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(54) Title: DEVICE FOR DOSED DISPENSING OF A LIQUID FROM A COMPOSITE CONTAINER AND METHOD FOR FILLING SUCH A CONTAINER WITH LIQUID

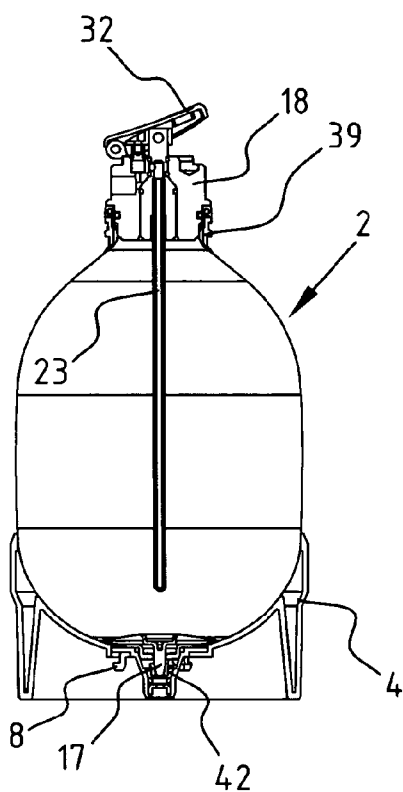


FIG. 20

(57) Abstract: The invention relates to a device for dosed dispensing of a liquid, comprising a composite container which consists of a flexible inner container, in which the liquid is received, and a form-retaining outer container in which the inner container is fixed. The device further comprises a tap unit which is connected to the composite container and which comprises an outflow channel and a valve accommodated therein. The inner container has a dispensing opening and the outer container is provided with a neck enclosing the dispensing opening. The inner container is connected to the outer container at the position of the dispensing opening and at a location remote from the dispensing opening. The outer container further has an opening for admitting a displacing medium at a location remote from the neck. The tap unit is accommodated sealingly in the dispensing opening of the inner container. The invention further relates to a method for filling a composite container to be used in such a dispensing device with a liquid.



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DEVICE FOR DOSED DISPENSING OF A LIQUID FROM A COMPOSITE
CONTAINER AND METHOD FOR FILLING SUCH A CONTAINER WITH
LIQUID

5 The invention relates to a device for dosed
dispensing of a liquid from a composite container. It is
possible here to envisage the liquid as a drink, in
particular a carbonated drink, such as for instance beer.

 Various devices are already known with which
10 carbonated drinks such as beer can be dosed. As an
alternative to visiting catering establishments, where beer
is tapped using professional installations, the use of home
tap installations has increased greatly in recent years.
Most known home tap installations are relatively complicated
15 and thus expensive, in particular because they are provided
with their own cooling.

 In addition, simple tap mechanisms are known which
can be connected to small kegs for home use. However, these
kegs have to be kept in a refrigerator, usually in a lying
20 position. Then the keg has to be taken out of the
refrigerator for every use, because the conventional tap
mechanism cannot empty a lying keg.

 And finally, most prior art home tap systems
suffer from problems with respect to "dripping". After
25 tapping a glass of beer some liquid will remain in the
outflow channel and these remains will gradually be
released, causing dripping. Since home tap systems are
usually kept on a kitchen working top or in a refrigerator,
such dripping leads to stains and is a nuisance. Moreover,
30 liquid remaining in the outflow channel may eventually
decay, giving rise to mould or bacteria.

 The invention has for its object to provide an
improved and simplified device for dosed dispensing of

liquids, in particular carbonated drinks. This object is achieved with a device as described in claim 1. Preferred embodiments of the device form the subject-matter of dependent claims 2-16.

5 In addition, the invention relates to a method for filling with a liquid a composite container which can be used in a device of the above described type. The filling of conventional kegs with a liquid, in particular a carbonated liquid, often entails problems. The invention therefore has
10 the further object of providing an improved method for filling containers with liquid. According to the invention this object is achieved with a method as described in claim 17. Preferably applied variants of the method according to the invention are described in dependent claims 18 and 19.

15 The invention is elucidated on the basis of some embodiments, wherein reference is made to the accompanying drawing, in which corresponding parts are identified by reference numerals that are increased by "100", and in which:

20 Fig. 1 shows a perspective view of the device according to a first embodiment of the invention in assembled situation,

 Fig. 2 shows schematically how a container with tap unit is mounted on a pressure unit,

25 Fig. 3 shows a partly cut-away perspective view of the pressure unit of fig. 2,

 Fig. 4 shows a cross-sectional perspective view of the upper part of the container and the tap unit mounted thereon,

30 Fig. 5 shows a longitudinal cross-section of the upper part of the container and the tap unit mounted thereon in the rest position,

Fig. 6 is a view corresponding with fig. 5 during tapping,

Fig. 7 is a cross-section along line VII-VII in fig. 6 of an alternative embodiment of the tap unit,

5 Fig. 8-10 show different steps of the pre-forming of a composite container for use in the device,

Fig. 11 shows the composite container after it is been inflated to its final form,

10 Fig. 12 shows the connection of a source of displacing medium to the admitting opening of the container,

Fig. 13-19 show different steps of the filling of the container,

Fig. 20 show the container in the filled situation, ready for use,

15 Fig. 21A is a longitudinal cross-section through the upper part of a container and a tap unit according to an alternative embodiment of the invention in its ready-to-use position,

20 Fig. 21B is an enlarged scale cross-sectional detailed view of part of the outflow channel and the outflow valve in the position of Fig. 21A,

Fig. 22A and 22B are views corresponding to fig. 21A and 21B of the container and tap unit at the start of tapping, just before the outflow valve is opened,

25 Fig. 23A and 23B are views corresponding to fig. 21A and 21B of the container and tap unit during tapping, when the outflow valve is opened but the aerating valve is closed, and

30 Fig. 24A and 24B are views corresponding to fig. 21A and 21B of the container and tap unit during blowing out of the outflow channel after tapping, when the outflow valve is closed and the aerating valve is opened.

A device 1 for dosed dispensing of a liquid comprises a composite container 2 and a tap unit 3 connected thereto. Arranged on the top side of container 2 is a ring 4 which defines two handles 5 and in which tap unit 3 is received. Likewise arranged on the underside of container 2 is a ring 6, which functions as base during storage and transport of container 2. Container 2 is further provided on its underside with means by means of which it can be releasably connected to a pressure unit 7, for instance in the form of protrusions 8 which form a bayonet connection with recesses 9 in the top side of pressure unit 7.

Pressure unit 7 comprises a pump 10 which is driven by an electric motor 11. This motor 11 is powered by a number of batteries 12, in the shown example four AA batteries, each of 1.5 V. Pressure unit 7 is further provided with control means which are connected to electric motor 11 of pump 10 and which are connected for signal receiving to means for detecting the pressure in container 2. In the shown example the control means and the pressure detecting means are formed together by a so-called pressostat 13. This pressostat is set to a value such that the pressure in container 2 is always higher than the saturation pressure of a gas dissolved in the liquid, for instance carbon dioxide. The gas hereby remains in solution and the liquid retains its taste and character. Pump 10 is connected via a conduit (not shown here) to an air inlet 14, which is in turn connected to a connecting opening 15 in the centre of pressure unit 7. This connecting opening 15, which is enclosed by a gasket 16, can be connected to an admitting opening 17 of container 2 to be described hereinbelow.

Tap unit 3 comprises a stopper body 18 which can be placed sealingly in a dispensing opening 28 of container 2 using an annular gasket 27. Defined in this stopper body

18 is a vertically running central opening 19 in which a valve 20 can be moved up and downward. Central opening 19 has two cylindrical parts 19A and 19B which are connected by a conically tapering part 19C. Valve 20 has a similar form and is provided with three gasket rings 21A-21C. Formed in valve 20 is a vertical bore 22, to which is connected a rigid and straight dip tube 23. Lying transversely of this vertical bore is a second bore 24 which defines the outflow part of valve 20.

