



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) **EP 0 990 594 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
05.04.2000 Bulletin 2000/14

(51) Int. Cl.⁷: **B65D 47/34**, B65D 83/00,
B05B 11/00

(21) Application number: **98830553.8**

(22) Date of filing: **23.09.1998**

(84) Designated Contracting States:
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE**
Designated Extension States:
AL LT LV MK RO SI

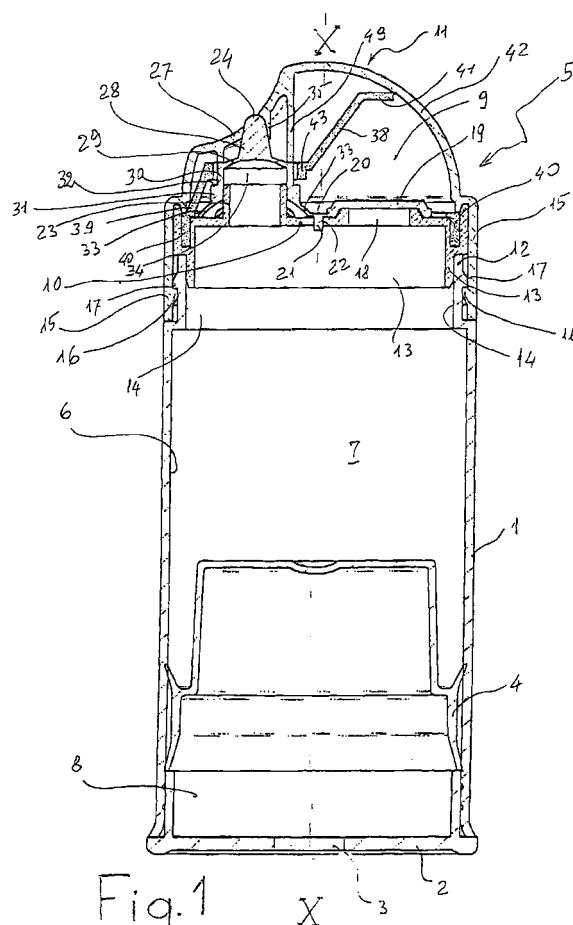
(71) Applicant:
Guala Dispensing S.P.A.
15047 Alessandria (IT)

(72) Inventor: **Gramola, Marco**
15011 Acqui Terme (Alessandria) (IT)

(74) Representative:
Perani, Aurelio et al
c/o JACOBACCI & PERANI S.p.A
Via Senato 8
20121 Milano (IT)

(54) **Device for dispensing pasty products**

(57) Device for dispensing pasty products of the type comprising a container (1) that extends along a longitudinal axis (X-X) from a bottom end (2) having an air inlet aperture (3) to an opposite end (14) on which a dispensing head (5) is mounted, a piston (4) located inside the said container (1) and which can move along the said axis (X-X) only in the direction leading towards the dispensing head (5), and a chamber (9) of variable volume formed inside the said dispensing head (5), the said chamber (9) being delimited by a rigid wall (10) that divides it from the said container and is positioned transversely to the said longitudinal axis (X-X) and by a peripheral wall (11), one portion (42) of which is deformable on manual application of an external pressure, the said chamber (9) also being fitted with an inlet valve (18,19) formed in the said dividing wall that allows the product to pass from the container (1) into the chamber but not vice versa, and with an outlet valve (24,26) that allows the product to be dispensed from the chamber to the outside, the said outlet valve (24,26) comprising an aperture (26) formed in a rigid portion (27) of the peripheral wall (11) of the said chamber (9) and, located inside the chamber, a closure member (24) on which the periphery (25) of the said aperture (26) presses when in the closed position, the said closure member (24) being able to move relative to the aperture (26) when manual pressure is exerted on the said deformable portion (42) of the peripheral wall (11) of the said chamber of variable volume (9). The closure member of this device is connected to an intermediate point (37) of a tongue-like element (38), one end (39) of which is fixed to one of the said walls (10,11) delimiting the said chamber of variable volume (9) while the opposite end (41) is free to project out towards the said deformable portion (42).



EP 0 990 594 A1

Description

[0001] The present invention relates to a device for dispensing pasty products of the type comprising a container that extends along a longitudinal axis from a bottom end having an air inlet aperture to an opposite end on which a dispensing head is mounted, a piston located inside the said container and which can move along the said axis only in the direction leading towards the dispensing head, and a chamber of variable volume formed inside the said dispensing head, the said chamber being delimited by a rigid wall that divides it from the said container and is positioned transversely to the said longitudinal axis and by a peripheral wall, one portion of which is deformable on manual application of an external pressure, the said chamber also being fitted with an inlet valve formed in the said dividing wall that allows the product to pass from the container into the chamber but not vice versa, and with an outlet valve that allows the product to be dispensed from the chamber to the outside, the said outlet valve comprising an aperture formed in a rigid portion of the peripheral wall of the said chamber and, located inside the chamber, a closure member on which the periphery of the said aperture presses when in the closed position, the said closure member being able to move relative to the aperture when manual pressure is exerted on the said deformable portion of the peripheral wall of the said chamber of variable volume.

[0002] Dispensing devices of the type mentioned above are known in the art and are widely used, especially for products such as, for example, toothpaste and cosmetic creams.

[0003] Dispensing devices of the type described above are, for example, disclosed in EP-A-0,363,307, EP-A-0,282,791 and in DG-A-9,518,670.

