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(54) CLOSING DEVICE FOR A BOTTLE PROVIDED WITH A SLIDING PIPE

(57) The invention relates to closures for bottle with expensive liquids having tamper-indicating means to prevent refilling and indicating first opening of the bottle.

The bottle closure with a slide tube comprises: a decorative casing, a shutoff sleeve with splines on the interior surface, a threaded discharge sleeve and a cap installed therein with a tube for liquid pouring, and splines on its exterior surface. The decorative casing is made with a breakable upper piece weakened by vertical slots, and having strips on the side and end surfaces made at different spacing, wherein the last strip on the end surface in direction of rupture is strengthened, its length ratio to the weakened strip being at least 2.5, said decorative casing having at least two restrictive collars and slots on the interior surface thereby to engage with exterior ribs on the side surface of the discharge sleeve.

According to the second embodiment, the interior surface of the decorative casing and the exterior surface of the discharge sleeve are threaded in unlike directions.

The proposed invention allows for an additional level of tamper-evident means by providing rupture of the upper piece of the casing. This also contributes to reliability of operation at bottling owing to the absence of mechanical elements in the discharge sleeve able to provoke sticking or wedging.

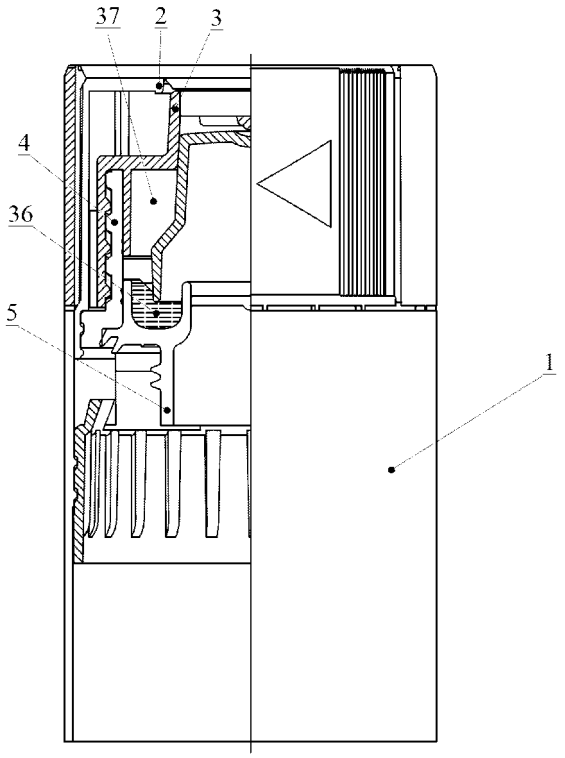

Fig. 1

EP 1 867 576 A1

Description

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

[0002] Known in the art is a safety closure incorporating a discharge device, a fastening hood, a cap and a shutoff sleeve. The hood is connected with the shutoff sleeve via a weak line in the form of a few strips. The discharge device has ribs to distribute the flow over the free space. The shutoff sleeve has a spline on its interior surface being in engagement with the spline on the basic device. Aforesaid valve protects bottles from refilling (RU Patent № 2150417, Int. Cl. 7: B 65 D 49/02, published 10.06.2000). A drawback of this closure is in low reliability due to a small basic length of the valve within the guiding cavity of the discharge device as a result of which the valve may be jammed in the guide at a slight tilt.

[0003] Various closures incorporating an extensible dispenser of different dimension-types have appeared lately (RU Patent № 22937,Int. Cl. 7: B65D 41/34; 41/38, published 10.05.2002). Closures of the type commonly incorporate a decorative metallic or plastic casing with a tamper-evident means warning about the first opening of the bottle, and a polyethylene cap with a discharge device, which extends upwards and opens at turning the decorative casing of the bottle (RU Patent № 23290, Int. C1.7: B65D 39/00, published 10.06.2002). Rotation of the casing in reverse direction makes the cap operate like a gate closing tightly the unsealed bottle and preventing thereby its contents from evaporation.

[0004] Known is a polymeric hood with an extensible valve comprising a decorative cap, a shutoff and a discharge sleeves, a pouring tube, a gate and a fastening casing. The discharge device is made as a pouring tube able to seal the bottle cap tightly with the help of the gate. The pouring tube is screwed out of the hood cavity by unscrewing the decorative cap, which results in rupture of the strips that connect the decorative cap with the safety strap and rupture of said strap indicating the first opening of the bottle (RU Patent № 2238893, Int. Cl. 7: B 65D 47/20, published 27.10.2000). Above-mentioned closures do not, however, furnish sufficient protection from unauthorised opening and are rather inconvenient. Besides, there is a possibility of reassembling the breakable safety strap to mislead the customer.

