(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
6 January 2005 (06.01.2005)

PCT

(10) International Publication Number
WO 2005/000702 A1

(51) International Patent Classification[7]: B65D 51/16, 1/32, 21/08, 39/04, 53/00, F16K 24/04, 17/04, 31/18, 33/00

(21) International Application Number: PCT/AU2004/000841

(22) International Filing Date: 25 June 2004 (25.06.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
2003903313 30 June 2003 (30.06.2003) AU
2003904640 28 August 2003 (28.08.2003) AU

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(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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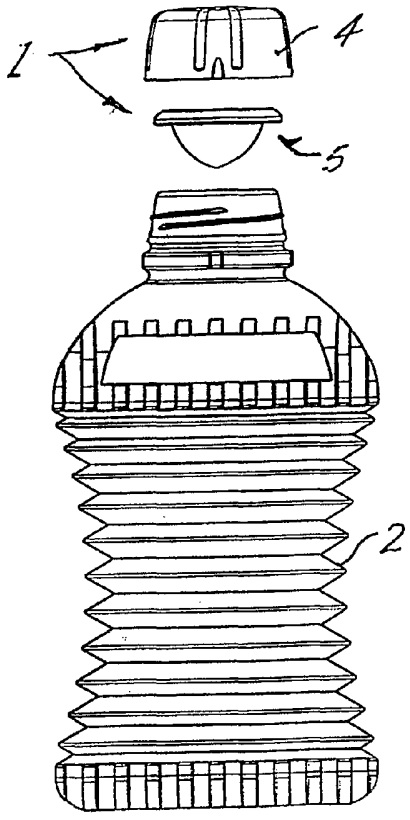
(54) Title: CLOSURE FOR COLLAPSIBLE CONTAINER



(57) Abstract: A closure (1) for flexible packaging (2, 3) with a floating valve (5) which is a situated within the cap (4). The cap (4) is provided with holes (14) to allow for escape of air. The valve (5) may incorporate a spring (15) to regulate flow of air upon collapse of container (2, 3).

WO 2005/000702 A1

Published:
— *with international search report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

CLOSURE FOR COLLAPSIBLE CONTAINER

Field of Invention

This invention relates to closures for collapsible containers.

Background Art

In my Australian patent no. 738438, I have described a collapsible container having an internal closure valve. As the container is emptied of its contents, the side walls of the container are able to collapse reducing the volume of the container, the closure valve providing a seal between the remaining contents and the spout of the container.

The present invention has similar objectives to the invention described by my Australian patent no. 738438 and is primarily aimed at reducing the costs of such containers.

Further objects and advantages of the present invention will become apparent from the ensuing description which is given by way of example only.

Disclosure of Invention

According to the present invention, there is provided closure means for a collapsible liquid container having an externally threaded spout, said closure means comprising:

(a) a cap having air bleed means;

(b) a valve located within the spout said valve having a peripheral flange adapted to be seated between the top edge of the threaded spout and the cap, and a semispherical diaphragm dome which extends into the spout, the arrangement and construction being such that as the liquid content of the container is reduced, headspace air within the container can be evacuated via the air bleed means.

The bleed means may include an air passage situated on the inner wall of the cap and an aperture or apertures in the top or side walls of the cap which vent the interiors of the container to atmosphere.

The spout includes a peripheral internally directed ledge.

The valve may be moulded in a material such as silicone or similar.

The cap may be moulded in plastics.

The container may be moulded in plastics.

The container may be formed from a laminate including a paperboard.

The closure means may include a biasing spring positioned between the base of the dome and the cap.

Brief Description of the Drawings

Aspects of the present invention will now be described with reference to the accompanying drawings in which:

Figure 1 is a sectional drawing of the spout of a flexible container showing closure means according to the present invention, and

Figure 2 is a side view of a flexible bottle container showing the closure means of the present invention detached, and

Figure 3 is a side view of a box-type container showing the closure means of the present invention attached thereto.

Figures 4, 5, 6 and 7 are sectional drawings of a further possible form of the present invention.

With respect to the drawings, the present invention provides a closure means generally indicated by arrow 1 for fixture to a collapsible liquid container 2, 3.

The closure means comprises a cap 4 having an air bleed facility and a valve generally indicated by arrow 5.

