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(71) Applicant: **Inostrannoye Unitarnoye
Proizvodstvennoye
Predpriyatiye "Belkeps"
Gomel, 246028 (BY)**

(72) Inventors:
• **PACHOMOV, Dmitriy Ivanovitch
Gomel, 246032 (BY)**
• **BIRUCOV, Nicolai Petrovich
Gomel, 246050 (BY)**

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

(54) **BOTTLE CLOSING DEVICE**

(57) The present invention relates to closures for bottles with expensive liquids to prevent bottle refilling and indicating the first opening of the bottle.

The bottle closure comprises a threaded cap engaged by said thread with the discharge sleeve and forming through channels, a resilient element with a through opening and projections forming open on top annular cavity accommodating the lower part of the inner sleeve at a gap formed between the bottom and projections of the resilient element. The described apparatus is additionally provided with a casing fastened on the outer sleeve and having a breakable upper piece weakened by vertical slots and made with strips on the side and end surfaces of said upper piece of the casing, wherein the last strip in direction of rupture is strengthened, its length ratio to the weakened strip being at least 2.5, said casing having at least two restrictive annular collars on the interior surface, one of the collars being slotted.

The second embodiment of the closure is accomplished by providing a thread on the interior surface of the casing and exterior surface of the discharge sleeve, said thread being made in different directions.

The proposed invention makes provision for an additional level of protection against unauthorized unsealing of the bottle by the accomplishment of a breakable piece of the casing. This feature raises reliability of operation at bottling due to the absence of mechanical components in the discharge sleeve, which may result in unpleasant aftereffects connected with their sticking or wedging.

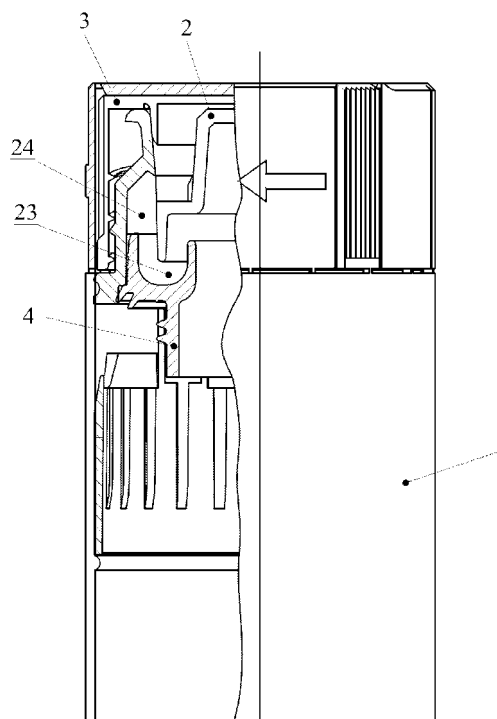


Fig.1

Description

[0001] The invention relates to bottle closures for expensive liquids with tamper-evident means protecting against refilling and indicating the first opening.

[0002] Known in the art is a closure for bottles comprised of a cylindrical casing having a seat with a through opening inserted in the bottom of said casing, and a shutoff member propped against the seat thereof. The inner surface of the casing accommodates tightly a splitter made as a ring with ribs separating the interior space of the casing into through channels for liquid flow. This apparatus is elastically and tightly fastened in the bottleneck by means of resilient annular projections to prevent liquid escape. The closure is unscrewed as a result of rotation and rupture of the safety collar thereby to allow liquid pouring when the bottle is tilted, during which the liquid flow force pushes the shutoff member out of the seat and opens the through opening it rests upon, letting thereby the liquid pass via through channels of the splitter formed therein by spaces between the ribs. On restoring upright position of the bottle the shutoff member returns into the initial position under its own gravity and chokes the through opening thereby making refilling of the bottle impossible (EP 0670271 A1, Int. Cl. 6: B65D 49/00, published 1995).

