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(54) **Closure**

(57) The closure contains a screw cap (1) threadedly engaged with the external sleeve (2) and connected via ribs (5) with the internal sleeve (6) and forming thereby through channels (7), a resilient element (4) provided with a through-pass hole (22), and a metal case (3). There is a bevel (8) made on the exterior surface of the lower portion of the screw cap (1), whereas the lower portion of the cap contains a circular indicator collar (14) in the form of a taper, the interior face surface of said screw cap (1) being fit with an annular elastic sealing ridge inside which there are radially arranged fixing elements, the interior surface of aforesaid external sleeve having at least 2 stops (23) for fixing the resilient element in axial direction. The invention provides for an extra level of protection against unauthorized opening, preventing thereby refilling of the bottle while keeping high performance, technological effectiveness and reliability of the device.

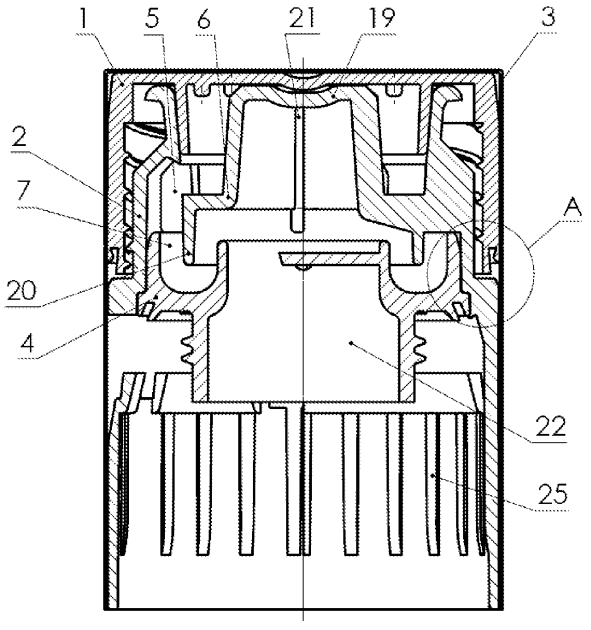


Fig. 1

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## Description

**[0001]** The invention relates to closures for containers, essentially for bottles with elite alcohol drinks, preventing refilling thereof, particularly to the devices with tamper-evident means.

**[0002]** Closures for bottles known in the art with tamper-evident means indicating unauthorized opening of the bottle are described at length in home and foreign literature.

**[0003]** Among known in the art analogues we may name: "Closing joint for bottles with high-quality alcohol drink", RU patent 2232116, IPC B 65 D 41/34, published 10.07.2004; "Closure", RU patent 2150417, IPC B 65 D 49/02, published in 2000; "Safety cap for bottles", UK patent 2158424, IPC B 65 D 55/08, published 13.11.1985; "Device for bottle closure with a warranty seal", RU patent 2219114, IPC B 65 D 49/04,published 20.12.2003.

**[0004]** Known analogues are rather intricate structurally and present difficulties for batch production of components. Some of these devices fail to provide pouring of a needed quantity of the liquid or quality emptying of the bottle due to numerous design elements and insufficient distance between them. The majority of named designs use a ball as a gate element known to be unstable in positioning, wherefore some additional elements are to be introduced that complicate the design or even restrict free motion of the element, limiting thereby quick shift from one position into another. Various indicator collars, tear strips and warranty seals, etc. used to indicate opening are often laborious in manufacture and can be easily restored. As a result, one can rearrange the collar or strips in their original position after unauthorized opening of the bottle, thus misleading the customer by counterfeiting high-quality beverages.

**[0005]** The closest technical solution to the present invention is a safety bottle cap containing a screw cap threadedly fastened on an outer sleeve, a metal case fixed on the screw cap, said cap resting on the contour of the warranty indicator collar. The metal case consists of two mating parts whose edges are rolled into the indicator collar so as to allow one of said edges release when the cap is unscrewed. The external sleeve is connected via its ribs with the internal sleeve forming thereby through-pass channels, and coupled with a resilient element (RU patent 2225337, IPC B 65 D 49/02, published 10.03.2004). This design, however, has a drawback in that the lower edge of the case rolls out partially when the cap is unscrewed, in which gap the indicator collar can be reinserted after unauthorized opening of the bottle. The polymer parts may shrink and slip out under the low temperatures of storage and transportation at vibration, letting the liquid leak out. In addition thereto, this design is insufficiently reliable and complex for manufacture because of some limitations imposed on the molding process of tubular components.