Likewise formed in stopper body 18 is a horizontal opening 25 in which an outflow channel 26 is received. This horizontal opening 25 is placed into connection with second bore 24 of valve 20 when valve 20 is moved to its open position (fig. 6). Further formed in stopper body 18 is a second vertical opening 29 which debouches into the upper side thereof and which forms an aerating opening. Aerating of outflow channel 26 prevents liquid remaining therein due to an underpressure after closing valve 20 at the end of tapping, which could result in decay. Received in this aerating opening 29 is a valve 30 which must be operated in a determined sequence with valve 20. For this purpose the two valves 20, 30 are mutually connected to form a unit, which is pivotally connected via a shaft 31 to a shared operating member 32, which is in turn pivotally connected to ring 4 via a shaft 33. Finally, recesses 34, 35 are also formed both in operating member 32 and in stopper body 18, between which recesses a resetting spring (not shown) can be tensioned.

In an alternative embodiment (fig. 7) the second bore 24 is otherwise oriented in opposite direction to outflow channel 26, and bore 24 is connected to this channel 26 by an annular conduit 36 around valve 20. In this way the outflow of liquid from container 2 is guided better and

excessive foam formation is prevented when the liquid in container 2 is under pressure and comprises carbon dioxide or another gas dissolved therein.

Container 2 is a composite container which
5 consists of a flexible inner container 37 and a form-retaining outer container 38. The term 'form-retaining' is intended to denote that the outer container 38 is stable and does not deform to any considerable degree under the loads encountered during normal use. Inner container 37 can for
10 instance be made of a relatively soft plastic such as PP, while a harder plastic, such as for instance PET, can be chosen for outer container 38. The difference in stiffness between inner container 37 and outer container 38 can also be achieved using different material thicknesses when the
15 materials are per se the same or at least related. Inner container 37 and outer container 38 can be pre-formed by means of injection-moulding and then be inflated to their final form. Inner container 37 and outer container 38 can be connected to each other in different ways.

20 In the shown example inner container 37 is connected at the position of its dispensing opening 28 to a neck 39 of the outer container, while in addition at least one other connection is formed between the two containers 37, 38 at a location remote from dispensing opening 28. In
25 the shown example this is a mechanical connection. Inner container 37 and outer container 38 are here injection-moulded separately and the one is then inserted into the other (fig. 8). A tip-shaped connecting member 41 of inner container 37 herein protrudes through admitting opening 17
30 of outer container 38 while leaving free a narrow annular gap 46.

A cap 40 is then placed over this tip-shaped connecting member 41 (fig. 9) and attached thereto by means

of spin welding (fig. 10). Cap 40 forms part of a valve 42 for displacing medium, which is described in more detail in the non pre-published Netherlands patent application 1034419 of applicant, the content of which should be deemed as included herein. When inner container 37 and outer container 38 are thus connected to each other, they can be inflated to their final form, in which the remainder of valve 42 and ring 6 are also mounted.

The connection by means of the tip-shaped connecting member 41 and the spin welded cap 40 is strong enough to withstand the loads to which the inner and outer containers 37, 38 are subjected by the introduction of a pressurized displacing medium.

In an alternative embodiment of the tap unit 103 (fig. 21) the outflow channel 126 has a dispensing part 147, which in the illustrated embodiment is connected by a ball joint 148 to a horizontal part 149, which in turn is clamped into a widened part 150 of a bend 151. This bend 151 forms part of a knob 152 that is snapped onto a stepped cylindrical aerating valve 130.

The vertical part of the bend 151 extends into an inner wall 153 of the aerating valve 130, in which also the outflow valve 120 is fixed. The outflow valve 120 is also formed as a stepped cylinder, and has a T-shaped channel 154 of which one leg runs axially through the narrow part of the valve 120, while the other leg runs transversely through the wider part of the valve 120 and debouches in the periphery thereof at both sides.

The outflow valve 120 and the aerating valve 130 are jointly slidable in a two-part housing 155, of which an inner and lower part 156 is suspended in the container neck 139, while an outer and upper part 157 is fixed to the neck 139 by connecting means 158. The aerating valve 130 has two

gasket rings 159A, 159B that cooperate with an inner wall 160 of the upper house part 157 and an outer wall 161 of the lower house part 156, respectively. The outflow valve 120 has three gasket rings 121A-121C that cooperate with the various parts of a stepped inner wall 162 of the inner house part 156.

The inner house part 156 is arranged in a tray 163 which is also suspended in the container neck 139. This tray 163 has an opening 164 in its bottom, which is connected to the interior of the container 102. At the bottom of the tray 126 a dip tube 123 is fixed for transporting liquid from the bottom of the container 102 to the tap unit 103.

The tap unit 103 may be operated by means of a handle 132 that is pivotable about a horizontal shaft 133 at the top of the upper house part 157. This handle 132 has an engaging part 165 that pushes the knob 152 when the handle 132 pivots around its shaft 133. The handle 134 further comprises two arms 166 which engage an edge of the knob 152 from below when the handle 132 is in its position of rest. In this way movement of the knob 152 is blocked.

The aerating valve 130 is arranged to connect the outflow channel 126 with the displacing medium that is present in the space R between the inner and outer containers 137, 138 after the outflow valve 120 has been closed. To this end the tap unit 103 includes an intermediate chamber 167 that is bordered by the aerating valve 130 and the inner house part 156. This intermediate chamber 167 is connected to the space R when the outflow valve 120 is opened (fig. 23), and is connected to the outflow channel 126 when the outflow valve 120 is closed (fig. 24). In this way a limited amount of the displacing medium is led to the outflow channel 126.

The connection between the space R and the intermediate chamber 167 is formed by a channel 168 that is defined in the neck 139 of the outer container 138, a space between the neck 139 of the outer container 138 and a neck 5 169 of the inner container 137, a plurality of openings 170 in the inner container neck 169, a corresponding plurality of openings 171 in the lower house part 156, and a gap between the lower and upper house parts 156, 157. The connection is opened as soon as the lowermost gasket ring 10 159B of the aerating valve 130 is released from a thickened part 172 of the outer wall 161 of the inner house part 156, after which the intermediate chamber 167 is filled with displacing medium.

The connection between the intermediate chamber 15 167 and the outflow channel 126 is formed by a plurality of openings 173 in the inner wall 162 of the inner house part 156, which debouches in a somewhat widened part of that wall, and by the T-shaped channel 154. This connection is opened as soon as the central gasket ring 121B of the 20 outflow valve 120 reaches this widened part of the inner wall 162, after which the displacing medium can flow from the intermediate chamber 167 through the outflow channel 126 to the surrounding area. Any liquid remaining in the outflow channel 126 is thus blown out. Since aerating of the outflow 25 channel 126 takes place immediately after tapping, a glass will still be under the outflow channel 126, so that the remaining liquid being blown out is caught in the glass.

In order to fill container 2 a source of displacing medium under pressure, for instance compressed 30 air, is first connected to valve 42 by means of a nipple 43 (fig. 12). The air is then pressed through annular gap 46 into space R between inner container 37 and outer container 38, whereby inner container 37 is almost completely

compressed (fig. 13). Only the somewhat thickened bottom of inner container 37 around pin 41 retains its form. A filling conduit 44 with a nozzle 45 is then placed in dispensing opening 28 (fig. 14) and liquid is injected into inner container 37 via this conduit 44 (fig. 15, 16). The air is here pressed out of space R and leaves container 2 via admitting opening 17. By holding the pressure of the air in space R above the saturation pressure of the gas dissolved in the liquid it is possible to prevent the formation of foam during filling.

When inner container 37 is completely filled (fig. 17) the filling conduit 44 is detached (fig. 18) and inner container 37 is sealed by fastening stopper body 18 of tap unit 3 into dispensing opening 28 (fig. 19). The remaining components of tap unit 3 and ring 4 can then be mounted on container 2, after which it is ready for use.

Container 2 with tap unit 3 can otherwise be used not only for carbonated drinks, but also for other drinks where it is important that the content is not exposed to the environment, such as for instance wine or fruit juices. It is of course possible here to dispense with the use of pressure unit 7, and ambient air can easily be admitted into space R between inner container 37 and outer container 38 when the liquid is poured out.