[0003] The described device has, however, some drawbacks affecting its operation. Being made in the form of a ball, the shutoff member is unstable and specifies the shape of the longitudinal guides for fitting the seat, said guides being arranged so that the ball is held between them and acquires limited mobility. When cooled, the pressure in the bottle drops, which may result in sticking of the shutoff member and stuck-closed failure of pouring.

[0004] Known is a closure containing a sleeve of cylindrical shape, upper piece of said sleeve being a threaded cap having an elastic annular projection for fastening on the bottle and creating thereby a non-detachable joint (RU Patent № 2150417, Int. Cl. B 65D 49/02, published 2000). A hood with a safety collar is pressed onto the threaded cap, wherein inside the casing a splitter is installed on the thread in the form of a ring with ribs separating the interior space into through channels for liquid flow. Inside the casing cavity a resilient element is inserted for liquid pouring in which centre there is a seat with a through opening to interact with a shutoff member in the form of a valve. The resilient element is tightly fastened inside the bottleneck with the aid of elastic annular projections to form a leak-proof joint with the casing for easy filling and eliminating liquid escape. The liquid can be poured from the bottle after rupture of the safety collar when the bottle is tilted, during which the force of the liquid flow impels the shutoff member out of the seat, opening a through hole in it and letting the liquid flow through the channels of the casing formed by spaces between the ribs. Upon returning of the bottle into the initial upright position the shutoff member returns into its

original location under the gravity force thereby closing the through opening and making refilling of the bottle improbable.

[0005] Nevertheless, the presence of the movable valve induces the probability of skew and jamming, as well as sticking at temperature drop due to the reduction of pressure in the container. This results in failure of pouring and the need to shake the container to make the valve function properly.

[0006] The closest in its engineering essence and the effect attained is a safety closure for bottles incorporating a threaded cap engaged by said thread with the outer sleeve that interacts by its ribs with the inner sleeve and forming thereby through channels, a resilient element with a through opening and projections forming open on top annular cavity, in said cavity the lower part of the inner sleeve is accommodated so that between the bottom and said projections of the resilient element a gap is formed (RU Patent № 2193000, Int. Cl. B 65 D 49/02, published 20.11.2002 - a prototype).

[0007] The task of the invention is to improve reliability and create an additional level of protection against refilling.

[0008] Named technical result is achieved in that the closure for bottles includes a threaded cap fastened by said thread on the discharge sleeve and forming through channels, a resilient element with a through opening and projections forming open on top annular cavity accommodating the lower part of the inner sleeve, wherein a gap is formed between the bottom and projections of the resilient element, aforesaid casing being fit with a break-away upper piece weakened by vertical slots and having strips on the side and end surfaces of the upper piece of the casing made at different spacing, the last strip thereof on the end surface of the casing along the rupture direction being strengthened and its length ratio to the weakened strip is at least 2.5. The interior surface of the decorative casing has at least two restrictive annular projections, one of which is slotted.

[0009] The closure according to the second embodiment is made with differently directed threading on the interior surface of the casing and exterior surface of the discharge sleeve.

[0010] Indicated technical result is accomplished additionally by provision of rough surface on a portion of the side breakable piece of the casing. The exterior surface of the discharge sleeve is made with an annular slot having tapered ledges to interact with the annular slotted projection on the casing.

[0011] The essence of the invention is illustrated by the following drawings:

Fig. 1. General view of the assembled closure.

Fig. 2. The casing.

Fig. 3. Upper view of the casing.

Fig. 4. Cross-section A-A in Fig. 2.

Fig. 5. View A in Fig. 2.

Fig. 6. View B in Fig. 3.

Fig. 7. View C in Fig. 3.

Fig. 8. The discharge sleeve.

Fig. 9. Section A-A in Fig. 8.

Fig. 10. The cap.

Fig. 11. The resilient element.

Fig. 12. The casing with differently directed threading according to the 2nd embodiment.

Fig. 13. The discharge sleeve with differently directed threading of the 2nd embodiment.