**[0006]** The task of the invention is to create a simpler closure design that can be easily and durably manufactured, assembled and prevent refilling, be fit with more efficient visual signs of opening to furnish apparent and irreversible indication of bottle opening.

**[0007]** The technical result achieved in realizing the invention consists in raising the degree of protection of the ready product from counterfeiting while keeping high manufacturability of the closures in conditions of large-scale production and increased output.

**[0008]** Above-indicated technical result is achieved in that the closure contains a screw cap threadedly engaged with the external sleeve and connected via ribs with the internal sleeve and forming thereby through channels, a resilient element provided with a through-pass hole, and a metal case, said screw cap having on its external upper part a bevel and a circular indicator collar in the lower part of the cap protruding beyond the edges of said cap, the collar being in the form of a taper with a cross-section increasing evenly from the smaller diameter in direction of the larger diameter of the taper, while the curvature of the circular indicator collar is devoid of the rounding radius in order to mount the parts evenly at assembly, the internal surface of said screw cap being fit with a sealing, and the internal surface of the external sleeve having at least 2 stops to fix the resilient element in axial direction.

**[0009]** A particular case of the invention distinguished in that a circular indicator collar is made on the lateral surface of the cap so as to form an external annular groove into which the indicator collar is being laid at assembly.

**[0010]** In a particular embodiment of the invention, the circular indicator collar is made over the external edge of the lower part of the cap.

**[0011]** In a particular embodiment of the invention, the sealing is made as an annular elastic ridge inside which fixing elements are radially arranged.

**[0012]** In a particular embodiment of the invention, a sealing is made as annular protrusions with a closed end on which fixing elements are radially located.

**[0013]** The circular indicator collar is preferably lengthened so as to protrude in the open condition beyond the external surface of the case.

**[0014]** It is preferable to make slots over the exterior surface of the screw cap to let the air out during closing such that they emerge on the exterior surface of the indicator collar.

**[0015]** In a particular embodiment of the invention, the screw cap and the indicator collar are contrasted in the color spectrum to that of the metal case.

**[0016]** The interior surface of the internal sleeve is made with radially arranged vertical ribs. The lateral surface of the metal case is perforated above the bending point of the indicator collar.

**[0017]** A particular embodiment of the invention comprises a resilient element with internal and external protrusions forming together an annular cavity, where the external protrusion juts out the internal protrusion to ex-

tend the contact area with the external sleeve, making thereby the device tighter. The external surface of the resilient element is tapered and bears at least one sealing ridge. This ridge can be either rounded or cylindrical.

**[0018]** In a particular embodiment of the invention, the closure comprises a tamper evident means preventing refilling, the means being formed by the internal sleeve and the annular cavity of the resilient element.

**[0019]** The probability of embodiment of the invention characterized by above-cited combination of limitations and the chance of realizing the purpose of the invention are supported by the description of the closure design implemented according to the present invention. The description of the design is illustrated with drawings, wherein the following is shown:

Fig. 1. Schematic view of the closure in cross-section;
Fig. 2. View A in Fig. 1 is the device prior to opening;
Fig. 3. View A in Fig. 1 is the device after opening;
Fig. 4. Metal case (general view);
Fig. 5. Screw cap in partial section;
Fig. 6. View B in Fig. 5 is indicator collar forming an external annular groove in molded state.
Fig. 7. View B in Fig. 5 is a variant of embodiment of the indicator collar on the external edge of the lower part of the cap without the annular groove;
Fig. 8. View C in Fig. 5 (with a sealing ridge)
Fig. 9. View C in Fig. 5 (with dead-ended sealing protrusions);
Fig. 10. External sleeve with a partial cross-section;
Fig. 11. View D in Fig. 10;
Fig. 12. The resilient element in cross-section;
Fig. 13. View E in Fig. 10 is annular rounded ridge;
Fig,. 14. View E in Fig. 10 is annular cylindrical ridge;
Fig. 15. View F in Fig. 10 with annular sealing ring;
Fig. 16. View F in Fig. 10 is resilient element with a sealing ridge.

