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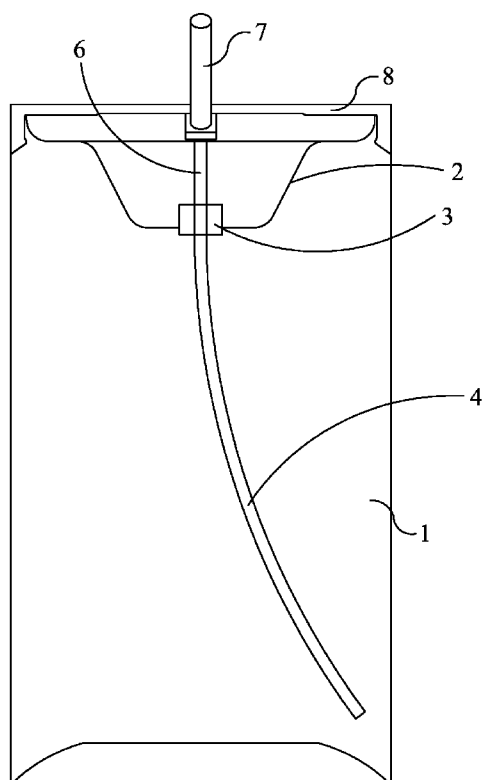
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- (71) Applicant (for all designated States except US): **SHU PACKAGING PRODUCTS LTD.** [CY/CY]; 38 Andrea Araouzou Street, Office 401, Nicosia, P.C. 1076 (CY).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **GADET, Henricus, Maria, Lambert, Johan** [NL/NL]; Putmansveld 11, NL-4813 AK Breda (NL). **VAN DER AA, Bert, Johannes, Gerhardus** [NL/NL]; Balfortstraat 40, NL-4811 RV Breda (NL).
- (74) Agents: **EVELEENS MAARSE, Pieter** et al.; Patentwerk B.V., P.O. Box 1514, NL-5200 BN 's-hertogenbosch (NL).
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(54) Title: CONTAINER FOR A LIQUID AND A PROPELLING GAS COMPRISING A VALVE



(57) Abstract: The invention relates to a container for containing a liquid and a propelling gas, in which the container comprises a valve for expelling the liquid from the container through the propelling gas during operating the valve, in which the valve comprises an operating element connected with the valve, and wherein the valve is adapted to be opened when the operating element is moved from its rest position, wherein a tilting element is connected tiltably around a single tilting axis with the container, that the tilting element is coupled mechanically with the operating element for moving the operating element from its rest position during tilting of the tilting element. The consequence of this feature is that the valve is easily operable by executing a tilting movement. A tilting movement is a rotational movement which is easier operated by a human being than the pressing on a push button.



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Container for a liquid and a propelling gas comprising a valve

The invention relates to a container for containing a liquid and a propelling gas, in which the container comprises a valve for expelling the liquid from the container through the propelling gas during operating the valve, in which the valve comprises an operating element connected with the valve, and wherein the valve is adapted to be opened when the operating element is moved from its restposition.

Such containers are generally known as containers for aerosols and such. Often the valve is of the type which is operable by pushing on it. Further such containers are known, in which the valve can be operated by an element which can be pushed in. This avoids the clumsy searching for the valve by the fingers. Nevertheless a valve operable on such a way is not always easily operable.

The aim of the present invention is to provide such a container, in which the valve is easily operable, also when it should be pushed in during a substantial time.

This aim is reached in that a tilting element is connected tiltably around a single tilting axis with the container and that the tilting element is coupled mechanically with the operating element for moving the operating element from its restposition during tilting of the tilting element.

The consequence of this feature is that the valve is easily operable by executing a tilting movement. A tilting movement is a rotational movement which is easier operated by a human being than the linear movement of the pressing on to a push button. Another reason for the ease of use is the fact that also as caused by the tilting movement a part of the tilting element to be operated stays at its location, and thus forms a reference for the operating finger or fingers. Preferably the tilting element extends from the access of tilting of the tilting movement. Thus a leverage is developed so that the operating of the tilting element requires only little force.

The consequence of this feature is that the tilting element can be operated easily in whatever position it is held. This allows an easier operating of the tilting element, in particular for both left handed and right handed persons.

Yet another embodiment provides the feature that the tilting element is connected to a structure connected rigidly with the container through two connection bridges extending in the tilting axis. This feature makes the construction easier, not only when the tilting
5 element is made of plastic, but also when it is made of other materials like aluminium or other metals; indeed it is easy to produce such a structure from a plate of material by stamping.

