(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 4 331 397 A1**

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
06.03.2024 Bulletin 2024/10

(21) Application number: **21939173.7**

(22) Date of filing: **26.04.2021**

(51) International Patent Classification (IPC):
A24F 40/40 *(2020.01)*

(52) Cooperative Patent Classification (CPC):
A24F 40/20; A24F 40/40; A24F 40/46; A24F 40/51; A24F 47/00

(86) International application number:
PCT/JP2021/016605

(87) International publication number:
WO 2022/230009 (03.11.2022 Gazette 2022/44)

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(71) Applicant: **Japan Tobacco, Inc.**
Tokyo, 105-6927 (JP)

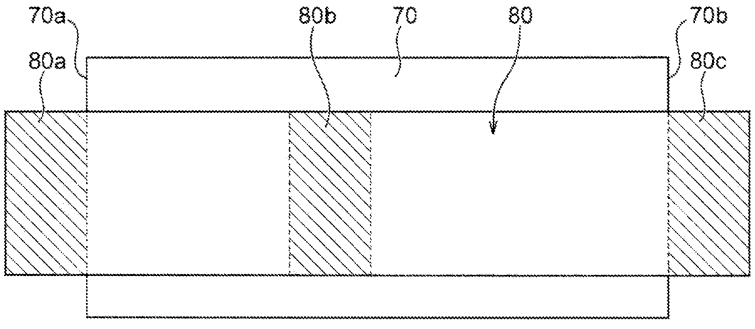
(72) Inventors:
- **INOUE, Yasunobu**
  Tokyo 130-8603 (JP)
- **NAKAAE, Hiroki**
  Tokyo 130-8603 (JP)
- **YAMADA, Manabu**
  Tokyo 130-8603 (JP)

(74) Representative: **Hoffmann Eitle**
Patent- und Rechtsanwälte PartmbB
Arabellastraße 30
81925 München (DE)

(54) **FLAVOR INHALER**

(57) The present invention appropriately attaches a heat-insulating material to the outside of a storage section. This flavor inhaler has a storage section for storing a consumable material, a heating element for heating the consumable material, a heat-insulating member provided to the outer periphery of the storage section, and a first tape member which is stuck to the heat-insulating member. The first tape member has a first section which extends from a first end section in the circumferential direction of the heat-insulating member, and a second section which is positioned on the heat-insulating member or extends from the heat-insulating member. The first section is stuck to the second section.

Fig. 9



EP 4 331 397 A1

Description

TECHNICAL FIELD

[0001] The present invention relates to a flavor inhaler.

BACKGROUND ART

[0002] Conventionally, a flavor inhaler for inhaling flavor or the like without burning a material is known. The flavor inhaler has, for example, a chamber that accommodates a flavor generating article and a heater that heats the flavor generating article accommodated in the chamber. As such a flavor inhaler, one that has a cylindrical heat insulator on an outer side of a member that accommodates a flavor generating article is known (see Patent Literature 1).

CITATION LIST

PATENT LITERATURE

[0003] PTL 1: International Publication No. 2020/084775

SUMMARY OF INVENTION

TECHNICAL PROBLEM

[0004] Patent Literature 1 discloses that the heat insulator can be a fibrous heat insulator or a foam heat insulator. However, Patent Literature 1 does not disclose at all how to attach such a heat insulator on an outer side of the container member that accommodates the flavor generating article. Such a heat insulator tends to be weak in structural strength, and some ingenuity is needed to attach the heat insulator to an outer side of the container member.

[0005] An object of the present invention is to more properly attach a heat insulator to an outer side of a containing unit.

SOLUTION TO PROBLEM

[0006] According to a first aspect, a flavor inhaler that is capable of heating a consumable is provided. This flavor inhaler includes a containing unit that accommodates the consumable, a heating element that heats the consumable, a heat insulating member that is provided on an outer circumference of the containing unit, and a first tape member that is attached to the heat insulating member. The first tape member has a first part that extends beyond a first end part of the heat insulating member in a circumferential direction and a second part that is located on the heat insulating member or extends beyond the heat insulating member. The first part is attached to the second part.

[0007] Since the heat insulating member tends to be weak in structural strength, in a case where the heat insulating member to which the first tape member has been attached is attached to the containing unit, there is a possibility that the first tape member is detached from the heat insulating member. On the other hand, according to the first aspect, the first part of the first tape member is attached to the second part, and therefore an adhesion strength of the first tape member can be improved. As a result, the heat insulating member can be properly attached to an outer side of the containing unit, and therefore the flavor inhaler has a good heat insulating function and can precisely heat the consumable.

[0008] In the first aspect, a second aspect is arranged such that the first tape member has a fixing part that extends beyond a second end part of the heat insulating member on a side opposite to the first end part and is directly or indirectly attached to the containing unit.

[0009] According to the second aspect, the second end part of the first tape member can be fixed by being directly or indirectly attached to the containing unit by the fixing part. With this configuration, a position of the first tape member with respect to the heating element or the containing unit can be fixed, and therefore the first tape member and the heat insulating member can be easily attached to the containing unit. Therefore, the heat insulating member can be properly attached, and therefore the flavor inhaler can have a good heat insulating function.

[0010] In the first or second aspect, a third aspect is arranged such that the first tape member is attached to the heat insulating member throughout an entire length of the heat insulating member in a circumferential direction.

[0011] According to the third aspect, a strength of the heat insulating member can be improved by the first tape member. Specifically, a tension strength of the heat insulating member in a circumferential direction can be improved. Furthermore, since the heat insulating member can be attached to the containing unit by winding the first tape member, the heat insulating member can be wound around the containing unit while being compressed. As a result, a thickness of the heat insulating member can be easily adjusted, and therefore the flavor inhaler can have good design accuracy.

[0012] In the first to third aspects, a fourth aspect is arranged such that the heat insulating member is wound one or more turns around the outer circumference of the containing unit.

[0013] According to the fourth aspect, the containing unit is covered with the heat insulating member throughout an entire length thereof in a circumferential direction, and therefore a flavor inhaler in which it is harder for heat of the heated consumable to be transmitted to an outside of the device is provided.

[0014] In the fourth aspect, a fifth aspect is arranged such that the heat insulating member and the first tape member are wound two or more turns around the outer circumference of the containing unit.

[0015] According to the fifth aspect, a flavor inhaler in which it is still harder for heat of the heated consumable to be transmitted to an outside of the device is provided.

[0016] In any one of the first to fifth aspects, a sixth aspect is arranged to further include a thermistor provided on an outer surface of the first tape member.

[0017] According to the sixth aspect, the thermistor can be easily fixed as compared with a case where the thermistor is provided on an outer surface of the heat insulating member. Furthermore, in a case where the thermistor is attached to the first tape member by a tape member, the thermistor is reattachable. Therefore, the thermistor can be disposed at a desired position, and therefore a flavor inhaler that is good in detection accuracy and product yield is provided.

[0018] In the sixth aspect, a seventh aspect is arranged such that the thermistor is located outside the heating element in a radial direction.

[0019] According to the seventh aspect, the thermistor can be disposed close to the heating element, and therefore a temperature of the heating element or the containing unit can be accurately acquired.

[0020] In the sixth or seventh aspect, an eighth aspect is arranged such that the containing unit has a cylindrical side wall part; the side wall part has a flat outer surface; and the thermistor is located outside the flat outer surface in a radial direction.

[0021] According to the eighth aspect, the thermistor can be easily disposed on the outer surface of the first tape member as compared with a case where the thermistor is disposed on a curved surface. Furthermore, in a case where a cylindrical heat insulator is provided on an outer circumference side of the containing unit, by locating the thermistor on an outer side of the flat outer surface, a distance between the heat insulator and the thermistor can be made wide, and therefore physical contact between the heat insulator and the thermistor can be made further less likely to occur.

[0022] In any one of the sixth to eighth aspects, a ninth aspect is arranged to further include a second tape member that fixes the thermistor together with the first tape member so that the thermistor is sandwiched between the first tape member and the second tape member.

[0023] According to the ninth aspect, the thermistor is sandwiched between the first tape member and the second tape member, and therefore the thermistor can be more firmly attached to the first tape member.

[0024] In the ninth aspect, a tenth aspect is arranged to further include a shrinkable tube that is located on an outer side of the second tape member.

[0025] According to the tenth aspect, the shrinkable tube can fix the heating element, the heat insulating member, the first tape member, the thermistor, and the second tape member to the containing member by applying force so as to press these members against the containing unit.

[0026] In any one of the first to tenth aspects, an eleventh aspect is arranged such that a length of the first tape member in an axis direction of the containing unit is 50% or more of a length of the heat insulating member in the axis direction.

[0027] According to the eleventh aspect, it can be made harder for the heat insulating member to be displaced with respect to the containing unit or the heating element. Furthermore, since 50% or more of the heat insulating member in the axis direction is covered with the first tape member, frictional force applied to the shrinkable tube can be reduced when the cylindrical shrinkable tube is disposed on an outer side of the heat insulating member and the first tape member. Therefore, a cylindrical member such as the shrinkable tube can be easily disposed on an outer side of the heat insulating member and the first tape member.

[0028] In any one of the first to eleventh aspects, a twelfth aspect is arranged such that the heat insulating member is a fibrous heat insulator.

[0029] According to the twelfth aspect, since the first part of the first tape member is attached to the second part, an adhesion strength of the first tape member can be improved as compared with a case where the first part is attached to the fibrous heat insulator.

[0030] In any one of the first to twelfth aspects, a thirteenth aspect is arranged such that the containing unit has an opening through which the consumable is inserted and a bottom that makes contact with an end surface of the consumable; and the heating element is disposed closer to the opening than to the bottom.

[0031] According to the thirteenth aspect, the heating element is disposed so as to be separated away from the bottom of the containing unit, and therefore a leading end of the consumable is less heated by the heating element. With this configuration, a material (e.g., a smokable substance) of the consumable is less likely to fall off from the leading end of the consumable due to contraction of the leading end of the consumable caused by heating. Furthermore, since the leading end side of the consumable can be cooled relative to the consumable on an opening side, secondhand smoke generated by heating of the consumable can be cooled on the leading end side, and leakage of the secondhand smoke from the leading end of the consumable can be made less likely to occur.

[0032] In any one of the first to thirteenth aspects, a fourteenth aspect is arranged such that the heating element heats the consumable from an outer side.

[0033] In a case where the heating element heats the consumable from an outer side, the heating element is disposed on an outer side and heat of the heating element is easily transmitted to an outside of the device as compared with an internal heating type heating element. According to the fourteenth aspect, even in a case where the heating element heats the consumable from an outer side, it can be made harder for heat of the heating element to be transmitted to an outside of the device.

