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Amended claim nr.1 in accordance with Rule 86 (2)
EPC.

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(54) **Plug with siphon valve**

(57) The present invention relates to a plug with a siphon valve, of the type of the plugs used to serve carbonated drinks stored in discardable pressurised containers. It is characterised by a valve consisting of the use of an elastic part (3) with a sealing element (3.5) on the end of a communication duct (2.4) between the pressurised container (4) and a chamber (2.2) previous to

the outlet (2.6) of the liquid. It also uses an elastic membrane (1.2) joined to a pusher (1.3) meant to open the valve by applying pressure with a finger and the subsequent recovery and closure of the valve. Lastly, the plug is provided with an oblique outlet duct (2.6) that facilitates pouring the liquid, propelled into a glass for example, without it spilling.

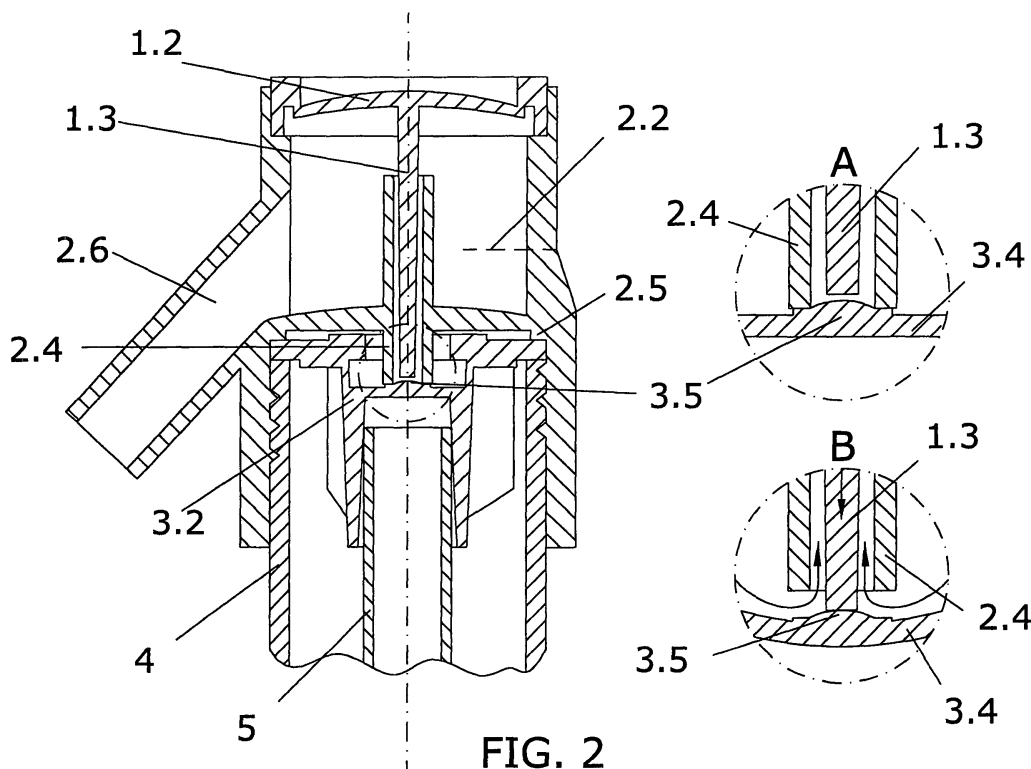


FIG. 2

Description

OBJECT OF THE INVENTION

[0001] The present invention relates to a plug with a siphon valve, from among plugs used to serve carbonated drinks stored in discardable pressurised containers.

[0002] It characterises the use of a valve consisting of an elastic part having a sealing element on the end of a duct connecting the pressurised container and a chamber previous to the outlet.

[0003] It also characterises the use of an elastic membrane joined to a pusher, meant to open the valve by pressing with the finger and the later recovery and therefore closure of the valve.

[0004] Lastly, the plug has an oblique outlet duct that facilitates pouring the liquid, such as into a glass, without it being spilled.

BACKGROUND OF THE INVENTION

[0005] The use of carbonated water and other gaseous drinks requires containers that can maintain the adequate pressure to keep the dissolved gas from evaporating, in which case the drink would lose its desired properties.

[0006] The gas, in addition to contributing a tactile sensation in the palate and a characteristic taste, has traditionally been used as a propellant means in siphons.

[0007] Siphons are pressurised containers provided with a liquid outlet valve and a lever or the like to open when serving the desired amount.

