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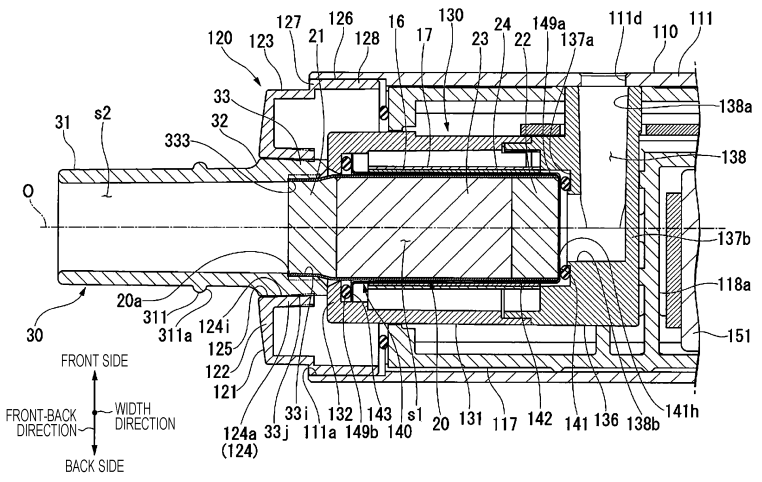
(54) FLAVOR INHALATION SYSTEM, MOUTHPIECE, AND CARTRIDGE

(57) A flavor inhalation system according to one aspect of the present embodiment is provided with a housing and a pull-out retainer (30). The housing extends in an axial direction and has an opening (125) formed at a first end portion in the axial direction. In the inside of the housing, a storage space (s1) communicating with the opening is formed. A cartridge (20) containing a flavor component is stored in the storage space in the housing. The pull-out retainer has an engagement section and a holding section (33i). The engagement section is engaged with the opening. The holding section is configured to hold the cartridge.

FIG. 5



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Description

[Technical Field]

[0001] The present invention relates to a flavor inhalation system, a mouthpiece, and a cartridge.

[Background Art]

[0002] Flavor inhalation systems have been known, which are configured to heat and atomize vapor, so that the user can inhale the vapor and enjoy the flavor.

[0003] For example, Patent Literature 1 discloses an aerosol-generating system that includes an aerosol-generating device and a mouthpiece. A cartridge is placed in a housing of the aerosol-generating device, and the mouthpiece is disposed to cover an end portion of the cartridge.

[Citation List]

[Patent Literature]

[0004] PTL 1: Japanese Unexamined Patent Application Publication (Translation of PCT Application) No. 2018-528788

[Summary of Invention]

[Technical Problem]

[0005] In the related art described above, replacing the cartridge after use involves detaching the mouthpiece, pulling the cartridge out of the housing, inserting a new cartridge into the housing, and attaching the mouthpiece. A problem is that it is cumbersome to detaching the cartridge and the mouthpiece individually.

[0006] The present invention provides a flavor inhalation system, a mouthpiece, and a cartridge that facilitate replacement of the cartridge.

[Solution to Problem]

[0007] (1) To achieve the object described above, a flavor inhalation system according to an aspect of the present embodiment includes a housing and a pull-out retainer. The housing extends in an axial direction and has an opening formed at a first end portion thereof in the axial direction. The housing has therein a storage space communicating with the opening. The housing stores, in the storage space, a cartridge containing a flavor component. The pull-out retainer includes an engagement section and a holding section. The engagement section is engaged in the opening. The holding section is configured to hold the cartridge.

[0008] In the present aspect, when the pull-out retainer is detached from the housing to replace the cartridge, the engagement section of the pull-out retainer and the opening of the housing are brought out of engagement. This allows the cartridge held by the holding section of the pull-out retainer to be detached from the housing together with the pull-out retainer, eliminates the need to individually detach the cartridge and the pull-out retainer, and facilitates replacement of the cartridge.

[0009] (2) In the flavor inhalation system according to the aspect (1), the pull-out retainer is configured to extend on both sides of the opening in the axial direction while being engaged in the opening.

[0010] In the present aspect, the pull-out retainer can be detached from the housing by simply holding a portion of the pull-out retainer protruding outward from the opening of the housing. The pull-out retainer can thus be detached easily.

[0011] (3) In the flavor inhalation system according to the aspect (1) or (2), the pull-out retainer is a mouthpiece having a flow channel configured to allow vapor from the cartridge to flow therein.

[0012] In the present aspect, when the mouthpiece is detached from the housing, the cartridge is detached from the housing together with the mouthpiece.

[0013] (4) In the flavor inhalation system according to any one of the aspects (1) to (3), the engagement section is a protrusion protruding in a radial direction outward from an outer periphery of the pull-out retainer. An inner periphery of the housing has a first groove portion and a second groove portion. The first groove portion is recessed outward in the radial direction and extends from the first end portion in the axial direction. The second groove portion is recessed outward in the radial direction and extends in one circumferential direction from an end portion of the first groove opposite the first end portion. The engagement section is engaged in the second groove.

[0014] In the present aspect, the engagement section (protrusion) is engaged in the second groove in the housing. To bring the engagement section and the second groove out of engagement, the pull-out retainer needs to be rotated in the circumferential direction before the engagement section is moved along the first groove. This prevents accidental disengagement of the engagement section and the second groove.

[0015] (5) In the flavor inhalation system according to any one of the aspects (1) to (4), the storage space is capable of storing the cartridge in such a way that the cartridge does not protrude outward from the opening.

[0016] In the present aspect, where the cartridge does not protrude outward from the opening of the housing, the user is prevented from accidentally touching the cartridge.

[0017] (6) In the flavor inhalation system according to any one of the aspects (1) to (5), a static frictional force acting between the holding section and the cartridge is greater than a static frictional force acting between an inner wall of the storage space and the cartridge.

[0018] In the present aspect, a static frictional force acting between the holding section of the pull-out retainer

and the cartridge is greater than a static frictional force acting between the inner wall of the storage space and the cartridge. Therefore, when the pull-out retainer is detached from the housing, the cartridge can be reliably pulled out together with the pull-out retainer.

[0019] (7) In the flavor inhalation system according to any one of the aspects (1) to (6), the holding section is configured to be fitted onto one end portion of the cartridge extending in the axial direction.

[0020] In the present aspect, where the holding section is fitted onto the one end portion of the cartridge extending in the axial direction, the cartridge can be easily held by the holding section.

[0021] (8) In the flavor inhalation system according to the aspect (7), an inner periphery of the holding section has a grooved portion recessed outward in the radial direction.

[0022] In the present aspect, the cartridge elastically deforms in such a way as to allow the outer periphery of the cartridge to enter into the grooved portion in the holding section. Thus, with a repulsive force generated when the outer periphery of the cartridge bends, the holding section firmly holds the cartridge.

[0023] (9) In the flavor inhalation system according to the aspect (8), a plurality of grooved portions are equally spaced in a circumferential direction.

[0024] In the present aspect, where a plurality of grooved portions are equally spaced in the circumferential direction, a repulsive force generated when the outer periphery of the cartridge bends is uniformly distributed in the circumferential direction. This allows the holding section to hold the cartridge with uniform force throughout its circumference.

[0025] (10) In the flavor inhalation system according to the aspect (9), adjacent ones of the grooved portions have therebetween a protruding portion protruding inward in the radial direction. A sum of lengths of inner peripheries of a plurality of protruding portions in the circumferential direction is greater than or equal to half a circumference of an imaginary circle defined by the inner peripheries of the plurality of protruding portions.

[0026] In the present aspect, the sum of the lengths of the inner peripheries of the plurality of protruding portions in the circumferential direction is greater than or equal to half the circumference of the imaginary circle described above. This provides a sufficient area of contact between the protruding portions and the outer periphery of the cartridge, and secures a sufficient force with which the holding section holds the cartridge.

[0027] (11) In the flavor inhalation system according to any one of the aspects (1) to (10), the engagement section is configured as an engagement surface having a planar shape. The opening is provided with a contact surface formed along the axial direction and capable of being in contact with the engagement surface.

[0028] In the present aspect, the engagement section is in contact with the contact surface formed in the opening of the housing along the axial direction. This reduces displacement (or shaking) of the pull-out retainer in a direction intersecting the axial direction with respect to the opening of the housing, and facilitates attachment and detachment of the pull-out retainer along the axial direction.

[0029] (12) In the flavor inhalation system according to any one of the aspects (1) to (11), the housing biases the engagement section inward in the radial direction.

[0030] In the present aspect, where the engagement section is biased inward in the radial direction by the housing, the pull-out retainer is prevented from accidentally falling off the housing.

[0031] (13) In the flavor inhalation system according to any one of the aspects (1) to (12), an outer periphery of the pull-out retainer has a finger hold on which a user can place fingers.

[0032] In the present aspect, the outer periphery of the pull-out retainer has the finger hold on which the user can place fingers. This allows the user to attach and detach the pull-out retainer with fingers placed on the finger hold, and improves attachability and detachability of the pull-out retainer.

[0033] (12) A mouthpiece according to another aspect of the present embodiment is detachably attached to a housing that extends in an axial direction, has an opening formed at a first end portion thereof in the axial direction, and has therein a storage space communicating with the opening and storing a cartridge containing a flavor component. The mouthpiece includes an engagement section and a holding section. The engagement section is engaged in the opening, and the holding section is configured to hold the cartridge. The mouthpiece has a flow channel configured to allow vapor from the cartridge to flow therein.

[0034] In the present aspect, when the mouthpiece is detached from the housing to replace the cartridge, the engagement section of the mouthpiece and the opening of the housing are brought out of engagement. This allows the cartridge held by the holding section of the mouthpiece to be detached from the housing together with the mouthpiece, eliminates the need for the user to individually detach the cartridge and the mouthpiece, and facilitates replacement of the cartridge.

[0035] (15) In the mouthpiece according to the aspect (15), a cross-section orthogonal to the axial direction has a flattened shape.

[0036] In the present aspect, a cross-section orthogonal to the axial direction has a flattened shape. Therefore, when the user puts the mouthpiece in the mouth, with the short-side direction of the mouthpiece being the up-down direction, the upper and lower lips are not far apart. This reduces the flow of air into the mouth through the gap between the mouthpiece and each end of the lips in the right and left direction.

[0037] (16) A cartridge according to another aspect of the present embodiment is a cartridge used in a flavor inhalation system that includes a housing and a pull-out retainer. The housing extends in an axial direction and

has an opening formed at a first end portion thereof in the axial direction. The housing is internally formed to communicate with the opening. The cartridge includes a flavor portion and a filter portion. The flavor portion has a flavor component. The filter portion is configured to allow vapor produced by heating the flavor portion to pass therethrough. The filter portion is held by a holding section of the pull-out retainer.

[0038] In the present aspect, when the pull-out retainer is detached from the housing to replace the cartridge, the engagement section of the pull-out retainer and the opening of the housing are brought out of engagement. This allows the cartridge including the filter portion held by the holding section of the pull-out retainer to be detached from the housing together with the pull-out retainer, eliminates the need for the user to individually detach the cartridge and the pull-out retainer, and facilitates replacement of the cartridge.

Advantageous Effects of Invention

[0039] An aspect of the present embodiment facilitates replacement of the cartridge.

[Brief Description of Drawings]

[0040]

[Fig. 1] Fig. 1 is a perspective view of a flavor inhalation system according to a first embodiment.
[Fig. 2] Fig. 2 is a perspective view of the flavor inhalation system according to the first embodiment, with a cap detached therefrom.
[Fig. 3] Fig. 3 is a cross-sectional view taken along line III-III in Fig. 2.
[Fig. 4] Fig. 4 is a perspective view of a mouthpiece supporting member of the flavor inhalation system according to the first embodiment.
[Fig. 5] Fig. 5 is an enlarged view of part A in Fig. 3.
[Fig. 6] Fig. 6 is a perspective view of a mouthpiece of the flavor inhalation system according to the first embodiment, as viewed from the outlet side.
[Fig. 7] Fig. 7 is a perspective view of the mouthpiece of the flavor inhalation system according to the first embodiment, as viewed from the non-outlet side.
[Fig. 8] Fig. 8 is a plan view of the mouthpiece of the flavor inhalation system according to the first embodiment, as viewed from the outlet side.
[Fig. 9] Fig. 9 is a plan view of the mouthpiece of the flavor inhalation system according to the first embodiment, as viewed from the non-outlet side.
[Fig. 10] Fig. 10 is a cross-sectional view of the mouthpiece and a cartridge of the flavor inhalation system according to the first embodiment.
[Fig. 11] Fig. 11 is a cross-sectional view of a main part of a flavor inhalation system according to a second embodiment.
[Fig. 12] Fig. 12 is a perspective view of a cartridge container of the flavor inhalation system according to the second embodiment.
[Fig. 13] Fig. 13 is a perspective view of a mouthpiece of the flavor inhalation system according to the second embodiment.
[Fig. 14] Fig. 14 is a lateral view of a mouthpiece of a flavor inhalation system according to a third embodiment.
[Fig. 15] Fig. 15 is a perspective view of the mouthpiece of the flavor inhalation system according to the third embodiment.
[Fig. 16] Fig. 16 is a perspective view of a cartridge container of the flavor inhalation system according to the third embodiment.
[Fig. 17] Fig. 17 is a lateral view of a mouthpiece of a flavor inhalation system according to modified embodiment 1.
[Fig. 18] Fig. 18 is a lateral view of a mouthpiece of a flavor inhalation system according to modified embodiment 2.
[Fig. 19] Fig. 19 is a lateral view of a mouthpiece of a flavor inhalation system according to modified embodiment 3.

