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### (54) BOTTLE CLOSURE FOR CONTROLLED RELEASE OF A SOAP SOLUTION

(57) The present invention provides a bottle closure (60) for controlled release of a soap solution, comprising a cap (1) with a first opening (19) completely extending there through and a cylindrical control part (70) with one or more peripheral openings (22) along the casing of said cylinder form that are in connection to a second opening (27, 37) partially extending through the control part (70), in which the control part (70) can be placed along a bottom side (18) of the cap (1), which bottom side (18) is opposite to an upper side (17) of the cap (1), in the first opening (19) of the cap (1) when they are oriented in such way that a central longitudinal axis (80) passes through both the control part (70) and the cap (1), in which the one or more peripheral openings (22) can be brought above the first opening (19) by rotating the cap (1) with respect to the control part (70) around said longitudinal axis (80). The invention further provides a kit comprising a soap bottle and a bottle closure (60) according to the present invention, a method for adjusting a bottle closure (60) and a use of a method according to the present invention for adjusting a bottle closure (60) according to the present invention.

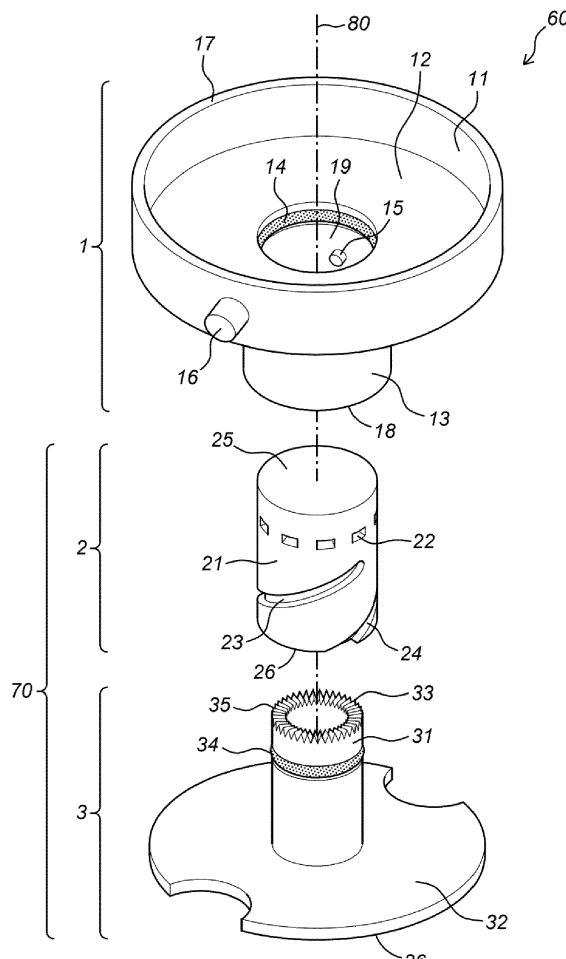


Fig. 1

## Description

### TECHNICAL DOMAIN

**[0001]** The invention relates to a bottle closure for controlled release of a soap solution.

### STATE OF THE ART

**[0002]** Bottle closures for controlled release of a soap solution are desired for allowing the release of and/or for dosing a soap solution. In this way, an opened condition of a bottle closure can allow the release of a soap solution while a closed condition prevents the release. Moreover, certain bottle closures offer the possibility to dose the release of a soap solution in a variable and adjustable manner.

**[0003]** GB 1 434 095 aims at providing a dispenser with an interchangeable and refillable soap bottle. There-to, GB 1 434 095 describes a soap bottle of which the neck comprises a plug. It relates to an axial and inwards moveable plug that is moved to an inwards opened position when the soap bottle is placed on a dispenser. By moving the plug to said inwards position, the flow of a soap solution is enabled from the bottle to the dispenser. GB 1 434 095 has the problem that it is difficult for a user to control to which extent the plug has moved inwards when placing the soap bottle. Consequently, the release of a soap solution according to GB 1 434 095 is difficult to standardize, resulting in problems, such as insufficiently purified hands or an unpredictable consumption of the soap solution.

**[0004]** The present invention aims to find a solution for at least some of the above-mentioned problems.

### SUMMARY OF THE INVENTION

**[0005]** In a first aspect, the present invention provides a bottle closure 60 for controlled release of a soap solution, comprising a cap 1 with a first opening 19 completely extending through it and a cylindrical control part 70 with one or more peripheral openings 22 along the casing of said cylinder form that is in connection to a second opening 27, 37 partially extending through the control part 70, wherein the control part 70 can be placed along a bottom side 18 of the cap 1, which bottom side 18 is opposite to an upper side 17 of the cap 1, in the first opening 19 of the cap 1 when they are oriented in such way that a central longitudinal axis 80 passes through both the control part 70 and the cap 1, in which the one or more peripheral openings 22 can be brought above the first opening 19 by rotating the cap 1 with respect to the control part 70 around said longitudinal axis 80.

**[0006]** Bringing the one or more peripheral openings 22 of the control part 70 above the first opening 19 of the cap 1 allows the flow of a soap solution along the cap 1 and subsequently along the control part 70. Dosing the soap solution, more in particular the amount of soap so-

lution that can flow along the control part 70, can be adjusted optimally by rotating the cap 1. The rotation movement can indeed perfectly be controlled; rotation along a certain angle allows for a particular extent to which the peripheral openings 22 are brought above the first opening 19.

**[0007]** In a second aspect, the present invention provides for a kit comprising a soap bottle and a bottle closure 60 according to the first aspect of the invention.

**[0008]** A kit according to the second aspect of the present invention offers all equipment to a user for a controlled release of a soap solution. In use, the cap 1 of the bottle closure 60 is attached to the soap bottle. The soap solution, contained in the soap bottle, can, whether or not and in a desired extent, be released along the bottle closure 60, and this by means of the perfectly controllable rotation of the parts of the bottle closure 60 with respect to each other.

**[0009]** In a third aspect, the present invention provides a method for adjusting a bottle closure 60 for controlled release of a soap solution, the bottle closure 60 comprising a cap 1 with a first opening 19 completely extending there through and a cylindrical control part 70 with one or more peripheral openings 22 along the casing of said cylinder form that are in connection to a second opening 27, 37 partially extending through the control part 70, in which the control part 70 can be placed along a bottom side 18 of the cap 1, which bottom side 18 is opposite to an upper side 17 of the cap 1, in the first opening 19 of the cap 1 when they are oriented in such way that a central longitudinal axis 80 passes through both the control part 70 and the cap 1, in which the method comprises the step of placing the control part 70 in the first opening 19 of the cap 1 according to the orientation of the central longitudinal axis 80, in which the method further comprises the step of bringing the peripheral openings 22 above the first opening 19 by means of rotating the cap 1 with respect to the control part 70 around said longitudinal axis 80.

**[0010]** In a fourth aspect, the present invention provides for a use of a method according to the third aspect of the invention for adjusting a bottle closure 60 according to the first aspect of the invention.

### DESCRIPTION OF THE FIGURES

**[0011]**

Fig. 1 shows a perspective view of an embodiment of a bottle closure 60 according to the present invention.

Fig. 2a shows a longitudinal section of an embodiment of a bottle closure 60 according to the present invention.

Fig. 2b shows a longitudinal section of an embodiment of a bottle closure 60 according to the present

invention, in which peripheral openings 22 of a control part 70 are within a first opening 19 of a cap 1.

Fig. 3 shows a longitudinal section of an embodiment of a bottle closure 60 according to the present invention, in which peripheral openings 22 of a control part 70 are above a first opening 19 of a cap 1.

Fig. 4 shows a perspective view of an embodiment of a soap dispenser including a bottle closure according to the present invention, a soap bottle 4 and a support unit 5 for carrying the bottle closure.

Fig. 5 shows a longitudinal section of a detail of a shaft 2 and a pin 3 according to an embodiment of a bottle closure according to the present invention.

Fig. 6-8 show a longitudinal section of a detail of an embodiment of a bottle closure according to the present invention, combined with a soap bottle 4 and a support unit 5 for carrying the bottle closure, in which the positioning of a shaft 2 of the bottle closure with respect to a cap 1 of the bottle closure is changed, and in which flows of air and soap solution are shown.

Fig. 9-13 show different views of a possible embodiment of a bottle closure.

#### DETAILED DESCRIPTION OF THE INVENTION

**[0012]** Unless otherwise defined, all terms used in the description of the invention, including technical and scientific terms, shall have the meaning as they are generally understood by the skilled person in the technical field of the invention. For a better assessment of the description of the invention, the following terms are explained explicitly:

The term "soap solution" is used in this text in its general meaning, namely the cleaning compositions, more in particular the known liquid soaps, that are made of an alkali metal compound such as sodium or potassium hydroxide and a fat or fatty acid. In the context of the present invention, the term "soap solution" also refers to a solution which can be dispensed as hygienic hand spray, such as for example a liquid soap with low viscosity in absence of water.

**[0013]** The term "soap bottle" is used in this text for a bottle with a whether or not closable opening which comprises a soap solution. Preferably, the soap bottle is reusable and the soap bottle can thus be replenished with a soap solution.

**[0014]** In a first aspect, the present invention provides a bottle closure 60 for controlled release of a soap solution, comprising a cap 1 with a first opening 19 completely extending there through and a cylindrical control part 70

with one or more peripheral openings 22 along the casing of said cylinder form that are in connection to a second opening 27, 37 partially extending through the control part 70, in which the control part 70 can be placed along a bottom side 18 of the cap 1, which bottom side 18 is opposite to an upper side 17 of the cap 1, in the first opening 19 of the cap 1 when they are oriented in such way that a central longitudinal axis 80 passes through both the control part 70 and the cap 1, in which the one or more peripheral openings 22 can be brought above the first opening 19 by rotating the cap 1 with respect to the control part 70 around said longitudinal axis 80.

**[0015]** The cap 1 of the bottle closure 60 is configured to be attached to the opening of a soap bottle. The control part 70 is configured to control the release of soap solution to the environment. The peripheral openings 22 can have any shape. Moreover, the peripheral openings 22 can be arranged in any way along the casing of the cylindrical control part 70. Preferably, the peripheral openings 22 are arranged in one or more rows along the casing of the control part 70, which one or more rows are in turn preferably placed transversely along said casing. The position in which the peripheral openings 22 of the control part 70 are within the first opening 19 of the cap 1 is defined herein as a "closed position". Likewise, the position in which the peripheral openings 22 of the control part 70 are above the first opening 19 of the cap 1 is defined herein as an "open position". In the closed position, a soap solution will be able to flow from a soap bottle up to the first opening 19 of the cap 1. At the level of this opening 19, in the closed position, the soap solution is stopped by the cylindrical control part 70. In the open position, the soap solution can flow via the peripheral openings from the control part 70 to the second opening 27, 37 in the control part. This second opening 27, 37 extends partially through the control part 70 and is in contact with the environment. In this way, the soap solution can be released to the environment in the open position. The thus released soap solution can be used for any hygienic purposes, such as, but not limited to, washing the hands.