The invention thus provides a structurally simple device for dosed dispensing of liquids, in particular carbonated liquids and/or liquids under pressure, the container of which is easy to replace. Ageing of the liquid can moreover be prevented due to the construction of the composite container, while it can also be kept under pressure in simple manner, among other reasons in order to prevent escape of gas dissolved therein. The connection between the inner and outer containers at a second location,

in addition to their connection at the container neck,
prevents the inner container from being crumpled up near the
dispensing opening and trapping part of the liquid. In
combination with the displacing medium, which keeps the
5 liquid in the inner container under uniform pressure from
all sides, this allows the inner container to be emptied
completely. Aeration of the outflow channel, either by
ambient air or using part of the displacing medium, keeps
the outflow channel clean and prevents dripping. And
10 finally, the container is easy to fill.

Although the invention is elucidated above with
reference to an embodiment, it will be apparent that it is
not limited thereto. The scope of the invention is defined
by the following claims.

Claims

1. Device for dosed dispensing of a liquid,
comprising a composite container which consists of a
5 flexible inner container, in which the liquid is received,
and a form-retaining outer container in which the inner
container is fixed, and a tap unit which is connected to the
composite container and which comprises at least one outflow
channel and a valve accommodated therein,

10 wherein the inner container has a dispensing
opening and the outer container is provided with a neck
enclosing the dispensing opening,

wherein the inner container is connected to the
outer container at the position of the dispensing opening
15 and at least at one location remote from the dispensing
opening,

wherein the outer container has at least one
opening for admitting a displacing medium at a location
remote from the neck, and

20 wherein the tap unit is accommodated sealingly in
the dispensing opening of the inner container.

2. Device as claimed in claim 1, **characterized in**
that the inner container is connected to the outer container
at the location of the admitting opening.

25 3. Device as claimed in claim 2, **characterized in**
that the inner container is connected to the outer container
by means of a connecting element protruding through the
admitting opening.

30 4. Device as claimed in any of the foregoing
claims, **characterized by** a unit connected to the admitting
opening of the outer container for the purpose of
pressurizing the displacing medium.

5. Device as claimed in claim 4, **characterized in that** the pressure unit comprises a motor-driven pump.

6. Device as claimed in claim 5, **characterized in that** the drive of the pump is a battery-powered electric
5 motor.

7. Device as claimed in claim 5 or 6,
characterized by control means which are connected to the drive of the pump and which are connected for signal receiving to means for detecting the pressure in the inner
10 container.

8. Device as claimed in any of the claims 4-7,
characterized in that the pressure unit is connected releasably to the outer container.

9. Device as claimed in any of the foregoing
15 claims, **characterized in that** the tap unit comprises a stopper body to be received in the dispensing opening and which is provided with a central opening in which the valve is received, and the outflow channel extends substantially transversely of the central opening.

20 10. Device as claimed in claim 9, **characterized by** a stiff dip tube connected to the central opening and extending over a considerable length in the inner container.

11. Device as claimed in any of the foregoing claims, **characterized in that** the tap unit has an aerating
25 opening connected to the outflow channel and closable by a valve.

12. Device as claimed in claim 11, **characterized in that** the aerating valve and the outflow valve can be operated in a determined sequence.

30 13. Device as claimed in claim 12, **characterized by** a shared operating member co-acting with the aerating valve and the outflow valve.

14. Device as claimed in any of claims 11-13,
characterized in that the aerating opening communicates with
ambient air.

15. Device as claimed in any of claims 11-13,
5 **characterized in that** the aerating opening communicates with
the displacing medium.

16. Device as claimed in claim 15, **characterized**
by an intermediate chamber that is connected with the space
between the inner and outer containers when the outflow
10 valve is opened and that is connected with the outflow
channel when the outflow valve is closed.

17. Method for filling a composite container with
a liquid, in particular a composite container for use in the
device as claimed in any of the foregoing claims, comprising
15 the steps of:

connecting the admitting opening of the outer
container to a source of displacing medium,

filling a space defined between the inner
container and the outer container with displacing medium,

20 connecting a filling conduit for the liquid onto
the dispensing opening of the inner container,

injecting the liquid through the dispensing
opening into the inner container, wherein the displacing
medium is urged out of the outer container through the
25 admitting opening,

releasing the filling conduit from dispensing
opening when the inner container has been sufficiently
filled, and

30 closing the dispensing opening by arranging a tap
unit therein.

18. Method as claimed in claim 17, **characterized**
in that the displacing medium is introduced into the space
between the inner container and the outer container under a

pressure adapted to the pressure at which the liquid is injected into the inner container through the filling conduit.

19. Method as claimed in claim 18, **characterized**
5 **in that** the liquid comprises a gas dissolved therein, and the pressure at which the displacing medium is introduced into the space between the inner container and the outer container is set to be higher than the saturation pressure of the gas in the liquid.