[0008] This type of containers must be filled in the factory that provides the drink of this type, previously recovering the container.

[0009] In addition to the valves that are opened with a lever, the applicant is aware of patents that describe valves employing flexible membranes to obtain said opening.

[0010] U.S. Patent 5894962 describes a plug for gaseous drink bottles that has an outlet valve with a flexible membrane in a hemispherical cap shape, centred under which is the sealing element fixed by a wedged element.

[0011] The deformation of the membrane due to the pressure of a finger opens the sealing element placed below, communicating the pressurised container with the outside.

[0012] A variation of this invention can be found in Patent application WO 9624553, where the shape of the deformable element is changed.

[0013] Also known to the applicant is US Patent 5447257, in which the elastic element is basically tubular and allows a rod to be lowered, which acts as a valve configured at its bottom end.

[0014] In any of these arrangements, opening of the valve involves deformation of an element that must be properly restored for a subsequent good seal of the

valve.

[0015] As the displacement by deformation is not guided in any of these cases, in the first because the displacement is due to the deformation of the membrane to which the valve is attached and in the second because the guide is in fact the element that is deformed, the seal will always depend on the proper state of said deformable element.

[0016] The present invention makes use of two mutually independent deformable elements, one allowing opening by pressure and the other determining the valve itself, which provides a longer lifetime of the device.

DESCRIPTION OF THE INVENTION

[0017] The present invention consists of a plug with a siphon valve with a configuration lacking the drawbacks cited in the background section, allowing its use in containers that constitute a discardable assembly.

[0018] The plug is mainly comprised of three parts, an outer casing, the flexible body of the valve and a pusher.

[0019] The outer casing is the main body, essentially cylindrical in shape, with two clearly differentiated chambers (an upper chamber and a lower chamber) communicated to each other by a tubular duct that is prolonged above and below.

[0020] The upper chamber allows receiving the liquid when it exits if the flow regime is sufficiently turbulent, stabilising it before it reaches the outside.

[0021] The bottom chamber houses the flexible element of the valve and is in overpressure.

[0022] The tubular duct connecting the two chambers is closed on its lower end by a spherical cap protrusion supported by flexible spokes that reach the cylindrical body of the flexible element of the valve.

[0023] A third part comprises a curved, downwardly concave flexible membrane that establishes the seal of the upper chamber. It also is provided with a pusher in the form of a rod that is prolonged inside the tubular duct that communicates the chambers.

[0024] This pusher is guided by the tubular duct in its vertical displacement as it is pushed downward by the pressure exerted on the upper membrane with the finger.

[0025] The push of the pressure and deformation of the membrane moves the pusher downwards and the latter in turn moves a spherical cap protrusion of the flexible element of the valve.

[0026] The displacement of the sealing protrusion is made possible by the deformation of the spokes that support it, eliminating the seal and allowing passage of the liquid to the upper chamber, and eventually to the exterior.

[0027] When the upper membrane is released the pusher ceases to open the valve, so that the membrane and the flexible body of the valve recover their initial positions.

DESCRIPTION OF THE DRAWINGS

[0028] The present description is accompanied by a set of drawings illustrating the preferred embodiment that do not limit the invention in any way.

[0029] Figure 1 shows an elevation section of the three main parts of the plug with a valve, also including a plan view of the flexible valve element.

[0030] Figure 2 shows the three parts operatively coupled with a representation of the neck of the pressurised container and the feeding tube arriving from the bottom of the container.

PREFERRED EMBODIMENT OF THE INVENTION

[0031] Figure 1 shows the three main parts of the plug: the casing or the main body (2), the lid (1) with a pusher and the flexible body (3) of the valve.

[0032] The main body (2) is essentially cylindrical and has two chambers differentiated by a discoid plate (2.8), the upper chamber (2.2) being closed by the lid (1) and the bottom chamber (2.9) prolonged in the container (4) to which it is coupled by an internal threading (2.10).

[0033] The upper chamber (2.2) and the lower chamber (2.9) are communicated by means of a central vertical tubular duct (2.3, 2.4) that is prolonged above (2.3) and below (2.4) the discoid plate (2.8).

[0034] The upper chamber (2.2) has a lip (2.1) that defines a seat for the top lid (1).

[0035] The liquid reaches the outside from said upper chamber (2.2) through an oblique duct (2.6).

[0036] The oblique duct (2.6) rises from the level determined by the discoid plate (2.8) to prevent liquid being retained in the upper chamber.