**[0016]** Bringing the one or more peripheral openings 22 of the control part 70 above the first opening 19 of the cap 1 allows the flow of a soap solution along the cap 1 and subsequently along the control part 70. Dosing the soap solution, in particular the amount of soap solution that can flow along the control part 70, can be adjusted optimally by means of rotating the cap 1. The rotation movement can indeed perfectly be controlled; rotation along a certain angle allows for a particular extent to which the peripheral openings 22 are brought above the first opening 19. A controlled release of a soap solution by using rotatable components and a rotation movement is not obvious for a person skilled in the state of the art. Such skilled person would, after all, rather fall back on a rectilinear movement between components for a controlled release of a soap solution. For a user, it is rather difficult to achieve a sufficiently controlled release of a

soap solution with such a rectilinear movement.

**[0017]** In a preferred embodiment, the present invention provides for a bottle closure 60 according to the first aspect of the invention, in which the peripheral openings 22 of the control part 70 are situated symmetrically along the longitudinal axis 80. In an open position of the bottle closure 60, a symmetrical position of the peripheral openings 22 contributes to an equal flow of soap solution to the second opening 27, 37 of the control part 70 and thus contributes to an equal release of a soap solution to the environment. An equal release is desired for using the soap solution for hygienic purposes, such as, but not limited to, washing the hands.

**[0018]** In a preferred embodiment, the present invention provides for a bottle closure 60 according to the first aspect of the invention, in which the peripheral opening 22 has an identical shape. In an open position of the bottle closure 60, an identical shape of each peripheral opening 22, and especially combined with a symmetrical position of the peripheral openings 22, contributes to an equal flow of a soap solution to the second opening 27, 37 of the control part 70 and thus contributes to an equal release of a soap solution to the environment. As indicated above, an equal release of the soap solution is desired.

**[0019]** In a preferred embodiment, the present invention provides a bottle closure 60 according to the first aspect of the invention, in which the control part 70 comprises an upper side 25 opposite to a bottom side 26, in which this upper side 25 is located closer to the upper side 19 of the cap 1 than the bottom side 26 of the control part 70 when placing the control part 70 in the first opening 19 of the cap 1, and in which the peripheral openings 22 are located in the vicinity of this upper side 25 of the control part 70. Such location of the peripheral openings 22 allows for the passage from the so-called closed position to the so-called open position, and vice versa, by means of only a limited rotation of the cap 1 with respect to the control part 70.

In a preferred embodiment, the present invention provides a bottle closure 60 according to the first aspect of the invention, in which the first opening 19 of the cap 1 is provided with one or more internal protrusions 15 that are configured to be connected via a bayonet fitting with one or more helical grooves 23 that are situated along the casing of the cylindrical control part 70. Such bayonet fitting is optimally suitable for carrying out the rotation of the cap 1 with respect to the control part 70 in a controlled way. The coupling of a protrusion 15 in a groove 23 ensures indeed a reversible fixation of the cap 1 with respect to the control part 70 at each positioning of cap 1 and control part 70 with respect to each other. Moreover, the guiding of a protrusion 15 through the profile of a groove 23 allows to carry out the rotation of the cap 1 with respect to the control part 70 in a standardized and equal way. The direction of the rotation movement, clockwise or anti-clockwise, to bring the bottle closure 60 from the closed position to the open position, or from the open position

to the closed position, depends on the rotation direction of the one or more helical grooves 23. According to some embodiments, the rotation direction of the one or more helical grooves 23 is left-hand and according to other embodiments, the rotation direction of the one or more helical grooves 23 is right-hand.

**[0020]** In a preferred embodiment, the present invention provides for a bottle closure 60 according to the first aspect of the invention, in which the first opening 19 is provided with a sealing ring 14. The sealing ring 14 functions as an obstruction that blocks the control part 70 when it is placed along the bottom side 18 of the cap 1 in the first opening 19 of the cap 1. In embodiments, the control part 70 can only move past this sealing ring 14, thus oriented towards the upper side 17 of the cap 1, when an external force is used in the form of the rotating of the cap 1 with respect to the control part 70. In preferred embodiments, the sealing ring 14 is placed transversely and form-fitting along the internal wall which is defined by the first opening 19. In preferred embodiments, the sealing ring 14 is placed in the vicinity of the upper side 17 of the cap 1 in the first opening 19. In this way, the control part 70 can, when placed in the internal opening 19, be incorporated as far as possible through this opening 19 until the control part 70 is blocked by the sealing ring 14. In this way, in closed position of the bottle closure 60, the peripheral openings 22 of the control part 70 are located as close as possible to the upper side 17 of the cap 1. Such location of the peripheral openings 22 allows for the passage from the so-called closed position to the so-called open position, and vice versa, by means of only a limited rotation of the cap 1 with respect to the control part 70. The sealing ring 14 also prevents leakage of a soap solution along the first opening 19 and thus contributes to a controlled release of a soap solution.

**[0021]** In a preferred embodiment, the present invention provides a bottle closure 60 according to the first aspect of the invention, in which the cap 1 comprises a ventilation valve 101 which extends through the cap 1 and is configured for allowing a flow of a fluid, preferably air, through the cap 1 according to a direction that is oriented from the bottom side 18 of the cap 1 to the upper side 17 of the cap 1. This ventilation valve 101 functions for allowing a flow of air from the bottle closure 60 to a soap bottle, when a soap bottle is attached to the bottle closure 60 via the cap 1. When moving a soap solution from a soap bottle to and through the bottle closure 60, an underpressure is indeed created in the soap bottle. Through the ventilation valve 101, air can subsequently be brought into the bottle, so that said underpressure is compensated.

**[0022]** In a preferred embodiment, a sealing ring is provided around the casing of the cylindrical control part 70. Such sealing ring functions as an obstruction clamping the control part 70 in a reversible way when it is placed in the first opening 19 of the cap 1. In embodiments, the control part 70 comprising said sealing ring can only move relatively with respect to the cap 1 when an external

force is used in the form of rotating the cap 1 with respect to the control part 70. In this way, the position of the cap 1 with respect to the control part 70 can be controlled optimally. In preferred embodiments, the sealing ring is placed transversely and form-fitting along the casing of the cylindrical control part 70. In preferred embodiments, said sealing ring is situated between the peripheral openings 22 and the bottom side 26 of the control part 70. In this way, the control part 70 can still be clamped in a reversible way when the peripheral openings 22 in the open position of the bottle closure 60 are situated above the first opening 19 of the cap 1. Also, the sealing ring prevents leakage of a soap solution along the first opening 19 and thus contributes to a controlled release of a soap solution.

**[0023]** In a preferred embodiment, said invention provides a bottle closure 60 according to the first aspect of the invention, in which the control part 70 i) comprises a cylindrical shaft 2 with peripheral openings 22 along the casing of said cylindrical form that are in connection to an opening 27 partially extending through the shaft 2 and ii) comprises a pin 3 with an opening 37 completely extending through the pin 3, in which the pin 3 and cylindrical shaft 2 can be coupled when they are oriented in such way that a central longitudinal axis 80 passes through both the pin 3 and the shaft and in which the pin 3 comprises one or more indentations 33 that are configured to be brought into contact with one or more protrusions 28 through the shaft 2. The cylindrical shaft 2 is configured at a bottom side 26 to be coupled to the pin 3 and to an upper side 25, situated opposite to the bottom side 26, configured to be placed along a bottom side 18 of the cap 1 in the first opening 19 of the cap 1. The control part 70 comprising the shaft 2 and the pin 3 is configured to control the release of soap solution to the environment. The position in which the peripheral openings 22 of the shaft 2 are within the first opening 19 of the cap 1, corresponds to a "closed position". Likewise, the position in which the peripheral openings 22 of the shaft 2 are above the first opening 19 of the cap 1 is defined herein as an "open position". In the closed position, a soap solution will be able to flow from a soap bottle to the first opening 19 of the cap 1. At the level of this opening 19, in the closed position, the soap solution is stopped by the shaft 2. In the open position, the soap solution can flow via the peripheral openings 22 from the shaft 2 to the opening 27 within the shaft 2 and subsequently to the opening of the pin 3. This opening of the pin 3 is in contact with the environment. In this way, the soap solution can be released to the environment in the open position. The thus released soap solution can be used for any hygienic purposes, such as, but not limited to, washing the hands. In the used state of the bottle closure 60, the shaft 2 and the pin 3 are coupled to each other according to a mechanical enclosure of the one or more protrusions 38 enclosed by the shaft 2 in the one or more notches 33 enclosed by the pin 3. This mechanical enclosure ensures moreover a fixation of the shaft 2, so that the shaft

2 does not turn together with the cap 1 when the latter is rotated with respect to the shaft 2. In this way, the cap 1 can move via a rotation with respect to the shaft 2 and the bottle closure 60 can be set from a closed position to an open position, and vice versa, by means of a rotation.

**[0024]** In a preferred embodiment, the present invention provides a bottle closure 60 according to the first aspect of the invention, in which the shaft 2 comprises along its casing one or more helical grooves 23 for receiving one or more internal protrusions 15 of the cap 1 via a bayonet fitting. Such bayonet fitting is optimally suitable for carrying out the rotation of the cap 1 with respect to the shaft 2 in a controlled way. The coupling of a protrusion 15 in a groove 23 ensures after all a reversible fixation of the cap 1 with respect to the shaft 2 at each positioning of cap 1 and shaft 2 with respect to each other. Moreover, the guiding of a protrusion 15 through the profile of a groove 23 allows to carry out the rotation of the cap 1 with respect to the shaft 2 in a standardized and equal way. The rotation direction of the one or more helical grooves 23 is decisive for the direction of the rotation movement, clockwise or anti-clockwise, to bring the bottle closure 60 from the closed position to the open position, or from the open position to the closed position. According to some embodiments, the rotation direction of the one or more helical grooves 23 is left-hand and according to other embodiments, the rotation direction of the one or more helical grooves 23 is right-hand.

**[0025]** In a preferred embodiment, a sealing ring is provided around the casing of the cylindrical shaft 2. Such sealing ring functions as an obstruction clamping the shaft 2 in a reversible way when it is placed in the first opening 19 of the cap 1. In embodiments, the shaft 2 comprising said sealing ring can only move relatively with respect to the cap 1 when an external force is used in the form of rotating the cap 1 with respect to the shaft 2. In this way, the position of the cap 1 with respect to the shaft 2 can be controlled optimally. In preferred embodiments, the sealing ring is placed transversely and form-fitting along the casing of the shaft 2. In preferred embodiments, said sealing ring is situated between the peripheral openings 22 and the bottom side 26 of the shaft 2. In this way, the shaft 2 can still be clamped in a reversible way when the peripheral openings 22 in the open position of the bottle closure 60 are situated above the first opening 19 of the cap 1. Also, the sealing ring prevents leakage of a soap solution along the first opening 19 and thus also contributes to a controlled release of a soap solution. In other preferred embodiments, several sealing rings are provided around the casing of the cylindrical shaft 2. In a preferred embodiment, two sealing rings are provided around the casing of the cylindrical shaft 2. In the case of two sealing rings provided around the casing of the cylindrical shaft 2, these sealing rings are preferably placed in such way that they are situated at both sides with respect to the peripheral openings 22 of the shaft 2, so that a particularly adequate, preferably

reversible, clamping between shaft 2 and cap 1 can be obtained in both said closed position and in said open position.

