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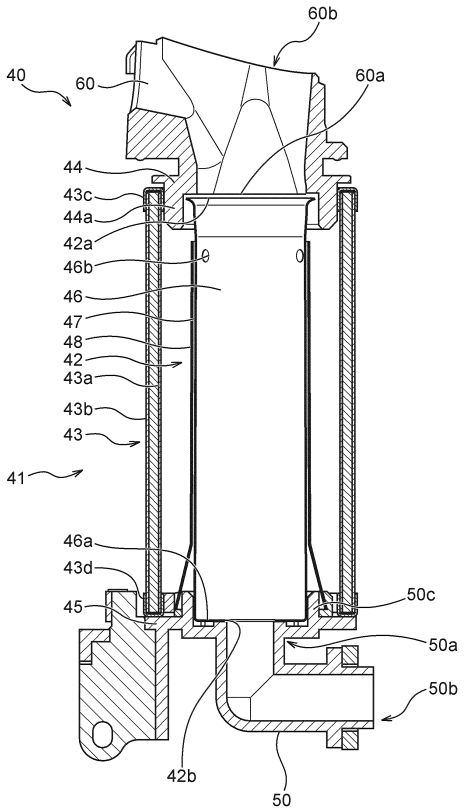
(54) **HEATING ASSEMBLY AND FLAVOR INHALER**

(57) Provided are a flavor inhaler and an insertion guide member which have novel structures. Provided is a heating assembly. The heating assembly comprises a heating portion extending in a first direction and configured to heat a flavor generating article, a heat insulating portion extending in the first direction and located away from the heating portion in a second direction orthogonal to the first direction, and a partition wall disposed in at least either one of first and second end portions of the heating portion and configured to block fluid from exiting through a gap between the heating portion and the heat insulating portion.

Fig. 4



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Description

TECHNICAL FIELD

[0001] The invention relates to heating assemblies and flavor inhalers.

BACKGROUND ART

[0002] There are well-known flavor inhalers that are used to inhale flavors without burning base materials containing flavor sources. These well-known flavor inhalers include a device in which a heat insulating portion is disposed away from a heating portion to suppress heat transmission from the heating portion to the heat insulating portion (see Patent Literature 1, for example).

CITATION LIST

PATENT LITERATURE

[0003] PTL 1: International Publication WO 2017/194763

SUMMARY OF INVENTION

TECHNICAL PROBLEM

[0004] An object of the invention is to provide a heating assembly and a flavor inhaler which have novel structures.

SOLUTION TO PROBLEM

[0005] One embodiment of the invention provides a heating assembly. The heating assembly comprises a heating portion extending in a first direction and configured to heat a flavor generating article, a heat insulating portion extending in the first direction and located away from the heating portion in a second direction orthogonal to the first direction, and a partition wall disposed in at least either one of first and second end portions of the heating portion and configured to block fluid from exiting through a gap between the heating portion and the heat insulating portion.

[0006] Another embodiment of the invention provides a flavor inhaler comprising the above-described heating assembly.

BRIEF DESCRIPTION OF DRAWINGS

[0007]

Fig. 1A is a perspective overall view of a flavor inhaler according to Embodiment 1.

Fig. 1B is a perspective overall view of the flavor inhaler according to Embodiment 1 which holds a flavor generating article.

Fig. 2 is a cross-section of the flavor generating article.

Fig. 3 is a cross-section taken along and viewed in a direction of an arrow 3-3 in Fig. 1A.

Fig. 4 is a cross-section of a heating portion.

Fig. 5 is an enlarged cross-section of an engagement region between the heating portion and an insertion guide member.

Fig. 6 is an enlarged cross-section of an engagement region between the heating portion and an inlet pipe.

Fig. 7 is an enlarged cross-section of an engagement region between a heating portion and an insertion guide member according to Embodiment 2.

Fig. 8 is an enlarged cross-section of an engagement region between the heating portion and an inlet pipe according to Embodiment 2.

DESCRIPTION OF EMBODIMENTS

[0008] Embodiments of the invention will be discussed below with reference to the attached drawings. In the drawings mentioned below, similar or corresponding constituent elements are provided with the same reference signs, and repetitive explanation will be omitted.

[0009] Fig. 1A is a perspective overall view of a flavor inhaler according to Embodiment 1. Fig. 1B is a perspective overall view of the flavor inhaler according to Embodiment 1 which holds a flavor generating article. A flavor inhaler 10 according to the present embodiment is configured to generate aerosol containing a flavor, for example, by heating a flavor generating article 110 provided with a flavor source containing an aerosol source.

[0010] As illustrated in Figs. 1A and 1B, the flavor inhaler 10 includes a top housing 11A, a bottom housing 11B, a cover 12, a switch 13, a lid portion 14, a first vent hole 15, and a cap 16. The top housing 11A and the bottom housing 11B are connected together and thus form an outer housing 11 located at an outermost side of the flavor inhaler 10. The outer housing 11 is of a size that fits in a user's hand. When using the flavor inhaler 10, the user inhales a flavor while holding the flavor inhaler 10 in his or her hand.

[0011] The top housing 11A includes an opening, not shown. The cover 12 is connected to the top housing 11A so as to close the opening. As illustrated in Fig. 1B, the cover 12 includes an opening 12a in which the flavor generating article 110 can be inserted. The lid portion 14 is configured to open/close the opening 12a of the cover 12. In particular, the lid portion 14 is mounted on the cover 12 and configured to be movable between a first position for closing the opening 12a and a second position for opening the opening 12a along a surface of the cover 12. The lid portion 14 thus allows or restricts access of the flavor generating article 110 to the inside of the flavor inhaler 10 (opening 60b of an insertion guide member 60 illustrated in Fig. 4).

[0012] The switch 13 is used to switch between ON and OFF of actuation of the flavor inhaler 10. For exam-

ple, if the user operates the switch 13 with the flavor generating article 110 inserted in the opening 12a as illustrated in Fig. 1B, electric power is supplied from a power source, not shown, to a heating element, not shown. The user thus can heat the flavor generating article 110 without burning the flavor generating article 110. When the flavor generating article 110 is heated, aerosol is vaporized from an aerosol source contained in the flavor generating article 110, and the flavor in the flavor source is captured in the aerosol. The user can inhale the aerosol containing the flavor by sucking a portion of the flavor generating article 110 which is protruding from the flavor inhaler 10 (portion illustrated in Fig. 1B).

[0013] The first vent hole 15 is a vent hole for introducing air into a heating assembly 41 (see Fig. 3) that is housed in an interior space of the outer housing 11. The cap 16 is attachable to and detachable from the bottom housing 11B. The cap 16 is mounted on the bottom housing 11B, to thereby form the first vent hole 15 between the bottom housing 11B and the cap 16. The cap 16 may include, for example, a through-hole, a notch or the like, not shown. In the present description, a longitudinal direction (first direction) of the flavor inhaler 10 refers to a direction the flavor generating article 110 is inserted into the opening 12a. With regard to the flavor inhaler 10 according to the present description, a side into which fluid, such as air, enters (for example, the first vent hole 15 side) is an upstream side, and a side from which fluid exits (for example, the opening 12a side) is a downstream side.

[0014] The following explanation describes a configuration of the flavor generating article 110 used in the flavor inhaler 10 according to the present embodiment. Fig. 2 is a cross-section of the flavor generating article 110. According to the embodiment illustrated in Fig. 2, the flavor generating article 110 comprises a base material portion 110A that includes a filler 111 and a first paper wrapper 112 for wrapping the filler 111, and a mouthpiece portion 110B that forms an end portion on an opposite side from the base material portion 110A. The base material portion 110A and the mouthpiece portion 110B are connected together by a second paper wrapper 113 that is another paper wrapper than the first paper wrapper 112. However, the second paper wrapper 113 may be omitted, and the first paper wrapper 112 may be used to connect the base material portion 110A and the mouthpiece portion 110B.

[0015] The mouthpiece portion 110B illustrated in Fig. 2 includes a paper tube portion 114, a filter portion 115, and a hollow segment portion 116 disposed between the paper tube portion 114 and the filter portion 115. The hollow segment portion 116 comprises, for example, a filling layer including one or more hollow channels, and a plug wrapper that covers the filling layer. The filling layer has a high fiber packing density. During inhalation, therefore, air and aerosol flow only through the hollow channel or hollow channels and hardly flow through the filling layer. If it is desired to moderate an aerosol component decrease that is caused by filtration of the filter portion 115, it is effective in order to increase a delivery amount of the aerosol to shorten the filter portion 115 and replace the amount that the filter portion 115 is shortened with the hollow segment portion 116.

[0016] The mouthpiece portion 110B illustrated in Fig. 2 comprises three segments. According to the present embodiment, however, the mouthpiece portion 110B may comprise one or two segments or may comprise four or more segments. It is also possible, for example, to omit the hollow segment portion 116 and arrange the paper tube portion 114 and the filter portion 115 adjacent to each other to form the mouthpiece portion 110B.

