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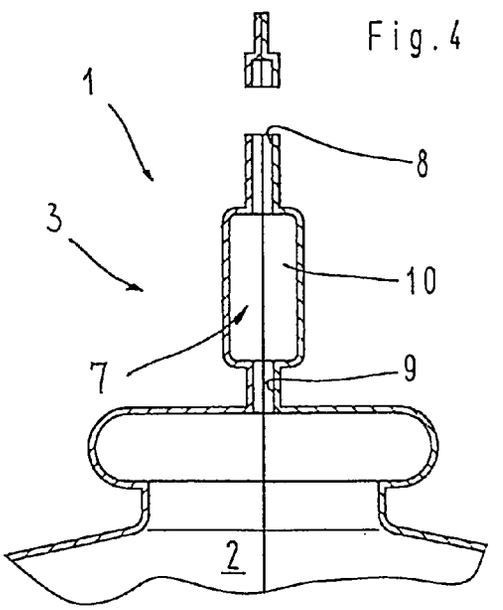
(54) Container for fluid material

(57) A container 1 has an elastically deformable body 2 and a neck 3 including a chamber 7 connected with the container interior and the discharge opening of the neck 3 by means of passages 8 and 9 which are sized, shaped and positioned to prevent accidental spillage of the product, even if the container is horizontal. At least one of the passages 8 and 9 may have a cross-section which is lenticular in shape, squashed at first but having geometry variable between an undeformed configuration when closed, and a deformed configuration when open that allows outflow of product when the container is purposely squeezed by the user. On releasing the container, the shape of the cross-section returns to its initial almost closed, configuration.

Fig. 4



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Description

The invention concerns a container for fluid material, in particular for liquids or pasty fluids, comprising a main body and a neck an outer end of which is openable to discharge the contents.

The prior art involves containers for products in the form of liquids or pasty fluids, in which the top end of the neck is designed to be opened, for example by cutting, or tearing, along a predetermined fracture line: the discharge of the product is generally achieved by inclining the container and possibly pressing on the sides of the container to deform them elastically so as to increase the pressure of the product inside the container, thereby force out the product.

However, with the use of such containers, for example in a domestic environment, where they are frequently knocked over, a resulting, undesirable discharge of the product through the opening occurs due to the product inside the container being forced towards the opening: this causing a quantity of the product to be wasted and the further inconvenience of an undesired spillage into the environment, even if the container is quickly righted after the fall.

FR-A-1352979 discloses a flexible plastics bottle of spherical form and mounted in a cruciform base to deter falling-over of the bottle. The neck includes widenings each of lenticular form in axial section, whereby bubbles entering the neck from effervescent liquid contained therein burst at those widenings to prevent spilling-over of the liquid upon opening.

US-A-4502616 discloses a single-use vial with a neck including a narrowed passage followed outwardly by a chamber itself followed outwardly by another narrowed passage which terminates in an airtight seal which can be twisted off to provide a discharge opening. To maintain the surface of the treatment liquid in the vial below the level of the outer passage and thus prevent inadvertent leakage of the liquid from the opened vial when it is placed on a horizontal surface, two major faces of the vial taper towards each other away from the neck.

EP-A-0425263 discloses a sterile packaging assembly for dispensing a liquid in drops, wherein a flow rate restriction in the form of a short length of capillary tube is inserted into an intermediate part of the neck of a squeeze bottle. A closure head integral with the neck can be twisted off to reveal the discharge opening.

US-A-4917267 discloses a thermoplastic squeezable self-closing valve with a tamper-evident lip seal tab for liquids, pastes or solids. A neck of a container incorporating the valve can be formed by heat and pressure moulding a circular-cylindrical neck into a form including a unilaterally projecting valve comprising two curved walls in face-to-face sealing contact. The heat and pressure applied in forming the nested opposing walls is not sufficient to weld them together, but is sufficient to impart into the thermoplastics of the walls a memory after cooling prior to release from the thermoforming tool which causes the walls to nest against each other. Additional pressure and heat from those walls outwardly provide a lipseal weld. A scored notch between the walls and the weld allows the weld to be cut or torn away by a user.