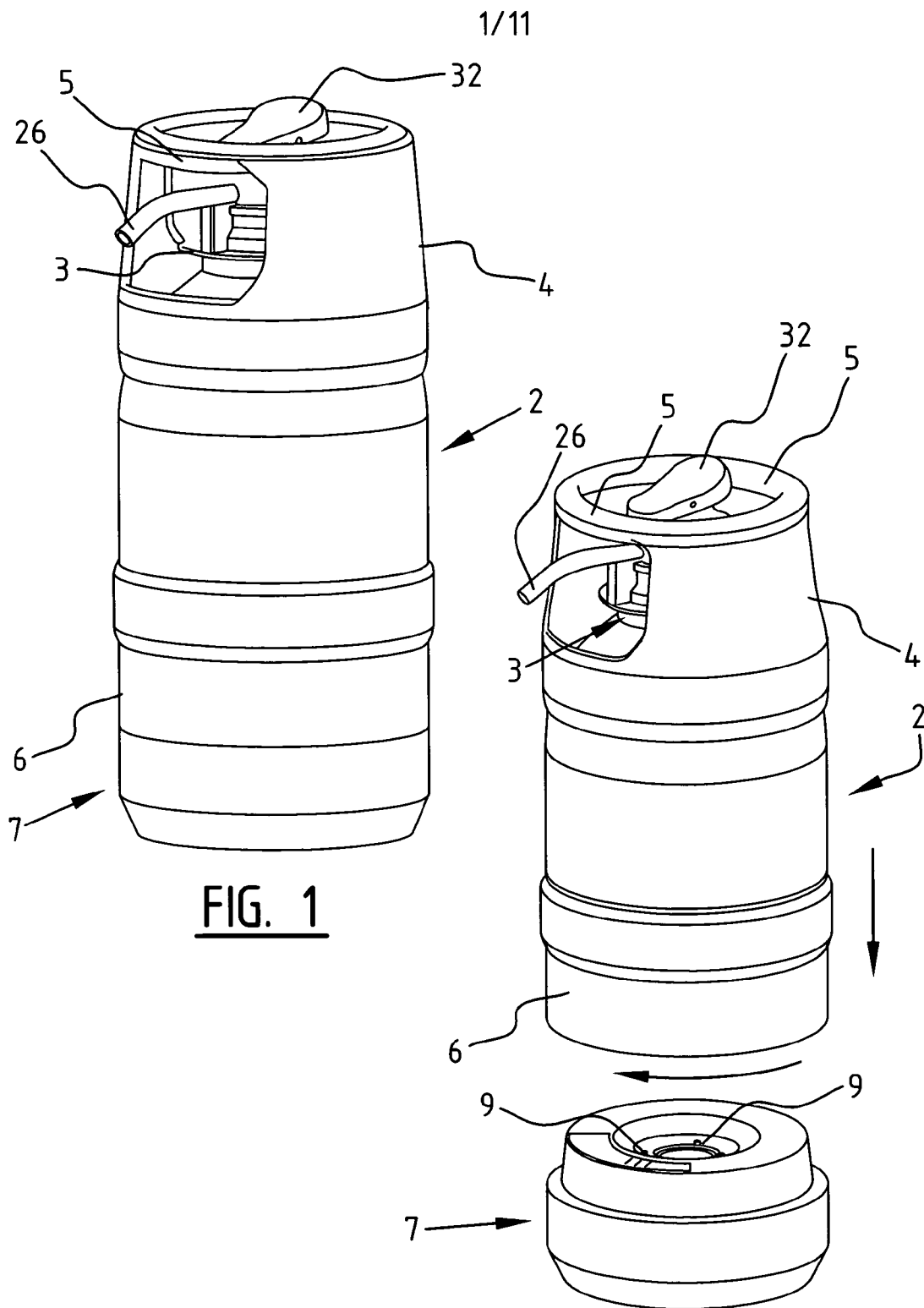
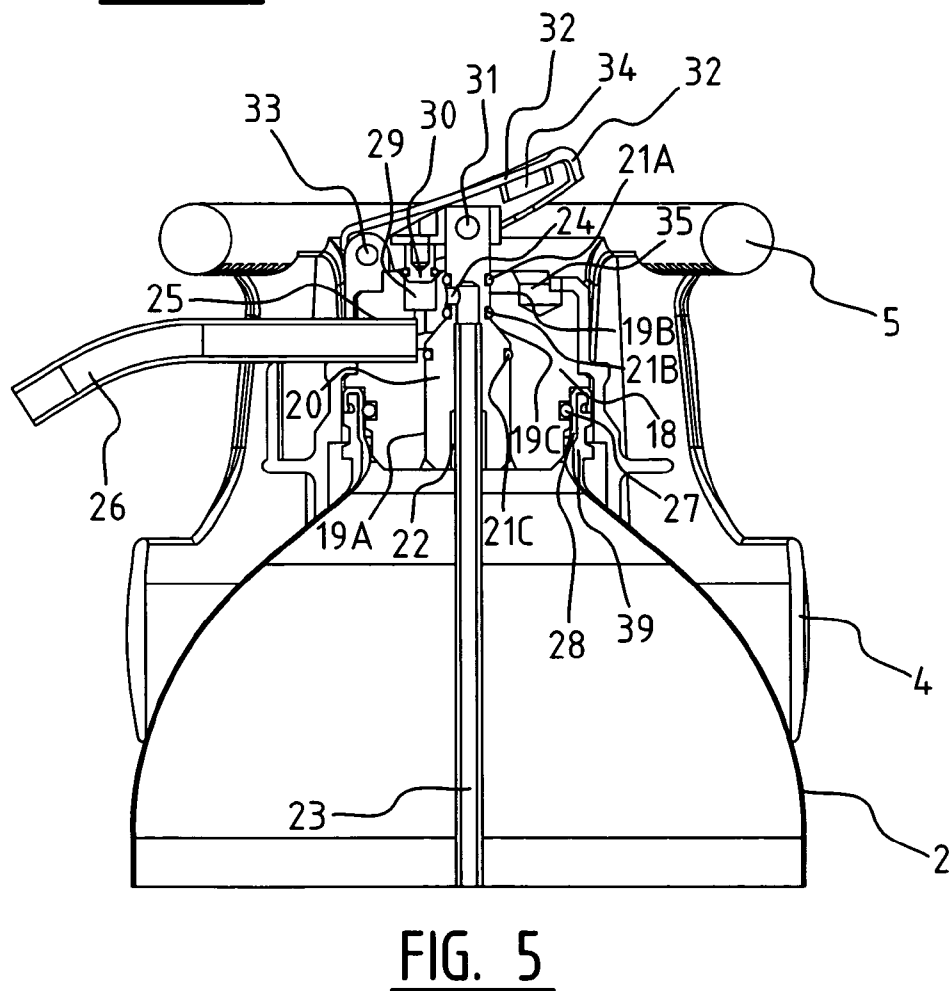
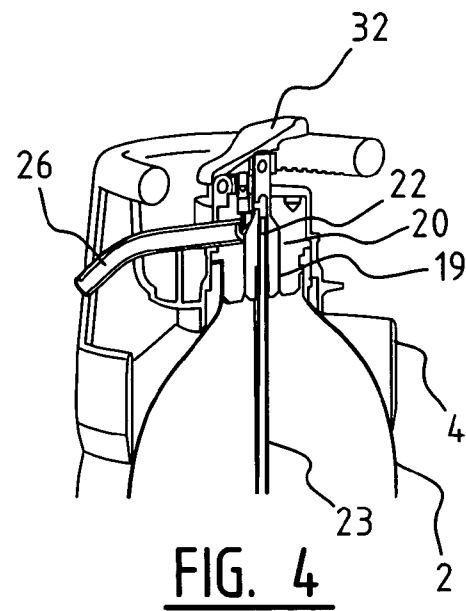
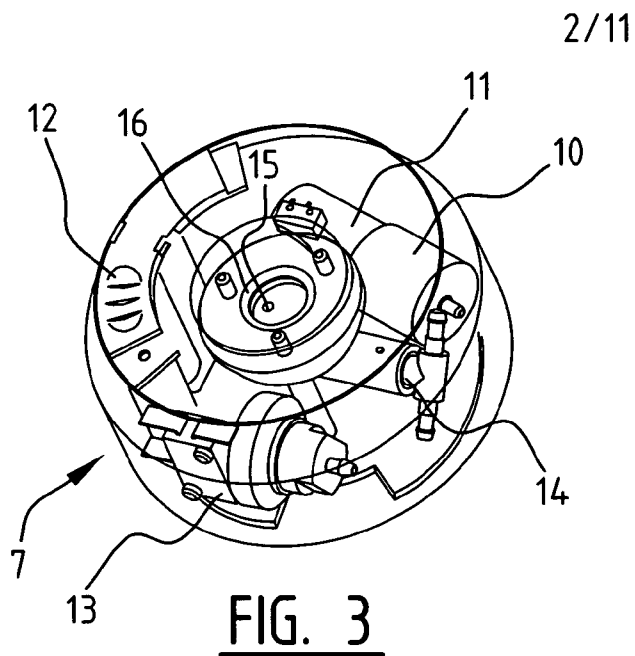
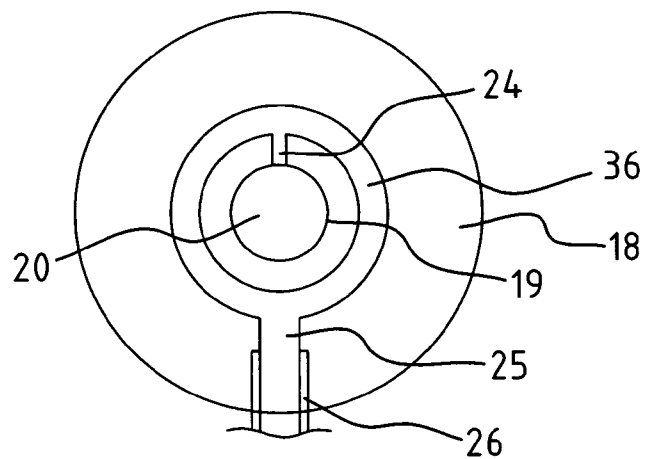
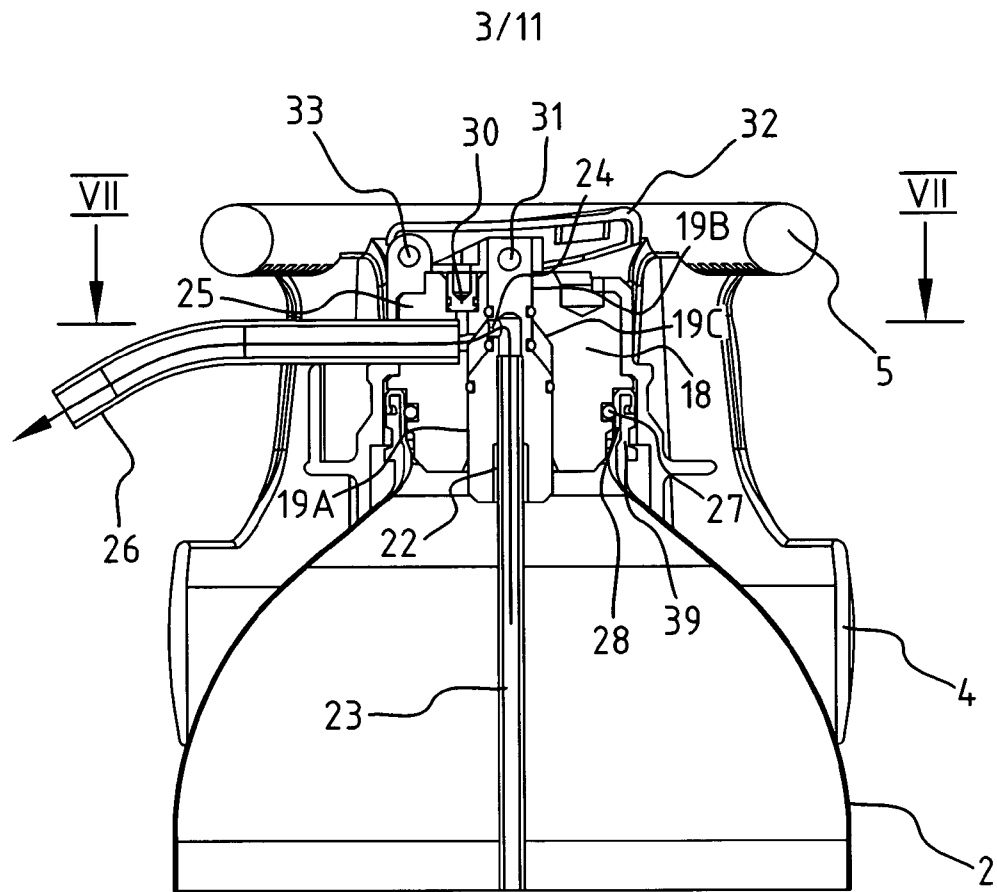


