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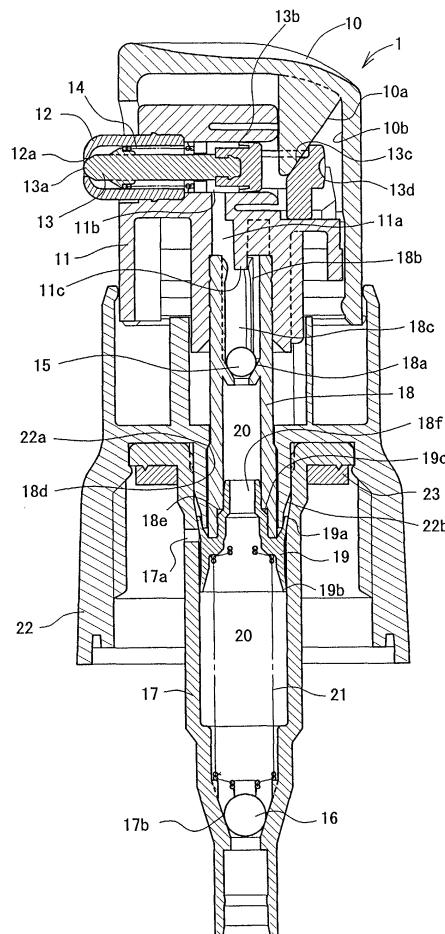
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(54) **Dispenser**

(57) A dispenser which prevents the fluid residue in a discharging aperture (12a) nearby or a discharging pass way (11) from dripping, hardening and deteriorating. Also the leakage or dripping of the contents is prevented in the case that the container is fallen down. The dispenser has a valve stem (18), a housing (17), an upper valve (15) in the valve stem and a lower valve (16) in the housing. When the upper valve (15) is opened by actuation the contents stored in a chamber (20) between said upper valve (15) and said lower valve (16) are discharged from the discharging aperture. The dispenser has a linear passage for communicating a valve stem and a housing in order to suck the fluid residue present in the aperture nearby or the discharging pass way after discharge into a storage chamber, effectively. The dispenser also provides a shutoff member (13) for opening and closing the aperture by means of the spring (14) in order to prevent the fluid residue present in the discharging aperture nearby from dripping, or the contents from leaking or dripping.

Fig. 1



Description**BACKGROUND OF THE INVENTION****1. Field of the Invention**

[0001] The present invention relates to a dispenser for discharging fluid contents such as shampoo, detergent, cosmetics stored in a container, more particularly, to a dispenser for providing a suction mechanism and a shutoff member so that the fluid residue present in a discharging aperture nearby after discharge are prevented from dripping, hardening, deteriorating.. The present invention also relates to a dispenser for preventing the contents from leaking or dripping when the container is fallen down.

2. Prior Art

[0002] Japanese publication NO.8-169462 discloses a pomp type liquid dispenser for preventing fluid residue from dripping from a nozzle after discharging the contents.

[0003] Fig. 7, Fig. 8 and Fig. 9 illustrate the pomp type liquid dispenser. Fig. 7 illustrates a mode in nonuse, Fig. 8 illustrates a mode in use and Fig. 9 illustrates a transition state from the mode in use to the mode in nonuse after releasing an actuator.

[0004] In these figures, 40 shows a pomp type liquid dispenser, 41 shows an actuator, 41(a) shows a nozzle, 41(b) shows a nozzle aperture, 41(c) shows a pass way, 42 shows a valve stem fixed firmly with the actuator 41 so that it moves upwardly and downwardly with the operation of the actuator 41, 42(a) shows a side hole for passing contents, 42(b) shows an annular convex portion, 42(c) shows a reception for receiving a seal member 44, 42(d) shows an annular flange, 43 shows a housing, 43(a) shows a storage chamber, 43(b) shows an opening for drawing air in the decompressed container 52 after discharge, 44 shows a seal member urged upwardly against the valve stem 42, 44(a) shows an upper end of the seal member 44, 44(b) shows a lower end of the seal member 44, 45 shows a member for screwing with the actuator 41, 45(a) shows a skirt for receiving the seal member 44, 46 shows a cap, 47 shows a gasket, 48 shows an upper ball valve, 49 shows a lower ball valve, 50 shows a spring for urging the valve stem upwardly, 51 shows a spring for urging the seal member upwardly against the valve stem 42.

[0005] As shown in Fig.7, in the mode in nonuse, since the valve stem 42 is urged upwardly by means of the spring 50. The housing 43 includes the contents flown from a container, according to the previous operation. Since the upper end 44(a) of the seal member 44 contacts firmly with the skirt 45(a) of the engaging member 45 and the lower end 44(b) contacts firmly with the reception 42(c) of the valve stem 42, the side hole 42(a) for communicating the housing 43 and the valve

stem 42 is shut.

[0006] As shown in Fig.8, in the mode in use, pressing the actuator 41 forces the valve stem 43 to move downwardly against the urging force of the spring 50. The seal

5 member 44 moves upwardly relatively to the valve stem 42 until the upper end 44(a) contacts the annular convex portion 42(b). Therewith, the side hole 42(a) is opened. Also, since the pressure in the housing 43 is increased, the upper ball valve 48 is opened, therewith the contents 10 in the storage chamber 43 is discharged outside through the route shown with an arrow, that is, the storage chamber 43(a) of the housing 43 - the side hole 42(a) - the valve stem 42 - the passage 41(c) - the nozzle 41(a) - the nozzle aperture 41(b).

[0007] As shown in Fig.9, in the transition state from the mode in use to the mode in nonuse after releasing the actuator 41, as the valve stem 42 moves upwardly by urging force of the spring 50, the pressure in the valve stem 42 and the housing 43 is decreased.

[0008] Since the valve stem 42 moves upwardly, at first the upper ball valve 48 is closed. Then the lower ball valve 49 is opened so that the contents flows in the housing 43. Finally, the lower ball valve 49 is closed. The fluid residue present in the nozzle 41(a) and the 25 passage 41(c) and so on after discharge are drawn into the valve stem 42 and housing 43 until the upper ball valve 48 is closed.

[0009] After the seal member 44 moves upwardly relatively to the valve stem 42 until the upper end 44(a) 30 contacts firmly with the skirt 45(a) of the member 45, only the valve stem 42 moves upwardly. When the valve stem 42 gets back to be a nonuse position, the lower end 44(b) of the seal member 44 contacts firmly with the reception 42(c) of the valve stem 42, therewith the side hole 42(a) is shut and the way from the storage chamber 43(a) to the valve stem 42 is closed.

[0010] Therefore, the fluid residue present in the nozzle 41(a) and the valve stem 42 are drawn into the housing 43 through the side hole 42(a) until the valve stem 40 42 gets back to be a nonuse position, that is, until the side hole 42(a) is closed after releasing the actuator 41.

[0011] As mentioned above, the conventional pomp-type liquid dispenser keeps the side hole for communicating the valve stem with the housing opening after releasing the actuator in order to draw the fluid residue present in the nozzle or the pass way into the housing through the valve stem so as to prevent dripping from the nozzle aperture.

[0012] However, the route from the valve stem to the 50 housing is twisted, therefore it is difficult to draw the fluid residue present in the nozzle or the pass way into the housing smoothly and certainly.