**[0026]** In a preferred embodiment, the present invention provides a bottle closure 60 according to the first aspect of the invention, in which the shaft 2 comprises a ventilation valve 201 which extends through the shaft 2 and is configured for allowing a flow of a fluid, preferably air, through the shaft 2 according to a direction that is oriented from the bottom side 26 of the shaft 2 to the upper side 25 of the shaft 2. This ventilation valve 201 functions for removing air from a cavity at the level of the opening 27 partially extending through the shaft 2, which cavity becomes smaller when attaching the soap bottle to the bottle closure and when further pushing down the soap bottle. Via the ventilation valve, air that is under increased pressure in said cavity can thus escape in the soap bottle. Consequently, it is avoided that air is displaced to the opening 37 completely extending through the pin 3, as a result of which the undesired release of a used soap solution by means of the bottle closure 60 can be avoided.

**[0027]** In a preferred embodiment, said invention provides a bottle closure 60 according to the first aspect of the invention, in which the shaft 2 comprises a separation wall 204 extending at least partially through the opening 27 extending partially through the shaft 2, and this according to a direction that is substantially situated according to the direction in which said opening 27 is extending. In being present, this separation wall 204 ensures a physical separation within said opening 27. This separation wall 204 is intended for obtaining a separation of air and a soap solution. In particular, when filling a bottle closure 60 according to the first aspect of the invention, this separation wall 204 will allow air, for example in the form of one or more air bubbles, to move along one side of the separation wall, while the thus freed other side of the separation wall can be used for moving the soap solution. This applies in particular to the displacement of a soap solution from a soap bottle to and through the often with respect to a soap bottle smaller diameters of the openings 19, 27, 37 of embodiments of the bottle closure 60 according to the first aspect of the present invention.

**[0028]** In a preferred embodiment, the present invention provides a bottle closure 60 according to the first aspect of the invention, in which the bottle closure 60 comprises one or more detection means for detecting the presence of a soap solution in at least one of the openings 19, 27, 37 of the bottle closure 60. Thus, it can be checked whether or not the bottle closure 60 is provided with a soap solution, which is important in normal use of the bottle closure 60 and which can give a signal when the soap solution should be refilled. Preferably, one or more sensors are selected as the one or more detections means. Possible examples of sensors are chemical sensors that monitor the presence of one or more compounds that are present in the soap solution, and/or physical sensors that can monitor the physical presence of

the soap solution, in which the physical sensors can be selected from the group comprising temperature sensors, pressure sensors, vicinity sensors, video sensors, audio sensors and positioning sensors, or any combination of the foregoing. The sensors can be connected physically or wirelessly to a source for data processing and/or storage.

**[0029]** In a preferred embodiment, the present invention provides for a bottle closure 60 according to the first aspect of the invention, in which the pin 3 is cylindrical and carries a sealing ring 34 around the casing of its cylindrical form. Preferably, the sealing ring 34 is provided transversely around the casing of the cylindrical pin 3. The sealing ring 34 ensures an additional fixation of the shaft 2 through the pin 3 by means of the friction and clamping exercised by the ring 34 on the shaft 2 when it is placed over the shaft 3 by means of its opening 27.

**[0030]** In a second aspect, the present invention provides for a kit comprising a soap bottle and a bottle closure 60 according to the first aspect of the invention.

**[0031]** A kit according to the second aspect of the present invention provides all equipment to a user for a controlled release of a soap solution. In use, the cap 1 of the bottle closure 60 is attached to the soap bottle. The soap solution, comprised by the soap bottle, whether or not and in a desired extent, can be released along the bottle closure 60, and this by the perfectly controllable rotation of the parts of the bottle closure 60 with respect to each other.

**[0032]** In a third aspect, the present invention provides a method for adjusting a bottle closure 60 for controlled release of a soap solution, the bottle closure 60 comprising a cap 1 with a first opening 19 completely extending there through and a cylindrical control part 70 with one or more peripheral openings 22 along the casing of said cylinder form that are in connection to a second opening 27, 37 partially extending through the control part 70, in which the control part 70 can be placed along a bottom side 18 of the cap 1, which bottom side 18 is opposite to an upper side 17 of the cap 1, in the first opening 19 of the cap 1 when they are oriented in such way that a central longitudinal axis 80 passes through both the control part 70 and the cap 1, in which the method comprises the step of moving the control part 70 in the first opening 19 of the cap 1 according to the orientation of the central longitudinal axis 80, in which the method further comprises the step of bringing the peripheral openings 22 above the first opening 19 by means of rotating the cap 1 with respect to the control part 70 around said longitudinal axis 80.

**[0033]** The terms "open position" and "closed position" of the bottle closure 60 as defined above for the first aspect of the invention also apply to the second aspect of the invention. The action of rotating the cap 1 with respect to the control part 70 around said longitudinal axis 80 can be perfectly controlled; rotation along a particular angle ensures a certain degree into which the peripheral openings 22 are brought above the first opening 19, and thus

in the open position. Dosing the soap solution, in particular the amount of soap solution that can flow in an open position along the control part 70 to the environment, can thus be adjusted optimally by means of rotating the cap 1. By a rotation to another direction, the bottle closure can again be moved to the closed position, in which no flow of a soap solution to the environment is possible.

**[0034]** In a preferred embodiment, the present invention provides a method according to the third aspect of the invention, in which rotation is carried out until further rotation is blocked by a mechanical obstruction. This is an optimal appropriate way in order to avoid that cap 1 and control part 70 are separated from each other when adjusting the bottle closure 60 in the direction of the open position or the closed position. Separation of the cap 1 and the control part 70 would lead, after all, to undesired and uncontrolled leakage of a soap solution. Moreover, the rotation until such a mechanical obstruction ensures a completely open position and a completely closed position to be clearly defined and easily applied and recognised for a user. In that way, by means of a rotation in a particular rotation direction until a mechanical obstruction, the bottle closure 60 can be brought into a completely open position, while a rotation in the opposite direction until a mechanical obstruction brings the bottle closure 60 into a completely closed position.

**[0035]** In a fourth aspect, the present invention provided for a use of a method according to the third aspect of the invention for adjusting a bottle closure 60 according to the first aspect of the invention. This use is very advantageous for the controlled release of a soap solution. Thus, in an embodiment, the bayonet fitting of the one or more internal protrusions 15 of the first opening 19 of the cap 1 in the one or more helical grooves 23 situated along the casing of the cylindrical control part 70 is ideally appropriate for rotating the cap 1 with respect to the control part 70 until further rotation is blocked by a mechanical obstruction. This mechanical obstruction can hereby be understood as the obstruction of a protrusion 15 in an end of a helical groove 23.

## EXAMPLES

**[0036]** The invention will now be further explained by means of following examples, without being limited thereto.

### EXAMPLE 1

**[0037]** The example relates to a preferred embodiment of a bottle closure 60 for controlled release of a soap solution according to the present invention. The bottle closure 60 comprises a cap 1 with a first opening 19 completely extending there through and a cylindrical control part 70 with one or more peripheral openings 22 along the casing of said cylinder form that are connection to a second opening 27, 37 partially extending through the control part 70, in which the control part 70 can be placed

along a bottom side 18 of the cap 1, which bottom side 18 is opposite to an upper side 17 of the cap 1, in the first opening 19 of the cap 1 when they are oriented in such way that a central longitudinal axis 80 passes through both the control part 70 and the cap 1. Fig. 1 shows a perspective view of this embodiment of a bottle closure 60 according to the present invention.

**[0038]** The cap 1 comprises specific devices for receiving a soap bottle at the upper side 17 of the cap 1, in particular an upright wall 11 for enclosing the soap bottle, a platform 12 as a support surface for the soap bottle and a peripheral protrusion 16 at the outer circumference of said upright wall 11 for a bayonet fitting with a soap bottle. Said platform 12 surrounds the first opening 19 of the cap 1. Thus, a wall of a soap bottle enclosing the opening of such a soap bottle can be supported by said platform 12, while a soap solution can flow from said opening of said soap bottle to the internal opening 19 of the cap 1. The terms "closed position" and "open position", as defined earlier in the text, apply of course to this example. In this way, in the closed position, a soap solution will only be able to flow up to the internal opening 19 of the cap 1. The first opening 19 extends from said platform 12 to the bottom side 18 of the cap 1. This internal opening 19 is formed by a cylindrical case 13, which cylindrical case 13 is configured for receiving the shaft 2. Furthermore, the cap 1 comprises two internal protrusions 15 (only one of which is shown in Fig. 1) along the internal wall which is defined by the first opening 19.

**[0039]** The control part 70 comprises a shaft 2 and a pin 3. The shaft 2 comprises two grooves 23, 24 turning to the right along its external circumference 21. These grooves 23, 24 are configured for receiving said internal protrusions 15 of the cap 1 via a bayonet fitting. Said bayonet fitting is optimally appropriate for a standardized rotation of the cap 1 with respect to the shaft 2 in which there is an optimal control at the transition from a closed position to an open position of the bottle closure 60, and vice versa, and in which a desired positioning between cap 1 and shaft 2 can be maintained in a stable way. Additionally, the shaft 2 comprises along its casing a plurality of peripheral openings 22 with identical form which are situated in a symmetric way around said longitudinal axis 80. In an open position of the bottle closure 60, the

symmetrical position of the peripheral openings 22 with identical form contributes to an optimal equal flow of soap solution from the peripheral openings 22 to the second opening 27 within the shaft 2 and subsequently to the opening 37 of the pin 3 and thus contributes to an equal release of a soap solution to the environment. An equal release is desired for using the soap solution for hygienic purposes, such as, but not limited to, washing the hands. The shaft 2 comprises an upper side 25 opposite to a bottom side 26, in which this upper side 25 is located closer to the upper side 19 of the cap 1 than the bottom side 26 of the shaft 2 when placing the shaft 2 in the first opening 19 of the cap 1, and in which the peripheral openings 22 are located in the vicinity of this upper side 25 of

the shaft 2. Such location of the peripheral openings 22 allows for the transition from the so-called closed position to the so-called open position, and vice versa, by means of only a limited rotation of the cap 1 with respect to the shaft 2. Moreover, the shaft 2 comprises a plurality of protrusions 28.

