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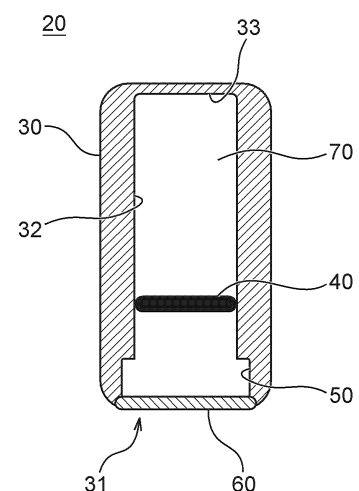
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(54) **CARTRIDGE AND FLAVOR INHALER COMPRISING SAME**

(57) A cartridge is provided. The cartridge comprises a bottomed cylinder-like housing with an opening at one end, a movable member provided to be slidable along an inner wall of the housing, and a communication mechanism that is provided in at least either one of the housing and the movable member, the communication mechanism being configured to bring a confined space defined by the inner wall of the housing, a bottom surface of the housing, and the movable member into communication with external space. The confined space is depressurized by the movable member moving toward the opening.

Fig. 2



EP 4 154 743 A1

Description

TECHNICAL FIELD

[0001] The invention relates to a cartridge and a flavor inhaler comprising the same.

BACKGROUND ART

[0002] Non-burning-type flavor inhalers for inhaling flavors without burning materials have conventionally been known. Known as such a flavor inhaler is, for example, a liquid heating-type inhaler. The liquid heating-type inhaler delivers the aerosol to the user's mouth which is generated by atomizing liquid (aerosol-forming material) containing a flavor, such as nicotine, or delivers the aerosol to the user's mouth which is generated by atomizing liquid that does not contain a flavor, such as nicotine, after bringing the aerosol through a flavor source (tobacco source, for example).

[0003] Some liquid heating-type inhalers include a cartridge that contains liquid for generating aerosol and an atomization portion that atomizes the liquid. Known as such a cartridge is one that can be reused by being refilled with the liquid. As a mechanism for refilling the cartridge with liquid, a mechanism that refills the cartridge with liquid while releasing the air in a cartridge through a hollow structural needle has been known (see Patent Literature 1, for example).

CITATION LIST

PATENT LITERATURE

[0004] PTL 1: International Publication No. 2018/046532

SUMMARY OF INVENTION

TECHNICAL PROBLEM

[0005] An object of the invention is to provide a cartridge in which a depressurized space can be preliminarily formed within the cartridge when the cartridge is refilled with liquid, and a flavor inhaler comprising the cartridge.

SOLUTION TO PROBLEM

[0006] In a first mode of the invention, a cartridge is provided. The cartridge comprises a bottomed cylinder-like housing with an opening at one end, a movable member provided to be slidable along an inner wall of the housing, and a communication mechanism that is provided in at least either one of the housing and the movable member, the communication mechanism being configured to bring a confined space defined by the inner wall of the housing, a bottom surface of the housing, and the

movable member into communication with external space. The confined space is depressurized by the movable member moving toward the opening.

[0007] In a second mode of the invention according to the first mode, the communication mechanism is a recessed portion that is provided in the inner wall of the housing at an open end of the housing to form a clearance between the inner wall of the housing and an outer peripheral surface of the movable member.

[0008] In a third mode of the invention according to the first mode, the communication mechanism is an abutment member that is provided near the open end of the housing so as to abut the movable member, the abutment member being configured to deform or displace the movable member and thus form a clearance between the inner wall of the housing and an outer peripheral surface of the movable member.

[0009] In a fourth mode of the invention according to the first mode, the communication mechanism comprises two plates constituting the movable member. The two plates are provided with apertures. The apertures of the two plates are aligned to bring the confined space into communication with the external space.

[0010] In a fifth mode of the invention according to any one of the first to fourth modes, the movable member is so configured to form a clearance between itself and the inner wall of the housing when moving toward the bottom surface.

[0011] In a sixth mode of the invention according to any one of the first to fifth modes, the movable member is moved by a rod-like member that is inserted into the bottom surface of the housing from outside.

[0012] In a seventh mode of the invention according to any one of the first to sixth modes, the cartridge is used in a non-burning-type flavor inhaler.

[0013] In an eighth mode of the invention according to any one of the first to seventh modes, the cartridge contains liquid for generating aerosol.

[0014] In a ninth mode of the invention, a flavor inhaler is provided. The flavor inhaler comprises the cartridge according to any one of the first to eighth modes in a detachable manner.

BRIEF DESCRIPTION OF DRAWINGS

[0015]

Fig. 1 is a perspective view of a flavor inhaler according to a first embodiment of the invention.

Fig. 2 is a cross-sectional view of a cartridge according to the first embodiment of the invention.

Fig. 3 is an explanatory view of an aerosol-forming material refill procedure using the cartridge according to the first embodiment of the invention.

Fig. 4 is a configuration diagram showing a seal member and a rod-like member in another cartridge according to the first embodiment of the invention.

Fig. 5 is a configuration diagram showing a seal

member and a rod-like member in another cartridge according to the first embodiment of the invention. Fig. 6 is a configuration diagram showing a seal member and a rod-like member in another cartridge according to the first embodiment of the invention. Fig. 7 is a cross-sectional view of another cartridge according to the first embodiment of the invention. Fig. 8 is a cross-sectional view of another cartridge according to the first embodiment of the invention. Fig. 9 is a cross-sectional view of another cartridge according to the first embodiment of the invention. Fig. 10 is a configuration diagram showing a seal member in another cartridge according to the first embodiment of the invention. Fig. 11 is a cross-sectional view of another cartridge according to the first embodiment of the invention. Fig. 12 is an explanatory view of a cartridge according to a second embodiment of the invention and an aerosol-forming material refill procedure using the same. Fig. 13 is an explanatory view of a cartridge according to a third embodiment of the invention and an aerosol-forming material refill procedure using the same. Fig. 14 is an explanatory view of a cartridge according to a fourth embodiment of the invention and an aerosol-forming material refill procedure using the same.

DESCRIPTION OF EMBODIMENTS

[0016] A cartridge according to the invention and a flavor inhaler comprising the same will be discussed below with reference to the attached drawings. Identical or corresponding parts in the drawings are provided with the same reference signs.

First Embodiment:

[0017] Fig. 1 is a perspective view of a flavor inhaler according to a first embodiment of the invention. In Fig. 1, a flavor inhaler 100 comprises a mouthpiece 11, an atomization unit 12, and a battery 13 which are configured to be detachable from one another. The atomization unit 12 includes a cartridge 20 (see Fig. 2) containing an aerosol-forming material, such as glycerin and propylene glycol, and an atomization portion, not shown, which atomizes the aerosol-forming material.

[0018] The atomization portion atomizes the aerosol-forming material contained in the cartridge 20 and delivers aerosol to the mouthpiece 11. The mouthpiece 11 guides the aerosol generated in the atomization portion to a user's mouth. The battery 13 supplies electric power to the atomization portion. The cartridge 20 can be reused by being refilled with the aerosol-forming material. The aerosol-forming material may contain, for example, nicotine or the like.

[0019] Fig. 2 is a cross-sectional view of the cartridge

according to the first embodiment of the invention. In Fig. 2, the cartridge 20 comprises a housing 30, a seal member (movable member) 40, a recessed portion (communication mechanism) 50, and a wick 60.

[0020] The housing 30 has a shape like a bottomed cylinder with one end opened. The housing 30 includes an opening 31, an inner wall 32, and a bottom surface 33. The housing 30 is made of resin, glass, metal, or another like material. The seal member 40 has a disc-like shape and is provided to be slidable along the inner wall 32 of the housing 30. The seal member 40 is formed of an elastic member made of rubber or another like material. The housing may have a polygonal tube-like shape, such as a square tube-like shape, instead of a cylindrical shape. The seal member has a shape that fits with the shape of the inner wall of the housing.

[0021] A confined space 70 is defined by the inner wall 32 and the bottom surface 33 of the housing 30 and the seal member 40. The confined space 70 is depressurized by the seal member 40 moving toward the opening 31 of the housing 30.