[0013] Also, in the case that the container is fallen 55 down, the contents in the valve stem, the nozzle and the pass way, which are positioned in the downstream of the side hole of the valve stem may be leaked or dripped.

[0014] Still, the fluid residue present in the nozzle contacts with the air so that they may be deteriorated or

hardened. This causes a nozzle blockade, consequently the contents cannot be discharged.

[0015] It is an object of the present invention to provide a dispenser which the fluid residue present in a discharging aperture nearby or a discharging pass way can be sucked smoothly and certainly after discharge so as to prevent from dripping.

[0016] It is an another object of the present invention to provide a dispenser so as to prevent the contents from dripping in the case that a container is fallen down, and to prevent the fluid residue present in a discharging aperture nearby and a discharging pass way from deteriorating and hardening.

[0017] It is a further object of the present invention to provide a dispenser so as to reduce the number of the parts and to simplify the assembly.

SUMMARY OF THE INVENTION

[0018] A dispenser that the fluid residue present in a discharging aperture nearby or a discharging pass way after discharge are prevented from dripping, hardening and deteriorating has now been discovered. The dispenser provides a valve stem, a housing, an upper valve in the valve stem and a lower valve in the housing. When the upper valve is opened by actuation, the contents stored in a chamber between the upper valve and the lower valve are discharged from a discharging aperture. The dispenser configures a linear passage between the upper valve and the lower valve formed by having a mouth at housing side portion of the valve stem, and a shutoff member for closing the discharging aperture with urging force and for opening the discharging aperture against the urging force according to the actuation.

[0019] According to the present invention, since a passage between an upper valve and a lower valve is configured to be linear, the fluid residue present in the discharging aperture nearby or the discharging pass way after discharge can be sucked smoothly and certainly into a housing. Therefore, dripping from a discharging aperture is prevented.

[0020] Also, as the discharging aperture is closed by the shutoff member with urging force compulsorily except for actuation, the contents are prevented from leaking or dripping when a container is fallen down and the fluid residue present in a discharging aperture nearby or a discharging pass way are prevented from deteriorating and hardening.

[0021] Preferably, a seal member for contacting with the inner surface of the housing is combined with the valve stem.

[0022] According to the present invention, as the valve stem and the contacting member are substantially configured to be in one part, the number of the parts, for example a spring for urging the seal member can be reduced and the assembly thereof is simplified.

[0023] More preferably, the seal member for contacting with the inner surface of the housing is integrally

formed with the valve stem.

[0024] According to the present invention, as the seal member and the valve stem are in one part, the number of the parts can be reduced and the assembly thereof is simplified.

[0025] More preferably, the seal member is configured to make an opening, which is formed in said housing in an active state in order to draw air into a container room around the housing.

[0026] According to the present invention, after discharge air can be drawn into the decompressed container so that the pressure in the container is recovered to be the original state for next discharge.

15 BRIEF DESCRIPTION OF THE DRAWINGS

[0027] These and other aspects of the present invention may be more fully understood by reference to one or more of the following drawings wherein:

20 FIG.1 illustrates a mode in nonuse of a pomp-type dispenser for fixing a seal member to a valve stem.
FIG.2 illustrates a mode in use of the pomp-type dispenser shown in FIG.1.

25 FIG.3 illustrates a transition state from the mode in use to the mode in nonuse after releasing an actuator of the pomp-type dispenser shown in FIG.1.

30 FIG.4 illustrates a mode in nonuse of a pomp-type dispenser providing a valve stem which the valve stem and the seal member shown in FIG.1 are integrally molded.

35 FIG.5 illustrates a mode in use of the pomp-type dispenser shown in FIG.4.

FIG.6 illustrates a transition state from the mode in use to the mode in nonuse after releasing an actuator of the pomp-type dispenser shown in FIG.4.

DETAILED DESCRIPTION OF THE INVENTION

40 **[0028]** In these figures, 1 shows a pomp-type dispenser, 10 shows a cover, 10(a) shows a taper-shaped operation portion for moving an after mentioned shutoff member 13 so as to open a tubular tip aperture 12(a), 10(b) shows an inner surface of the cover, 11 shows a

45 cylindrical head, 11(a) shows a longitudinal discharging pass way, 11(b) shows a lateral discharging pass way, 11(c) shows a receiving portion for restricting upward movement of the upper ball valve 15, 12 shows a tubular tip, 12(a) shows a discharging aperture, 13 shows a

50 shutoff member installed movable in the cylindrical head, 13(a) shows a front end, 13(b) shows a lip sealingly moves against the head, 13(c) shows a tapered portion for corresponding to the operation portion, 13(d) shows a back end, 14 shows a spring for urging the shutoff member in the direction of the aperture 12(a), 15 shows an upper ball valve, 16 shows a lower ball valve,

55 17 shows a housing, 17(a) shows an opening for drawing air into a decompressed container after discharge,

17(b) shows a conical seat for receiving the lower ball valve 16, 18 shows a valve stem, 18(a) shows a conical seat for receiving the upper ball valve 15, 18(b) shows a rib for restricting upward movement of the upper ball valve 15, 18(c) shows an upper room in the valve stem 18 (a part of the discharging pass way), 18(d) shows a shoulder, 18(e) shows an inner rim, 18(f) shows a passageway for communicating the valve stem 18 and a housing 17, 18(g) shows a seal portion formed at the lower end of the valve stem 18, 18(h) shows a peripheral upper end of the seal portion 18(g), 18(i) shows a peripheral lower end of the seal portion 18(g), 19 shows a seal member fixed firmly with the valve stem 18, for opening or shutting the opening 17(a), 19(a) shows a peripheral upper end of the seal member 19, 19(b) shows a peripheral lower end of the seal member 19, 19(c) shows a rim of the seal member 19, 20 shows a storage chamber (inner space between the upper ball valve 15 and the lower ball valve 16), 21 shows a spring for urging the valve stem 18 upwardly, 22 shows a cap, 22(a) shows an inner rim, 22(b) shows a convex portion formed between the cap 22 and the housing 17, 23 shows a gasket.

[0029] Here, the shutoff member 13 is formed so that the front part comprising the front end 13(a), and the back part comprising the lip 13(b) and the back end 13(d) are fixed firmly. The seal portion 18(g) and the seal member 19 move guided by the inner surface of the housing 17 when the valve stem 17 moves. Also, the seal portion 18(g) and the seal member 19 sealingly slide against the inner surface of the housing 17.

[0030] As shown in FIG.1 and FIG.2, the pump type dispenser 1 is comprised of the followings, that is, the shutoff member 13 for opening or closing the discharging aperture 12(a) of the tip 12, the head 11 which is movable upwardly and downwardly against the cap 22 with holding the tip 12 and the valve stem 18, the cover 10 which the taper-shaped operation portion 10(a) is formed and is movable upwardly and downwardly against the head 11, the valve stem 18 which the seat 18(a) and the rib 18(b) for the upper ball valve 15 are formed and the seal member 19 is fixed, the housing 17 which the storage chamber 20 and the seat 17(b) for the lower ball valve 16 are formed and guides the seal portion 18(g) or the seal member 19 when they move upwardly and downwardly, and the cap 22 which the housing 17 is fixed and maintains the head 11 and the cover 10 in the state that the head 11 and the cover 10 are movable upwardly and downwardly.

