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(54) **SAFETY BOTTLE CAP**

(57) The invention relates to closing devices for low-viscous liquid containers preventing the refilling thereof during storage and transportation. The inventive engineering solution is aimed at the improvement of the reliability thereof by using an additional safety level. The inventive bottle top comprises a screw cap which is fixed to an external sleeve with the aid of thread. Said external sleeve is connected to an internal sleeve by means of ribs in such a way that through channels are formed. The bottle top also comprises an elastic element provided with through holes and protrusions which form an an-

nular open-top cavity containing the low part of the internal sleeve, thereby forming a space between the bottom and protrusions of the elastic element. The bottle top is provided with a metal enclosure which is fixed to the screw cap which is embodied with a control-indicating collar. Said metal enclosure is embodied in the form of two adjacent parts whose edges are seamed, thereby forming the indicating collar in such a way that one of the edges is released when the top is unscrewed.

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Description

[0001] The invention relates to closing devices for low-viscosity liquid containers preventing refilling thereof during storage and transportation.

[0002] A closing device is known for bottles described in application EP 0670271, A1 IPC⁶ B 65 D 49/00, published in 1995, which comprises a case of a cylindrical shape at the bottom end of which there is provided a seat with a through-pass opening supporting the gate element. The inner surface of the case is adjoined tightly by a splitter in the form of a ring with ribs dividing the interior space of the case into through-pass channels for liquid flow. The device is resiliently and sealingly fixed inside the bottleneck using elastic annular protrusions which prevent leaking of the liquid. Pouring out the liquid from the bottle after unscrewing the cap and tearing the warranty collar is effected by tilting the bottle, whereby the force of the liquid flow pushes out the gate element that sits in the seat having the through-pass opening and opens it letting the liquid pass through the splitter channels of the power body channels defined by the space between the ribs. When the bottle returns in the initial upright position, the closing element, under its own gravity, returns to the initial position and locks the through-pass opening, upon which it is impossible to refill the bottle with the liquid.

[0003] The disclosed device, however, has a number of essential drawbacks affecting its functional operation. The ball-shaped gate element is unstable, which dictates the shape of upright guides for accommodation on the seat, these guides being positioned such that the ball is squeezed there between due to which its mobility is limited. As a result of cooling the container, pressure reduction in the bottle occurs which may result in sticking of the gate element and in failure to pour out the liquid, which requires quick agitation of the container.

[0004] A closing device is also known that contains a cylindrical sleeve the upper portion of which is a screw cap and has a moveable elastic annular protrusion to be fixed on a bottle, thereby providing a permanent connection. A cowl with a warranty collar is pressed on the screw cap, a splitter in the form of a ribbed ring is positioned inside the housing by means of a thread, the ribs dividing the interior space into through-pass channels for liquid flow. To pour in the liquid, the housing cavity is provided with a resilient element having on its centre a seat with a through-pass opening which supports the gate element in the form of a valve. The resilient element is sealingly fixed inside the bottleneck using the elastic annular protrusions and is hermetically connected to the housing for pouring in the liquid, which prevents leaking out the liquid.

[0005] Pouring out the liquid from the bottle following preliminary tearing of the warranty collar is effected by tilting the bottle, whereby the force of liquid flow pushes out the closing gate element that sits in the seat having a through-pass opening and opens it letting the liquid

pass through the housing channels defined by the space between the ribs. When the bottle returns to its initial upright position, the gate element, under its own gravity, returns to the initial position and locks the through-pass opening, upon which it is impossible to refill the bottle with the liquid. (RU, No.2150417, Cl. B 65 D 49/02, published 2000).

[0006] This device, however, has a number of essential drawbacks affecting its functional operation. Because of the presence of the moveable valve, its deformation and wedging are possible as well as sticking at a decreased temperature due to reduced pressure within the container, which results in failure to pour out the liquid and in the need to agitate the container so that the valve could operate.