BRIEF DESCRIPTION OF DRAWINGS

[0034]

[Fig. 1A] Fig. 1A is a schematic front view of a flavor inhaler according to the present embodiment.
[Fig. 1B] Fig. 1B is a schematic top view of the flavor inhaler according to the present embodiment.
[Fig. 1C] Fig. 1C is a schematic bottom view of the flavor inhaler according to the present embodiment.
[Fig. 2] Fig. 2 is a schematic side cross-sectional view of a consumable.
[Fig. 3] Fig. 3 is a cross-sectional view of the flavor inhaler taken along line 3-3 illustrated in Fig. 1B.
[Fig. 4A] Fig. 4A is a perspective view of a chamber.
[Fig. 4B] Fig. 4B is a cross-sectional view of the chamber taken along line 4B-4B illustrated in Fig. 4A.
[Fig. 5A] Fig. 5A is a cross-sectional view of the chamber taken along line 5A-5A illustrated in Fig. 4B.
[Fig. 5B] Fig. 5B is a cross-sectional view of the chamber taken along line 5B-5B illustrated in Fig. 4B.
[Fig. 6] Fig. 6 is a perspective view of the chamber and a heating unit.
[Fig. 7] Fig. 7 is a schematic side cross-sectional view of the chamber and a heater illustrating a state where members that constitute the heater overlap each other.
[Fig. 8] Fig. 8 is a schematic transverse cross-sectional view of the chamber and the heater taken along line 8-8 illustrated in Fig. 6.
[Fig. 9] Fig. 9 is a plan view of unrolled heat insulating member and first tape member that are to be wound around the chamber.
[Fig. 10] Fig. 10 is a plan view of another example of the unrolled heat insulating member and first tape member that are to be wound around the chamber.

DESCRIPTION OF EMBODIMENTS

[0035] An embodiment of the present invention is described below with reference to the drawings. In the drawings described below, identical or corresponding structural elements are given identical reference signs, and repeated description thereof is omitted.

[0036] Fig. 1A is a schematic front view of a flavor inhaler 100 according to the present embodiment. Fig. 1B is a schematic top view of the flavor inhaler 100 according to the present embodiment. Fig. 1C is a schematic bottom view of the flavor inhaler 100 according to the present embodiment. In the drawings described in the present specification, an X-Y-Z Cartesian coordinate system may be attached for convenience of description. In this coordinate system, the Z axis is pointed vertically upward, the X-Y plane is disposed so as to cut the flavor inhaler 100 in a horizontal direction, and the Y axis is disposed so as to extend from a front face to a rear face of the flavor inhaler 100. The Z axis can be regarded as a consumable insertion direction in which a consumable accommodated in a chamber 50 of an atomizing unit 30, which will be described later, is inserted or an axial direction of the chamber 50. Furthermore, the X axis direction can be regarded as a device longitudinal direction in a plane orthogonal to the consumable insertion direction or a direction in which a heater and a power supply unit are arranged. The Y axis direction can be regarded as a device lateral direction in the plane orthogonal to the consumable insertion direction. A direction parallel with the X-Y plane is a direction orthogonal to the axial direction of the chamber 50 and can be regarded as a radial direction. As used herein, a circumferential direction refers to a circumferential direction about the consumable insertion direction or the axial direction of the chamber 50.

[0037] The flavor inhaler 100 according to the present embodiment is, for example, configured to generate an aerosol containing a flavor by heating a stick-type consumable having a flavor source including an aerosol source.

[0038] As illustrated in Figs. 1A to 1C, the flavor inhaler 100 can include a slide cover 90 and a main body 120. The main body 120 has an outer housing 101 and a switch unit 103. The outer housing 101 constitutes an outermost housing of the flavor inhaler 100 and has a size that fits in a user's hand. In a case where the user uses the flavor inhaler 100, the user can inhale an aerosol while holding the main body 120 in his or her hand. The outer housing 101 may be one obtained by assembling a plurality of members.

[0039] As illustrated in Fig. 1B, the outer housing 101 has an opening 101a through which the consumable is inserted. The slide cover 90 is slidably attached to the outer housing 101 so as to close the opening 101a. Specifically, the slide cover 90 is movable along an outer surface of the outer housing 101 between a closed position (a position illustrated in Fig. 1A) where the opening 101a of the outer housing 101 is closed and an opened position (a position illustrated in Fig. 1B) where the opening 101a is opened. For example, the user can move the slide cover 90 between the closed position and the opened position by manually operating the slide cover 90. With this configuration, the slide cover 90 can permit or restrict access of a consumable into the flavor inhaler 100.

[0040] The switch unit 103 is used to switch on an off operation of the flavor inhaler 100. For example, the user operates the switch unit 103 in a state where a consumable is in the flavor inhaler 100, and thereby electric power is supplied to a heater (not illustrated) from a power supply (not illustrated), and the consumable can be heated without being burned. Note that the switch unit 103 may have a switch provided outside the outer housing 101 or may have a switch located inside the outer housing 101. In a case where the switch is located inside the outer housing 101, the switch is indirectly pressed by pressing the switch unit 103 on the surface of the outer housing 101. In the present embodiment, an example in which the switch of the switch unit 103 is located inside the outer housing 101 is described.

[0041] The flavor inhaler 100 may further have a terminal (not illustrated). The terminal can be an interface that connects the flavor inhaler 100, for example, to an

external power supply. In a case where the power supply provided in the flavor inhaler 100 is a rechargeable battery, the power supply can be charged by connecting the external power supply to the terminal and passing an electric current into the power supply from the external power supply. Furthermore, data related to operation of the flavor inhaler 100 may be transmitted to an external device by connecting a data transmission cable to the terminal.

[0042] Next, a consumable used in the flavor inhaler 100 according to the present embodiment is described. Fig. 2 is a schematic side cross-sectional view of a consumable 110. In the present embodiment, the flavor inhaler 100 and the consumable 110 constitute a smoking system. In the example illustrated in Fig. 2, the consumable 110 has a smokable substance 111, a cylindrical member 114, a hollow filter part 116, and a filter part 115. The smokable substance 111 is wrapped with first wrapping paper 112. The cylindrical member 114, the hollow filter part 116, and the filter part 115 are wrapped with second wrapping paper 113 different from the first wrapping paper 112. The second wrapping paper 113 wraps a part of the first wrapping paper 112 that wraps the smokable substance 111. In this way, the cylindrical member 114, the hollow filter part 116, and the filter part 115 and the smokable substance 111 are coupled. Note, however, that the second wrapping paper 113 may be omitted, and the cylindrical member 114, the hollow filter part 116, and the filter part 115 and the smokable substance 111 may be coupled by using the first wrapping paper 112. The cylindrical member 114 and the second wrapping paper 113 that covers the cylindrical member 114 may have a perforation V. The perforation V is usually a hole for promoting inflow of air from an outside by user's inhalation, and the inflow of air can lower a temperature of a component and air flowing from the smokable substance 111. A lip release agent 117 for making it hard for a user's lip to adhere to the second wrapping paper 113 is applied onto an outer surface of the second wrapping paper 113 in the vicinity of an end on a filter part 115 side. A portion of the consumable 110 to which the lip release agent 117 is applied functions as an inhalation port of the consumable 110.

[0043] The smokable substance 111 can include, for example, a flavor source such as tobacco and an aerosol source. Furthermore, the first wrapping paper 112 that wraps the smokable substance 111 can be a sheet member having air permeability. The cylindrical member 114 can be a paper tube or a hollow filter. Although the consumable 110 includes the smokable substance 111, the cylindrical member 114, the hollow filter part 116, and the filter part 115 in the example illustrated in Fig. 2, the configuration of the consumable 110 is not limited to this. For example, the hollow filter part 116 may be omitted, and the cylindrical member 114 and the filter part 115 may be arranged adjacent to each other.

[0044] Next, an internal structure of the flavor inhaler 100 is described. Fig. 3 is a cross-sectional view of the flavor inhaler 100 taken along line 3-3 illustrated in Fig. 1B. In Fig. 3, the slide cover 90 is located at the closed position. As illustrated in Fig. 3, an inner housing 10 is accommodated in the outer housing 101 of the flavor inhaler 100. The inner housing 10 is, for example, made of a resin and, in particular, can be formed of polycarbonate (PC), Acrylonitrile-Butadiene-Styrene (ABS) resin, polyether ether ketone (PEEK), a polymer alloy or the like containing plural kinds of polymers, or a metal such as aluminum. From a perspective of heat resistance and strength, the inner housing 10 is preferably formed of PEEK. However, a material of the inner housing 10 is not limited in particular. A power supply unit 20 and the atomizing unit 30 are provided in an internal space of the inner housing 10. Furthermore, the outer housing 101 is, for example, made of a resin and, in particular, can be formed of polycarbonate (PC), Acrylonitrile-Butadiene-Styrene (ABS) resin, polyether ether ketone (PEEK), a polymer alloy or the like containing plural kinds of polymers, or a metal such as aluminum.

[0045] The power supply unit 20 has a power supply 21. The power supply 21 can be, for example, a rechargeable battery or a non-rechargeable battery. The power supply 21 is electrically connected to the atomizing unit 30 with a printed circuit board (PCB) and the like (not illustrated) interposed therebetween. With this configuration, the power supply 21 can supply electric power to the atomizing unit 30 so that the consumable 110 is properly heated.

[0046] As illustrated in Fig. 3, the atomizing unit 30 has a chamber 50 (corresponding to an example of a containing unit) that extends in an insertion direction (Z axis direction) in which the consumable 110 is inserted, a heater 40 that surrounds a part of the chamber 50, a heat insulator 32, and a substantially cylindrical insertion guide member 34. The chamber 50 is configured to accommodate the consumable 110. It is preferable that the chamber 50 has heat resistance and is formed of a material having a low coefficient of thermal expansion, and for example, the chamber 50 can be formed of a metal such as stainless steel, a resin such as PEEK, glass, ceramic, or the like. As illustrated in Fig. 3, the chamber 50 may have a bottom member 36 on a bottom thereof. The bottom member 36 can function as a stopper that determines a position of the consumable 110 inserted into the chamber 50. The bottom member 36 has irregularities on a surface thereof which the consumable 110 makes contact with and can define a space where air can be supplied to the surface which the consumable 110 makes contact with. The bottom member 36 can be, for example, made of a resin material such as PEEK, a metal, glass, ceramic, or the like, but is not limited to this in particular. A material of which the bottom member 36 is made may be a material having a lower heat conductivity than a material of which the chamber 50 is made. In a case where the bottom member 36 is joined to the bottom of the chamber 50, an adhesive that can be made of a resin material such as epoxy resin or an inorganic

material can be used.

[0047] The heater 40 is configured to make contact with an outer circumference surface of the chamber 50 and heat the consumable 110 accommodated in the chamber 50. Specifically, the heater 40 can have, for example, a heating element such as a heating track and an electric insulating sheet that covers at least one surface of the heating element. A detailed configuration of the heater 40 will be described later.

[0048] The heat insulator 32 is substantially cylindrical as a whole and is disposed so as to surround the chamber 50 and the heater 40. The heat insulator 32 can include, for example, an aerogel sheet. The heat insulator 32 is disposed so as to be separated away from the chamber 50 and the heater 40, and an air layer is formed between the heat insulator 32 and the chamber 50 and the heater 40. The insertion guide member 34 is, for example, formed of a resin material such as PEEK, PC, or ABS and is provided between the slide cover 90 at the closed position and the chamber 50. Furthermore, the flavor inhaler 100 has a first holder 37 and a second holder 38 for holding the heat insulator 32. The first holder 37 and the second holder 38 can be, for example, formed of elastomer such as silicone rubber. As illustrated in Fig. 3, the first holder 37 holds an end part of the heat insulator 32 on a positive side in the Z axis direction. The second holder 38 holds an end part of the heat insulator 32 on a negative side in the Z axis direction.