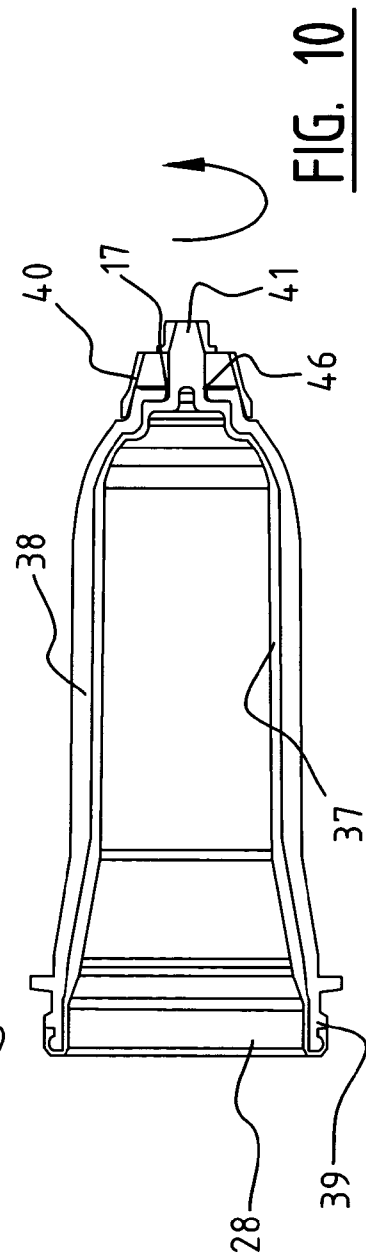
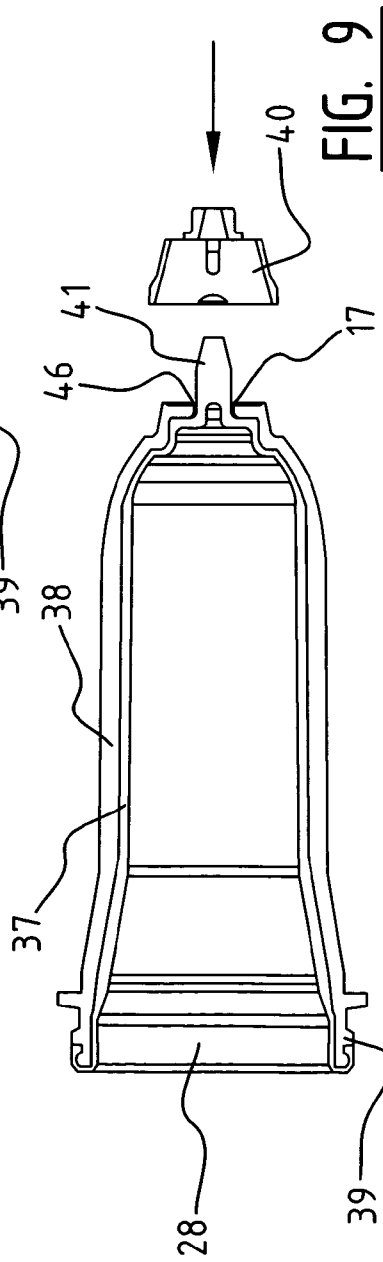
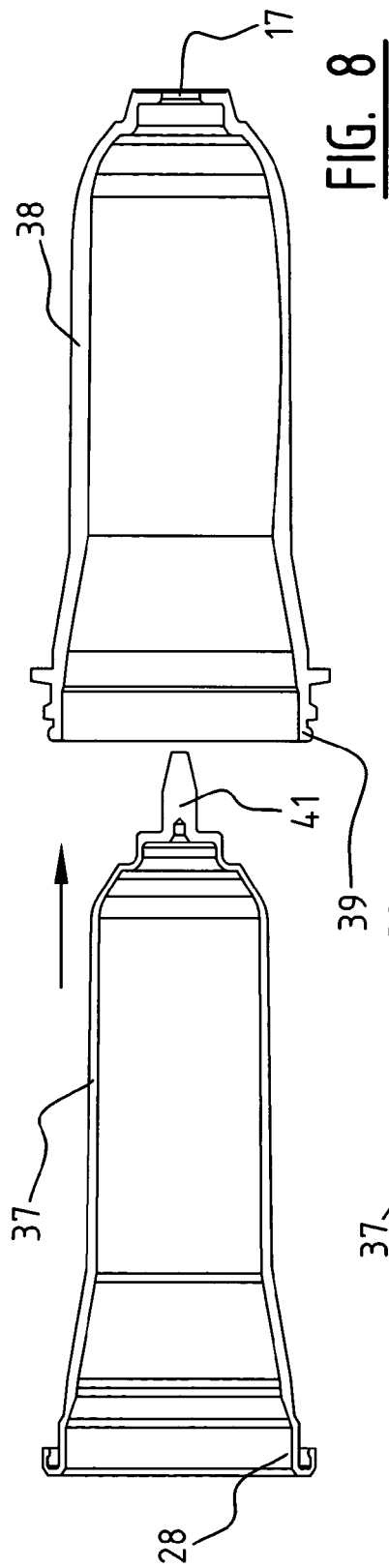
FIG. 1