[0004] These known devices have the drawback that the valve for dispensing the product to the outside opens when a given pressure is reached inside the chamber of variable volume as a result of the pumping action exerted manually on the flexible portion of the peripheral wall.

[0005] This state generally leads to an initial uncontrolled dose of product being spurted out on account of the sudden displacement of the closure member and the consequent opening of the dispensing aperture when the pressure inside the chamber of variable volume reaches a level such that it generates a thrust force on the closure member which is only just greater than the counter-force exerted by the elastic members designed to keep it in the closed position.

[0006] The object of the present invention is to eliminate the abovementioned drawback of known devices by proposing a device that allows the product to be dispensed in a controlled manner, even during the initial phase, irrespective of the pressure reached inside the chamber of variable volume.

[0007] This object is achieved by the device according

to the invention, as defined in the claims set out below.

[0008] The invention will now be described in greater detail with reference to a preferred embodiment thereof, given solely by way of non-limiting example and illustrated in the appended drawings, in which:

- Figure 1 shows a vertical cross-section of the dispensing device according to the invention in the rest position with the closure member in the closed position;
- Figure 2 shows, on an enlarged scale, the top part of the device of Figure 1 with the closure member in a position of initial opening;
- Figure 3 shows the cross-section of Figure 2 with the closure member in a position of maximum opening;
- Figure 4 shows a perspective view of the wall that divides the chamber of variable volume from the container;
- Figure 5 shows a perspective view of the tongue-like element that operates the closure member;
- Figure 6 shows a side view of the tongue-like element of Figure 5;
- Figure 7 shows a perspective view from above of the closure member of the outlet valve together with the closure member of the inlet valve that allows the product to enter the chamber of variable volume;
- Figure 8 shows a perspective view from below of the same members as those illustrated in Figure 7; and
- Figure 9 shows a perspective view of the tongue-like element of Figure 5 mounted on the closure member of the product outlet valve of Figure 7.

[0009] With reference to the abovementioned figures, the numeral 1 denotes a cylindrical container designed to contain a pasty product such as, for example, cream. The bottom 2 has a hole 3.

[0010] The container 1 mainly extends along the longitudinal axis X-X.

[0011] Located inside the cylinder 1 is a piston 4 which, in the conventional manner, is designed to move along the axis X-X only in the direction leading away from the bottom 2 and towards a dispensing head, which is denoted overall as 5.

[0012] Inside the container 1, the piston 4 defines a cylindrical chamber 6, which contains the product 7 to be dispensed, and an opposite chamber 8 into which air enters, via the hole 3, when the dispenser is operated.

[0013] The head 5 comprises a chamber 9 of variable volume which is defined by a wall 10 that divides it from the chamber 6 of the container 1 and by an outer peripheral wall 11.

[0014] The dividing wall 10 is made of a rigid material and is positioned perpendicularly to the longitudinal axis X-X.

[0015] This wall 10 is fixed to the edge 12 of the container 1 by means of a collar 13 which is inserted like a

stopper into the end aperture 14 of the said container 1.

[0016] The peripheral wall of the chamber 9, denoted overall as 11, is fastened on to the said edge 12 of the container 1 via a sleeve 15 which is attached like a cap and held in position by an annular projection 16 that engages by snap-action underneath a corresponding annular projection 17 on the external surface of the edge 12.

[0017] The dividing wall 10 has a through hole 18 over which a plate-like closure element 19, housed in the chamber 9, operates.

[0018] The hole 18 and the plate 19 constitute a conventional inlet valve that allows the pasty product 7 to pass only from the container 1 into the chamber of variable volume 9 and not vice versa.

[0019] In order to fulfil this function, the plate 19 is connected to the wall 10 via a flexible strip 20 that acts as a hinge and a peg 21 that fits securely into a corresponding hole 22 in the wall 10.

[0020] To the side of the hole 18, the wall 10 has a cylindrical collar 23 which, in the example illustrated, is hollow and communicates with the chamber 6 of the container 1.

[0021] The collar 23 extends towards the chamber of variable volume 9 and extends axially into it for a certain length.

[0022] Mounted so that it can slide axially on the collar 23 is the closure member 24 on which presses the periphery 25 of an aperture 26 formed in a rigid portion 27 of the peripheral wall 11 of the chamber 9.

[0023] The closure member 24 and the aperture 26 constitute an outlet valve through which the pasty product is dispensed to the outside once it has passed from the container 1 into the chamber 9.

[0024] In terms of its structure, the closure member 24 comprises a first conical portion 28 which is connected, via a first elastic bellows-type flexible diaphragm 29, to a second cylindrical portion 30 having a diameter larger than that of the first conical portion 28 at the point where it connects to the diaphragm 29.

[0025] There is a third cylindrical portion 31, following coaxially on from the portion 30, the outer diameter of which is larger than the diameter of the portion 30, thereby forming an annular step 32.

[0026] Lastly, the portion 31 is connected to a second elastic bellows-type flexible diaphragm 33. This diaphragm contains a plurality of through holes 33a which allow the space beneath the diaphragm to communicate with the chamber 9 so as to keep the respective local pressures equal. The said diaphragm 33 is connected to the strip 20 and, via the peg 21, to the dividing wall 10. The sliding connection between the closure member 24 and the collar 23 is achieved by virtue of the cavities 34 inside the cylindrical portions 30 and 31.