[0022] The recessed portion 50 is provided at the open end of the housing 30 as a part of the inner wall 32 of the housing 30. An inner peripheral surface of the recessed portion 50 has a diameter that is larger than a diameter of an inner peripheral surface of the inner wall 32 and a maximum diameter of the seal member 40. The recessed portion 50 forms a clearance between the inner wall 32 of the housing 30 and an outer peripheral surface of the seal member 40 and thus brings the confined space 70 into communication with the external space of the cartridge 20.

[0023] The wick 60 is so arranged as to cover the opening 31 of the housing 30. The wick 60 is a member that holds the aerosol-forming material contained in the cartridge 20 and delivered to the atomization portion. The wick 60 is made of glass fiber, porous ceramic, or another like material. The wick 60 may be provided after a mesh member is arranged to cover the opening 31 to prevent the wick 60 from entering into the cartridge 20 during the refill of the aerosol-forming material which will be discussed later. The wick 60 may have a coverage area that is larger than the opening area of the housing 30 to prevent the wick 60 from entering into the cartridge 20.

[0024] A procedure performed by the user to refill the cartridge 20 with the aerosol-forming material will be discussed below with reference to Fig. 3. Fig. 3 is an explanatory view of an aerosol-forming material refill procedure using the cartridge according to the first embodiment of the invention. The seal member 40 is located near the opening 31 when the cartridge 20 is in use.

[0025] After consuming the aerosol-forming material contained in the cartridge 20, the user first moves the seal member 40 toward the bottom surface 33 of the housing 30 (State A). At this time, the seal member 40 is moved by the rod-like member 41 inserted from outside through an engagement portion, not shown, which is provided in the bottom surface 33 of the housing 30. Suf-

cient airtightness is secured at the engagement portion in order to depressurize the confined space 70. This enables the seal member 40 to move with a simple structure. The rod-like member 41 may be detachable, foldable, or expandable.

[0026] In order to prevent the confined space 70 from being pressurized when the seal member 40 is moved toward the bottom 33 of the housing 30, the seal member 40 is configured to form a clearance between itself and the inner wall 32 of the housing 30 when moving toward the bottom surface 33. More specifically, the seal member 40 may have a shape of a curved face that is protruding toward the bottom surface 33 in the cross-section illustrated in Fig. 3. The seal member 40 thus configured is easily deformed when moving toward the bottom surface 33, thereby releasing air and liquid contained in the confined space 70. It is also possible to release the air and liquid in the confined space 70 if a check valve is provided which allows only a flow in a direction from the confined space 70 toward the external space. The check valve may be provided in the seal member 40, the bottom surface 33, the engagement portion, or another place.

[0027] The user then makes the opening 31 of the housing 30 abut a liquid bottle 80 and moves the seal member 40 toward the opening 31 of the housing 30 (State B). The liquid bottle 80 includes a bottle body 81 containing the aerosol-forming material, a contact portion 82 that abuts the opening 31 of the housing 30, and a liquid delivery tube 83 that delivers the aerosol-forming material contained in the bottle body 81 to the contact portion 82. The contact portion 82 may be a sponge-like liquid holding portion. When the seal member 40 moves toward the opening 31 of the housing 30, the confined space 70 is depressurized. This makes it possible to preliminarily form a depressurized space within the cartridge 20 when the cartridge 20 is refilled with the aerosol-forming material.

[0028] The seal member 40 and the rod-like member 41 may be combined together to release the air and liquid in the confined space 70 when the seal member 40 moves toward the bottom surface 33, and the confined space 70 may be depressurized when the seal member 40 moves toward the opening 31. The specific configuration will be discussed below with reference to Fig. 4. In Fig. 4, the seal member 40 includes a hole 40a in which the rod-like member 41 is inserted, and protrusions 40b provided at intervals around the hole 40a on a lower surface of the seal member 40. The rod-like member 41 includes an upper flange 41a and a lower flange 41b which are so provided as to hold the seal member 40 therebetween.

[0029] In a case where the seal member 40 and the rod-like member 41 are combined together as shown in Fig. 4, when the seal member 40 moves toward the bottom surface 33 (upward direction in the drawing), a clearance is formed between the seal member 40 and the lower flange 41b due to the protrusions 40b, thereby releasing the air and liquid in the confined space 70. When

the seal member 40 moves toward the opening 31 (downward direction in the drawing), a clearance between the seal member 40 and the upper flange 41a is closed, and the confined space 70 is depressurized. The protrusions may be provided on the upper side of the lower flange 41b, instead of on the lower surface of the seal member 40.

[0030] Instead of the configuration in which the seal member 40 and the rod-like member 41 are combined together as in Fig. 4, a through-hole 41c may be provided in the lower flange 41b as in Fig. 5. Alternatively, as in Fig. 6, an internal gear-like groove 40c may be provided in the hole 40a of the seal member 40, and the upper flange 41a may be designed to have an external diameter larger than the depth of the groove 40c, whereas the lower flange 41b may be designed to have an external diameter smaller than the depth of the groove 40c. In the foregoing cases, too, the air and liquid in the confined space 70 can be released when the seal member 40 moves toward the bottom surface 33, and the confined space 70 can be depressurized when the seal member 40 moves toward the opening 31.

[0031] Returning to Fig. 3, when the user moves the seal member 40 toward the opening 31 of the housing 30, and the seal member 40 then reaches the recessed portion 50, a clearance is formed between the inner wall 32 of the housing 30 and the outer peripheral surface of the seal member 40, bringing the confined space 70 into communication with the external space of the cartridge 20 (State C).

[0032] When the confined space 70 that is depressurized comes into communication with the external space of the cartridge 20, the aerosol-forming material contained in the bottle body 81 flows through the liquid delivery tube 83 and the contact portion 82 to be introduced into the housing 30 through the clearance between the inner wall 32 of the housing 30 and the outer peripheral surface of the seal member 40 (State D). In this manner, the cartridge 20 can be refilled with the aerosol-forming material.

[0033] As shown in Fig. 7, when the seal member 40 is slidable along the inner wall 32 of the housing 30 at the opening 31 side of the recessed portion 50, the confined space 70 can be tightly sealed if the seal member 40, after reaching the recessed portion 50, is further pushed toward the opening 31. This way, liquid leakage from the cartridge 20 is prevented during transportation or storage.

[0034] As described above, according to the first embodiment, the cartridge comprises the bottomed cylinder-like housing with the opening at one end, the movable member provided to be slidable along the inner wall of the housing, and the communication mechanism that is provided in at least either one of the housing and the movable member, the communication mechanism being configured to bring the confined space defined by the inner wall of the housing, the bottom surface of the housing, and the movable member into communication with

external space. The confined space is depressurized by the movable member moving toward the opening. Therefore, the depressurized space can be preliminarily formed within the cartridge when the cartridge is refilled with liquid.

[0035] In the first embodiment, the configuration of the communication mechanism is not limited to the foregoing. The communication mechanism may be an abutment member that is provided near the open end of the housing 30 so as to abut the seal member 40 and deform or displace the seal member 40 to form a clearance between the inner wall 32 of the housing 30 and the outer peripheral surface of the seal member 40.

[0036] In particular, the abutment member may be a claw-like member 51 provided in the inner wall 32 of the housing 30 as shown in Fig. 8. In Fig. 8, two claw-like members 51 are provided apart from each other. If the seal member 40 is formed of a flexible member and moves toward the opening 31 of the housing 30, the claw-like members 51 abut and deform the seal member 40, and a clearance is formed between the inner wall 32 of the housing 30 and the outer peripheral surface of the seal member 40. The claw-like member 51 may be provided at least at one location.

[0037] The abutment member may be a claw-like member 52 provided in the inner wall 32 of the housing 30 as shown in Fig. 9. In Fig. 9, the claw-like member 52 is provided at one location. If the seal member 40 is formed of a rigid member and moves toward the opening 31 of the housing 30, the claw-like member 52 abuts and displaces the seal member 40 so that the seal member 40 is inclined. A clearance is thus formed between the inner wall 32 of the housing 30 and the outer peripheral surface of the seal member 40. The claw-like member 52 may be provided at two or more locations, as long as the seal member 40 is displaced.