FIG. 2

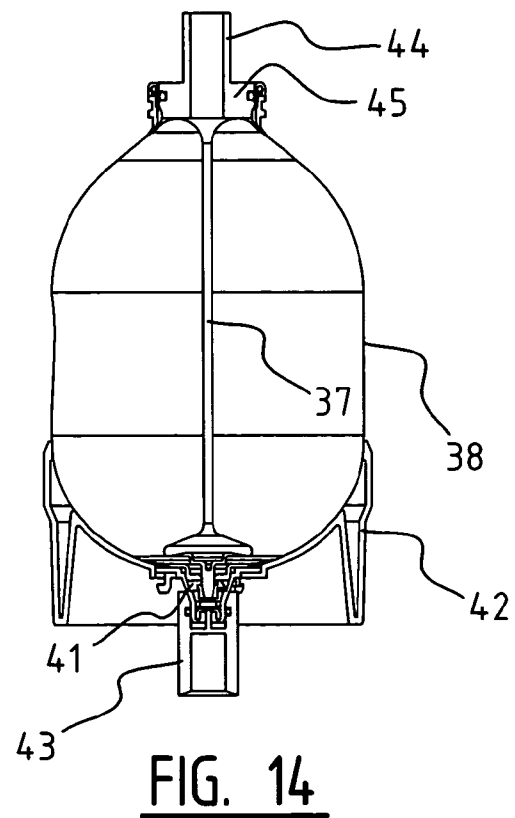
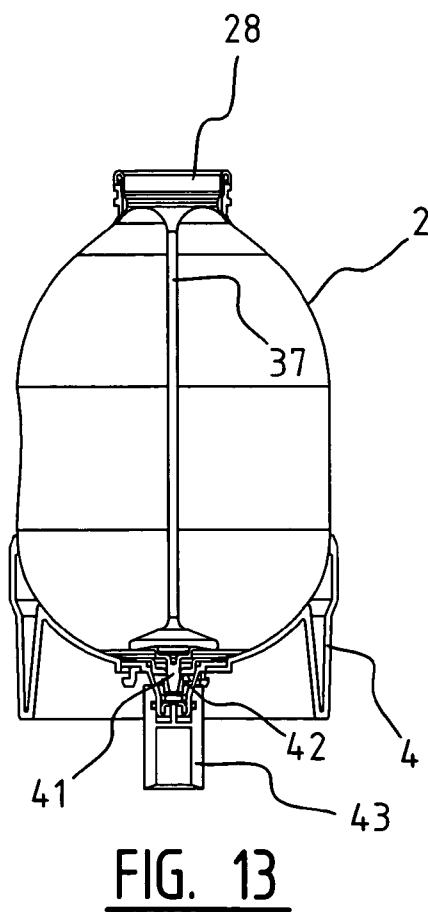
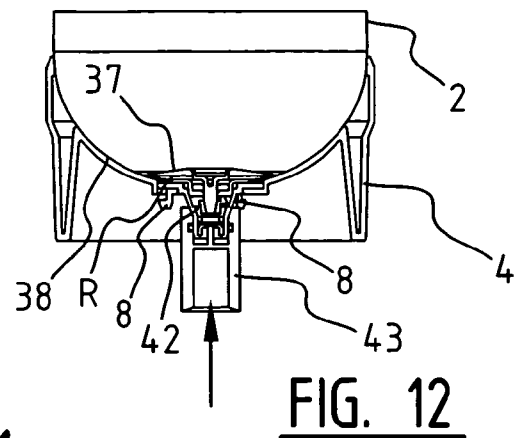
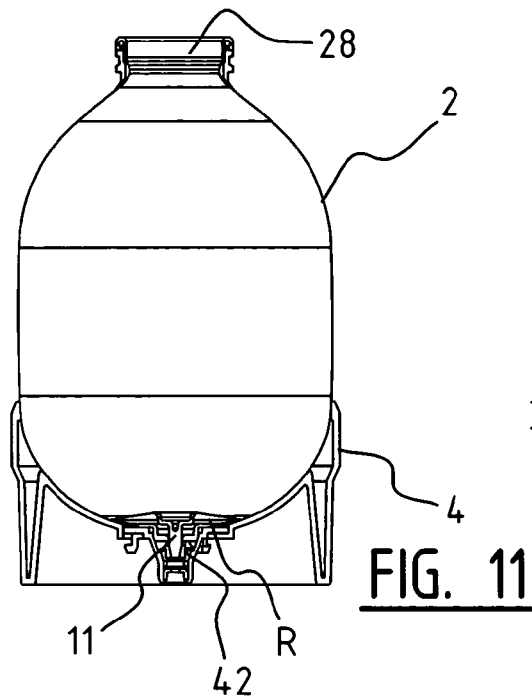




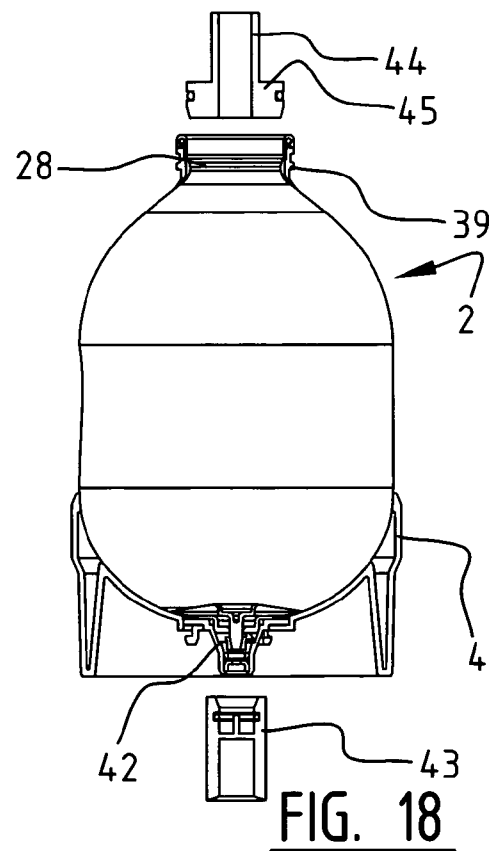
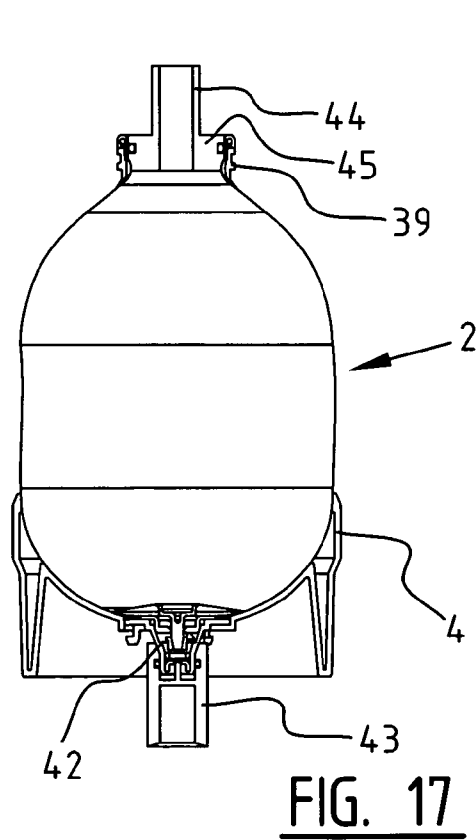
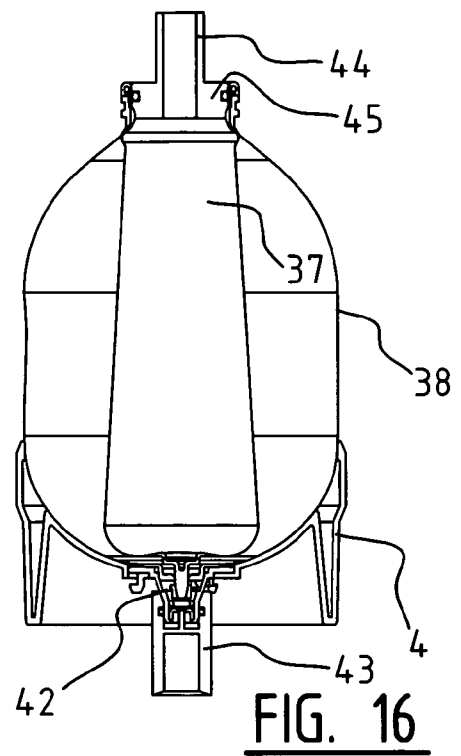
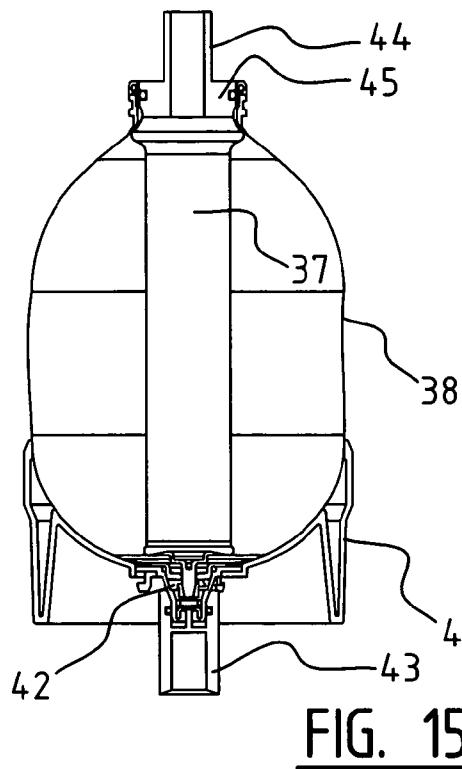
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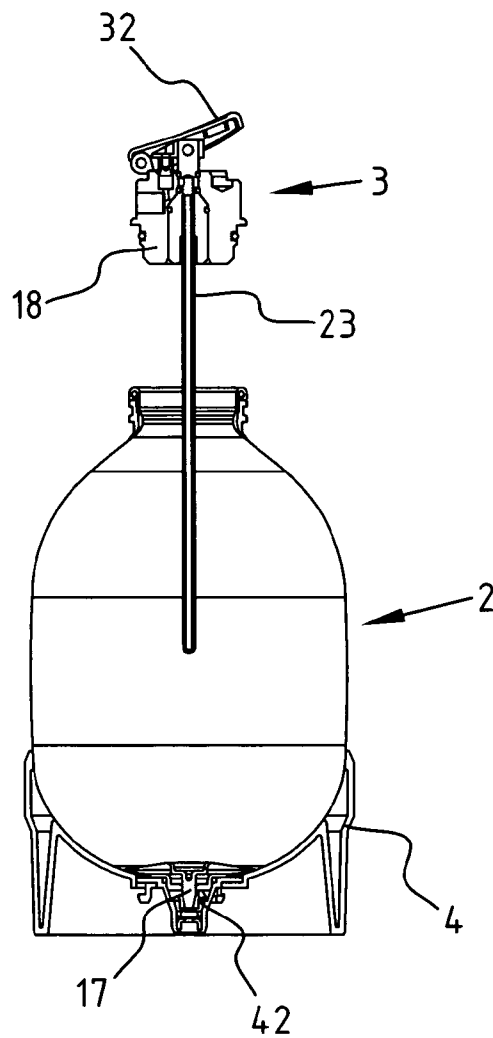