[0049] The insertion guide member 34 has a function of guiding insertion of the consumable 110. Specifically, the insertion guide member 34 is communicated with the opening 101a illustrated in Fig. 1B of the flavor inhaler 100 when the slide cover 90 is located at the opened position, and guides the consumable 110 into the chamber 50 when the consumable 110 is inserted into the insertion guide member 34. In the present embodiment, the insertion guide member 34 can make contact with the chamber 50, and therefore the insertion guide member 34 is preferably formed of PEEK from a perspective of heat resistance.

[0050] The flavor inhaler 100 has a first chassis 22 that extends in the Z axis direction between the power supply 21 and the atomizing unit 30 and a second chassis 23 that extends so as to cover a slide cover 90 side of the power supply 21. The first chassis 22 and the second chassis 23 serve as partitions for a space in which the power supply 21 is accommodated in the inner housing 10.

[0051] The flavor inhaler 100 further has a slider 94 that is coupled to the slide cover 90. The slider 94 can be slidably attached to a part of the inner housing 10 of the main body 120. This allows the slide cover 90 coupled to the slider 94 to slide along the outer surface of the outer housing 101 of the main body 120. The slide cover 90 can be fixed to the slider 94 with the use of a screw 92. In the present embodiment, the slider 94 can be fixed to a part of the inner housing 10 with a spring 96 interposed therebetween. The screw 96 is configured to bias the slider 94 so that the slide cover 90 is biased to the opened position or the closed position.

[0052] Next, a structure of the chamber 50 is described. Fig. 4A is a perspective view of the chamber 50. Fig. 4B is a cross-sectional view of the chamber 50 taken along line 4B-4B illustrated in Fig. 4A. Fig. 5A is a cross-sectional view of the chamber 50 taken along line 5A-5A illustrated in Fig. 4B. Fig. 5B is a cross-sectional view of the chamber 50 taken along line 5B-5B illustrated in Fig. 4B. As illustrated in Figs. 4A and 4B, the chamber 50 can be a cylindrical member including an opening 52 through which the consumable 110 is inserted and a cylindrical side wall part 60 that accommodates the consumable 110. It is preferable that the chamber 50 has heat resistance and is formed of a material having a low coefficient of thermal expansion, and for example, the chamber 50 can be formed of a metal such as stainless steel, a resin such as PEEK, glass, ceramic, or the like.

[0053] As illustrated in Figs. 4B and 5B, the side wall part 60 includes a flat part 62 and a curved part 66. When the consumable 110 is disposed at a desired position in the chamber 50, the flat part 62 makes contact with or presses a part of the consumable 110, and the curved part 66 is separated away from the consumable 110. Note that the "desired position in the chamber 50" as used herein refers to a position where the consumable 110 is properly heated or a position of the consumable 110 during user's smoking. The flat part 62 has a flat inner surface 62a and a flat outer surface 62b. The curved part 66 has an inner surface 66a and an outer surface 66b.

[0054] As illustrated in Figs. 4A, 4B, and 5B, the chamber 50 has two flat parts 62 in a circumferential direction of the chamber 50, and the pair of flat parts 62 are parallel with each other. A distance of at least a part between the inner surfaces 62a of the pair of flat parts 62 is preferably smaller than a width of a portion of the consumable 110 inserted into the chamber 50 that is disposed between the flat parts 62.

[0055] As illustrated in Fig. 5B, the inner surface 66a of the curved part 66 can have an arc-shaped cross section as a whole in a plane orthogonal to the longitudinal direction (the Z axis direction) of the chamber 50. Furthermore, the curved part 66 is disposed so as to be adjacent to the flat part 62 in the circumferential direction. In other words, the curved part 66 is configured to connect end parts of the pair of flat parts 62.

[0056] As illustrated in Fig. 4B, the chamber 50 can have a hole 56a in the bottom 56 thereof so that the bottom member 36 illustrated in Fig. 3 passes through the hole 56a and is disposed inside the chamber 50. The bottom member 36 can be fixed to an inner part of the bottom 56 of the chamber 50 with the use of an adhesive or the like. The bottom member 36 provided on the bottom 56 can support a part of the consumable 110 inserted into the chamber 50 so that at least a part of an end surface of the consumable 110 is exposed.

[0057] As illustrated in Figs. 4A and 4B, the chamber 50 preferably has a cylindrical part 54 between the open-

ing 52 and the side wall part 60. A gap can be formed between the cylindrical part 54 and the consumable 110 in a state where the consumable 110 is positioned at a desired position in the chamber 50. Furthermore, as illustrated in Figs. 4A and 4B, the chamber 50 preferably has a first guide part 58 including a tapered surface 58a that connects an inner surface of the cylindrical part 54 and the inner surface 62a of the flat part 62.

[0058] Next, a structure of the heater 40 is described. Fig. 6 is a perspective view of the chamber 50 and the heater 40. Fig. 7 is schematic side cross-sectional view of the chamber 50 and the heater 40 illustrating a state where members that constitute the heater 40 overlap each other. Fig. 8 is a schematic transverse cross-sectional view of the chamber 50 and the heater 40 taken along line 8-8 illustrated in Fig. 6. In Fig. 6, illustration of a shrinkable tube 46 is omitted. Fig. 7 illustrates a state before compression of each member by the shrinkable tube 46 so that an order in which the members constituting the heater 40 overlap each other becomes clear. Furthermore, Fig. 8 illustrates a cross section that does not include a thermistor 43 and a second tape member 45.

[0059] As illustrated in Figs. 6 to 8, a heating element 42, a heat insulating member 70, a first tape member 80, the thermistor 43, the second tape member 45, and the shrinkable tube 46 are provided on the side wall part 60 of the chamber 50. Note that as used herein, "outer" and "inner" regarding the heating element 42, the heat insulating member 70, the first tape member 80, the thermistor 43, the second tape member 45, and the shrinkable tube 46 that constitute the heater 40 are defined on the basis of the chamber 50, and for example, an "outer side" means a side far from the chamber 50, and an "outer circumference" means a circumference on a side far from the chamber 50.

[0060] The heating element 42 is configured to heat the consumable 110 accommodated in the chamber 50 from an outer side. The heating element 42 can be, for example, a heating track. The heating element 42 may be provided on an outer surface of the side wall part 60 of the chamber 50 or may be provided on an inner surface of the side wall part 60 of the chamber 50. As illustrated in Figs. 6 to 8, in the present embodiment, the heating element 42 is attached to the outer surface 62b of the flat part 62 of the side wall part 60. The heating element 42 is preferably disposed so as not to make contact with the curved part 66 of the chamber 50 and so as to heat the flat part 62. In other words, the heating element 42 is preferably disposed only on the outer surface 62b or the inner surface 62a of the flat part 62. The heater 40 may have an electric insulating member (not illustrated) such as polyimide that covers at least one surface of the heating element 42 in addition to the heating element 42, and the electric insulating member is preferably disposed so as to cover both surfaces of the heating element 42.

[0061] The heat insulating member 70 is provided on an outer circumference of the chamber 50. In the present embodiment, the heating element 42 is attached to the outer surface of the flat part 62 of the chamber 50, and therefore the heat insulating member 70 is provided so as to cover an outer surface of the heating element 42. Specifically, the heating element 42 is sandwiched between the flat part 62 of the chamber 50 and the heat insulating member 70. The heat insulating member 70 may be a fibrous heat insulator such as glass wool or rock wool or may be a foam heat insulator such as urethane foam or phenolic foam. Since the heat insulating member 70 is provided on the outer circumference of the chamber 50, in the present embodiment, on the outer circumference of the heating element 42, it can be made harder for heat of the consumable 110 to be transmitted to an outside of the flavor inhaler 100.

[0062] The first tape member 80 is attached to the heat insulating member 70. Specifically, the first tape member 80 is attached to the heat insulating member 70 so that the heat insulating member 70 is fixed with respect to the chamber 50 or positional shift of the heat insulating member 70 is prevented. As the first tape member 80, for example, a resin material such as polyimide (PI), polybenzimidazole (PBI), or polyamide-imide (PAI), a liquid crystal polymer, glass cloth, or the like can be used, and preferably a material having heat insulation or electric insulation against the heating element 42 is used.

[0063] The heat insulating member 70 is preferably wound one or more turns around the outer circumference of the chamber 50. With this configuration, the chamber 50 is covered with the heat insulating member 70 throughout an entire length thereof in the circumferential direction, and therefore it can be made harder for heat of the heated consumable 110 to be transmitted to an outside of the device. Furthermore, as illustrated in Fig. 8, the heat insulating member 70 is preferably wound two or more turns around the outer circumference of the side wall part 60 of the chamber 50. In the example of Fig. 8, the heat insulating member 70 is wound substantially two turns around the outer circumference of the side wall part 60. As a result, a structure having a portion where the heat insulating member 70 and the first tape member 80 are alternately disposed in layers on the side wall part 60 of the chamber 50 is formed. This can make it still harder for heat of the heated consumable 110 to be transmitted to an outside of the device.

[0064] As described above, the heat insulating member 70 tends to be weak in structural strength depending on a material. For example, in a case where the heat insulating member 70 is a fibrous heat insulator such as glass wool, there is a possibility that the first tape member 80 is detached from the heat insulating member 70 even in a case where the heat insulating member 70 to which the first tape member 80 has been attached is attached to the chamber 50. In view of this, in the present embodiment, in order to properly dispose the heat insulating member 70 on the outer side of the chamber 50, the first tape member 80 is attached so that parts of the first tape member 80 overlap each other.

[0065] Fig. 9 is a plan view of the unrolled heat insu-

lating member 70 and first tape member 80 that are to be wound around the chamber 50. As illustrated in Fig. 9, the heat insulating member 70 has a band-like planar shape as a whole so as to be wound around the chamber 50. The heat insulating member 70 has a first end part 70a and a second end part 70b, which is an end part at which winding around the chamber 50 starts. As illustrated in Fig. 9, the second end part 70b is an end part on a side opposite to the first end part 70a. Furthermore, the first end part 70a constitutes an end part in the circumferential direction of the heat insulating member 70 in a state where the heat insulating member 70 is wound around the chamber 50.

[0066] The first tape member 80 has a first part 80a that extends beyond the first end part 70a of the heat insulating member 70. The first part 80a is attached to a second part 80b of the first tape member 80. This can improve an adhesion strength of the first tape member 80 as compared with a case where the first part 80a of the first tape member 80 is attached to the heat insulating member 70. As a result, the heat insulating member 70 can be properly attached to an outer side of the side wall part 60. In particular, in a case where the heat insulating member 70 is a fibrous heat insulator, an adhesion strength of the first tape member 80 can be improved as compared with a case where the first part 80a is attached to the fibrous heat insulator. In the example illustrated in Fig. 9, the second part 80b is attached onto the heat insulating member 70. Specifically, in the example illustrated in Fig. 9, the heat insulating member 70 is wound substantially two turns around the chamber 50 starting from the second end part 70b, which is a start position of winding, and therefore the second part 80b to which the first part 80a of the first tape member 80 is attached can be located at an approximately central part of the heat insulating member 70.