[0031] The whole body of the shutoff member 13 is urged in the direction that the aperture is closed by means of the spring 14. The whole peripheral surface of the lip 13(b) contacts with the inner surface of the head 11. The tapered portion 13(c) contacts with the operation portion 10(a) of the cover 10.

[0032] The seal member 19 is fixed firmly with the valve stem 18 so that the rim 19(c) is engaged with the inner rim 18(e), and the peripheral upper end 19(a) and

the peripheral lower end 19(b) contacts with the inner surface of the housing 17. The seal member 19 combined with the stem 18 moves upwardly and downwardly with guiding by the inner surface of the housing 17.

[0033] As the passageway 18(f) communicating the valve stem 18 and the housing 17 is not divided by the seal member 19, the route of the longitudinal discharging pass way 11(a) - the upper room 18(c) of the valve stem - the storage chamber 20 is almost linear. Here, the storage chamber 20 for storing contents means the room surrounded with the lower ball valve 16, the housing 17, the seal member 19, the valve stem 18 and the upper ball valve 15.

[0034] As shown in FIG.1, in the mode in nonuse, the valve stem 18 moves upwardly until the shoulder 18(d) contacts the inner rim 22(a) of the cap 22 by means of the spring 21.

[0035] In this state, the peripheral upper end 19(a) engages the convex portion 22(b) and close the opening 17(a) tightly in order to prevent the contents from passing through the opening 17(a), the upper ball valve 15 and the lower ball valve 16 contact firmly with the respective conical seats 18(a), 17(b), the shutoff member 13 is urged leftwards by means of the spring 14 therewith the front end 13(a) closes the aperture 12(a) of the tubular tip 12, and the cover 10 moves upwardly because the operation portion 10(a) is pressed by the tapered portion 13(c) of the shutoff member 13 which urged leftwards.

[0036] The storage chamber 20 includes contents which are flown from the container after previous operation. Because after the previous operation the valve stem 18 moves upwardly by means of the spring 21, the pressure in the storage chamber 20 is lowered, therewith the lower ball valve 16 is opened and the contents flow from the container to the storage chamber 20.

[0037] As shown in FIG.2, when the cover 10 is actuated, the operation portion 10(a) acts the tapered portion 13(c) of the shutoff member 13 so that the shutoff member 13 moves rightwards.

[0038] The head 11 does not move until the back end 13(d) of the shutoff member 13 contacts the inner surface 10(b) of the cover 10. After the back end 13(d) of the shutoff member 13 contacts the inner surface 10(b) of the cover 10, the head 11 moves downwardly with the cover 10. At this time the valve stem 18 moves downwardly, therewith the pressure in the storage chamber is increased, so that the upper ball valve 15 leaves the seat 18(a) and moves upwardly until it engages the ribs 18(b) and receiving portion 11(c).

[0039] Consequently, the contents in the storage chamber 20 are discharged from the aperture 12(a) of the tubular tip 12 through the route of the upper room 18(c) of the valve stem 18 - a narrow gap between the ribs 18b and the upper ball valve 15 - the longitudinal discharging pass way 11(a) - the lateral discharging pass way 11(b).

[0040] In this mode in use, the lower ball valve 16 con-

tacts with the seat 17(b), therefore contents are not allowed to flow in the storage chamber 20 from the container.

[0041] The seal member 19 is positioned below the opening 17(a), the inside of the container communicates with outside by the route shown (A) through the opening 17(a).

[0042] As shown in FIG.3, when the cover 10 is released, the valve stem 18 and the head 11 starts to move upwardly by means of the spring 21, therewith the pressure of in the storage chamber 20 is gradually lowered, then upper ball valve 15 is close to the seat 18.

[0043] This pressure decrease makes fluid residue present in the aperture 12(a) nearby, the lateral discharging pass way 11(b), the longitudinal discharging pass way 11(a) and the upper room 18(c) of the stem valve 18 sucked in the storage chamber 20. This suction continues until the upper ball valve 15 contacts the seat 18(a) firmly.

[0044] As mentioned above, the route of the longitudinal discharging pass way 11(a) - the upper room 18(c) of the valve stem 18 - the storage chamber 20 is almost linear, the fluid residue present in the aperture 12(a) nearby, the lateral discharging pass way 11(b), the longitudinal discharging pass way 11(a) are effectively sucked in the storage 20.

[0045] The stem valve 18 moves upwardly so that the upper ball valve 15 contacts the seat 18(a), then the pressure in the storage chamber 20 is lowered than the pressure in the container, the lower ball valve 16 leaves the seat 17(b) so that the contents in the container flow in the storage chamber 20.

[0046] The pressure in the container is decreased corresponding to the degree that the contents in the container flows in the storage chamber 20. However, the outside air is drawn through the route shown (A) until the opening 17 is closed by the seal member 19 when the valve stem 18 recovers the position shown in FIG. 1. Therefore, the pressure in the container is recovered to be the original state.

[0047] Another distinctive feature of the pomp type dispenser 1 is that the shutoff member 13 moves leftwards after releasing the cover 10 by means of the spring 14 so as to close the aperture 12(a) of the tubular tip 12. Since the tapered portion 13(c) of the shutoff member 13 presses the operation portion 10(a), the cover 10 moves upwardly relatively to the head 11 so as to recover the state shown in FIG.1.

[0048] As mentioned above, the front end 13(a) of the shutoff member 13 closes the aperture 12(a) of the tubular tip 12, therefore, even when the small quantity of the fluid are remained in the aperture 12(a) nearby, the fluid residue are prevented from dripping, hardening and deteriorating.

[0049] Also, when the container is fallen down and the upper ball valve 15 is slip out of the seat 18(a) the contents are neither leaked nor dripped.

[0050] FIG.4, FIG.5, FIG.6 illustrate the another em-

bodiment which the seal member 19 shown and the valve stem 18 in FIG.1 are integrally molded. The other components are same as those shown in FIG.1. To assemble this dispenser the step for fixing the seal member to the valve stem 18 is needless.

[0051] Same as the above-mentioned embodiment, in this case, the route of though the longitudinal discharging pass way 11(a) - the upper room 18(c) of the valve stem 18 - the storage chamber 20 between the upper ball valve 15 and the lower ball valve 16 is almost linear, the inner diameter through the route in the valve stem 18 is almost same.

[0052] When the cover 10 is actuated, same as the case shown in FIG.2, the contents in the storage chamber 20 are discharged from the aperture 12(a) of the tubular tip 12 through the route of the upper room 18(c) of the valve stem 18 - the longitudinal discharging pass way 11(a) - the lateral discharging pass way 11(b) (see FIG.5).

[0053] When the cover 10 is released, same as the case shown in FIG.3, the pressure in the storage chamber 20 is decreased. This pressure decrease makes fluid residue present in the aperture 12(a) nearby, the lateral discharging pass way 11(b), the longitudinal discharging pass way 11(a) and the upper room 18(c) of the stem valve 18 sucked into the storage chamber 20 until the upper ball valve 15 contacts the seat 18(a) firmly (see FIG.6).