EP-A-0225251 discloses a self-righting liquid container of flexible or semi-rigid material including a neck portions of which co-operate with each other such that their geometry can be varied for acting as a valve for the liquid, these portions being of various shapes.

Such prior art could be considerably improved. For example, it is highly desirable to resolve the technical problem that significant spillage of fluid material can result from an accidental fall of the container. Another technical problem arises with a valve of the character disclosed in US-A-4917267, for example, in that its two face-to-face walls cannot readily be formed by a blow-moulding method in which two face-to-face sheets have air introduced between them; a further technical problem with a valve of that character is that, where significant transverse forces are used to open the same (rather than forces applied to increase the pressure of the fluid material in the container and thus cause the fluid material to open the valve) the transverse forces have to be relatively high and even then the desired opening movement may not be obtained.

According to a first aspect of the present invention, there is provided a container for fluid material, comprising a body and a neck an upper end of which is openable to discharge contents of the container, the neck including a chamber and passages which connect the chamber with the inside of the body and with said upper end, characterised in that said passages are sized, shaped and positioned in such a way as to prevent accidental spillage of said fluid material when said container falls over.

This enables the container to be used more safely, owing to the elimination, or almost elimination, of the spillage of contents when the container is knocked over, or falls over. According to a second aspect of the present invention, there is provided a container for fluid material, comprising a body and a neck an outer end of which is openable to discharge contents of the container, said neck including a passage of variable geometry in cross-section to act as a valve for the fluid material, characterised in that said cross-section is substantially always lenticular in shape.

This container can be readily made by blow-moulding of two face-to-face sheets and the valve is relatively easily openable in a reliable manner by transverse forces applied thereto.

In a preferred embodiment, the container has an elastically deformable body and a neck which includes a chamber which is connected with the inside of the container and the discharge opening of the neck by means of passages which are sized, shaped and positioned in such a way as to prevent accidental spillage of the product, even if the container is in a horizontal position. At least one of the passages has a cross-section which is lenticular in shape, for example a parallelogram, squashed at first and having geometry variable between an undeformed configuration when closed, and a

deformed configuration when open that allows outflow of product when the container is purposely squeezed by the user.

In this way it is possible, in order to discharge some of the product, to squeeze the sides of the container thereby pressurising the product to a point where it deforms the discharge opening, causing it to take on the open configuration favouring the outflow of the product, whilst, on releasing the container, the shape of the section, for example advantageously a parallelogram, can return to its initial almost closed, configuration.

It is to be noted how, in this way, the shape of the cross-section acts as a valve controlling the discharge of the product inside the container.

The lenticular configuration of the valve can be adopted on a smooth-necked container, that is, a container that does not have such chamber.

This provides for greater safety against accidental spillage of the liquid, whilst maintaining optimal functionality during use.

Some embodiments of the invention are illustrated, purely by way of example, in the accompanying drawings in which:

Figure 1 is a front view of a container obtained by blow-moulding a pair of sheets of plastics material welded along desired profiles:
Figure 2 is a side view of the container;
Figure 3 is a detail, enlarged and sectioned, of a neck of the container, opened, in a version having a parallelepiped-shaped chamber;
Figure 4 is section IV-IV of Figure 3;
Figure 5 is section V-V of Figure 3;
Figure 6 is a section as in Figure 3, but in a version having a circular cylindrical chamber;
Figure 7 is section VII-VII of Figure 6;
Figure 8 is a section as in Figure 6, but in a version having a substantially spherical chamber;
Figure 9 is an axial section of an opened container, with the container lying on its side as a result of having been accidentally knocked over;
Figure 10 is a transverse section through one or each of two passages of the container;
Figure 11 is a section as in Figure 10, but in an open configuration.