[0027] The aperture 26 is surrounded by a sleeve 35 which extends inside the chamber of variable volume 9, coaxially with the conical portion 28 of the closure member 24, forming a conical cavity 35a whose shape corre-

sponds to the external shape of the said conical portion 28. When the closure member is moved in order to open the aperture 26, an annular gap 36 of given area is formed between the sleeve 35 and the external conical surface of the portion 28 in a manner that will be described below.

[0028] The abovementioned closure member engages with an intermediate zone 37 of a tongue-like element 38 which is made of an elastically flexible material.

[0029] The end 39 of the said element 38 is connected to an annulus 40 while its opposite end 41 extends towards an elastically flexible portion 42 of the peripheral wall 11 of the chamber 9.

[0030] The intermediate zone 37 of the element 38 is in the shape of a ring 43, with the second cylindrical portion 30 of the closure member 24 engaging axially inside this ring 43.

[0031] That edge 44 of the element 38 that axially faces the dividing wall 10 has a projecting portion 45 with a cam profile which is designed to engage operationally with the step 32 on the closure member during operation of the device.

[0032] The tongue-like element 38 is anchored to the dividing wall 10 by inserting the annulus 40 into an annular groove 48 formed in the external face of the sleeve 13.

[0033] By virtue of this arrangement the element 38 is positioned such that it projects out and such that it can bend at the end 39 when the end 41 is pressed.

[0034] A tubular sleeve 49, integral with the rigid portion 27 of the wall 11, is also provided around the closure member 24 and extends into the chamber 9.

[0035] This sleeve 49 is coaxial with the portion 30 of the closure member against which its front end abuts when the closure member is in the closed position, as illustrated in Figure 1.

[0036] The sleeve 49 thus isolates the portion 28 of the closure member and the flexible diaphragm 29 from the chamber 9 when the closure member is in the closed position, offering the advantage that it will be unaffected by any induced pressure fluctuations that may arise inside the chamber 9, for example as a result of changes in temperature.

[0037] The sleeve 49 thus ensures that the device is fully sealed when not in use or during transportation and storage.

[0038] During operation of the dispenser, when the flexible portion 42 of the wall 11 is pressed manually from the outside in the conventional manner, the consequent change in volume of the chamber 9 does not cause the dispensing valve to open, even though it does cause an increase in the internal pressure.

[0039] The dispensing valve opens as a result of the mechanical displacement of the closure member 24 relative to the hole 26, irrespective of the pressure reached inside the chamber of variable volume 9.

[0040] The axial displacement of the closure member

24 takes place as a result of the element 38 bending and the cam profile 45 engaging with the step 32 and pressing it against the wall 10, counter to the elastic force of the bellows diaphragm 33.

[0041] The pasty material present in the chamber 9 can thus be dispensed via the aperture 26 in a consistent and controlled manner, without the risk of it being spurting out as is the case in known devices in which the opening of the closure member can be abrupt, depending as it does on the pressure reached inside the chamber 9.

[0042] The product normally flows out through the annular gap 36. However, if, as the product is dispensed, high internal pressures are reached following a rapid and repeated manual pumping action on the flexible portion 42, the flow rate of the dispensed product can be increased since, following the collapse of the bellows diaphragm 29 as illustrated in Figure 3, the entire through passage of the sleeve 35 and the aperture 26 is opened up.

[0043] When the flexible portion 42 of the wall 11 is released, in the conventional manner, a certain amount of pasty material is sucked up from the container 1 into the chamber 9 through the hole 18, the closure plate 19 being lifted as a result of the suction force.

[0044] Under these conditions, even though the closure member 24 does not yet abut fully against the periphery 25 of the hole 26, the drop in pressure inside the chamber 9 cannot cause air to be sucked in from the outside because a certain amount of product fills the annular gap 36 and the conical cavity 35a and acts as a temporary stopper.

[0045] This is because, during the time that the closure member 24 is not fully closed, the drop in pressure inside the chamber 9 causes only some of the product present in the cavity 35a and gap 36 to be sucked in, thereby preventing air from being sucked in. In this way the problem of the product dripping down the outside the device is also avoided.

[0046] To achieve this, the area of the annular gap 36 must of course be calculated as a function of the viscosity of the product to be dispensed so that a certain amount of product remains in this gap such that only some of it will be sucked back into the chamber 9 when the flexible portion 42 is released.

[0047] For example, it has been found that, with a product having a viscosity of between 500 and 5000 cps, satisfactory results were obtained when a gap 36 between 0.1 and 0.5 mm wide was used.

[0048] Operation of the device described above is also facilitated by the fact that the closure member 24 is opened by mechanically actuating the lever 38, the intermediate ring-shaped 43 part of which can travel only a limited distance, irrespective of the force with which the end 41 is squeezed.

[0049] This is because, as illustrated in Figure 2, the ring 43 bears on the step 32 of the closure member and, once the portion 31 of the latter bears on the wall 10, it

cannot be moved any further. This unequivocally determines the position of the conical portion 28 relative to the collar 35 and, consequently, the size of the annular gap 36.

[0050] Any additional pressure exerted on the lever 38 only causes it to bend inside the chamber 9.

[0051] The piston 4 acts in a conventional manner inside the container 1 and so does not need to be described here.

