-noted analogues are rather intricate in structure so that batch production of their elements presents certain problems. Some of the closures are unable to provide pouring out a needed quantity or quality emptying of the liquid due to numerous design elements and insufficient distance between them. The majority of mentioned devices employ a ball-shaped element as a gate known to be unstable in positioning, wherefore some auxiliary elements are to be introduced that complicate the design and confine mobility of the element limiting thereby quick shift from one position into another.

[0005] A tamper-proof closure for bottles and the like is known that prevents from substitution of the valuable liquid for a counterfeit to mislead the customer. The closure contains a locking ring snapped between the inner and outer caps, said outer cap having enfeebled joint with the indicator collar wherein inner denticles are made so that engage with the denticles on the sleeve enabling thereby break-away of said collar upon unscrewing of the cap for the first time (RU patent 2229424, IPC B 65 D 41/38, publ. 27.05.2004).

[0006] A closure for bottles is known comprising a cap and a warranty collar in the form of a strap united in a single part. The collar is fit with denticles over the interior surface forming a frangible joint with an incision such that the first opening of the closure results in breakage of the frangible joint and separation of the collar (USA patent 4062466, IPC B 65 D 41/34, publ. 1976).

[0007] The disadvantage common for above-described closures is the probability of reassembling the breakable collar in its initial position after unauthorized opening of the bottle, which may mislead the customer when buying a counterfeit of a high-quality beverage. One more problem connected with the breakable indicator collars is that the infringer may try to remove the cap and the indicator collar without disturbing said collar or frangible strips in order to spoil or substitute the contents of the container and then place the closure on its place. Such infringement can be made by a thing like a knife blade inserted between the indicator collar and bottleneck capped by said closure. To prevent such unauthor-

ized opening some auxiliary means should be involved.

[0008] The closest in its engineering essence and the result attained is "Tamper-proof device" (EA patent 5536, IPC B65D 49/04, publ. 28.04.2005). The device comprises an outer cap consisting of two parts joined together by frangible strips, an internal screw sleeve, a closure element and a means to create in-between a spacer in the form of an indicator collar made as a whole with said sleeve. The first opening of the container leads to rupture or breakage of the frangible strips whereby the first and second parts turn to be spaced apart when you try to reclose the container.

[0009] This design has, however, a drawback in that after opening of the cap the frangible strips can be repeatedly connected, whereas the break-away indicator collar can be concealed or removed by a pointed item.

[0010] The purpose of the present invention consists in developing a simpler and more reliable closure to prevent refilling by a more efficient tamper-evident means visualizing clearly that the bottle has been open.

[0011] Above-indicated technical result is achieved in that the closure comprises an outer cap installed onto the internal threaded sleeve, a discharge element with a facility to be fixed on the bottleneck, a cylindrical casing sealingly adjoining the discharge element, a threaded joint between the discharge element and the internal sleeve for the cap to be screwed on and unscrewed, a base with a tight seal in the bottleneck connected to said discharge element, aforesaid device being provided additionally with a visual control unit of the first opening of the cap containing an indicator collar able to displace vertically, and at least one cut-through aperture in the side wall of the cylindrical casing through which the indicator collar becomes visible when the cap is unscrewed warning thereby about opening of the bottle, wherein the diameter of the indicator collar cedes slightly the diameter of the cylindrical casing, and the upper external portion of said indicator collar is threaded.

[0012] In a particular embodiment of the invention, the indicator collar is made in a color spectrum contrasted to the color of the cylindrical casing. The lower internal part of the indicator collar is fit with denticles to be engaged with the ring on the discharge element.

[0013] A particular embodiment of the invention presumes that identification marks can be made on the external lower surface of the indicator collar in the form of words, letters or symbols. The internal upper surface of the indicator collar is fit with retaining ribs to be engaged with the ribs on the discharge element so as to interplay when the cap is screwed but lock-up at unscrewing.

[0014] In a particular embodiment of the invention the slotted aperture on the cylindrical sleeve may contain identification lettering in the form of words, letters or symbols, and the lettering is made of the material of the casing and molded as a single unit.

[0015] An additional thread is made on the lower part of the internal sleeve threadedly engaged with the thread of the indicator collar. It is preferable to have the pitch of

the lower thread of the internal sleeve much larger than the pitch on the upper part of the sleeve engaged with the thread of the discharge element, said lower thread of the sleeve being multistart while the upper thread of the sleeve is single-start.