Referring to the drawings, a container 1 for a product in the form of a liquid L, or pasty fluid, or particulates, has a body 2 with base resting on work top 2a, and a neck 3 designed to be opened by cutting, or tearing, along a predetermined fracture line 5, near its top extremity.

Figures 1 to 5 show the container 1 obtained by blow-moulding a pair of sheets of plastics joined by heat-welding along a peripheral rib 6.

As shown in Figure 3, the neck 3 of the container 1 includes a chamber 7, having passages of selected size, shape and position, on both sides, namely a passage 8 leading to the discharge opening at the free end of the neck 3, and a passage 9 communicating with the inside of the main body 2 of the container.

The chamber 7, and/or the passage 8, 9, can be defined by side walls 10 defining a volume in the shape of a parallelepiped, as shown in Figures 3 and 4, or by side walls 11 defining a circular cylindrical volume, as shown in Figures 6 and 7, or, only as regards the chamber 7, by side walls 12 defining a substantially spherical volume, as shown in Figure 8.

Figure 9 shows how, when knocked over on work top 2a, the passage 9 allows only a small quantity of liquid L to pass into the chamber 7, at the moment it is knocked over: this being as a result of the liquid being shaken up so developing forces of inertia acting towards the neck 3; the passage 9 is advantageously sized so as not to allow the passage of liquid L when at rest, with the container in a horizontal position.

The passage 9 provides a throttle such as to prevent the natural outflow of the fluid material: the amplitude of the throttling being chosen as a function of the flowability of the fluid material and the likely working pressure inside the container.

The quantity of liquid L possibly forced through the passage 9 as a result of the accelerations developed when knocked over, is received in the collecting chamber 7, without spilling into the surrounding environment.

The throttle can have substantially fixed geometry, as illustrated in Figure 5, or, as shown in Figures 10 and 11, can take the form of a valve 14, consisting of the side walls of the container formed in such a way that they define a lenticular section, for example rhombic: the valve being elastically deformable under the effect of the pressure induced in the fluid by the user squeezing the sides of the container, from a squashed closed configuration, shown in Figure 10, to an open configuration, shown in Figure 11.

The closed configuration, with the walls 15 almost in face-to-face contact, guards against accidental spillage of the liquid, even rendering the collecting chamber 7 superfluous in certain applications, in particular those for liquids of low flowability.

On the other hand, when the container is deformed elastically to discharge the liquid L in the form of a jet, the lenticular cross-section of the valve 14 takes on an open configuration, with the walls 15 considerably separated from each other in order to facilitate the discharge.

Because the walls 15, even when the valve 14 is in the closed configuration of Figure 10, are already cranked towards the open configuration, in an embodiment in which the valve 14 is opened by transversely squeezing the valve, rather than by squeezing the side walls of the container towards each other to force the liquid through the valve, movements of the walls to a fully opened configuration can be reliably obtained.

Another advantage of the version of Figures 10 and 11 is that the valve 14 can readily be made by a blow-moulding method in which air or other inflating fluid is forced to between two sheets of heated plastics.

Claims

1. A container for fluid material, comprising a body (2) and a neck (3) an upper end of which is openable to discharge contents (L) of the container (1), the neck (3) including a chamber (7) and passages (8,9) which connect the chamber (7) with the inside of the body (2) and with said upper end, characterised in that said passages (8,9) are sized, shaped and positioned in such a way as to prevent accidental spillage of said fluid material (L) when said container (1) falls over.

2. A container as claimed in claim 1, characterised in that one of said passages (8,9) has variable geometry to act as a valve (14).

3. A container as claimed in claim 2, characterised in that said one of said passages (8,9) is the passage (9) which connects said chamber (7) with the inside of the body (2).

4. A container as claimed in claim 2 or 3, characterised in that said valve (14) is lenticular in through-flow cross-section.