FIG. 19

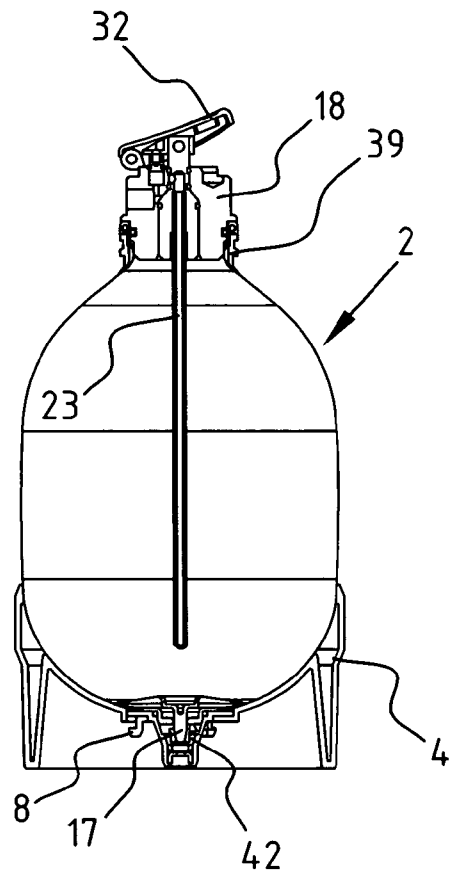


FIG. 20

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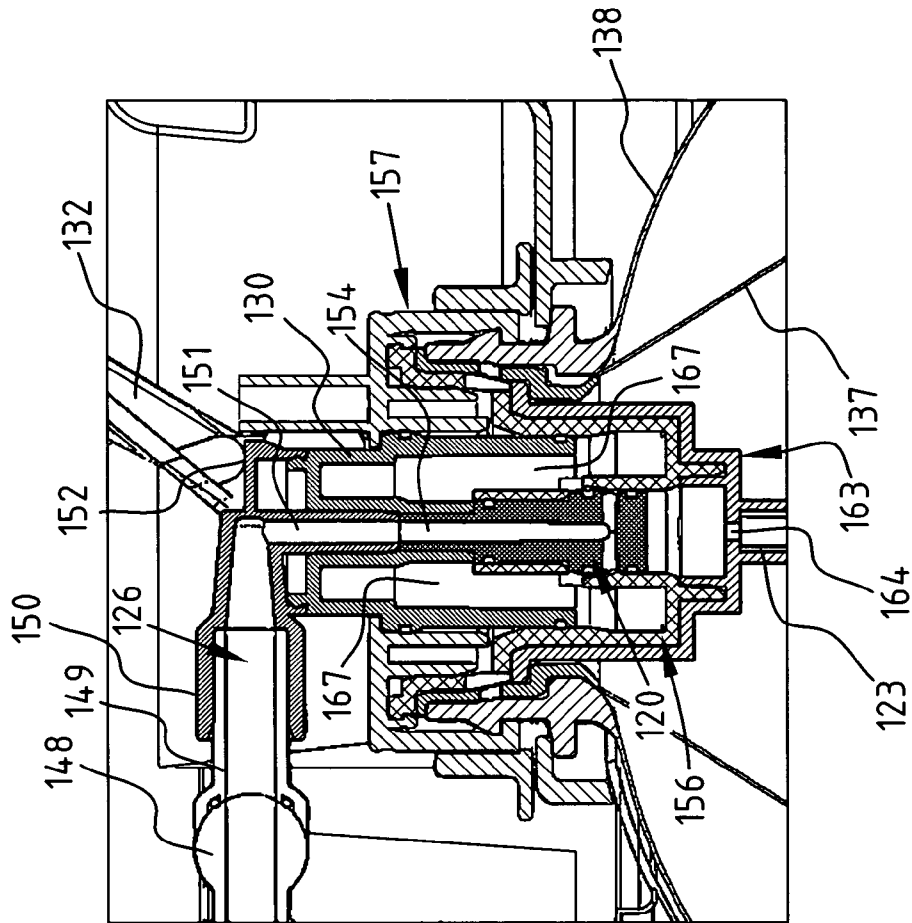


FIG. 21B

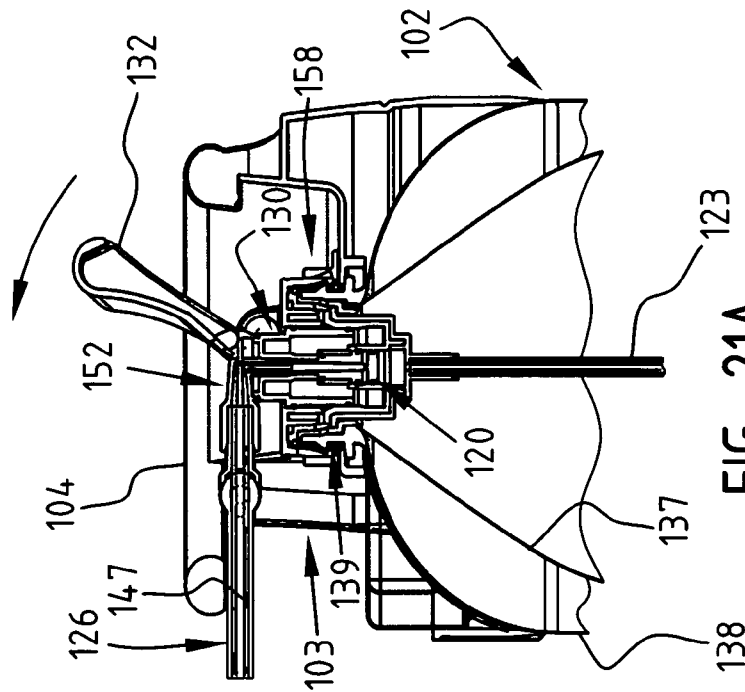


FIG. 21A

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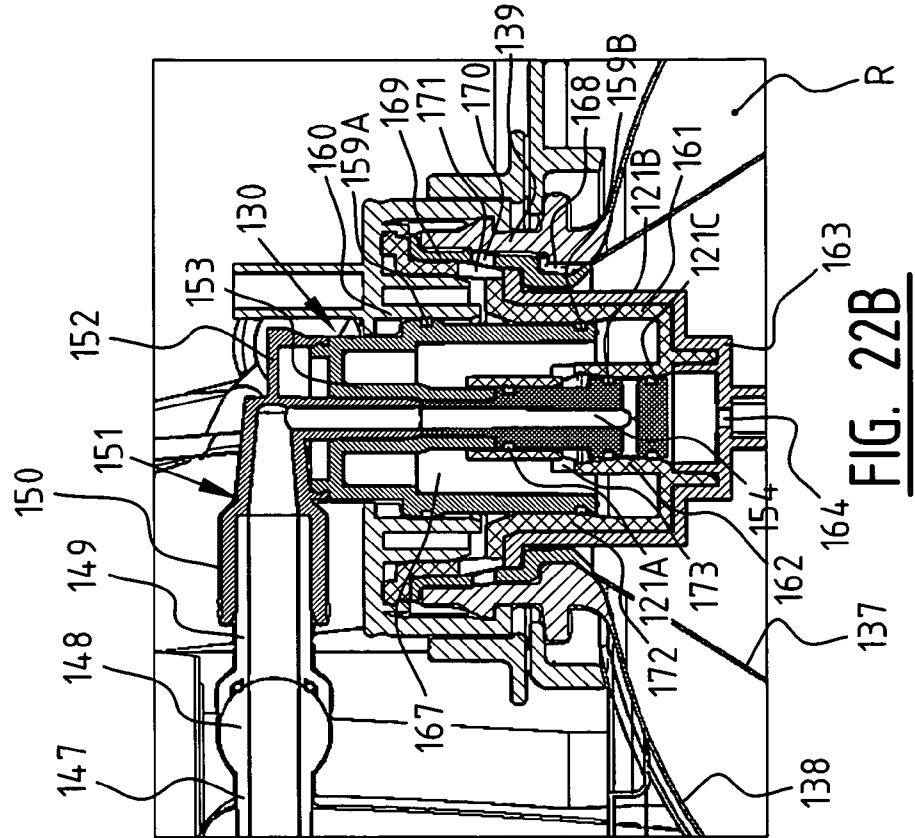