**[0040]** The pin 3 comprises an upper side 35, opposite to a bottom side 36. Said upper side 35 is configured for being coupled to said shaft 2. Thereto, the pin 3 comprises at its upper side 35 a plurality of notches 33 with a zig zag pattern. The protrusions 28 of the shaft 2 fit into these notches 33 and consequently ensure, when coupling pin 3 and shaft 2, a fixation of the shaft 2 through the pin 3. Moreover, the pin 3 comprises along its external circumference 31 a sealing ring 34, which contributes to said fixation when coupling pin 3 and shaft 2. Such fixation is very important, since, when rotation the cap 1, the shaft 2 does not turn with this cap 1 in this way, and thus adjustment of the bottle closure from a closed position to an open position, and vice versa, is possible. Furthermore, the pin 3 comprises a widened base 32.

**[0041]** Fig. 2a provides a clear representation of how in this embodiment, the pin 3 is coupled to the shaft 2 according to a rectilinear direction 40. Fig. 2b shows a longitudinal section of an embodiment of a bottle closure 60 according to the present invention, in which peripheral openings 22 of the shaft are within a first opening 19 of the cap 1. In other words, Fig. 2b represents a closed position of the bottle closure 60. In the cap 1, a sealing ring 14 is placed transversely and form-fitting along the internal wall defined by the first opening 19. This sealing ring 14 functions as an obstruction that blocks the shaft 2 when it is placed along the bottom side 18 of the cap 1 in the first opening 19 of the cap 1.

**[0042]** Via a rotation of the cap 1 with respect to the shaft 2, the bottle closure 60 is brought from a closed position to an open position. Fig. 3 shows an open position according to the embodiment of the present example, in which peripheral openings 22 of the shaft 2 are above the first opening 19 of the cap 1. Herein, Fig. 3 clearly shows the path 50 along which a soap solution can flow in an open position of the bottle closure 60 along the peripheral openings 22 of the shaft 2 to the opening 27 within the shaft 2 and subsequently to the opening 37 within the pin 3 to the environment.

## EXAMPLE 2

**[0043]** Fig. 4 shows a perspective view of an embodiment of a soap dispenser including a bottle closure according to the present invention, a soap bottle 4 and a support unit 5 for carrying the bottle closure. The soap bottle 4 comprises a body 401 for enclosing a soap solution and a screw thread 402 to be attached in the cap 1 of the bottle closure. The support unit 5 comprises a body with a raised edge 501 for enclosing the soap bottle 4 and recesses 502 for enclosing protrusions 16 of the cap 1, in function of the attaching of the bottle closure by

means of the cap 1 in the support unit 5. In the presentation according to Fig. 4, the pin 3 of the bottle closure is positioned centrally in the support unit 5. By means of this central positioning of the shaft 3 in the support unit 5, the cap 1 and shaft 2 of the bottle closure, as well as the soap bottle 4, can be placed symmetrical with respect to each other according to a symmetric axis which is oriented along the centre of the first opening 19 of the cap 1 and perpendicular to the platform 12 of the cap 1. Fig. 5 shows a longitudinal section of a detail of the shaft 2 and the pin 3 according to this embodiment of a bottle closure according to the present invention, in which shaft 2 and pin 3 are coupled to each other. In coupled position of shaft 2 and pin 3, the one or more finger-shaped protrusions 28 of the shaft 2 are mechanically enclosed in the one or more finger-shaped notches 33 of the pin 3. Said mechanical enclosure ensures in an efficient way a fixation of the shaft 2, so that the shaft 2 does not turn together with the cap 1 when the latter is rotated with respect to the shaft 2. In this way, the cap 1 can move via a rotation with respect to the shaft 2 and can be brought from a closed position to an open position, and vice versa, by means of a rotation. The shaft 2 is provided with two sealing rings 202, 203 along both sides of the peripheral openings 22 of the shaft 2. These two sealing rings 202, 203 are placed in such way that a particularly adequate and reversible clamping between shaft 2 and cap 1 can be obtained in both said closed position and said open position of the bottle closure. The pin 3 ends in a spray nozzle 38 that has a ridged surface 39. Said ridged surface 39 is particularly appropriate for placing a hose or other accessory, which can be desired in particular cases.

**[0044]** Fig. 6-8 shows a longitudinal cross-section of a detail of the embodiment of a bottle closure according to the present invention, combined with a soap bottle 4 and a support unit 5 according to Example 2. In Fig. 6, the bottle closure is present in the so-called closed position and in Fig. 7-8, the bottle closure is present in the so-called open position.

**[0045]** The depicted arrow 51 in Fig. 6 schematically shows an air flow 51 when attaching the soap bottle 4 to the bottle closure. Said air can escape from shaft 2 and/or pin 3 to the inside of the soap bottle 4, and this by means of a ventilation valve 201 which extends through the shaft 2. When attaching the soap bottle 4, the sealing ring 34 around the pin 3 will ensure the closure of the shaft 2. A cavity with air at the level of the opening 27 partially extending through the shaft 2 (situated where the depicted arrow 51 starts) that is created in this way, will become smaller when further pushing down the soap bottle 4. The air that is brought under increased pressure can escape in the soap bottle 4 through said ventilation valve 201. Without this ventilation valve 201, the air would be moved to the opening 37 completely extending through the pin 3, as a result of which the used soap solution would undesirably be released.

**[0046]** The depicted arrow 52 in Fig. 7 schematically

shows an air flow 52 that occurs when soap solution is moved from the soap bottle 4 to the bottle closure, amongst other things when the bottle closure is brought from a so-called closed position to a so-called open position. By moving the soap solution from the soap bottle 4 to the bottle closure according to the peripheral openings 22 of the shaft 2 (soap solution flow 54), an under-pressure is indeed created in the soap bottle 4. This underpressure is abolished by said air flow 52 that can flow from a cavity 102 between the cap 1, soap bottle 4 and support unit 5 to the soap bottle 4. The depicted arrows 53 and 54 respectively show an air flow 53 and a soap solution flow 54, which flows occur along a separation wall 204 when the bottle closure is filled by means of soap solution from the soap bottle 4. The separation wall 204 partially extends through the opening 27 of the shaft 2 and this according to a direction which is substantially situated according to the direction in which said opening 27 is extending. When filling a bottle closure 60, the separation wall 204 ensures that air is moved along one side of the separation wall 204, while the thus freed other side of the separation wall can be used for moving the soap solution. This prevents the scenario in which the openings 19, 27, 37 of the bottle closure are mainly or completely filled with air, as a result of which liquid could not be moved along said openings 19, 27, 37, but on the contrary, would be blocked outside the shaft 2 at the peripheral openings 22. The depicted arrow 55 in Fig. 8 schematically indicates an additional soap solution flow 55, which occurs in open position of the bottle closure once above-said air from air flow 53 has moved to the soap bottle 4.

### EXAMPLE 3

**[0047]** Fig. 9-13 show in different views a possible embodiment of a bottle closure. In particular, Fig. 9-13 shows an evaporation device 9 with a bottle closure comprising a push button 904 for allowing an evaporation of a soap solution by means of pushing the push button 904 and an opening 905 of the push button 904 as a result of which soap solution can escape to an environment. The push button 904 is contained in a finger grip 901, which finger grip 901 comprises an arch 903 and a collar 902. The collar 902 is capable of being in contact with the push button 904 and is preferably in contact with the push button 904. The arch 903 includes a central cavity in which simply one or more fingers of a person can be inserted. In this way, a person who wants to use an evaporation device 9 as shown in Fig. 9-13, can simply grasp this evaporation device 9 and thus easily use it. Next to bottle closure and finger grip 901, the evaporation device 9 also comprises a soap bottle comprising a soap solution, which soap bottle is designed as a soap bottle with a cylindrical form 906. Said soap bottle 906 is configured to be in contact with said push button 904 and is preferably in contact with said push button 904. In particular, soap solution that is present in the soap bottle 906, can

preferably flow to the push button 904 and past the opening 905 of the push button 904 when this push button 904 is pushed. Said soap bottle 906 comprises a cylindrical body 907 limited by an upper surface (not indicated in Fig. 9-13) and an opposite bottom surface 909. Furthermore, the evaporation device 9 shown in Fig. 9-13 is provided with a label whether or not removably attached to the cylindrical body 907 of the soap bottle 906. The label can be provided with various information.

10

### EXAMPLE 4

**[0048]** This example relates to a preferred embodiment of a soap solution. This embodiment of a soap solution is particularly appropriate for being released, and preferably to be released in a controlled way, by means of a bottle closure according to the present invention. The preferred embodiment of a soap solution relates to a soap solution composition as indicated in Table 1.

20

**Table 1 Composition of a soap solution, in which amounts of components are indicated as a weight percentage expressed with respect to the total weight of the soap solution**

25

	Weight percentage (%)
Denatured ethanol	65 to 80%
Perfume	0 to 0.30
Water	20 to 30%
Glycerine	1 to 5%
Hyaluronic acid	1 to 5%

35

**[0049]** In the shown soap solution composition, perfume cannot be present or can be present. When present, perfume is present according to an amount of 0.05 to 0.30 weight percent. Any type of perfume can be used. In preferred embodiments, the perfume comprises benzyl salicylate, limonene, hexyl cinnamal, citral, benzyl alcohol, linalol and/or benzyl benzoate. The used water preferably has a high level of purity. In a preferred embodiment, demineralized water is selected as water. In a preferred embodiment, ultra-pure water, well known under this term but also as high-purity water, is selected as water.