5. A container as claimed in any preceding claim, characterised in that said body (2) is flexible.

6. A container as claimed in any preceding claim, characterised in that said chamber (7) is substantially cylindrical.

7. A container as claimed in any one of claims 1 to 5, characterised in that said chamber (7) is parallelepiped-shaped.

8. A container as claimed in any one of claims 1 to 5, characterised in that said chamber (7) is substantially spherical.

9. A container as claimed in any preceding claim, characterised in that at least one of said passages (8,9) is substantially rectangular in cross-section.

10. A container as claimed in any preceding claim and formed by blow-moulding of two face-to-face sheets.

11. A container for fluid material, comprising a body (2) and a neck (3) an outer end of which is openable to discharge the contents (L) of the container (1), said neck (3) including a passage (9) of variable geometry in cross-section to act as a valve for the fluid material (L), characterised in that said cross-section is substantially always lenticular in shape.

12. A container as claimed in claim 11 and formed by blow-moulding of two face-to-face sheets.

Fig.1

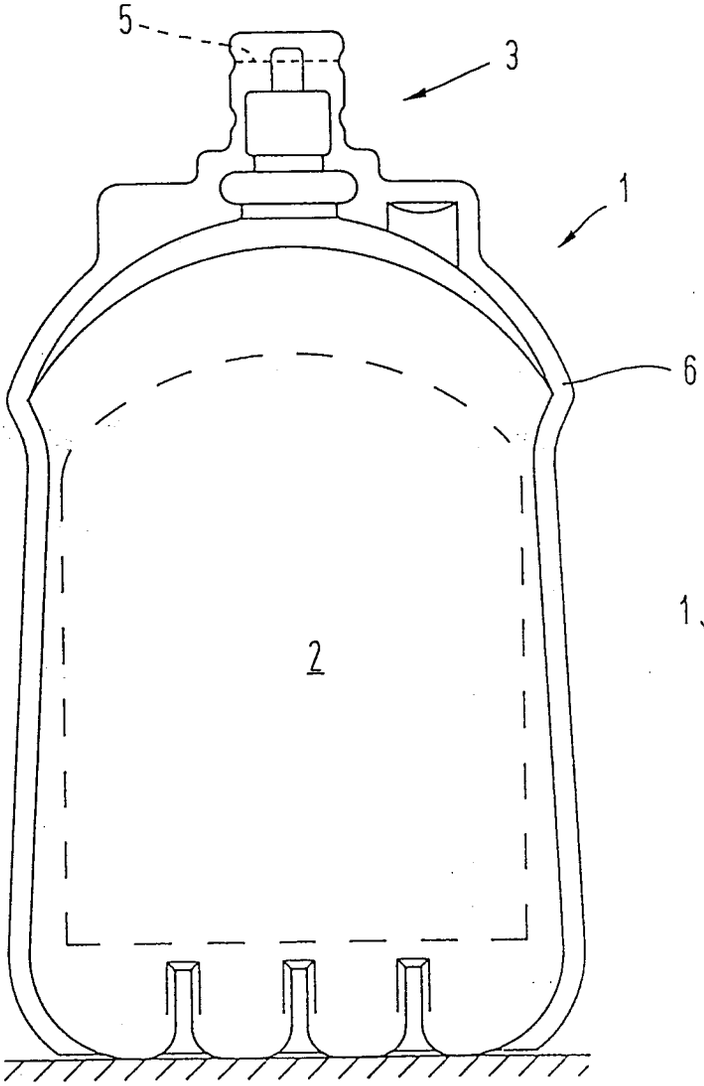
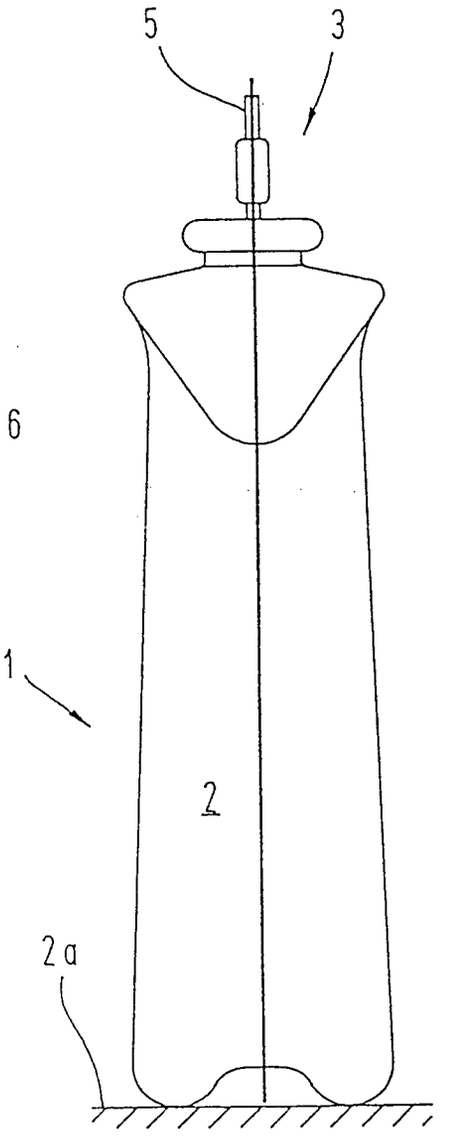