**[0020]** The closure comprises screw cap 1, external sleeve 2, metallic case 3, and resilient element 4.

**[0021]** The crew cap 1 is threadedly engaged on external sleeve 2 connected via ribs 5 with internal sleeve 6 and forming thereby through-pass channels 7. The exterior surface of cap 1 is made with a bevel 8 (Fig. 5) to facilitate assembly of the components. The interior surface of cap 1 is fit with an annular elastic ridge 9 inside which fixing elements 10 are arranged (Fig. 10) so as to keep the component within the assembly when being unscrewed. Another embodiment of the device presupposes dead-ended annular protrusions 11 on the interior surface of cap 1 over which fixing elements 13 are located radially (Fig. 9).

**[0022]** There is a circular indicator collar 14 in the lower part of the lateral surface of cap 1 made as an extended taper that protrudes beyond the cap, and an external annular groove 15 (Fig. 6) into which the indicator collar is enclosed at assembly of the design. Above implementation of the indicator collar imparts extra safety against reclosing thanks to the extended thread length of the screw cap. The edge of the lower part of cap 1 is accommodated in groove 15 and fills it at reclosing, thus preventing placing of the collar in the groove.

**[0023]** To simplify the design of the device and raise durability of the assembly some embodiments propose to mount indicator collar 14 over the exterior edge of the lower part of cap 1 without forming an annular groove (Fig. 7).

**[0024]** Metal case 3 is fastened by a push fit on the external sleeve 2, where perforation 16 or a continuous slit (Fig. 4) is made on the side surface above the bending point of circular indicator collar 14 so as to rupture at opening of the container.

**[0025]** Circular indicator collar 14 is made lengthened so that in the open condition of cap 1 it is released and protrudes over the exterior part of metallic case 3, overlapping thereby broken edges of perforation 16 (Fig. 3). The described implementation of the collar safeguards the customer from sharp edges of the broken perforation when the cap is unscrewed or screwed on.

**[0026]** Curvature line 17 of circular indicator collar 14 has no rounding radius (Fig. 5), which assists uniform arrangement of collar 14 into the external annular groove 15 over the interior surface of the case during assembly of the closure.

**[0027]** Radially located slots 18 envisaged on the interior surface of cap 1 pass over onto the exterior surface of indicator collar 14 to let air out at closure (Fig. 5).

**[0028]** External sleeve 2 contains internal sleeve 6 having a closed end 19 and lower annular projection 20. The interior surface of internal sleeve 6 is made with radial vertical ribs 21 (Fig. 1) to simplify the molding process and improve the efficiency of assembly.

**[0029]** Resilient element 4 with through-pass hole 22 abuts against the lower part of external sleeve 2 in which stops 23 are made to fix said resilient element in axial direction inside sleeve 2 (Fig. 11). Stops 23 avert slip out of resilient element 4 at low temperatures and protect at assembly and transportation.

**[0030]** Slots 24 are made over the exterior circular portion of external sleeve 2 to let air out at closure (Fig. 10). There are spline ridges 25 on the interior surface of external sleeve 2 to be engaged with the ribs on the bottleneck, preventing thereby slippage of the device.

**[0031]** Resilient element 4 contains inner 26 and outer 27 projections and annular cavity 28 (Fig. 12), which accommodates during assembly annular projection 20 of internal sleeve 6 at a certain gap, forming thereby a temper-evident means preventing refilling. The pressure created inside the container prevents refilling by a counterfeit. Adoption of such a device eliminates the necessity in moveable gate valves. Outer projection 27 extends above inner projection 26 so as to enlarge the contact area with external sleeve 2, making thus the assembly tighter. The exterior surface of resilient element 4 is tapered in order to facilitate the assembly of the device and

improve tightness of the joint.