Claims

1. Device for dispensing pasty products comprising a container (1) that extends along a longitudinal axis (X-X) from a bottom end (2) having an air inlet aperture (3) to an opposite end (14) on which a dispensing head (5) is mounted, a piston (4) located inside the said container (1) and which can move along the said axis (X-X) only in the direction leading towards the dispensing head (5), and a chamber (9) of variable volume formed inside the said dispensing head (5), the said chamber (9) being delimited by a rigid wall (10) that divides it from the said container and is positioned transversely to the said axis (X-X) and by a peripheral wall (11), one portion (42) of which is deformable on manual application of an external pressure, the said chamber (9) also being fitted with an inlet valve (18, 19) formed in the said dividing wall that allows the product to pass from the container (1) into the chamber but not vice versa, and with an outlet valve (24, 26) that allows the product to be dispensed from the chamber to the outside, the said outlet valve (24, 26) comprising an aperture (26) formed in a rigid portion (27) of the peripheral wall (11) of the said chamber (9) and, located inside the chamber, a closure member (24), on which the periphery (25) of the said aperture (26) presses when in the closed position, the said closure member (24) being able to move relative to the aperture (26) when manual pressure is exerted on the said deformable portion (42) of the peripheral wall (11) of the said chamber of variable volume (9), characterized in that the said closure member (24) is connected to an intermediate point (37) of a tongue-like element (38), one end (39) of which is fixed to one of the said walls (10, 11) delimiting the said chamber of variable volume (9) while the opposite end (41) is free to project out towards the said deformable portion (42).
2. Device according to Claim 1, characterized in that the said tongue-like element (38) is securely fitted into the said wall (10) that divides the chamber of variable volume (9) from the container (1) and is transverse to the said longitudinal axis (X-X).
3. Device according to Claims 1 and 2, characterized in that the said tongue-like element (38) consists of

a strip that is elastically flexible with respect to the end (39) that is fixed to the said wall (10) that divides the said chamber, of variable volume (9) from the said container (1).

4. Device according to Claim 1, characterized in that the said closure member (24) comprises a first conical portion (28), a second cylindrical portion (30) which is coaxial to the first and has a larger diameter than the largest diameter of the first portion, a first elastically flexible diaphragm (29) which axially connects the first portion (28) to the second portion (30), a third cylindrical portion (31), coaxial to both the first and second portions, the said third portion (31) having a larger diameter than that of the second portion with which it forms a step (32), and a second flexible diaphragm (33) which connects the said third cylindrical portion (31) to the said rigid wall (10) that divides the chamber of variable volume (9) from the said container (1), the said first and the said second flexible diaphragms exerting, when deformed, an axial thrust towards the aperture (26) of the said outlet valve.

5
10
15
20
5. Device according to Claim 4, characterized in that the said second flexible diaphragm (33) contains holes that allow the said chamber of variable volume (9) to communicate with the area beneath the said diaphragm (33).

25
30
6. Device according to Claim 4, characterized in that the said second cylindrical portion (30) and the said third cylindrical portion (31) of the closure member are axially hollow, thereby forming a single cylindrical chamber (34) slidably mounted on a sleeve (23) which is integral with the said wall that divides the chamber of variable volume (9) from the container (1).

35
7. Device according to Claims 1 to 6, characterized in that the said tongue-like element (38) comprises an intermediate ring-shaped (43) portion, the said ring (43) being attached to the outside of the said second cylindrical portion (30) of the closure member.

40
45
8. Device according to Claim 7, characterized in that the axial edge (44) of the said ring (43) which is attached to the said second cylindrical portion (30) of the closure member has a cam profile (45), the said profile coming into axial contact during operation with the said step (32) formed between the said third cylindrical portion (31) of the closure member and the second portion (30).

50
9. Device according to Claims 1 to 8, characterized in that the said aperture (26) of the outlet valve is fitted with a sleeve (35) which forms a conical cavity (35a) that faces the inside of the said chamber of

55

variable volume (9) and is coaxial with the said first conical portion (28) of the closure member, forming with the latter an annular dispensing gap (36) of given area when the said first conical portion (28) is moved out of engagement with the periphery (25) of the said aperture (26).

10. Device according to Claims 1 to 9, characterized in that it comprises a tubular sleeve (49) which is coaxial with the said closure member (24) and concentric with the said second cylindrical portion (30) of the closure member against which it abuts axially when the closure member (24) is in the closed position.