[Description of Embodiments]

[0041] Embodiments of the present invention will now be described with reference to the drawings. In the drawings referred to below, the same or corresponding component elements are assigned the same reference numerals and redundant description will be omitted.

<First Embodiment>

[0042] Fig. 1 is a perspective view of a flavor inhalation system according to a first embodiment.

[0043] As illustrated in Fig. 1, an inhaler 1, which is an example of the flavor inhalation system according to the first embodiment, is a so-called heated tobacco product. The inhaler 1 heats tobacco leaves to produce vapor, and allows the user to inhale the vapor and enjoy flavor of the tobacco leaves.

[0044] Fig. 2 is a perspective view of the inhaler 1, with a cap 40 detached therefrom.

[0045] As illustrated in Fig. 2, the inhaler 1 includes a main unit 10, a cartridge 20, a mouthpiece (pull-out retainer) 30, and the cap 40 (see Fig. 1). The cartridge 20 according to the embodiments and modified embodiments typically has an outer periphery made of paper and is either elastic or flexible. The configuration of the cartridge 20 is not limited to this. Any consumable material configured to be capable of being attached to and detached from the inhaler 1 can be used as the cartridge 20.

[0046] The outer shape of the inhaler 1 is a substantially rectangular columnar shape centered on the axis line O. The main unit 10, the cartridge 20, the mouthpiece 30, and the cap 40 are arranged on the axis line O. In

the following description, in the direction of the axis line O (i.e., direction along the axis line O, or axial direction), one side of the main unit 10 to which the mouthpiece 30 is disposed is referred to as an outlet side, and one side of the mouthpiece 30 to which the main unit 10 is disposed is referred to as a non-outlet side. In plan view as viewed in the direction of the axis line O, a direction intersecting the axis line O is referred to as a radial direction. A radial direction toward the axis line O is referred to as an inward direction, and a radial direction away from the axis line O is referred to as an outward direction. A direction circling around the axis line O is referred to as a circumferential direction. In the present specification, the term "direction" refers to two directions, each of which is referred to as "side".

[0047] Fig. 3 is a cross-sectional view taken along line III-III in Fig. 2. As illustrated in Fig. 3, the main unit 10 includes a housing 11, a power supply unit 15, and a heater 16. The housing 11 includes a housing body 110, a mouthpiece supporting member 120, and a cartridge container 130.

[0048] The housing body 110 includes an outer housing 111 and a bottom cap 116.

[0049] The outer housing 111 is formed substantially in the shape of a rectangular cylinder centered on the axis line O. The outer housing 111 constitutes the outer surface of the inhaler 1. The outer housing 111 may be of any appropriate shape that will extend in the direction of the axis line O.

[0050] The outer housing 111 has an outlet-side opening 111a formed at an end portion thereof on the outlet side and passing therethrough in the direction of the axis line O. The outer housing 111 has a non-outlet side opening 111b formed at an end portion thereof on the non-outlet side and passing therethrough in the direction of the axis line O. The outer housing 111 has a switch opening 111c formed at a portion thereof in the circumferential direction and passing therethrough in the radial direction. The switch opening 111c has a switch 112 therein.

[0051] In the present embodiment, a radial direction that connects the axis line O and the switch opening 111c is defined as a front-back direction. In this case, one side of the axis line O to which the switch opening 111c is disposed is defined as a front side, and the other side of the axis line O opposite the switch opening 111c is defined as a back side.

[0052] The bottom cap 116 is disposed in the non-outlet side opening 111b of the outer housing 111. The bottom cap 116 is substantially rectangular in plan view, as viewed in the direction of the axis line O. The bottom cap 116 is configured to close the non-outlet side opening 111b of the outer housing 111. The bottom cap 116 may be of any appropriate shape that will close the non-outlet side opening 111b of the outer housing 111.

[0053] The housing body 110 has therein an inner cylindrical member 117. The inner cylindrical member 117 extends in the direction of the axis line O and is formed substantially in the shape of a rectangular cylinder. The inner cylindrical member 117 is formed by a pair of halves coupled together along the direction of the axis line O. The overall length of the inner cylindrical member 117 (i.e., length along the direction of the axis line O) is shorter than the overall length of the outer housing 111. The inner cylindrical member 117 may be of any appropriate shape.

[0054] The inner cylindrical member 117 is internally provided with a partition 118 that separates a space for accommodating a battery 151 (described below) from a space for accommodating the heater 16.

[0055] The partition 118 has an outlet-side partition portion 118a and a lateral partition portion 118b. This reduces the flow of air heated by the heater 16 into the space for accommodating the battery 151. Accordingly, a rise in the temperature of the battery 151 is reduced.

[0056] The outlet-side partition portion 118a is disposed to the outlet side of the battery 151. The lateral partition portion 118b is disposed to cover the exterior of the battery 151 in the circumferential direction.

[0057] The mouthpiece supporting member 120 is disposed in the outlet-side opening 111a of the outer housing 111.

[0058] Fig. 4 is a perspective view of the mouthpiece supporting member 120.

[0059] As illustrated in Fig. 4, the mouthpiece supporting member 120 includes a protruding cylinder 121, a fitting cylinder 126, and locking pieces 129.

[0060] The protruding cylinder 121 includes an inner annular portion 122, an inner peripheral portion 123, and an engagement inner peripheral portion 124.

[0061] The outer shape of the inner annular portion 122 is substantially rectangular in plan view, as viewed in the direction of the axis line O. The inner annular portion 122 may be of any appropriate shape, and is not limited to being substantially rectangular in plan view.

[0062] The inner annular portion 122 has a mouthpiece opening (opening) 125 passing therethrough in the direction of the axis line O. In other words, the mouthpiece supporting member 120 has the mouthpiece opening 125 formed at an end portion thereof on the outlet side and passing therethrough in the direction of the axis line O.

[0063] The mouthpiece opening 125 is substantially rectangular in plan view, as viewed in the direction of the axis line O. Note that the mouthpiece opening 125 may be of any appropriate shape, and is not limited to being substantially rectangular in plan view.

[0064] Fig. 5 is an enlarged view of part A in Fig. 3.

[0065] As illustrated in Fig. 5, the inner peripheral portion 123 extends from the outer edge of the inner annular portion 122 toward the non-outlet side. The inner peripheral portion 123 is disposed over the entire circumference of the inner annular portion 122 in the circumferential direction.

[0066] The engagement inner peripheral portion 124 extends from the mouthpiece opening 125 in the inner annular portion 122 toward the non-outlet side. The engagement inner peripheral portion 124 is disposed over the entire circumference of the mouthpiece opening 125

in the circumferential direction.

[0067] A direction orthogonal to the direction of the axis line O and the front-back direction is defined as a width direction.

[0068] The engagement inner peripheral portion 124 is formed in a plate shape. A part 124a of the engagement inner peripheral portion 124 along the width direction is disposed with the plate thickness thereof being in the front-back direction. A part 124b of the engagement inner peripheral portion 124 along the front-back direction (see Fig. 4) is disposed with the plate thickness thereof being in the width direction. An inner periphery (contact surface) 124i of the engagement inner peripheral portion 124 is formed in a planar shape along the direction of the axis line O.

[0069] As illustrated in Fig. 4, the engagement inner peripheral portion 124 disposed along a substantially rectangular shape in plan view, as viewed in the direction of the axis line O, has a slit 124s at a corner thereof. The slit 124s is formed to extend from an end portion of the engagement inner peripheral portion 124 on the non-outlet side toward the outlet side. The slit 124s penetrates the engagement inner peripheral portion 124 in the direction of the plate thickness thereof. This allows the engagement inner peripheral portion 124 to elastically deform in the direction of the plate thickness thereof.

[0070] The fitting cylinder 126 includes an outer annular portion 127 and an outer peripheral portion 128.

[0071] As illustrated in Fig. 5, the outer annular portion 127 extends outward in the radial direction, from an end of the inner peripheral portion 123 of the protruding cylinder 121 on the non-outlet side. The outer annular portion 127 is disposed over the entire circumference of the inner peripheral portion 123 in the circumferential direction. The outer shape of the outer annular portion 127 is substantially rectangular in plan view, as viewed in the direction of the axis line O (see Fig. 4). The outer annular portion 127 may have any outer shape that will fit in the outlet-side opening 111a of the outer housing 111.

[0072] A surface of the outer annular portion 127 on the outlet side is disposed to be flush with the end portion of the outer housing 111 on the outlet side. The protruding cylinder 121 is disposed to protrude toward the outlet side from the outlet-side opening 111a of the outer housing 111.

[0073] The outer peripheral portion 128 extends from the outer edge of the outer annular portion 127 toward the non-outlet side. The outer peripheral portion 128 is disposed over the entire circumference of the outer annular portion 127 in the circumferential direction.

[0074] The outer peripheral portion 128 is inserted through the outlet-side opening 111a of the outer housing 111 and fit to a portion of the outer housing 1 1 1 on the outlet side. In other words, the outer peripheral portion 128 is disposed in contact with the inner periphery of the outer housing 111 on the outlet side.

[0075] As illustrated in Fig. 4, a part 128b of the outer peripheral portion 128 along the front-back direction is provided with the locking piece 129 extending toward the non-outlet side.

[0076] The locking piece 129 has a locking hole 129h passing therethrough in the width direction. A protrusion (not shown) on the outer periphery of the inner cylindrical member 117 (see Fig. 5) is locked in the locking hole 129h.

[0077] The locking piece 129 has a locking protrusion 129c on the non-outlet side of the locking hole 129h. The locking protrusion 129c protrudes outward in the width direction (i.e., protrudes in a direction away from the axis line O). The locking protrusion 129c is locked in a recess (not shown) formed in the inner periphery of the outer housing 111 (see Fig. 5).

[0078] As illustrated in Fig. 5, the cartridge container 130 is disposed inside the inner cylindrical member 117, on the outlet side of the outlet-side partition portion 118a.

[0079] The cartridge container 130 is formed by assembling a cylindrical container member 131 and a bottom member 136 together. The cylindrical container member 131 is disposed on the outlet side of the bottom member 136.

[0080] The cylindrical container member 131 is formed in the shape of a circular cylinder centered on the axis line O. The cylindrical container member 131 may be of any appropriate shape that will extend in the direction of the axis line O.

[0081] The cylindrical container member 131 has a cartridge supporting wall 132 formed at an end portion thereof on the outlet side and extending inward in the radial direction. The cartridge supporting wall 132 is annularly shaped in plan view, as viewed in the direction of the axis line O. The cartridge supporting wall 132 is preferably shaped to be capable of being in contact with the outer periphery of the cartridge 20 and may be of any appropriate shape.

[0082] The bottom member 136 has a container recess 137a formed toward the non-outlet side. The container recess 137a is formed in a circular shape in plan view, as viewed in the direction of the axis line O.

[0083] The outer housing 111 has a ventilation opening 111d formed on the front side thereof and passing therethrough in the front-back direction. The bottom member 136 has a bottom portion 137b at an end portion thereof on the non-outlet side, and an inflow-side opening 138a communicating with the ventilation opening 111d is formed on the front side of the bottom portion 137b. The bottom portion 137 has an outflow-side opening 138b formed at a bottom of the container recess 137a (i.e., formed in a surface orthogonal to the direction of the axis line O). A ventilation passage 138 is formed to allow the inflow-side opening 138a to communicate with the outflow-side opening 138b.

[0084] The cartridge container 130 includes therein a cartridge supporting member 140. The cartridge supporting member 140 has a supporting bottom 141, a peripheral portion 142, and a flange 143. For example, the cartridge supporting member 140 is formed of a material of

high thermal conductivity, such as stainless steel.

[0085] The supporting bottom 141 is disposed along the bottom of the container recess 137a in the cartridge container 130. The outer shape of the supporting bottom 141 is circular in plan view, as viewed in the direction of the axis line O. The supporting bottom 141 has a ventilation hole 141h passing therethrough in the direction of the axis line O. The ventilation hole 141h is formed in a circular shape centered on the axis line O in plan view, as viewed in the direction of the axis line O. Note that the supporting bottom 141 and the ventilation hole 141h may be of any appropriate shapes.

[0086] An elastic O-ring 149a is disposed between the supporting bottom 141 of the cartridge supporting member 140 and the bottom of the container recess 137a.

[0087] The peripheral portion 142 extends from the edge of the supporting bottom 141 toward the outlet side. The peripheral portion 142 is formed in the shape of a circular cylinder centered on the axis line O.

[0088] The flange 143 extends outward in the radial direction, from an end of the peripheral portion 142 on the outlet side. The flange 143 is annularly shaped in plan view, as viewed in the direction of the axis line O. The flange 143 is disposed on the non-outlet side of the cartridge supporting wall 132 of the cartridge container 130.

[0089] An elastic O-ring 149b is disposed between the flange 143 of the cartridge supporting member 140 and the cartridge supporting wall 132 of the cartridge container 130.

[0090] The cartridge supporting member 140 has therein a cartridge storage space (storage space) s1 capable of storing the cartridge 20. The cartridge storage space s1 communicates with the mouthpiece opening 125 in the mouthpiece supporting member 120.

[0091] The cartridge supporting member 140 is provided with a sensor (not shown), for example, at the supporting bottom 141. The sensor may be, for example, a temperature sensor or a gas component concentration sensor (chemical sensor). The temperature sensor is configured to measure or estimate the temperature of vapor containing a flavor component released from a flavor portion 23 (described below) of the cartridge 20. The gas component concentration sensor is configured to measure or estimate the concentration of vapor containing a flavor component released from the flavor portion 23 of the cartridge 20.

[0092] As illustrated in Fig. 3, the power supply unit 15 is formed by mounting, for example, the battery 151, a controller 152, and the heater 16 on the inner cylindrical member 117.