[0067] As illustrated in Fig. 9, the first tape member 80 preferably has a fixing part 80c that extends beyond the second end part 70b of the heat insulating member 70 and is directly or indirectly attached to the chamber 50. In the present embodiment, since the heating element 42 is provided on the outer surface of the side wall part 60 of the chamber 50, the fixing part 80c is attached to the outer surface of the heating element 42, and as a result, the fixing part 80c can be indirectly attached to the chamber 50. With this configuration, the second end part 70b of the first tape member 80 can be fixedly attached to the heating element 42 or the chamber 50 by the fixing part 80c. Therefore, a position of the first tape member 80 with respect to the heating element 42 or the chamber 50 can be fixed, and therefore the first tape member 80 and the heat insulating member 70 can be easily attached to (wound around) the chamber 50. Note that, for example, in a case where the heating element 42 is provided on the inner surface of the side wall part 60 of the chamber 50, the fixing part 80c can be directly attached to the chamber 50. Alternatively, the fixing part 80c may be indirectly attached to the chamber 50 by being attached to another member fixed to the chamber 50.

[0068] Furthermore, as illustrated in Figs. 8 and 9, the first tape member 80 is preferably attached to the heat insulating member 70 throughout an entire length of the heat insulating member 70 in the circumferential direction. With this configuration, a strength of the heat insulating member 70 can be improved by the first tape member 80. Specifically, a tension strength of the heat insulating member 70 in the circumferential direction can be improved. Furthermore, since the heat insulating member 70 can be attached to the chamber 50 by winding the first tape member 80, the heat insulating member 70 can be wound around the chamber 50 while being compressed. As a result, a thickness of the heat insulating member 70 can be easily adjusted. The first tape member 80 may be attached throughout the entire length of the heat insulating member 70 in the circumferential direction as a single long tape or may be attached throughout the entire length of the heat insulating member 70 in the circumferential direction as a plurality of tapes connected to each other.

[0069] Fig. 10 is a plan view of another example of the unrolled heat insulating member 70 and first tape member 80 that are to be wound around the chamber 50. As illustrated in Fig. 10, the first tape member 80 may include a plurality of tape members 81 and 82. The tape member 81 is attached to the first end part 70a of the heat insulating member 70 and includes a first part 80a that extends beyond the first end part 70a. The tape member 82 is attached to the second end part 70b of the heat insulating member 70 and can have a fixing part 80c that extends beyond the second end part 70b. In the example illustrated in Fig. 10, the fixing part 80c is directly or indirectly attached to the chamber 50, and the heat insulating member 70 is wound around the chamber 50 starting from the second end part 70b. The heat insulating member 70 is wound one turn around the chamber 50, and the first part 80a is attached to a second part 80b of the tape member 82. Although the second part 80b partially overlaps the fixing part 80c in the example illustrated in Fig. 10, this is not restrictive, and the second part 80b may completely match the fixing part 80c or may be a part completely different from the fixing part 80c. In other words, the second part 80b may be a part that extends beyond the heat insulating member 70. Note that in the example illustrated in Fig. 10, the heat insulating member 70 is wound one turn around the chamber 50, and is therefore shorter than the heat insulating member 70 illustrated in Fig. 9.

[0070] A length of the first tape member 80 in the axis direction is preferably 50% or more of a length of the heat insulating member 70 in the axis direction. This can make it harder for the heat insulating member 70 to be displaced with respect to the chamber 50 or the heating element 42. Furthermore, the heat insulating member 70 generally has a higher coefficient of friction than the first tape member 80 that can be formed of a resin material or the like. In this respect, since 50% or more of the heat

insulating member 70 in the axis direction is covered with the first tape member 80, frictional force applied to the shrinkable tube 46 can be reduced when the cylindrical shrinkable tube 46 is disposed on an outer side of the heat insulating member 70 and the first tape member 80. Therefore, a cylindrical member such as the shrinkable tube 46 can be easily disposed on the outer side of the heat insulating member 70 and the first tape member 80.

[0071] As illustrated in Fig. 7, the heating element 42 is preferably disposed closer to the opening 52 than to the bottom 56 of the chamber 50. With this configuration, a leading end of the consumable 110 is less heated by the heating element 42, and therefore a material (e.g., the smokable substance 111) of the consumable can be made less likely to fall off from the leading end of the consumable 110 due to contraction of the leading end of the consumable 110 caused by heating. Furthermore, since the leading end side of the consumable 110 can be cooled relative to the consumable 110 on an opening 52 side where the consumable is inserted, secondhand smoke generated by heating of the consumable can be cooled on the leading end side, and leakage of the secondhand smoke from the leading end of the consumable 110 can be made less likely to occur. Furthermore, the configuration in which the heating element 42 is provided close to the opening 52 through which the consumable is inserted makes it possible to inhale vapor (steam) generated from the consumable 110 without condensing the vapor and is therefore effective. In addition, in a case where the heating element 42 is expanded over the whole chamber 50, an electric power density decreases and a rate of temperature rise decreases, whereas according to this configuration, a temperature of a desired position of the chamber 50 can be increased by heat transfer from the heating element 42 without lowering a rate of temperature rise. This contributes to efficient generation of vapor and is therefore effective.

[0072] The thermistor 43 is configured to measure a temperature of the consumable 110, the chamber 50, or the heating element 42. The thermistor 43 is electrically connected to a PCB (not illustrated) by a wire 43a and can transmit temperature data to the PCB. As illustrated in Figs. 6 and 7, the thermistor 43 is preferably provided on an outer surface of the first tape member 80. With this configuration, the thermistor 43 can be easily fixed as compared with a case where the thermistor 43 is provided on an outer surface of the heat insulating member 70. Furthermore, in a case where the thermistor 43 is attached to the first tape member 80 with the use of the second tape member 45, the thermistor 43 is reattachable.

[0073] As illustrated in Fig. 7, the thermistor 43 is preferably located outside the heating element 42 in the radial direction. With this configuration, the thermistor 43 can be disposed close to the heating element 42, and therefore can accurately acquire a temperature of the heating element 42 or the chamber 50. Furthermore, as illustrated in Figs. 6 and 7, the thermistor 43 is preferably located outside the flat outer surface 62b of the flat part 62 in the radial direction. With this configuration, the thermistor 43 can be easily disposed on the outer surface of the first tape member 80 as compared with a case where the thermistor 43 is disposed on the outer surface 66b of the curved part 66. Furthermore, in a case where the cylindrical heat insulator 32 is provided on an outer circumference side of the chamber 50, the configuration in which the thermistor 43 is located on the flat outer surface 62b can widen a distance between the heat insulator 32 and the thermistor 43, and therefore can make physical contact between the heat insulator 32 and the thermistor 43 further less likely to occur.

[0074] As illustrated in Figs. 6 and 7, the second tape member 45 is configured to fix the thermistor 43 together with the first tape member 80 so that the thermistor 43 is sandwiched between the second tape member 45 and the first tape member 80. In other words, the second tape member 45 is attached onto the thermistor 43, and thereby the thermistor 43 is fixed to the outer surface of the first tape member 80. With this configuration, the thermistor 43 is sandwiched between the first tape member 80 and the second tape member 45, and therefore the thermistor 43 can be more firmly attached to the first tape member 80. Note that the second tape member 45 may be omitted, and the thermistor 43 may be fixed onto the outer surface of the first tape member 80, for example, with the use of an adhesive or the like.

[0075] As illustrated in Figs. 7 and 8, the shrinkable tube 46 has a cylindrical shape, is disposed on an outermost side of the heater 40, and can be configured to fix the members that constitute the heater 40 to the chamber 50. Specifically, in the present embodiment, the shrinkable tube 46 can be located on an outer side of the second tape member 45. With this configuration, the shrinkable tube 46 can fix the heating element 42, the heat insulating member 70, the first tape member 80, the thermistor 43, and the second tape member 45 to the chamber 50 by applying force so as to press these members against the chamber 50. The heater 40 need not necessarily include the thermistor 43 and the second tape member 45. In this case, the shrinkable tube 46 can be located on an outer side of the first tape member 80 so as to make contact with the outer surface of the first tape member 80.

[0076] The shrinkable tube 46 can be, for example, a heat shrinkable tube that thermally shrinks upon application of heat in a state where the shrinkable tube 46 is disposed on an outer circumference side of the members that constitute the heater 40. The members that constitute the heater 40 can be pressed against the chamber 50 by the heat shrinkage of the shrinkable tube 46. In a case where the shrinkable tube 46 is a heat shrinkable tube, the shrinkable tube 46 can be for example, formed of a thermoplastic resin such as perfluoroalkoxy fluorine resin (PFA). Note that the shrinkable tube 46 is not limited to a heat shrinkable tube and can be any member that can accomplish a similar objective. For example, a tube

or the like that elastically contracts can be used as the shrinkable tube 46.

[0077] Although the embodiment of the present invention has been described above, the present invention is not limited to the above embodiment, and can be modified in various ways within the scope of the technical idea described in the claims, the specification, and the drawings. Note that even shapes and materials that are not directly described in the specification and the drawings are encompassed within the scope of the technical idea of the present invention as long as the operation and effects of the present invention are produced.

REFERENCE SIGNS LIST

[0078]

32	heat insulator
40	heater
42	heating element
43	thermistor
45	second tape member
46	shrinkable tube
50	chamber
52	opening
56	bottom
60	side wall part
62b	outer surface
70	heat insulating member
70a	first end part
70b	second end part
80	first tape member
80a	first part
80b	second part
80c	fixing part
81	tape member
82	tape member
100	flavor inhaler
110	consumable

Claims

1. A flavor inhaler that is capable of heating a consumable, comprising:

a containing unit that accommodates the consumable;
a heating element that heats the consumable;
a heat insulating member that is provided on an outer circumference of the containing unit; and
a first tape member that is attached to the heat insulating member,
wherein the first tape member has a first part that extends beyond a first end part of the heat insulating member in a circumferential direction and a second part that is located on the heat insulating member or extends beyond the heat insulating member, and
the first part is attached to the second part.

2. The flavor inhaler according to claim 1, wherein
the first tape member has a fixing part, and at least a part of the fixing part extends beyond a second end part of the heat insulating member on a side opposite to the first end part and is attached to the heating element or the containing unit.

3. The flavor inhaler according to claim 1 or 2, wherein
the first tape member is attached to the heat insulating member throughout an entire length of the heat insulating member in a circumferential direction.

4. The flavor inhaler according to any one of claims 1 to 3, wherein
the heat insulating member is wound one or more turns around the outer circumference of the containing unit.

5. The flavor inhaler according to claim 4, wherein
the heat insulating member is wound two or more turns around the outer circumference of the containing unit.

6. The flavor inhaler according to any one of claims 1 to 5, further comprising a thermistor provided on an outer surface of the first tape member.

7. The flavor inhaler according to claim 6, wherein
the thermistor is located outside the heating element in a radial direction.

8. The flavor inhaler according to claim 6 or 7, wherein

the containing unit has a cylindrical side wall part;
the side wall part has a flat outer surface; and
the thermistor is located outside the flat outer surface in a radial direction.

9. The flavor inhaler according to any one of claims 6 to 8, further comprising a second tape member that fixes the thermistor together with the first tape member so that the thermistor is sandwiched between the first tape member and the second tape member.

10. The flavor inhaler according to claim 9, further comprising a shrinkable tube that is located on an outer side of the second tape member.