[0012] The safety closure for bottles consisting of casing 1, discharge sleeve 2, threaded cap 3 and resilient element 4. Casing 1 is made with a break-away upper piece by means of weakened strips 5 on the side surface and strips 6 on the end surface separated by vertical slots 7. The last strip 8 in direction of rupture is made strengthened. The beginning portion of the break-away piece has rough surface 9 where the direction of rupture 10 is indicated. The interior surface of decorative casing 1 is made with two restrictive annular collars, namely the upper collar 11 being slotted and the lower collar 12.

[0013] Discharge sleeve 2 contains a plugged inner sleeve 13. In the upper part of discharge sleeve 2 there is a cylindrical projection 14 with external thread 15. The interior surface of discharge sleeve 2 is made with ribs 16 for fastening on the bottleneck. The exterior surface of discharge sleeve 2 has an annular slot 17 with tapered ledges 18 (Fig. 9) to be engaged with slotted collar 11 of casing 1 thereby to restrict its axial movement. Discharge sleeve 2 contains a resilient element 4 with a through opening 19 and projections 20 and 21 forming on top annular cavity 22. Inner sleeve 13 is installed so as to accommodate its lower part in annular cavity 22 forming thereby a hydraulic gate 23 (Fig. 1) and through channels 24 (Fig. 1) for liquid pouring.

[0014] Threaded cap 3 is made with internal thread 25 to be engaged with the external thread 15 of discharge sleeve 2, said cap having annular cylindrical projections 26 and dampers 27 on the interior surface to protect the product from deformation at closing.

[0015] The closure is assembled as follows: the resilient element 4 is inserted in the lower part of discharge sleeve 2, threaded cap 3 is fit on top, onto which casing 1 with the breakable upper piece is installed.

[0016] Casing 1 made of a polymeric material fixes tightly threaded cap 3 and discharge sleeve 2 with resilient element 4 over the interior periphery by means of the upper restrictive slotted collar 11 and lower annular projection 12. The safety closure being installed on the bottle is fastened on the bottleneck with the aid of inner ribs 16 of discharge sleeve 2.

[0017] The second embodiment of the closure consists of the same elements as the first one and is distinguished by the accomplishment of a new joint. Threading 28 and 29 made in different directions on the interior surface of casing 1 and exterior surface of discharge sleeve 2, correspondingly, (Figs. 12, 13) secures a reliable protection of the casing from circumferential or axial dislocation.

The described design of the decorative casing with the discharge sleeve excludes the provision of such structural elements as grooves, ribs and collars, simplifies the product design and alleviates labour intensity. The threading can be made as a single or multiple-thread. The described structure is assembled as follows: the casing is pressed against the sleeve and the parts are locked in a tight fitting of aforesaid threading. In our example, a single-thread was used.

[0018] The safety closure is handled in the following way: during the first opening the upper piece of casing 1 is unsealed by rotating the element with a rough surface 9 along arrow 10 counter-clockwise thereby breaking away the upper piece of the decorative casing and breaking strips 5 and 6 on the side and end parts of the casing. Due to different spacing between the side and end strips their breakage proceeds easily without any effort. Vertical slots 7 in the upper piece of decorative casing 1 are made so that the break-away member is readily folded while its end part, being broken together with the side breakable elements, is kept by the last side element owing to the strengthened strip 8. As a result, the whole ruptured upper part of the casing is removed as one piece. Then, the threaded cap is unscrewed, the liquid is poured and the cap can be closed again, to repeat the operation as many times as necessary.

[0019] When tilted, the liquid in the bottle flows via through opening 19 into the annular cavity 22 of hydraulic gate 23 formed by the annular cavity of the resilient element and the inner sleeve, passes through channels 24 and escapes from the bottle. On returning to the upright position the liquid from through channels 24 is fed into the annular cavity 22 of gate 23 and then into the bottle, creating thereby excess pressure and hindering further flow of the liquid.