[0054] As mentioned above, the route through the longitudinal discharging pass way 11(a) - the upper room 18(c) of the stem - the narrow gap between the ribs 18(b) and the upper ball valve 15 -the upper ball valve 15 - the lower ball valve 16 is almost linear without twisted parts. Also the route which the fluid residue move from the valve stem 18 to the housing 17 is not narrowed. Therefore, the fluid residue present in the aperture 12(a) nearby, the lateral discharging pass way 11(b), and the longitudinal discharging pass way 11(a) are easy to be sucked into the storage chamber 20.

[0055] In the mode in nonuse, as mentioned above, the front end 13(a) of the shutoff member 13 closes the aperture 12(a) of the tubular tip 12, certainly.

[0056] It will be understood that the claims are intended to cover all changes and modifications of the preferred embodiments of the invention herein chosen for the purpose of illustration which do not constitute a departure from the spirit and scope of the invention.

50 Claims

1. A dispenser having a valve stem, a housing, an upper valve in said valve stem and a lower valve in said housing, wherein said upper valve is opened by actuation so as to discharge contents stored in a chamber between said upper valve and said lower valve from a discharging aperture comprising:

a linear passage between said upper valve and said lower valve, formed by having a mouth at housing side portion of said valve stem, and a member for closing said discharging aperture with urging force, and for opening said discharging aperture against said urging force according to said actuation. 5

2. The dispenser of claim 1 wherein a seal member for contacting with the inner surface of said housing 10 is combined with said valve stem.

3. The dispenser of claim 2 wherein said seal member is integrally formed with said valve stem. 15

4. The dispenser of claim 2 and claim 3 wherein said seal member makes an opening, which is formed in said housing in an active state, in order to draw air into a container room around said housing. 20