11. The flavor inhaler according to any one of claims 1 to 10, wherein
a length of the first tape member in an axis direction of the containing unit is 50% or more of a length of the heat insulating member in the axis direction.

12. The flavor inhaler according to any one of claims 1 to 11, wherein
the heat insulating member is a fibrous heat insulator.

13. The flavor inhaler according to any one of claims 1 to 12, wherein

the containing unit has an opening through which the consumable is inserted and a bottom that makes contact with an end surface of the consumable; and
the heating element is disposed closer to the opening than to the bottom.

14. The flavor inhaler according to any one of claims 1 to 13, wherein
the heating element heats the consumable from an outer side.

Fig. 1A

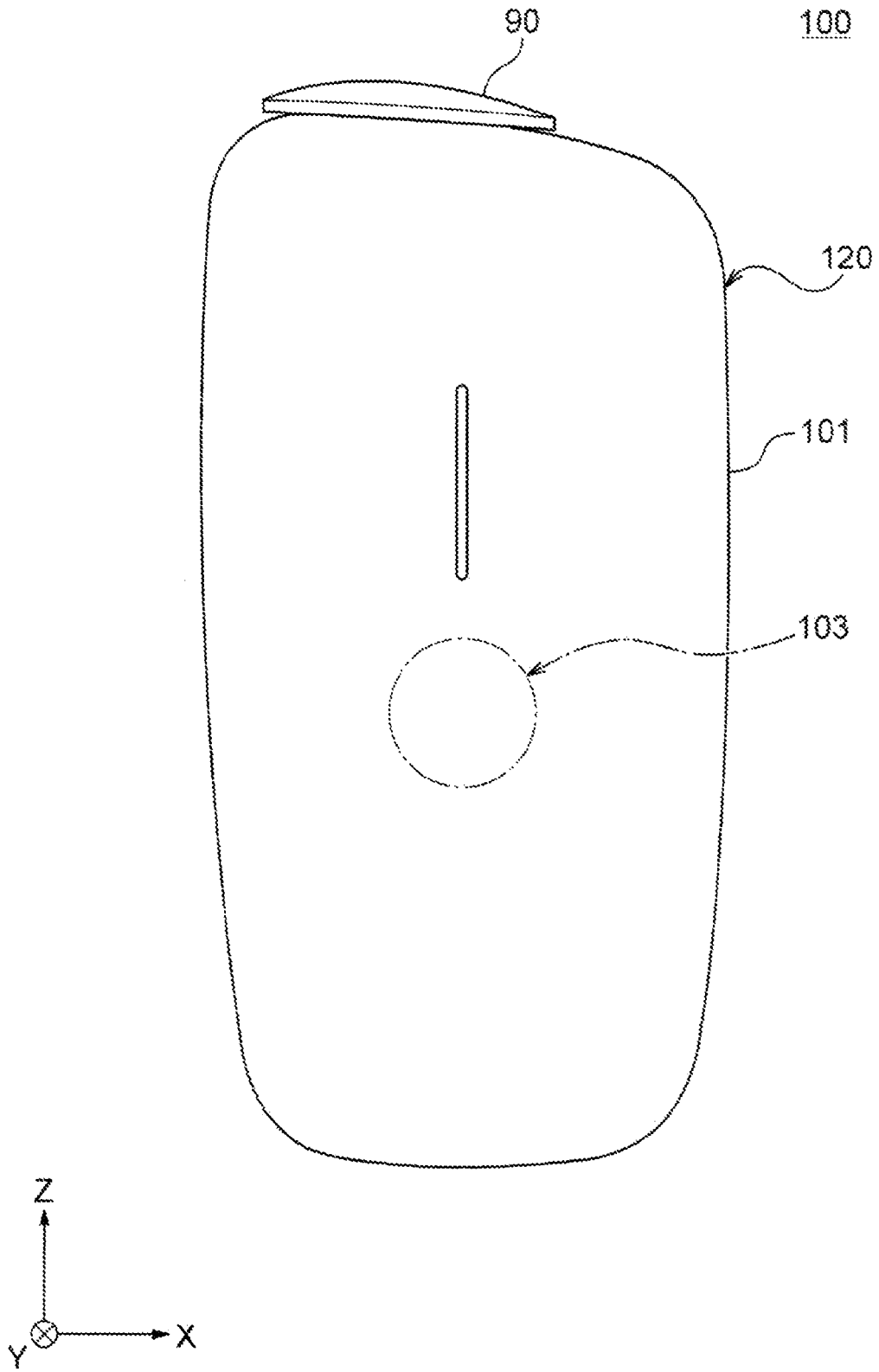


Fig. 1B

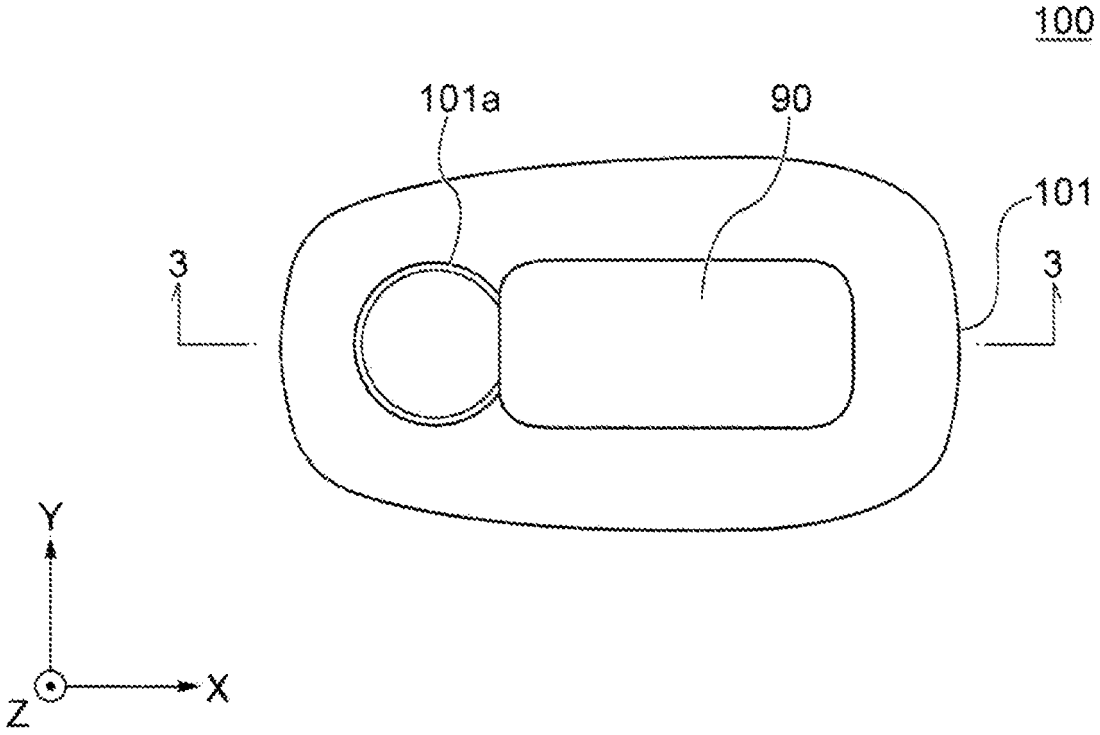


Fig. 1C

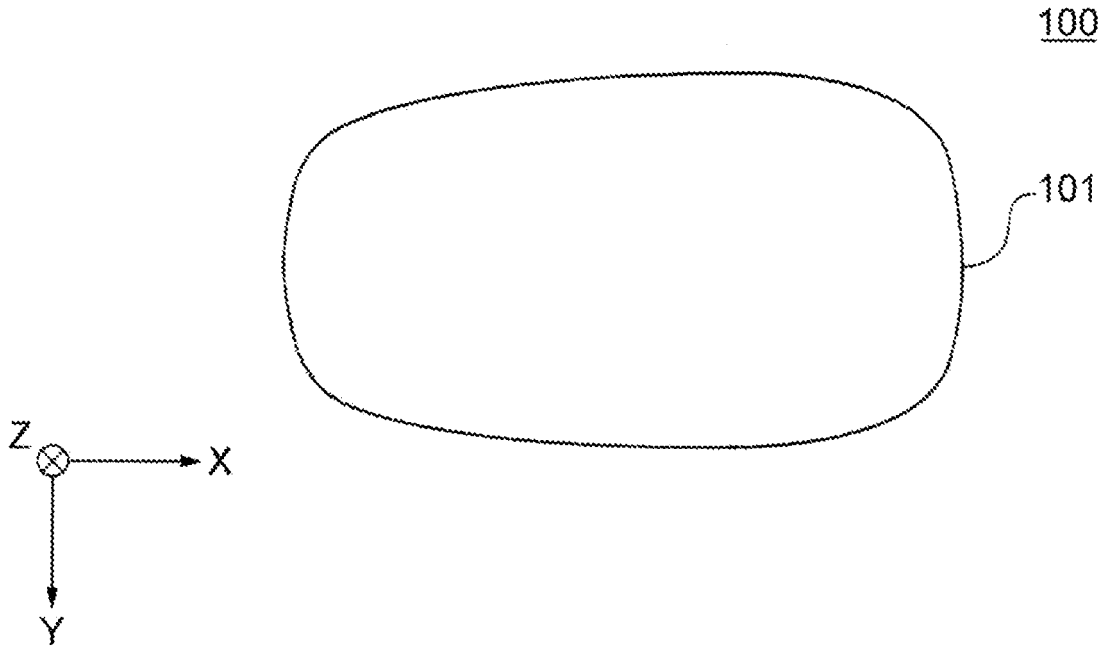


Fig. 2