The valve is provided with a peripheral flange 6 which is adapted to be seated between the top edge 7 of a threaded spout 8 of the container and the top wall 9 of the cap 4, and semi-spherical dome 10 which extends into the spout.

An air bleed facility is provided by an interaction between the cap 4 and the valve 5.

The cap 4 is provided with an internal thread 11 to match the

external thread 12 of the container.

The internal walls of the cap are provided with a plurality of flutes 13 each of the flutes leading to apertures 14 in the top wall of the flutes.

As the contents of the containers are used and it is desired to reduce the evacuated air from the headspace of the container, the cap and diaphragm are replaced and axial pressure is applied to the container forcing the ledge of the diaphragm to lift and air is evacuated via the apertures in the manner illustrated by figure 1.

The cap is set to "vent" at one half turn from the fully sealed position thus allowing the valve clearance from the cap and the bottle.

As the fluid in the container reaches the valve its buoyancy locks it against the cap creating an air lock and stopping further evacuation of air or moisture.

Recoil from the collapsing container creates reverse suction that forces the valve back onto the top edge of the spout of the bottle, thus creating the hydraulic lock required to prevent re-inflation of the bottle.

A final permanent seal is created by twisting the cap until it is fully closed. Indicia on the cap and bottle can be provided which indicate both sealed and venting positions.

The venting path of air from the headspace is indicated by the directional arrows to the right hand side of figure 1.

Evacuated air passes over the top edge 7 of the spout 8 of the container around the flange 6 and is vented via apertures 14 in the top wall 9 of the cap.

A supplementary air vent (not shown) may be provided in the side wall of the cap to reduce the chances of a person's eyes being splashed by liquid during the venting process.

The closure means can be used on any form of collapsible container.

Figure 2 of the drawings illustrates a container 2 similar to that described by my Australian patent no. 738438.

Figure 3 of the drawings illustrates a box-type container 3

similar to the well known Tetra-pak™.

With respect to figures 4, 5 and 6 of the present invention according to a further aspect of the present invention, the closure may include a biasing spring 15 positioned between the base 16 of the dome 10 and the underside of the cap 4.

The spring 15 may be fabricated from stainless steel or food grade plastics and regulates the flow of air and liquid.

Figure 4 of the drawings shows the cap in a "compression" position. As a container 2 is compressed, air passes by the seal of the buoyancy valve and escapes via the bleeder holes in the top of the cap in a similar manner to that described in relation to figure 1. When fluid in the container 2 reaches the valve 5, it causes it to rise and block the flow of air via the bleeder holes as is the situation illustrated by figure 5. Once this happens, the container can no longer be compressed. When the container is released (figure 6) recoil from the concertina in the container draws the valve on to the container neck creating a hydraulic lock. With the valve in this position, the container cannot reinflate.

The cap is then tightened (figure 7) to create a permanent seal.

The spring 15 can be secured by upper and lower saddles 17, 18 formed in the dome and cap respectively.

The closure means of the present invention provides an economic, secure and simply operated device for venting collapsible containers to reduce headspaces.

Aspects of the present invention have been described by way of example only and modifications and additions thereto may be made without departing from the spirit or scope thereof.

SCOTT LINDSAY BROWN

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A closure containing a cap with air bleed facility, a floatation valve adapted to be seated within the cap and may contain a spring which regulates the air flow upon elimination of headspace within the container.
2. A valve as claimed in claim 1with a peripheral flange that may be semi spherical, cone, disk or spherical in shape which acts to seal off flow of contents when all air is evacuated from container.
3. A valve as claimed in claim 2 wherein it may incorporate a soft peripheral flange made of silicone or same that acts to provide a seal upon inner top of cap and upon container pouring spout.
4. A cap as claimed in claim 1 with internal thread to match external external thread of container.
5. A cap as claimed in claim 1 with internal walls that may provide a pluralities of flutes leading to air bleed facility.
6. A cap as claimed in claim 1 with an indicia on the cap and container that can be provided to indicate venting and sealing positions.
7. A cap as claimed in claim 1 that incorporates a seat for positioning of spring.
8. A valve as claimed in claim 2 that incorporates a seat for positioning of spring.
9. An interference detail within the cap and outside of container to ensure sealing of container.
10. A spring as claimed in claim 1 that may be of stainless steel or food grade plastic.