[0038] The communication mechanism may comprise two plates 42, 43 constituting the seal member 40 as shown in Fig. 10. Apertures 44, 45 are formed in the two plates 42, 43, respectively. The apertures 44, 45 of the two plates 42, 43 are aligned with each other, which brings the confined space 70 into communication with the external space. The plates are aligned by rotating the rod-like member 41 inserted into the bottom surface 33 of the housing 30.

[0039] The communication mechanism may be a check valve 53 as shown in Fig. 11 which is provided in the housing 30 and allows only a flow in a direction from the external space toward the confined space 70. If the aerosol-forming material is delivered via the check valve 53 in the state where the confined space 70 is depressurized, the cartridge 20 can be refilled with the aerosol-forming material. The check valve 53 should be provided near the opening 31 of the housing 30 so that the aerosol-forming material may be delivered in the state where the confined space 70 is sufficiently depressurized.

[0040] The communication mechanism may be the seal member 40 configured to shrink when contacting

liquid. The shrinkage of the seal member 40 forms a clearance between the inner wall 32 of the housing 30 and the outer peripheral surface of the seal member 40.

[0041] The communication mechanism may be a mechanism that rotates the rod-like member 41 inserted into the bottom surface 33 of the housing 30 to vary the diameter of the seal member 40. If the seal member 40 is decreased in diameter, a clearance is formed between the inner wall 32 of the housing 30 and the outer peripheral surface of the seal member 40.

[0042] The communication mechanism may be a mechanism that deforms the seal member 40 using heat or electricity. Mechanisms that use heat to deform the seal member 40 include those using shape-memory alloy or bi-metal. Mechanisms that use electricity to deform the seal member 40 include those using a piezo actuator. If the seal member 40 is deformed using heat or electricity, a clearance is formed between the inner wall 32 of the housing 30 and the outer peripheral surface of the seal member 40.

[0043] The first embodiment has been discussed with the example where a clearance is formed between the seal member 40 and the inner wall 32 of the housing 30 when the seal member 40 moves toward the bottom surface 33 since the seal member 40 has the shape of a curved surface protruding toward the bottom surface 33. However, this is not the only way to form the clearance. Specifically, to form the clearance between the seal member 40 and the inner wall 32 of the housing 30 when the seal member 40 moves toward the bottom surface 33, the inner peripheral surface of the inner wall 32 may be increased in diameter from the opening 31 toward the bottom surface 33 to have a tapered shape. The tapered area does not necessarily have to expand through the entire length between the opening 31 and the bottom surface 33 and may expand, for example, from the opening 31 to around an intermediate position in a longitudinal direction of the housing 30.

[0044] In the aforementioned cases, since the housing 30 is narrowed toward the opening 31, adhesion between the seal member 40 and the inner wall 32 of the housing 30 is improved. If the seal member 40 is made of a memory foam material, such as an elastomer, the seal member 40 is slowly increased in diameter when moving toward the bottom surface 33. A clearance is therefore formed between the inner wall 32 of the housing 30 and the outer peripheral surface of the seal member 40. If the seal member 40 moves toward the opening 31 after the diameter of the seal member 40 is restored, adhesion between the seal member 40 and the inner wall 32 of the housing 30 is improved.

[0045] The first embodiment has been discussed with the example where the seal member 40 is moved by the rod-like member 41 inserted into the bottom surface 33 of the housing 30. However, this is not the only way to move the seal member 40. Specifically, the rod-like member for moving the seal member 40 may be provided on the liquid bottle 80 side. The seal member 40 may be

moved using a screw. The seal member 40 may be connected to the liquid bottle 80 through a ball screw and moved by screwing engagement.

[0046] The seal member 40 may be configured to be partially exposed to the external space through a slit that is formed along the longitudinal direction of the housing 30 and may be moved through the exposed part from the slit. The seal member 40 may be formed of a magnetic element and moved using a magnetic force that is generated by a permanent magnet or electric magnet.

[0047] To assist the movement of the seal member 40, a spring or a rubber element for biasing the seal member 40 toward the opening 31 may be provided between the bottom surface 33 of the housing 30 and the seal member 40.

Second Embodiment:

[0048] A cartridge according to a second embodiment of the invention will be discussed below. Fig. 12 is an explanatory view of a cartridge according to the second embodiment of the invention and an aerosol-forming material refill procedure using the same.

[0049] In Fig. 12, a cartridge 20A comprises a housing 30A, a seal member 40A, and a wick 60A. The housing 30A has a cylindrical shape and includes a first opening 31A, an inner wall 32A, and a second opening 33A. The housing 30A is made of resin, glass, metal, or another like material. The seal member 40A has a disc-like shape and is provided to be slidable along the inner wall 32A of the housing 30A. The seal member 40A is formed of an elastic member made of rubber or another like material.

[0050] The wick 60A is so arranged as to cover the first opening 31A of the housing 30A. The wick 60A is a member that holds the aerosol-forming material contained in the cartridge 20A and delivered to an atomization portion. The wick 60A is made of glass fiber, porous ceramic, or another like material. As in the first embodiment, the wick 60A may be provided after a mesh member is arranged to cover the first opening 31A and may have a coverage area that is larger than the opening area of the housing 30A.

[0051] A procedure performed by the user to refill the cartridge 20A with the aerosol-forming material will be discussed below with reference to Fig. 12. The seal member 40A is located near the second opening 33A when the cartridge 20A is in use.

[0052] After consuming the aerosol-forming material contained in the cartridge 20A (State A), the user first makes the first opening 31A of the housing 30A abut a liquid bottle 80A and moves the seal member 40A toward the first opening 31A of the housing 30 (State B). The liquid bottle 80A has a similar configuration to the liquid bottle 80 of the first embodiment, and therefore, the configuration thereof will not be discussed here.

[0053] In the State B, the seal member 40A is moved by an attachment 41A that is detachably provided in the

second opening 33A of the housing 30A. Fig. 12 shows the example where a linear motion of a rod-like member moves the seal member 40A. This is not the only way to move the seal member 40A. A rotary motion of a screw or the like may be converted into a linear motion of the seal member 40A. Alternatively, the seal member 40A may be moved by a motive power portion that is provided in the liquid bottle 80A.

[0054] When the seal member 40A reaches the first opening 31A, the user inverts the moving direction of the seal member 40A, thereby moving the seal member 40A toward the second opening 33A of the housing 30A (State C).

[0055] When the seal member 40A moves toward the second opening 33A of the housing 30A, a depressurized space is formed in a space defined by the inner wall 32A of the housing 30A, the seal member 40A, and the wick 60A. As a result, the aerosol-forming material contained in a bottle body 81A flows through a liquid delivery tube 83A and a contact portion 82A to be introduced into the housing 30A (State D). The cartridge 20A is thus refilled with the aerosol-forming material.

[0056] To prevent damage to the wick 60A, the cartridge 20A may be refilled with the aerosol-forming material through another course without passing through the wick 60A. For example, the aerosol-forming material may be refilled without passing through the wick 60A by sealing the wick 60A using an engagement portion between the first opening 31A and the liquid bottle 80A or the like when the first opening 31A of the housing 30A is brought into abutment with the liquid bottle 80A.

[0057] As described above, according to the second embodiment, the cartridge 20A comprises the cylindrical housing 30A, the seal member 40A that is provided to be slidable along the inner wall 32A of the housing 30A, and the wick 60A that is so arranged as to cover the first opening 31A of the housing 30A. In the cartridge 20A, the depressurized space is formed in a space defined by the inner wall 32A of the housing 30A, the seal member 40A, and the wick 60A by the seal member 40A moving toward the second opening 33A of the housing 30A. If the aerosol-forming material is introduced into the depressurized space, the cartridge 20A is refilled with the aerosol-forming material.

Third Embodiment:

[0058] A cartridge according to a third embodiment of the invention will be discussed below. Fig. 13 is an explanatory view of a cartridge according to the third embodiment of the invention and an aerosol-forming material refill procedure using the same.

[0059] In Fig. 13, a cartridge 20B comprises a housing 30B, an elastic container 90B, and a wick 60B. The housing 30B has a shape like a bottomed cylinder with one end opened. The housing 30B includes an opening 31B, an inner wall 32B, and a bottom surface 33B. The housing 30B is made of resin, glass, metal, or another like mate-

rial.