[0093] The battery 151 inside the inner cylindrical member 117 is disposed on the non-outlet side of the outlet-side partition portion 118a. The battery 151 is formed in the shape of a circular column centered on an axis parallel to the axis line O. The battery 151 is a chargeable and dischargeable secondary battery. For example, the battery 151 may be a lithium-ion battery. The battery 151 may be of any appropriate shape.

[0094] The controller 152 inside the inner cylindrical member 117 is disposed on the front side of the lateral partition portion 118b. The controller 152 is disposed between the lateral partition portion 118b and the front side of the outer housing 111. The battery 151 and the heater 16 are electrically connected through the controller 152 by a wire (not shown).

[0095] The controller 152 includes switch elements 152a at positions corresponding to the switch 112 disposed on the front side of the outer housing 111. The controller 152 controls the battery 151 and the heater 16 in accordance with the operation of the switch 112.

[0096] The controller 152 is configured to control current flowing from the battery 151 to the heater 16. This makes it possible to control the heating temperature at which to heat the flavor portion 23 of the cartridge 20.

[0097] As illustrated in Fig. 5, the heater 16 is disposed along the outer periphery of the peripheral portion 142 of the cartridge supporting member 140. The heater 16 is disposed throughout the outer periphery of the peripheral portion 142. For example, the heater 16 is constituted by a film heater. The film heater includes a pair of film substrates and a resistance heating element interposed therebetween. The film substrates are preferably made of a material having high heat resistance and high electrical insulation properties. For example, the heater 16 is configured from a polyimide film heater. The resistance heating element is preferably made of any one or more of metal materials, such as copper, nickel alloy, chromium alloy, stainless steel, and platinum-rhodium alloy. For example, the resistance heating element is constituted by a stainless steel substrate. The resistance heating element, which is connected by a flexible printed circuit (FPC) to a power supply, may be copper-plated at the point of connection and the lead portion.

[0098] A heat insulating material 17 is disposed along the outer periphery of the heater 16. The heat insulating material 17 may be disposed throughout the outer periphery of the heater 16, or may be disposed only on part of the outer periphery of the heater 16. The heat insulating material 17 may be optional.

[0099] The cartridge 20 is disposed in the cartridge storage space s1 of the cartridge supporting member 140. The cartridge 20 is formed in the shape of a circular column centered on the axis line O. The cartridge 20 is a replaceable component.

[0100] The cartridge 20 includes a first filter portion (filter portion) 21, a second filter portion 22, the flavor portion 23, and a wrapping paper portion 24.

[0101] The first filter portion 21 is disposed on the outlet side of the cartridge 20 in the direction of the axis line O. The second filter portion 22 is disposed on the non-outlet side of the cartridge 20 in the direction of the axis line O.

[0102] The first filter portion 21 and the second filter portion 22 are configured to allow passage of vapor produced by heating the flavor portion 23. For example, the first filter portion 21 and the second filter portion 22 are

formed by spraying a plasticizer (triacetin) over bundles of cellulose acetate fibers for spot bonding of the fibers, so as to ensure rod hardness.

[0103] The flavor portion 23 is disposed between the first filter portion 21 and the second filter portion 22. The flavor portion 23 contains a flavor component and is formed, for example, by spraying the flavor onto tobacco granules. The length of the flavor portion 23 (i.e., length along the direction of the axis line O) is 50% to 70%, or preferably about 60%, of the length of the cartridge 20 along the direction of the axis line O. Besides tobacco granules, the flavor portion 23 may be charged with a material having a flavor component, such as menthol, vanilla, lavender, or cinnamon.

[0104] The wrapping paper portion 24 is wrapped around the outer periphery of the first filter portion 21, the second filter portion 22, and the flavor portion 23. For example, the wrapping paper portion 24 is mainly made of paper.

[0105] When the cartridge 20 is in the cartridge storage space s1 of the cartridge supporting member 140, at least part of the first filter portion 21 protrudes from the cartridge supporting member 140 toward the outlet side while being disposed on the non-outlet side of the mouthpiece opening 125 (i.e., the first filter portion 21 does not protrude from the mouthpiece opening 125 toward the outlet side).

[0106] The mouthpiece 30 is attached to the mouthpiece supporting member 120. The mouthpiece 30 includes an outlet portion 31, a base 32, and an engagement peripheral portion 33.

[0107] Fig. 6 is a perspective view of the mouthpiece 30, as viewed from the outlet side. Fig. 7 is a perspective view of the mouthpiece 30, as viewed from the non-outlet side. Fig. 8 is a plan view of the mouthpiece 30, as viewed from the outlet side.

[0108] As illustrated in Fig. 6, Fig. 7, and Fig. 8, the outlet portion 31 is formed in a cylindrical shape centered on the axis line O. Outer and inner cross-sections of the outlet portion 31 orthogonal to the axis line O have a flattened shape. The outlet portion 31 is wider in the front-back direction.

[0109] The outlet portion 31 has a finger hold 311 on the outer periphery thereof. The finger hold 311 protrudes outward in the radial direction from the outer periphery of the outlet portion 31. The finger hold 311 is disposed over the entire circumference of the outer periphery of the outlet portion 31 in the circumferential direction.

[0110] To detach the mouthpiece 30 attached in place as illustrated in Fig. 5, the user places fingers on a face 311a of the finger hold 311 on the non-outlet side and pulls the mouthpiece 30 toward the outlet side. The mouthpiece 30 is thus detached easily.

[0111] As illustrated in Fig. 6, the base 32 protrudes outward in the radial direction from an end of the outlet portion 31 on the non-outlet side. The outer shape of the base 32 is substantially rectangular in plan view, as viewed in the direction of the axis line O. As illustrated in Fig. 5, an end face of the base 32 on the outlet side is disposed to be flush with an end face of the inner annular portion 122 of the mouthpiece supporting member 120 on the outlet side. The base 32 preferably has an outer shape that will fit in the mouthpiece opening 125 in the mouthpiece supporting member 120, and may have any appropriate outer shape.

[0112] The engagement peripheral portion 33 extends from the base 32 toward the non-outlet side. An outer periphery (engagement section, engagement surface) 33j of the engagement peripheral portion 33 has a planar shape extending along the direction of the axis line O.

[0113] Fig. 9 is a plan view of the mouthpiece 30 as viewed from the non-outlet side.

[0114] As illustrated in Fig. 9, the outer shape of the engagement peripheral portion 33 is substantially octagonal in plan view, as viewed in the direction of the axis line O. The engagement peripheral portion 33 may have any appropriate shape that is capable of being in contact with the engagement inner peripheral portion 124 of the mouthpiece supporting member 120.

[0115] Fig. 10 is a cross-sectional view of the mouthpiece 30 and the cartridge 20 along the width direction.

[0116] As illustrated in Fig. 7 and Fig. 10, the engagement peripheral portion 33 is thinner at a non-outlet-side part 331 than at an outlet-side part 332. This creates a step 333 at the boundary between the non-outlet-side part 331 and the outlet-side part 332. The step 333 is substantially annular in plan view, as viewed in the direction of the axis line O.

[0117] As illustrated in Fig. 7, an inner periphery 33i of the non-outlet-side part 331 of the engagement peripheral portion 33 (i.e., an inner periphery of the engagement peripheral portion 33) has a plurality of grooved portions 335 recessed outward in the radial direction. In other words, adjacent ones of the grooved portions 335 have therebetween a protruding portion 336 protruding inward in the radial direction. As illustrated in Fig. 9, six grooved portions 335 are substantially equally spaced in the circumferential direction. Note that there may be provided any appropriate number of grooved portions 335. The grooved portions 335 may be optional.

[0118] A circle formed by the inner peripheries 33i of the plurality of protruding portions 336 is defined as an imaginary circle A1 (see a two-dot chain line). The sum of the lengths of the inner peripheries 33i of the plurality of protruding portions 336 in the circumferential direction is preferably greater than or equal to half the circumference of the imaginary circle A1.

[0119] As illustrated in Fig. 7, the engagement peripheral portion 33 has a tapered portion 337 formed at an end thereof on the non-outlet side. The tapered portion 337 is gradually inclined outward in the radial direction, with decreasing distance to the non-outlet side.

[0120] As illustrated in Fig. 5, the mouthpiece 30 has a flow channel s2 passing therethrough in the direction of the axis line O. The flow channel s2 allows vapor from the cartridge 20 to flow therein.

[0121] The engagement peripheral portion 33 of the mouthpiece 30 is fitted to the engagement inner peripheral portion 124 of the protruding cylinder 121 of the mouthpiece supporting member 120. In other words, the outer periphery 33j of the engagement peripheral portion 33 of the mouthpiece 30 is in contact with an inner periphery 124i of the engagement inner peripheral portion 124 of the mouthpiece supporting member 120. When the mouthpiece 30 is attached in place, the engagement inner peripheral portion 124 of the mouthpiece supporting member 120 is elastically deformed outward in the radial direction, from the state indicated by a two-dot chain line to the state indicated by a solid line, so that the repulsive force biases the engagement peripheral portion 33 of the mouthpiece 30 inward in the radial direction. The engagement peripheral portion 33 of the mouthpiece 30 is thus engaged in the protruding cylinder 121 of the mouthpiece supporting member 120.

[0122] The inner periphery (holding section) 33i of the engagement peripheral portion 33 of the mouthpiece 30 is fitted onto (or holds) the first filter portion 21 of the cartridge 20. When the mouthpiece 30 is attached in place, the first filter portion 21 is elastically deformed inward in the radial direction, from the state indicated by a two-dot chain line to the state indicated by a solid line, and is held by the engagement peripheral portion 33 of the mouthpiece 30.

[0123] As illustrated in Fig. 10, an end portion 20a of the cartridge 20 on the outlet side is in contact with the step 333 of the engagement peripheral portion 33 of the mouthpiece 30. The opening width of the connection between the outlet portion 31 and the base 32 increases toward the non-outlet side from the outlet side. The end portion 20a of the cartridge 20 on the outlet side and a surface of the outlet portion 31 of the mouthpiece 30 on the non-outlet side form a space s3 therebetween. This reduces the area obstructed by the end portion 20a of the cartridge 20 on the outlet side and reduces ventilation resistance.

[0124] As indicated by a two-dot chain line in Fig. 9, the first filter portion 21 of the cartridge 20 is in contact with the inner periphery 33i of the engagement peripheral portion 33 of the mouthpiece 30. At the same time, the first filter portion 21 bends outward in the radial direction at the grooved portions 335, and elastically deforms to enter into the grooved portions 335.

[0125] The length of the portion of the cartridge 20 held by the engagement peripheral portion 33 of the mouthpiece 30 (i.e., length along the direction of the axis line O) may be 10% to 30%, or preferably about 20%, of the length of the cartridge 20 along the direction of the axis line O.

[0126] As illustrated in Fig. 5, the mouthpiece 30 extends on both sides of the mouthpiece opening 125 in the direction of the axis line O. In other words, the engagement peripheral portion 33 of the mouthpiece 30 is located on the non-outlet side of the mouthpiece opening 125, and the outlet portion 31 of the mouthpiece 30 is located on the outlet side of the mouthpiece opening 125.

[0127] A configuration is made such that the static frictional force acting between the inner periphery 33i of the engagement peripheral portion 33 of the mouthpiece 30 and the first filter portion 21 of the cartridge 20 is greater than the static frictional force acting between the outer periphery 33j of the engagement peripheral portion 33 of the mouthpiece 30 and the engagement inner peripheral portion 124 of the mouthpiece supporting member 120.

[0128] As illustrated in Fig. 1, the cap 40 is disposed to cover the mouthpiece 30. The cap 40 includes an outer cap portion 41 and an end cap portion 42.

[0129] The outer cap portion 41 is formed substantially in the shape of a rectangular cylinder centered on the axis line O. The end cap portion 42 is disposed at an end of the outer cap portion 41 on the outlet side.

[0130] To attach the cartridge 20 and the mouthpiece 30 in place in the inhaler 1, the cartridge 20 is inserted through the mouthpiece opening 125 into the cartridge supporting member 140. When the mouthpiece 30 is fitted into the mouthpiece supporting member 120, the cartridge 20 is held in place by the mouthpiece 30. To replace the cartridge 20, the user pulls the mouthpiece 30 out toward the outlet side, with fingers placed on the face of the finger hold 311 of the mouthpiece 30 on the non-outlet side. Thus, the cartridge 20, which is held by the mouthpiece 30, is pulled out together with the mouthpiece 30.

[0131] In the inhaler 1 according to the present embodiment, when the mouthpiece 30 is detached from the housing 11 to replace the cartridge 20, the outer periphery 33j of the engagement peripheral portion 33 of the mouthpiece 30 and the engagement inner peripheral portion 124 of the mouthpiece supporting member 120 are brought out of engagement. This allows the cartridge 20 held by the inner periphery 33i of the engagement peripheral portion 33 of the mouthpiece 30 to be detached from the housing 11 together with the mouthpiece 30, eliminates the need for the user to individually detach the cartridge 20 and the mouthpiece 30, and facilitates replacement of the cartridge 20.

[0132] The mouthpiece 30 is detached from the housing 11 by simply holding the outlet portion 31 of the mouthpiece 30 protruding outward from the mouthpiece opening 125 of the housing 11. The mouthpiece 30 can thus be detached easily.

[0133] The cartridge 20 does not protrude outward from the mouthpiece opening 125 of the housing 11. This prevents the user from accidentally touching the cartridge 20.