[0017] According to the embodiment illustrated in Fig. 2, the flavor generating article 110 has a longitudinal length ranging preferably from 40 mm to 90 mm, more preferably from 50 mm to 75 mm, and still more preferably from 50 mm to 60 mm. The flavor generating article 110 has a circumference ranging preferably from 15 mm to 25 mm, more preferably from 17 mm to 24 mm, and still more preferably from 20 mm to 23 mm. The base material portion 110A of the flavor generating article 110 may have a length of 20 mm. The first paper wrapper 112 may have a length of 20 mm. The hollow segment portion 116 may have a length of 8 mm. The filter portion 115 may have a length of 7 mm. The length of each of the foregoing segments may be changed as necessary according to manufacturability, required quality, and the like.

[0018] According to the present embodiment, the filler 111 of the flavor generating article 110 may contain the aerosol source that is heated at predetermined temperature and generates aerosol. The aerosol source may be of any kind, and materials extracted from various natural products and/or components thereof may be selected according to the intended use. The aerosol source may be, for example, glycerin, propylene glycol, triacetin, 1, 3-butanediol or a mixture of these substances. An amount of the aerosol source contained in the filler 111 is not particularly limited. However, from a perspective of sufficient aerosol generation and addition of a favorable smoking flavor, the contained amount of the aerosol source is generally 5% by weight or more and preferably 10% by weight or more, and generally 50% by weight or less and preferably 20% by weight or less.

[0019] The filler 111 of the flavor generating article 110 according to the present embodiment may contain shred tobacco as a flavor source. The shred tobacco may be made of any material including publicly-known materials, such as laminae and stems. If the flavor generating article 110 has a circumference of 22 mm and a length of 20 mm, the amount of the filler 111 contained in the flavor generating article 110 ranges, for example, from 200 mg to 400 mg and preferably from 250 mg to 320 mg. A moisture content of the filler 111 ranges, for example, from 8% by weight to 18% by weight and preferably from 10% by weight to 16% by weight. The moisture content in the above ranges suppresses the adhesion of a stain on the paper wrappers and improves a winding efficiency

during manufacture of the base material portion 110A. There is no particular limitation in size or preparation method for the shred tobacco used as the filler 111. For example, the shred tobacco may be prepared using dried tobacco leaves that are cut into pieces each having a width ranging from 0.8 mm to 1.2 mm. The dried tobacco leaves also may be pulverized into particles with an average particle diameter ranging from about 20 μm to about 200 μm to be equalized in size, processed into a sheet, and then shredded into pieces each having a width ranging from 0.8 mm to 1.2 mm. The dried tobacco leaves subjected to the sheet processing may be gathered together, instead of being shredded, and used as the filler 111. The filler 111 may include one or more kinds of aroma chemicals. The aroma chemical may be of any kind but is preferably menthol from a perspective of addition of a favorable smoking flavor.

[0020] According to the present embodiment, the first and second paper wrappers 112 and 113 of the flavor generating article 110 may be made of base paper having a basis weight ranging, for example, from 20 gsm to 65 gsm, and preferably from 25 gsm to 45 gsm. The first paper wrapper 112 and the second paper wrapper 113 are not particularly limited in thickness. From a perspective of rigidity, air permeability, and adjustability during paper manufacturing, however, the thickness ranges from 10 μm to 100 μm, preferably from 20 μm to 75 μm, and more preferably from 30 μm to 50 μm.

[0021] According to the present embodiment, the first and second paper wrappers 112 and 113 of the flavor generating article 110 may contain a loading material. A contained amount of the loading material may range from 10% by weight to 60% by weight relative to total weight of the first and second paper wrappers 112 and 113, and preferably ranges from 15% by weight to 45% by weight. According to the present embodiment, the loading material preferably ranges from 15% by weight to 45% by weight relative to the preferable range of basis weight (from 25 gsm to 45 gsm). The loading material may be, for example, calcium carbonate, titanium dioxide, kaolin or the like. The paper containing such a loading material shows a bright white color that is preferable in view of appearance of the paper used as paper wrapper for the flavor generating article 110, and can permanently maintain whiteness. The paper wrapper containing a large amount of such a loading material has, for example, an ISO brightness of 83% or more. Considering a utilitarian purpose of the paper to be used as the paper wrapper for the flavor generating article 110, the first and second paper wrappers 112 and 113 preferably have a tensile strength of 8 N/15 mm or higher. The tensile strength can be increased by reducing the contained amount of the loading material. Specifically, the tensile strength can be increased by reducing the contained amount of the loading material to be lower than an upper limit of the contained amount of the loading material within each of the base weight ranges as exemplified above.

[0022] An internal structure of the flavor inhaler 10 illustrated in Figs. 1A and 1B will be discussed below. Fig. 3 is a cross-section taken along and viewed in a direction of an arrow 3-3 line in Fig. 1A. As illustrated in Fig. 3, the flavor inhaler 10 includes a power source portion 20, a circuit portion 30, and a heating portion 40 in an interior space of the outer housing 11 and of an inner housing 17. The top housing 11A and the bottom housing 11B which form the outer housing 11 enclosing the inner housing 17 and thus house the inner housing 17 in interior spaces thereof.

[0023] The circuit portion 30 includes a first circuit board 31, a second circuit board 32, and a third circuit board 33 which are electrically connected to one another. The first circuit board 31 is disposed, for example, adjacent to one surface of a rectangular power source 21 and extends in the longitudinal direction as illustrated in the drawing. Provided between the first circuit board 31 and the heating portion 40 is a partition wall 34, which sections off at least a part of an area in which the power source portion 20 and the first circuit board 31 are housed. The partition wall 34 may be provided with a notch, a through-hole or the like for allowing a fluid communication between a space on the power source portion 20 side and a space on the heating portion 40 side.

[0024] The second circuit board 32 is disposed between the cover 12 and the power source portion 20 on an inner side of the top housing 11A and extends in a direction orthogonal to a direction the first circuit board 31 extends. The switch 13 is disposed adjacent to the second circuit board 32. When pushed down by the user, the switch 13 partially contacts the second circuit board 32. The third circuit board 33 is disposed to extend in the longitudinal direction in a space formed on an opposite side of the heating portion 40 from the opening 12a (see Fig. 1B).

[0025] The third circuit board 33 includes a main surface on which various kinds of electronic components are mounted. For example, the third circuit board 33 may be disposed within the bottom housing 11B so that the main surface is inclined with respect to the longitudinal direction. This makes it possible to enlarge the main surface of the third circuit board 33, thereby making effective use of a space in the bottom housing 11B.

[0026] The first circuit board 31, the second circuit board 32, and the third circuit board 33 each include, for example, a microprocessor and the like and are capable of controlling power supply from the power source portion 20 to the heating portion 40. This enables the first circuit board 31, the second circuit board 32, and the third circuit board 33 to control the heating of the flavor generating article 110 which is performed by the heating portion 40.

[0027] The power source portion 20 includes the power source 21 that is electrically connected to the first circuit board 31, the second circuit board 32, and the third circuit board 33. The power source 21 may be, for example, a rechargeable or non-rechargeable battery. The power source 21 is electrically connected to the heating portion 40 through at least one of the first circuit board 31, the

second circuit board 32, and the third circuit board 33. The power source 21 is thus capable of supplying electric power to the heating portion 40 so that the flavor generating article 110 may be properly heated. As illustrated in the drawing, the power source 21 is disposed in parallel with the heating portion 40. If the power source 21 is increased in size, therefore, the flavor inhaler 10 does not have to be increased in longitudinal length.

[0028] The flavor inhaler 10 includes a terminal 22 that is connectable to an external power source. The terminal 22 can be connected, for example, to a cable of a micro USB or the like. If the power source 21 is a rechargeable battery, current can be imparted from the external power source to the power source 21 to recharge the power source 21 by connecting the terminal 22 with an external power source. A data transmission cable of a micro USB or the like may be connected to the terminal 22 so that data relevant to the actuation of the flavor inhaler 10 may be transmitted to an external device.

[0029] The heating portion 40 includes the heating assembly 41 extending in the longitudinal direction, an inlet pipe 50 having a substantially L-shaped section, and the insertion guide member 60 having a substantially cylindrical shape, as illustrated in the drawing. The heating assembly 41 includes a plurality of cylindrical members and is formed into a cylindrical body as a whole. The heating assembly 41 is configured to be able to house a part of the flavor generating article 110 in the inside thereof. The heating assembly 41 functions to define a channel of air to be supplied to the flavor generating article 110 and also functions to heat the flavor generating article 110 from an outer periphery of the flavor generating article 110. The inlet pipe 50 is made, for example, of resin material and introduces air into the heating portion 42 (see Fig. 4). The insertion guide member 60 is made, for example, of resin material. The insertion guide member 60 is provided between the cover 12 including the opening 12a (see Fig. 1B) and a downstream end of the heating assembly 41 and guides the insertion of the flavor generating article 110 into the heating portion 42 (see Fig. 4).