FIG. 22B

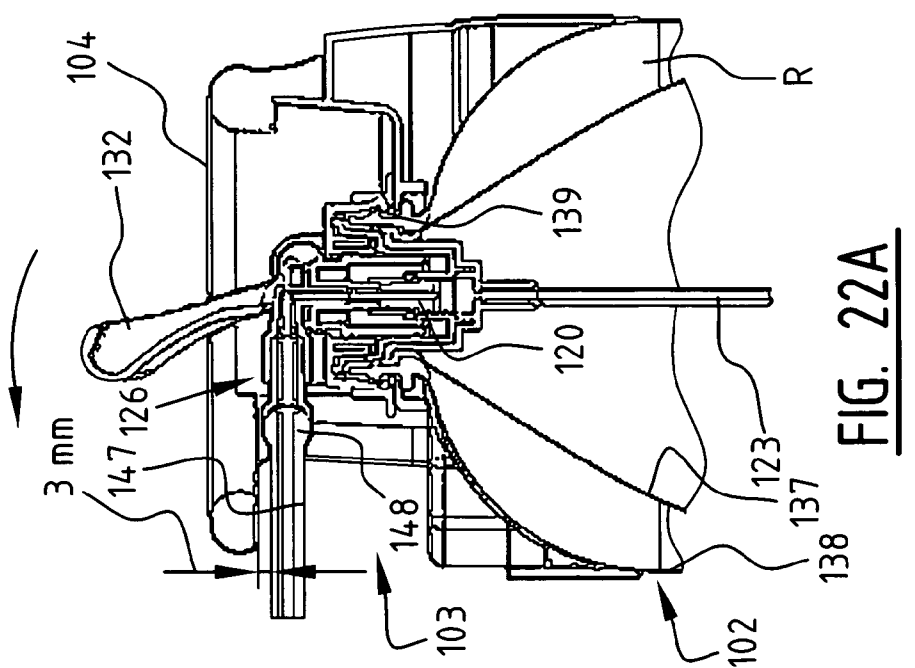


FIG. 22A

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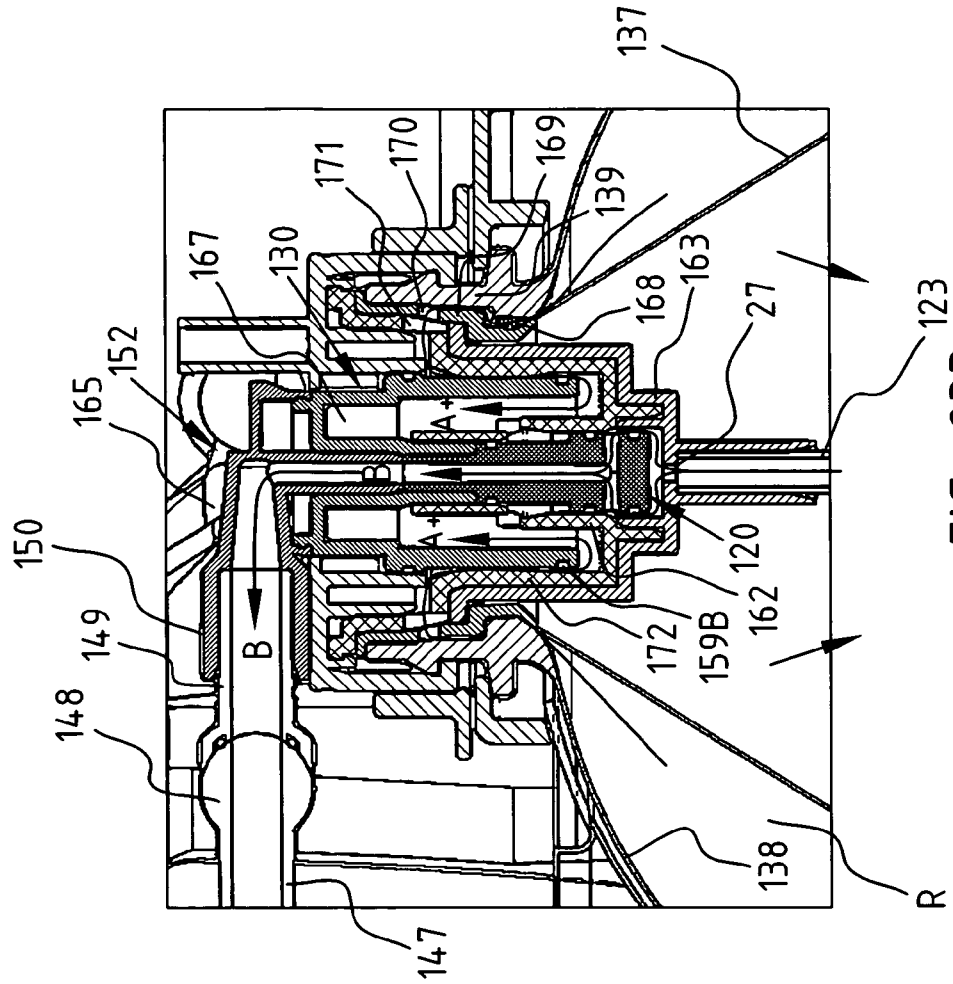


FIG. 23B

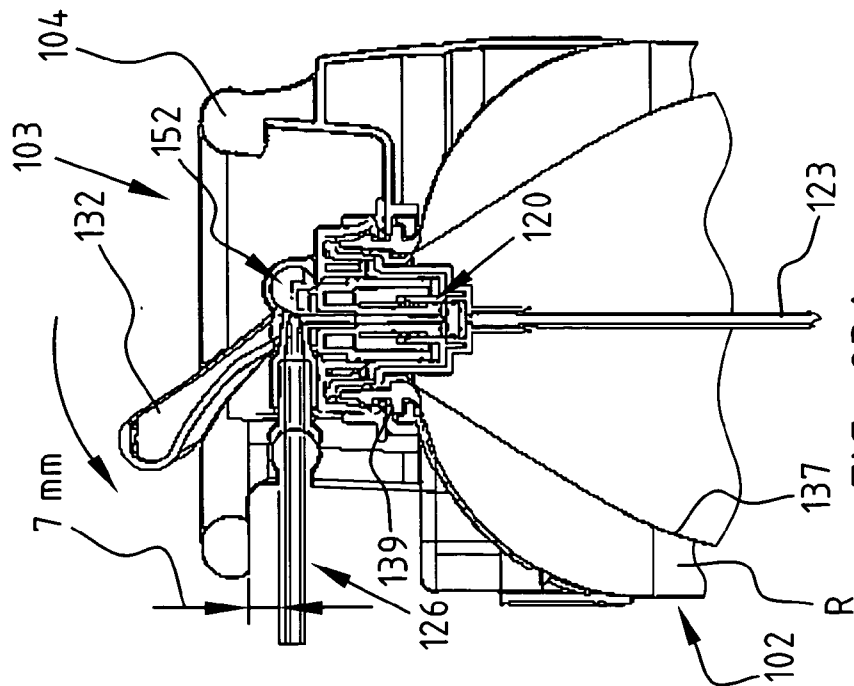


FIG. 23A