[0020] All components of the closure are made of ecologically safe polymer materials, e.g. polyethylene and polystyrene using highly productive thermoplastic automatic machines by injection moulding in moulds with a hot-channel system and in dies. Both weakened and strengthened strips 5, 6, 8, and slots 7 are moulded as a single whole with casing 1 and then separated by cutting. The bottles are closed by pressing top-down on a capping machine.

[0021] The proposed closure is accomplished as an integral unit, can be transported separately, and is intended for installation on bottles.

[0022] A pre-production model of the closure has been manufactured at the experimental mechanical enterprise IUPP "Belkeps" using the turning/milling equipment.

[0023] The advantage of proposed closure is faultless detection of any unauthorized unsealing since the breakable piece of the casing cannot be reassembled. The described invention furnishes an additional level of tamper-evident means by providing the breakable piece of the casing. This also improves reliability during bottling thanks to the absence of mechanical parts in the discharge sleeve able to lead to unpleasant consequences

such as sticking or jamming.

Claims

1. A closure for bottles comprising a threaded cap (3) engaged by said thread with the discharge sleeve (2) and forming through channels, a resilient element (4) with a through opening (19) and projections (20, 21) forming open on top annular cavity (22) into which the lower part of the inner sleeve (13) is inserted forming thereby a gap between the bottom and projections of the resilient element (4), **characterized by** having a casing (1) fastened on the outer sleeve (3), said casing being made with a breakable upper piece weakened by vertical slots (7) and having strips (5, 6) spaced (1) at a different distance on the side and end surfaces of the upper piece of the casing, wherein the last strip (8) in direction of rupture is strengthened and its length ratio to the weakened strip is at least 2.5.
2. Closure as claimed in Claim 1, wherein at least two restrictive collars (11, 12) are made on the interior surface of the casing, one of said collars being slotted.
3. Closure as claimed in Claim 1, wherein a portion of the side breakable element of the casing is made with a rough surface (9).
4. A closure for bottles comprising a threaded cap (3) engaged by said thread with the outer sleeve (2) and forming through channels, a resilient element (4) with a through opening (19) and projections (20, 21) forming open on top annular cavity (22) accommodating the lower part of the inner sleeve (13) and forming thereby a gap between the bottom and projections of the resilient element (4), **characterized in that** aforesaid cap (3) is made with a casing (1) fastened on the outer sleeve and having a break-away upper piece weakened by vertical slots (7), and strips (5, 6) on the side and end surfaces of said upper piece made at a different pitch, wherein the last strip (8) in direction of breakage is strengthened and its length ratio to the weakened strip is at least 2.5. The interior surface of aforesaid decorative casing (1) and exterior surface of the discharge sleeve (2) are threaded, said thread being made in different directions (28, 29).
5. Closure as claimed in Claim 1 or 2, wherein a portion of the side breakable piece of the casing has a rough surface (9).
6. Closure as claimed in Claim 1 or 2, wherein the exterior surface of the discharge sleeve (2) is made with an annular slot (18) having tapered ledges.