[0134] The maximum static frictional force acting between the inner periphery 33i of the engagement peripheral portion 33 of the mouthpiece 30 and the outer periphery of the first filter portion 21 of the cartridge 20 is greater than the maximum static frictional force acting between the inner periphery of the peripheral portion 142 of the cartridge supporting member 140 and the outer periphery of the remaining portion of the cartridge 20 (i.e.,

portion of the cartridge 20 in contact with the inner periphery of the peripheral portion 142 of the cartridge supporting member 140). Therefore, when the mouthpiece 30 is detached from the housing 11, the cartridge 20 can be reliably pulled out together with the mouthpiece 30.

[0135] The cartridge 20 is held by fitting the inner periphery 33i of the engagement peripheral portion 33 of the mouthpiece 30 onto first filter portion 21 of the cartridge 20. The cartridge 20 can thus be easily held by the mouthpiece 30.

[0136] The cartridge 20 elastically deforms to allow the outer periphery of the cartridge 20 to enter into the grooved portions 335 in the inner periphery 33i of the engagement peripheral portion 33 of the mouthpiece 30. Thus, with the repulsive force generated when the outer periphery of the cartridge 20 bends, the inner periphery 33i of the engagement peripheral portion 33 of the mouthpiece 30 firmly holds the cartridge 20.

[0137] The plurality of grooved portions 335 are equally spaced in the circumferential direction. Therefore, a repulsive force generated when the outer periphery of the cartridge 20 bends is uniformly distributed in the circumferential direction. This allows the inner periphery 33i of the engagement peripheral portion 33 of the mouthpiece 30 to hold the cartridge 20 with uniform force throughout its circumference.

[0138] The sum of the lengths of the inner peripheries 33i of the plurality of protruding portions 336 in the circumferential direction is, for example, greater than or equal to half the circumference of the imaginary circle A1. This provides a sufficient area of contact between the protruding portions 336 and the outer periphery of the cartridge 20, and secures a sufficient force with which the inner peripheries 33i of the engagement peripheral portion 33 of the mouthpiece 30 holds the cartridge 20.

[0139] The outer periphery 33j of the engagement peripheral portion 33 of the mouthpiece 30 is in contact with the inner periphery 124i of the engagement inner peripheral portion 124 of the mouthpiece supporting member 120 formed along the direction of the axis line O. This reduces displacement (or shaking) of the mouthpiece 30 in a direction intersecting the direction of the axis line O, with respect to the mouthpiece opening 125 of the housing 11, and facilitates attachment and detachment of the mouthpiece 30 along the direction of the axis line O.

[0140] The outer periphery 33j of the engagement peripheral portion 33 of the mouthpiece 30 is biased inward in the radial direction by the housing 11, so that the mouthpiece 30 is prevented from accidentally falling off the housing 11.

[0141] The outer periphery of the mouthpiece 30 has the finger hold 311 on which the user can place fingers. This allows the user to attach and detach the mouthpiece 30 with fingers placed on the finger hold 311, and improves attachability and detachability of the mouthpiece 30.

[0142] A cross-section orthogonal to the direction of the axis line O has a flattened shape. Therefore, when the user puts the mouthpiece 30 in the mouth, with the short-side direction of the mouthpiece 30 being the up-down direction, the upper and lower lips are not far apart. This reduces the flow of air into the mouth through the gap between the mouthpiece 30 and each end of the lips in the right and left direction.

[0143] The engagement peripheral portion 33 of the mouthpiece 30 has the tapered portion 337 formed at the end thereof on the non-outlet side. This prevents the mouthpiece 30 from coming into contact with the end portion 20a of the cartridge 20 on the outlet side when the mouthpiece 30 is inserted into the housing 11, and thus prevents the cartridge 20 from being deformed or damaged.

[0144] The controller 152 is capable of controlling the heating temperature of the heater 16 in such a way that components contained in the flavor portion 23 are heated at a temperature lower than the temperature at which the components are aerosolized. For example, when the ambient temperature is room temperature, the flavor component and other components of the flavor portion 23 are aerosolized when heated at about 150°C or higher. The controller 152 is capable of controlling the heating temperature in such a way that the flavor portion 23 is heated below 150°C. This allows the flavor component to be delivered in a substantially invisible state to the user. By heating the flavor portion 23 at a lower temperature, it is possible to slow down the exhaustion of the flavor component and others contained in the flavor portion 23, and thus to deliver the flavor component to the user over a long period of time. For example, the heating temperature at which to heat the flavor portion 23 is preferably from 100°C to 120°C.

<Second Embodiment>

[0145] Fig. 11 is a cross-sectional view of a main part of a flavor inhalation system according to a second embodiment. Fig. 12 is a perspective view of a cartridge container of the flavor inhalation system according to the second embodiment. Fig. 13 is a perspective view of a mouthpiece of the flavor inhalation system according to the second embodiment.

[0146] As illustrated in Fig. 11, in an inhaler 1A, which is an example of the flavor inhalation system according to the second embodiment, a mouthpiece 30A is engaged in a cartridge container 130A.

[0147] As illustrated in Fig. 11 and Fig. 12, the cylindrical container member 131 of the cartridge container 130A has a plurality of extending walls 133 extending on the outlet side of the cartridge supporting wall 132. The extending walls 133 are formed at four positions spaced apart in the circumferential direction. There may be provided only one extending wall 133, or more than one (except four) extending wall 133 may be provided. The extending wall 133 may be formed continuously in the circumferential direction.

[0148] The inner periphery of each of the extending

walls 133 has an engagement recess 134 recessed outward in the radial direction. The engagement recess 134 is formed over the entire length of the extending wall 133 in the circumferential direction. The engagement recess 134 may be formed in part of, or at multiple points in, the extending wall 133 in the circumferential direction.

[0149] As illustrated in Fig. 12, the outer periphery of the cylindrical container member 131 of the cartridge container 130A has regulating protrusions 135 protruding outward in the radial direction. The regulating protrusions 135 are in contact with, or slightly spaced from, the corners of the inner cylindrical member 117 (see Fig. 11). This regulates, in the inner cylindrical member 117, the rotation of the cartridge container 130A in the circumferential direction of the axis line O.

[0150] As illustrated in Fig. 11 and Fig. 13, an engagement peripheral portion 34 extends from the base 32 toward the non-outlet side. The outer shape of the engagement peripheral portion 34 is circular in plan view, as viewed in the direction of the axis line O.

[0151] An outer periphery 34j of the engagement peripheral portion 34 has an engagement annular portion (engagement section) 35 protruding outward in the radial direction.

[0152] The engagement annular portion 35 is provided over the entire circumference of the engagement peripheral portion 34 in the circumferential direction. The engagement annular portion 35 does not necessarily need to be provided over the entire circumference in the circumferential direction, as long as it is provided at points corresponding to the engagement recesses 134 in the cartridge container 130A. The outlet portion 31 of the mouthpiece 30A does not have the finger hold 311 described in the first embodiment.

[0153] The engagement annular portion 35 of the mouthpiece 30A is engaged in the engagement recesses 134 in the cartridge container 130A.

[0154] To attach the cartridge 20 and the mouthpiece 30A in place in the inhaler 1A, the cartridge 20 is inserted through the mouthpiece opening 125 into the cartridge supporting member 140. When the mouthpiece 30A is inserted into the mouthpiece supporting member 120, the engagement annular portion 35 of the mouthpiece 30A is brought into contact with portions of the extending walls 133 of the cartridge container 130A on the outlet side of the engagement recesses 134, and the extending walls 133 of the cartridge container 130A are elastically deformed outward in the radial direction. After passing over the portions of the extending walls 133 of the cartridge container 130A on the outlet side of the engagement recesses 134, the engagement annular portion 35 of the mouthpiece 30A is fitted into the engagement recesses 134. The mouthpiece 30A holds the cartridge 20. To replace the cartridge 20, the user holds the mouthpiece 30A and pulls it out toward the outlet side. Thus, the cartridge 20, which is held by the mouthpiece 30A, is pulled out together with the mouthpiece 30A.

[0155] In the inhaler 1A according to the present embodiment, when the mouthpiece 30A is detached from the housing 11 to replace the cartridge 20, the engagement annular portion 35 of the mouthpiece 30A and the engagement recesses 134 in the cartridge container 130A are brought out of engagement. This allows the cartridge 20 held by the inner periphery of the engagement peripheral portion 34 of the mouthpiece 30A to be detached from the housing 11 together with the mouthpiece 30A, eliminates the need for the user to individually detach the cartridge 20 and the mouthpiece 30A, and facilitates replacement of the cartridge 20.

[0156] When the engagement annular portion 35 of the mouthpiece 30A is fitted into the engagement recesses 134 in the cartridge container 130A, the extending walls 133 of the cartridge container 130A displaced outward in the radial direction are returned to the original positions. Since this enables the user to hear the click or feel the fit, the user can easily recognize that the mouthpiece 30A has been inserted.

<Third Embodiment>

[0157] Fig. 14 is a lateral view of a mouthpiece of a flavor inhalation system according to a third embodiment. Fig. 15 is a perspective view of the mouthpiece of the flavor inhalation system according to the third embodiment. Fig. 16 is a perspective view of a cartridge container of the flavor inhalation system according to the third embodiment. In Fig. 14, the cartridge container is indicated by a two-dot chain line.

[0158] As illustrated in Fig. 14, in an inhaler 1B, which is an example of the flavor inhalation system according to the third embodiment, an engagement protrusion 36 of a mouthpiece 30B is engaged in an engagement hole 134c formed in a cartridge container 130B.

[0159] As illustrated in Fig. 15, the outer periphery 34j of the engagement peripheral portion 34 of the mouthpiece 30B has the engagement protrusion (protrusion, engagement section) 36 protruding outward in the radial direction. There are provided two engagement protrusions 36 spaced apart in the circumferential direction of the engagement peripheral portion 34 (Fig. 15 shows only one engagement protrusion 36). Note that the number of the engagement protrusions 36 may be appropriately determined.

[0160] As illustrated in Fig. 16, the cylindrical container member 131 of the cartridge container 130B has an extending annular wall 139 extending on the outlet side of the cartridge supporting wall 132. The extending annular wall 139 is provided over the entire circumference of the cylindrical container member 131 in the circumferential direction.

[0161] The extending annular wall 139 has protrusion engagement grooves 134a. There are provided four protrusion engagement grooves 134a spaced apart in the circumferential direction of the extending annular wall 139. It is only required that the protrusion engagement grooves 134a be formed to correspond to the respective

engagement protrusions 36.

[0162] The protrusion engagement grooves 134a are each composed of an insertion recess (first groove) 134b and the engagement hole (second groove) 134c.

[0163] The insertion recess 134b is recessed outward in the radial direction from the inner periphery of the extending annular wall 139. At the same time, the insertion recess 134b extends from the end portion of the extending annular wall 139 on the outlet side toward the non-outlet side.

[0164] The engagement hole 134c extends in one circumferential direction from the end portion of the insertion recess 134b on the non-outlet side. The engagement hole 134c penetrates the extending annular wall 139 in the radial direction. A corresponding one of the engagement protrusions 36 is engaged in the engagement hole 134c.

[0165] To attach the cartridge 20 and the mouthpiece 30B in place in the inhaler 1B, the cartridge 20 is inserted through the mouthpiece opening 125 into the cartridge supporting member 140. When the mouthpiece 30B is inserted into the mouthpiece supporting member 120, the mouthpiece 30B is placed in such a manner that each engagement protrusion 36 of the mouthpiece 30B is on the same axis as a corresponding one of the insertion recesses 134b in the cartridge container 130B. After the engagement protrusion 36 of the mouthpiece 30B is moved along the insertion recess 134b in the cartridge container 130B, the mouthpiece 30B is rotated in one direction about the axis line O to engage the engagement protrusion 36 in the engagement hole 134c. The mouthpiece 30B holds the cartridge 20. To replace the cartridge 20, the user rotates the mouthpiece 30B in the opposite direction about the axis line O (i.e., in the direction opposite that when the mouthpiece 30B is attached) to allow the engagement protrusion 36 to be positioned at the insertion recess 134b, and pulls the mouthpiece 30B out toward the outlet side. Thus, the cartridge 20, which is held by the mouthpiece 30B, is pulled out together with the mouthpiece 30B.

[0166] In the inhaler 1B according to the present embodiment, when the mouthpiece 30B is rotated about the axis line O and pulled out from the housing 11 to replace the cartridge 20, the engagement protrusions 36 of the mouthpiece 30B and the engagement holes 134c in the mouthpiece supporting member 120 are brought out of engagement. This allows the cartridge 20 held by the inner periphery of the engagement peripheral portion 34 of the mouthpiece 30B to be detached from the housing 11 together with the mouthpiece 30B, eliminates the need for the user to individually detach the cartridge 20 and the mouthpiece 30B, and facilitates replacement of the cartridge 20.

[0167] The engagement protrusions 36 of the mouthpiece 30B are engaged in the engagement holes 134c in the mouthpiece supporting member 120. To bring the engagement protrusions 36 of the mouthpiece 30B and the engagement grooves 134c in the mouthpiece supporting member 120 out of engagement, the mouthpiece 30B needs to be rotated in the circumferential direction before the engagement protrusions 36 are moved along the insertion recesses 134b in the mouthpiece supporting member 120. This prevents accidental disengagement of the engagement protrusions 36 and the engagement holes 134c.

<Modified Embodiments 1 to 3>

[0168] Fig. 17 is a lateral view of a mouthpiece of a flavor inhalation system according to modified embodiment 1. Fig. 18 is a lateral view of a mouthpiece of a flavor inhalation system according to modified embodiment 2. Fig. 19 is a lateral view of a mouthpiece of a flavor inhalation system according to modified embodiment 3.