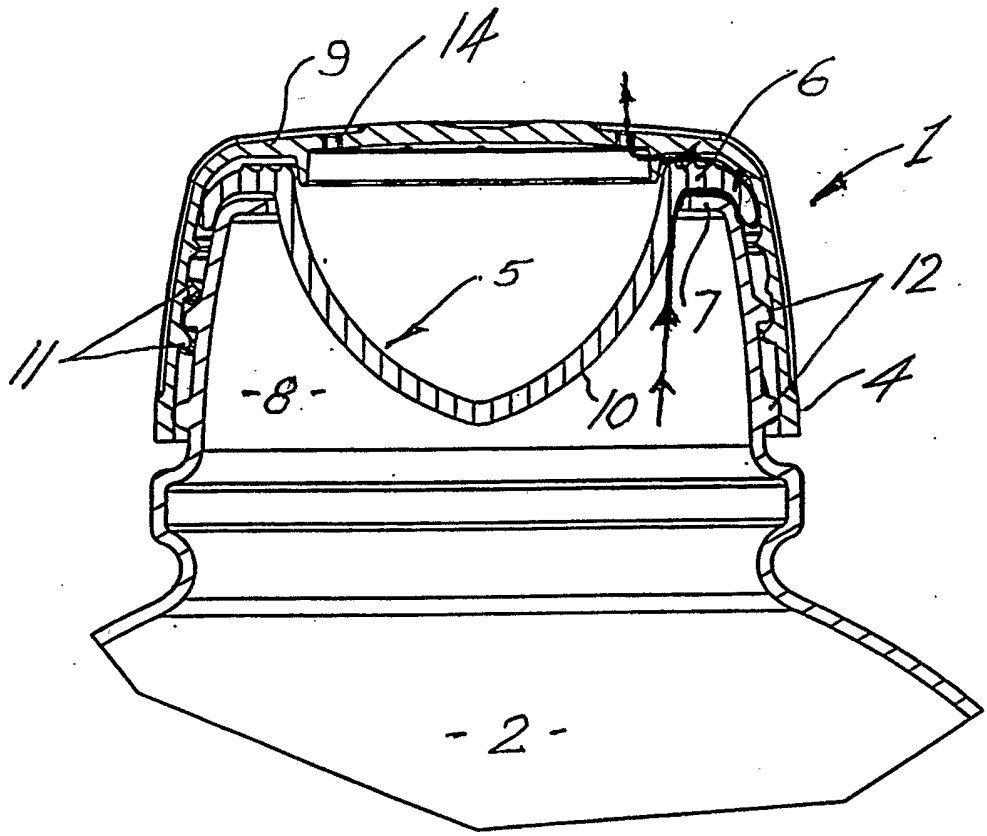


FIG 1

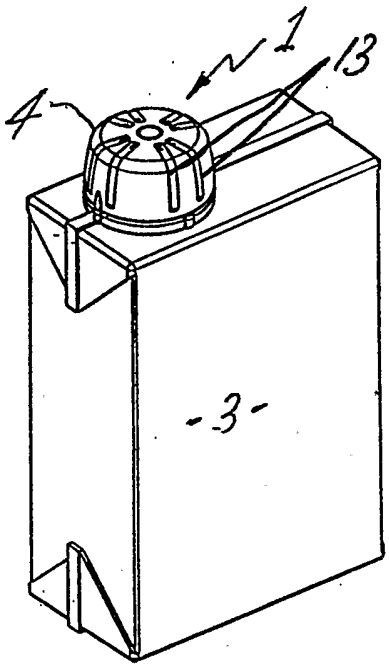


FIG.3

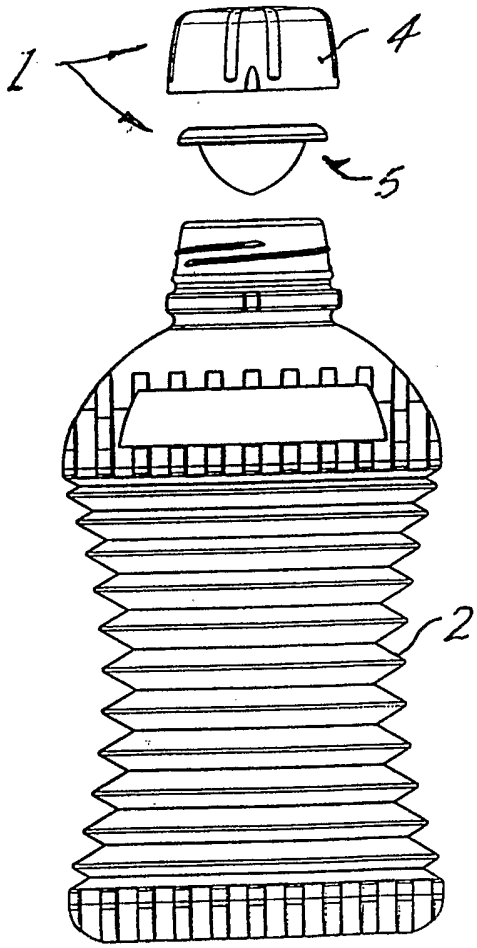


FIG2

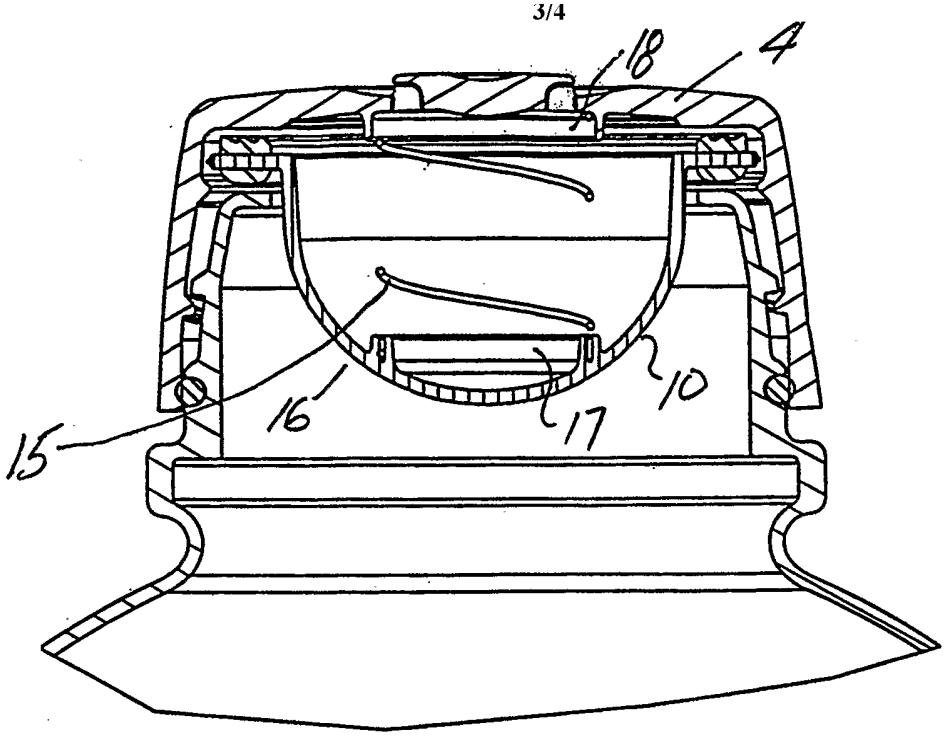


FIG 4

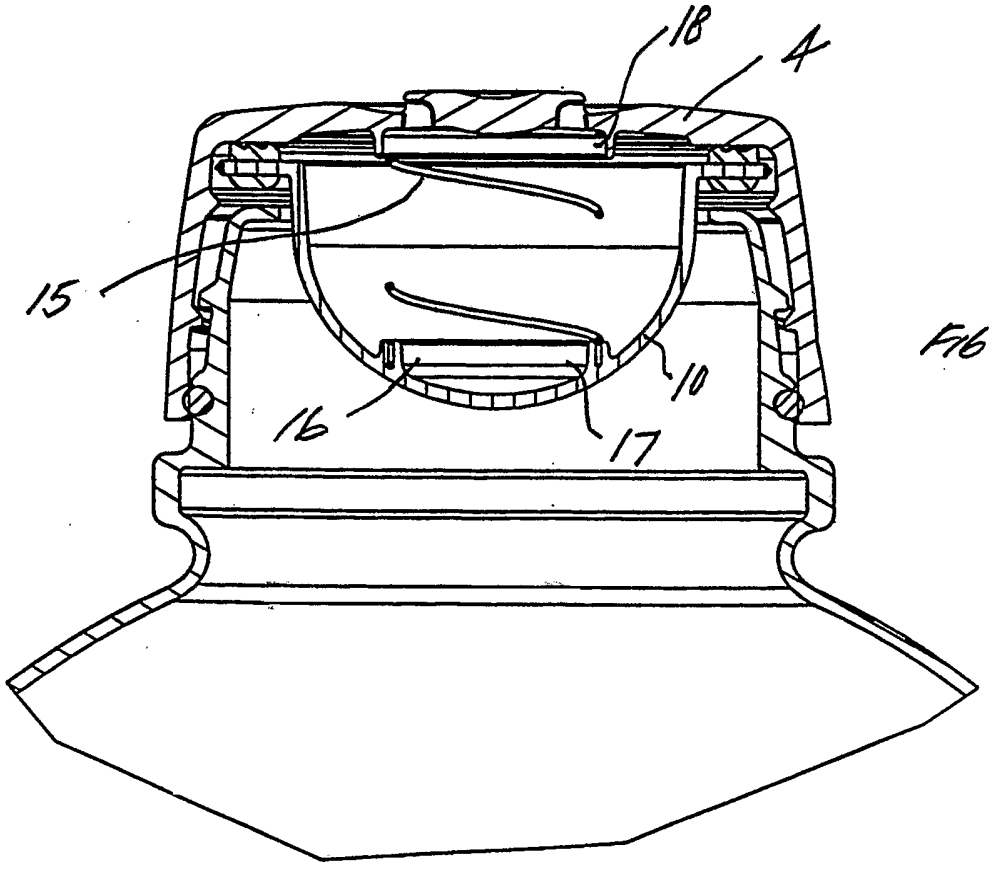


FIG 5

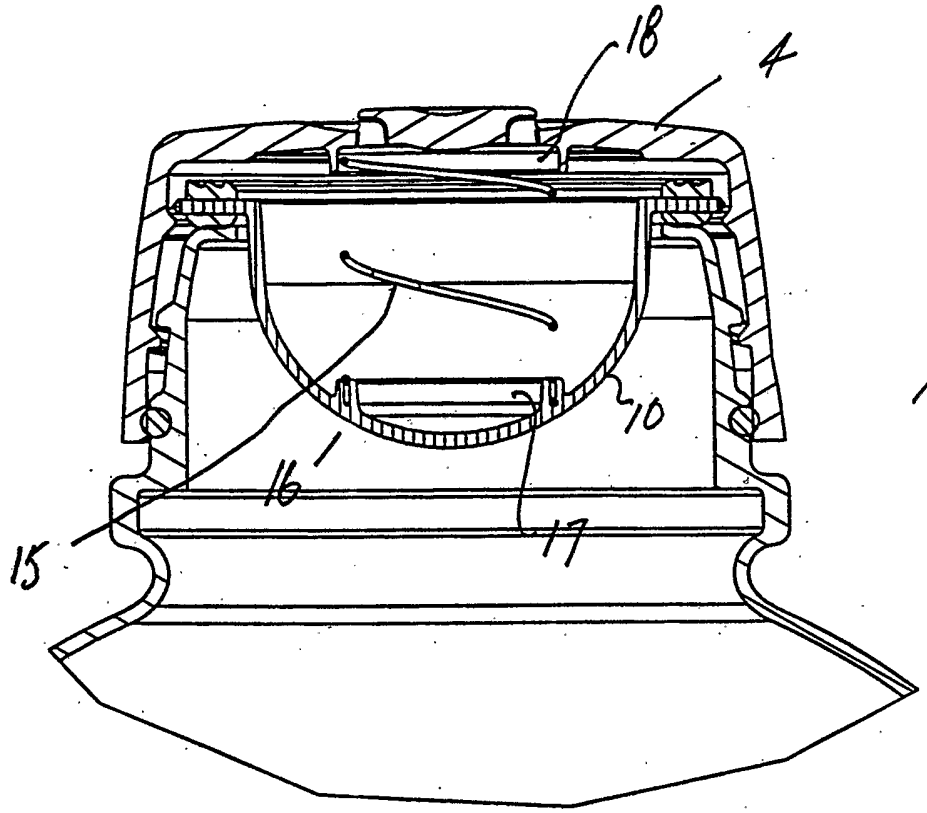


FIG 6

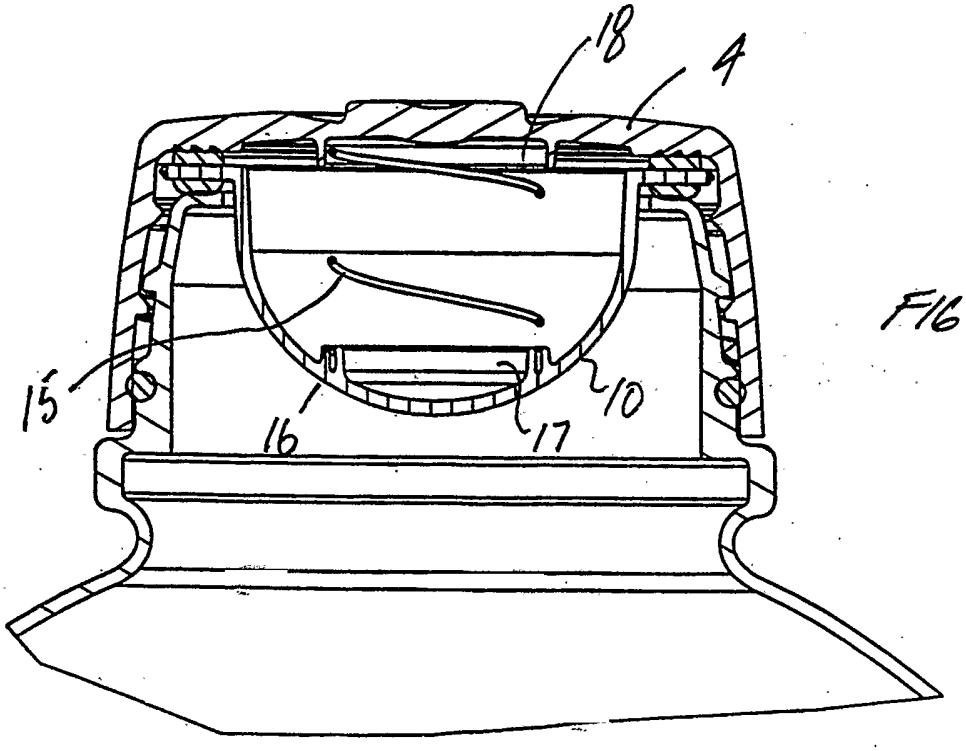


FIG 7

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU2004/000841

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl. [7]: B65D 51/16, 1/32, 21/08, 39/04, 53/00, F16K 24/04, 17/04, 31/18, 33/00

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)