[0005] The closest in its engineering essence and the effect attained is a safety closure (RU Patent № 2180311, Int. Cl. 7: B 65 D 47/20, published 10.03.2002) comprised of a decorative casing with a break-away element, a shutoff sleeve and a discharge device. The break-away element abuts against the decorative casing. The shutoff sleeve with splines on the interior surface is located in said decorative casing so as to provide their mutual rotation about the discharge sleeve and to engage its splines with the splines on the break-away element. The described closure is, however, insufficiently protected against unauthorised opening, and is neither tight enough in a sealed form nor when screwed/unscrewed.

[0006] The proposed embodiment of technical solution intends to raise durability of the device, furnish an additional level of protection and make the closure more convenient for handling.

[0007] Named technical result is achieved by the accomplishment of the closure for bottles with a slide tube consisting of a decorative casing, a shutoff sleeve having splines on its interior surface, a threaded discharge sleeve with splines on its exterior side surface and a cap with a tube for liquid escape placed on its end, said decorative casing having a breakable upper piece weakened by vertical slots and furnished with strips on the side and end surfaces of the casing made at different spacing, wherein the last strip on the end surface in direction of breakage is strengthened and its length ratio to the weakened strip comprises at least 2.5. The interior surface of the decorative casing has slots and at least two restrictive collars, said slots on the casing being in engagement with the ribs made on the exterior side surface of the discharge sleeve.

[0008] Another embodiment of the closure has a decorative casing, the interior surface of said casing and the exterior surface of the discharge sleeve being threaded in different directions.

[0009] The mentioned technical result of the first and second embodiments is attained additionally by imparting surface roughness to a portion of the breakable element. The end surface of the shutoff sleeve is furnished with a breakable element with weakened strips, the interior end surface of said shutoff sleeve being made with a restrictive annular collar. The cap with the tube contains a cylindrical projection, wherein at least one sealing collar is made. The discharge sleeve incorporates a resilient element with a through opening and projections forming open on top annular cavity, said discharge sleeve being seated with its lower part in the annular cavity, thereby forming a gap between the bottom and projections of the resilient element.

[0010] The essence of the invention is embodied in the following figures:

Fig. 1. General view of the assembled closure.
Fig. 2. The decorative casing.
Fig. 3. Upper view of the casing.
Fig. 4. View A in Fig. 2.
Fig. 5. View B in Fig. 2.
Fig. 6. View C in Fig. 3.
Fig. 7. View D in Fig. 3.
Fig. 8. Shutoff sleeve.
Fig. 9. View E in Fig. 8.
Fig. 10. View F in Fig. 8.
Fig. 11. The cap with a tube.
Fig. 12. View G in Fig. 11.
Fig. 13. The discharge sleeve.
Fig. 14. The resilient element.
Fig. 15. The decorative casing with differently directed threading of embodiment 2.

Fig. 16. The discharge sleeve with differently directed threading of embodiment 2.

[0011] The closure for bottles with a slide tube consists of decorative casing 1, shutoff sleeve 2, cap 3, discharge sleeve 4 and resilient element 5.

[0012] The decorative casing 1 has a breakable upper piece disconnected by means of weakened strips 6 on the side surface and strips 7 on the end surface, and slots 8 separating the upper part. The last strip 9 in direction of rupture is strengthened, and its length ratio to the length of the weakened strip constitutes at least 2.5. The beginning of the breakable element has rough surface 10, wherein the direction of rupture 11 is indicated. Slots 12 and at least two restrictive collars 13 are provided on the interior lower part of decorative casing 1.

[0013] Shutoff sleeve 2 is fit with splines 14 on the interior side surface and has a breakable piece 15 with weakened strips 16 on the end surface of said shutoff sleeve. The annular restrictive projection 17 is made on the interior end surface of shutoff sleeve 2, and at least one slotted annular collar 18 is provided on the interior lower part of said shutoff sleeve.

[0014] Cap 3 is made with tube 19 forming opening 20 for liquid escape. The interior surface of cap 3 has thread 21 and its exterior surface is provided with splines 22 to engage with splines 14 of the shutoff sleeve. There is a cylindrical projection 23 inside cap 3 with at least one sealing collar 24 to provide tightness of the closure.