[0016] A particular embodiment of the invention presumes that the number of turns in the lower thread of the internal sleeve exceeds much the number of turns in the upper thread. The spline coupling between the interior surface of the outer cap and exterior surface of the internal sleeve is made with spherical ridges on the splines. The interior surface of the cylindrical casing is fit with annular projections while the discharge element is made with the grooves engaged with the annular projection on the cylindrical casing and preventing thereby removal of the casing from the discharge element.

[0017] In a particular embodiment of the invention the discharge element has a ring fixed by its lower part to the denticles on the indicator collar. There are retaining ribs made on the external lower portion of the discharge element.

[0018] The retaining ribs on the internal lower portion of the cylindrical casing are made so as to engage with the ribs on the discharge element. There are open spline ridges in the lower part of the discharge element brought into engagement with the ribs on the bottleneck.

[0019] In the lower part of the base there is an annular folding tab to hold the base within the discharge element. The base is made with the outer and inner projections forming open-top annular cavity, said outer projection of the base protruding beyond the inner projection. The discharge element contains an internal sleeve deaden on top and a circular projection in its lower part. In addition, the discharge element is fit with a tamper-evident means to prevent refilling of the bottle, said means being formed by the circular projection on the internal sleeve of the discharge element and the annular cavity of the base.

[0020] The preferred embodiment characterized by above-described combination of features and accomplishment of its purpose can be supported by the description of a closure design made in accordance with the present invention. The description of the invention is illustrated by accompanying drawings in which:

- Fig. 1 is a general view of the closure in disassembled form;
- Fig. 2 is a partial section in disassembled form;
- Fig. 3 is a general view with a partial section;
- Fig. 4 is view B in Fig. 3;
- Fig. 5 is sectional view along line A-A in Fig. 3;
- Fig. 6 is view C in Fig. 5;
- Fig. 7 is a view of the open closure;
- Fig. 8 is view D in Fig. 7.

[0021] The bottle closure comprises outer cap 1, internal screw sleeve 2, indicator collar 3, casing 4, discharge element 5, and base 6.

[0022] Outer cap 1 has on its inner surface splines with

spherical ridges 7.

[0023] The internal screw sleeve 2 is made with outer splines 8 engaged with splines 7 of cap 1, upper thread 9 and supplementary lower thread 10.

5 **[0024]** Indicator collar 3 is fit with thread 11 on its external upper part to be engaged with thread 10 on sleeve 2. The internal surface of indicator collar 3 is provided with retaining ribs 12 and denticles 13.

10 **[0025]** Slotted apertures 14 (three apertures are shown in Fig. 3) are made in the side wall of cylindrical casing 4. On the internal surface of casing 4 there is annular projection 15 and retaining ribs 16.

15 **[0026]** There are open spline ridges 17 with rounded edges in the lower part of discharge element 5, said ridges being brought into engagement with the bottleneck ribs. Retaining ribs 18 are made over the external surface of discharge element 5 so as to engage with ribs 16 on casing 4, and annular grooves 19 to accommodate projection 15 of cylindrical casing 4, eliminating thereby removal of the casing from the discharge element. Discharge element 5 is also fit with ribs 20 to be engaged with ribs 12 of indicator collar 3 such that they interplay at screwing and latch when being unscrewed. Discharge element 5 is provided with annular tag 21 on its internal surface for fastening on the bottle, ring 22 over the external surface of discharge element 5 adjoining in the lower part denticles 13 of indicator collar 3, and four upright projections 23.

25 **[0027]** In the lower part of base 6 there is a folding tag 24 to keep the base in the discharge element 5 by means of upright projections 23. The base is made with outer 30 and inner projections 26 forming open-top annular cavity 27, wherein the outer projection 25 of base 6 protrudes beyond the inner projection 26. This fact provides an additional sealing of the discharge element against leakage of the liquid at tilting.

35 **[0028]** In addition, discharge element 5 contains internal sleeve 28 deaden on top 29 and having lower annular projection 30, said sleeve being connected via ribs 31 with the casing of discharge element 5. Besides, discharge element 5 contains a tamper-proof means preventing refilling of the bottle.

40 **[0029]** Aforesaid tamper-proof means for preventing refilling is formed by annular projection 30 of internal sleeve 28 of discharge element 5 and annular cavity 27 of base 6, annular projection 30 of the internal sleeve being accommodated at a certain clearance in the annular cavity 27 of the base.