[0030] The first vent hole 15 and a second vent hole 18 for introducing air into the heating assembly 41 are formed in the bottom housing 11B. Specifically, the first vent hole 15 is in a fluid communication with an upstream end of a channel extending through the inlet pipe 50 to the heating assembly 41. In other words, the first vent hole 15 comes into a fluid communication with an upstream end of the heating assembly 41 through a through-channel of the inlet pipe 50. The second vent hole 18 is in a fluid communication with an upstream end of an air channel 18A formed between the outer housing 11 and the inner housing 17. The air channel 18A has a downstream end that is in a fluid communication with the upstream end of the channel extending through the inlet pipe 50, so that the second vent hole 18, like the first vent hole 15, eventually comes into a fluid communication with the heating assembly 41.

[0031] The heating assembly 41 has a downstream end that is in a fluid communication with an upstream end of a channel extending through the insertion guide member 60 to the opening 12a illustrated in Fig. 1B. The flavor generating article 110 is inserted from the opening 12a of the cover 12 into the flavor inhaler 10 as illustrated in Fig. 1B and passes through the insertion guide member 60. A part of the flavor generating article 110 is then disposed inside the heating assembly 41. The insertion guide member 60 is therefore preferably formed so that an opening on the cover 12 side is larger than an opening on the downstream side of the heating assembly 41. This facilitates the insertion of the flavor generating article 110 from the opening 12a into the insertion guide member 60.

[0032] When the user inhales from a portion of the flavor generating article 110 which protrudes from the flavor inhaler 10, or the filter portion 115 illustrated in Fig. 2, with the flavor generating article 110 inserted from the opening 12a into the flavor inhaler 10 as illustrated in Fig. 1B, air enters the heating assembly 41 from the first vent hole 15 and the second vent hole 18. After entering the heating assembly 41, the air passes through the heating assembly 41 and reaches into the user's mouth together with the aerosol generated from the flavor generating article 110. Accordingly, a side of the heating assembly 41 which is close to the first vent hole 15 and the second vent hole 18 (side close to the inlet pipe 50) is an upstream side, and a side of the heating assembly 41 which is close to the opening 12a (side close to the insertion guide member 60) is a downstream side.

[0033] A configuration of the heating portion 40 illustrated in Fig. 3 will be now discussed. Fig. 4 is a cross-section of the heating portion 40. As illustrated in Fig. 4, the heating portion 40 includes the heating assembly 41, the inlet pipe 50, and the insertion guide member 60. The heating assembly 41 includes a heating portion 42, a heat insulating portion 43, a first wall 44, and a second wall 45. The first wall 44 is formed integrally with the insertion guide member 60 at an upstream side of the insertion guide member 60. The second wall 45 is formed integrally with the inlet pipe 50 at a downstream side of the inlet pipe 50. At least either one of the first and second walls 44 and 45 may be provided separately from the insertion guide member 60 or the inlet pipe 50. It is also possible to provide either one of the first and second walls 44 and 45, instead of providing the both.

[0034] The heating portion 42 extends in the longitudinal direction and is configured to heat the flavor generating article 110. The heating portion 42 includes a first end portion provided with a first opening 42a in which the flavor generating article 110 can be inserted, and a second end portion provided with a second opening 42b that is capable of supplying air toward the flavor generating article 110. The heating portion 42 is configured to be capable of housing the flavor generating article 110. The heating portion 42 includes a container (heat transmitting member) 46, a heating element 47, and a heat shrinkable tube 48.

[0035] The container 46 has a cup-like shape and forms a chamber that houses the flavor generating article 110. The first opening 42a and the second opening 42b are formed in the container 46. According to the present embodiment, the container 46 includes an inner wall that is configured to contact at least a part of an outer wall of the flavor generating article 110 inserted from the opening 42a. The container 46 further includes a bottom wall 46a against which a tip end of the flavor generating article 110 inserted from the first opening 42a hits. The second opening 42b is a through-hole that is formed in the bottom wall 46a of the container 46. The second opening 42b is located on an upstream side of an air flow, and the first opening 42a is located on a downstream side of the air flow. Formed in an inner peripheral surface of the container 46 on the first opening 42a side is a boss 46b. The boss 46b is configured to press the outer wall of the inserted flavor generating article 110 radially (second direction orthogonal to first direction) inward.

[0036] The heating element 47 may be a flexible film heater that comprises, for example, a heating resistor sandwiched between two films made of PI (polyimide) or the like. The heating element 47 is so disposed as to contact the container 46. Specifically, according to an example illustrated in the drawing, the heating element 47 is disposed in an outer peripheral surface of the container 46, and an interior surface of the heating element 47 is in tight contact with an exterior surface of the container 46. The heating element 47 is disposed along the outer peripheral surface of the container 46 and is therefore deformed into a substantially cylindrical shape as a whole.

[0037] The heating element 47 generates the heat applied to the flavor generating article 110. The container 46 is made of a highly heat-conductive metal material, such as steel use stainless. The heat generated in the heating element 47 is accordingly transmitted to the entire container 46, which heats the flavor generating article 110 inserted in the container 46.

[0038] The heat shrinkable tube 48 has a cylindrical shape and keeps the heating element 47 in tight contact with the container 46. In particular, the heat shrinkable tube 48 is thermally shrunk by being applied with heat in a position disposed on an outer peripheral side of the heating element 47. The heat shrinkable tube 48 thus applies pressure to the heating element 47 so as to press the heating element 47 against the container 46. In this state, the heat shrinkable tube 48 is thermally shrunk while covering a positioning portion 50c mentioned later which is formed at a downstream side of the inlet pipe 50. The heat shrinkable tube 48 thus brings the container 46 and the inlet pipe 50 into tight contact.

[0039] The heat insulating portion 43 is a cylindrical body extending in the longitudinal direction, located away from the heating portion 42 in the radial direction, and enclosing an outer periphery of the heating portion 42. In particular, the heat insulating portion 43 is a cylindrical member having a double-tube structure. The heat insulating portion 43 is disposed at predetermined distance from the heat shrinkable tube 48 in a radially outward direction. The heat insulating portion 43 is made of a metal material, such as steel use stainless, as with the container 46. The heat insulating portion 43 includes an inner tubular member 43a, an outer tubular member 43b, a first ring-like member 43c, and a second ring-like member 43d. The inner tubular member 43a and the outer tubular member 43b are disposed side by side in a radial direction of the inserted flavor generating article 110.

[0040] The first ring-like member 43c is disposed on a downstream side of the inner tubular member 43a and the outer tubular member 43b, and the second ring-like member 43d is disposed on an upstream side of the inner tubular member 43a and the outer tubular member 43b. For example, the heat insulating portion 43 may be a vacuum insulating material having depressurized air or vacuum inside the double tube structure. In particular, the heat generated by the heating element 47 becomes less transmittable to the outside of the heating assembly 41 by depressurizing a space formed by the inner tubular member 43a, the outer tubular member 43b, the first ring-like member 43c, and the second ring-like member 43d.

[0041] The first wall 44 is a partition wall that is disposed in the first end portion of the heating portion 42 and configured to block fluid from exiting through a gap between the heating portion 42 and the heat insulating portion 43. The first wall 44 is a ring-like member that is situated across the gap between the heating portion 42 and the heat insulating portion 43 and contacts the heating portion 42 and the heat insulating portion 43. In other words, the first wall 44 circumferentially extends between a downstream end portion of the heating portion 42 and a downstream end portion of the heat insulating portion 43.

[0042] The second wall 45 is a partition wall that is disposed in the second end portion of the heating portion 42 and configured to block fluid from exiting through the gap between the heating portion 42 and the heat insulating portion 43. The second wall 45 is a ring-like member that is situated across the gap between the gap between the heating portion 42 and the heat insulating portion 43 and contacts the heating portion 42 and the heat insulating portion 43. In other words, the second wall 45 circumferentially extends between an upstream end portion of the heating portion 42 and an upstream end portion of the heat insulating portion 43.

[0043] Since the heating portion 42 is provided at the first and second end portions thereof with the first and second walls 44 and 45, respectively, air is blocked from exiting through the gap between the heating portion 42 and the heat insulating portion 43. This suppresses the air from exiting through the gap due to convection created in the gap between the heating portion 42 and the heat insulating portion 43 and therefore also suppresses a high-temperature air from being diffused within the flavor inhaler 10. Accordingly, the high-temperature air around the heating portion 42 can be kept around the heating

portion 42, which improves an efficiency of heating the flavor generating article 110 by the heating portion 42. If the heating portion 42 is provided with only either one of the first wall 44 and the second wall 45, it is still possible to suppress the air from exiting through the gap due to the convection created in the gap between the heating portion 42 and the heat insulating portion 43 and suppress the high-temperature air from being diffused within the flavor inhaler 10.