[0015] Discharge sleeve 4 contains inner tube 25 with a plugged end. The upper part of discharge sleeve 4 has cylindrical projection 26 with male screw 27 engaged with thread 21 on cap 3. The exterior surface of discharge sleeve 4 is provided with ribs 28 to engage with interior slots 12 of casing 1, and retaining slots 29 and 30 to enclose annular slotted collar 18 of shutoff sleeve 2 and restrictive collars 13 of decorative casing 1, preventing thereby its axial movement, wherein the interior surface of said discharge sleeve has ribs 31 for fastening on the bottleneck. Discharge sleeve 4 contains an elastic element 5 with through opening 32, and projections 33 and 34 forming on top annular cavity 35. Inner tube 25 is installed so as to accommodate its lower end in annular cavity 35 thereby forming hydraulic gate 36 (Fig. 1) and through channels 37 for liquid escape.

[0016] The given closure is assembled as follows: resilient element 5 is housed into the lower part of discharge sleeve 4, cap 3 with tube 19 is put on top of said sleeve, thereafter shutoff sleeve 2 is installed with breakable element 15 and decorative casing 1 with the upper breakable piece.

[0017] Discharge sleeve 4 with cap 3 is such as to allow swivel relative to shutoff sleeve 2. Decorative casing 1 made of a polymeric material fixes tightly shutoff sleeve 2 with cap 3 and discharge sleeve 4 over the interior surface with the aid of collars 13 and interior slots 12 engaged with ribs 28 of discharge sleeve 4. When installed on a bottle the safety cap is attached to the bottleneck by means of ribs 31 of discharge sleeve 4.

[0018] According to the second embodiment of the closure consisting of the same elements as the first modification, is distinguished by implementing a new joint. The interior surface of decorative casing 1 and exterior surface of discharge sleeve 4 are made with threads of unlike direction 38 and 39, respectively (Figs. 16, 17), which allow for reliable protection of the casing from the circumferential and axial dislocation. Aforesaid differently directed threading can be made as a single or multiple-thread. Such implementation of the assembly of the decorative casing with the discharge sleeve eliminates certain structural elements like slots, ribs and collars, simplifies the design and is labour saving. The described unit is assembled by pressing the casing against the sleeve and locking by means of a tight fit of named threads.

[0019] The described closure is handled as follows: the break-away element with a rough surface 10 is pushed along arrow 11 breaking thereby strips 6 and 7 on the side and end surfaces of the casing and leading to rupture of the upper piece of the decorative casing. Since the side and end strips are spaced differently the rupture proceeds easily without any effort. In addition, vertical slots 8 in the upper piece of casing 1 facilitate folding of the breakable element, the end surface being ruptured together with the side breakable elements and remaining on the last side element owing to strengthened strip 9. Thus, the whole broken upper piece of the casing is left in hand for throw-away. Further, shutoff sleeve 2 is rotated, rotating simultaneously cap 3 with discharge sleeve 4 relative to the bottle. Owing to the engagement between splines 14 of shutoff sleeve 2 and splines 22 of cap 3 as well as thread 27 of discharge sleeve 4, cap 3 is displaced along the axis of the device. As a result, cap 3 squeezes breakable element 15 out of shutoff sleeve 2 by tube 20, breaking thereby strips 16, and forcing tube 19 outside shutoff sleeve 2.

[0020] At tilting the liquid inside the bottle flows through opening 35 into annular cavity 36 of gate 37 formed by annular cavity 3 of resilient element 5 and inner sleeve 25, then flows via through channels 38 and is poured out of the bottle through tube 19. On returning into the upright position the liquid found in through channels 38 runs into the annular cavity of gate 37 and then into the bottle, creating thereby excess pressure and hindering further flow of the liquid. The restored initial position of the shutoff sleeve makes the interior surface of tube 19 abut tightly on the exterior surface of discharge sleeve 2 sealing thereby reliably the bottle.

[0021] All elements of the closure are made of ecologically friendly polymeric materials, e.g. polyethylene and polystyrene using high-tech thermoplastic machines by injection moulding in moulds with a hot-channel system and dies. End strips 7, 9 and slots 8 of casing 1 are made by moulding in a mould, while side strips 6 are produced by automatic cutting. The bottle is closed by pressing top-down in a capping machine.

[0022] A pre-production sample of the bottle closure with a slide tube has been manufactured at an experimental industrial enterprise IUPP "Belkeps" using the turning/milling equipment.

[0023] The proposed invention allows for an additional level of proofing against tampering by means of making the end piece of the casing breakable at opening. This also improves reliability of operation during bottling of liquids by excluding mechanical parts in the discharge sleeve that may cause sticking or jamming.