[0060] The elastic container 90B has a sac-like shape. The elastic container 90B is provided inside the housing 30B and includes an opening 91B that coincides with the opening 31B of the housing 30B. The elastic container 90B is formed of an elastic member made of rubber or another like material. The aerosol-forming material is contained in the elastic container 90B. The elastic container 90B has a restoring force that is great enough not to be deformed by a decrease of the aerosol-forming material contained therein. The elastic container 90B may be formed partially of the elastic member, instead of being formed entirely of the elastic member.

[0061] The wick 60B is so arranged as to cover the opening 31B of the housing 30B and the opening 91B of the elastic container 90B. The wick 60B is a member that holds the aerosol-forming material contained in the cartridge 20B (elastic container 90B) and delivered to an atomization portion. The wick 60B is made of glass fiber, porous ceramic, or another like material. As in the first embodiment, the wick 60B may be provided after a mesh member is arranged to cover the opening 31B and may have cover a coverage area that is larger than the opening area of the housing 30B.

[0062] A procedure performed by the user to refill the cartridge 20B with the aerosol-forming material will be discussed below with reference to Fig. 13.

[0063] After consuming the aerosol-forming material contained in the cartridge 20B (State A), the user first makes the opening 31B of the housing 30B about a liquid bottle 80B. The user then compresses and deforms the elastic container 90B. The compression of the elastic container 90B forms a depressurized space inside the elastic container 90B (State B). The liquid bottle 80B has a similar configuration to the liquid bottle 80 of the first embodiment, and therefore, the configuration thereof will not be discussed here.

[0064] In the State B, the elastic container 90B is directly depressed by a compression member, not shown, which is provided within the housing 30B and can be operated from outside the housing 30B. Instead of such a configuration, the elastic container 90B may be compressed using a pump, not shown, which is provided inside or outside the housing 30B and is capable of increasing pressure inside the housing 30B.

[0065] The user then releases the compression of the elastic container 90B, and the elastic container 90B therefore tries to restore an original form using the restoring force (State C). Consequently, the aerosol-forming material contained in a bottle body 81B flows through a liquid delivery tube 83B and a contact portion 82B to be introduced into the housing 30B (elastic container 90B) (State D). The cartridge 20B is thus refilled with the aerosol-forming material.

[0066] As described above, according to the third embodiment, the cartridge 20B comprises the housing 30B having the shape like a bottomed cylinder with one end opened, the elastic container 90B provided inside the

housing 30B, and the wick 60B that is so arranged as to cover the opening 31B of the housing 30B and the opening 91B of the elastic container 90B. In the cartridge 20B, the depressurized space is formed within the elastic container 90B by the elastic container 90B being compressed. The cartridge 20B is refilled with the aerosol-forming material by introducing the aerosol-forming material into the depressurized space

10 Fourth Embodiment:

[0067] A cartridge according to a fourth embodiment of the invention will be discussed below. Fig. 14 is an explanatory view of a cartridge according to the fourth embodiment of the invention and an aerosol-forming material refill procedure using the same.

[0068] In Fig. 14, a cartridge 20C comprises a housing 30C, a seal member 40C, a plug element 54C, and a wick 60C. The housing 30C has a shape like a bottomed cylinder with one end opened and includes an opening 31C, an inner wall 32C, a bottom surface 33C, and a partition portion 34C. The partition portion 34C is so provided as to extend from the inner wall 32C in a direction orthogonal to an axial direction of the housing 30C. Apertures are formed in the partition portion 34C. The partition portion 34C spatially separates a space on the opening 31C side and a space on the bottom surface 33C side in the housing 30C in consort with the seal member 40C. The housing 30C is made of resin, glass, metal, or another like material.

[0069] The seal member 40C has a disc-like shape and is provided to be movable between the partition portion 34C and the wick 60C. The seal member 40C is formed of an elastic member made of rubber or another like material. The plug element 54C is provided in the bottom surface 33C of the housing 30C and pierced with a hole to allow communication between the inside and outside of the housing 30C. The plug element 54C is formed of an elastic member made of rubber or another like material.

[0070] The wick 60C is so arranged as to cover the opening 31C of the housing 30C. The wick 60C is a member that holds the aerosol-forming material contained in the cartridge 20C and delivered to the atomization portion. The wick 60C is made of glass fiber, porous ceramic, or another like material.

[0071] A procedure performed by the user to refill the cartridge 20C with the aerosol-forming material will be discussed below with reference to Fig. 14.

[0072] After consuming the aerosol-forming material contained in the cartridge 20C, the user first depressurizes the inside of the housing 30C through the plug element 54C (State A). The means for depressurizing the inside of the housing 30C may be a publicly-known pump (which is either manual or automatic). During the depressurization of the inside of the housing 30C, the seal member 40C covers the apertures in the partition portion 34C. A depressurized space is thus formed within the housing

30C.

[0073] The seal member 40C may be provided between the partition portion 34C and the wick 60C. In this case, the wick 60C does not have to be affected by the depressurization. The seal member 40C may be provided between the wick 60C and the opening 31C of the housing 30C. This makes it possible to form a larger depressurized space.

[0074] The user then pierces the plug element 54C with a hole by means of a liquid delivery tube 83C of the liquid bottle 80C (State B). The liquid bottle 80C according to the fourth embodiment is configured in a similar manner to the liquid bottle 80, except that the liquid bottle 80C does not include the contact portion 82. The liquid delivery tube 83C according to the fourth embodiment protrudes from the bottle body 81C and includes a distal end in a shape suitable for piercing a hole.

[0075] Since the inside of the housing 30C is depressurized, if the plug element 54C is pierced with a hole by means of the liquid delivery tube 83C of the liquid bottle 80C, the aerosol-forming material contained in the bottle body 81C is introduced into the housing 30C through the liquid delivery tube 83C (State C). The cartridge 20C is thus refilled with the aerosol-forming material.

[0076] After the cartridge 20C is refilled with the aerosol-forming material, the seal member 40C is detached from the partition portion 34C (State D), which makes it possible to deliver the aerosol-forming material contained in the cartridge 20C to the atomization portion. The seal member 40C may be controlled to be opened/closed using a mechanism that is employed in publicly-known electronic cigarettes and the like.

[0077] As described above, according to the fourth embodiment, the cartridge 20C comprises the housing 30C having a shape like a bottomed cylinder with one end opened, the seal member 40C that covers the apertures in the partition portion 34C of the housing 30C, the plug element 54C provided in the bottom surface 33C of the housing 30C, and the wick 60C that is so arranged as to cover the opening 31C of the housing 30C. In the cartridge 20C, the depressurized space is formed within the housing 30C by depressurizing the inside of the housing 30C through the plug element 54C. The cartridge 20C is refilled with the aerosol-forming material by introducing the aerosol-forming material into the depressurized space.

[0078] Several embodiments of the invention have been discussed. The above-discussed embodiments are presented to facilitate the understanding of the invention and are not intended to limit the invention. Alternations or modifications may be made to the invention without deviating from the gist of the invention. The invention includes equivalents thereof. Constituent elements mentioned in the claims and description may be combined or omitted as long as the aforementioned issue can be at least partially solved or as long as the advantageous effects can be at least partially provided.

REFERENCE SIGN LIST

[0079]

5	11 Mouthpiece
	12 Atomization unit
	13 Battery
	20, 20A - 20C Cartridge
	30, 30A - 30C Housing
10	31, 31B, 31C Opening
	31A First opening
	32, 32A - 32C Inner wall
	33, 33B, 33C Bottom surface
	33A Second opening
15	34C Partition portion
	40, 40A, 40C Seal member
	40a Hole
	40b Protrusion
	40c Groove
20	41 Rod-like member
	41a Upper flange
	41b Lower flange
	41c Through-hole
	41A Attachment
25	42, 43 Plate
	44, 45 Aperture
	50 Recessed portion
	51, 52 Claw-like member
	53 Check valve
30	54 Plug element
	60, 60A - 60C Wick
	70 Confined space
	80, 80A - 80C Liquid bottle
	81, 81A - 81C Bottle body
35	82, 82A, 82B Contact portion
	83, 83A - 83C Liquid delivery tube
	90B Elastic container
	91B Opening
40	100 Flavor inhaler

Claims

1. A cartridge comprising:

- a bottomed cylinder-like housing with an opening at one end;
- a movable member provided to be slidable along an inner wall of the housing; and
- a communication mechanism that is provided in at least either one of the housing and the movable member, the communication mechanism being configured to bring a confined space defined by the inner wall of the housing, a bottom surface of the housing, and the movable member into communication with external space, the confined space being depressurized by the movable member moving toward the opening.