[0037] Figure 2 shows the arrangement of the three parts when operationally coupled, showing that the lid (1) consists of a peripheral flange with a seat (1.1) meant to enter the lip (2.1) to establish a proper sealing of the upper chamber (2.2).

[0038] The central part of the lid (1) consists of a curved and downwardly concave flexible membrane (1.2).

[0039] In its central and lower area it is provided with a bar (1.3) that acts as a pusher. This bar or pusher (1.3) is housed in the tubular duct (2.3, 2.4) leaving an ample clearance to allow passage of the liquid from the bottom chamber (2.9) to the upper chamber (2.2).

[0040] Housed in the bottom chamber (2.9) is an elastic body (3) that, together with the cavities it encloses and the lower tubular duct (2.4), configures the sealing valve that prevents the exit of the pressurised liquid.

[0041] The elastic body (3) comprises a cylindrical tubular segment (3.2) in which enters the feeding tube (5) that reaches the bottom of the container, facilitating that at all times the pressure will propel the exit of the liquid that tends to remain on the bottom, instead of the gas that remains on the top.

[0042] The cylindrical tubular segment (3.2) ends on

the top at a flange (3.1) meant to establish a seal with the bottom part of the discoid plate (2.8).

[0043] This seal is established on the peripheral area of the flange (3.1), as there is a step under the discoid plate (2.8) that determines a lip area (2.5) on which the support is established.

[0044] In the cylindrical tubular segment (3.2) of the same elastic element (3) are a number of also elastic spokes (3.4) converging in the centre, where there is a protrusion (3.5) in the form of a spherical cap.

[0045] Said spherical cap protrusion (3.5) closes the communication between the bottom chamber (2.9) and the upper chamber (2.2) when it rests against the lower end of the bottom segment of the tubular duct (2.4).

[0046] The bottom end of the pusher (1.3) is placed slightly above the lower end of the tubular duct (2.4), thereby preventing a poor closure of the spherical cap protrusion (3.5) in its resting position.

[0047] The valve is opened by pressing on the lid (1), deforming the membrane (1.2) and causing the guided, vertical displacement of the pusher (1.3).

[0048] The pusher (1.3) lowers the spherical cap protrusion (3.5) until it no longer rests on the bottom end of the tubular duct (2.4); thus, liquid is allowed to pass from inside the feeding tube (5) to the upper chamber (2.2) through the clearance between the pusher (1.3) and the tubular duct (2.3, 2.4).

[0049] Figure 2 shows two enlarged insets of the contact area of the pusher (1.3) on the spherical cap protrusion (3.5). The inset A in a closed position and the inset B with the pusher (1.3) displacing the spherical cap protrusion (3.5) downwards, allowing liquid to pass.

[0050] The flexible element (3) is also provided with external flaps (3.3) that rest on the inside of the bottle-neck, maintaining the correct position of the flexible element (3) and preventing malfunctions of the valve seat.

[0051] It should be remarked that the protrusion (3.5) does not necessarily have a spherical cap surface. The invention also considers the use of a protrusion (3.5) limited by any surface of revolution that establishes a seat on the lower segment of the tubular duct (2.4).

[0052] A simple grip of the plug can be provided by making all or part of the outer surface (2.7) rough.

[0053] The essence of the invention is not affected by variations of the materials, shape, size and arrangement of the component elements, described in a non-limiting manner that should allow its reproduction by an expert.

Claims

1. Plug with siphon valve, from among plugs with a valve that use a flexible membrane acting as a spring to restore the original position of the valve, **characterised in that** it essentially comprises three parts, a casing (2), a lid (1) with a pusher (1.3) and an elastic valve element (3); wherein the casing (2) is an essentially cylindrical body, having a discoid

plate (2.8) separating two chambers, a bottom chamber (2.9) and an upper chamber (2.2) that are communicated by a vertical central tubular duct (2.3, 2.4); the upper chamber (2.2), connected to the exterior through an oblique duct (2.6) that rises from the level of the discoid plate (2.8) so that liquid is not retained, is closed by the lid (1) that is inserted by its peripheral seat (1.1) in the top lip (2.1) of the casing (2); the lid (1) is provided with a flexible membrane (1.2) under which is provided a pusher (1.3) that is housed with a clearance in the tubular duct (2.3, 2.4) and extends almost as far as the bottom end of said duct (2.3), where it closes a spherical cap protrusion (3.5) of the elastic element (3) of the valve, the protrusion (3.5) being supported by also elastic radial segments (3.4) that reach the tubular segment (3.4) of the elastic element (3) of the valve; all of said elastic body (3) rests by the perimeter of a flange (3.1) on an annular notched lip (2.5) of the casing (2) and on the inner wall of the neck of the container (4) by means of the flaps (3.3).