**[0032]** The external surface of resilient element 4 has at least one sealing annular ridge in the form of a rounded projection 29 (Fig. 13), or, following the second variant, the annular ridge may be in the form of a cylindrical projection 30 (Fig. 14), which simplifies the molding process and raises efficiency of the device.

**[0033]** The lower portion of resilient element 4 is made with an annular projection 31 having sealing rings 32 aimed at accommodating in the bottleneck (Fig. 15). Instead of sealing rings 32 a seal rim 33 may be formed on the lower face of the resilient element (Fig. 16). This fact may ensure a complete tight jointing of resilient element 4 in the bottleneck.

**[0034]** Screw cap 1 and indicator collar 14 have a color spectrum contrasted to the color of metallic case 3, which adds visual efficiency to indication of tampering.

**[0035]** The device operates as follows.

**[0036]** By unscrewing cap 1, perforations 16 of metal case 3 rupture releasing thereby circular indicator collar 14, thus visualizing opening. When tilting the bottle (not shown), the liquid passes via the through-pass hole of resilient element 22 into annular cavity 28 and further over through-pass channels 7 of external sleeve 2 escapes from the bottle.

**[0037]** When the bottle returns into its initial upright position, the liquid found in through-pass channels 7 spills over into annular cavity 28 of the tamper-evident means and flows into the bottle creating overpressure inside that hampers further liquid flow.

**[0038]** All details of the safety closure are made of ecologically safe polymeric materials. The case is made of a metal, predominantly aluminum, while the external sleeve and the resilient element are made of polymeric materials by injection molding using high-performance thermoplastic machines and press-tools with hot-channel systems and extruding dies.

**[0039]** The bottles are closed on a capping machine by top-down pushing.

**[0040]** The proposed closure is accomplished as an integral unit, can be transported separately, and is intended for installation on bottles.

**[0041]** The present invention imparts an extra level of protection against unauthorized opening by providing perforation and a protruding indicator collar, prevents refilling of bottles and retains at the same time high efficiency, manufacturability and reliability of the device.

## Claims

1. The closure comprising a screw cap (1) threadedly engaged on the external sleeve (2) connected via ribs (5) with the internal sleeve (6) and forming thereby through-pass channels (7), a resilient element (4) with a through-pass hole (22), a metal case (3) **characterized in that** a bevel (8) is made on the exterior surface of the screw cap (1) in its upper part, while in the lower part of the cap (1) there is an indicator collar (14) protruding beyond the edge of the metal case (3), said collar being made as a taper whose cross-section evenly increases from the smaller diameter in direction of the larger diameter of the taper, wherein the curvature of the indicator collar (14) is made without a rounding radius in order to be uniformly mounted at assembly, aforesaid screw cap (1) being fit with a sealing component (9), and the interior surface of the external sleeve (2) having at least 2 stops for fixing the resilient element (4) in axial direction.

2. Closure as claimed in Claim 1 **characterized in that** the circular indicator collar (14) is located on the side surface of the cap (1) so that forms an external annular groove (15) into which the indicator collar (14) is enclosed at assembly of the design.

3. Closure as claimed in Claim 1 **characterized in that** the circular indicator collar is mounted on the external edge of the lower part of the cap.

4. Closure as claimed in Claim 1 **characterized in that** the sealing component is made in the form of an annular elastic ridge (9) inside which there are radially arranged fixing elements (10).

5. Closure as claimed in Claim I **characterized in that** the sealing component is made in the form of annular projections (11) with a closed end (12) on which the fixing elements (13) are arranged radially.

6. Closure as claimed in Claim 1 **characterized in that** the circular indicator collar (14) is extended so that in the open condition protrudes beyond the external surface of case (3).

7. Closure as claimed in Claim 1 **characterized in that** slots (18) are made on the exterior surface of the screw cap that emerge on the exterior surface of the indicator collar (14) to let the air out at closure.

8. Closure as claimed in Claim 1 **characterized in that** the screw cap (1) and the indicator collar (14) are made in a color spectrum contrasted to the spectrum of the metal case (3).

9. Closure as claimed in Claim 1 **characterized in that** on the interior surface of the internal sleeve (6) radially arranged vertical ribs (21) are made.