2. The cartridge according to Claim 1,
wherein the communication mechanism is a re-
cessed portion that is provided in the inner wall of
the housing at an open end of the housing to form a
clearance between the inner wall of the housing and
an outer peripheral surface of the movable member. 5

3. The cartridge according to Claim 1,
wherein the communication mechanism is an abut-
ment member that is provided near the open end of
the housing so as to abut the movable member, the
abutment member being configured to deform or dis-
place the movable member and thus form a clear-
ance between the inner wall of the housing and an
outer peripheral surface of the movable member. 10 15

4. The cartridge according to Claim 1,
wherein the communication mechanism comprises
two plates constituting the movable member, the two
plates being provided with apertures, wherein the
apertures of the two plates are aligned to bring the
confined space into communication with the external
space. 20

5. The cartridge according to any one of Claims 1 to 4, 25
wherein the movable member is so configured to
form a clearance between itself and the inner wall of
the housing when moving toward the bottom surface.

6. The cartridge according to any one of Claims 1 to 5, 30
wherein the movable member is moved by a rod-like
member that is inserted into the bottom surface of
the housing from outside.

7. The cartridge according to any one of Claims 1 to 6, 35
wherein the cartridge is used in a non-burning-type
flavor inhaler.

8. The cartridge according to any one of Claims 1 to 7, 40
wherein the cartridge contains liquid for generating
aerosol.