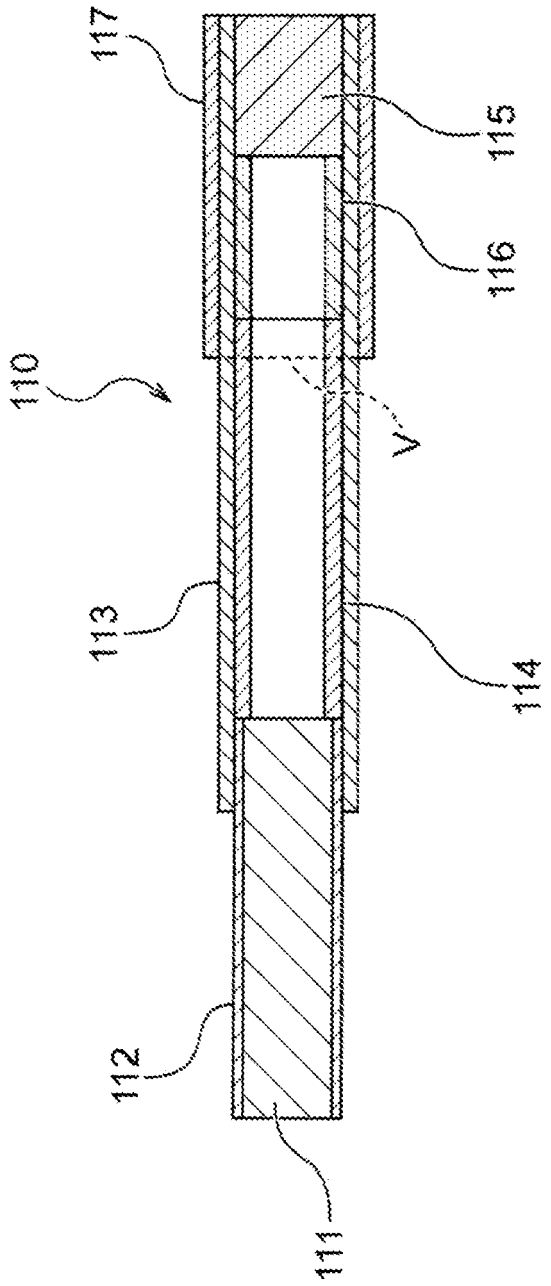


Fig. 3

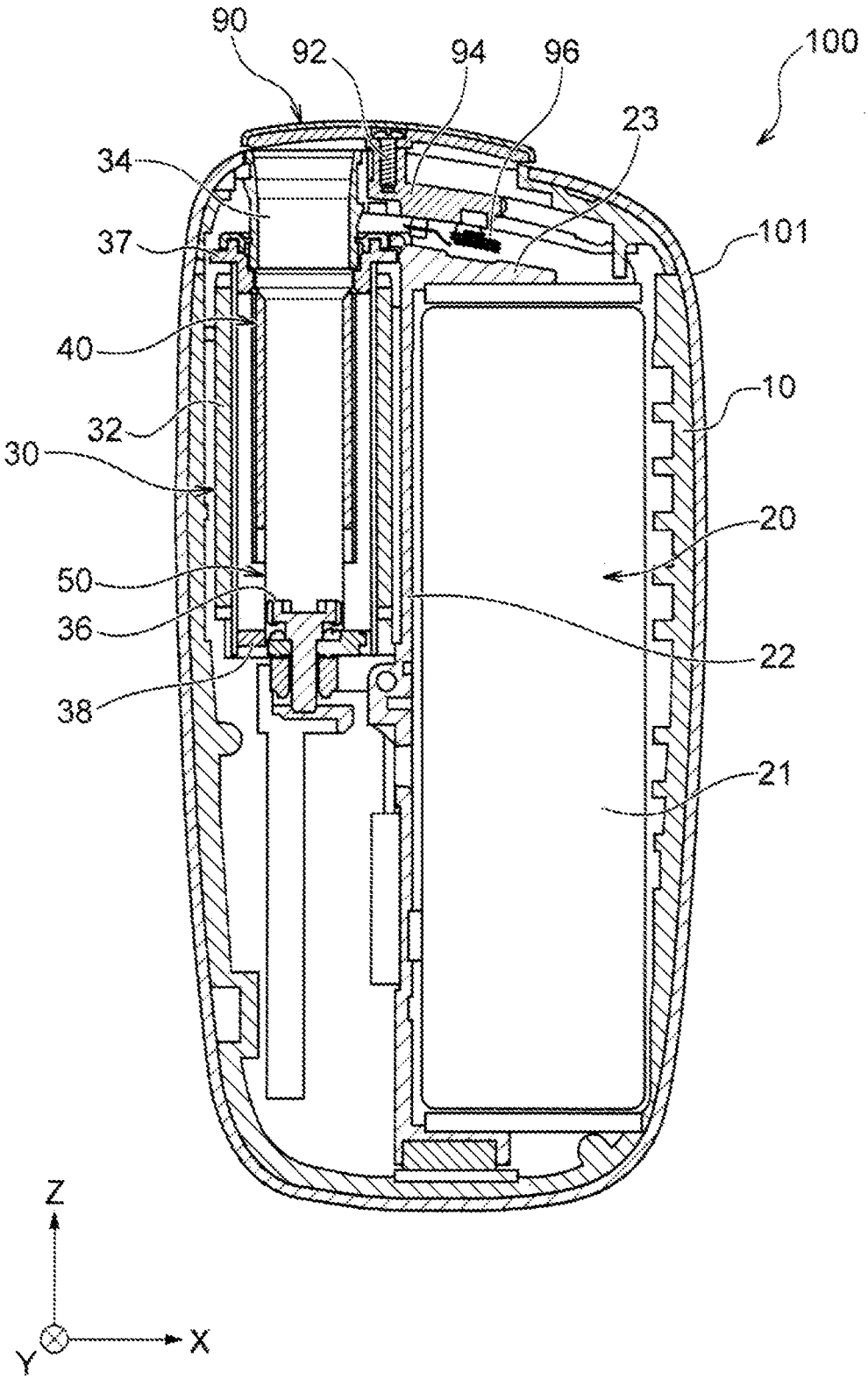


Fig. 4A

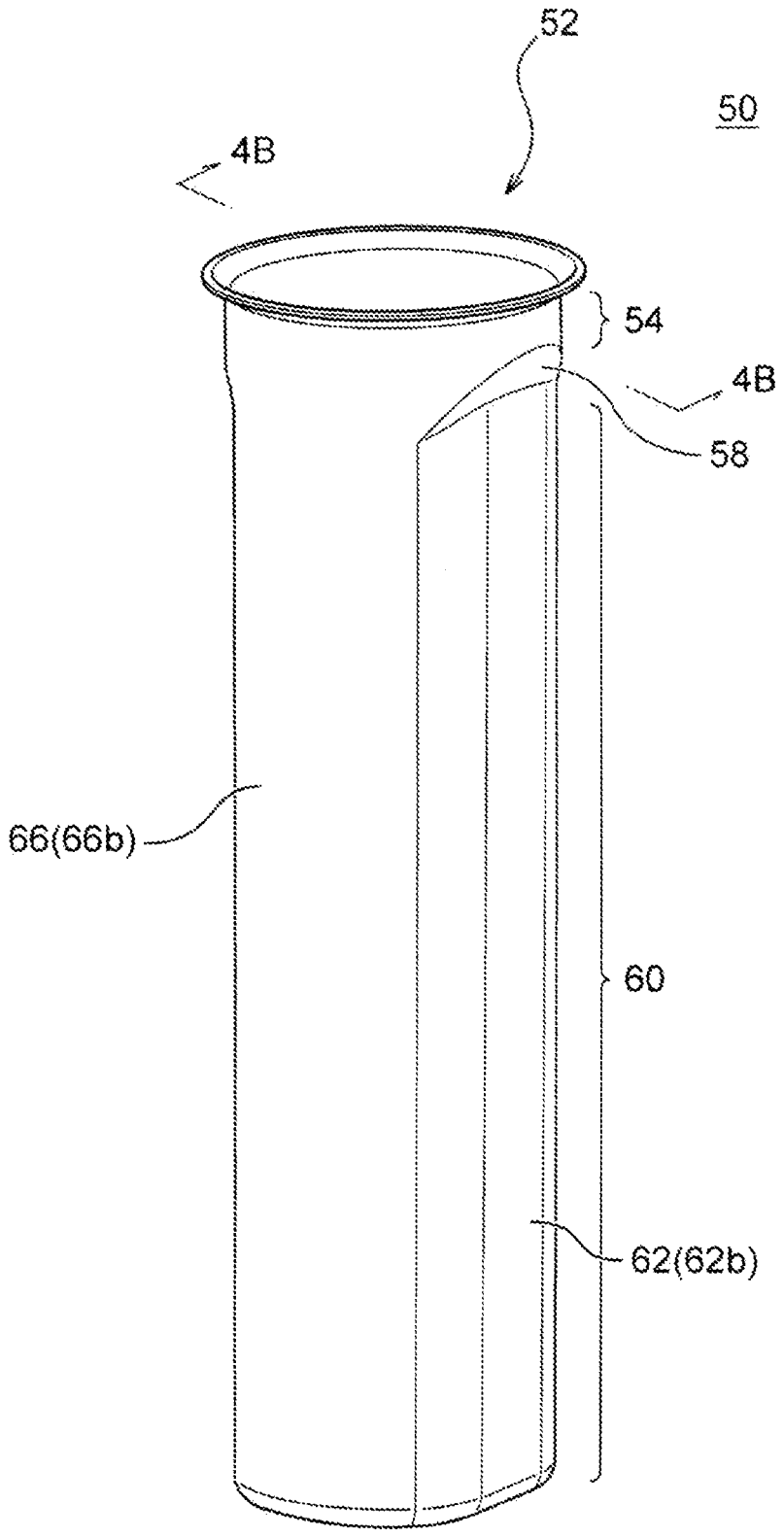


Fig. 4B

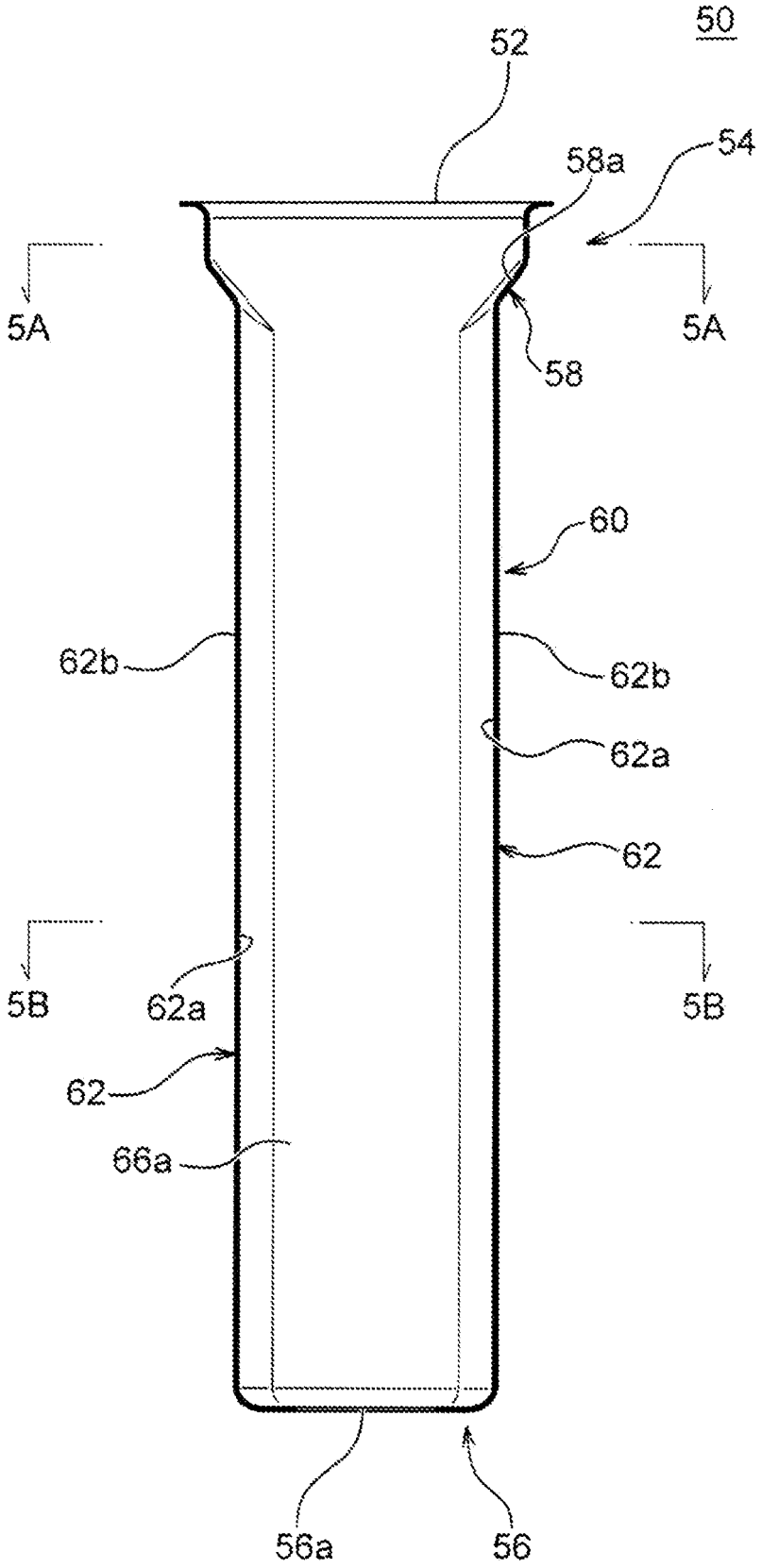


Fig. 5A

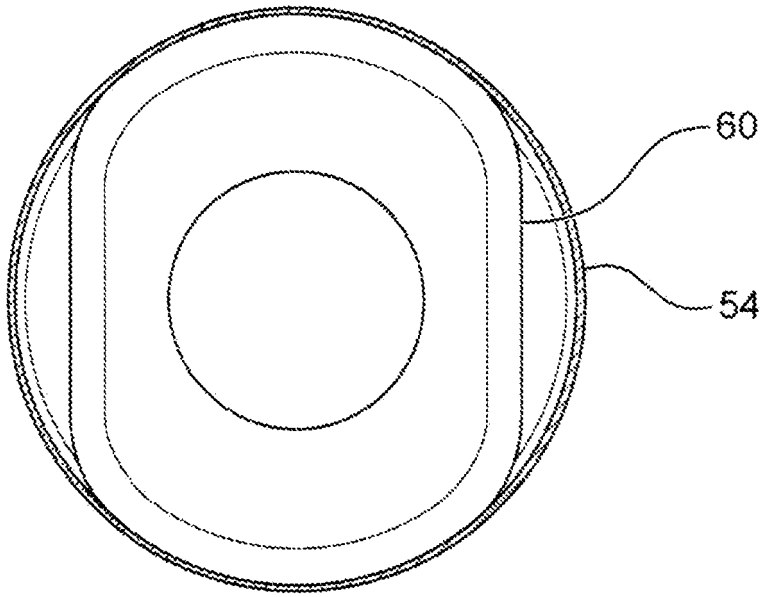


Fig. 5B

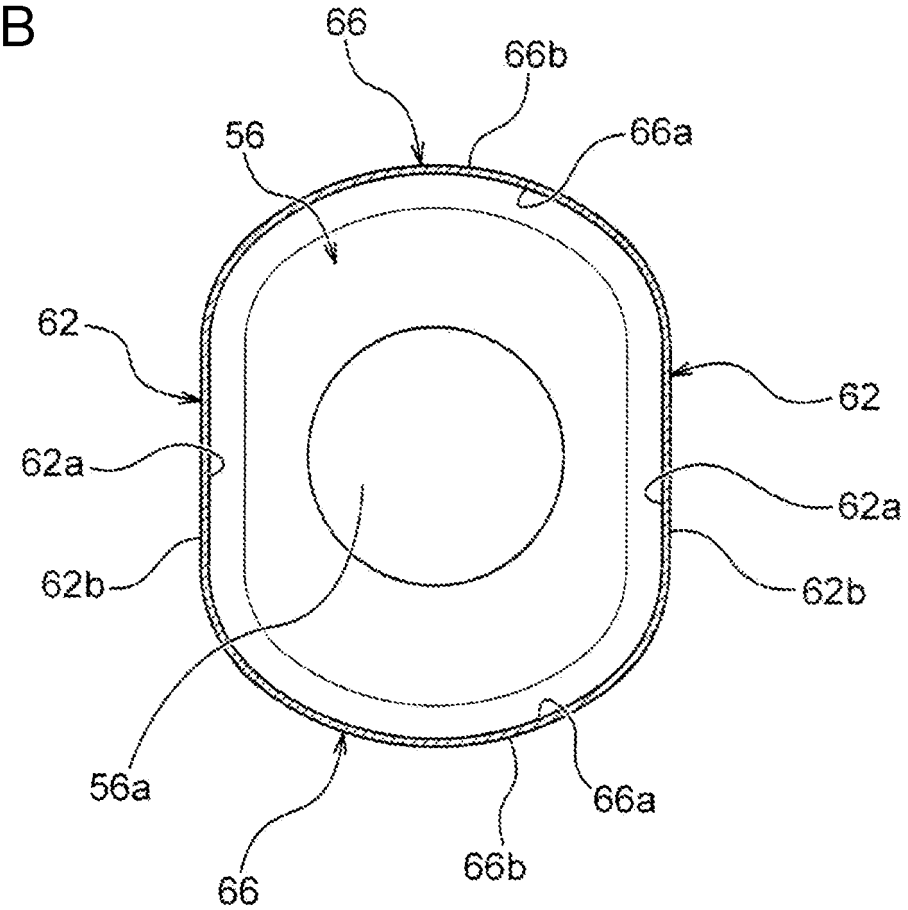


Fig. 6

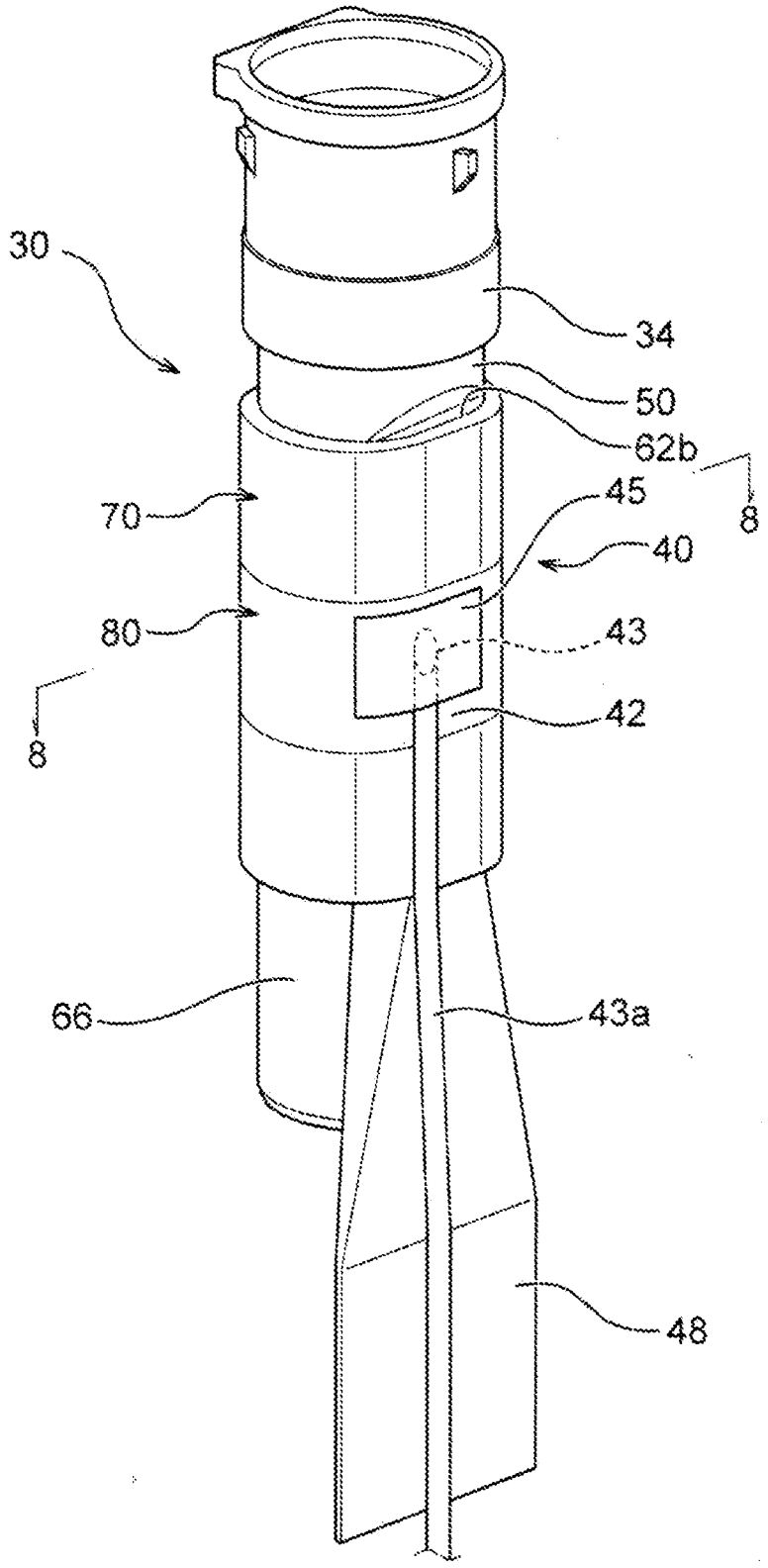


Fig. 7

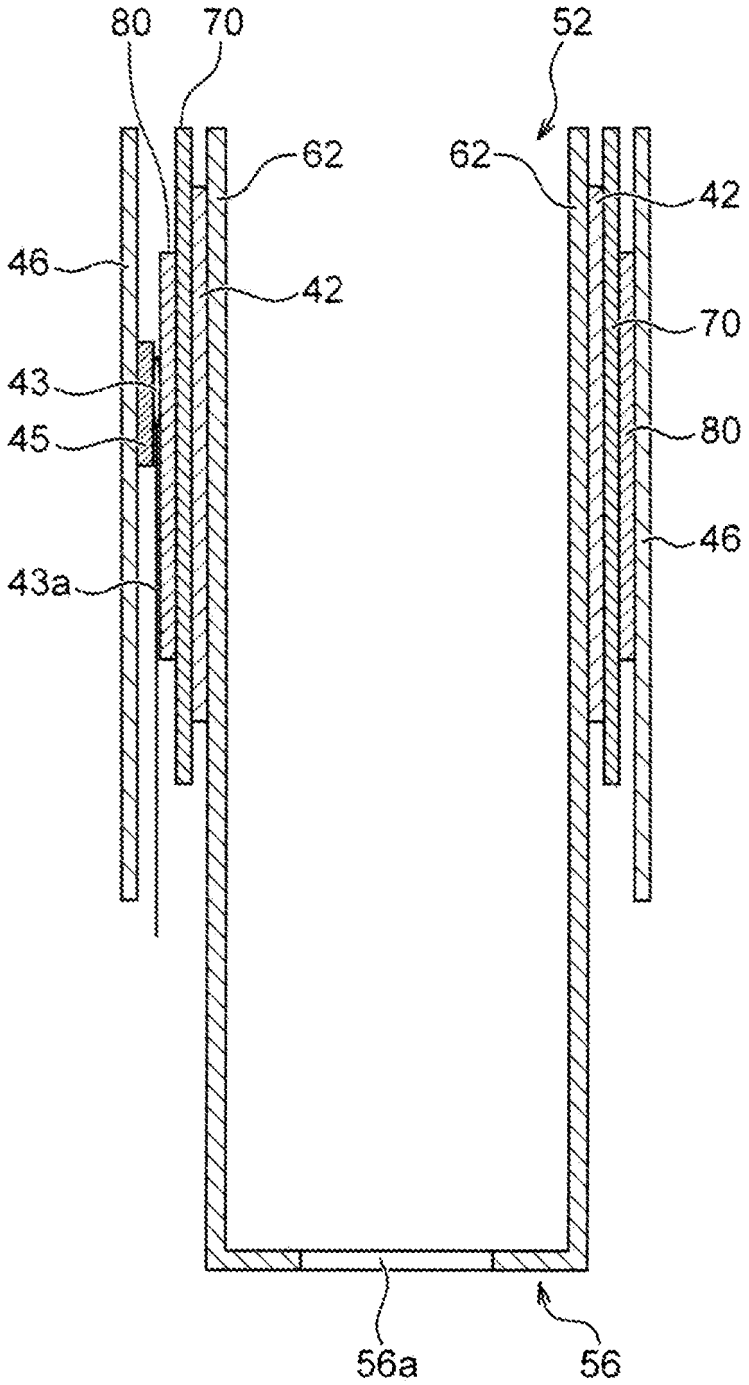


Fig. 8

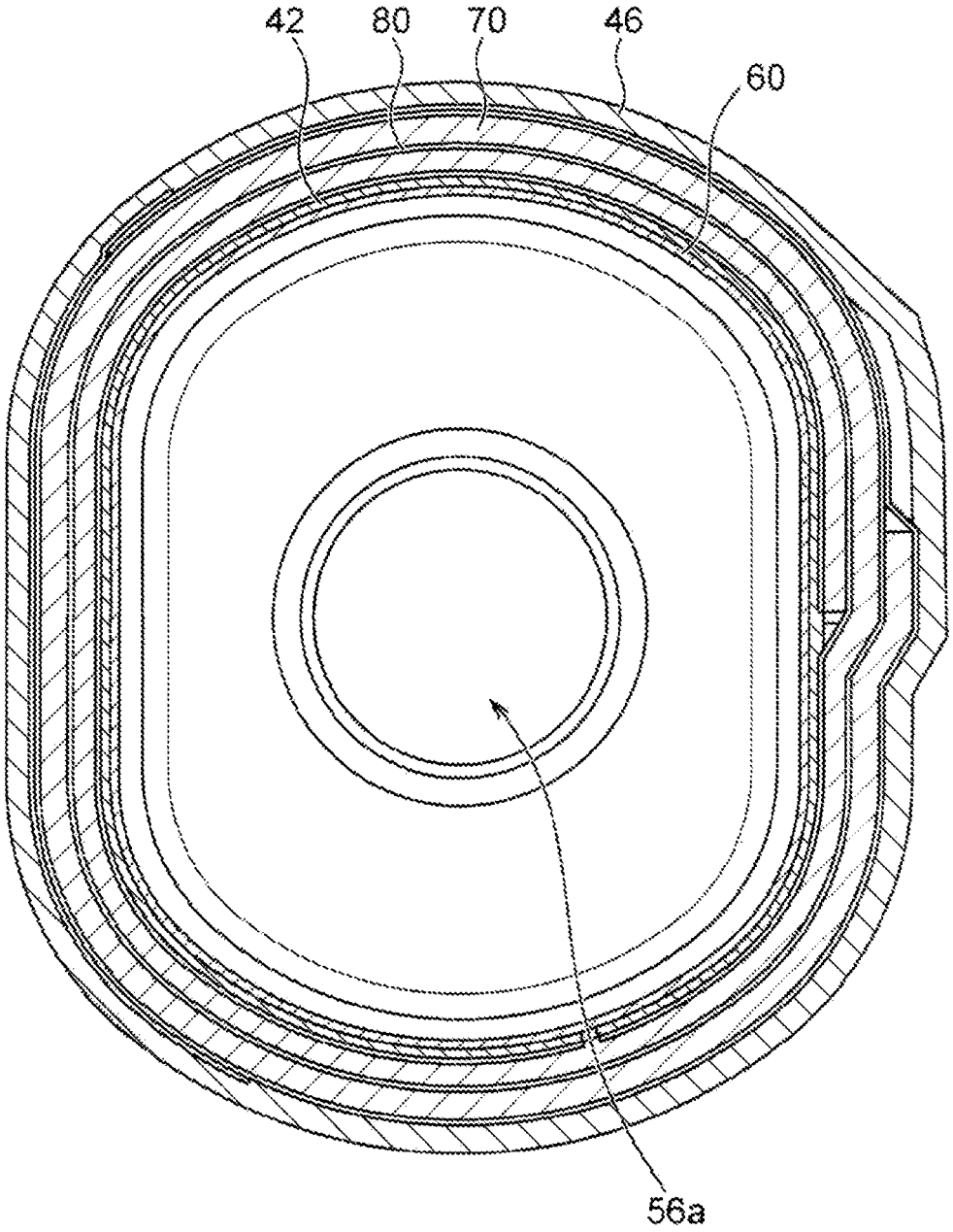


Fig. 9

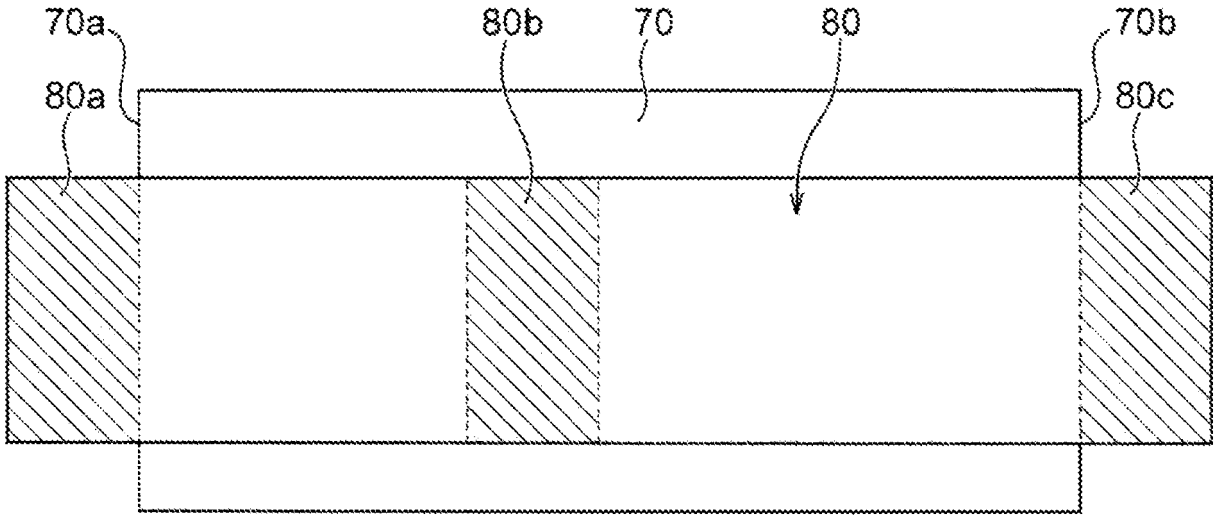
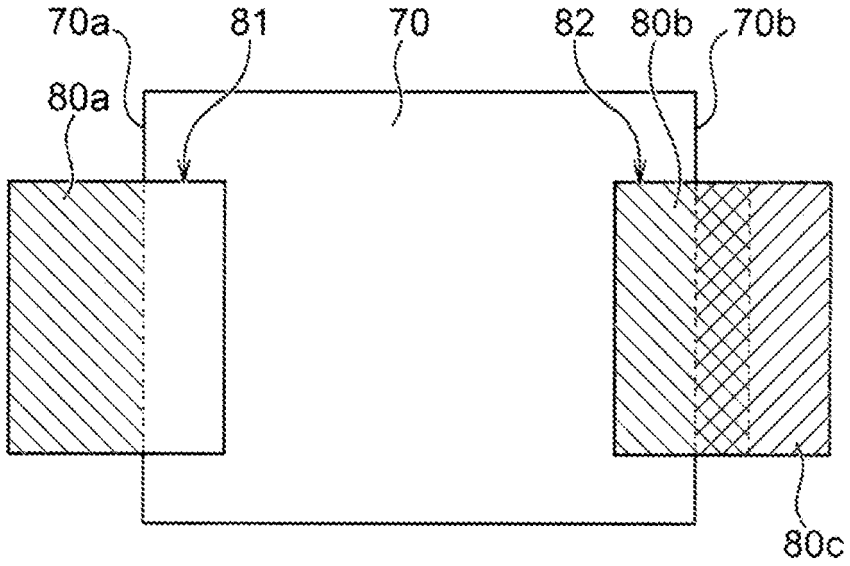


Fig. 10



INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2021/016605

A. CLASSIFICATION OF SUBJECT MATTER

A24F 40/40(2020.01)i
FI: A24F40/40

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)

A24F40/00 - 40/70; F16L59/00 - 59/22

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 1971-2021
Registered utility model specifications of Japan 1996-2021
Published registered utility model applications of Japan 1994-2021