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)
DWPI IPC B65D, F16K & keywords: closure, bleed, spring, float and similar terms

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1209093 A1 (STAMPAGGIO GOMMA S. N. C. DI PILONI CELESTINO & BOSSI ENRICO) 29 May 2002 Abstract & figures 1 to 3	1-10
X	GB 2135429 A (THE PRESTIGE GROUP PLC) 30 August 1984 Page 2, lines 74-95; figures 2a & 2b	1-10
X	AU 13415/83 A (ROFF) 13 October 1983 Page 5, lines 2-23, figures 1-4	1-10
X	WO 1997/006973 A (RAVIV PRECISION INJECTION MOLDING) 27 February 1997 Abstract	1-10

[X] Further documents are listed in the continuation of Box C [X] See patent family annex

* Special categories of cited documents:

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"P" document published prior to the international filing date but later than the priority date claimed

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"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

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"&" document member of the same patent family

Date of the actual completion of the international search
9 September 2004

Date of mailing of the international search report
20 SEP 2004

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU2004/000841

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	FR 2825442 A (BAYARD S.A.) 6 December 2002 Abstract & figure 2	1-10
X	FR 921013 A (ULKA) 24 April 1947 Whole document	1-10

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/AU2004/000841

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member					
EP	1209093						
GB	2135429						
AU	13415/83						
WO	9706973	AU	65302/96	BR	9610031	CZ	9800446
		EP	0846064	IL	123163	US	5762090
FR	2825442	EP	1265012				
FR	921013						

Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.

END OF ANNEX