Claims

1. A closure for bottles with a slide tube containing a decorative casing (1), a shutoff sleeve (2) with splines on the interior surface, a threaded discharge sleeve (4) on which top a cap (3) with a pouring tube (19) is installed with splines (22) on the exterior side surface, **characterised in that** it is the decorative casing (1) is made with a break-away upper piece weakened by vertical slots (8), said casing having strips on the side and end surfaces made at different spacing, wherein the last strip (6, 7) on the end surface in direction of rupture is strengthened and its length ratio to the weakened strip (9) length is at least 2.5, and there are slots (12) on the interior surface of the decorative casing (1) and at least two restrictive collars (13), said slots being in engagement with the ribs (28) found on the exterior side surface of the discharge sleeve (4).

2. A bottle closure with a slide tube containing a decorative casing (1), a shutoff sleeve (2) with splines on the interior surface, a threaded discharge sleeve (4) on which top a cap (3) with a tube (19) is installed for liquid escape, said discharge sleeve having splines (22) on the exterior side surface, **characterised in that** it is the decorative casing (1) is fit with a breakable upper element weakened by vertical slots (8), and having strips (6,7) on the side and end surfaces made at different spacing, the last strip (9) thereof on the end surface in direction of rupture being strengthened, and having length ratio to the weakened strip at least 2.5, the interior surface of aforesaid decorative casing (1) and the exterior surface of the discharge sleeve (4) being threaded in different directions (38 39).

3. Closure as claimed in Claims 1 or 2, wherein a portion of the side breakable element of the casing has a rough surface (10).

4. Closure as claimed in Claims 1 or 2, wherein the end surface of the shutoff sleeve has a breakable element (15) with weakened strips (16), said sleeve having an annular sealing projection (17) on the interior surface, and a cap (3) with a tube (19) containing a cylindrical projection (23) with at least one sealing collar (24).

5. Closure as claimed in Claims 1 or 2, wherein the discharge sleeve has a resilient element (5) with a through opening (32) and projections (33, 34) forming open on top annular cavity (35), said discharge sleeve having its lower part accommodated in the annular cavity and forming a gap between the bottom and projections of the resilient element thereof.