This advantage is enhanced when the structure connected rigid with the container is
10 formed by a ring connected with the container.

This allows to produce not only the tilting element by stamping a sheet, but also the ring, relative to which the tilting element is moveable.

15 The ring should be connected with the container. Preferably this connection has implemented in that the ring is connected by means of a clamping connection only difficultly releasable. This difficultly releasable connection allows it further to provide a good protection against unnoticed opening of the container by operating the valve. Difficultly releasable is understood to comprise releasable only with tools.

20 Herein the composition of the ring and the tilting element connecting therewith through material bridges, may be formed by plastic, for instance by injection molding, but is also possible to produce a tilting element by stamping from metal sheet. The only difficultly releasable connection with the holder can then be made by a folding seam or
25 another form locking connection.

Yet another embodiment provides the feature that the ring comprises clamping means for releasably clamping a lid extending over the tilting element. This lid can have the function of the blocking of the operating tilting element, simply by avoiding the
30 operating of the tilting element. Therefore it is important that neither the lid can be removed without this removing being recognizable later. By fixing the lid clamping to the ring, a fixation of the lid is obtained, but further the possibility is offered to provide for instance a fragmentable sticker, so that the removal of the sticker is recognizable, as the fragments thereof cannot be united later.

The ways explained above on to which the tilting element is produced, imply that the tilting element is substantially flat. However the tilting element has as function to operate the valve. Therefore it is of course possible to fold parts of the tilting element. A

5 preferred embodiment of the invention provides thus the feature that a connecting element has been located between the tilting element and the operating element, for connecting the tilting element with the operating element. Herein the movement of the tilting element is transferred to the connecting element, and further by the connecting element to the operating element.

10

To simplify the construction, it is attractive, when the connecting element is rigidly connected with the tilting element.

15 The liquid, gas or aerosol emerging from the valve should be conducted to the position at which it is used. Preferably the operating element comprises a channel which is adapted to conduct the liquid emerging from the valve and comprises the connected element a cavity to which the operating element leads and connect a connecting tube to the cavity of the connecting element. This construction offers a possibility to combine the attractive construction of the operating elements with a way to offer the fluid

20 emerging from the container in an appropriate way.

The construction mentioned above requires that the fluid is transferred from a channel connecting to the valve to a cavity in the connecting element, in which the channel is movable relative to the connecting element. To avoid the sealing problems caused by

25 this mutual movement, preferably a sealing element has been provided between the operating element and the coupling element to seal the connection between the channel extending through the operating element and the cavity in the connecting element.

For outward conduction of the fluid emerging from the valve, it is attractive when the

30 conducting tube extends through an aperture provided in the tilting element.

A following preferred embodiment provides the feature that the connecting tube is flexible. This allows to move the conducting tube to any position during its use, but it is

further possible to move the conducting tube to a less disturbing position during transport.

5 The flexibility of the conducting tube can be obtained by making the conducting tube of a rigid material or to make the construction flexible as in drinking straws, but generally it is simpler when the conducting tube is made of flexible material.

10 Yet another preferred embodiment provides the feature that the conducting tube has an asymmetric cross section. This asymmetric cross section leads to a preferred direction of the flexibility. Thus the conducting tube can be easier curved or flexed in a preferred direction. Preferably the asymmetric cross section is obtained in that the conducting tube has an outer cross section with a shape deviating from a circle, and having a circular inner cross section. This provides not only an attractive appearance but provides also in a preferred direction of flexibility. According to another preferred embodiment
15 the assymetric cross section is obtained to combine a circular outer cross section and a cross section deviating from round, an asymmetric, for instance elliptical or rectangular cross section. This leads to a very attractive appearance.

20 It is attractive when the conducting tube has an outer oval cross section. Such a conducting tube can easily be flexed in the preferred direction. Further an oval conducting tube can be stored very compactly.

25 Preferably the connecting element comprises a spout on to which the conducting tube can be clamped. This leads to a simple way of providing a throughgoing channel between the cavity in the connecting element and the conducting tube.

30 To provide a location for the conducting tube which is less obstructive, it is preferred if the spout extends in the direction of the operating element, and if in the outer surface of the tilting element a groove has been provided in to which the conducting tube can be located.