### Claims

50

1. Bottle closure (60) for controlled release of a soap solution, comprising a cap (1) with a first opening (19) completely extending there through and a cylindrical control part (70) with one or more peripheral openings (22) along the casing of said cylinder form that are in connection to a second opening (27, 37) partially extending through the control part (70), in

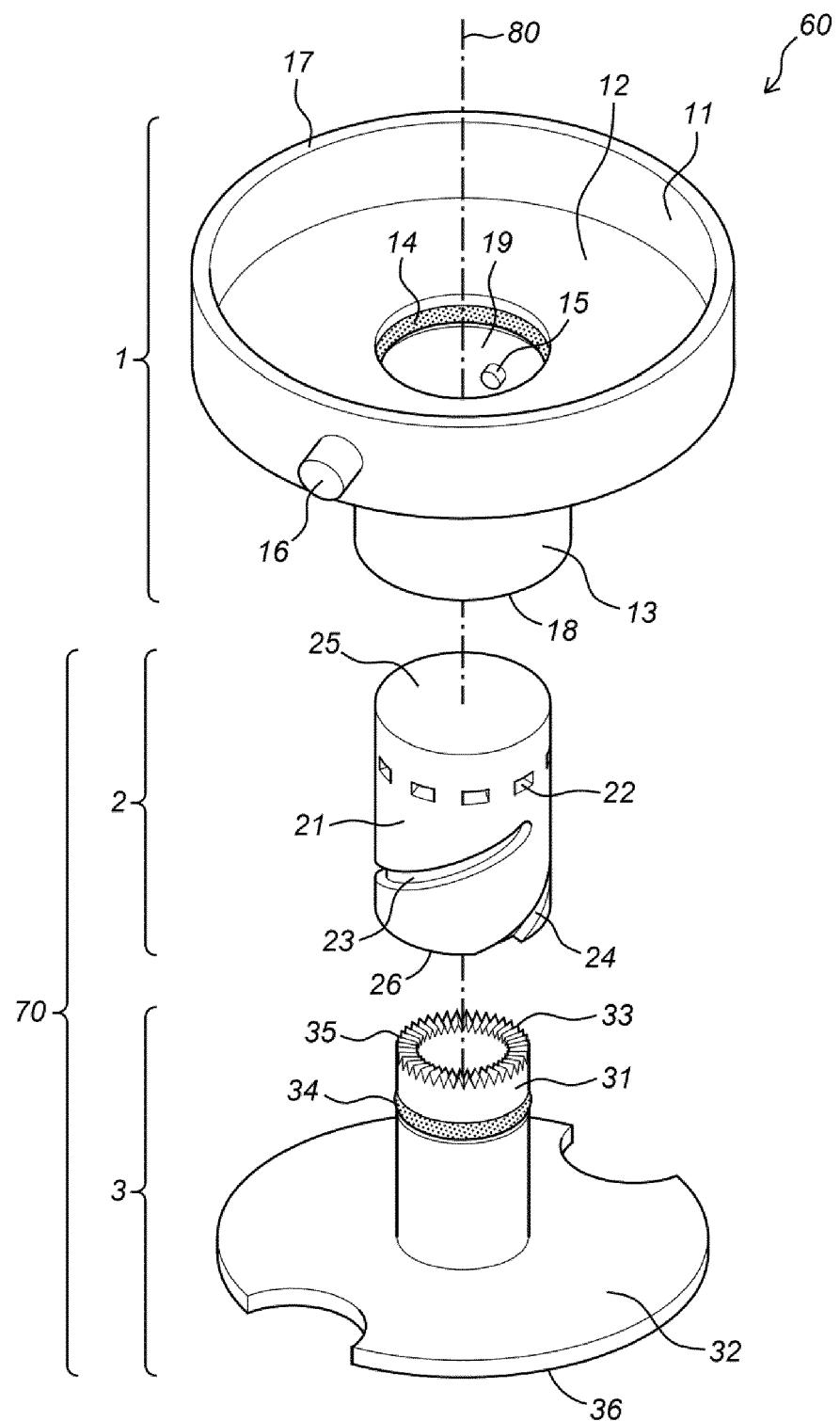
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which the control part (70) can be placed along a bottom side (18) of the cap (1), which bottom side (18) is opposite to an upper side (17) of the cap (1), in the first opening (19) of the cap (1) when they are oriented in such way that a central longitudinal axis (80) passes through both the control part (70) and the cap (1), **characterized in that** the one or more peripheral openings (22) can be brought above the first opening (19) by rotating the cap (1) with respect to the control part (70) around said longitudinal axis (80).

2. Bottle closure (60) according to claim 1, **characterized in that** the peripheral openings (22) of the control part (70) are situated symmetrically around the longitudinal axis (80).
3. Bottle closure (60) according to claim 1 or 2, **characterized in that** each peripheral opening (22) has an identical form.
4. Bottle closure (60) according to any one of the claims 1 to 3, **characterized in that** the control part (70) comprises an upper side (25) opposite to a bottom side (26), in which this upper side (25) is located closer to the upper side (19) of the cap (1) than the bottom side (26) of the control part (70) when placing the control part (70) in the first opening (19) of the cap (1), and that the peripheral openings (22) are located in the vicinity of this upper side (25) of the control part (70).
5. Bottle closure (60) according to any one of the claims 1 to 4, **characterized in that** the first opening (19) of the cap (1) is provided with one or more internal protrusions (15) that are configured to be coupled via a bayonet fitting with one or more helical grooves (23) that are situated along the casing of the cylindrical control part (70).
6. Bottle closure (60) according to any one of the claims 1 to 5, **characterized in that** the first opening (19) is provided with a sealing ring (14).
7. Bottle closure (60) according to any one of the claims 1 to 6, **characterized in that** the control part (70) i) comprises a cylindrical shaft (2) with peripheral openings (22) along the casing of said cylindrical form that are in connection to an opening (27) partially extending through the shaft (2) and ii) comprises a pin (3) with an opening (37) completely extending through the pin (3), in which the pin (3) and cylindrical shaft (2) can be coupled when they are oriented in such way that a central longitudinal axis (80) passes through both the pin (3) and the shaft (2) and in which the pin (3) comprises one or more notches (33) that are configured to be brought into contact with one or more protrusions (28) contained by the

shaft (2).

8. Bottle closure (60) according to claim 7, **characterized in that** the shaft (2) comprises along its casing one or more helical grooves (23) for receiving one or more internal protrusions (15) of the cap (1) via a bayonet fitting.
9. Bottle closure (60) according to claim 7 or 8, **characterized in that** the pin (3) is cylindrical and comprises a sealing ring (34) around the casing of its cylindrical form.
10. Kit comprising a soap bottle and a bottle closure (60) according to any one of claims 1 to 9.
11. Method for adjusting a bottle closure (60) for controlled release of a soap solution, the bottle closure (60) comprising a cap (1) with a first opening (19) completely extending there through and a cylindrical control part (70) with one or more peripheral openings (22) along the casing of said cylinder form that are in connection to a second opening (27, 37) partially extending through the control part (70), in which the control part (70) can be placed along a bottom side (18) of the cap (1), which bottom side (18) is opposite to an upper side (17) of the cap (1), in the first opening (19) of the cap (1) when they are oriented in such way that a central longitudinal axis (80) passes through both the control part (70) and the cap (1), in which the method comprises the step of placing the control part (70) in the first opening (19) of the cap (1) according to the orientation of the central longitudinal axis (80), **characterized in that** the method further comprises the step of bringing the peripheral openings (22) above the first opening (19) by means of rotating the cap (1) with respect to the control part (70) around said longitudinal axis (80).
12. Method according to claim 11, **characterized in that** the rotation is carried out until further rotation is blocked by a mechanical obstruction.
13. Use of a method according to claims 11 or 12 for adjusting a bottle closure (60) according to any one of the claims 1 to 9.



*Fig. 1*

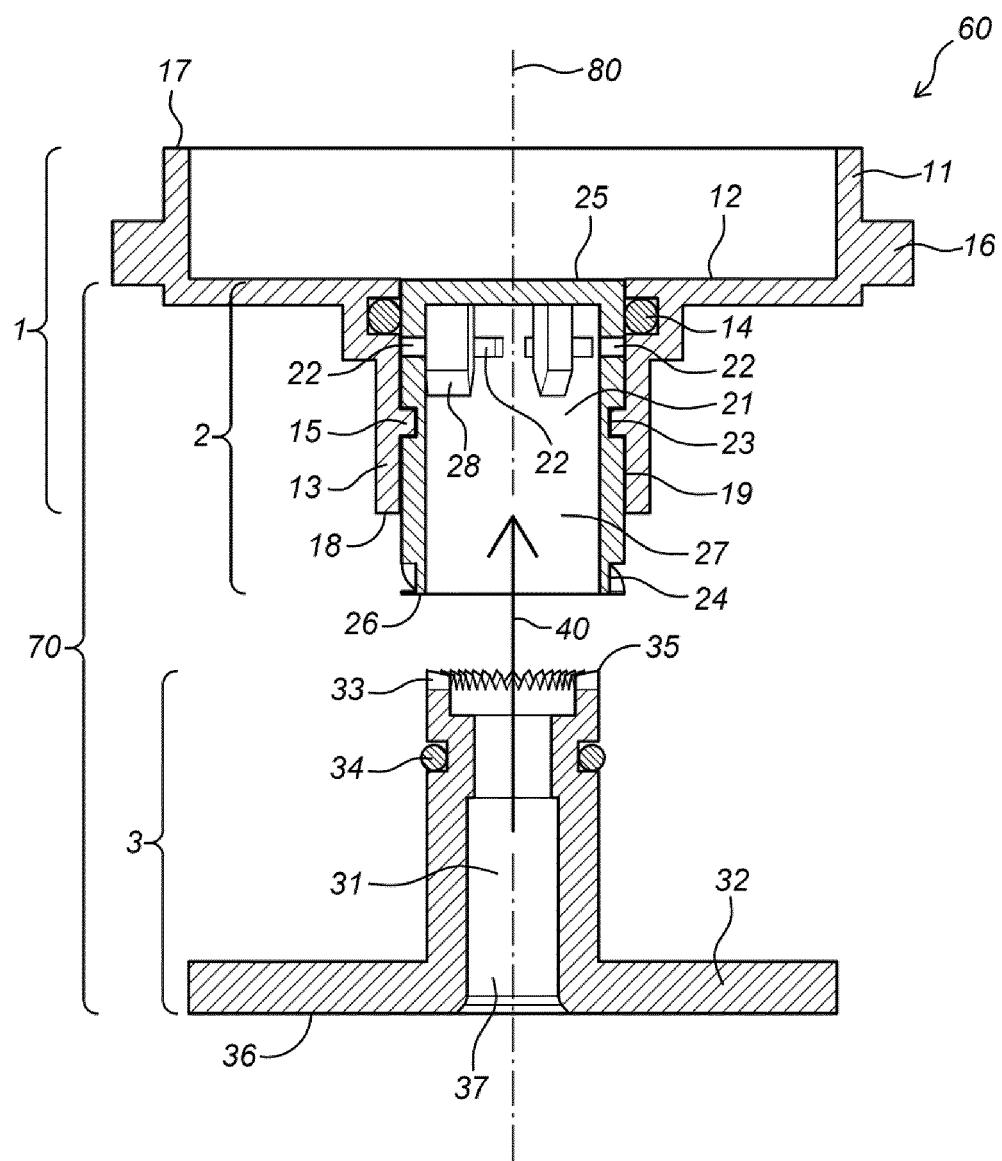
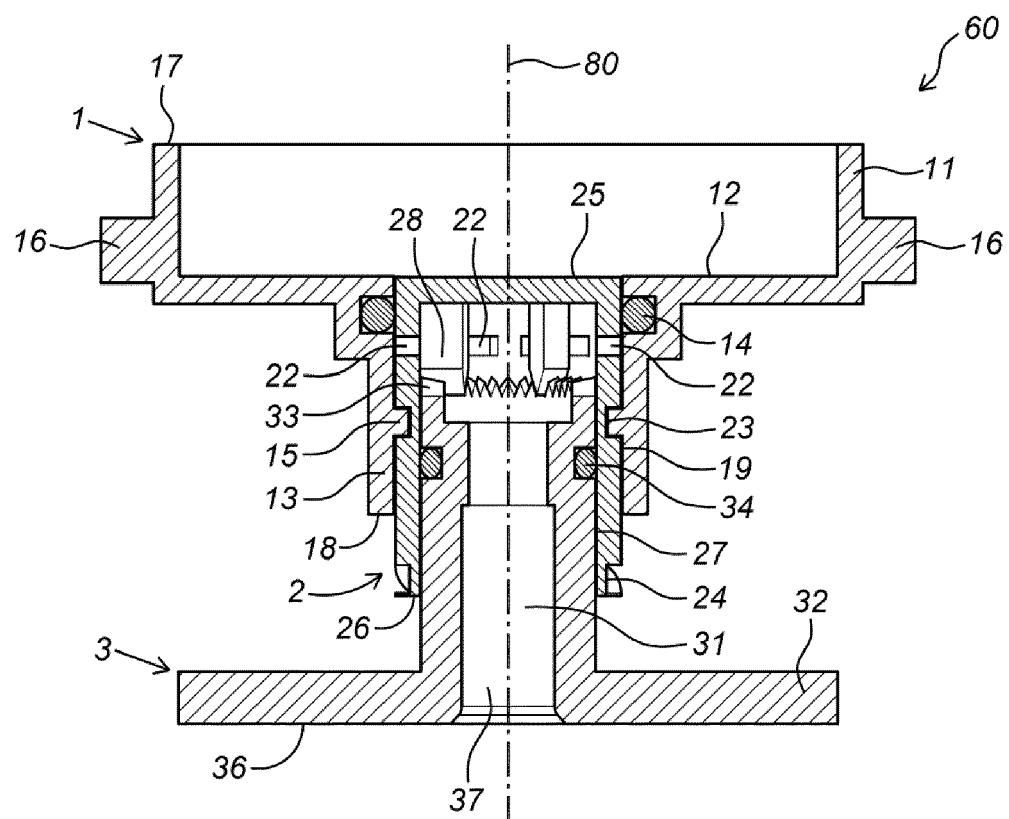