[0044] The inlet pipe 50 is a member forming a pipe including a downstream end 50a engaged with an upstream end (second opening 42b-side end portion) of the container 46, and an upstream end 50b on an opposite side from the downstream end 50a. The inlet pipe 50 forms an inner channel that introduces air toward the second opening 42b of the container 46. The inlet pipe 50 illustrated in Fig. 4 forms the inner channel that is bent into an L-like shape. The upstream end 50b of the inlet pipe 50 is disposed close or adjacent to the first vent hole 15 and the air channel 18A which are illustrated in Fig. 3. The inlet pipe 50 includes the positioning portion 50c for positioning the container 46.

[0045] The insertion guide member 60 is a substantially cylindrical member including an upstream end 60a engaged with a downstream end (first opening 42a-side end portion) of the container 46, and an opening 60b on an opposite side from the upstream end 60a. The opening 60b is in a fluid communication with the opening 12a (see Fig. 1B) of the cover 12 and so configured that the flavor generating article 110 can be inserted therein.

[0046] The heating assembly 41 is fixed to the inner housing 17 of the flavor inhaler 10 by the insertion guide member 60 with the first wall 44 formed in an integral manner and the inlet pipe 50 with the second wall 45 formed in an integral manner. In this state, the heat insulating portion 43 is fixed to the inner housing 17 without contacting the inner housing 17. This suppresses heat transmission from the heat insulating portion 43 to the inner housing 17.

[0047] The following discussion explains in detail an engagement region between the heating portion 42 and the insertion guide member 60 and an engagement region between the heating portion 42 and the inlet pipe 50. Fig. 5 is an enlarged cross-section of the engagement region between the heating portion 42 and the insertion guide member 60. Fig. 6 is an enlarged cross-section of the engagement region between the heating portion 42 and the inlet pipe 50. As illustrated in Figs. 5 and 6, the container 46 includes a first extending portion 46c that extends from the heating element 47 in a direction from the second end portion toward the first end portion, and a second extending portion 46d that extends from the heating element 47 in a direction from the first end portion toward the second end portion.

[0048] In other words, the first wall 44 is disposed across a gap between the first extending portion 46c and the heat insulating portion 43, and the second wall 45 is disposed across a gap between the second extending portion 46d and the heat insulating portion 43. The first and second walls 44 and 45 therefore do not contact the heating element 47. This makes it possible to suppress heat transmission from the heating portion 42 to the heat insulating portion 43 through the first and second walls 44 and 45.

[0049] The first extending portion 46c abuts on the first wall 44 only at the first end portion of the heating portion 42, and the second extending portion 46d abuts on the second wall 45 only at the second end portion of the heating portion 42. This reduces contact area between the first and second walls 44 and 45 of the heating portion 42 and therefore further suppresses heat transmission from the heating portion 42 to the heat insulating portion 43 through the first wall 44 and the second wall 45. It is also possible to provide either one of the first and second extending portions 46c and 46d, instead of providing the both.

[0050] The first wall 44 includes a first protruding portion 44a that is a protruding portion disposed in the gap between the heating portion 42 and the heat insulating portion 43 and protruding from the first wall 44 into the gap. The first protruding portion 44a extends from the first wall 44 to a first edge portion closet to the first end portion in the heating element 47 and disposed away from the heating portion 42. As compared to a case where the first protruding portion 44a is not provided, a space formed by the heating portion 42, the heat insulating portion 43, the first wall 44, and the second wall 45 can be reduced in volume. This makes it possible to reduce air in the space and eventually suppress the heat transmission from the heating portion 42 to the heat insulating portion 43 which is caused by convection. Since the first protruding portion 44a is provided, a high-temperature air is blocked from reaching the vicinity of the first wall 44. Even if the high-temperature air reaches the vicinity of the first wall 44, the air is confined in a small space between the first protruding portion 44a and the heating portion 42, which suppresses heat transmission from the heating portion 42 to the heat insulating portion 43 through the first wall 44.

[0051] Although not shown, the second wall 45 may be disposed in the gap between the heating portion 42 and the heat insulating portion 43 and include a second protruding portion that is a protruding portion that protrudes from the second wall 45 into the gap. The second protruding portion extends from the second wall 45 to a second edge portion located close to the second end portion in the heating element 47 and is disposed away from the heating portion 42. Instead of the first protruding portion 44a and the second protruding portion, a filling member may be provided. The filling member is disposed in the gap between the heating portion 42 and the heat insulating portion 43 and extends in a longitudinal direction at a distance from the heating portion 42. The filling member may be fixed, for example, to an inner peripheral surface of the heat insulating portion 43. Aerogel as a filling member may be tightly sealed in a space that is

defined by the heating portion 42, the heat insulating portion 43, the first wall 44, and the second wall 45. In the foregoing cases, too, it is possible to suppress the heat transmission from the heating portion 42 to the heat insulating portion 43 which is caused by convection and also suppress the heat transmission from the heating portion 42 to the heat insulating portion 43 through the first wall 44 or the second wall 45.

[0052] Embodiment 2 of the invention will be now explained. The following discussion refers to differences from Embodiment 1.

[0053] Fig. 7 is an enlarged cross-section of an engagement region between a heating portion 42 and an insertion guide member 60 according to Embodiment 2. Fig. 8 is an enlarged cross-section of an engagement region between the heating portion 42 and an inlet pipe 50 according to Embodiment 2. As illustrated in Figs. 7 and 8, fins 71 to 74 are provided in a gap between the heating portion 42 and a heat insulating portion 43. The fins 71 to 74 are ring-like members made of resin or rubber which extend from an inner peripheral surface of the heat insulating portion 43. The fins 71 to 74 function to divide a space that is formed by the heating portion 42, the heat insulating portion 43, a first wall 44, and a second wall 45. The fins 71 to 74 are located away from the heating portion 42 and disposed within an extent to which a heating element 47 extends in terms of a longitudinal direction. All the fins 71 to 74 do not necessarily have to be provided as long as at least one fin is provided.

[0054] Since the fins 71 to 74 are provided in the gap between the heating portion 42 and the heat insulating portion 43, air is further blocked from exiting through the gap between the heating portion 42 and the heat insulating portion 43. This makes it possible to more reliably suppress air from exiting through the gap between the heating portion 42 and the heat insulating portion 43 due to convection created in the gap and suppress a high-temperature air from being diffused within a flavor inhaler 10. The high-temperature air around the heating portion 42 therefore can be kept around the heating portion 42, which improves an efficiency of heating a flavor generating article 110 by the heating portion 42.

[0055] The fin 73 is disposed in a first edge portion located close to a first end portion in the heating element 47, and the fin 74 is disposed in a second edge portion located close to a second end portion in the heating element 47. In particular, the fins 73 and 74 extend from the inner peripheral surface of the heat insulating portion 43 away from the heating element 47 at an angle to the longitudinal direction.

[0056] According to the above-described configuration, end portions of the fins 73 and 74, which are located on the heating portion 42 side, face a first extending portion 46c and a second extending portion 46d in which the heating element 47 is not disposed. This reduces an influence of heat transmission from the heating element 47 to the fins 73 and 74 which is caused by convection. It is then possible to elongate the fins 73 and 74 longer than the fins 71 and 72 in a radial direction to bring the fins 73 and 74 closer to the heating portion 42. This makes it possible to more reliably block air from exiting through the gap between the heating portion 42 and the heat insulating 43.

[0057] The embodiments of the invention have been discussed. The invention, however, is not limited to these embodiments and may be modified in various manners within the scope of claims and the scope of technical ideas discussed in the description and drawings. Any shapes and materials that are not directly mentioned in the description and drawings are within the scope of the technical ideas of the invention as long as they provide operation and advantageous effects of the invention.

[0058] The following are some of modes disclosed in the present description.

[0059] A first mode provides a heating assembly comprising a heating portion extending in a first direction and configured to heat a flavor generating article, a heat insulating portion extending in the first direction and located away from the heating portion in a second direction orthogonal to the first direction, and a partition wall disposed in at least either one of first and second end portions of the heating portion and configured to block fluid from exiting through a gap between the heating portion and the heat insulating portion.

[0060] According to a second mode, in the heating assembly of the first mode, the first end portion of the heating portion includes a first opening in which the flavor generating article can be inserted, and the heat insulating portion is a cylindrical body enclosing an outer periphery of the heating portion.

[0061] According to a third mode, in the heating assembly of the first or second mode, the second end portion of the heating portion includes a second opening that is capable of supplying air toward the flavor generating article.