Preferably the groove extends between the connecting bridges. Herein the groove is provided in a part which is indeed moved during its operating, but on a location in to which the part is subjected to movements as less as possible.

To make the conducting tube flexible in a preferred direction, the conducting tube is located such on to the spout, that the cross section of the connecting tube in the direction of the groove is greater than in the direction perpendicular to the groove.

5

To reduce the costs as far as possible, it is attractive if at least one of the following parts: the tilting element, the structure connected with the container, the lid, the coupling element and the conducting tube is made of plastic. Generally the use of plastic leads to a reduction of the costprice. However there may be considerations to make certain parts of metal like aluminium to obtain the required strength, durability or appearance.

10

Yet another embodiment provides the feature that the valve is located in a part of the wall of the container which is recessed relative to the envelope of the container. Bij locating the valve in a recessed position the space around the valve can be used useful as effective content of the container. Thus the available volume is used better and such a container is used better for products like drinks which are produced and transported in large numbers. Also a greater degree of freedom is obtained through the higher availability of the contents.

20

According to another embodiment the container comprises a wall part which is separated from the remainder of the container by a closed line located in a flat surface, and that the wall part comprises a recessed part in which the valve has been located. Although the greater number of containers of the kind mentioned above has a substantially cylindrical shape, the features of the invention are also applicable for containers of other shapes, like cone shapes or compound and complicated shapes. The features mentioned above lead to the advantages of the features of the invention also in the case of containers of these shapes.

25

According to a more specific embodiment the container has a substantially cylindrical shape, and the valve is located in an end wall of the container. This embodiment concerns the embodiment which is now regarded as the most likely embodiment.

30

The features mentioned above leads to substantial improvements over the prior art. By the recessed location of the valve the valve is better protected and the available volume can be used better. It is however very well possible that the valve contains parts which still extend from the envelope of the container which would lead to less favourable effects of the features of the invention. These negative effects can be limited if the valve extends only within the space between the flat surface and the wall part.

It is also possible that the end wall of the container is recessed stepwise and that the valve is located in the deepest part. The stepwise recess of the end wall requires the same technology as the production of such a end wall according to the prior art comprising stepwise elevations. The only difference resides in the opposite use of the end wall. It is also possible to produce the end wall of the container through high pressure moulding. Herein use is made of attractive technology known per se without modifications for the production of recessed or stepped end walls in which the valves should be located.

It is noted, that an important field of application is found in the packing of drinks, like sodas. Then it is attractive to have a container with a appearance which is not too far diverging from the appearance of cans now generally in use for packing of such drinks.

Subsequently the present invention will be elucidated with the help of the accompanying drawings, in which show:

Figure 1: a cross sectional view of a container according to the invention;
Figure 2: a prespective view partially broken away of a detail of the container depicted in figure 1;
Figure 3: a prespective view partially broken away of another detail of the container depicted in figure 1; and
Figure 4: a view similar to figure 3, in which a part of the container is tilted to another position.

As appears from figure 1, the container according to the present invention comprises a substantially cylindrical container 1 in its limited meaning which has been obtained for instance through high pressure molding of aluminium. At its upper rim the container is

connected with a lid 2 through a folding seam or another connection such as is known per se in the shape of cans for instance sodas. The lid or end wall 2 comprises a bulge towards the inner of the container in to which a valve 3 has been located. A supplied tube 4 is connected with the supply aperture of the valve. The supply tube 4
5 extends until close to the opposite site of the container 1. Thus the valve 3 is located in a recessed part of the lid or end wall 2, being a part of the container 1. Herein the valve 3 does not extend beyond the envelope of the container.

The valve comprises a connection element in the shape of a protruding tube 6. The
10 valve 3 is adapted to open when the tube 6 moves from its rest position. The tube 6 connects to a conducting tube 7 on a way which will be elucidated further on, and which, can be used as a drinking straw when the container 1 is used as a container for drinks. Drinks must be understood to comprise also liquid pharmaceuticals besides normal consumptions, and which can be dispensed on a hygienic way through the
15 container according to the invention.