[0030] The device operates as follows.

45 **[0031]** As cap 1 is being unscrewed, indicator collar 3 is unscrewed too from internal sleeve 2. Due to the difference in pitch of the upper and lower thread of sleeve 2, indicator collar 3 turns to be unscrewed earlier than the cap does, so it shifts vertically inside the cylindrical casing 4, comes to a stop opposite slotted apertures 14, engages by denticles 13 with ring 22 of discharge element 5, and is retained in this position. In that way, indicator collar 3 contrasted in color to casing 4 appears in

slotted apertures 14 thus indicating that the bottle has been open. When cap 2 is screwed on again, indicator collar 3 is kept back owing to engagement of denticles 13, can not return in the initial position and remains visible. Various identification marks can be made on the indicator collar with characteristics of the manufacturer, trade name of the product or state of the closure, e.g. "open" or other.

[0032] By tilting the bottle (not shown) the liquid passes via the opening in base 6 into annular cavity 27 and further over the through-pass channels of discharge element 5 leaks out of the container.

[0033] When the bottle returns in its upright position, the liquid in the through channels flows into annular cavity 27 of the tamper-proof means and further into the bottle creating thereby excessive pressure thus hampering further inflow of the liquid. The pressure created inside the container prevents from filling the container with a counterfeited liquid.

[0034] The constituent parts of the closure are molded of ecologically pure polymer materials, such as polyethylene and polystyrene using high-capacity thermoplastic injection molding machines in molds with the hot runner system and dies. The bottles are closed by pushing top down with the help of a closing machine.

[0035] All parts of the proposed closure are made as a whole unit, can be transported separately and are intended for installation on bottles.

[0036] The preferred embodiment of the invention ensures an additional level of protection against unauthorized opening by making the tamper-evident means easily visible and discernible, giving a clear and irreversible identification that the bottle has been open, improves reliability of operation during pouring of the liquid thanks to the absence of mechanical parts in the discharge sleeve able to result in undesirable aftereffects connected with their sticking or wedging.

Claims

1. A closure comprising an outer cap (1) threadedly engaged with the internal screw sleeve (2), a discharge element (5) with a means for fastening on the bottleneck, a cylindrical casing (4) sealingly engaged with the discharge element (5), upper threaded junction between the discharge element (5) and internal sleeve (2) for the cap to be screwed on and unscrewed, a base (6) with a means of tight fixing in the bottleneck being connected to the discharge element (5), **characterized in that** said closure contains a unit of visual control of the first opening of the cap consisting of an indicator collar (3) capable of the vertical shift and at least one slotted aperture (14) made on the side wall of the cylindrical casing (4) through which the indicator collar (3) becomes visible when the cap is unscrewed, visualizing thereby that the bottle is open, the diameter of said indicator collar (3) being slightly less than the diameter of the cylindrical casing (4) and having a thread over its external upper part.
2. Closure as claimed in Claim 1 **characterized in that** the denticles (13) are made on the inner lower part of the indicator collar, while there is a thread (14) on the upper external part of the indicator collar.
3. Closure as claimed in Claim 1 **characterized in that** the retaining ribs (12) are made on the inner upper surface of the indicator collar (3).
4. Closure as claimed in Claim 1 **characterized in that** the external lower part of the indicator collar (3) is contrasted in color spectrum to the color of the cylindrical casing (4).
5. Closure as claimed in Claim 1 **characterized in that** identification marks can be written on the external lower surface of the indicator collar (3) in the form of words, letters or symbols.
6. Closure as claimed in Claim 1 **characterized in that** the slotted aperture (14) on the cylindrical sleeve (4) may contain identification lettering in the form of words, letters or symbols, and the lettering is made of the material of the casing and molded as a single unit.
7. Closure as claimed in Claim 1 **characterized in that** an additional thread (10) is made in the lower part of the internal sleeve (2) to be engaged with the thread (11) of the indicator collar (3).
8. Closure as claimed in Claim 5 **characterized in that** the pitch of the lower thread (10) of the internal sleeve (2) is larger than the pitch of the upper thread (9) of said sleeve (2) threadedly engaged with the discharge element (5).
9. Closure as claimed in Claim 5 **characterized in that** the lower thread (9) of the sleeve (2) is made multi-start, and the upper thread (10) of the sleeve (2) is made single-start, where the number of turns in the lower thread of the internal sleeve surpasses much the number of turns in the upper thread.
10. Closure as claimed in Claim 1 **characterized in that** there is a spline joint between the interior surface of the outer cap (1) and exterior surface of the internal sleeve (2), which splines are rounded off on the edges.
11. Closure as claimed in Claim 1 **characterized in that** an annular projection (15) is made over the interior surface of the cylindrical casing (4), and there are grooves (19) on the discharge element (5) made so

as to engage with the annular projection (15) of the cylindrical casing (4) and prevent thereby removal of the casing from the discharge element (5).