Fig.2



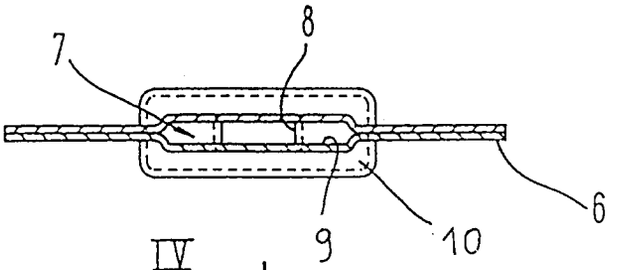


Fig.5

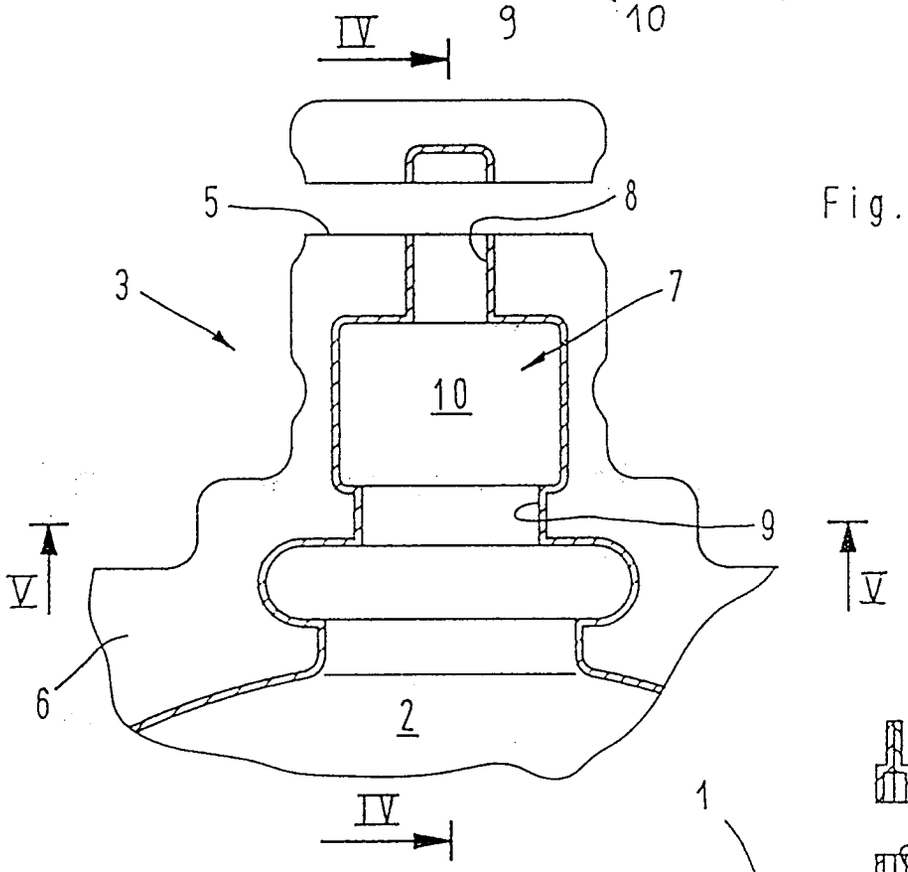


Fig.3

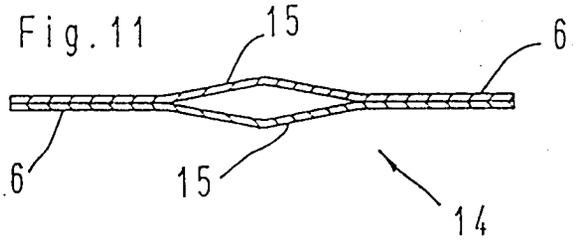