Further the tube 6 is operable on a way later to be discussed by tilting the tilting element 8 located above the lid 2, a bit above the plane of the folding seam between the lid 2 and the holder 1.
20

Figure 2 shows a detailed view of a lid 2. This lid deviates from the lid 2 depicted in figure 1 by the fact that the lid has a staggered or stepped appearance. Further it appears from this depiction that the valve 3 has been located from locked in a deepening way provided in the lid 2. At its lower side the valve 3 comprises a spout 9, on to which the
25 supply tube 4 has been clamped. At its upper side the valve comprises a protruding tube 6, functioning as an operating element. The tube 6 extends through an aperture provided in the lid 2. The construction of the valve 3 known per se is such, but the valve is closed in the neutral position of the tube 6 depicted in figure 2. When moving to an oblique position of tube 6, the valve opens and the liquid being present in the container under
30 pressure emerges through the tube 6 to the outside.

Figures 3 and 4 show further details. At the upper side of the container 1 a structure has been provided in the shape of a ring 10 preferably made of plastic, which is preferably applied through form locking on the folding seam between the lid 2 and the container 1.

This ring is connected with a substantially round tilting element 12 through two material bridges 11, which element extends within the ring 10 in its restposition. The tilting element comprises a groove 13 extending substantially between the material bridges 11, which groove is adapted to absorb a connecting tube 14 which will be elucidated
5 further onwards.

At the lower side of the tilting element 12 a connecting element 15 has been connected rigidly through a form locking connecting, glueing or welding. The connecting element serves to transfer the movement of the tilting element 12 to the tube 6 functioning as
10 operating element of the valve 3. Therefore the connecting element 15 comprises a sleeve 16 engaging around the tube 6. Within the sleeve 16 a chamber 17 has been formed, in to which the tube 6 extends. During the tilting of the tilting element from its restposition to its tilted position, the coupling elements connected rigidly with the tilting element 12 will follow this tilting movement. Therefore the coupling element 15 will
15 move the tube 6 from its rest position with the help of its sleeve 16 so that the valve 3 is opened.

When the valve 3 is opened, the liquid present in the container will emerge through the tube 6 as a consequence of the action of the propelling gas present in the container 1.
20 The liquid enters the chamber 17. To avoid that the liquid between the sleeve 16 and the tube 6 leaves the chamber, a sealing ring 18 has been provided at the inner side of the sleeve 16. It is however also possible to provide such a sealing ring around the tube 6.

The connecting element 15 comprises further a channel 19 connected to the chamber
25 17. This channel 19 conducts to a spout 20 provided on to the connecting element. This spout extends through an aperture provided in the tilting element 12. The connecting tube 14 is with one of its ends fixed clampingly around the spout 20. Thus a throughgoing channel for liquid in the container is formed via the supply tube 4, the valve 3, the tube functioning as an operating element 6, the chamber 17, the channel 19,
30 and the spout 20 towards the conducting tube 14. The conducting tube 14 has been made of flexibel material. Therefore the tube can be both within the groove 13, and the maintenance of the clamping connection with the spout 20, but it is also possible that it extends itself in the extension of the spout 20. Because the conducting tube 14 has an oval outer cross section the conducting tube 14 is preferably flexed in the direction of

the groove 13. Through the relatively small diameter of the oval outer cross section in the preferred direction of flexing, the conducting tube 14 can be tacked away compactly within the groove 13 under the lid 23.

- 5 At its inner side above the tilting element 12, the ring 14 comprises a locking rim 22. Under this locking rim 22 a separate lid 23 in the shape of a plastic sheet can be located. Instead of plastic, the plate or sheet 23 could also be made of a foil, metal, card board or a composite laminate. When this lid 23 is present, the tilting of the tilting element 12, and the opening of the valve is thus avoided. Herein the lid functions as a seal of the
10 container 1. A second function of the lid 23 is keeping the conducting tube 14 on its location within the groove 13.

- The locking rim 22 has such a shape, that a lid 23 once applied, can easily be removed to open the container 1, or the operating of the valve 3, but to make it very difficult that
15 a lid 23 once removed, is relocated back. This avoids that an opened container 1 gets the appearance of a fresh container not opened yet. To improve this effect, a desintegratable sticker or seal can be applied over the lid 23 and the ring 10, or on a part of the container adjacent to the ring 10.

- 20 The position of several parts discussed above has not been detailed. Now it is assumed, that the valve 3 will be located in a central position in the lid 2. The channel will have to leave the chamber sideways, so that the spout 20 should be located away from the center of the lid 2. This has the advantage that the connection of the conducting channel 14 is excentric, so that the connecting channel 14 in its inactive position will have a
25 position in a straight line within the groove 13.

- It is however also possible to locate the valve 3 excentrically, and to locate the spout 20 for connection of the conducting 14 in a central position in the tilting element 12. Further it is also possible that the spout 20, on to which the conducting 14 is connected,
30 together with the valve 3, or located in the center of the tilting element 12.