Fig. 2a



*Fig. 2b*

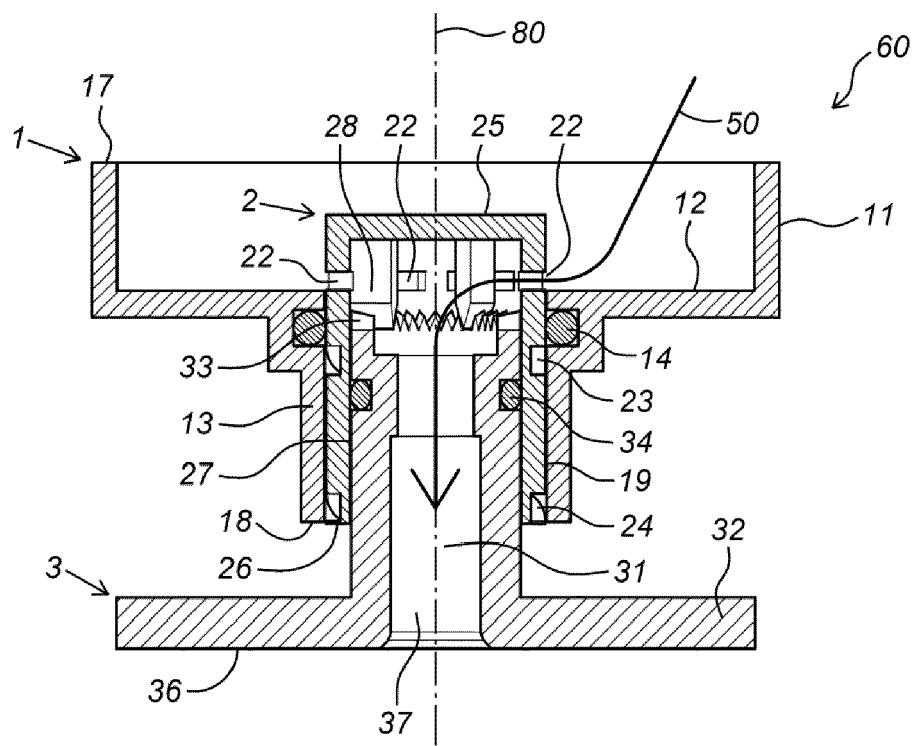


Fig. 3

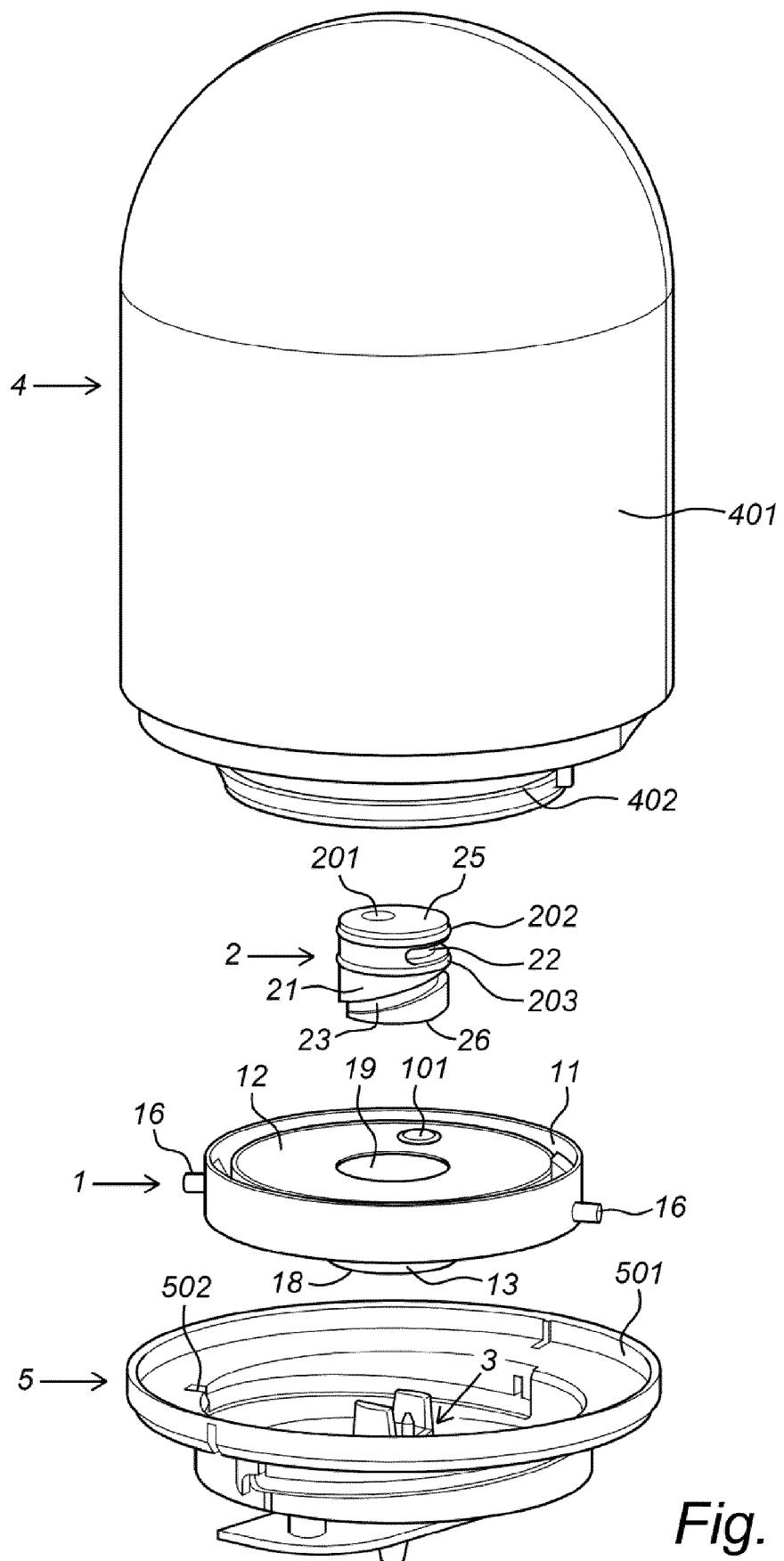