9. A flavor inhaler comprising the cartridge according
to any one of Claims 1 to 8 in a detachable manner. 45

50

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Fig. 1

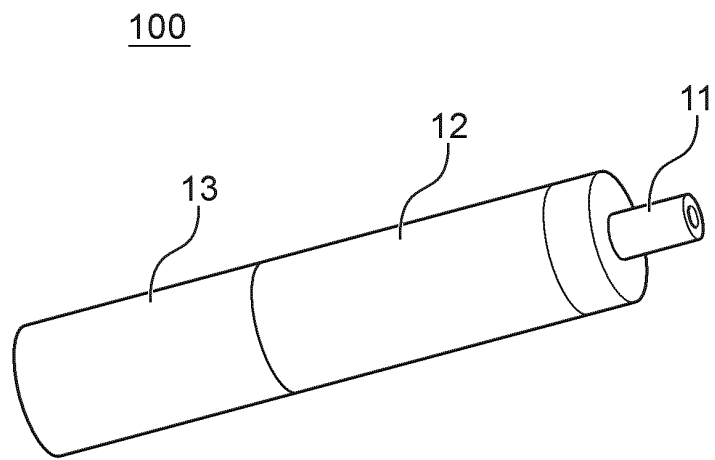


Fig. 2

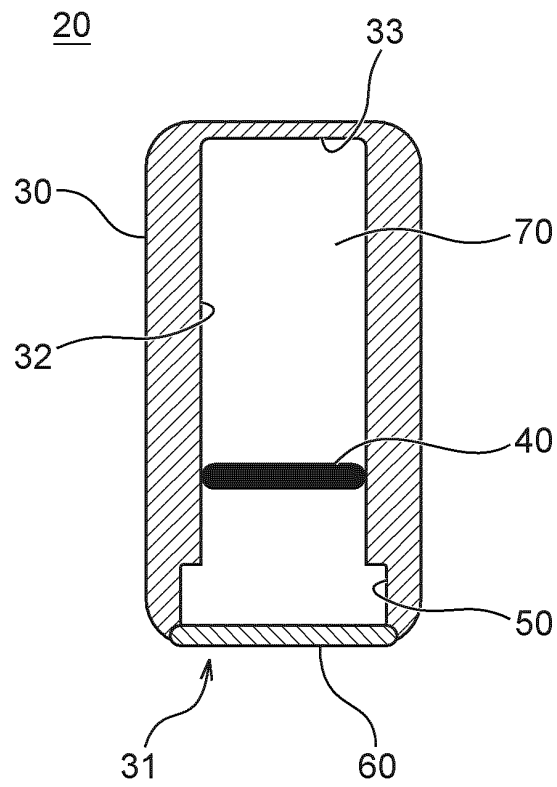


Fig. 3

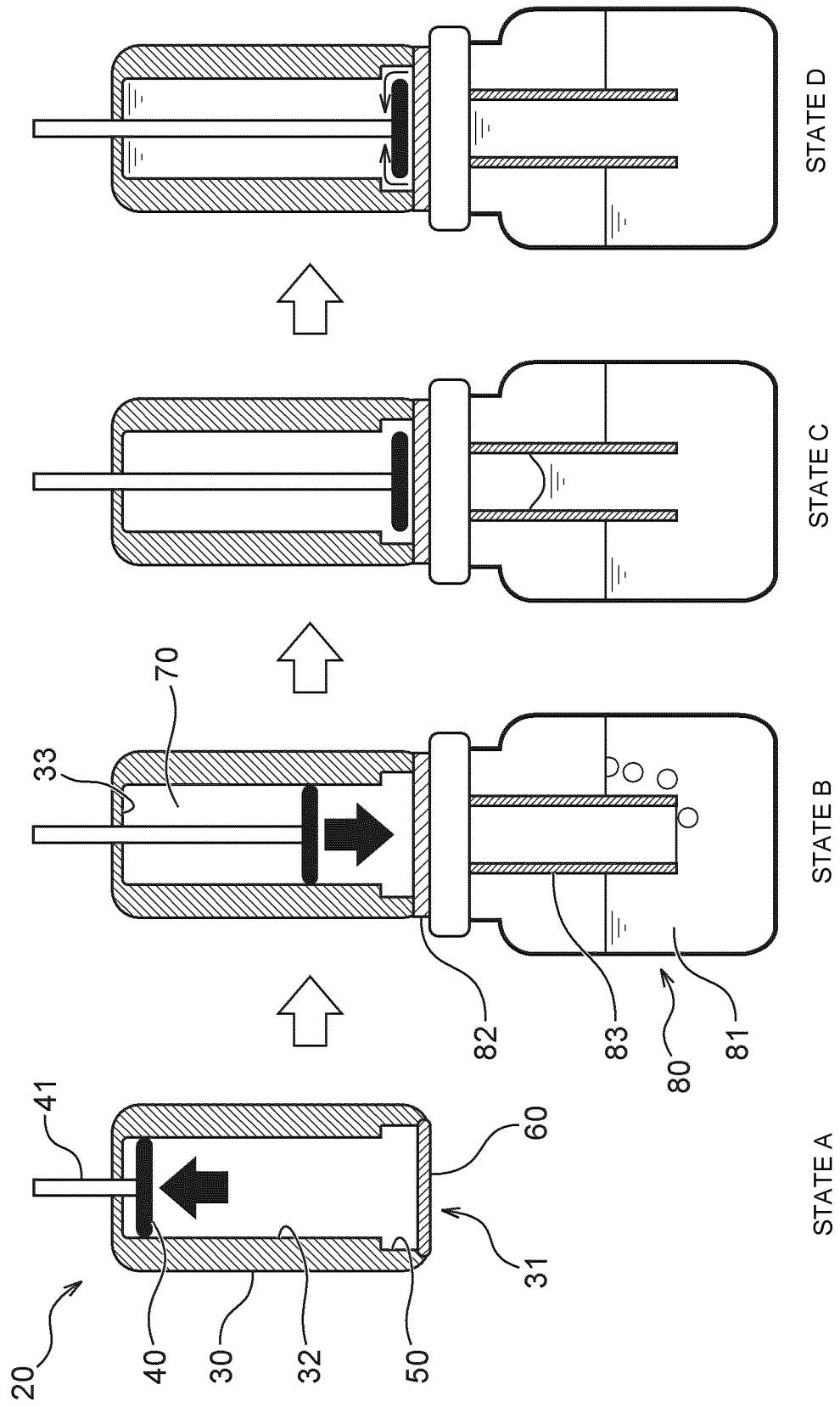


Fig. 4

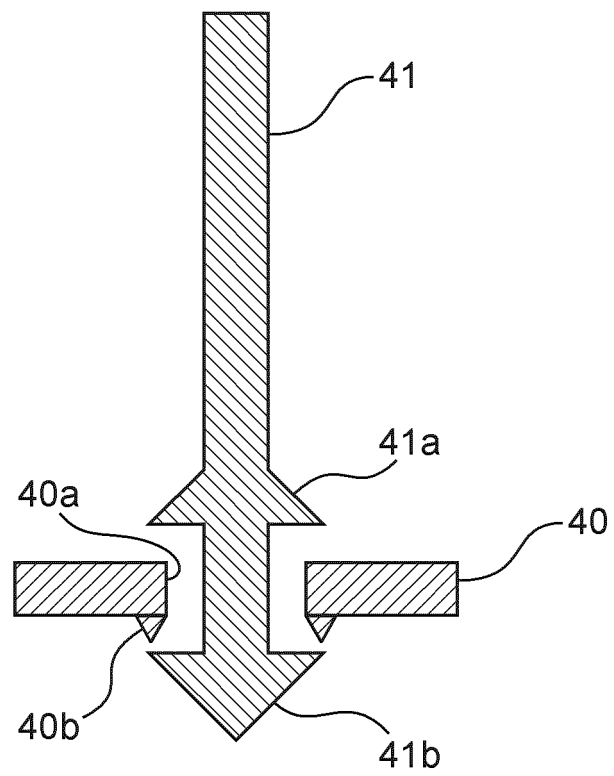


Fig. 5

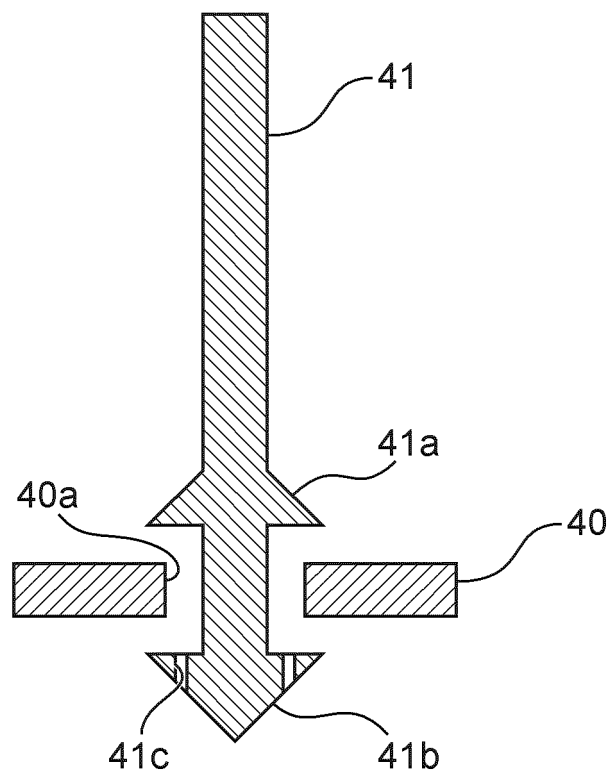


Fig. 6

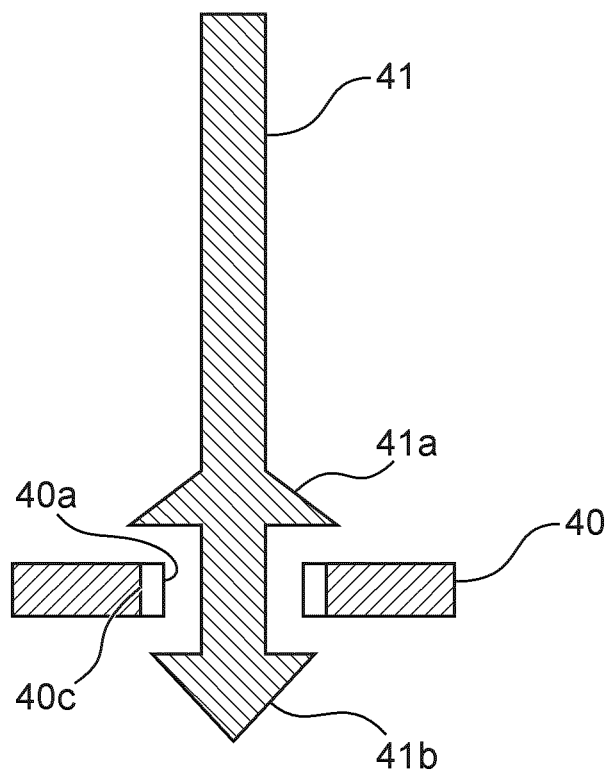


Fig. 7

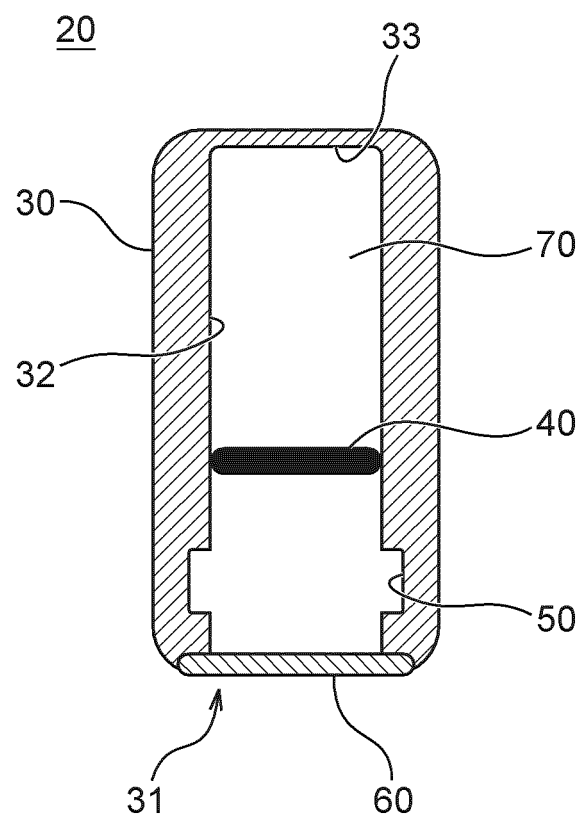


Fig. 8

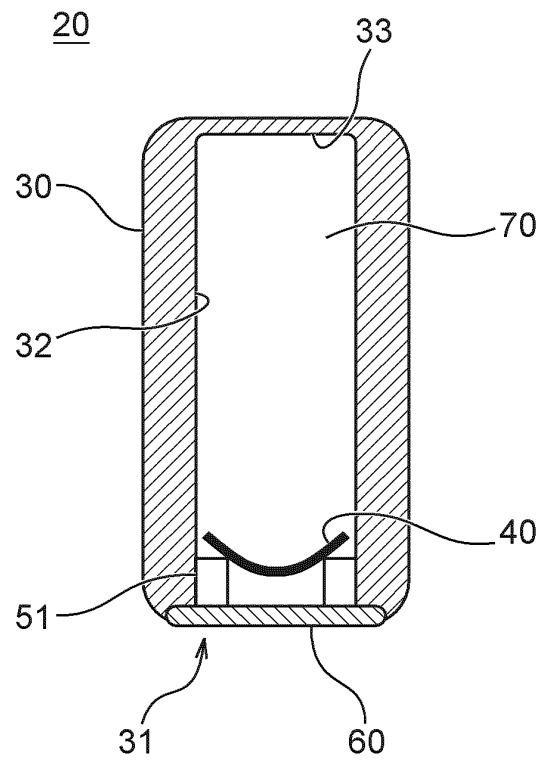


Fig. 9

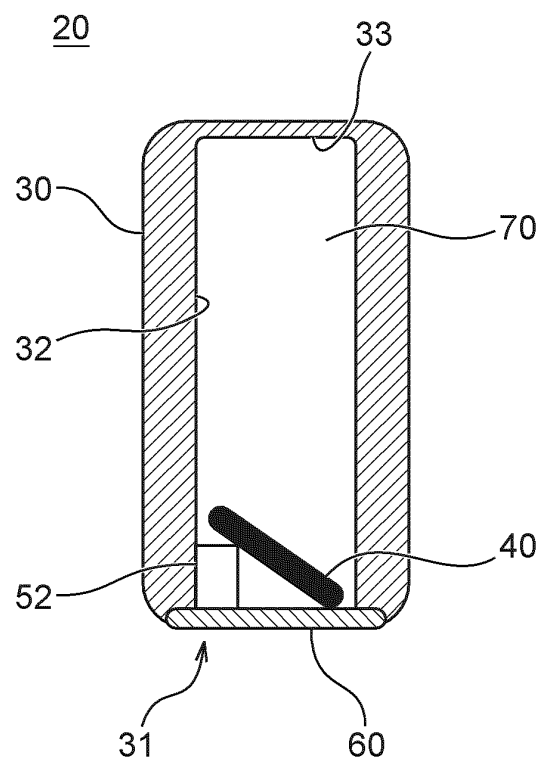


Fig. 10

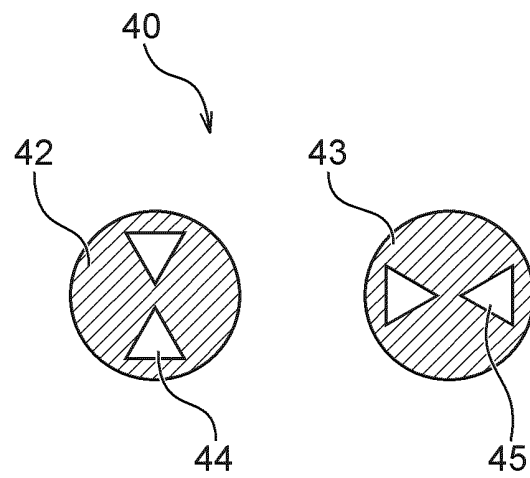


Fig. 11

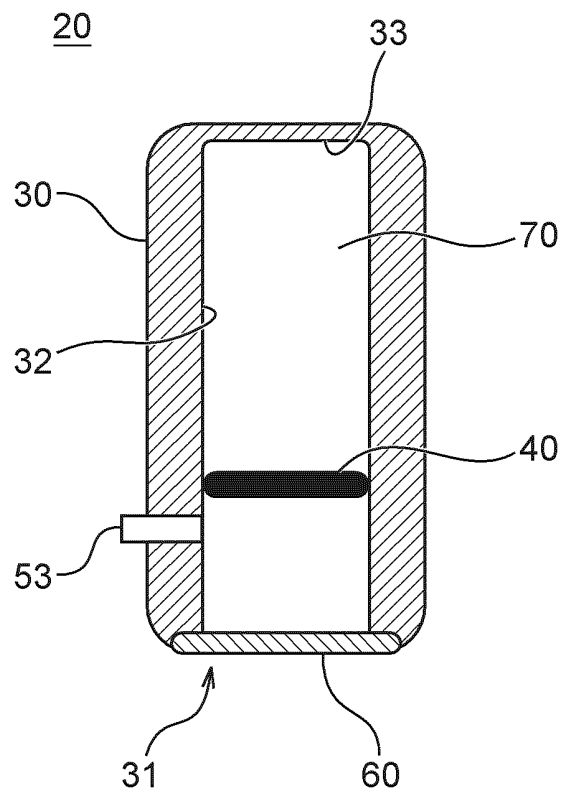


Fig. 12

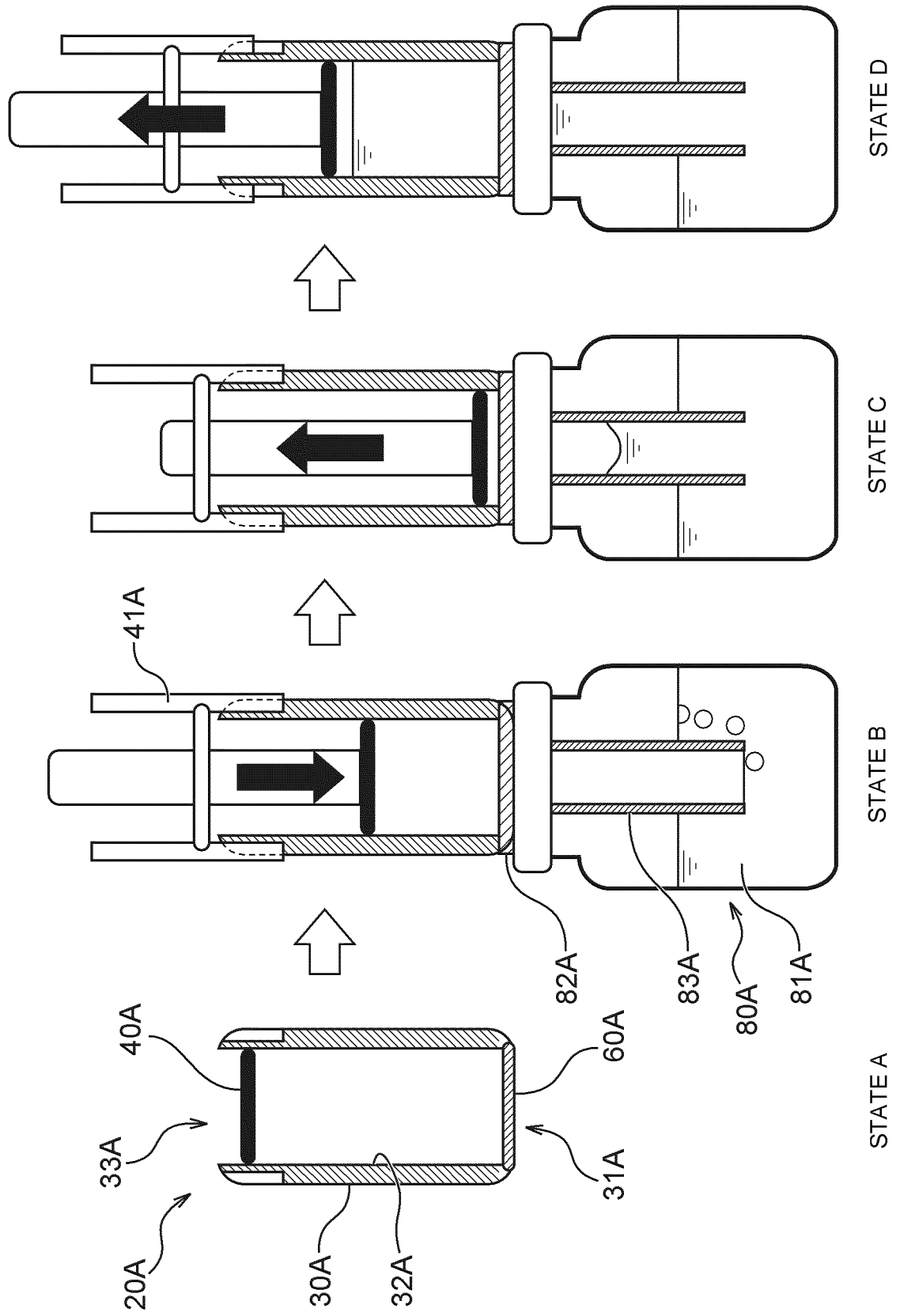
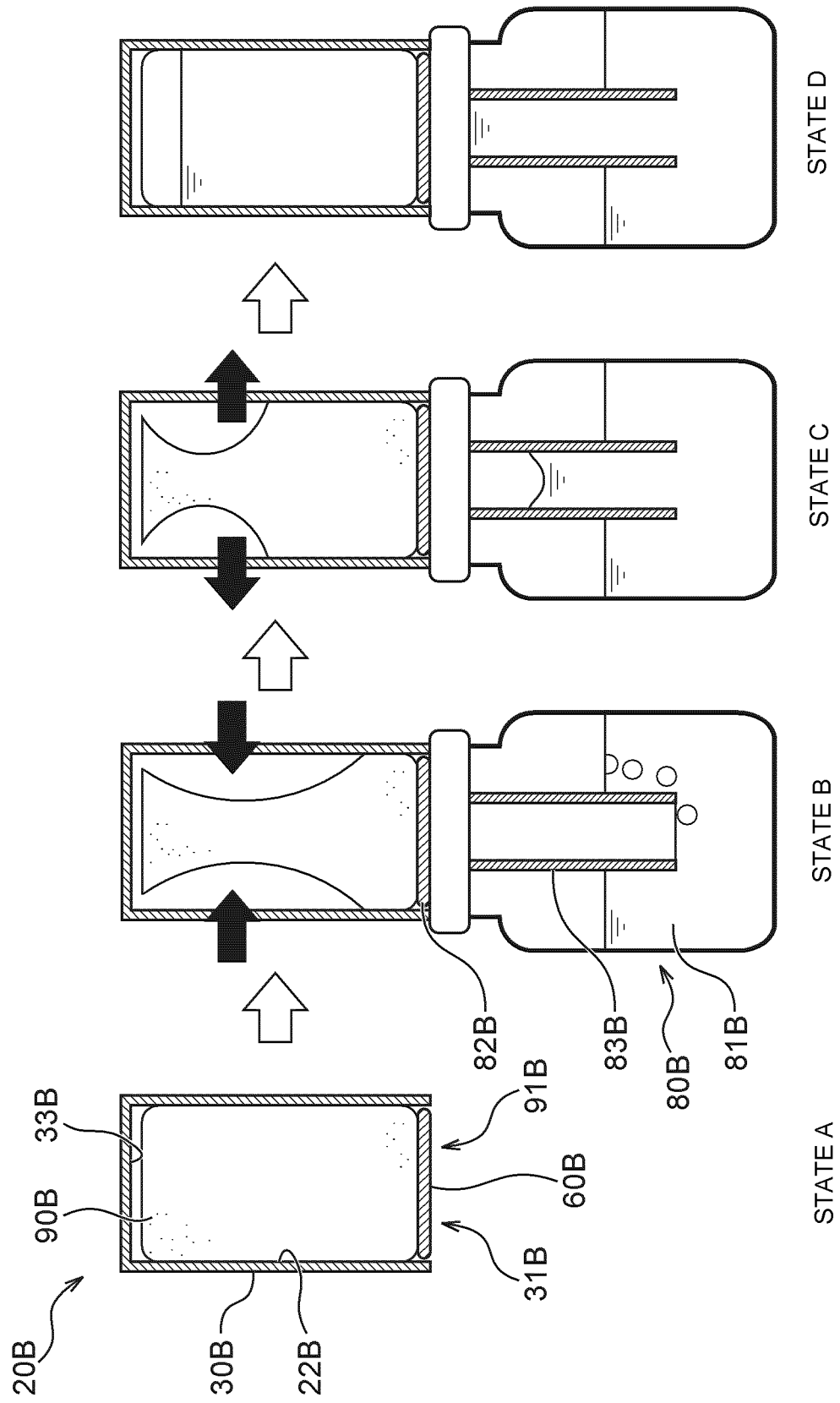