Claims

1. Container for containing a liquid and a propelling gas, in which the container comprises a valve for expelling the liquid from the container through the propelling gas
5 during operating the valve, in which the valve comprises an operating element connected with the valve, and wherein the valve is adapted to be opened when the operating element is moved from its rest position, **characterized in that** a tilting element is connected tiltably around a single tilting axis with the container, that the tilting element is coupled mechanically with the operating element for moving the
10 operating element from its rest position during tilting of the tilting element.
2. Container as claimed in claim 1, **characterized in that** the tilting element is tiltably in two directions from its rest position, and that the connection between the tilting element and the operating element is adapted for bringing the operating element
15 from its rest position during tilting of the tilting element to either direction.
3. Container as claimed in claim 1 or 2, **characterized in that** the tilting element is connected to a structure connected rigidly with the container through two connection bridges extending in the tilting axis.
20
4. Container as claimed in claim 3, **characterized in that** the structure rigidly connected with the container is a ring connected with the container.
5. Container as claimed in claim 4, **characterized in that** the ring is connected
25 with the holder through a clamping connection which is releasable only with difficulty.
6. Container as claimed in claim 4 or 5, **characterized in that** the ring comprises clamping means for fixed clamping of a lid extending over the tilting element.
- 30 7. Container according to one of the preceedings claims, **characterized in that** between the tilting element and the connecting element a connection element has been located for connecting the tilting element with the connection element.

8. Container as claimed in claim 7, **characterized in that** the connecting element is connected rigidly with the tilting element.
9. Container as claimed in claim 7, **characterized in that** the connecting element
5 comprises a channel which is adapted to conduct the liquid expelling from the valve, that the connecting element comprises a cavity to which the connecting element leads and that a conducting tube connects to the cavity of the connecting element.
10. Container as claimed in claim 9, **characterized in that** between the operating
10 element and the connecting element a sealing member has been applied for sealing the aperture between the channel extending through the connecting element and the cavity in the connecting element.
11. Container as claimed in claim 9 or 10, **characterized in that** the conducting
15 tube extends through an aperture provided in the tilting element.
12. Container as claimed in claim 11, **characterized in that** the conducting tube is flexible.
- 20 13. Container as claimed in claim 12, **characterized in that** the conducting tube has been made of flexible material.
14. Container as claimed in claim 12 or 13, **characterized in that** the conducting
25 tube has an asymmetrical cross section.
15. Container as claimed in claim 14, **characterized in that** the conducting tube has an external oval cross section.
16. Container as claimed in claim 11-15, **characterized in that** the connecting
30 element comprises a spout on to which the conducting tube has been clamped.
17. Container as claimed in claim 16, **characterized in that** the spout extends in the direction of the operating element, and that in the outer surface of the tilting element a groove has been applied in to which the conducting tube can be moved.

18. Container as claimed in claim 17, **characterized in that** the groove extends between the connecting bridges.
- 5 19. Container as claimed in claim 17, **characterized in that** the cross section of the conducting tube in the direction of the groove is greater than in the direction perpendicular to the groove.
- 10 20. Container as claimed in any of the preceeding claims, **characterized in that** at least one of the following parts: the tilting element, the stucture connected with the container, the lid, the connecting element and the conducting tube has been made of plastic.
- 15 21. Container as claimed in any of the preceding claims, **characterized in that** the valve is located in a part of the wall of the container which forms a recess relative to the envelope of the container.
- 20 22. Container as claimed in claim 21, **characterized in that** the container comprises a wall part which is separated from the remainder of the container by a closed line located in a flat surface, and that the wall part comprises a recessed part in which the valve has been located.
- 25 23. Container as claimed in claim 22, **characterized in that** the container has a substantially cylindrical shape, and that the valve is located in an end wall of the container.
- 30 24. Container as claimed in any of the claims 21-23, **characterized in that** the part of the valve located outside the wall part only extends within the space between the flat surface and the wall part.
25. Container according to any of the preceeding claims, **characterized in that** the container has been adapter to be filled with a liquid suitable for human consumption.

26. Container as claimed in claim 25, **characterized in that** the container has been filled with a liquid suitable for human consumption.