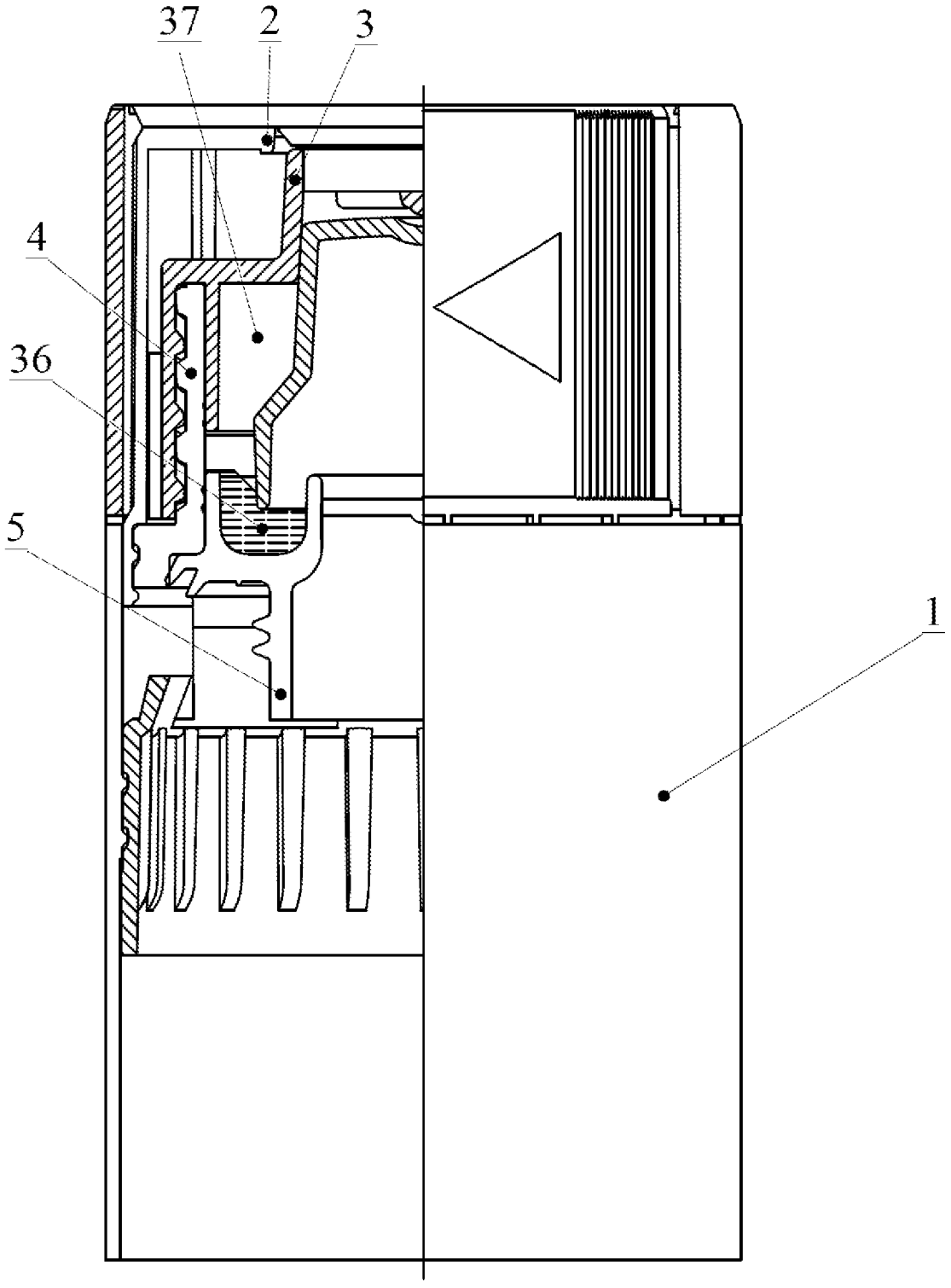

Fig. 1

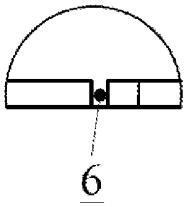

Fig. 4

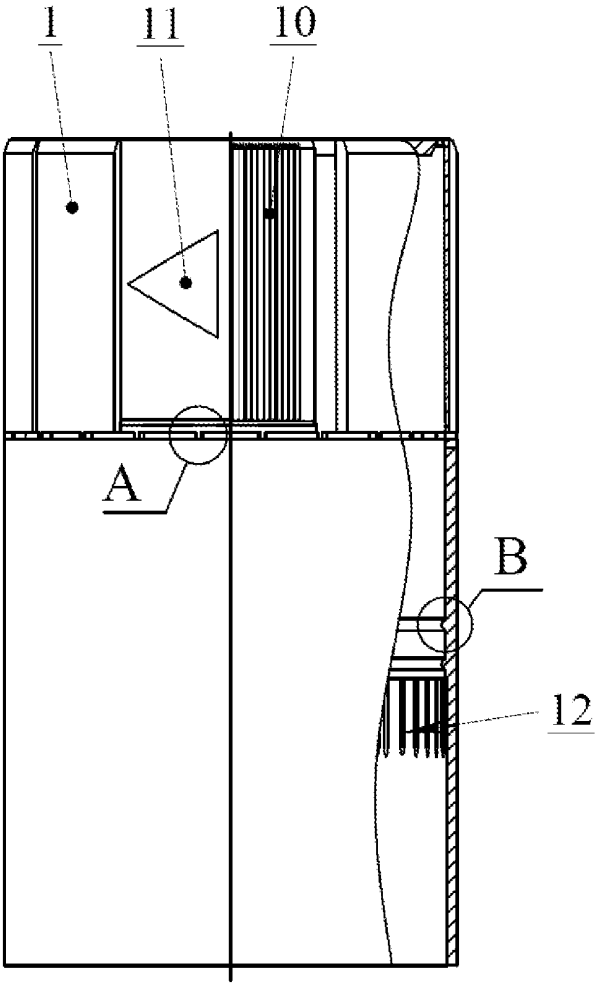

Fig. 2

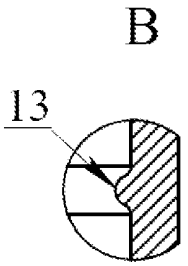

Fig.5

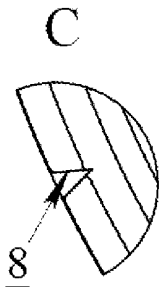

Fig.6

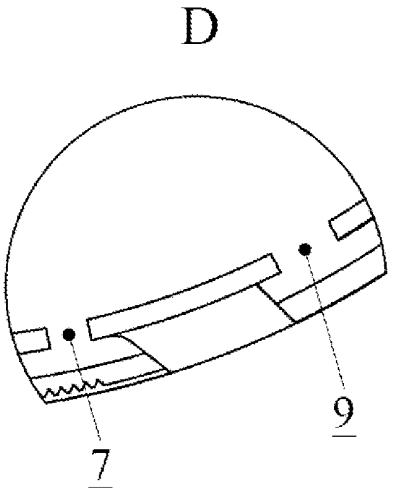

Fig.7

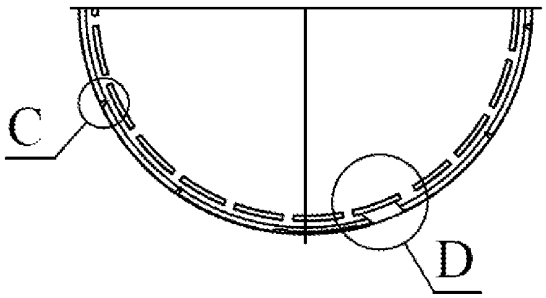

Fig.3