2. Plug with siphon valve, according to claim 1, **characterised in that** the flexible membrane (1.2) of the lid (1) is deformed by pressure causing a downwards displacement of the pusher (1.3), which in turn produces an opening between the bottom end of the tubular duct (2.4) and the spherical cap protrusion (3.5) by the deformation of the radial support flexible segments (3.4), establishing a communication between the bottom chamber (2.9) and the upper chamber (2.2) that leads to the exterior.
3. Plug with siphon valve, according to claim 1, **characterised in that** the protrusion (3.5) is limited by any surface of revolution that establishes a seat on the bottom segment of the tubular duct (2.4).
4. Plug with siphon valve, according to claim 1, **characterised in that** all or part of the outside of the casing has a rough surface (2.7) to facilitate the grip.

Amended claims in accordance with Rule 86(2) EPC

1. Plug with siphon valve of the type of the plugs with a valve that use a flexible membrane acting as a spring to restore the original position of the valve comprising three parts:

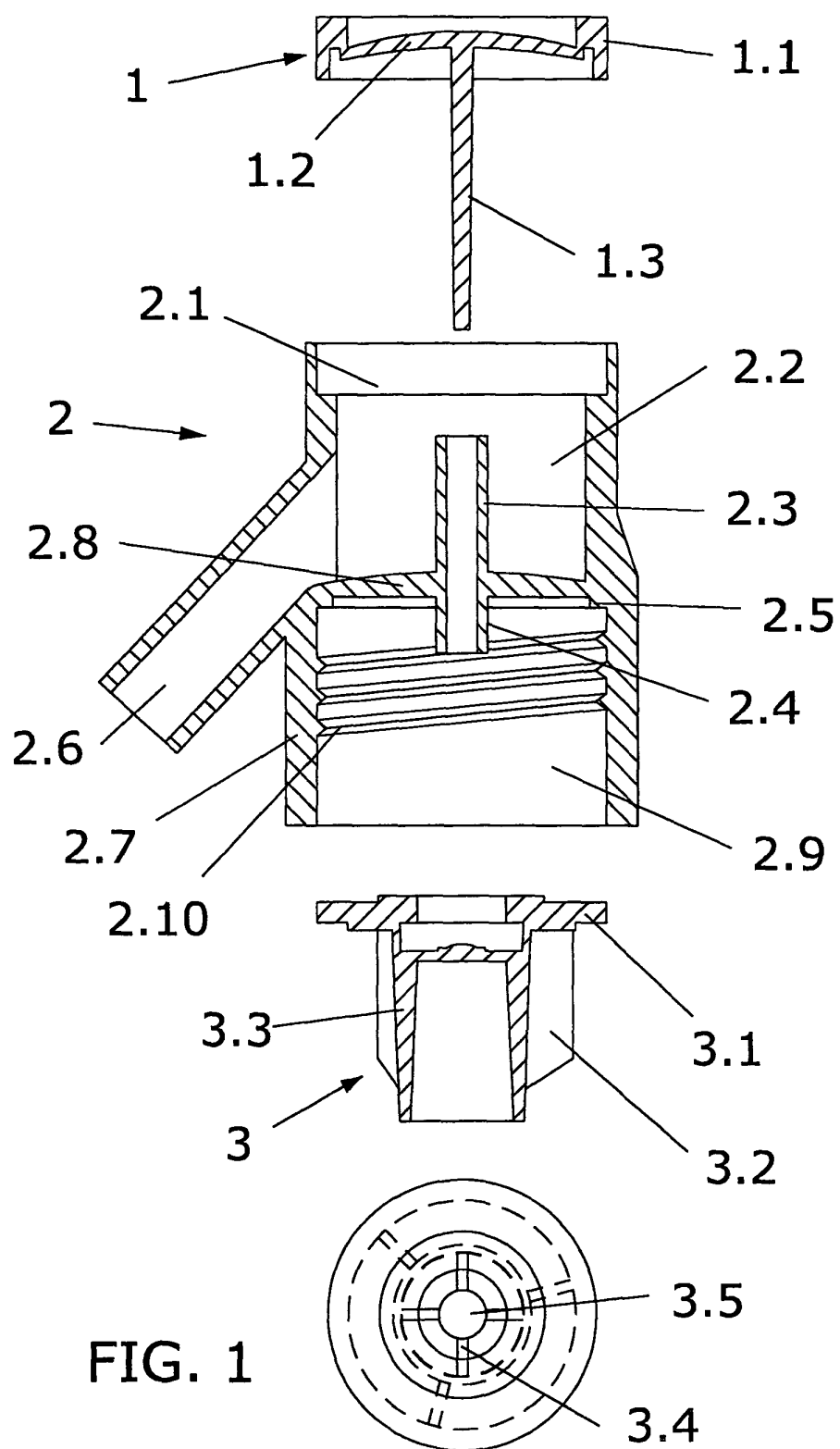
- a casing (2) which is an essentially cylindrical body, having a discoid plate (2.8) separating two chambers, a bottom chamber (2.9) and an upper chamber (2.2) that are communicated by a vertical central tubular duct (2.3) (2.4) wherein the upper chamber is connected to the exterior through an oblique duct (2.6) that rises from