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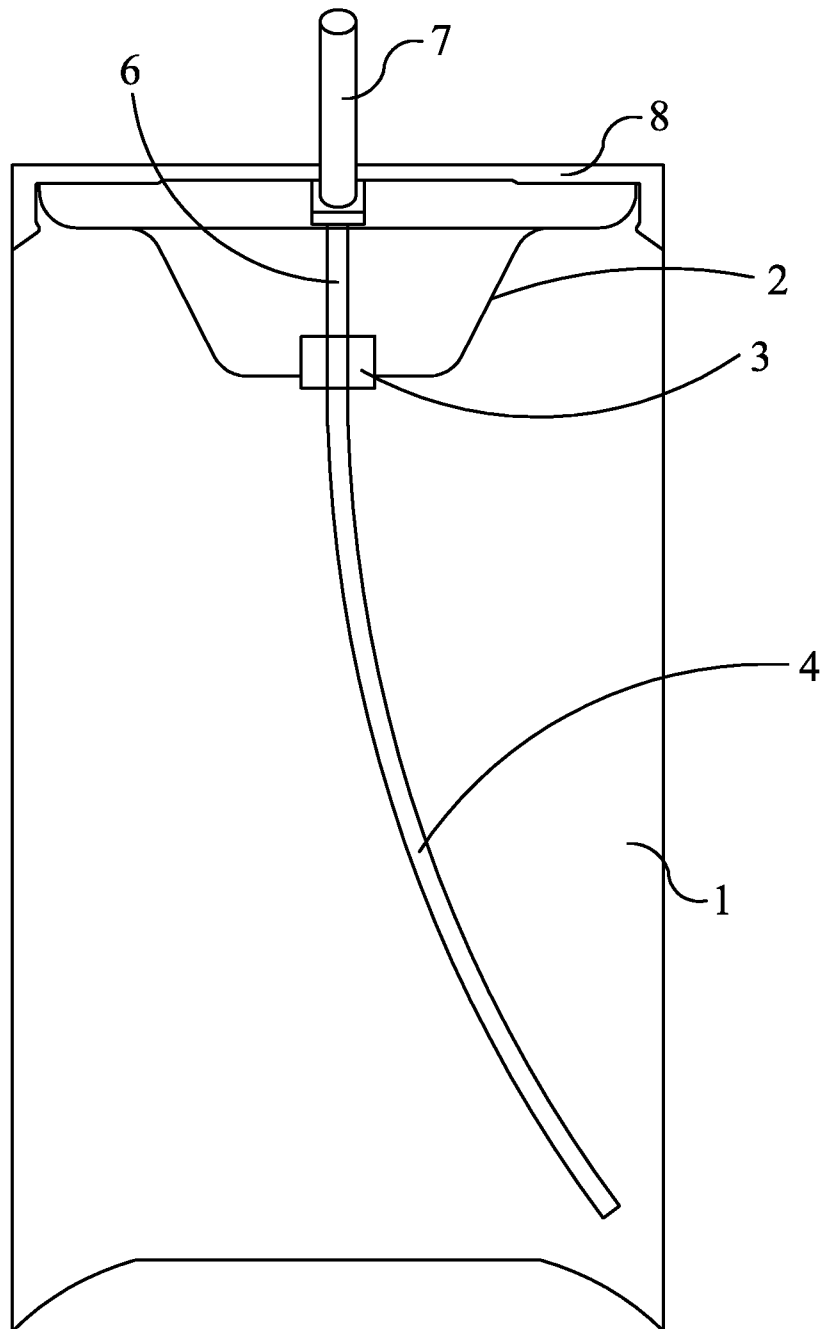