- 12.** Closure as claimed in Claim 1 **characterized in that** the discharge element (5) is made with a ring (22) to be fixed in the lower part with the denticles (13) of the indicator collar (3), and outer projections (23) engaged with the ribs (12) of the indicator collar(3).

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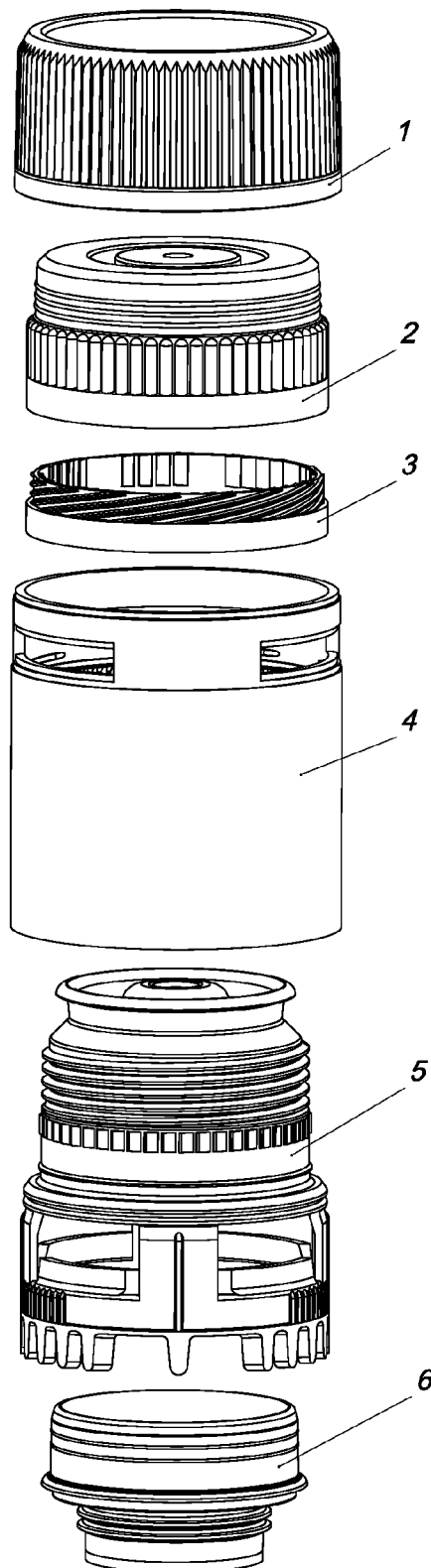