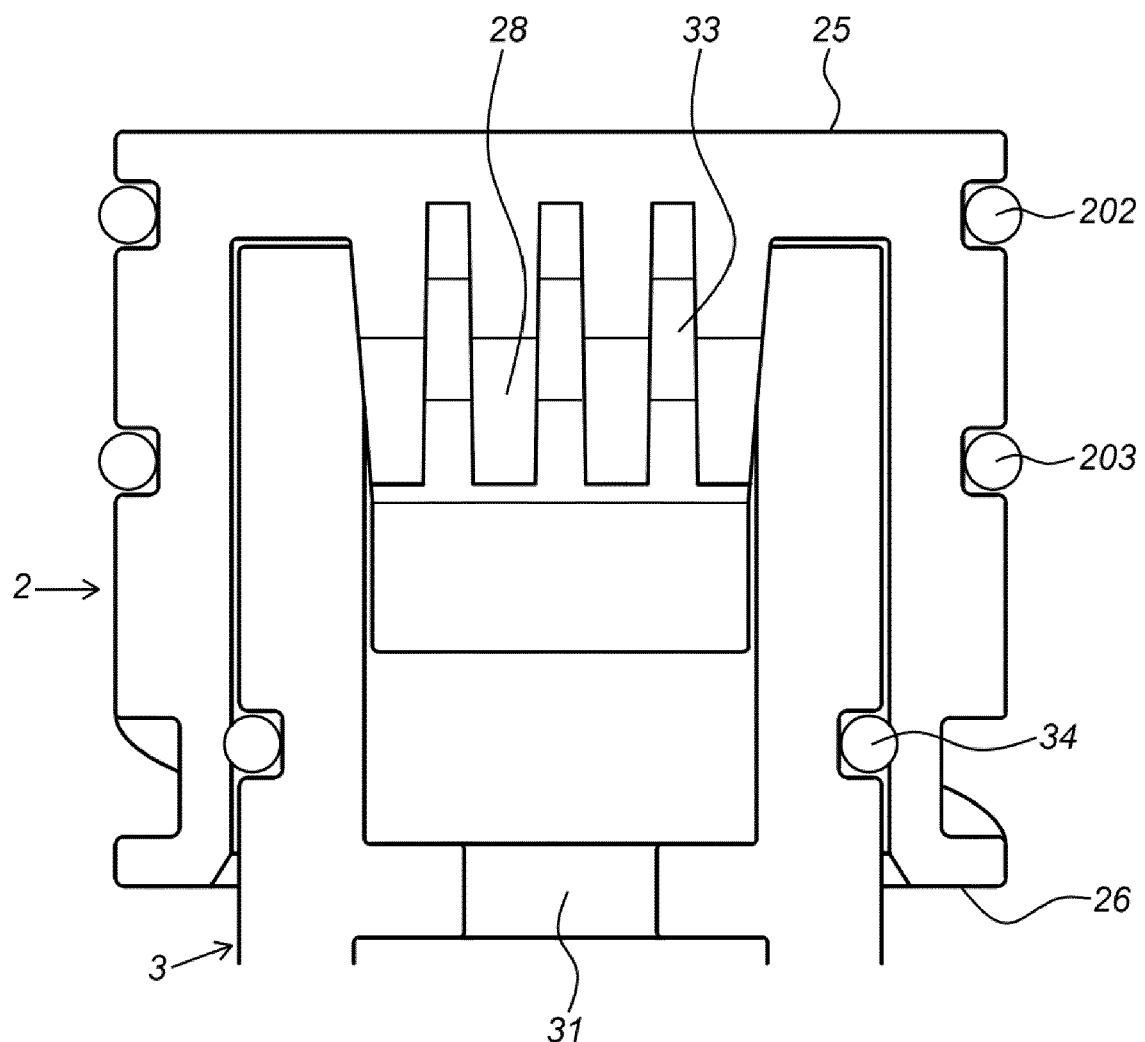
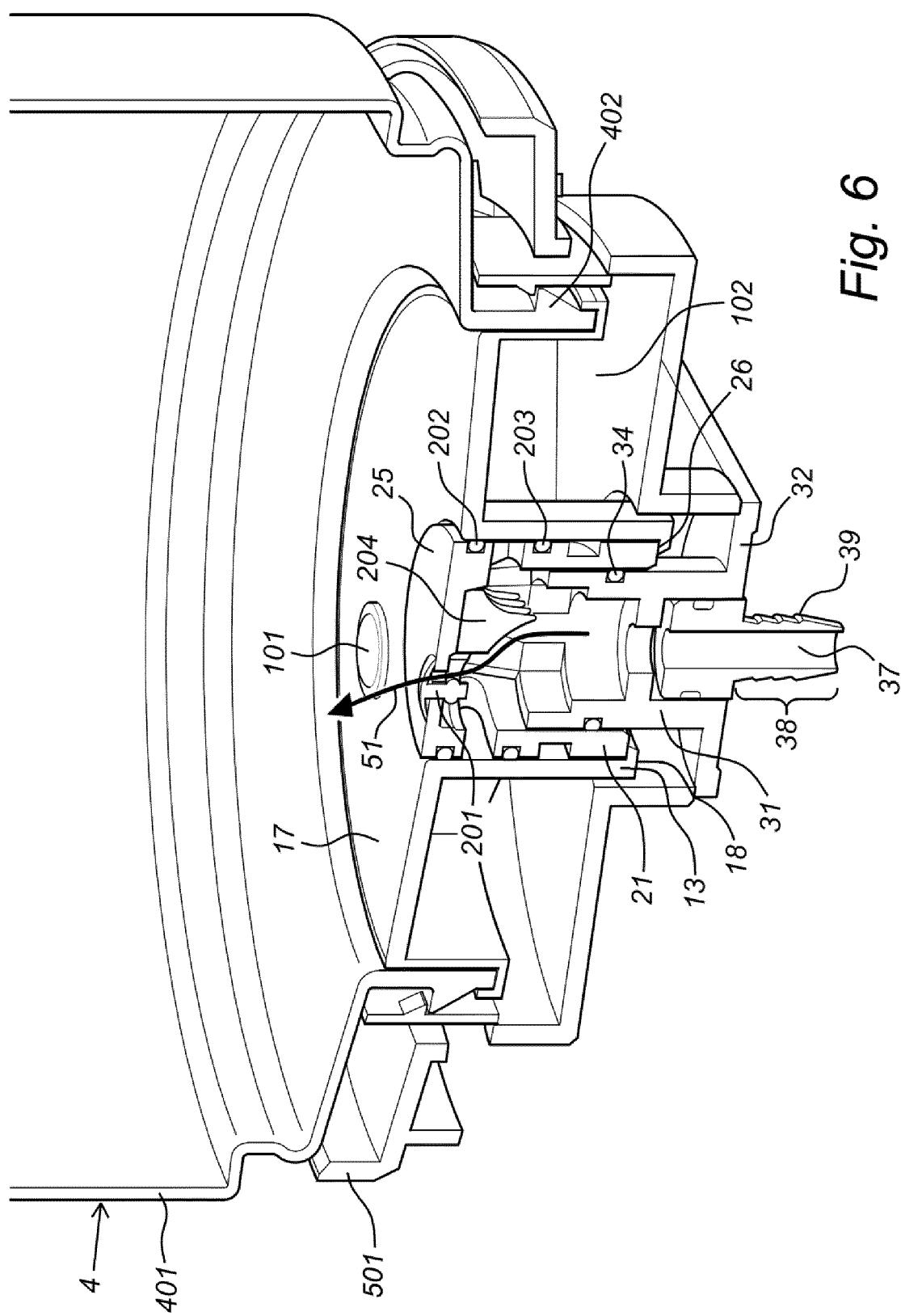
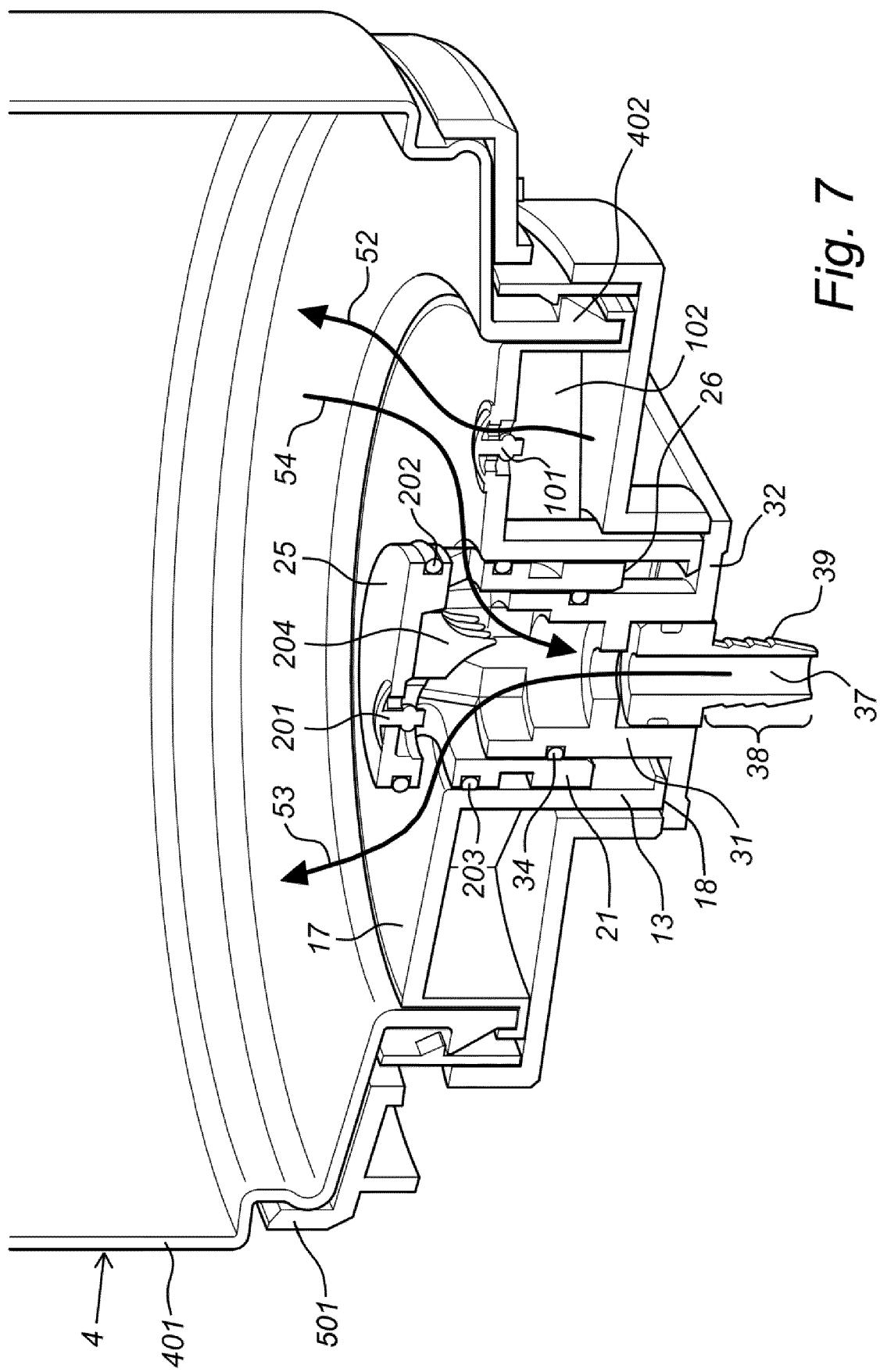