[0169] As illustrated in Fig. 17, a mouthpiece 30C of an inhaler, which is an example of the flavor inhalation system according to modified embodiment 1, has two finger holds 312 spaced apart on the outer periphery of the outlet portion 31 (Fig. 17 shows only one finger hold 312). The finger holds 312 are each disposed on a surface along the direction of the long side of the outlet portion 31 (i.e., along the front-back direction).

[0170] As illustrated in Fig. 18, a mouthpiece 30D of an inhaler, which is an example of the flavor inhalation system according to modified embodiment 2, has two finger holds 313 spaced apart on the outer periphery of the outlet portion 31. The finger holds 313 are each disposed on a surface along the direction of the short side of the outlet portion 31 (i.e., along the width direction).

[0171] As illustrated in Fig. 19, a mouthpiece 30E of an inhaler, which is an example of the flavor inhalation system according to modified embodiment 3, has finger holds 314 recessed inward in the radial direction from the outer periphery of the outlet portion 31. The finger holds 314 are each provided in a surface along the direction of the short side of the outlet portion 31 (i.e., along the width direction). The finger holds 314 may each be provided in a surface along the direction of the long side of the outlet portion 31 (i.e., along the front-back direction).

[0172] The lengths of the finger holds 312 to 314 along the direction of the axis line O may be appropriately determined. There may be provided a plurality of finger holds 312 to 314 along the direction of the axis line O.

[0173] As described above, the mouthpieces 30C to 30D according to modified embodiments 1 to 3 have, on the outer peripheries thereof, the finger holds 312 to 314 on which the user can place fingers. This allows the user to attach or detach the mouthpieces 30C to 30D with fingers placed on the finger holds 312 to 314, and thus improves attachability and detachability of the mouthpieces 30C to 30D.

[0174] While the preferred embodiments of the present invention have been described, the present invention is not limited to the embodiments described above. Addi-

tion, omission, and replacement of components and other changes may be made without departing from the scope of the present invention. The present invention is not defined by the description of the embodiments, and is defined only by the appended claims.

[0175] For example, although the embodiments have described the configuration where the cartridge 20 does not protrude beyond the mouthpiece opening 125 toward the outlet side, the configuration is not limited to this. The cartridge 20 may protrude beyond the mouthpiece opening 125 toward the outlet side. In this case, the mouthpiece 30 may be configured either to hold only a portion of the cartridge 20 protruding from the mouthpiece opening 125 toward the outlet side, or to hold both the portion of the cartridge 20 protruding from the mouthpiece opening 125 toward the outlet side and the portion of the cartridge 20 protruding from the mouthpiece opening 125 toward the non-outlet side.

[0176] Although the embodiments have described the mouthpiece 30 as a pull-out retainer, the configuration is not limited to this. The pull-out retainer may be a jig that is specifically designed for replacing the cartridge 20.

[0177] Although the embodiments have described a configuration where the static frictional force acting between the inner periphery 33i of the engagement peripheral portion 33 of the mouthpiece 30 and the first filter portion 21 of the cartridge 20 is greater than the static frictional force acting between the engagement inner peripheral portion 124 of the mouthpiece supporting member 120 and the first filter portion 21 of the cartridge 20, the configuration is not limited to this. For example, the mouthpiece 30 may have protrusions that are capable of being engaged with the cartridge 20, so that the cartridge 20 can be pulled out from the housing 11 together with the mouthpiece 30.

[0178] Although the embodiments described above use the heater 16 as a means of heating the cartridge 20, the configuration is not limited to this. As well as using an induction coil, the cartridge 20 may include therein a susceptor made of any material that is capable of generating heat by electromagnetic induction. The flavor component in the flavor portion 23 may be heated by induction heating of the susceptor in the cartridge 20 in an alternate-current magnetic field produced by the induction coil.

[Reference Signs List]

[0179]

1	inhaler
10	main unit
11	housing
15	power supply unit
16	heater
17	heat insulating material
20	cartridge
21	first filter portion (filter portion)
22	second filter portion
23	flavor portion
24	wrapping paper portion
30	mouthpiece (pull-out retainer)
31	outlet portion
32	base
33	engagement peripheral portion
33i	inner periphery of engagement peripheral portion 33 (holding section)
33j	outer periphery of engagement peripheral portion (engagement section, engagement surface)
35	engagement annular portion (engagement section)
36	engagement protrusion (protrusion, engagement section)
40	cap
110	housing body
111	outer housing
111a	outlet-side opening
117	inner cylindrical member
120	mouthpiece supporting member
124	engagement inner peripheral portion
124i	inner periphery of engagement inner peripheral portion (contact surface)
125	mouthpiece opening (opening)
130	cartridge container
134	engagement recess
134a	protrusion engagement groove
134b	insertion recess (first groove)
134c	engagement hole (second groove)
138	ventilation passage
140	cartridge supporting member
151	battery
152	controller
311	finger hold
335	grooved portion
336	protruding portion
s1	cartridge storage space (storage space)
s2	flow channel
A1	imaginary circle

Claims

1. A flavor inhalation system comprising:

a housing extending in an axial direction, having an opening formed at a first end portion in the axial direction, having a storage space formed inside the housing to communicate with the opening, and a cartridge containing a flavor component that is stored in the storage space; and

a pull-out retainer,

wherein the pull-out retainer includes:

an engagement section engaged in the

opening, and
a holding section configured to hold the cartridge.

2. The flavor inhalation system according to Claim 1, wherein the pull-out retainer is configured to extend on both sides of the opening in the axial direction in a state in which the pull-out retainer is engaged in the opening.

3. The flavor inhalation system according to Claim 1 or 2, wherein the pull-out retainer is a mouthpiece having a flow channel configured to allow vapor generated from the cartridge to flow the flow channel.

4. The flavor inhalation system according to any one of Claims 1 to 3, wherein the engagement section is a protrusion protruding outward in a radial direction from an outer periphery of the pull-out retainer;
an inner periphery of the housing includes:

a first groove recessed outward in the radial direction and extending from the first end portion in the axial direction, and
a second groove recessed outward in the radial direction and extending in one circumferential direction from an end portion of the first groove opposite the first end portion; and
the engagement section is engaged in the second groove.

5. The flavor inhalation system according to any one of Claims 1 to 4, wherein the storage space is capable of storing the cartridge in such a way that the cartridge does not protrude outward from the opening.

6. The flavor inhalation system according to any one of Claims 1 to 5, wherein a static frictional force acting between the holding section and the cartridge is greater than a static frictional force acting between an inner wall of the storage space and the cartridge.

7. The flavor inhalation system according to any one of Claims 1 to 6, wherein the holding section is configured to be fitted onto one end portion of the cartridge extending in the axial direction from the outside.

8. The flavor inhalation system according to Claim 7, wherein an inner periphery of the holding section has a grooved portion recessed outward in the radial direction.

9. The flavor inhalation system according to Claim 8, wherein a plurality of grooved portions are equally spaced in a circumferential direction.

10. The flavor inhalation system according to Claim 9, wherein a gap between the adjacent grooved portions is formed as a protruding portion protruding inward in the radial direction; and a sum of lengths of inner peripheries of a plurality of protruding portions in the circumferential direction is greater than or equal to half a circumference of an imaginary circle defined by the inner peripheries of the plurality of protruding portions.

11. The flavor inhalation system according to any one of Claims 1 to 10, wherein the engagement section is configured as an engagement surface having a planar shape; and
the opening is provided with a contact surface capable of being in contact with the engagement surface, the contact surface being formed along the axial direction.

12. The flavor inhalation system according to any one of Claims 1 to 11, wherein the housing biases the engagement section inward in the radial direction.

13. The flavor inhalation system according to any one of Claims 1 to 12, wherein an outer periphery of the pull-out retainer has a finger hold on which a user can place fingers.

14. A mouthpiece detachably attached to a housing, the housing extending in an axial direction, having an opening formed at a first end portion thereof in the axial direction, and having therein a storage space communicating with the opening, the storage space being configured to store a cartridge containing a flavor component, the mouthpiece comprising:

an engagement section engaged in the opening; and
a holding section configured to hold the cartridge,
wherein the mouthpiece has a flow channel configured to allow vapor from the cartridge to flow therein.

15. The mouthpiece according to Claim 14, wherein a cross-section orthogonal to the axial direction has a flattened shape.

16. A cartridge used in a flavor inhalation system that includes a housing and a pull-out retainer, the housing extending in an axial direction, having an opening formed at a first end portion in the axial direction, and internally formed to communicate with the opening, the cartridge comprising:

a flavor portion having a flavor component; and
a filter portion configured to allow vapor produced by heating the flavor portion to pass there-

through, the filter portion being held by a holding section of the pull-out retainer.