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.
Y	WO 2019/208536 A1 (JAPAN TOBACCO INC.) 31 October 2019 (2019-10-31) see in particular, paragraphs [0037], [0043], [0047], [0049], [0096], [0103], [0117]-[0119], [0123]-[0125], fig. 1, 2, 22, 24, 33	1-14
Y	JP 8-135888 A (SEKISUI CHEMICAL CO., LTD.) 31 May 1996 (1996-05-31) see in particular, paragraphs [0012]-[0016], fig. 1-3	1-14
Y	JP 2019-525737 A (PHILIP MORRIS PRODUCTS S.A.) 12 September 2019 (2019-09-12) see in particular, paragraphs [0021]-[0024], [0083], [0084], [0090], fig. 1-2a	6-14
A	WO 2020/084775 A1 (JAPAN TOBACCO INC.) 30 April 2020 (2020-04-30) entire text, all drawings	1-14
A	JP 2009-299760 A (IMAE INDUSTRY CO., LTD.) 24 December 2009 (2009-12-24) entire text, all drawings	1-14

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

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
24 June 2021	**06 July 2021**
Name and mailing address of the ISA/JP **Japan Patent Office (ISA/JP)** **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
Information on patent family members

International application No.
PCT/JP2021/016605

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
WO 2019/208536 A1	31 October 2019	US 2021045448 A1 see in particular, paragraphs [0074], [0080], [0084], [0086], [0136], [0143], [0157]-[0159], [0163]-[0165], fig. 1, 2, 22, 24, 33 EP 3785555 A1 KR 20200142583 A CN 112040796 A TW 201944915 A	
JP 8-135888 A	31 May 1996	(Family: none)	
JP 2019-525737 A	12 September 2019	US 2019/0320717 A1 see in particular, paragraphs [0024]-[0027], [0102], [0103], [0109], fig. 1-2a WO 2018/001746 A1 EP 3478101 A1 CN 109310153 A KR 10-2019-0024880 A	
WO 2020/084775 A1	30 April 2020	(Family: none)	
JP 2009-299760 A	24 December 2009	(Family: none)	

Form PCT/ISA/210 (patent family annex) (January 2015)

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- WO 2020084775 A **[0003]**