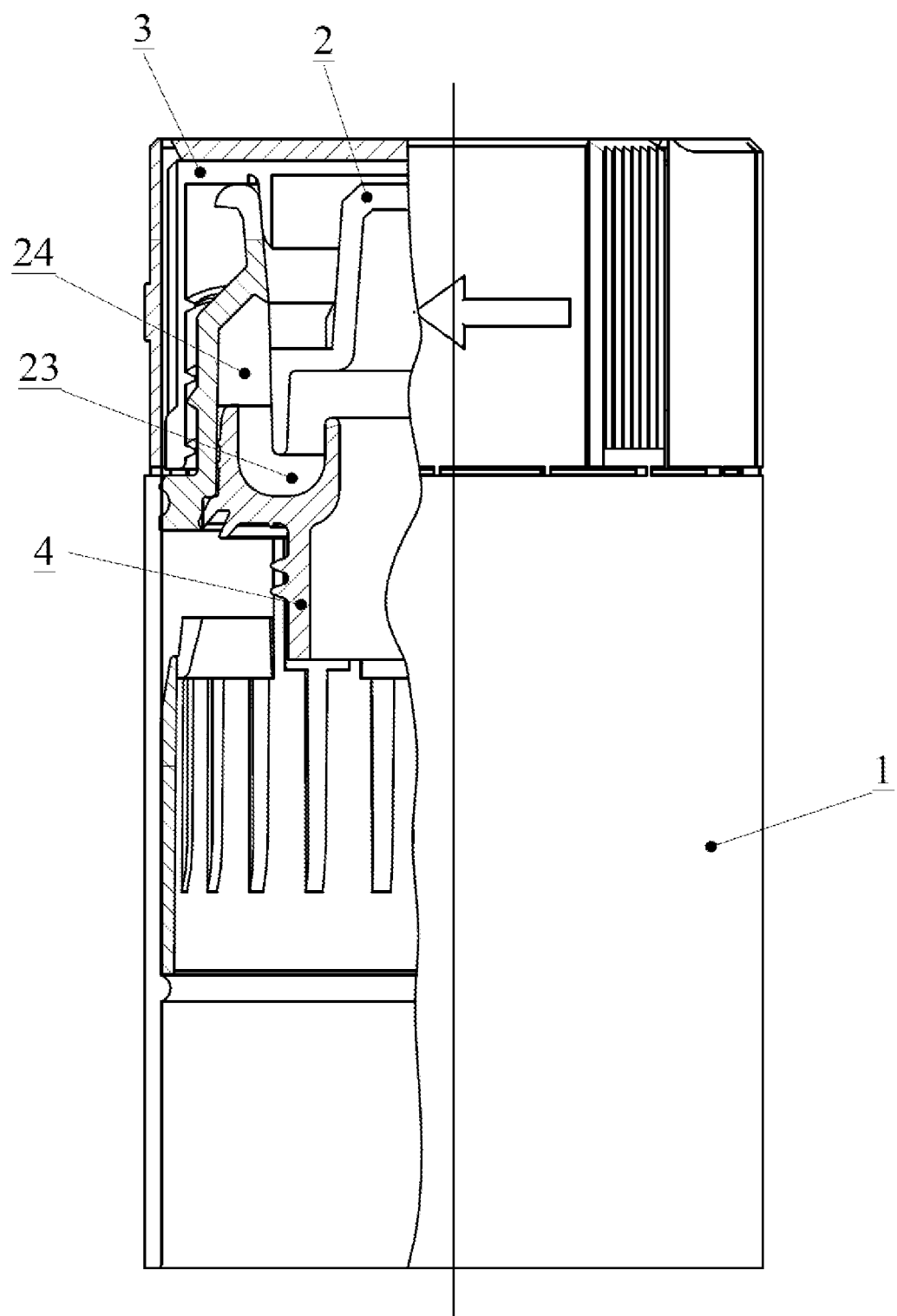


Fig.1

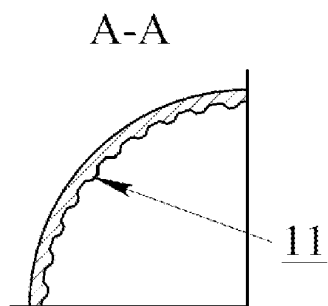


Fig. 4

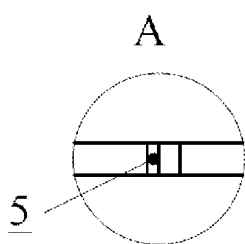


Fig. 5

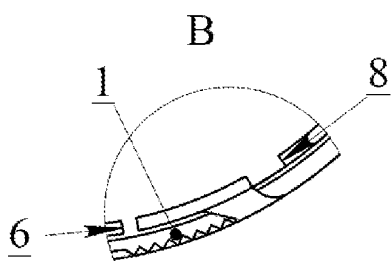


Fig. 6

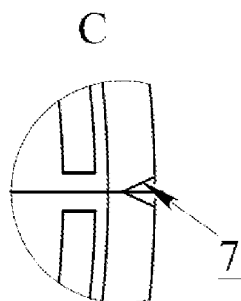


Fig. 7

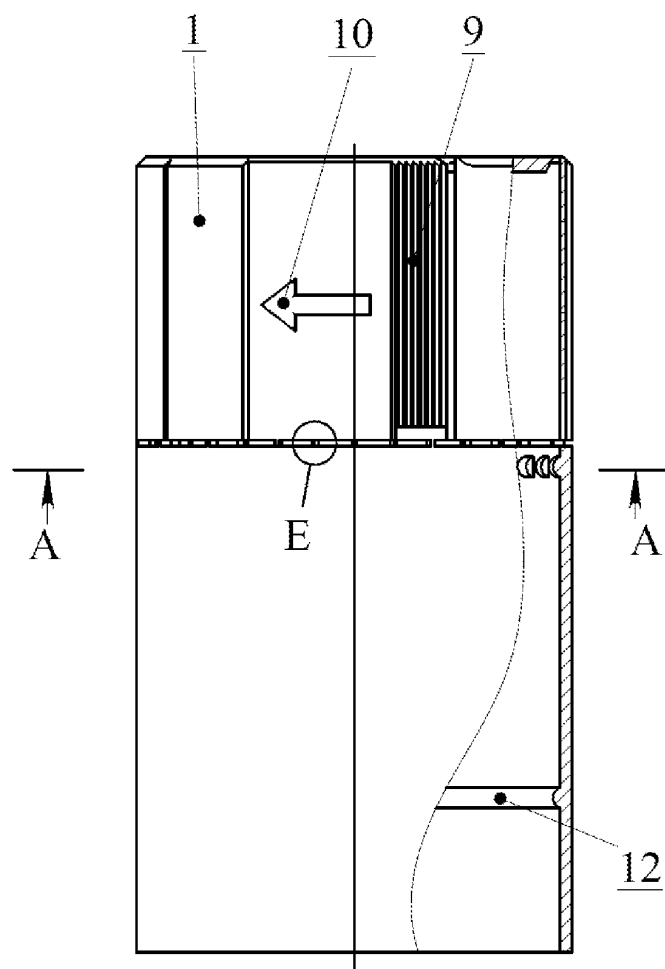


Fig. 2

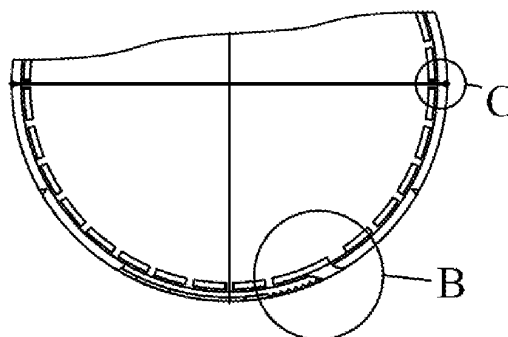


Fig. 3

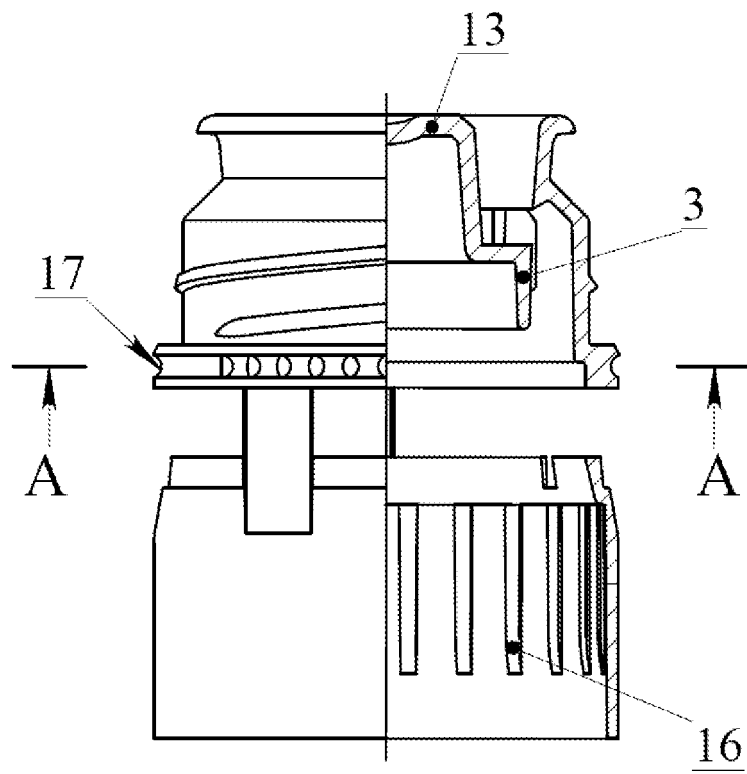


Fig. 8

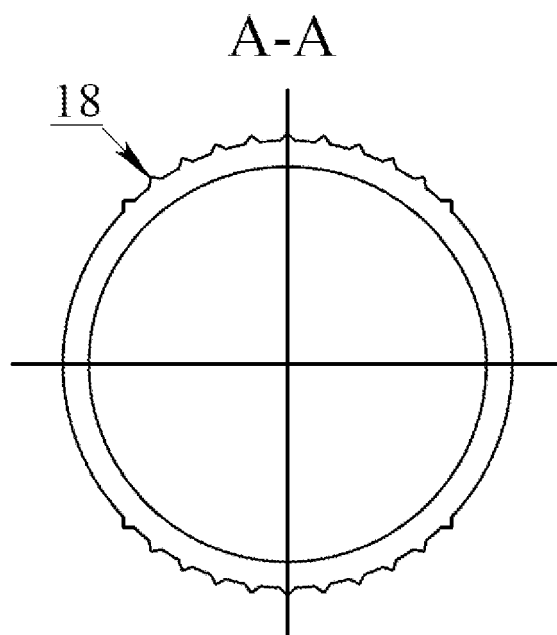