FIG. 1

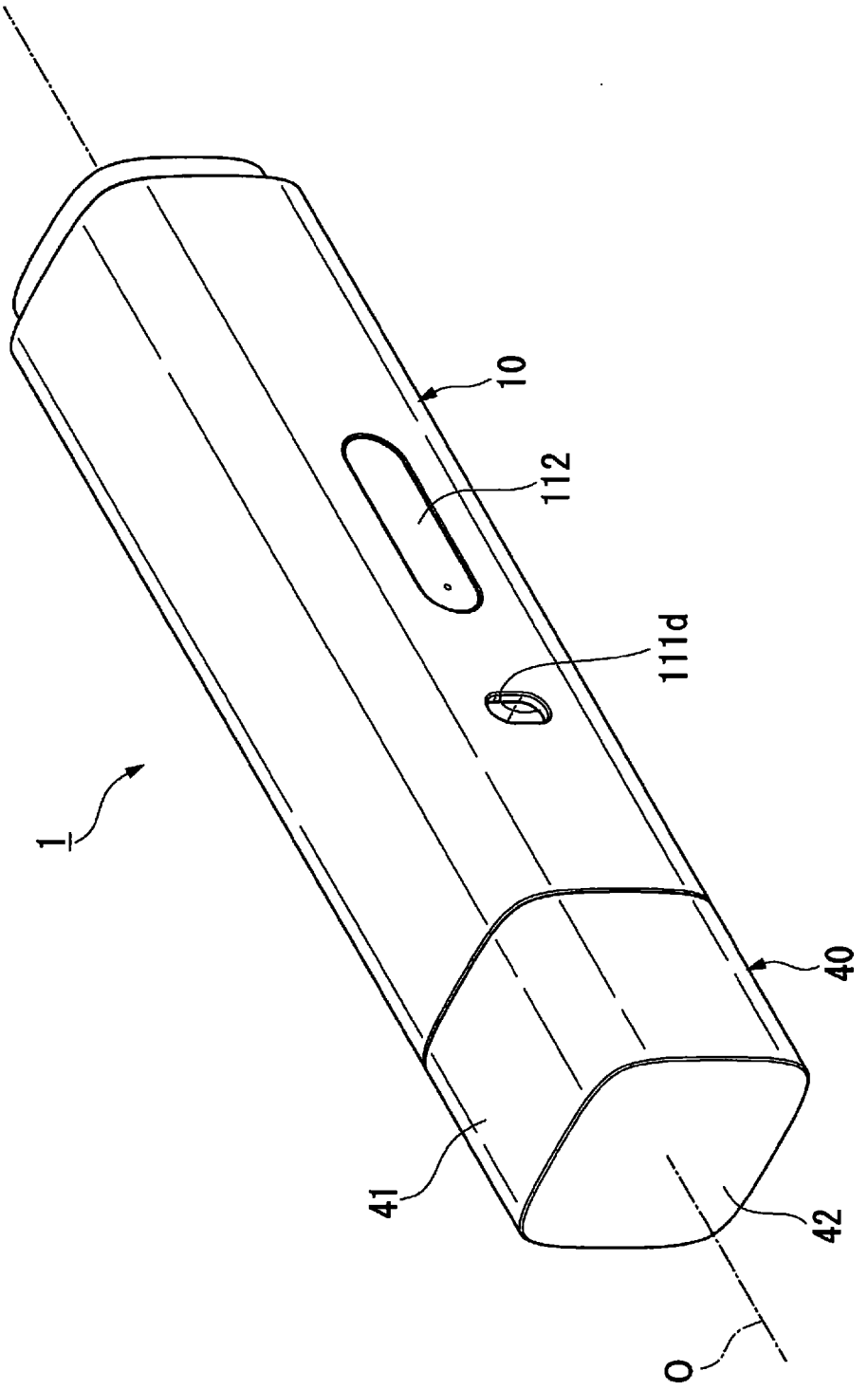


FIG. 2

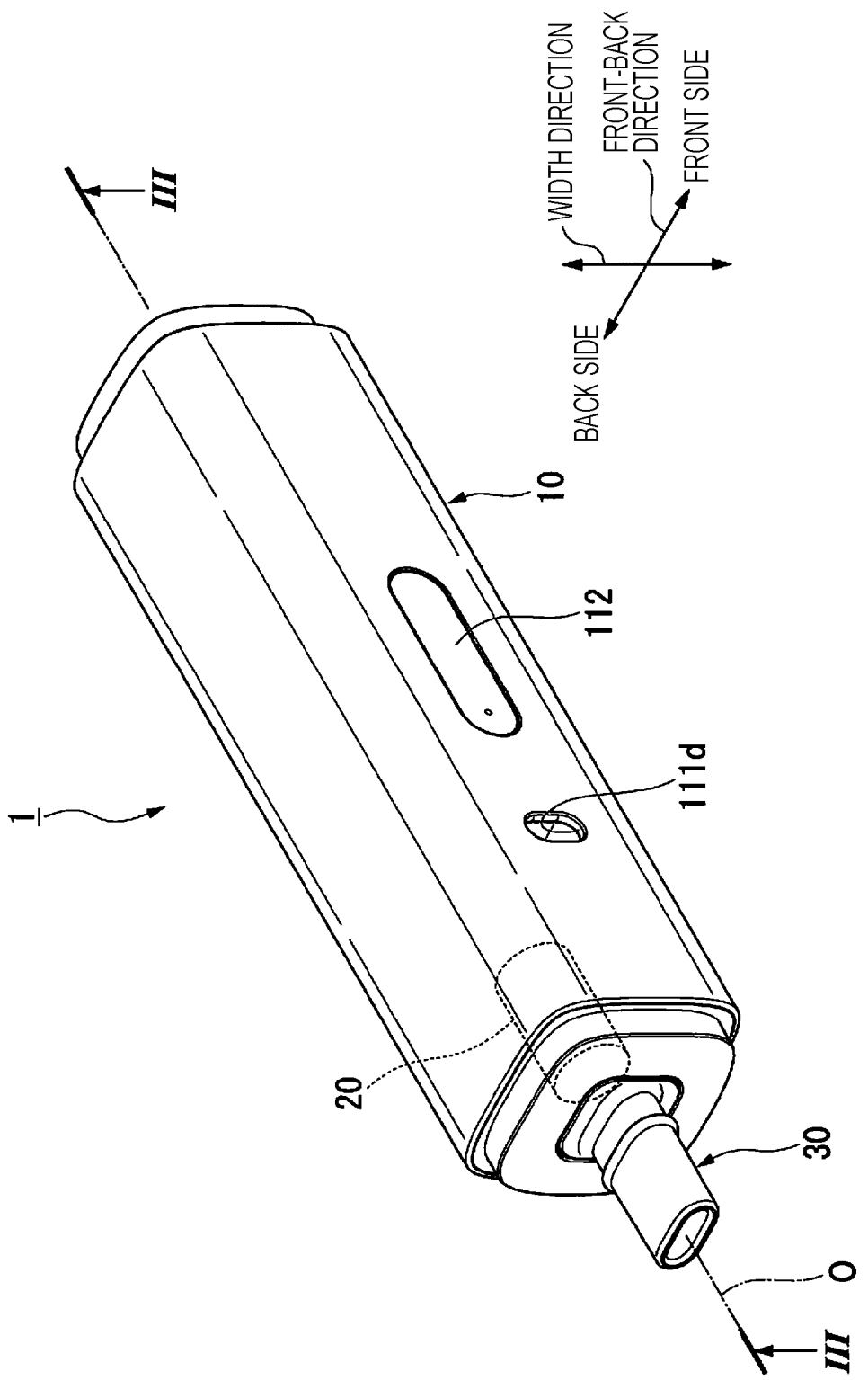
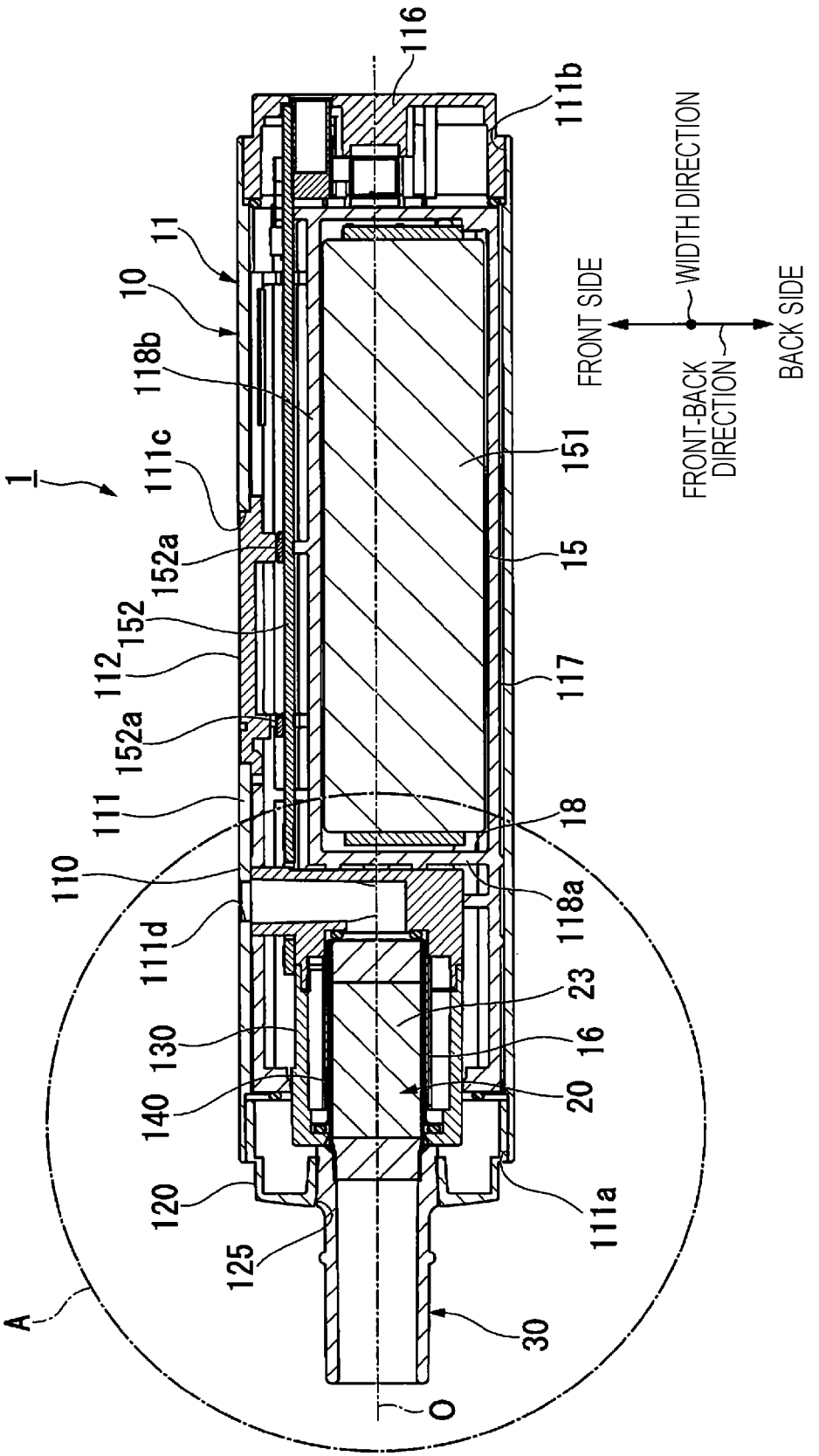

WIDTH DIRECTION
FRONT-BACK DIRECTION
FRONT SIDE
BACK SIDE
III
1
10
112
111d
20
30
O
III

FIG. 3


1
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11
111
111a
111b
111c
111d
110
112
116
117
118a
118b
120
125
130
140
15
151
152
152a
152a
16
18
20
23
30
A
O
FRONT SIDE
BACK SIDE
WIDTH DIRECTION
FRONT-BACK DIRECTION

FIG. 4

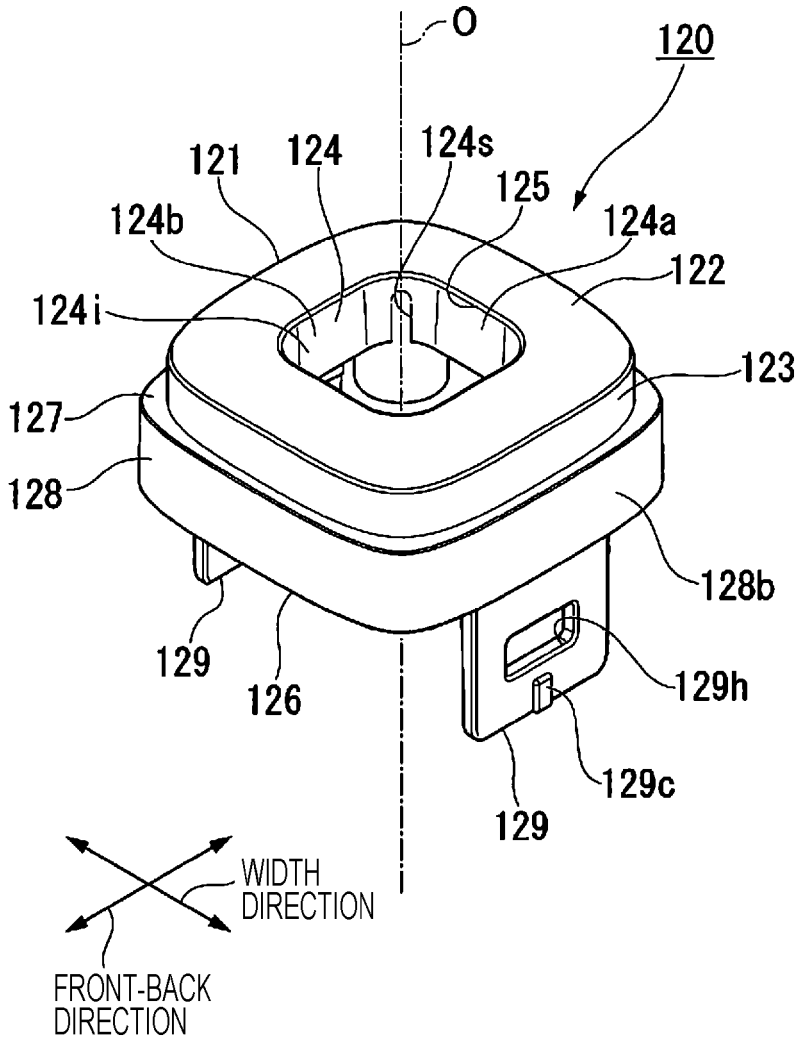

O
120
121
124
124s
125
124b
124a
122
124i
123
127
128
128b
129
126
129h
129c
129
WIDTH DIRECTION
FRONT-BACK DIRECTION

FIG. 5

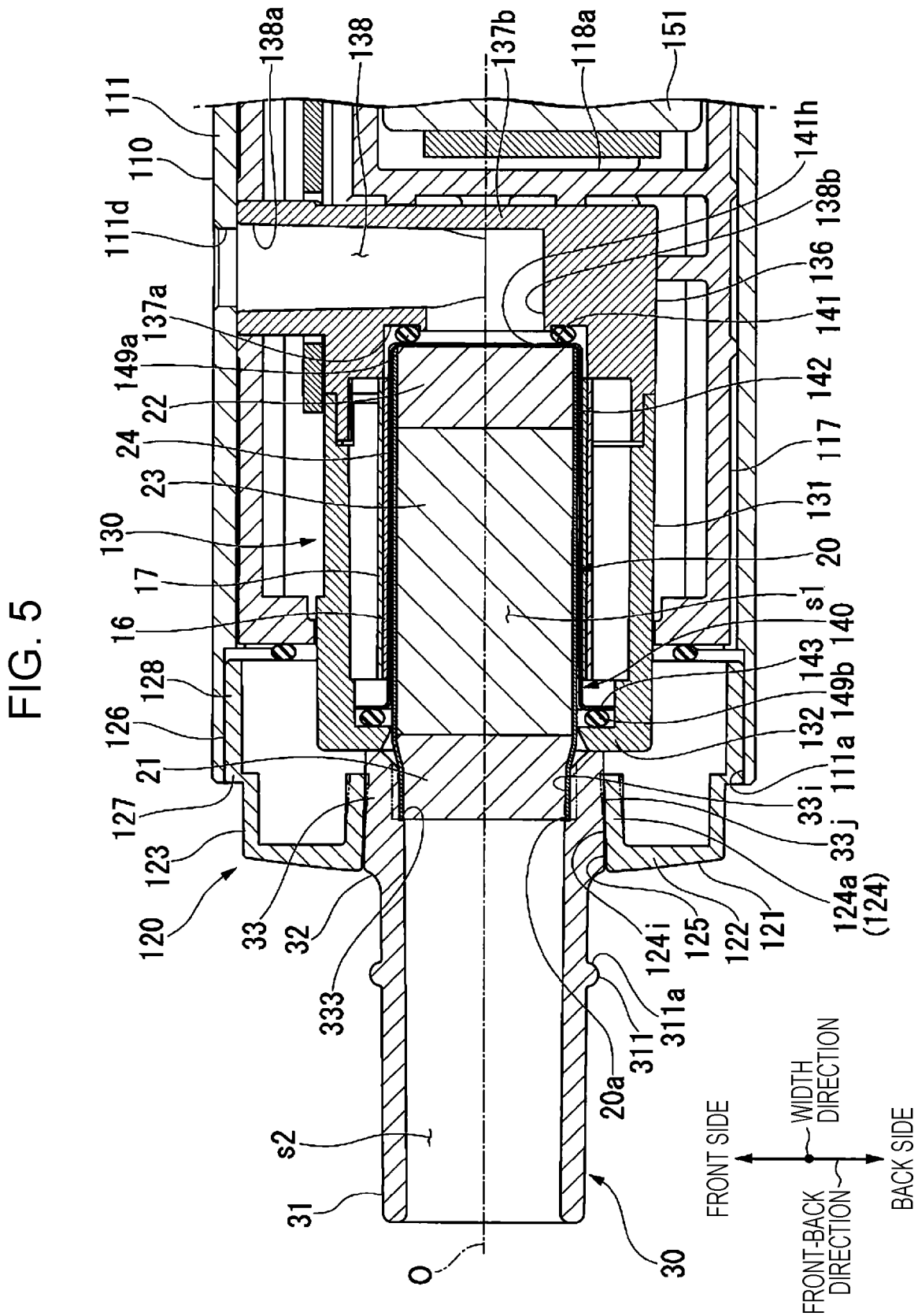

138a
138
137b
118a
151
111
110
111d
141h
138b
136
137a
141
149a
142
22
24
117
23
131
130
20
17
s1
16
140
143
128
149b
126
132
111a
21
33i
127
33j
123
124a
(124)
120
33
32
125
122
121
124i
333
311a
311
20a
s2
31
30
O
FRONT SIDE
WIDTH DIRECTION
BACK SIDE
FRONT-BACK DIRECTION