Fig.11

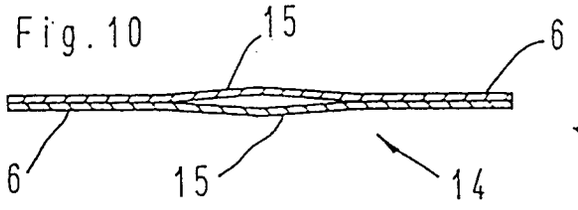


Fig.10

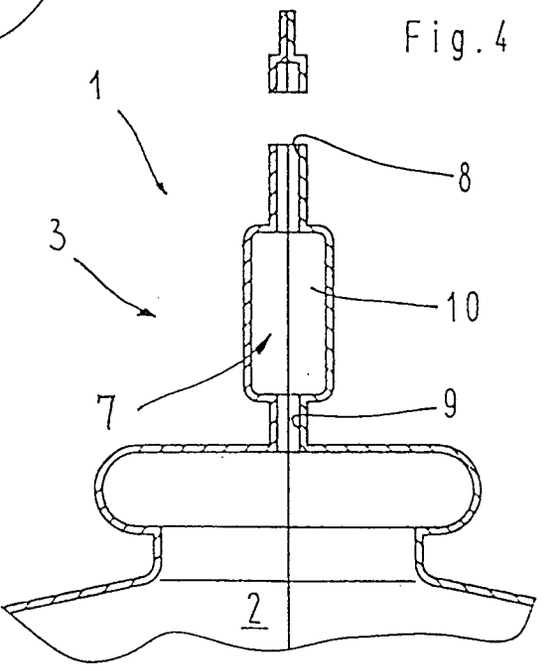


Fig.4

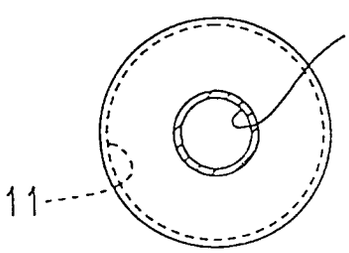