[0007] The closest technical solution to the present invention is a safety bottle cap comprising a metal enclosure with a screw cap fastened by a thread on an outer sleeve connected by ribs to an internal sleeve and forming through-pass channels, a resilient element with a put-through opening and protrusions that form an open-top annular cavity containing a low part of the internal sleeve, thereby forming a gap between the bottom and protrusions of the resilient element. (RU, No. 2193000, Cl. B 65 D 49/02, published 20.11.2002).

[0008] The proposed technical solution is directed to improvement of reliability thereof by using an additional level of protection against bottle refilling.

[0009] This aim is achieved by the fact that the safety bottle cap comprises a metal enclosure with a screw cap which is fixed to an external sleeve with the aid of a thread; said external sleeve is connected to an internal sleeve by means of ribs in such a way that through channels are formed; the safety cap also comprises an elastic element provided with a through-pass holes and protrusions which form an annular open-top cavity containing the low part of the internal sleeve, thereby forming a space between the bottom and protrusions of the elastic element; there is a metal enclosure which is fixed to the screw cap which is provided with a control indicator collar; said metal enclosure is provided in the form of two adjacent parts the edges of which are seamed, thereby forming the control indicator collar in such way that one of the edges is released when the cap is unscrewed.

[0010] The invention is illustrated with drawings wherein Fig.1 schematically shows the safety cap in sectional view; Fig.2 shows assembly A of Fig.1, the cap before opening; Fig.3 shows the same, the cap after opening.

[0011] Screw cap 2 is made with a control indicator collar 3 along the outline of the low part of the screw cap, the edges of the enclosure 1 are seamed into the control indicator collar 3.

[0012] Cap 2 is fixed by a thread to external sleeve 4 connected by ribs 5 with internal sleeve 6, thereby forming through channels 7.

[0013] Low part of interior sleeve 6 with a closed up-

per end is positioned adjacent to elastic element 8 having through hole 9 and protrusions 10 and 11 forming an open-top cavity 12. The low part of interior sleeve 6 is located within annular cavity 12, thereby to form a space between bottom 13, protrusions 10 and 11 of elastic element 8, which provides a hydraulic lock.

[0014] The device operates as follows.

[0015] When screw cap 2 is unscrewed, the sealed control indicator collar 3 is released. When the bottle (not shown) is tilted, the liquid passes through the through-pass hole 9 to annular cavity 12 of the hydraulic lock and then by through channels 7 leaks out of the bottle.

[0016] When the bottle is returned to its upright position, the liquid present in through channels 7 enters to the annular cavity of the hydraulic lock and further to the bottle, thereby providing excessive pressure preventing further inflow of the liquid. The pressure created by the hydraulic lock within the container prevents the liquid from filling the container.

[0017] The safety bottle cap preventing refilling the container, with the hydraulic lock, assembled from 4 parts and having several standard heights, suits a wide range of bottle shapes. The control safety collar and hydraulic lock provide a high level of protection from refilling. The bottle closure is effected by pressing from the top downwards using a closing machine (not shown).

[0018] All parts of the safety bottle cap are made of environmentally pure materials, polyethylene, polystyrene and metal on high-capacity automatic injection machines by injection using moulds with a hot runner system and dies.

[0019] A pilot specimen of the hydraulic lock valve was manufactured at the pilot/mechanical production facility IUPP AO "BELCAPS" on a lathe and milling equipment. The external sleeve was made of polymethylmethacrylate (organic glass), the elastic element was made of caprolon, and the enclosure was made of an aluminium sheet.

way that one of the edges is released when the cap is unscrewed.

Claims

1. A safety bottle cap comprising a screw cap which is fixed to an external sleeve with the aid of a thread; said external sleeve is connected to an internal sleeve by means of ribs in such a way that through channels are formed; the safety cap also comprising an elastic element provided with through holes and protrusions which form an annular open-top cavity containing the low part of the internal sleeve, thereby forming a space between the bottom and protrusions of the elastic element, **characterised in that** it is provided with a metal enclosure which is fixed to the screw cap the latter being provided on the outline with a control indicator collar; said metal enclosure being provided in the form of two adjacent parts the edges of which are seamed, thereby forming the control indicator collar in such