FIG. 1

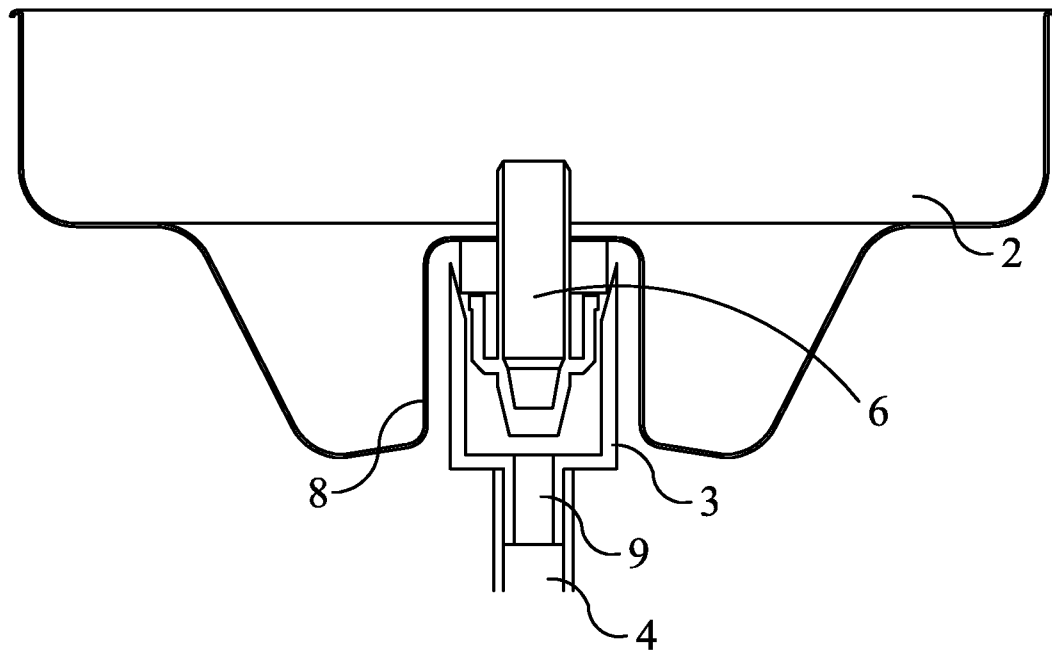


FIG. 2

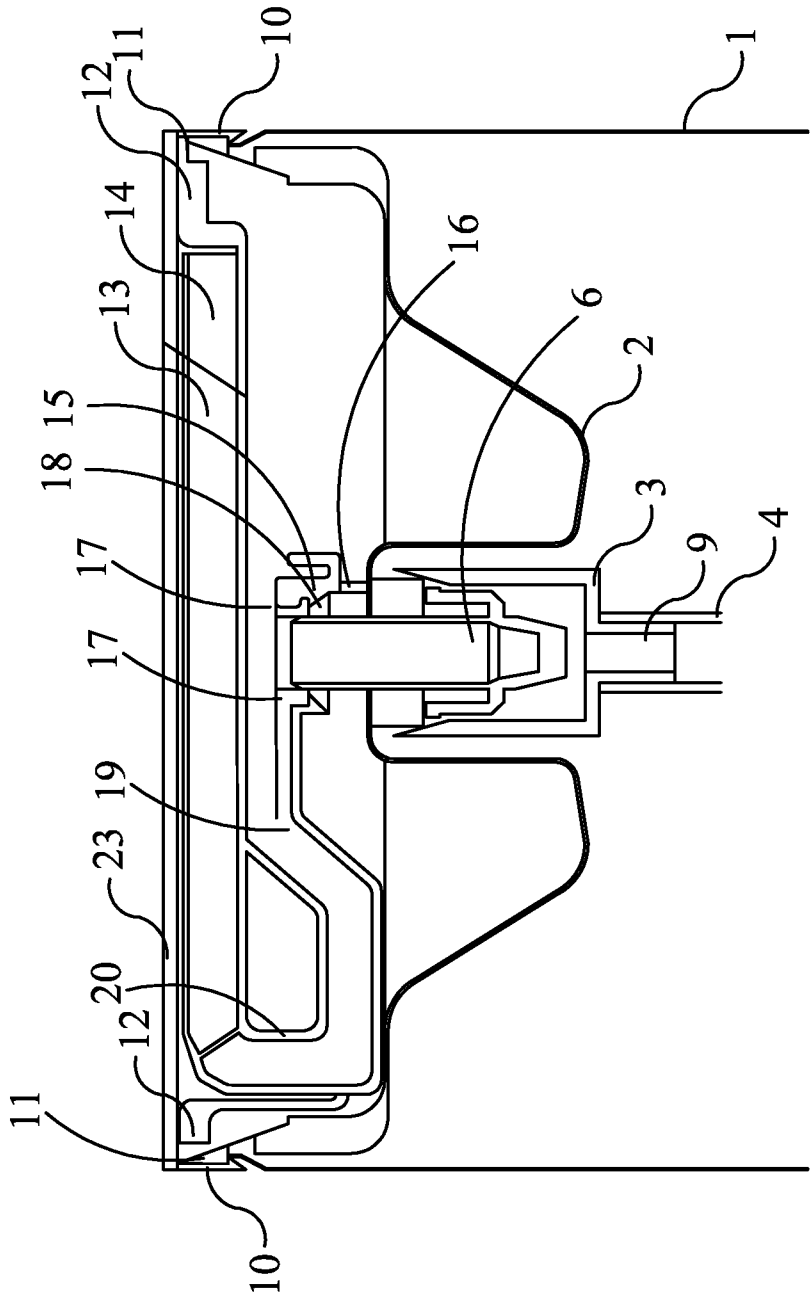