Fig.7

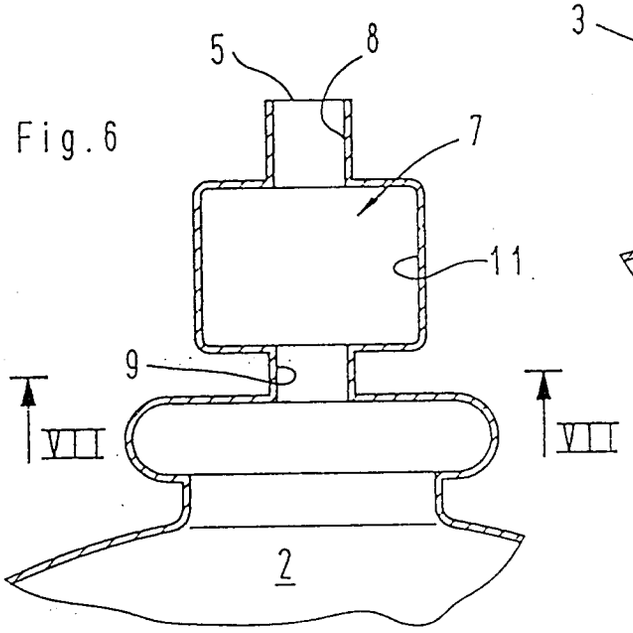


Fig.6

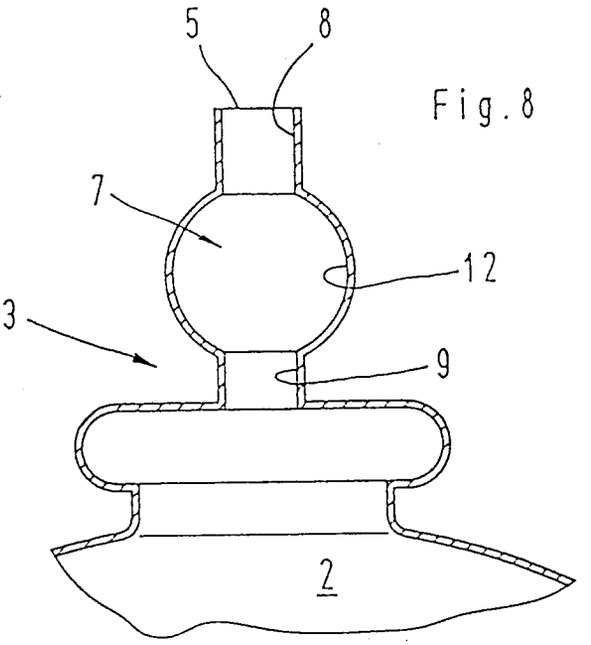


Fig.8

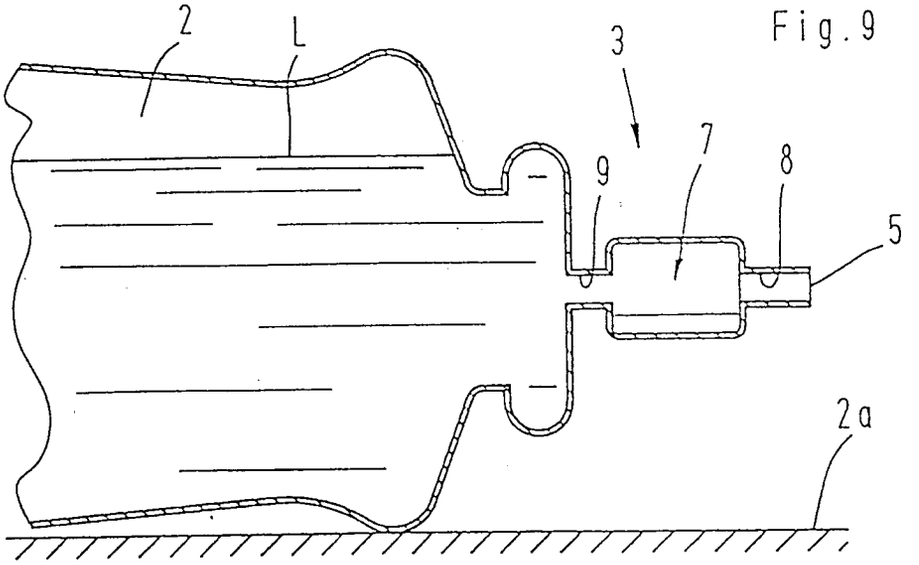


Fig.9