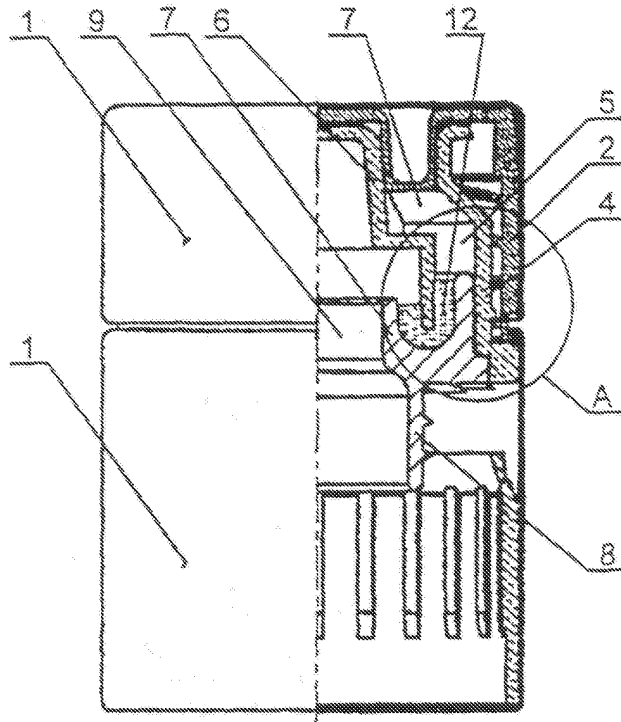


Fig. 1

Unit A

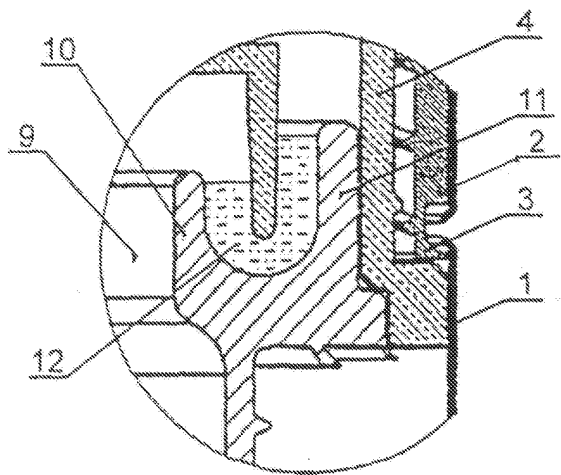


Fig. 2

Unit A

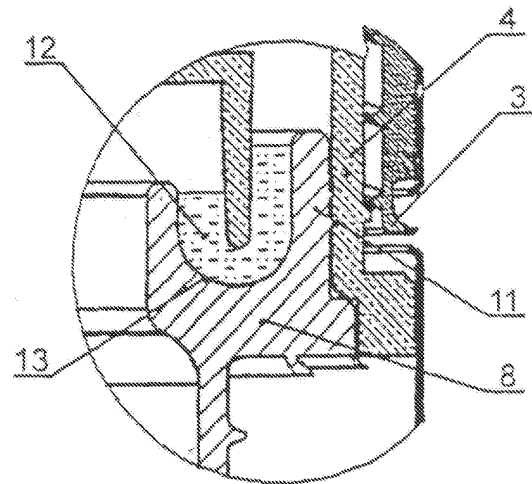


Fig. 3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/IB 2003/06440

A. CLASSIFICATION OF SUBJECT MATTER		
IPC ⁷ B65D 49/02		
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)		
IPC ⁷ B65D 49/00, 49/02, 41/00, 41/62		
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	(INOSTRANNOE PROIZVODSTVENNOE UNITARNOE PREDPRIYATIE AKTSIONERNOE OBSHESTVO "MULTIPAK"), 20.11.2002, the claims, figures 1, 2	1
A	(GUALA KLOZUPEC S.P.A.), 10.06.2000, the claims, figures 1, 3	1
A	the claims, figures 1, 2	1
A	the claims, figures 1, 2	1
<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 document 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
31st May 2004 (31.05.2004)		24th June 2004 (24.06.2004)
Name and mailing address of the ISA/ S.P.T.O		Authorized officer А. Гнедовский
Facsimile No.		Telephone No.

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