FIG. 3

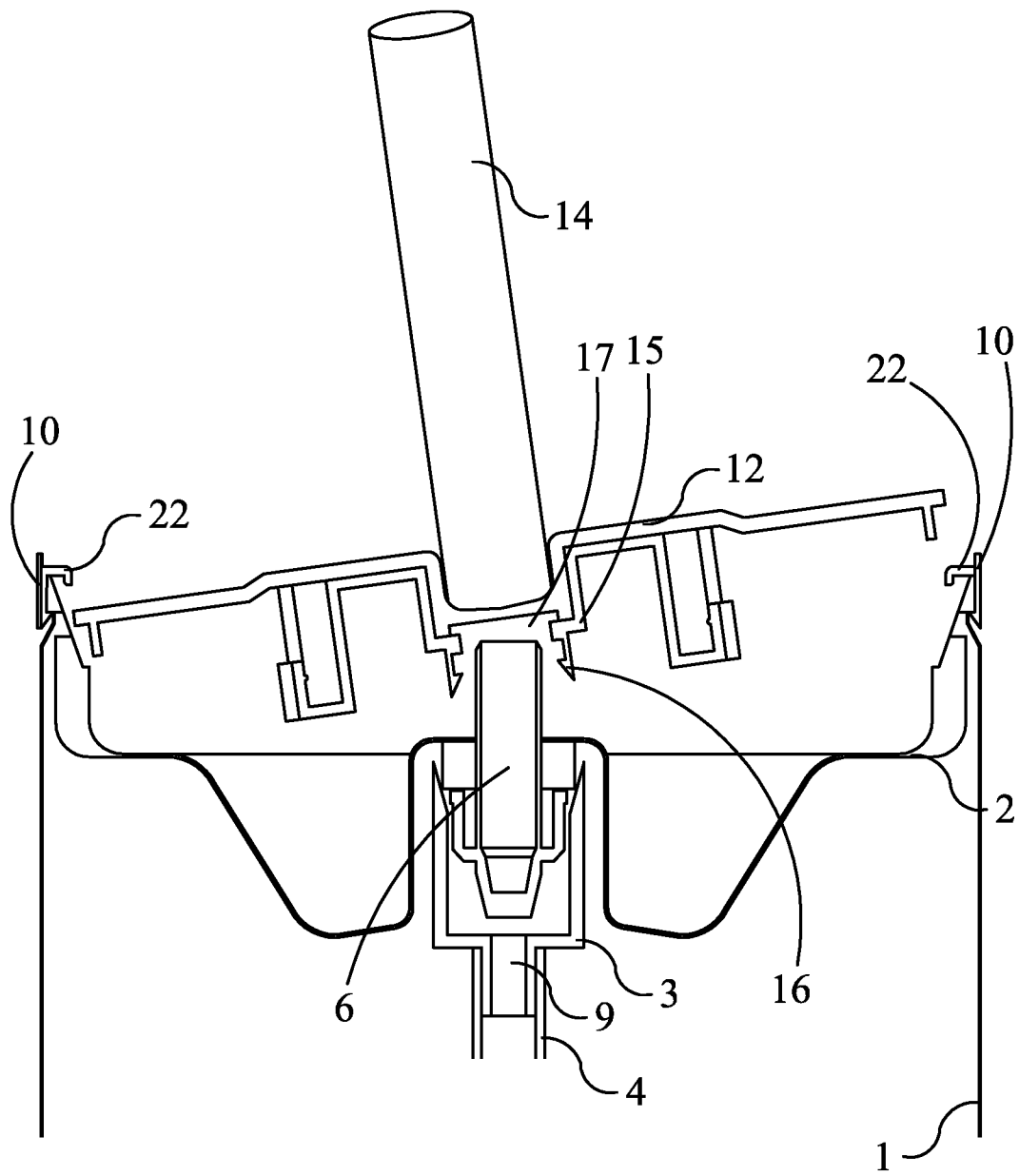


FIG. 4