[0062] According to a fourth mode, in the heating assembly of any one of the first to third modes, the heating portion includes a heating element configured to generate heat to be applied to the flavor generating article and a heat transmitting member configured to transmit the heat generated in the heating element to the flavor generating article. The heat transmitting member includes at least either one of a first extending portion that extends from the heating element in a direction from a second end portion toward a first end portion and a second extending portion that extends from the heating element in a direction from the first end portion toward the second end portion. The partition wall includes a first wall disposed across a gap between the first extending portion and the heat insulating portion and a second wall disposed across a gap between the second extending portion and the heat insulating portion.

[0063] According to a fifth mode, in the heating assembly of the fourth mode, the first extending portion abuts on the first wall only at the first end portion of the heating portion, and the second extending portion abuts on the

second wall only at the second end portion of the heating portion.

[0064] According to a sixth mode, in the heating assembly of the fourth or fifth mode, the first wall is formed integrally with an insertion guide member configured to guide insertion of the flavor generating article into the heating portion.

[0065] According to a seventh mode, in the heating assembly of any one of the fourth to sixth modes, the second wall is formed integrally with an inlet pipe configured to introduce air into the heating portion.

[0066] According to an eighth mode, in the heating assembly of any one of the first to seventh modes, the heating assembly includes a filling member that is disposed in the gap between the heating portion and the heat insulating portion and extends in a first direction at a distance from the heating portion.

[0067] According to a ninth mode, in the heating assembly of the eighth mode, the filling member includes a protruding portion that protrudes from the partition wall into the gap.

[0068] According to a 10th mode, in the heating assembly of any one of the first to ninth modes, the heating assembly includes a fin that is disposed in the gap between the heating portion and the heat insulating portion and divides a space formed by the heating portion, the heat insulating portion, and the partition wall.

[0069] According to an 11th mode, in the heating assembly of the 10th mode, the fin is disposed away from the heating portion.

[0070] According to a 12th mode, in the heating assembly of the 10th or 11th mode, the fin is disposed within an extent to which the heating element of the heating portion extends in terms of the first direction.

[0071] According to a 13th mode, in the heating assembly of any one of the 10th to 12th modes, the fin is disposed in at least either one of a first edge portion located close to the first end portion in the heating element of the heating portion and a second edge portion located close to the second end portion.

[0072] According to a 14th mode, in the heating assembly of the 13th mode, the fin extends from an inner peripheral surface of the heat insulating portion away from the heating element at an angle to the first direction.

[0073] A 15th mode provides a flavor inhaler comprising the heating assembly of any one of the first to 14th modes.

[0074] According to a 16th mode, in the flavor inhaler of the 15th mode, the partition wall is formed integrally with a supporting member configured to fix the heating portion and the heat insulating portion to a housing of the flavor inhaler.

[0075] According to a 17th mode, in the flavor inhaler of the 16th mode, the heat insulating portion is fixed to the housing by the supporting member without contacting the housing.

REFERENCE SIGNS LIST

[0076]

10: Flavor inhaler
41: Heating assembly
42: Heating portion
42a: First opening
42b: Second opening
43: Heat insulating portion
43a: Inner tubular member
43b: Outer tubular member
43c: First ring-like member
43d: Second ring-like member
44: First partition wall
44a: First protruding portion
45: Second partition wall
46: Container
46a: Bottom wall
46b: Boss
46c: First extending portion
46d: Second extending portion
47: Heating element
48: Heat shrinkable tube
50: Inlet pipe
50a: Downstream end
50b: Upstream end
50c: Positioning portion
60: Insertion guide member
60a: Upstream end
60b: Opening
71: Fin
72: Fin
73: Fin
74: Fin
110: Flavor generating article

Claims

1. A heating assembly comprising:

a heating portion extending in a first direction and configured to heat a flavor generating article;
a heat insulating portion extending in the first direction and located away from the heating portion in a second direction orthogonal to the first direction, and
a partition wall disposed in at least either one of first and second end portions of the heating portion and configured to block fluid from exiting through a gap between the heating portion and the heat insulating portion.

2. The heating assembly according to Claim 1,

wherein the first end portion of the heating por-

tion includes a first opening in which the flavor generating article can be inserted, and
wherein the heat insulating portion is a cylindrical body enclosing an outer periphery of the heating portion.

3. The heating assembly according to Claim 1 or 2,
wherein the second end portion of the heating portion includes a second opening that is capable of supplying air toward the flavor generating article.

4. The heating assembly according to any one of Claims 1 to 3,
wherein the heating portion includes:

a heating element configured to generate heat to be applied to the flavor generating article, and a heat transmitting member configured to transmit the heat generated in the heating element to the flavor generating article;
wherein the heat transmitting member includes at least either one of a first extending portion that extends from the heating element in a direction from a second end portion toward a first end portion and a second extending portion that extends from the heating element in a direction from the first end portion toward the second end portion, and
wherein the partition wall includes a first wall disposed across a gap between the first extending portion and the heat insulating portion and a second wall disposed across a gap between the second extending portion and the heat insulating portion.

5. The heating assembly according to Claim 4,

wherein the first extending portion abuts on the first wall only at the first end portion of the heating portion, and
wherein the second extending portion abuts on the second wall only at the second end portion of the heating portion.

6. The heating assembly according to Claim 4 or 5,
wherein the first wall is formed integrally with an insertion guide member configured to guide insertion of the flavor generating article into the heating portion.

7. The heating assembly according to any one of Claims 4 to 6,
wherein the second wall is formed integrally with an inlet pipe configured to introduce air into the heating portion.

8. The heating assembly according to any one of Claims 1 to 7,
wherein the heating assembly includes a filling member that is disposed in the gap between the heating portion and the heat insulating portion and extends in a first direction at a distance from the heating portion.

9. The heating assembly according to Claim 8,
wherein the filling member includes a protruding portion that protrudes from the partition wall into the gap.

10. The heating assembly according to any one of Claims 1 to 9,
wherein the heating assembly includes a fin that is disposed in the gap between the heating portion and the heat insulating portion and divides a space formed by the heating portion, the heat insulating portion, and the partition wall.

11. The heating assembly according to Claim 10,
wherein the fin is disposed away from the heating portion.

12. The heating assembly according to Claim 10 or 11,
wherein the fin is disposed within an extent to which the heating element of the heating portion extends in terms of the first direction.

13. The heating assembly according to any one of Claims 10 to 12,
wherein the fin is disposed in at least either one of a first edge portion located close to the first end portion in the heating element of the heating portion and a second edge portion located close to the second end portion.

14. The heating assembly according to Claim 13,
wherein the fin extends from an inner peripheral surface of the heat insulating portion away from the heating element at an angle to the first direction.

15. A flavor inhaler comprising the heating assembly according to any one of Claims 1 to 14.

16. The flavor inhaler according to Claim 15,
wherein the partition wall is formed integrally with a supporting member configured to fix the heating portion and the heat insulating portion to a housing of the flavor inhaler.

17. The flavor inhaler according to Claim 16,
wherein the heat insulating portion is fixed to the housing by the supporting member without contacting the housing.