Fig. 13



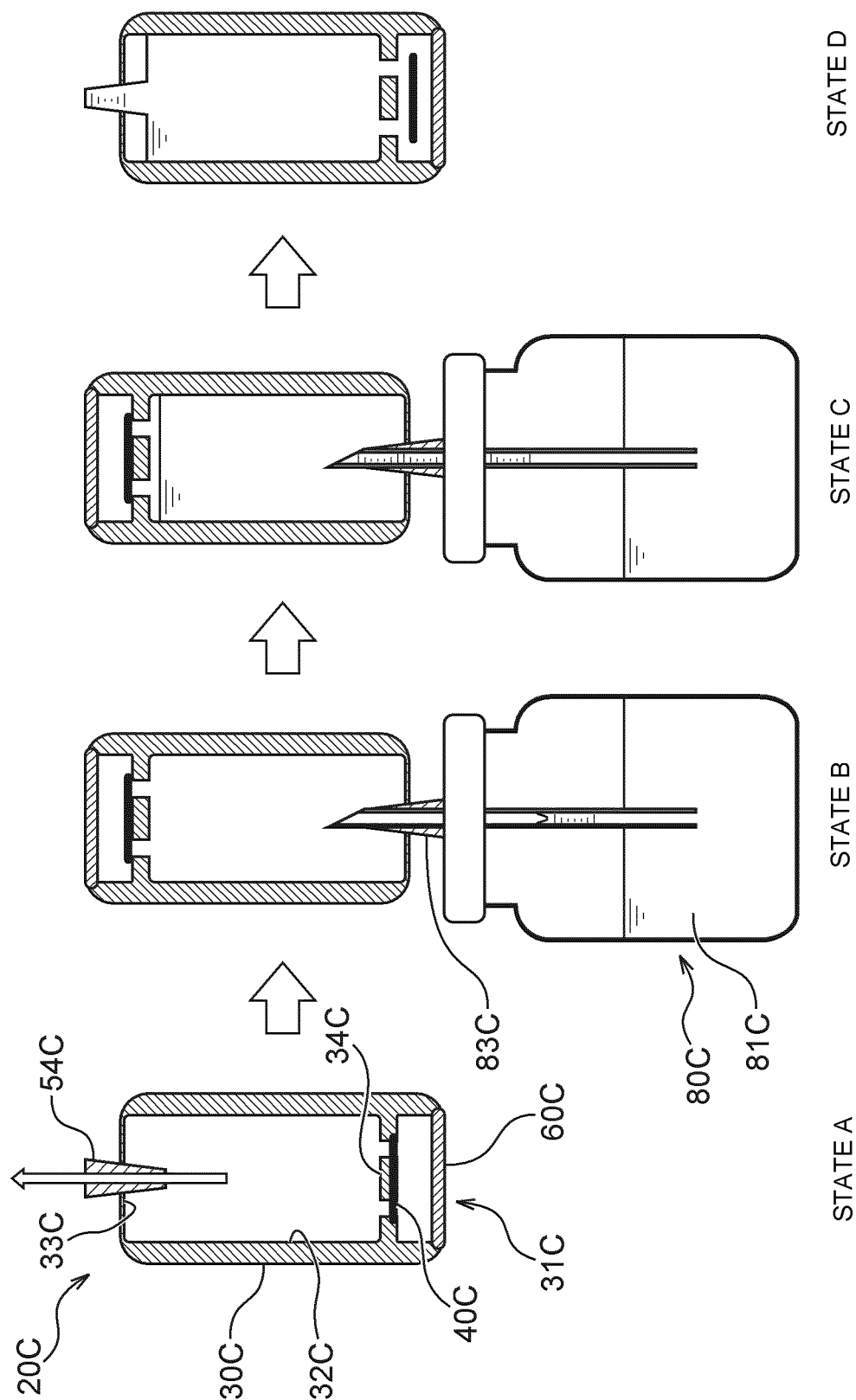


Fig. 14

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2020/020271

A. CLASSIFICATION OF SUBJECT MATTER

Int.Cl. A24F40/42 (2020.01) i

FI: A24F40/42

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Int.Cl. A24F40/42

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Published examined utility model applications of Japan 1922-1996

Published unexamined utility model applications of Japan 1971-2020

Registered utility model specifications of Japan 1996-2020

Published registered utility model applications of Japan 1994-2020

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 2015-523867 A (SHI ZI TECHNOLOGY, LTD.) 20 August 2015 (2015-08-20), fig. 20A, 20B, paragraphs [0079]-[0081]	1 6-9 2-5
Y	JP 2020-501588 A (JT INTERNATIONAL S.A.) (2020-01-23), 23 January 2015 (2015-01-23), fig. 4	6-9
A	JP 5-305713 A (HEWLETT PACKARD CO.) 19 November 1993 (1993-11-19), fig. 1-3	1-9



Further documents are listed in the continuation of Box C.



See patent family annex.

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

01 July 2020

Date of mailing of the international search report

14 July 2020

Name and mailing address of the ISA/

Japan Patent Office

3-4-3, Kasumigaseki, Chiyoda-ku,

Tokyo 100-8915, Japan

Authorized officer

Telephone No.

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No. PCT/JP2020/020271
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JP 2015-523867 A	20 August 2015	WO 2013/112579 A1 fig. 20A, 20B, paragraphs [0097]-[0099] US 2012/0029471 A1 EP 2806918 A1
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JP 5-305713 A	19 November 1993	US 5280300 A fig. 1-3

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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