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Fig. 1

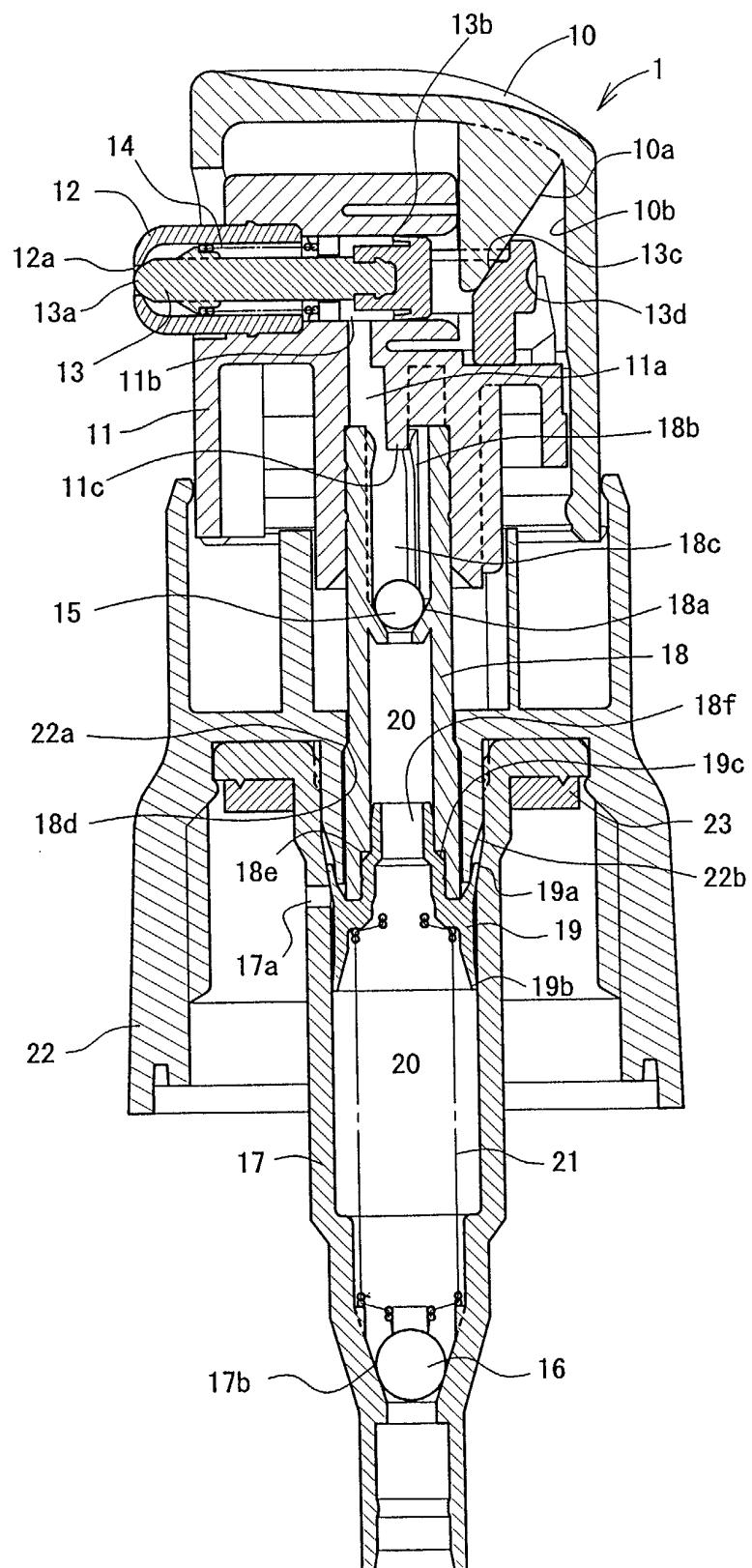


Fig. 2

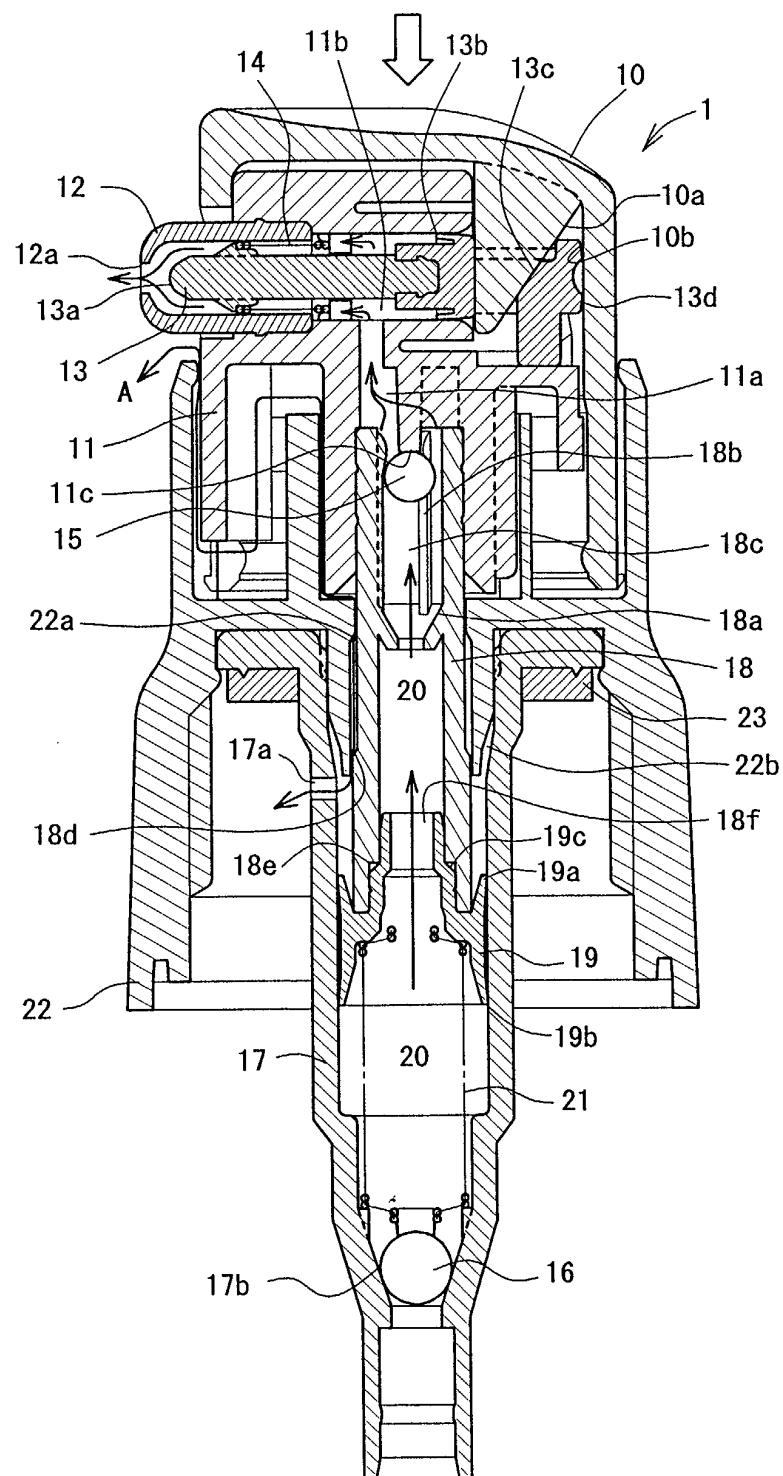


Fig. 3