10. Closure as claimed in Claim 1 **characterized in that** a perforation (16) is made on the lateral surface of the metal case (3) above the bending point of the circular indicator collar (14).

11. Closure as claimed in Claim 1 **characterized in that**

the resilient element (4) contains an internal (26) and external (27) projections forming an annular cavity (28), said external projection (27) protruding above the internal one to enlarge the contact area with the external sleeve (2) and making thereby the device tighter.

**12.** Closure as claimed in Claim 1 **characterized in that** the exterior surface of the resilient element (4) is conical, wherein at least one sealing ridge is made either rounded or cylindrical.

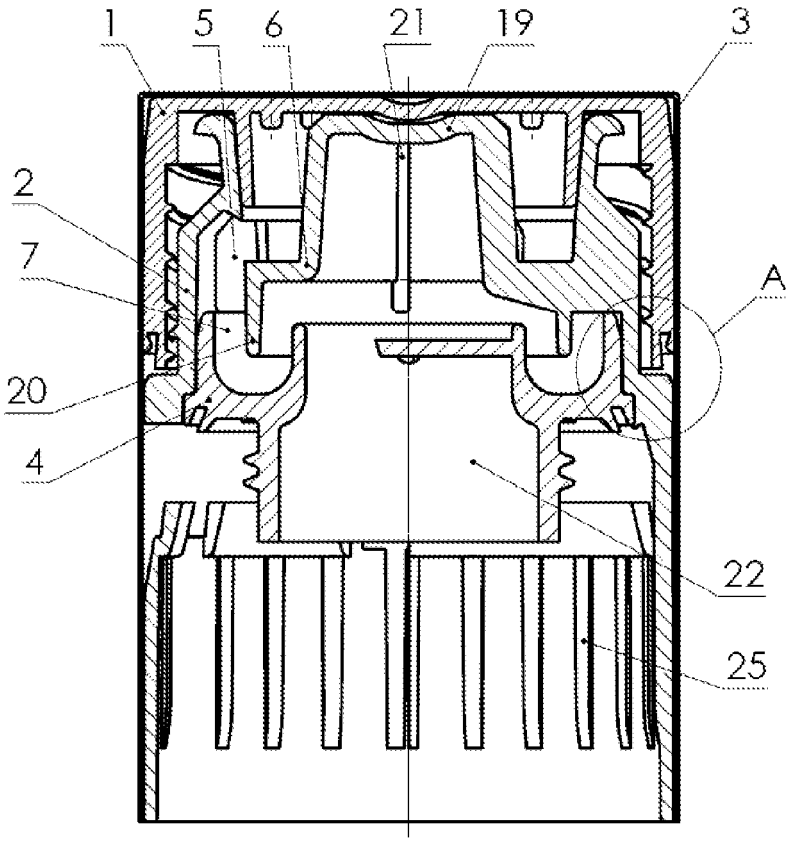


Fig. 1