FIG. 6

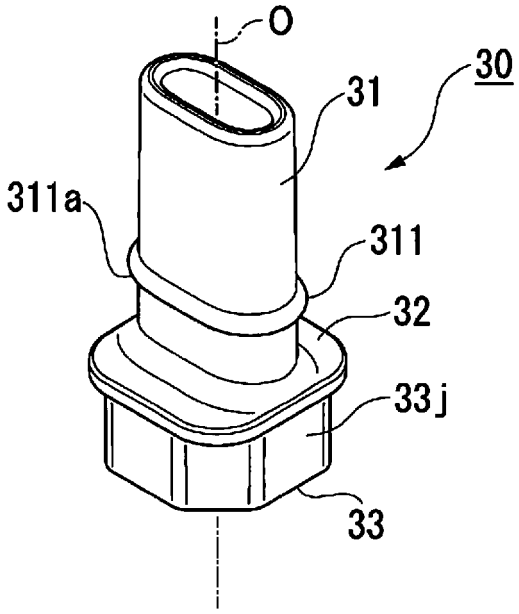
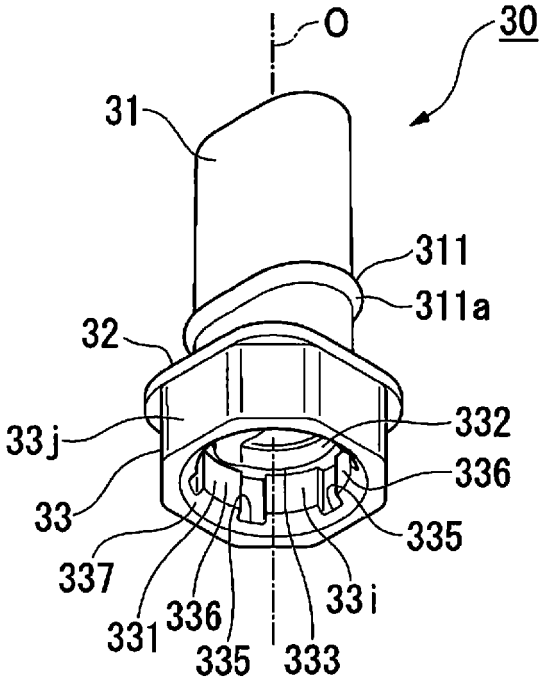

O
30
31
311a
311
32
33j
33

FIG. 7


O
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31
311
311a
32
33j
332
336
33
335
337
33i
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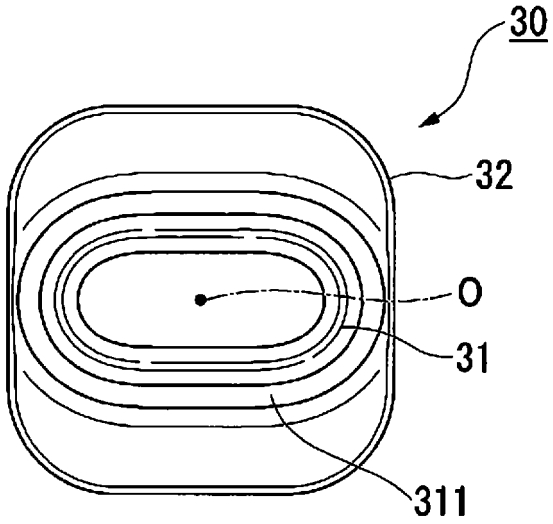
336
335
333

FIG. 8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32
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311

FIG. 9

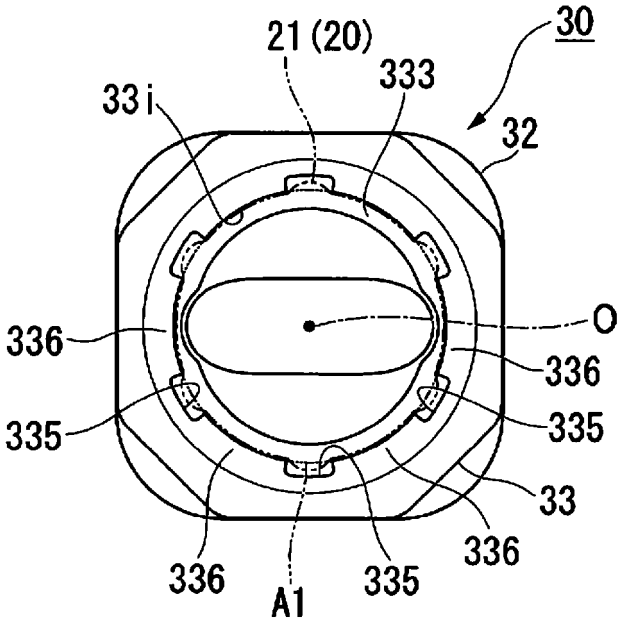
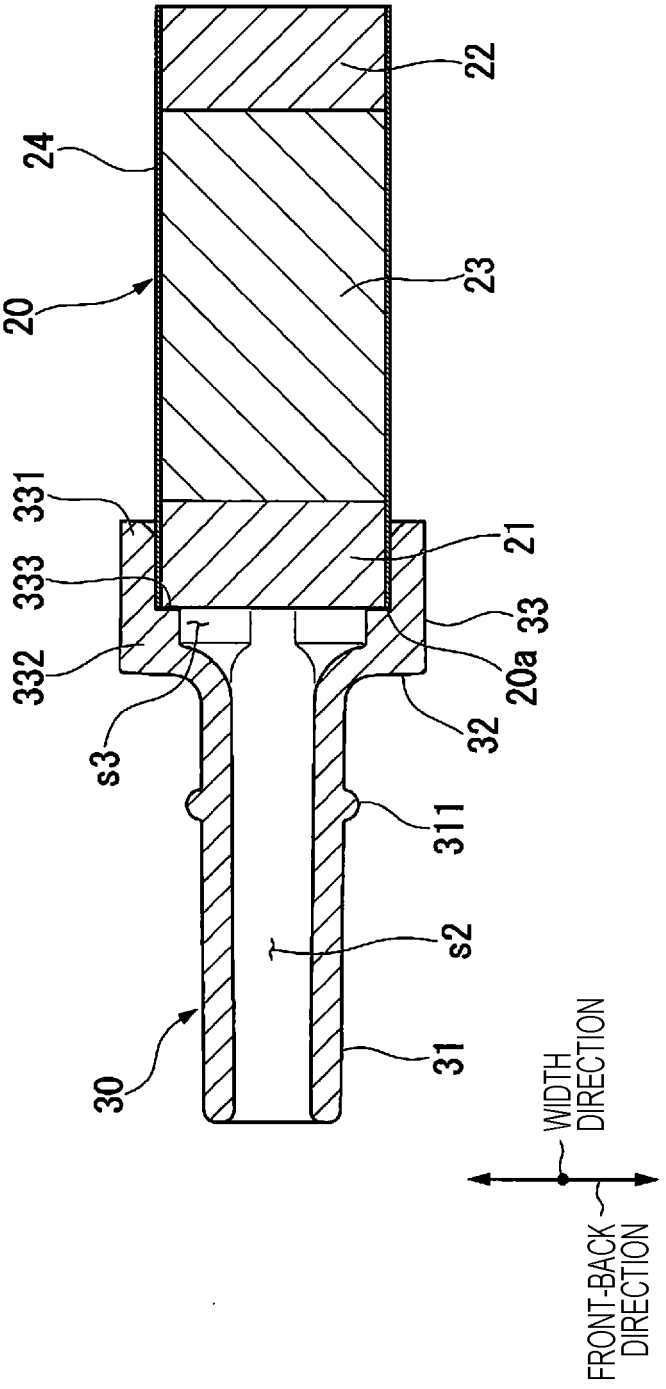

21 (20)
30
333
33 i
32
O
336
336
335
335
33
336
336
A1
335

FIG. 10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333
33
332
20a
32
s3
311
s2
31
30
WIDTH DIRECTION
FRONT-BACK DIRECTION

FIG. 11

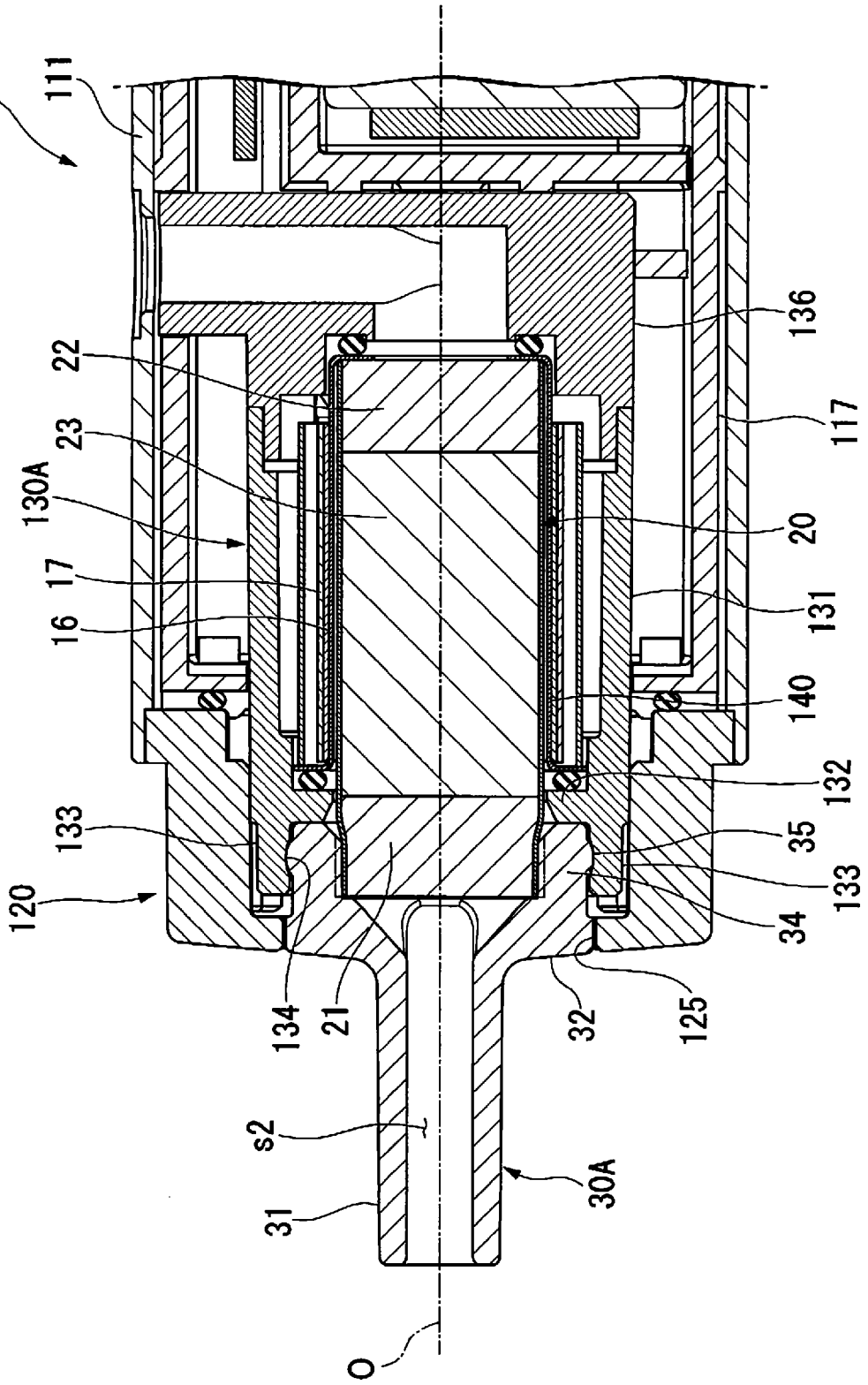

1A
111
22
23
130A
17
16
120
133
134
21
s2
31
O
32
125
30A
34
133
35
132
140
131
20
117
136

FIG. 12

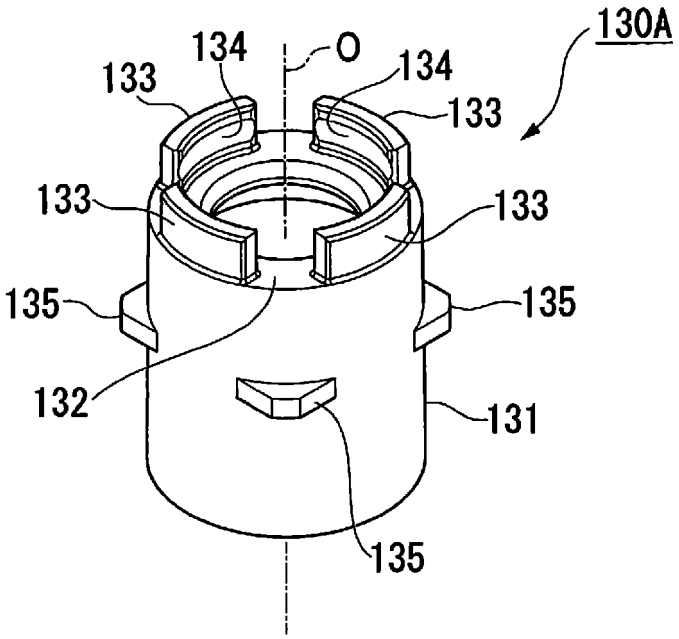
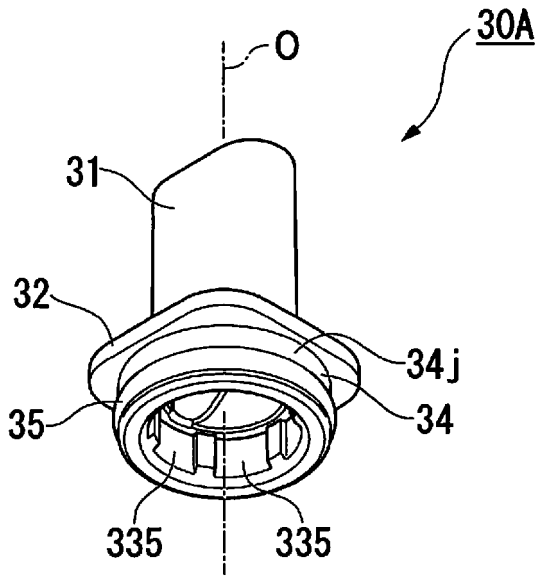