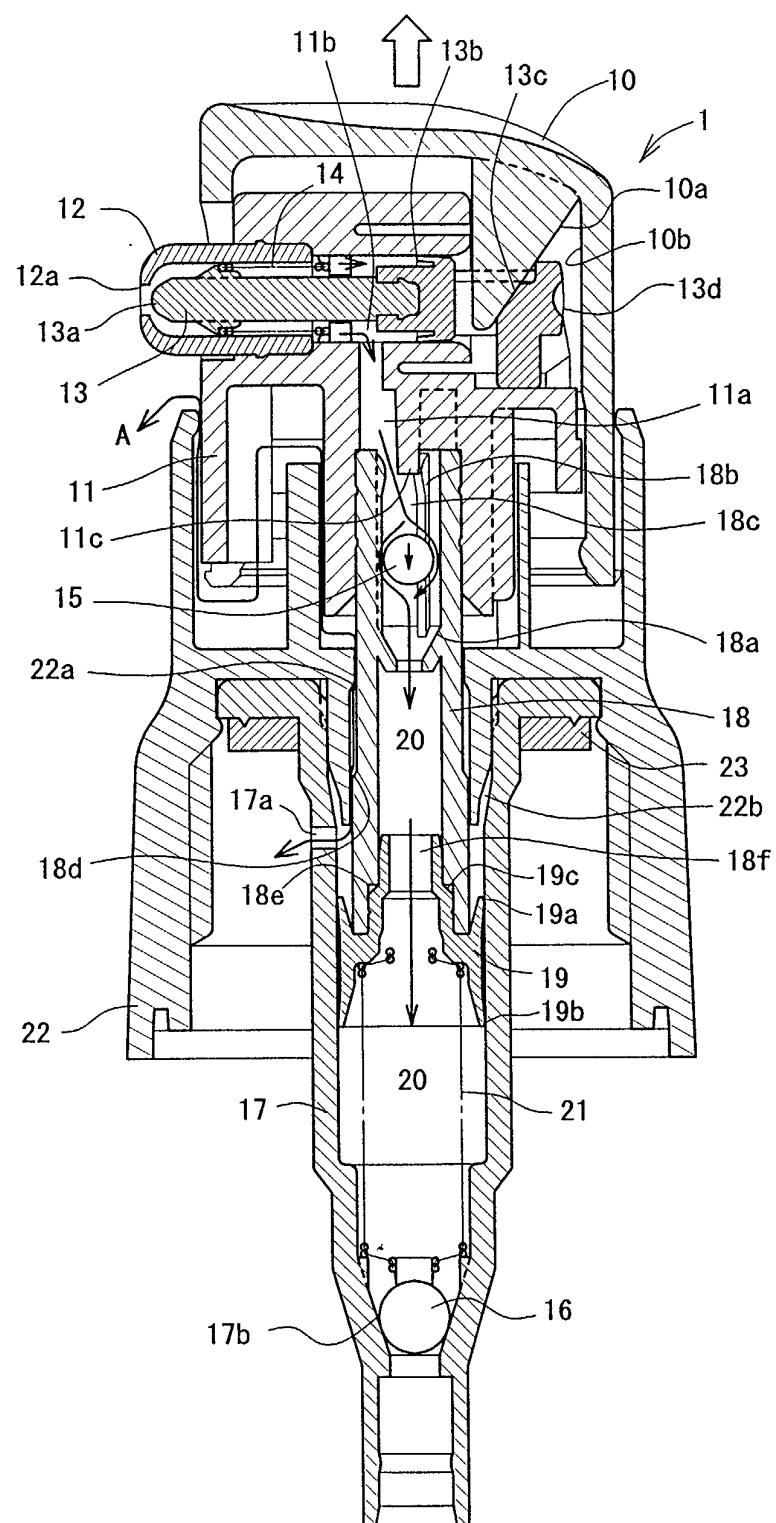


Fig. 4

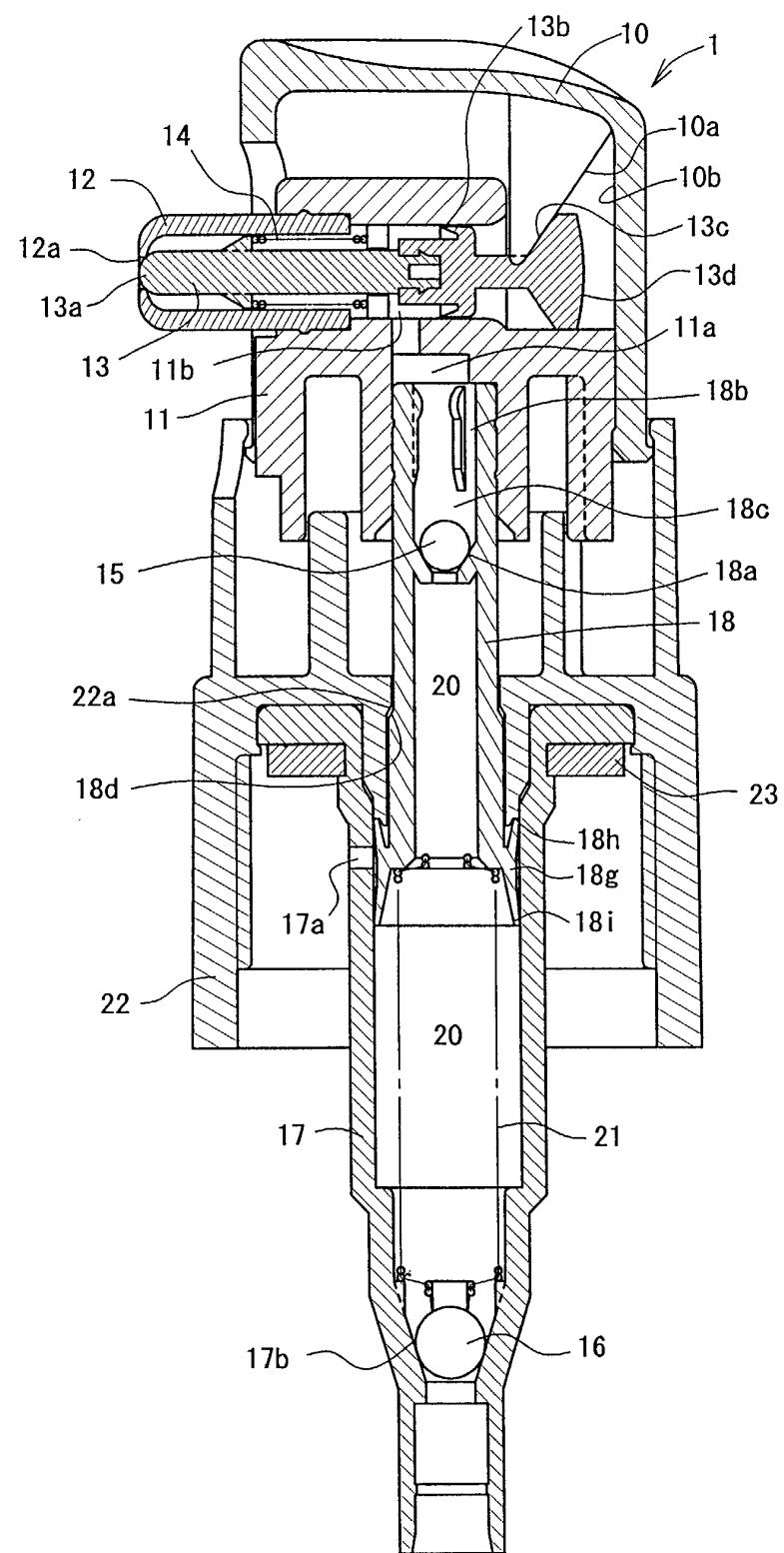


Fig. 5

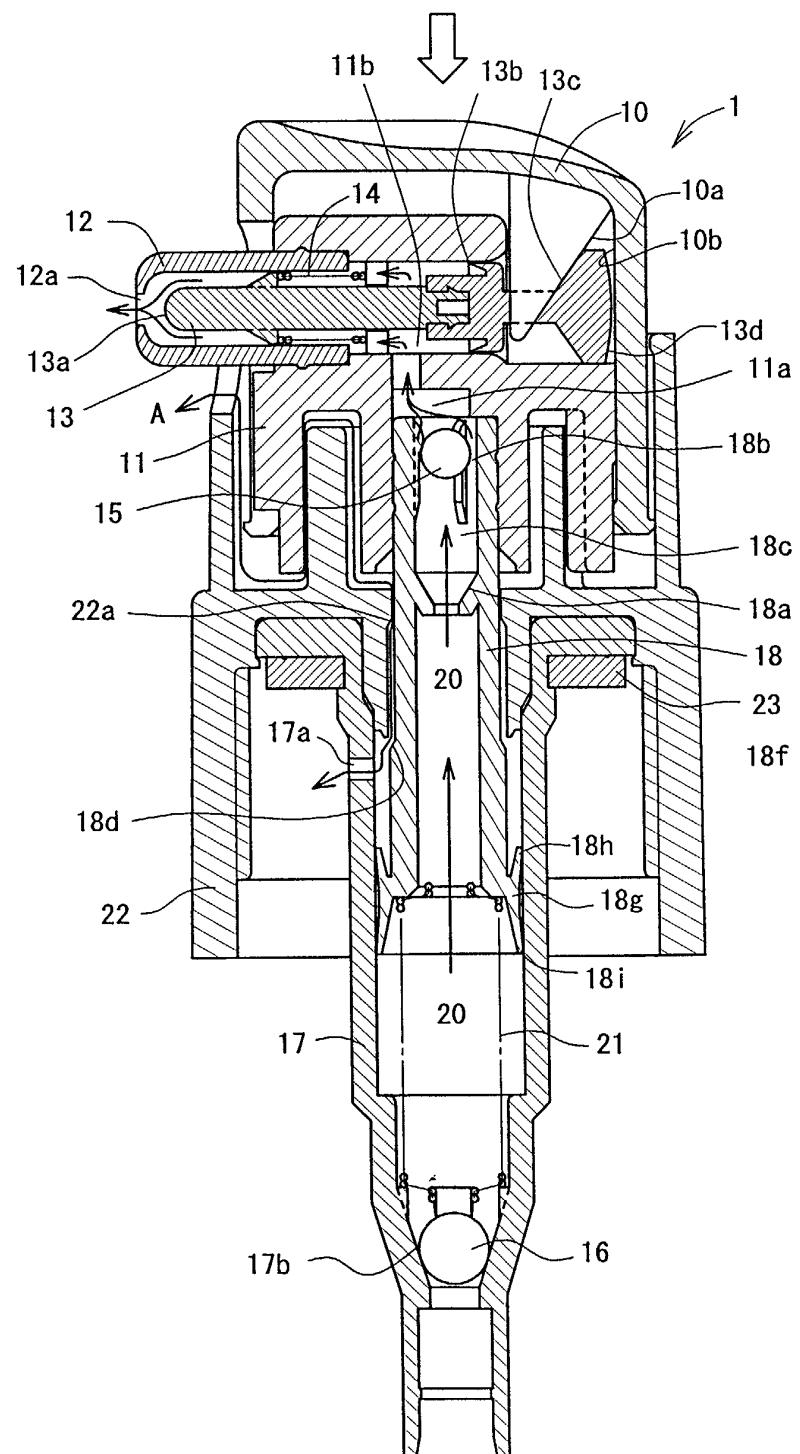


Fig. 6

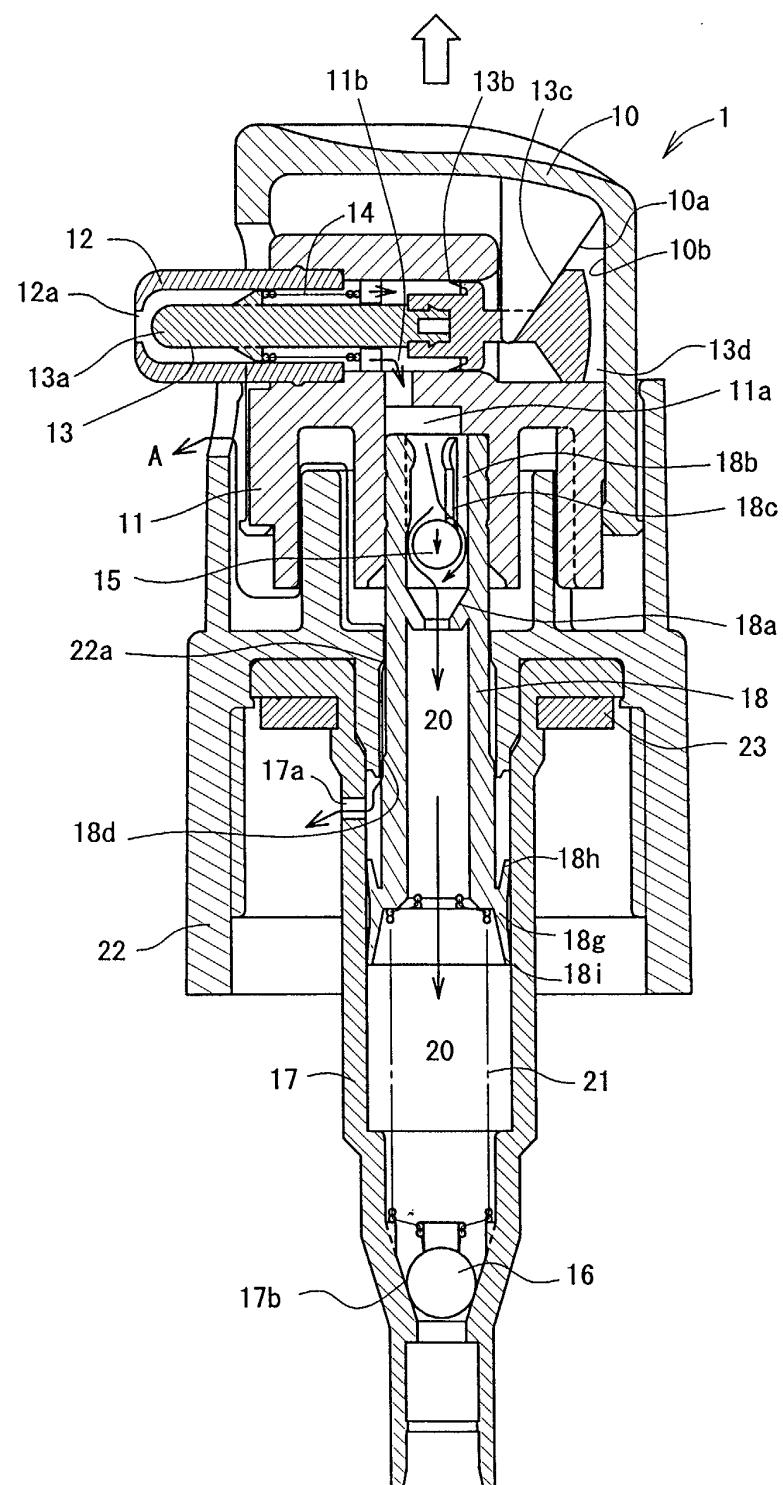