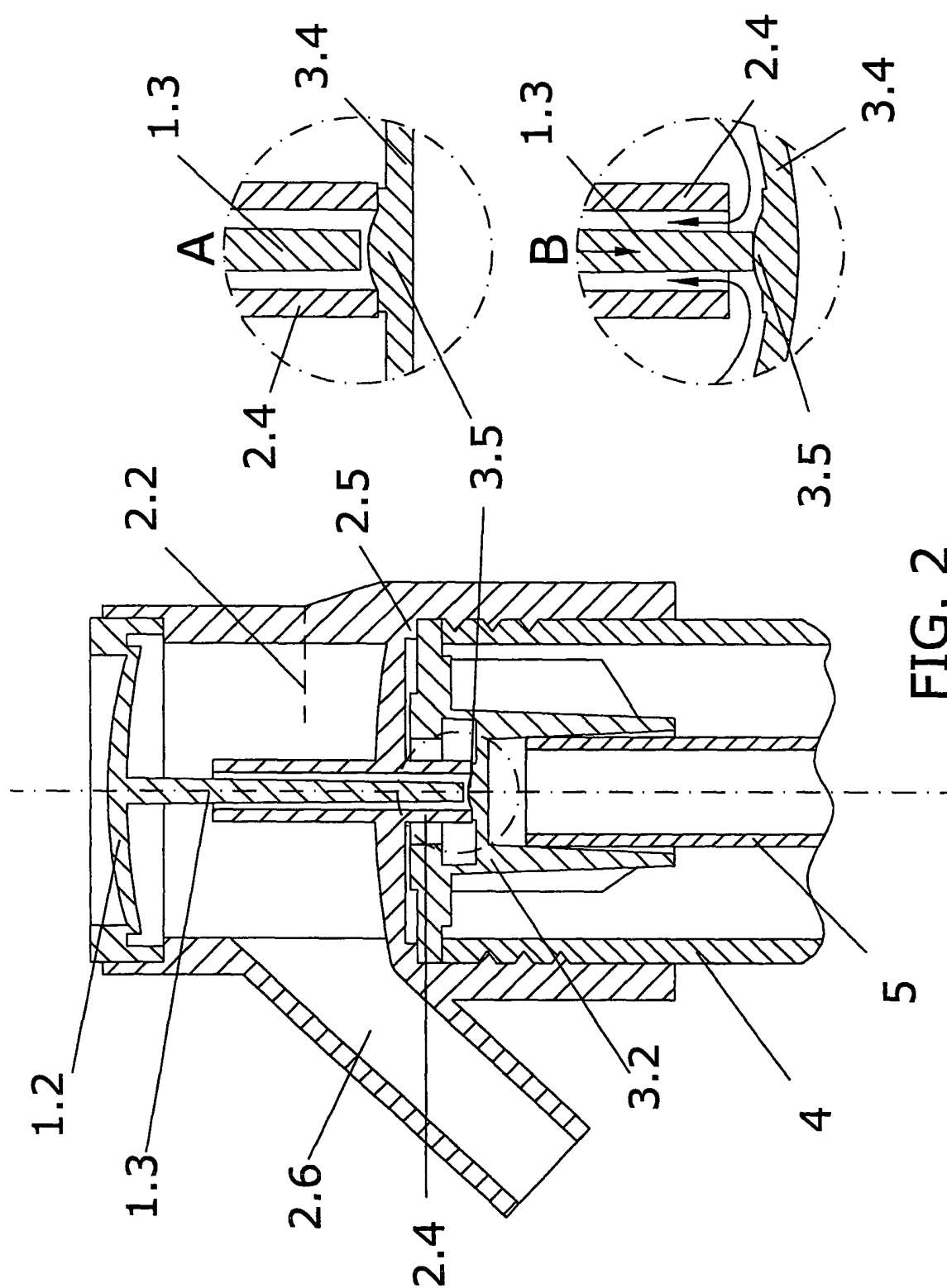
the level of the discoid plate (2.8) so that liquid is not retained.