Fig. 1A

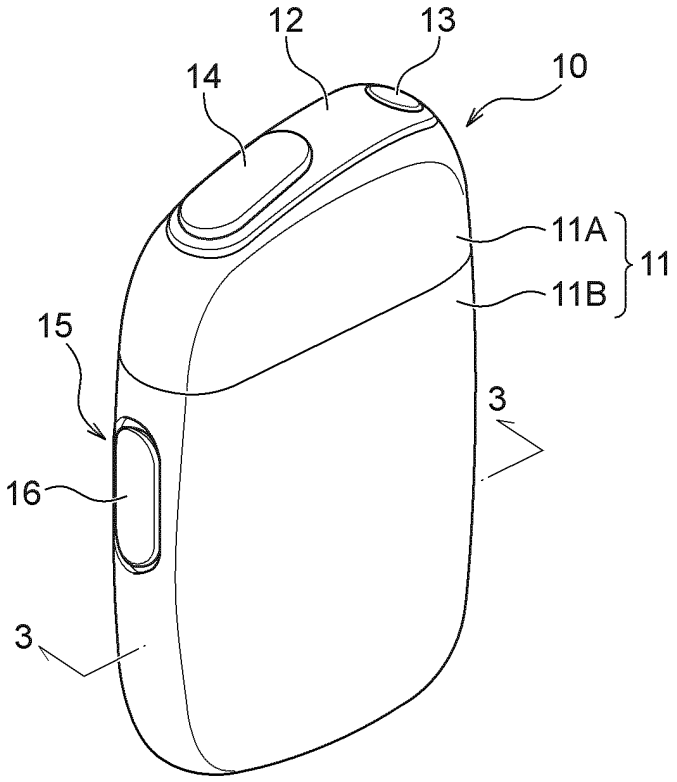


Fig. 1B

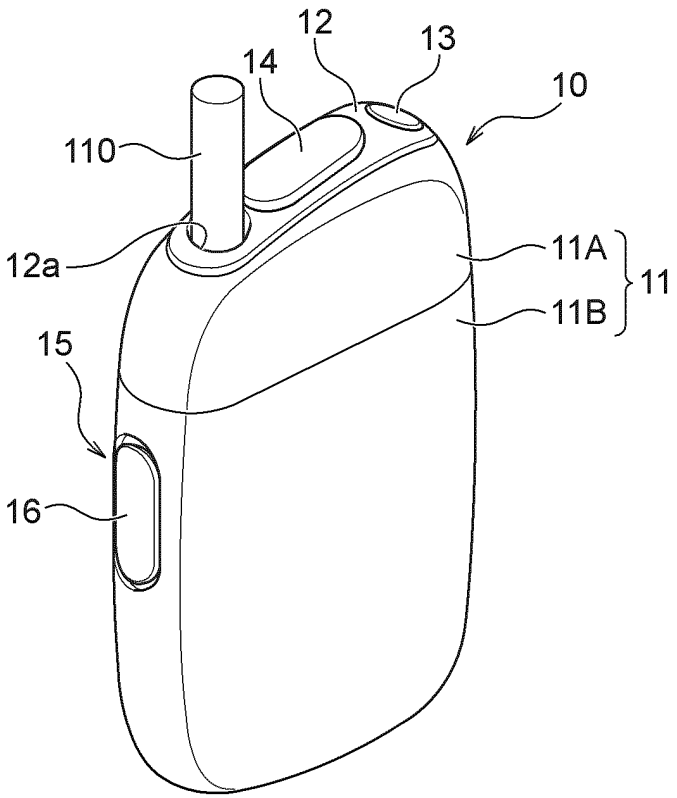
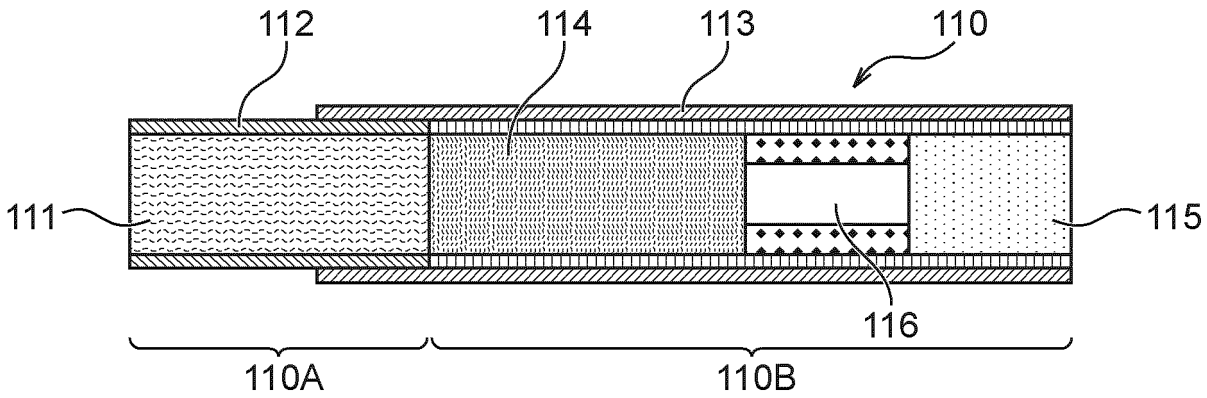