Fig. 7

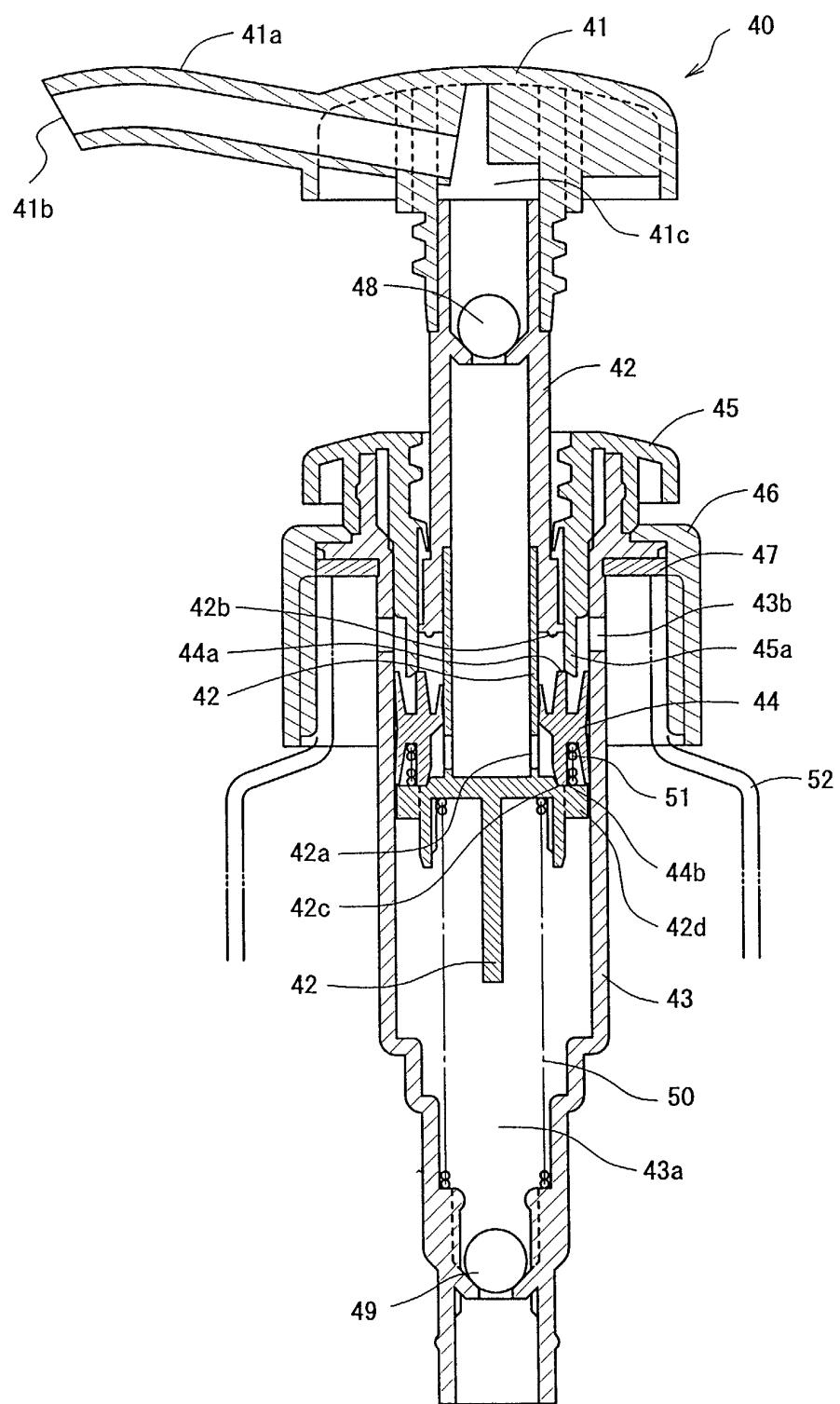


Fig. 8

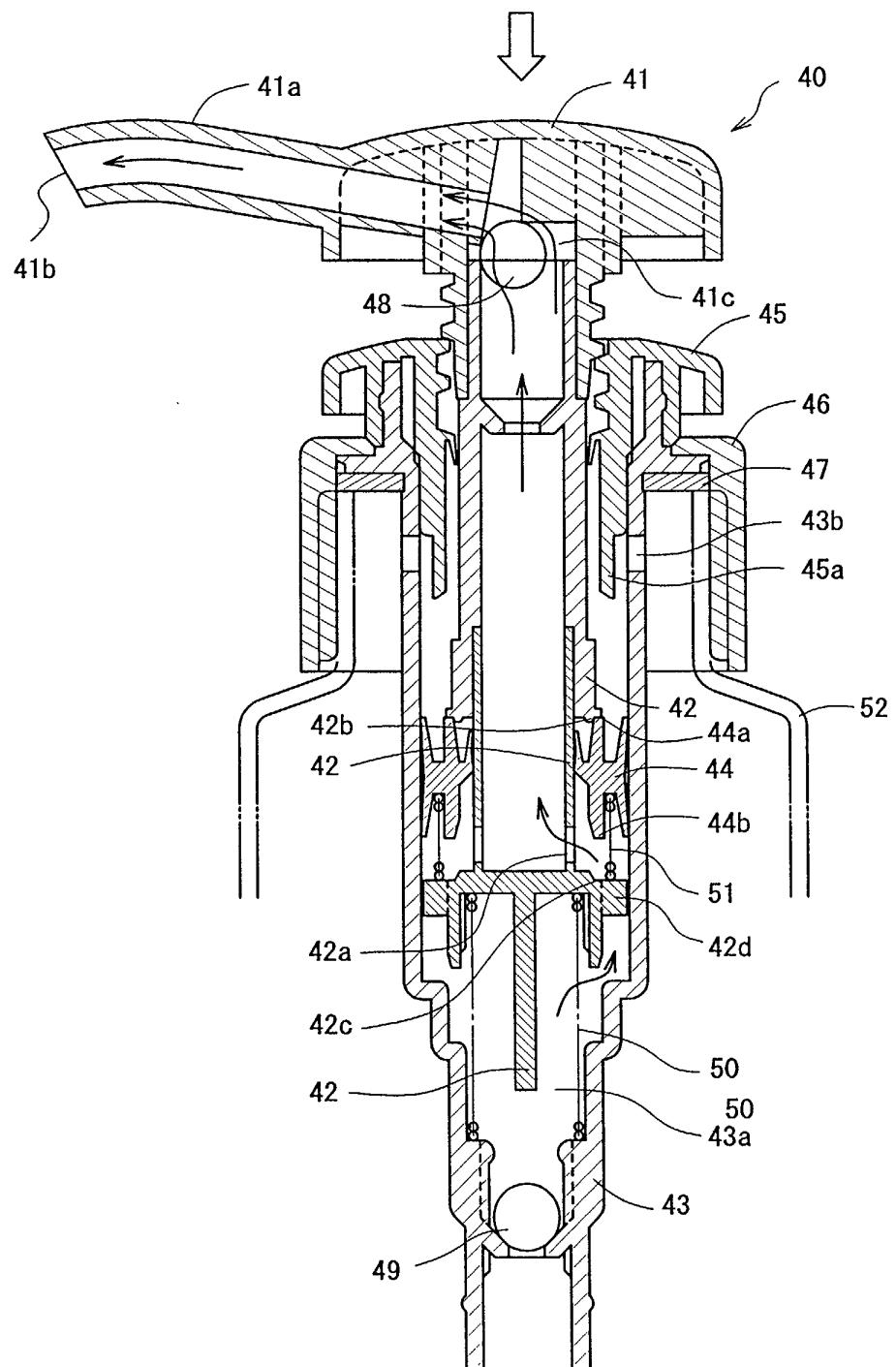
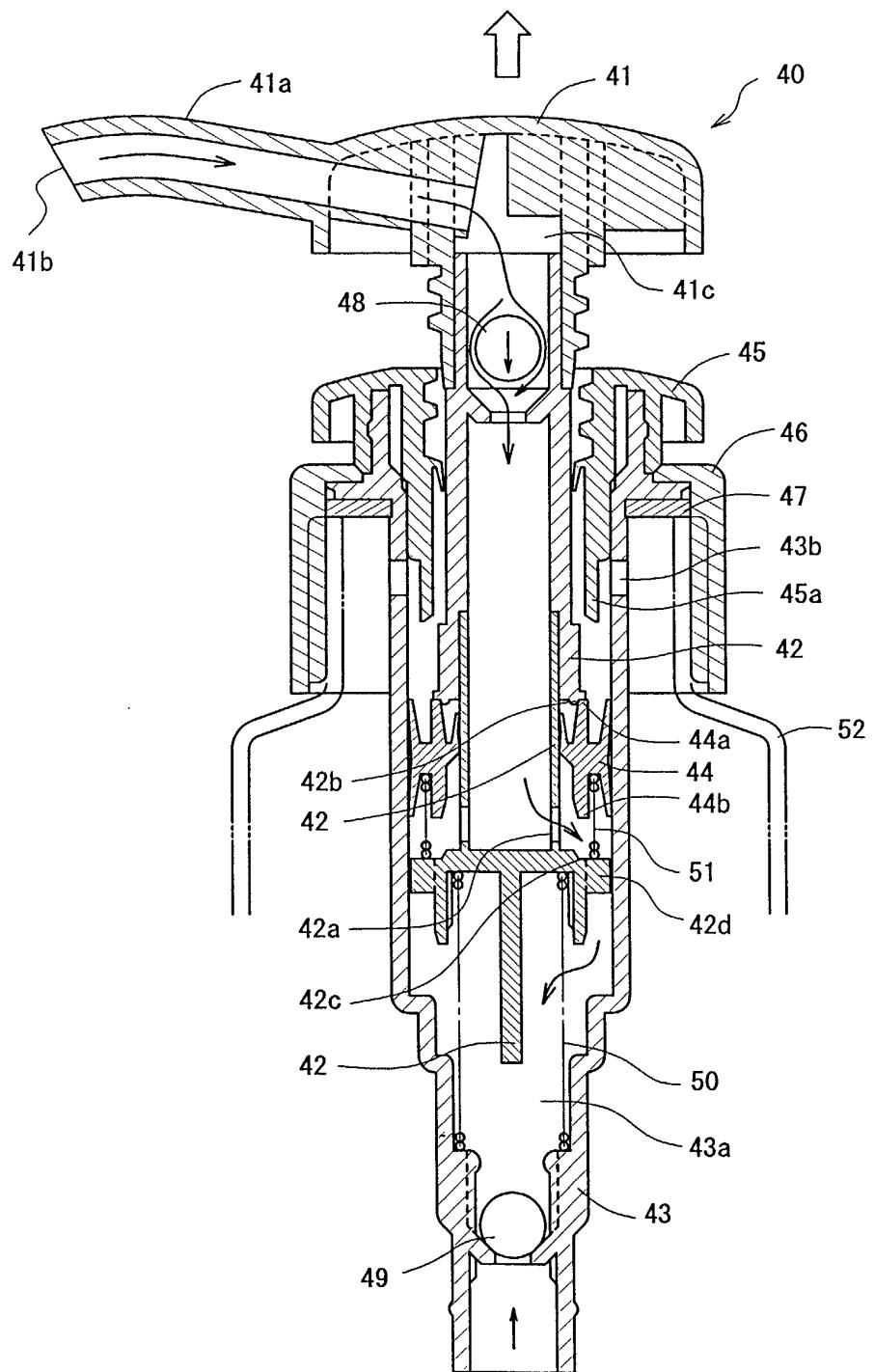


Fig. 9





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

EP 01 12 6499

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

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