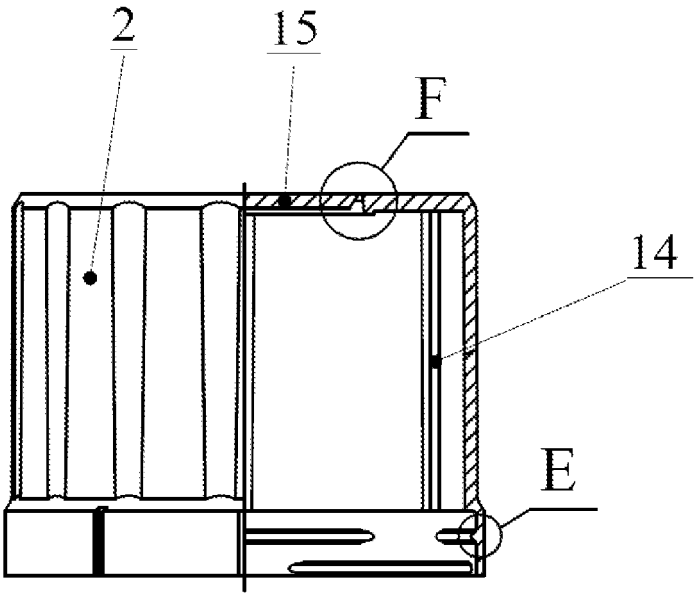

Fig. 8

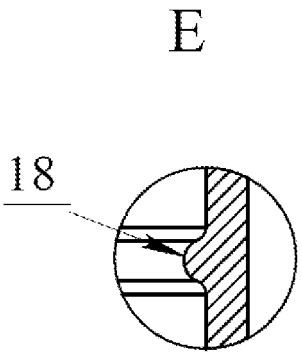

Fig. 9

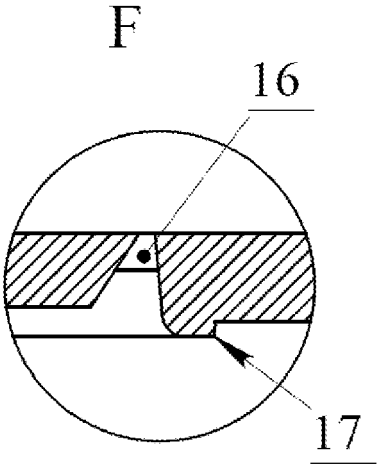

Fig. 10

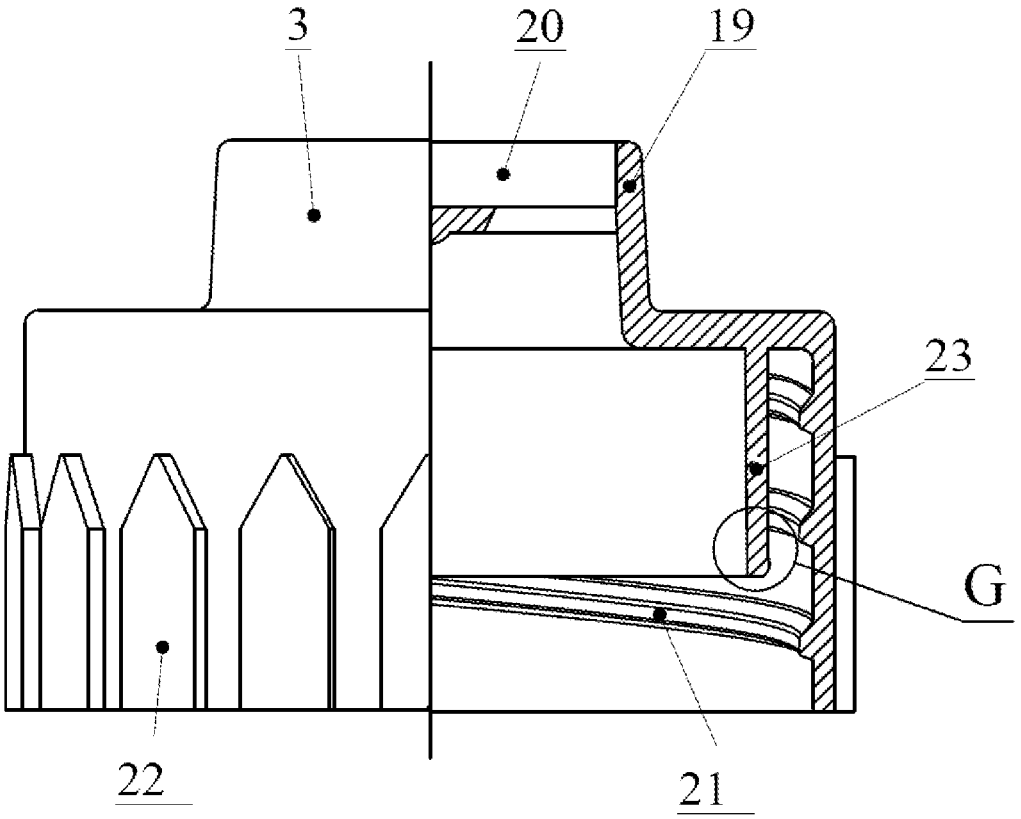

Fig.11

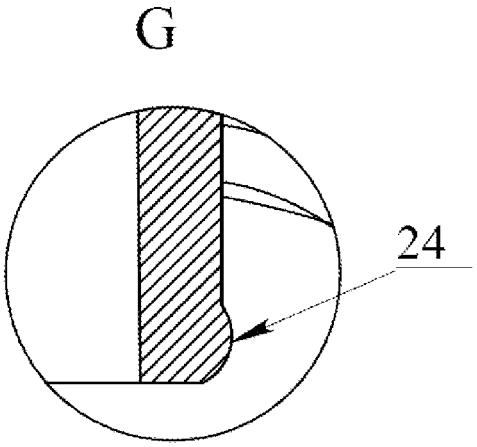

Fig.12

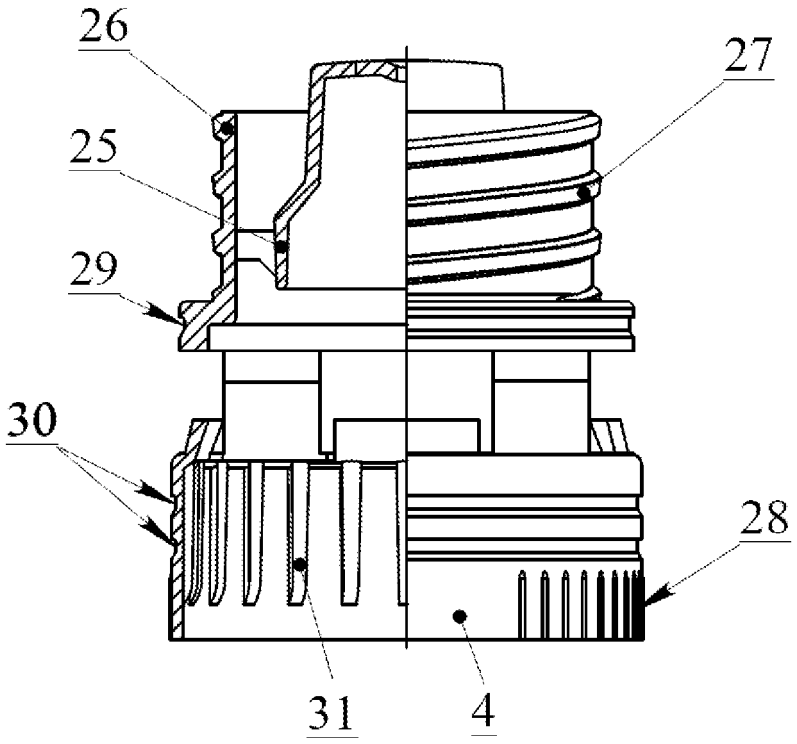

Fig. 13

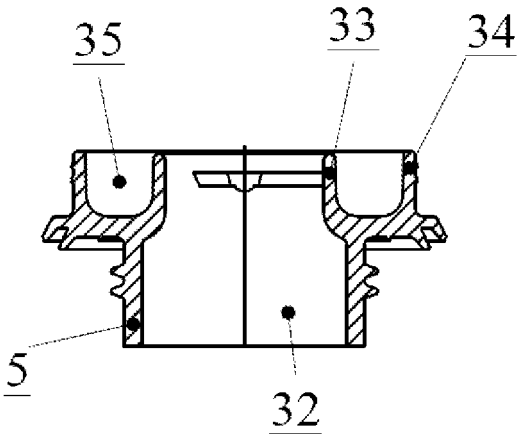

Fig. 14

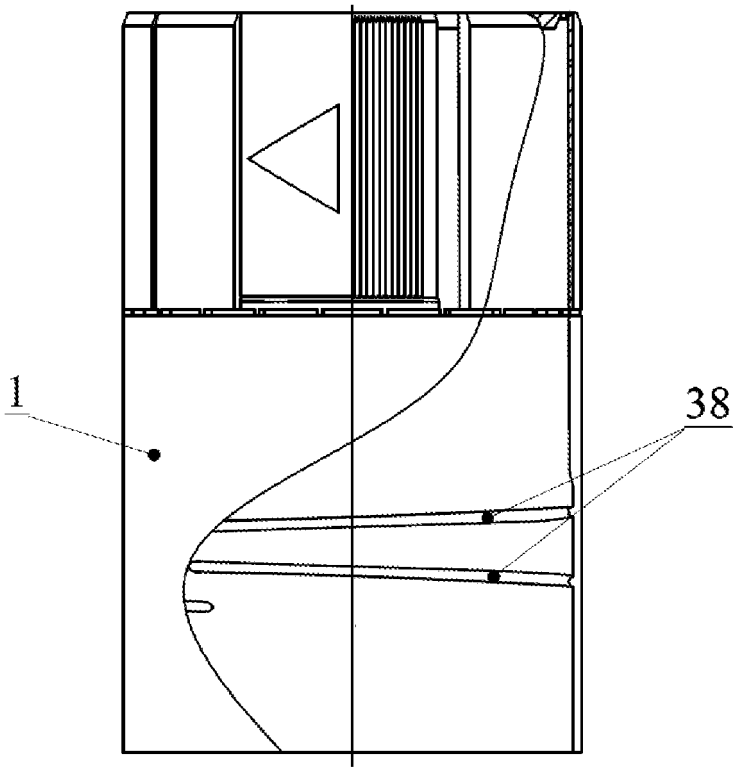