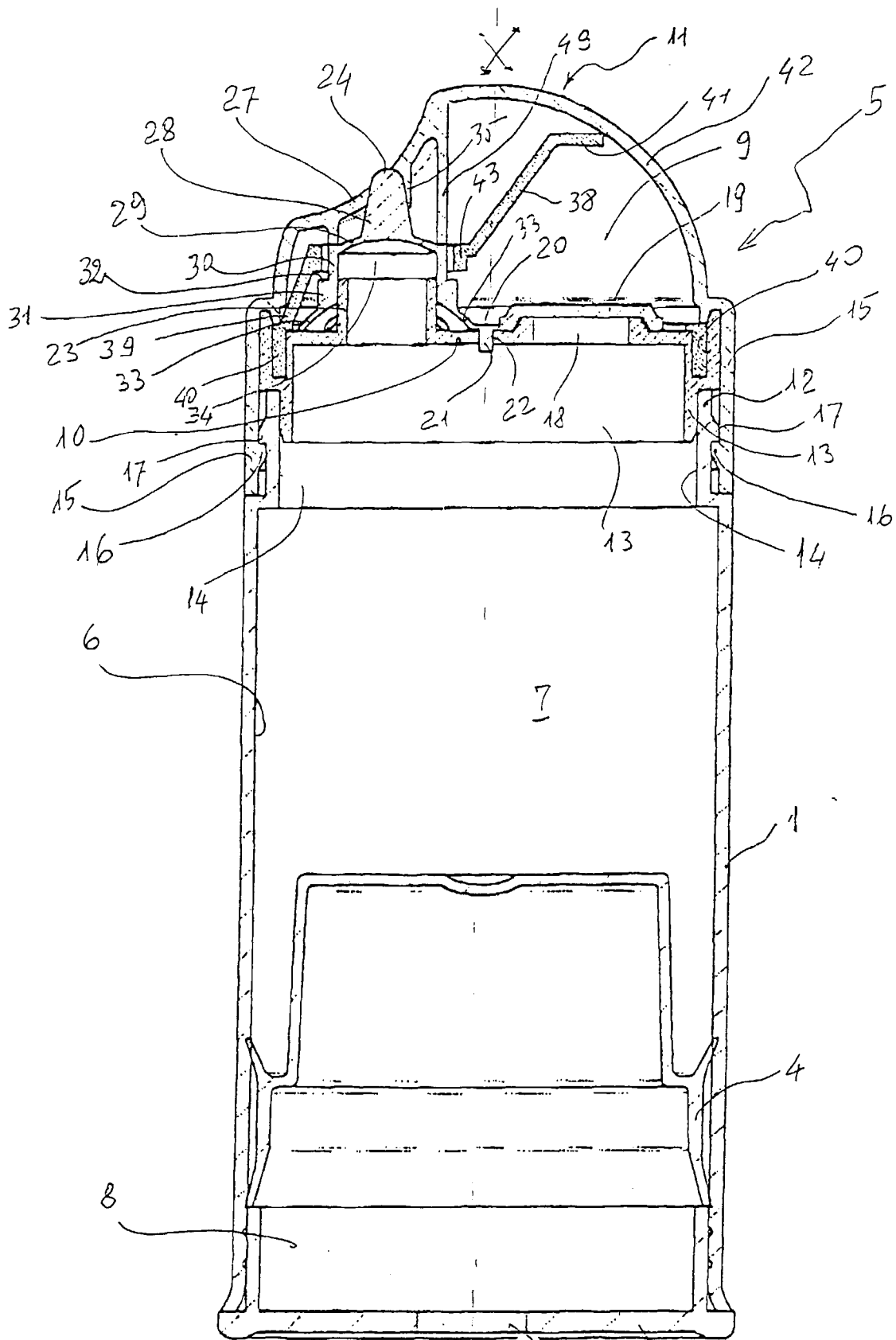
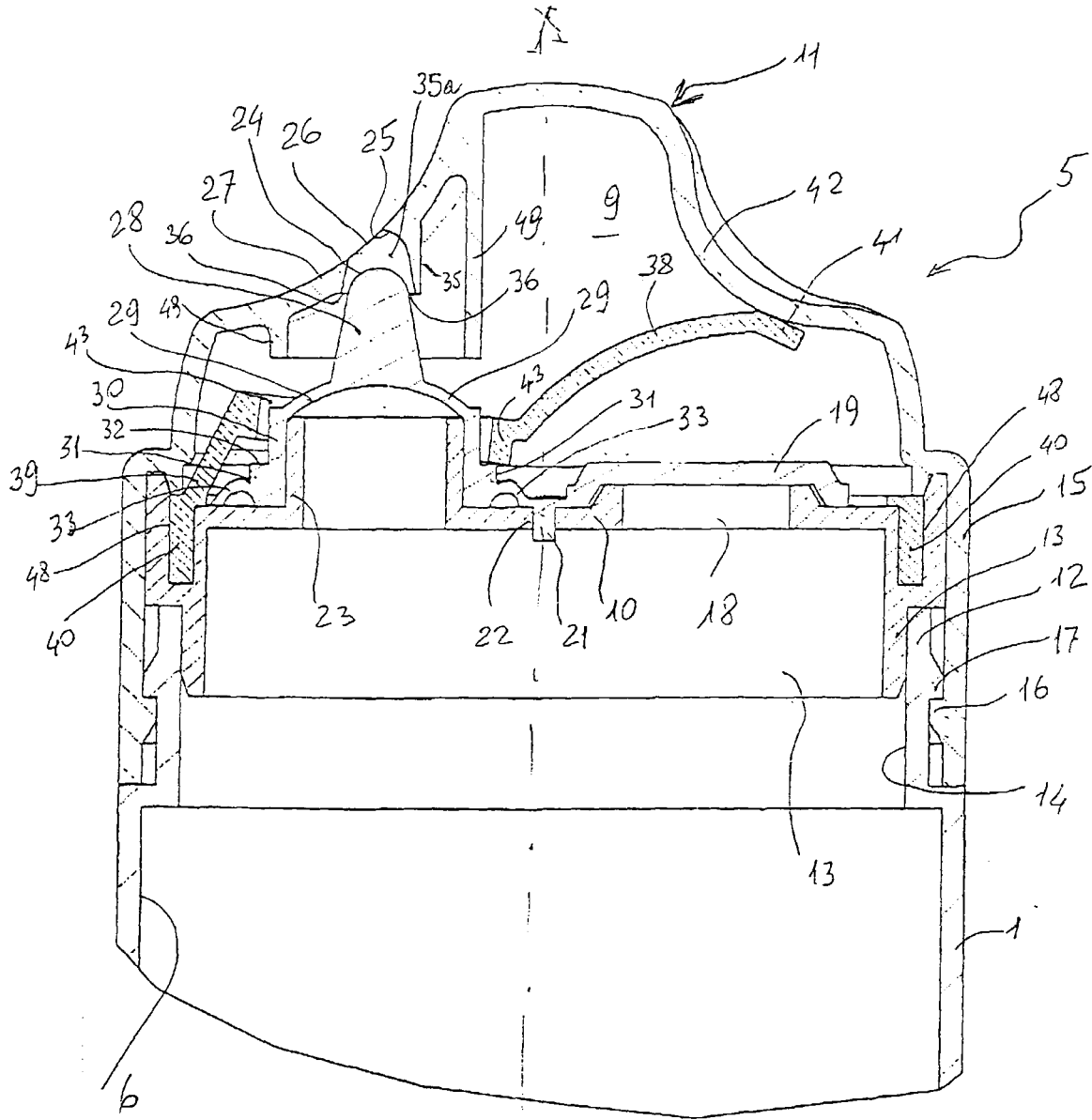