Fig. 2



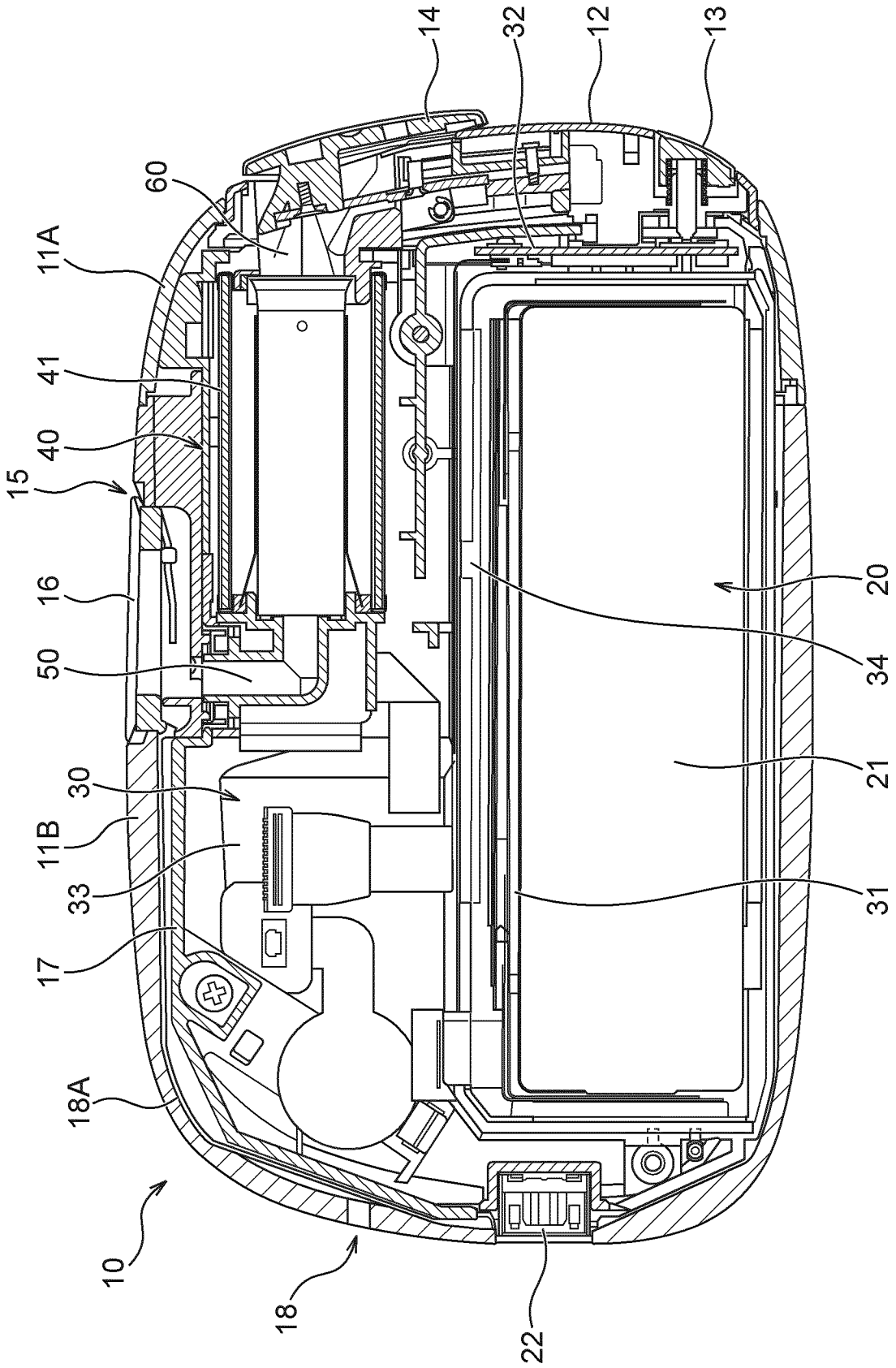


Fig. 3

Fig. 4

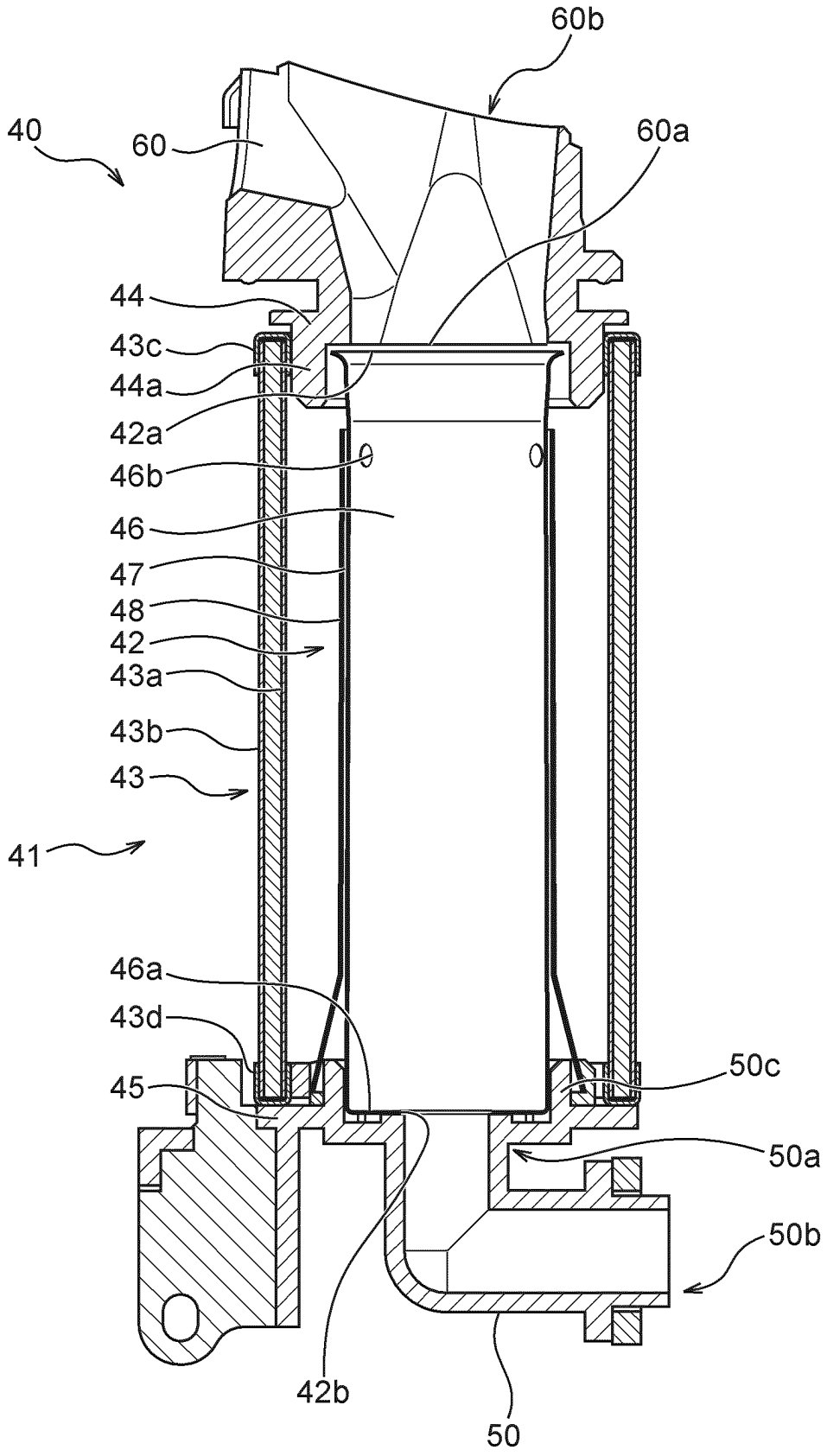

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Fig. 5

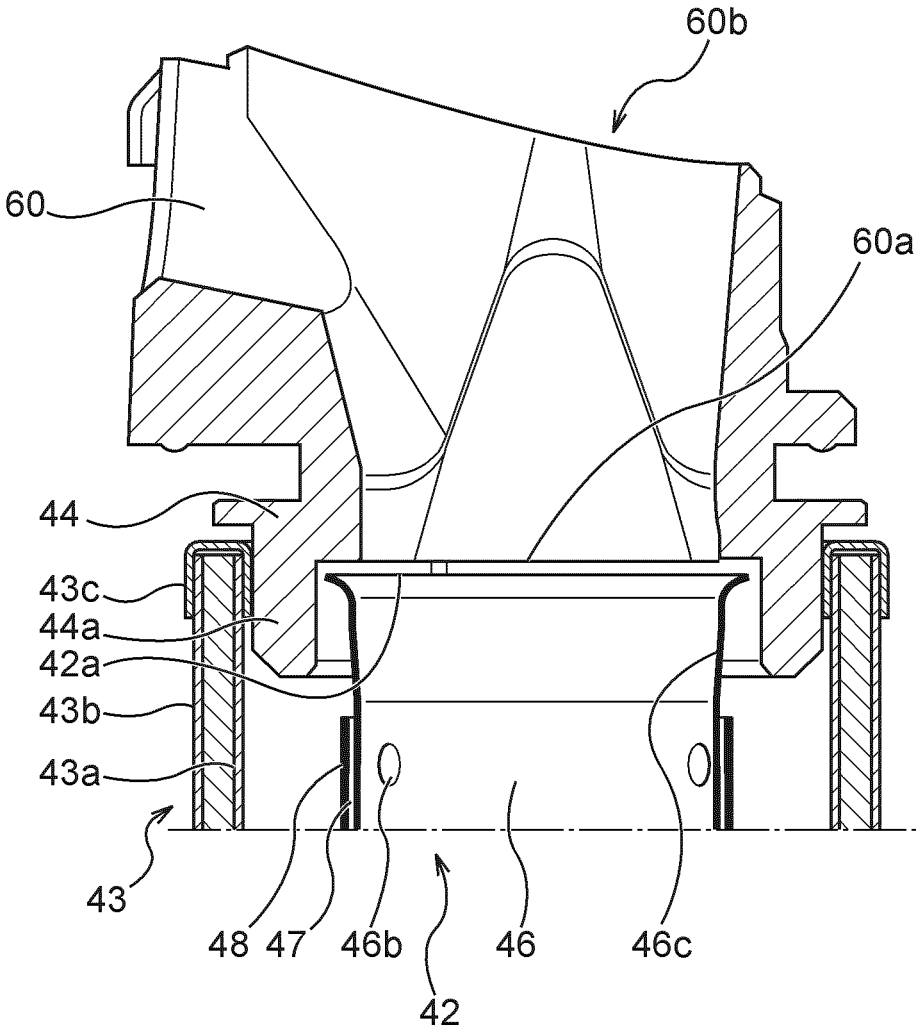


Fig. 6

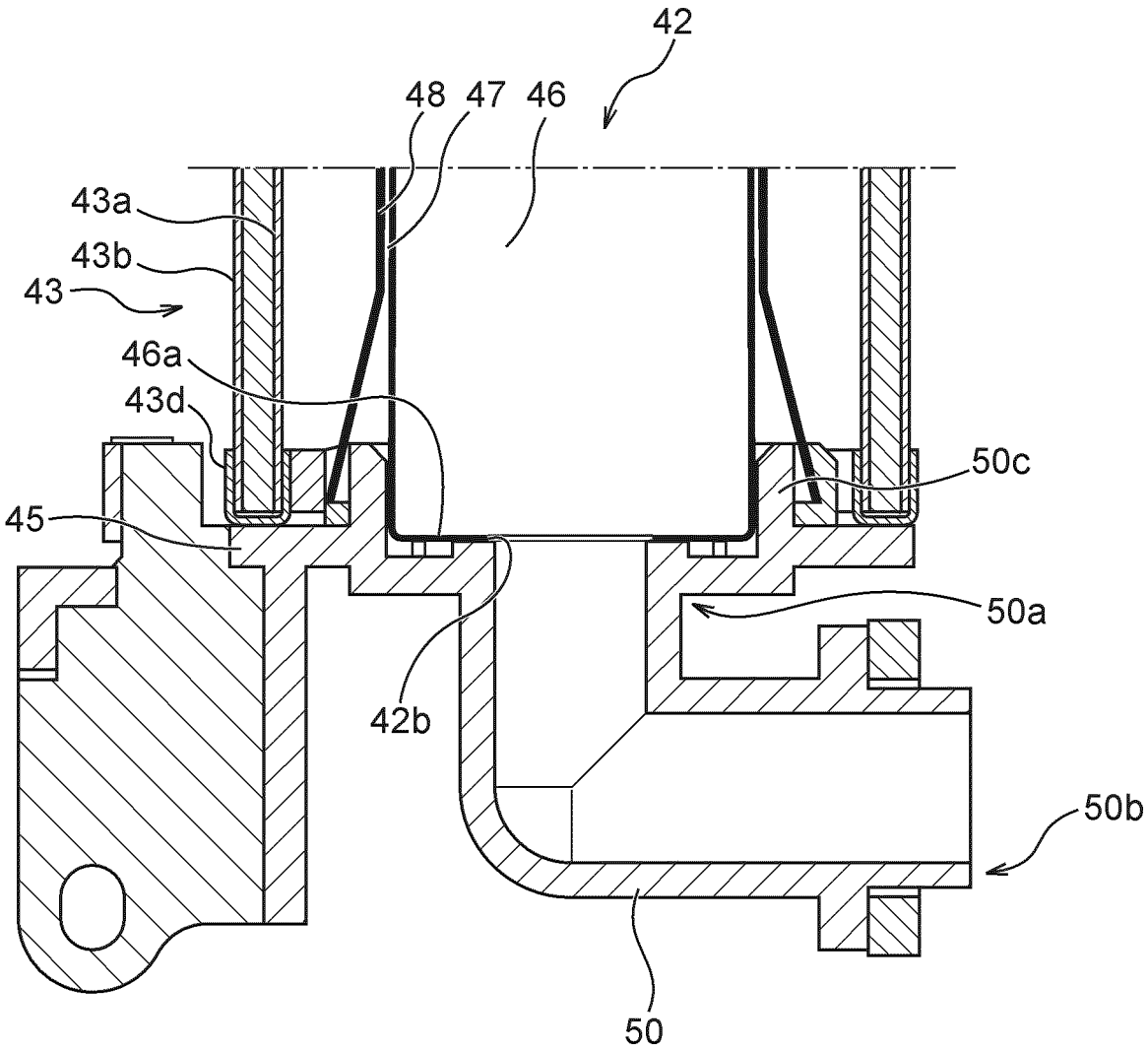


Fig. 7

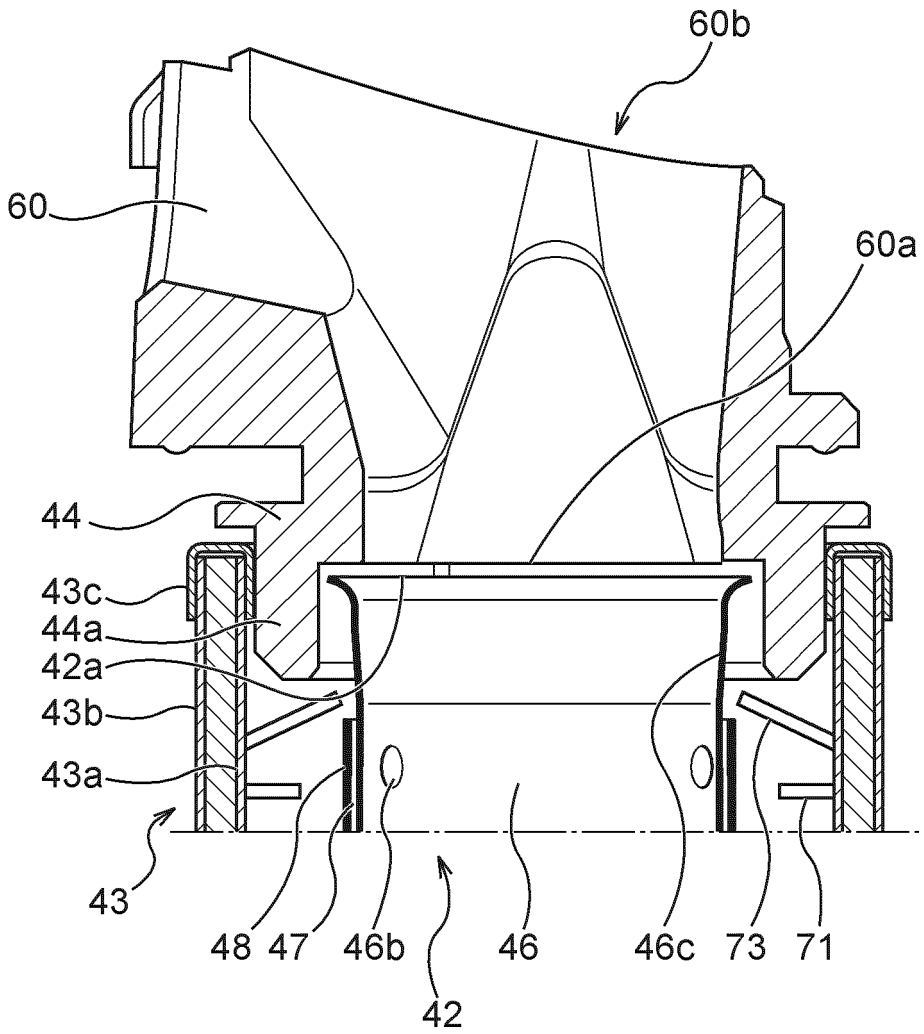
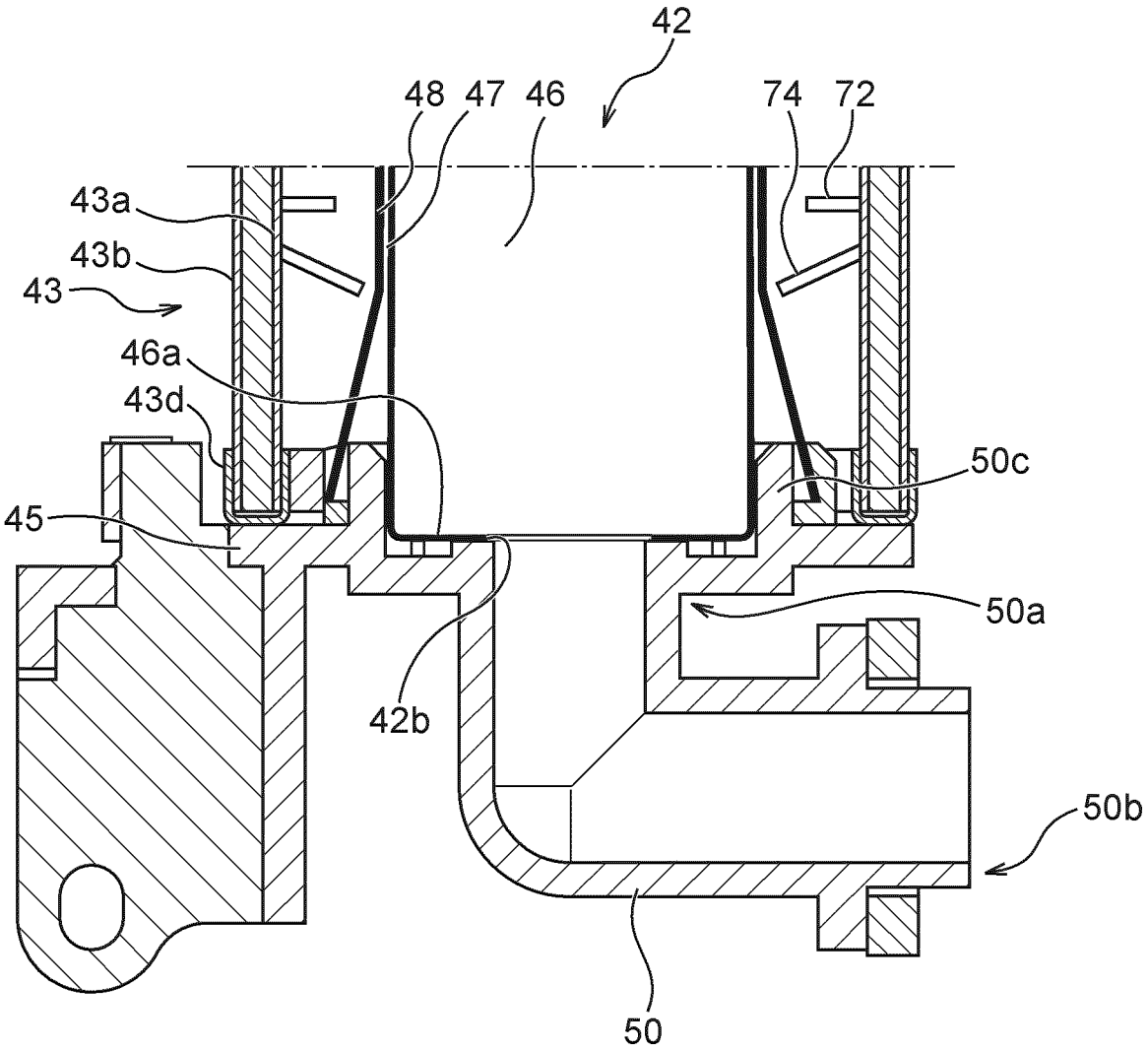


Fig. 8



INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2019/026177

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 A	CN 207885661 U (WAN, Lilong) 21 September 2018, paragraphs [0047], [0048], [0058], fig. 5, 6 (Family: none)	1-5 6-9, 15-17 10-14
X Y A	CN 109330030 A (SHENZHEN FIRST UNION TECH CO.) 15 February 2019, paragraphs [0057]-[0082], fig. 1-6 (Family: none)	1-3, 8-9 6-9, 15-17 10-14
A	JP 2016-534730 A (BRITISH AMERICAN TOBACCO (INVESTMENTS) LIMITED) 10 November 2016, entire text, all drawings & US 2016/0255879 A1 & WO 2015/062983 A2 & EP 3062644 A2 & KR 10-2016-0064159 A & CN 105682488 A	1-17

☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

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"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
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"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	Date of mailing of the international search report
02.09.2019	10.09.2019
Name and mailing address of the ISA/ Japan Patent Office 3-4-3, Kasumigaseki, Chiyoda-ku, Tokyo 100-8915, Japan	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2019/026177

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 109330033 A (LIU, Zhibin) 15 February 2019, entire text, all drawings (Family: none)	1-17
A	CN 109363246 A (SHENGHAI ELECTRONIC SHENZHEN CO., LTD.) 22 February 2019, entire text, all drawings (Family: none)	1-17
A	CN 208540733 U (SHENZHEN BRANCH HUIZHOU KIMREE TECH CO., LTD.) 26 February 2019, entire text, all drawings (Family: none)	1-17

Form PCT/ISA/210 (continuation of second sheet) (January 2015)

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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