130A
134
O
134
133
133
133
133
135
135
132
131
135

FIG. 13


30A
O
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32
34j
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34
335
335

FIG. 14

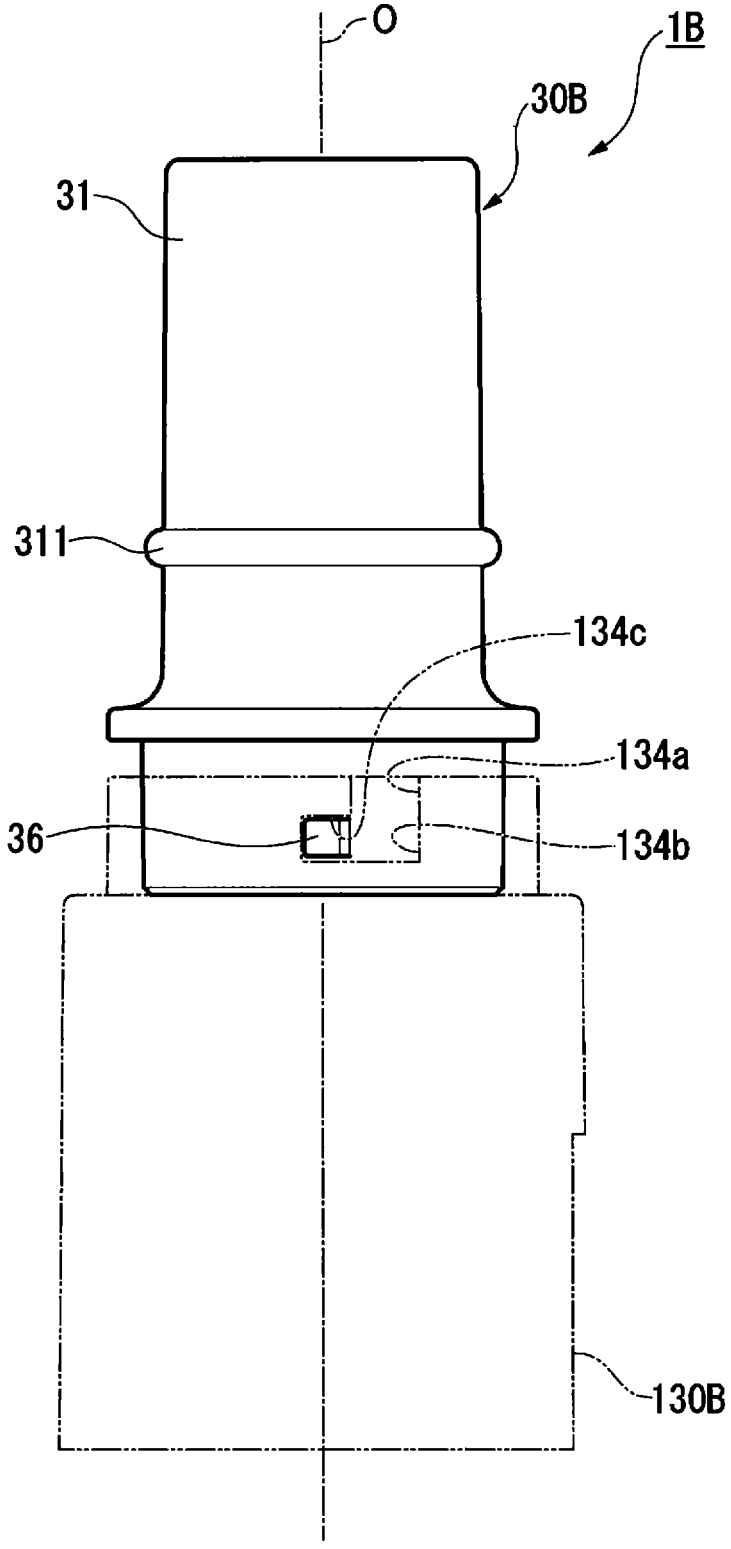


FIG. 15

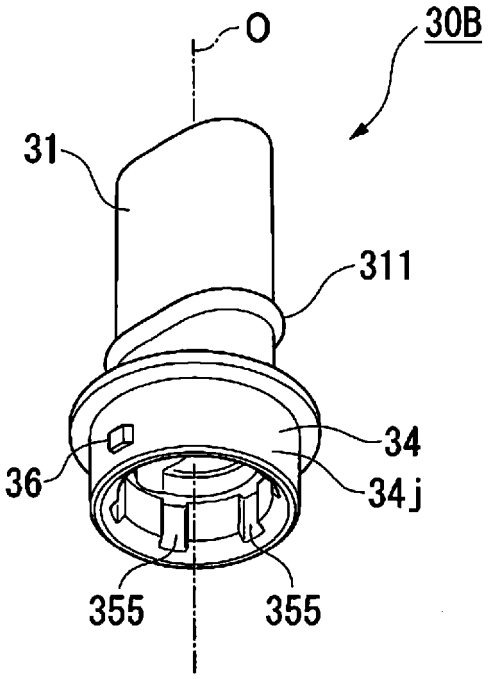

O
30B
31
311
34
34j
36
355
355

FIG. 16

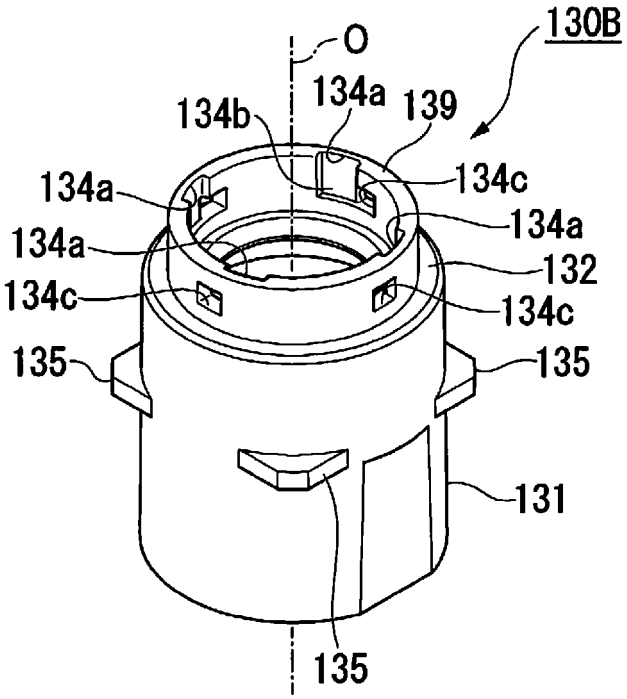

O
130B
134a
139
134b
134c
134a
134a
132
134c
134c
135
135
131
135

FIG. 17

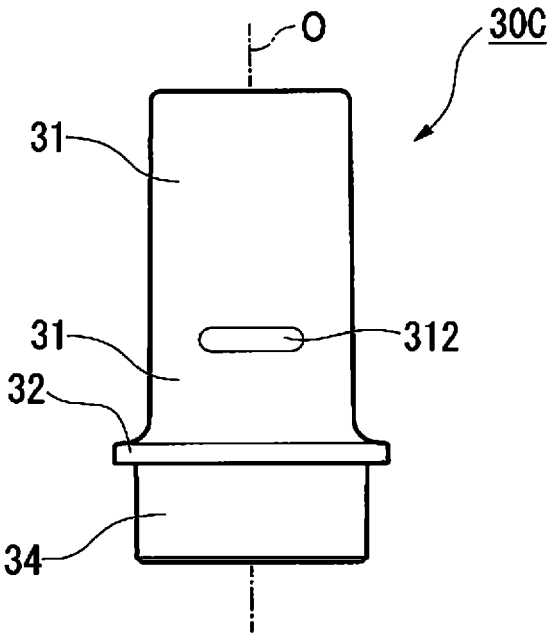


FIG. 18

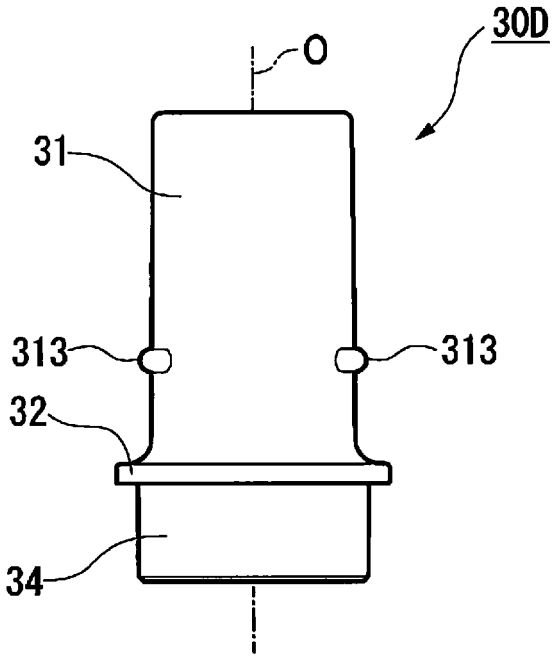
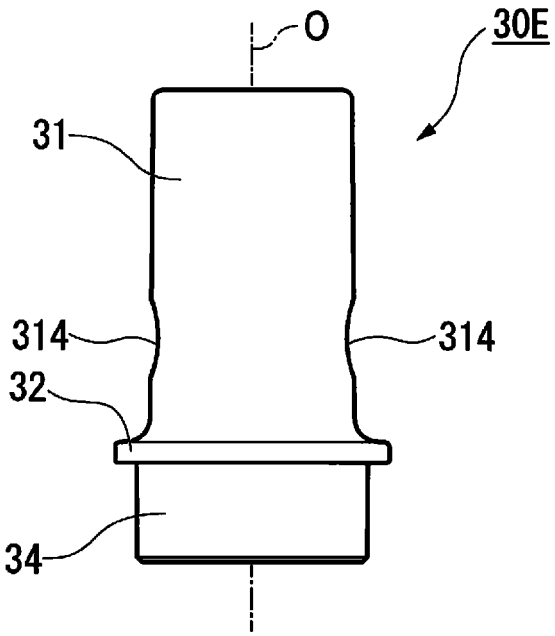


FIG. 19



INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2019/025841

A. CLASSIFICATION OF SUBJECT MATTER
Int. Cl. A24F47/00(2006.01)i

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. A24F47/00

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	1971-2019
Registered utility model specifications of Japan	1996-2019
Published registered utility model applications of Japan	1994-2019

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 Y	KR 20-2011-0003499 U (YOON, Hong Sun) 07 April 2011, paragraphs [0013]-[0043], fig. 1-5 (Family: none)	1-3, 14-15 4-13, 15-16
X Y	JP 10-4946 A (JAPAN TOBACCO INC.) 13 January 1998, paragraphs [0009]-[0037], fig. 1, 6 & US 6089857 A, column 3, line 19 to column 7, line 26, fig. 1, 6 & WO 1997/048294 A1 & EP 858744 A1 & CN 1196661 A	1-3, 14, 16 4-13, 15-16
Y A	US 2016/0302487 A1 (SHENZHEN SMOORE TECHNOLOGY LIMITED) 20 October 2016, paragraph [0041], fig. 2-7 & WO 2016/074231 A1 & EP 3042578 A1	4-13 1-3, 14-16

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
06.09.2019	17.09.2019
Name and mailing address of the ISA/ Japan Patent Office 3-4-3, Kasumigaseki, Chiyoda-ku, Tokyo 100-8915, Japan	Authorized officer Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2019/025841

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y A	US 2019/0142065 A1 (SHENZHEN SMOORE TECHNOLOGY LIMITED) 16 May 2019, paragraph [0034], fig. 1, 3A, 4A & CN 107927910 A	7-13 1-6, 14-16
Y A	WO 2004/089126 A1 (TAKANO, Shusei) 21 October 2004, page 7, line 26 to page 8, line 1, fig. 1 & US 2006/0191546 A1, paragraph [0046], fig. 1 & EP 1609376 A1 & CA 2520759 A1	7-13 1-6, 14-16
Y A	JP 5-115272 A (PHILIP MORRIS PRODUCTS INC.) 14 May 1993, paragraphs [0026], [0027], fig. 3 & US 5249586 A, column 5, lines 47-65, fig. 3A & EP 503767 A1	8-13 1-7, 14-16
Y A	US 2018/0020726 A1 (ALARCON, Ramon) 25 January 2018, paragraph [0040], fig. 2C & WO 2018/020404 A1 & CN 109890228 A	13 1-12, 14-16

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Patent documents cited in the description

- JP 2018528788 W **[0004]**