Fig. 1

X



X
Fig. 2

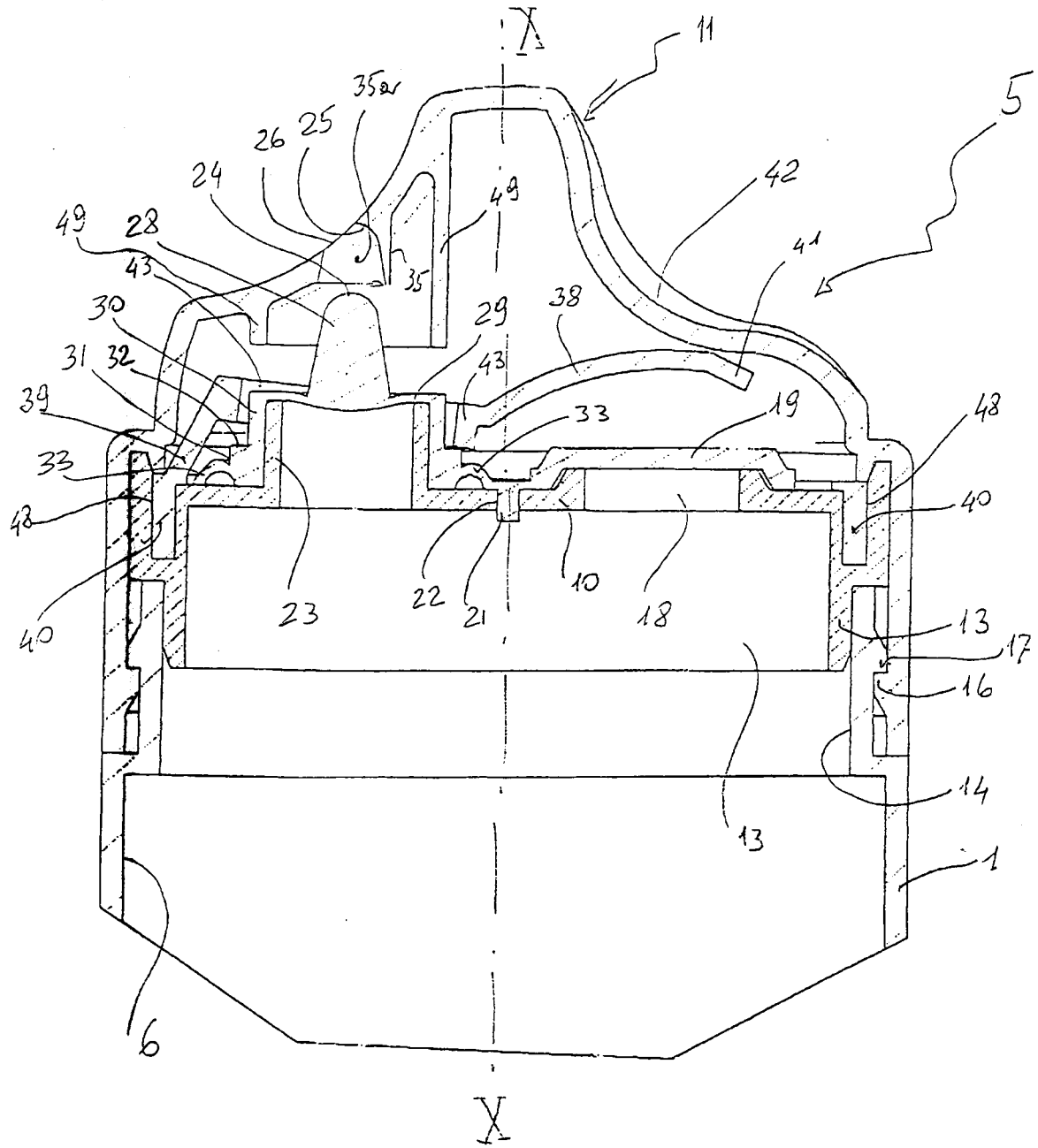


Fig. 3

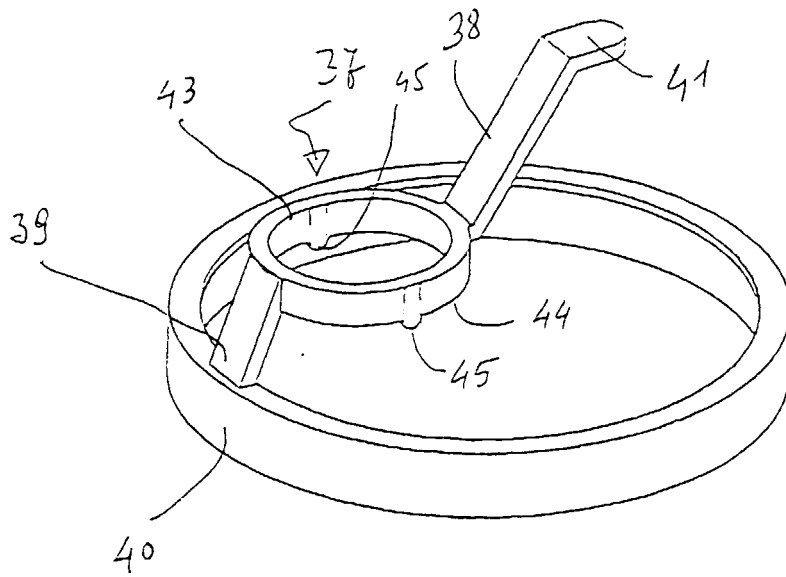


Fig. 5

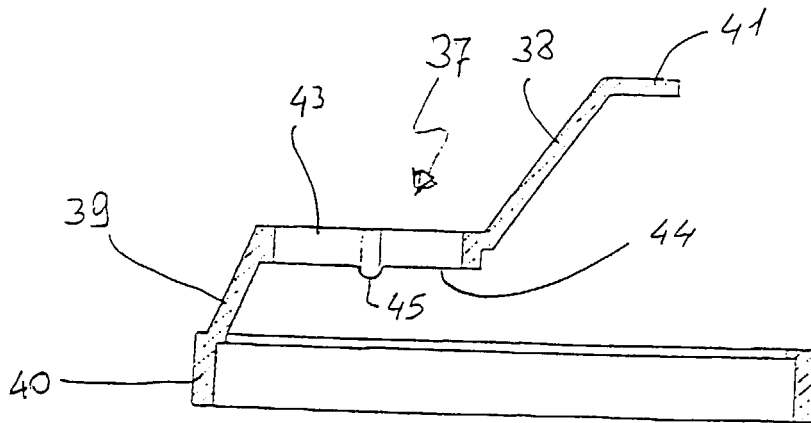


Fig. 6

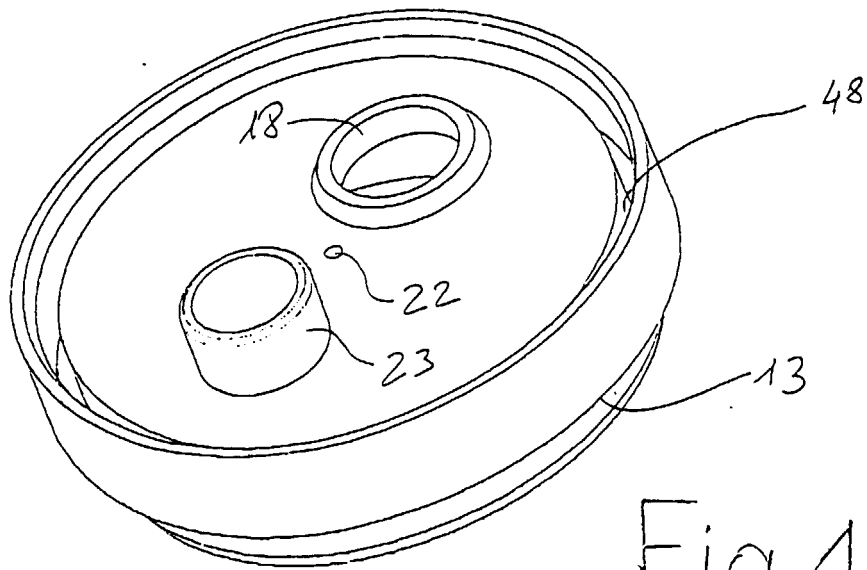
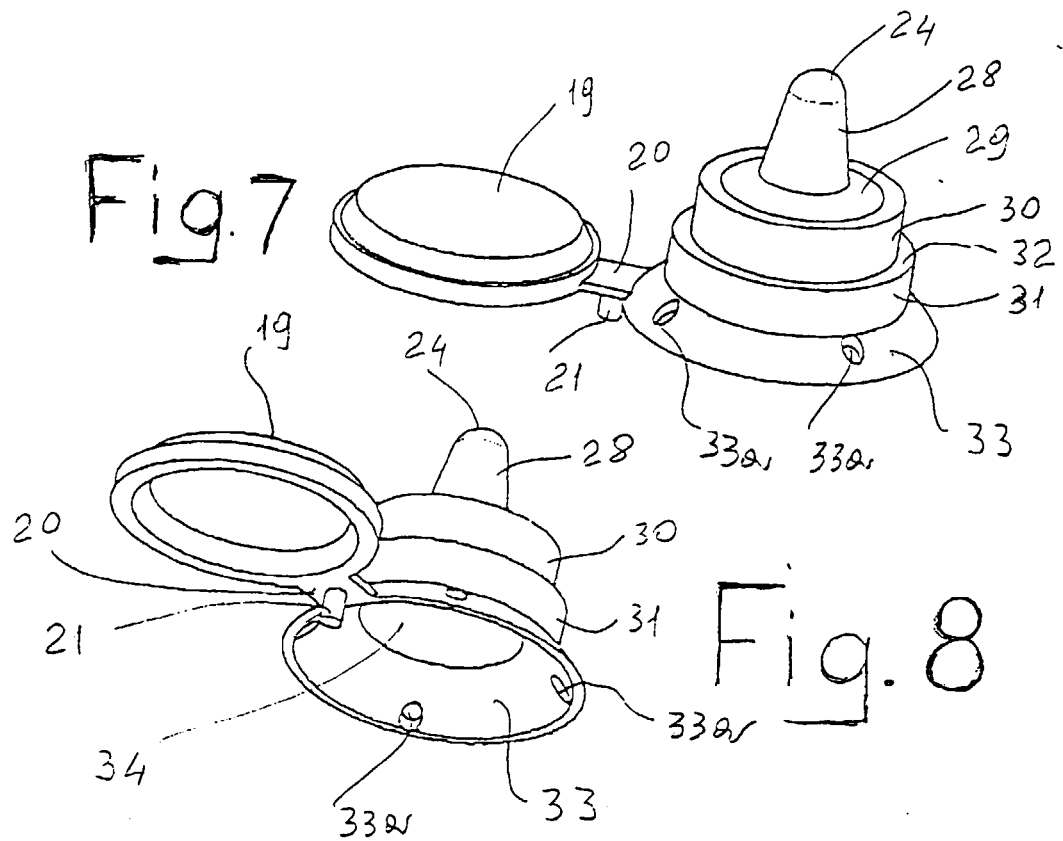
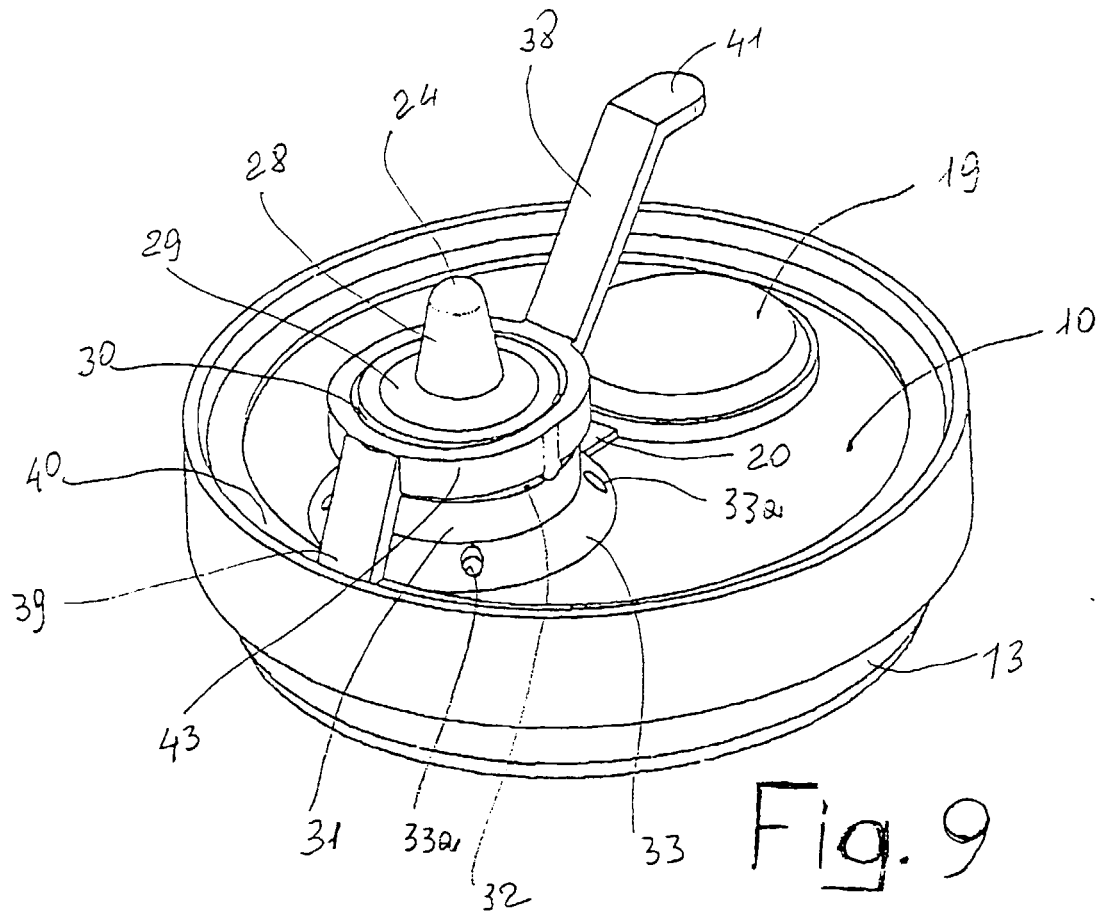


Fig. 4





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 98 83 0553

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.6)
D,A	EP 0 363 307 A (PLASCO SA) 11 April 1990 * column 7, line 20 - line 52; figure 8 * ---	1	B65D47/34 B65D83/00 B05B11/00
D,A	EP 0 282 791 A (BRAMLAGE GMBH) 21 September 1988 * figures 2-4,9 * ---	1	
A	EP 0 782 963 A (GUALA DISPENSING SRL) 9 July 1997 * claim 1; figure 1 * -----	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			B65D B05B
The present search report has been drawn up for all claims			
Place of search BERLIN		Date of completion of the search 22 February 1999	Examiner Spettel, J
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 O : 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	

EPO FORM 1503 03/82 (P04C01)

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

EP 98 83 0553

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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

22-02-1999

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0363307 A	11-04-1990	NONE	
EP 0282791 A	21-09-1988	DE 3708713 A	29-09-1988
		DE 3864288 A	26-09-1991
		DE 8816917 U	28-03-1991
EP 0782963 A	09-07-1997	IT MI952658 A	18-06-1997