Fig. 4



*Fig. 5*





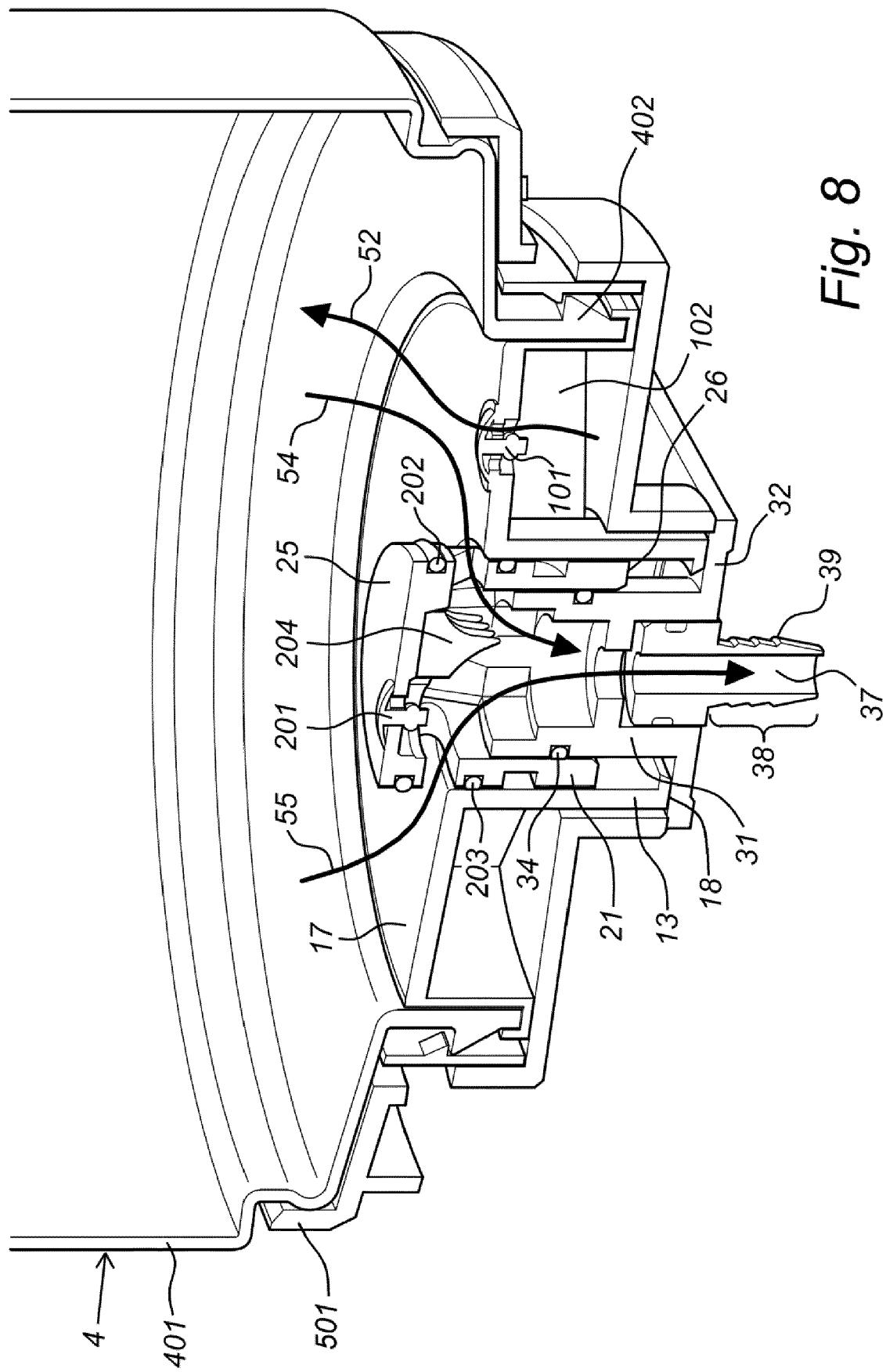
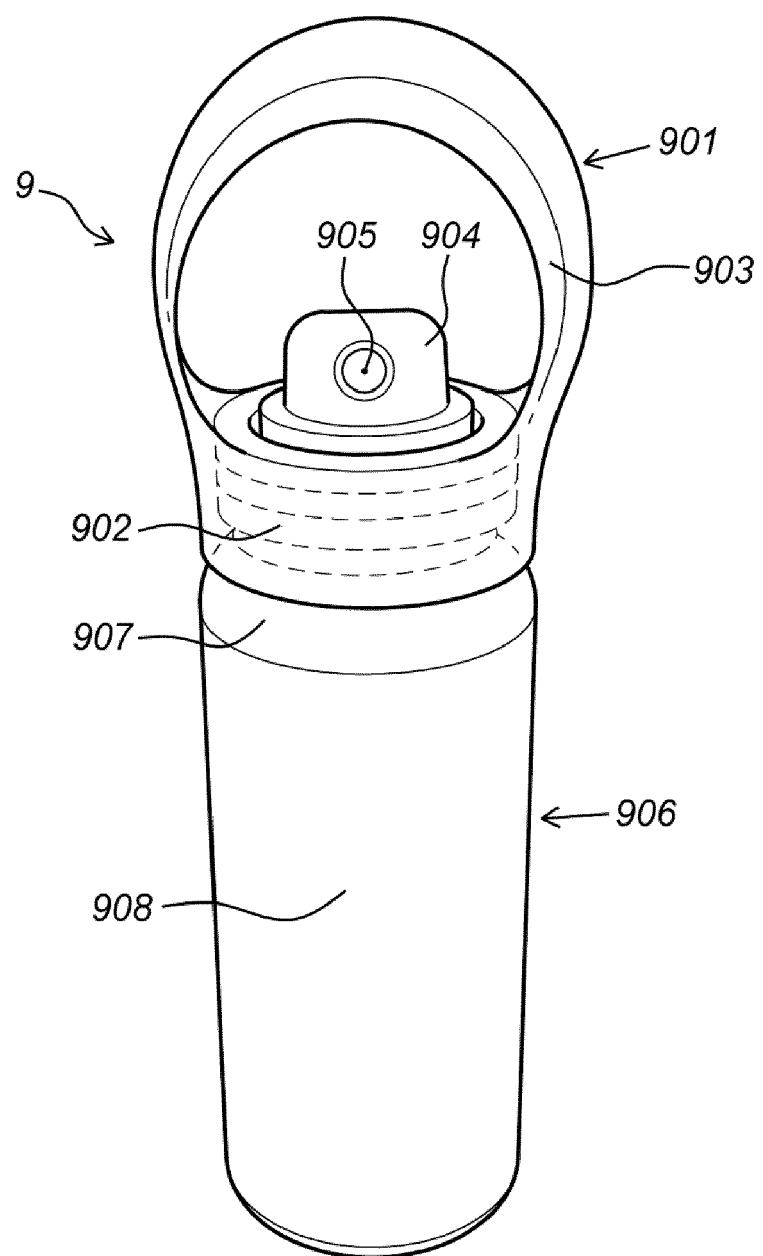


Fig. 8



*Fig. 9*

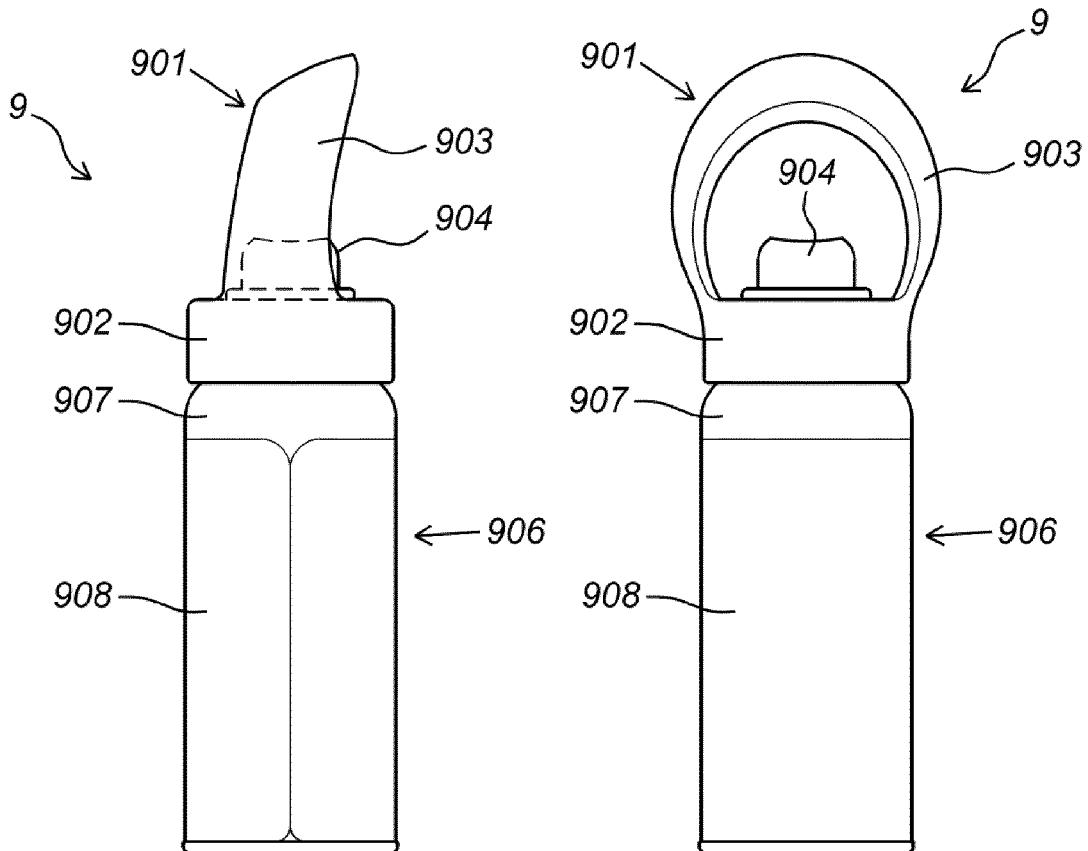


Fig. 10

Fig. 11

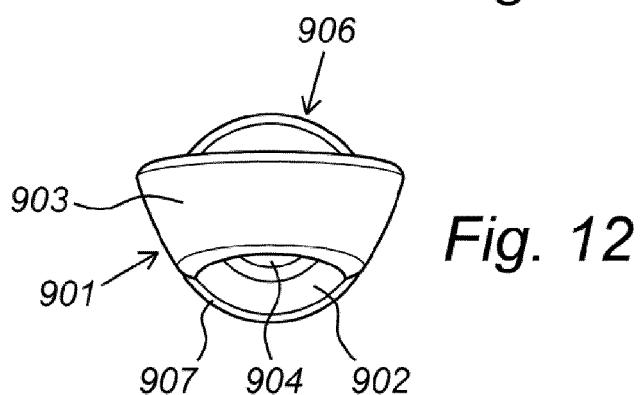


Fig. 12

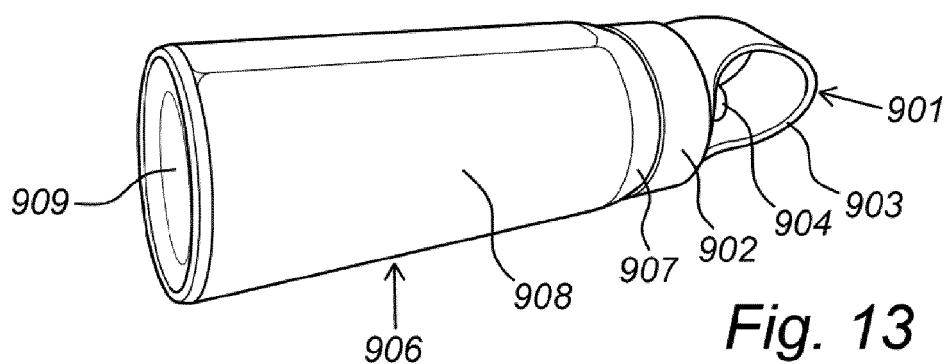


Fig. 13



## EUROPEAN SEARCH REPORT

Application Number

EP 17 15 2371

5

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2 992 761 A (SOMMERS SR EDWARD P) 18 July 1961 (1961-07-18) * column 2, line 58 - column 5, line 26; figures *	1-6, 10-13 7	INV. A47K5/12 B65D47/24
A	-----		
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			B65D A47K
1			
Place of search		Date of completion of the search	Examiner
The Hague		16 May 2017	Fordham, Alan
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16-05-2017

10	Patent document cited in search report	Publication date	Patent family member(s)	Publication date
15	US 2992761	A 18-07-1961	NONE	
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25				
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