Fig. 15

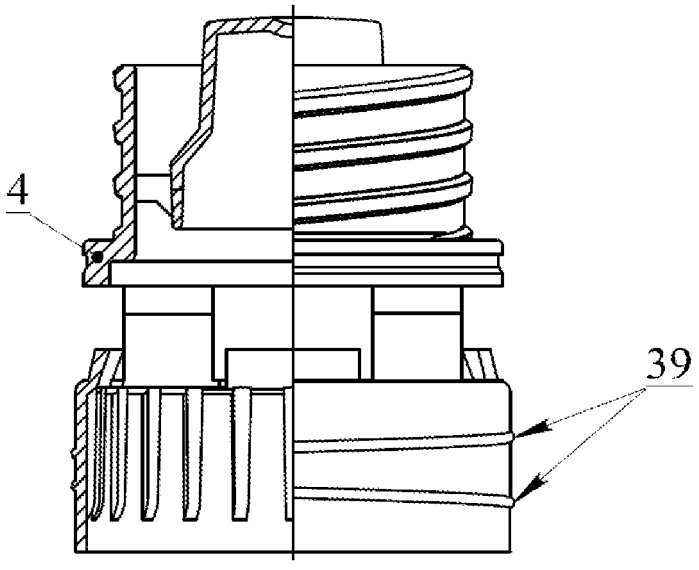

Fig. 16

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EA 2005/000007

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	RU 2180311 C1 (MESHALKIN GEORGI ALEKSEEVICH) 10.03.2002	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 OBSCHESTVA (MULTIPAK) 20.11.2002	1-5

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

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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.

Form PCT/ISA/210 (second sheet) (July 1998)

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- RU 2150417 **[0002]**
- RU 22937 **[0003]**
- RU 23290 **[0003]**
- RU 2238893 **[0004]**
- RU 2180311 **[0005]**