- a lid (1) which is provided with a flexible membrane (1.2) under which is provided with a pusher (1.3). The upper chamber (2.2) of the casing (2) is closed by the lid (1) that is inserted by its peripheral seat (1.1) in the top lip (2.1) of the casing (2).
- and an elastic valve element (3) having a protrusion (3.5) being supported by also elastic radial segments (3.4) and having said valve element (3) some flaps (3.3).

characterized in that:

- the pusher (1.3) is housed with a clearance in the tubular duct (2.3, 2.4) and extends almost as far as the bottom end of said duct (2.3)
- the elastic valve element (3) rests by the perimeter of a flange (3.1) on an annular notched lip (2.5) of the casing (2) and on the inner wall of the container (4),
- the cap protrusion (3.5) is spherical
- the elastic element (3) of the valve comprises a tubular element (3.2) in which enters a feeding dip tube (5).







European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 03 38 0131

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	US 5 918 779 A (VENTURA FRANCISCO JUAN) 6 July 1999 (1999-07-06) * column 3, line 50 - line 55 * * column 4, line 3 - line 8 * * column 4, line 15 - line 40 * * figures * ---	1	B67D1/04
A	EP 0 291 788 A (HAGAN RICHARD J ;LEMPERT DENNIS A (US)) 23 November 1988 (1988-11-23) * figure 10 * ---	1	
A	WO 95 31398 A (ADVANCED JET TECHNOLOGIES INC ;LINDMAYER STEPHEN I (CA)) 23 November 1995 (1995-11-23) * figure 29 * ---	1	
D,A	US 5 894 962 A (SONG CHRISTOPHER CHAN-WOO ET AL) 20 April 1999 (1999-04-20) * figures 11,12 * -----	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			B67D
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		3 November 2003	Martínez Navarro, A.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background Q : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 03 38 0131

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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03-11-2003

Patent document cited in search report		Publication date		Patent family member(s)	Publication date
US 5918779	A	06-07-1999	BR	9803013 A	05-10-1999
EP 0291788	A	23-11-1988	US	4671436 A	09-06-1987
			US	4660748 A	28-04-1987
			US	4617973 A	21-10-1986
			AT	48827 T	15-01-1990
			AU	583506 B2	04-05-1989
			AU	4221585 A	14-11-1985
			BR	8502217 A	14-01-1986
			CA	1277966 C	18-12-1990
			CA	1300568 C2	12-05-1992
			CA	1300569 C2	12-05-1992
			DE	3574864 D1	25-01-1990
			EP	0164218 A2	11-12-1985
			EP	0291788 A1	23-11-1988
			ES	8702860 A1	01-04-1987
			ES	8704417 A1	16-06-1987
			ES	8704426 A1	16-06-1987
			IL	75101 A	31-07-1989
			IN	163813 A1	12-11-1988
			JP	61000177 A	06-01-1986
			MX	161651 A	30-11-1990
			NZ	211998 A	30-09-1987
			SU	1535375 A3	07-01-1990
			US	4694975 A	22-09-1987
			JP	61047363 A	07-03-1986
			CN	85104389 A ,B	27-08-1986
			JP	61164955 A	25-07-1986
WO 9531398	A	23-11-1995	CA	2123446 A1	13-11-1995
			HU	663 U	28-12-1995
			US	5845823 A	08-12-1998
			AU	2265795 A	05-12-1995
			DE	69505519 D1	26-11-1998
			DE	69505519 T2	18-03-1999
			EP	0759007 A1	26-02-1997
			ES	2126274 T3	16-03-1999
			HU	75131 A2	28-04-1997
			WO	9531398 A1	23-11-1995
US 5894962	A	20-04-1999	KR	9709635 B1	17-06-1997
			WO	9624553 A1	15-08-1996

EPO FORM P0459

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