Fig.1

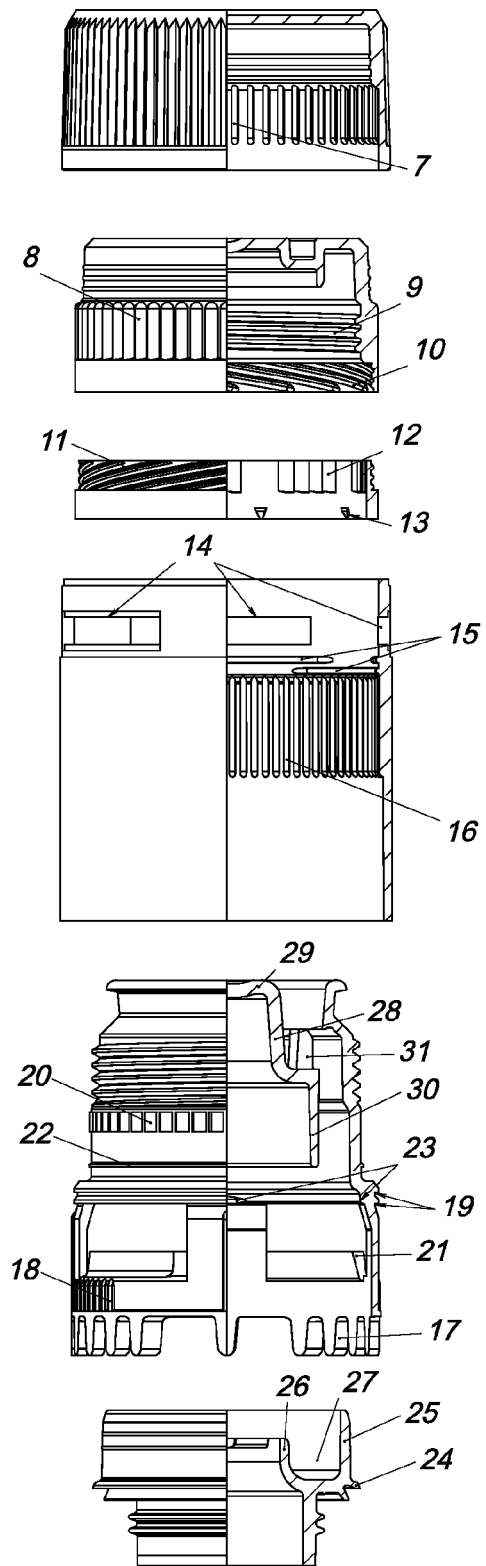


Fig.2

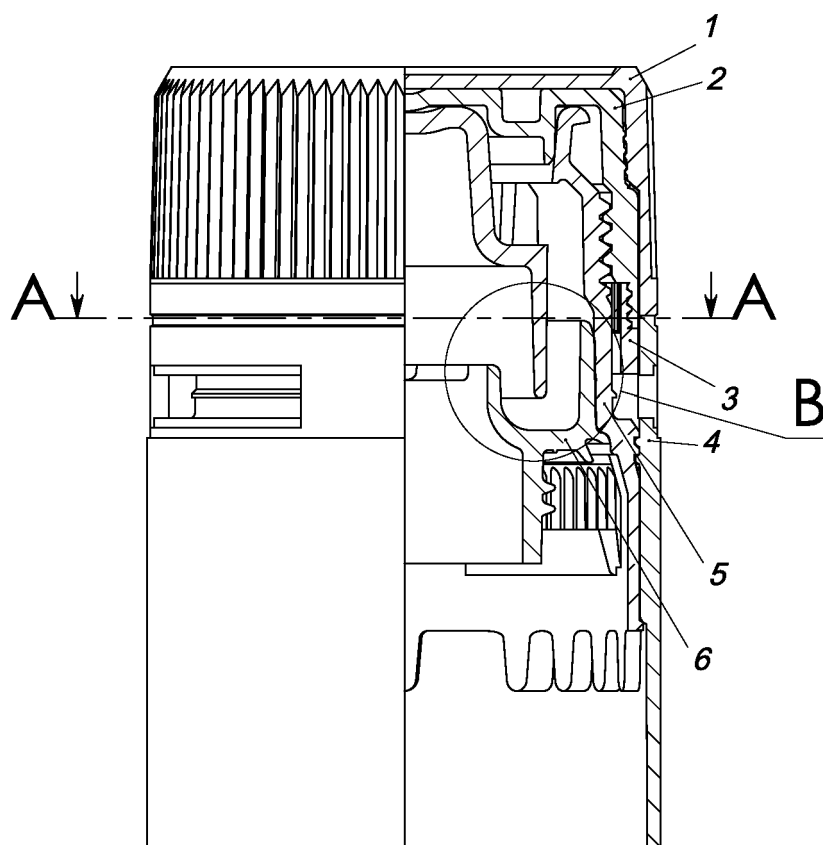


Fig.3

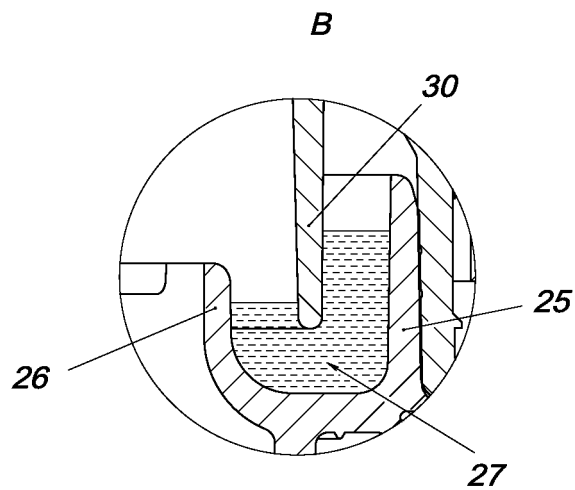


Fig.4

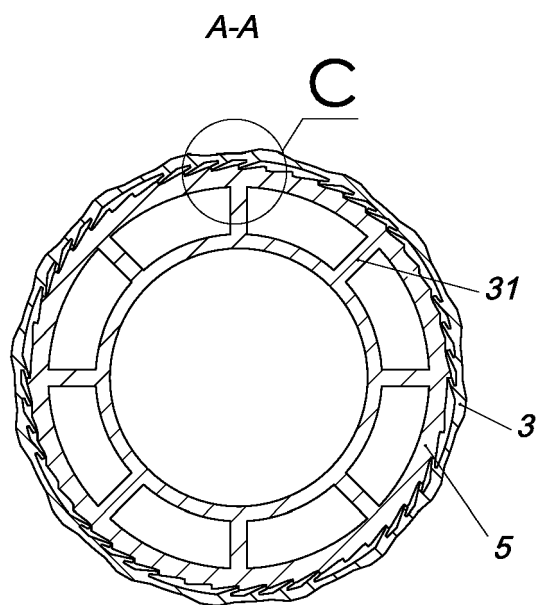


Fig. 5

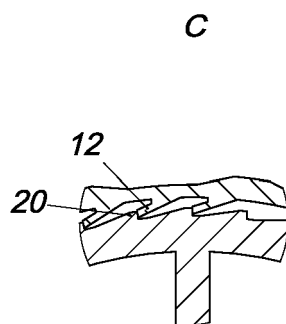


Fig. 6

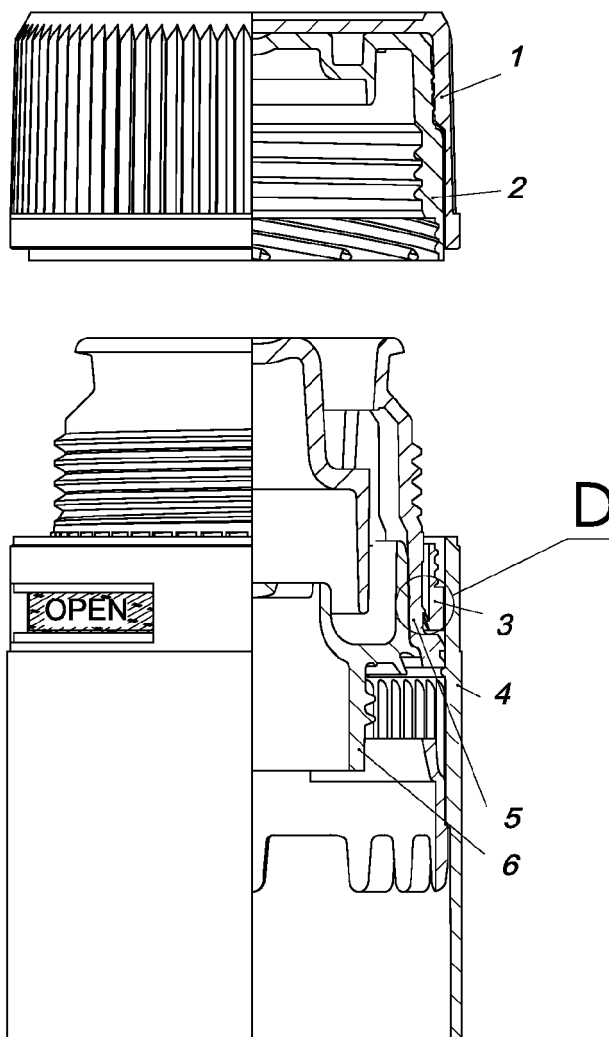


Fig.7

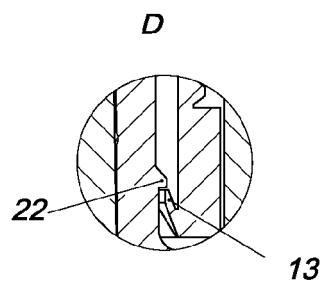


Fig.8



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 07 11 9042

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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 19 May 2008	Examiner Cazacu, Corneliu
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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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