Fig. 9

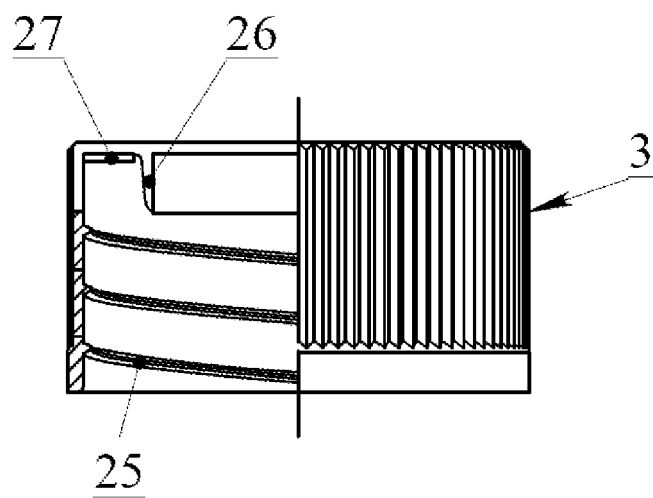


Fig. 10

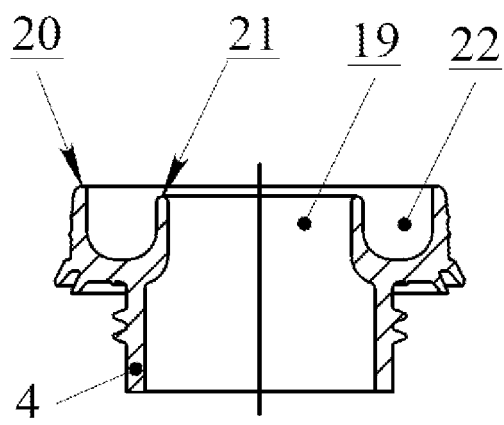


Fig. 11

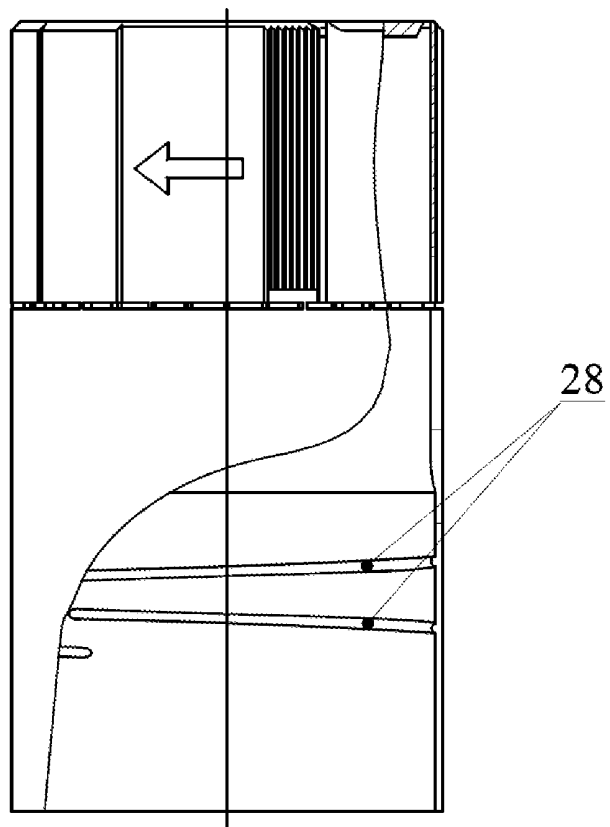


Fig. 12

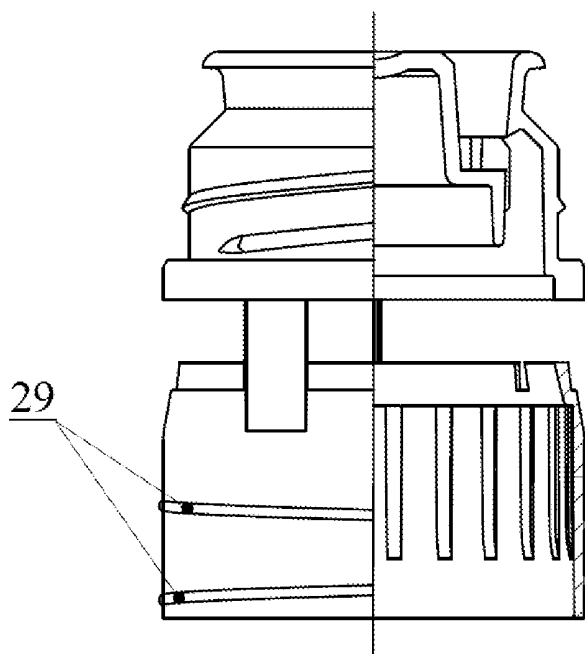


Fig. 13

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EA 2005/000006

A. CLASSIFICATION OF SUBJECT MATTER		
B65D 49/02 (2006.01)		
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 47/02-B65D 47/10, B65D 49/00-B65D 49/06, B65D 55/02-B65D 55/06, B65D 41/32-B65D 41/38		
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)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2002/096771 A1 (DANIEL MONTGOMERY & SON LIMITED) 05.12.2002	1-5
A	EP 0627359 A1 (JUNQUERAS GUERRE JOAQUIN) 07.12.1994	1-5
A	GB 1262743 A (LE BOUCHAGE MECHANIQUE) 02.02.1972	1-5
A	RU 2193000 C1 (INOSTRANNOE PROIZVODSTVENNOE UNITARNOE PREDPRIYATIE AKTIONSERNOGO OBSHESTVA (MULTIPAK) 20.11.2002	1-5
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> 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		Date of mailing of the international search report
17 January 2006 (17.01.2006)		26 January 2006 (26.01.2006)
Name and mailing address of the ISA/		Authorized officer
Facsimile No.		Telephone No.

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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- RU 2150417 [0004]
- RU 2193000 [0006]