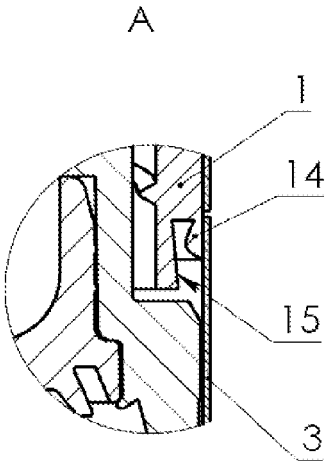


Fig. 2

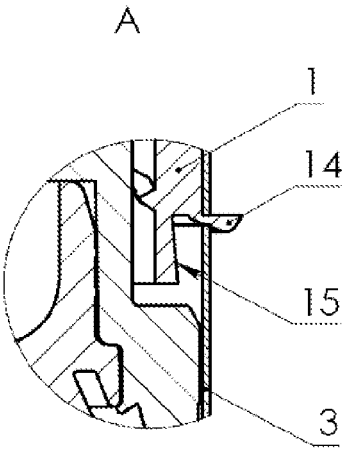


Fig.3

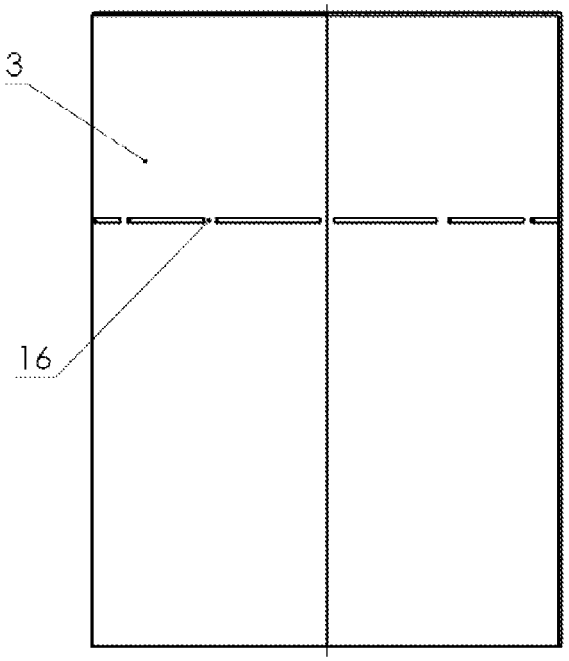


Fig. 4

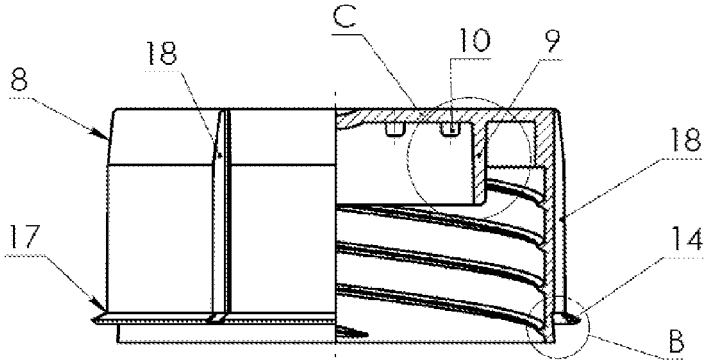


Fig. 5

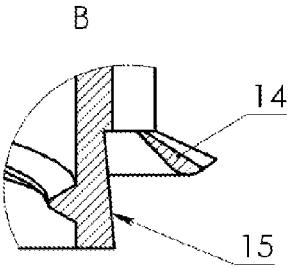


Fig. 6

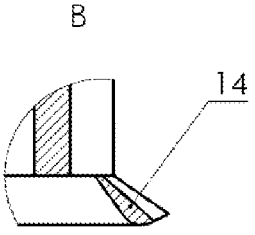


Fig. 7

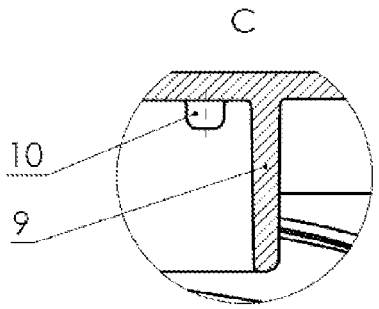


Fig. 8

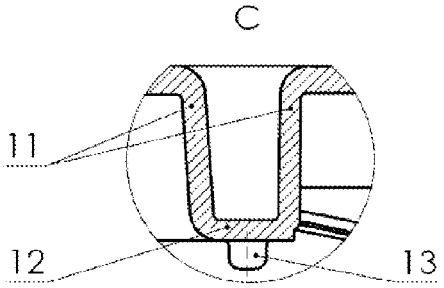


Fig. 9

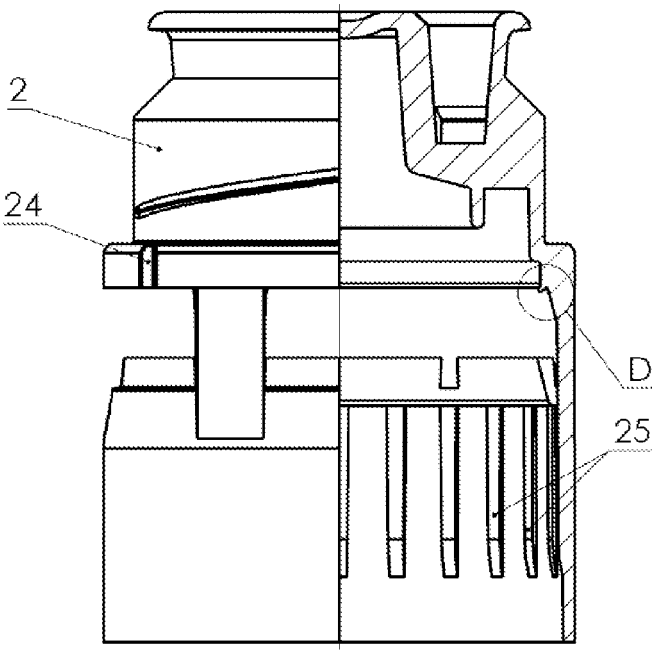


Fig. 10

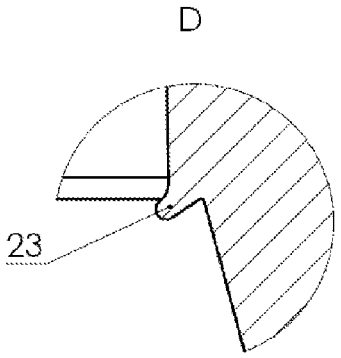


Fig. 11

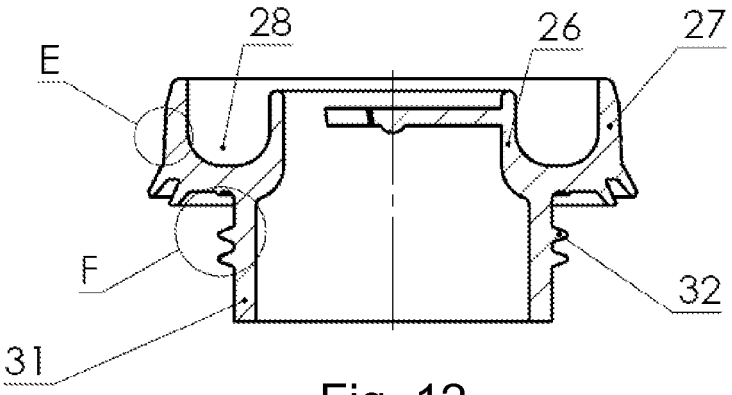


Fig. 12

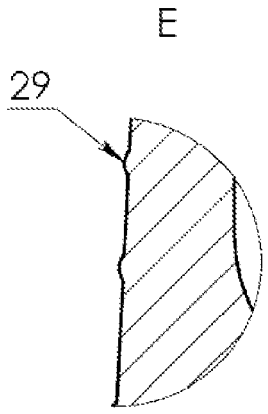


Fig. 13

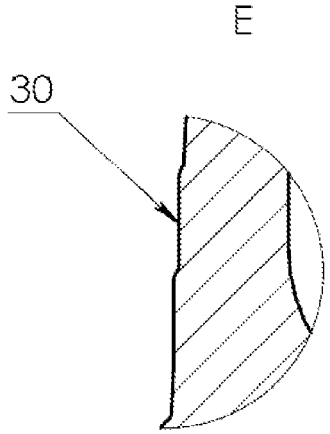


Fig. 14

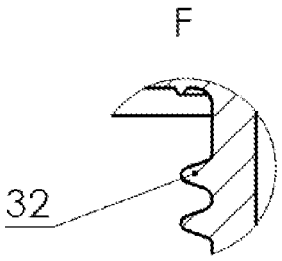


Fig. 15

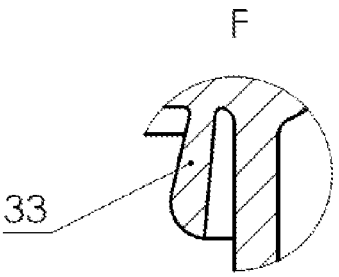


Fig. 16

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# EUROPEAN SEARCH REPORT

Application Number
EP 08 15 6256

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| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (IPC) |
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B65D

The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
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CATEGORY OF CITED DOCUMENTS

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## ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 08 15 6256

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

## REFERENCES CITED IN THE DESCRIPTION

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### Patent documents cited in the description


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