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

(11) **EP 4 260 722 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
19.03.2025 Bulletin 2025/12

(21) Application number: **20965139.7**

(22) Date of filing: **11.12.2020**

(51) International Patent Classification (IPC):
A24F 40/40 *(2020.01)* ***A24F 40/46*** *(2020.01)*
A24F 40/20 *(2020.01)*

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

(86) International application number:
PCT/JP2020/046195

(87) International publication number:
WO 2022/123757 (16.06.2022 Gazette 2022/24)

(54) **INHALER**

INHALER

INHALER

(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

(43) Date of publication of application:
18.10.2023 Bulletin 2023/42

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Description

TECHNICAL FIELD

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

BACKGROUND ART

[0002] Conventionally, there have been known flavor inhalers for inhaling a flavor or the like without burning a material. The flavor inhalers include, for example, a chamber that contains a flavor generation article, a heater that heats the flavor generation article contained in the chamber, and a heat insulation member that suppresses transfer of the heat of the heater to a housing (for example, refer to WO 2020-035454 A1).

[0003] Further, there has been known an apparatus including a heating chamber having a flattened substantially elliptic cross-section and a heating plate that heats this heating chamber, and configured in such a manner that a cigarette is inserted in the heating chamber and is held while being compressed in the heating chamber (refer to CN 205052881 U).

[0004] An inhaler comprising the features mentioned in the preamble of the present claim 1 is described in US2019/166918A. Further inhalers of the prior art are described in WO2019/208536A1, CN109876253A and CN111972712A.

CITATION LIST

PATENT LITERATURE

SUMMARY OF INVENTION

TECHNICAL PROBLEM

[0005] The heating chamber having the substantially elliptic cross-section in the apparatus disclosed in CN 205052881 U is in proximity to an outer housing over an area different between a surface thereof extending along a major axis of the ellipse and a surface thereof extending along a minor axis of the ellipse. More specifically, the area over which the surface extending along the major axis is in proximity to the outer housing is larger than the area over which the surface extending along the minor axis is in proximity to the outer housing. This facilitates transfer of the heat of the heating chamber to a portion of the outer housing in proximity to the surface extending along the major axis in a case where the distance between the surface extending along the major axis and the outer housing and the distance between the surface extending along the minor axis and the outer housing are substantially equal. As a result, such an apparatus may cause an unintended heat leak or make a user feel uncomfortable when using it. On the other hand, increasing the size of the outer housing to prevent them undesirably hinders a reduction in the size of the apparatus.

[0006] One of objects of the present invention is to suppress a heat leak in a flavor inhaler.

SOLUTION TO PROBLEM

[0007] According to a first aspect, a flavor inhaler is provided. This flavor inhaler includes a housing, a containing unit contained in the housing and configured to contain a consumable, and a heating member configured to heat the consumable contained in the containing unit. The housing has a first major axis extending through a centroid of the housing in a cross-section perpendicular to an axial direction of the containing unit. The containing unit has a second major axis extending through a centroid of the containing unit in the cross-section. The first major axis intersects with the second major axis in the cross-section.

[0008] According to the first aspect, and as the invention is defined, the first major axis does not extend in parallel with the second major axis, and therefore a surface along the second major axis of the containing unit can be prevented from facing a surface along the first major axis of the housing. As a result, compared to a configuration in which the surface along the second major axis of the containing unit faces the surface along the first major axis of the housing, the flavor inhaler can reduce the area of the surface along the second major axis of the containing unit in proximity to the housing, and therefore can suppress transfer of the heat of the containing unit to the housing and a leak of the heat. The "first major axis" in the present specification refers to an axis located on a predetermined axis when a length of the housing (a length between the outer surfaces) along the predetermined axis extending through the centroid of the housing corresponds to a maximum length of the housing in the cross-section perpendicular to the axial direction of the containing unit. Alternatively, the "first major axis" in the present specification can also be said to refer to an axis located on a predetermined axis when a length of the housing (a length between the outer surfaces) along an axis that is perpendicular to the predetermined axis extending through the centroid of the housing and extends through the centroid of the housing corresponds to a minimum length of the housing in the cross-section perpendicular to the axial direction of the containing unit. Similarly, the "second major axis" in the present specification refers to an axis located on a predetermined axis when a length of the containing unit (a length between the outer surfaces) along the predetermined axis extending through the centroid of the containing unit corresponds to a maximum length of the containing unit in the cross-section perpendicular to the axial direction of the containing unit. Alternatively, the "second major axis" in the present specification can also be said to refer to an axis located on a predetermined axis when a length of the containing unit (a length between the outer surfaces) along an axis that is perpendicular to the predetermined axis extending through the centroid of the containing unit

and extends through the centroid of the containing unit corresponds to a minimum length of the containing unit in the cross-section perpendicular to the axial direction of the containing unit.

[0009] According to a second aspect, and as the invention is defined, the heating member is provided on an inner surface or an outer surface of the containing unit. The heating member does not intersect with the second major axis in the cross-section.

[0010] In the case where the first major axis intersects with the second major axis, the containing unit can have a surface located farther away from the housing than a surface of the containing unit on the second major axis is. Therefore, according to the second aspect, the flavor inhaler can increase the distance between the housing and the heating member compared to a configuration in which the heating member intersects with the second major axis, and therefore can further suppress a leak of the heat of the heating member to the housing.

[0011] According to a third aspect, the first or second aspect further includes an air flow path formed between the consumable and the containing unit when the consumable is placed at a desired position in the containing unit. The air flow path intersects with the second major axis in the cross-section.

[0012] According to the third aspect, the air flow path is provided on the second major axis where the distance between the housing and the containing unit is relatively short, and therefore the air flow path functions as an air heat insulation layer and can contribute to suppressing transfer of the heat of the consumable heated in the containing unit to outside the containing unit. As a result, a leak of the heat to the housing can be suppressed.

[0013] According to a fourth aspect, in any of the first to third aspects, the containing unit includes a tubular sidewall portion. The sidewall portion includes a pair of flat portions each having a flat inner surface and a flat outer surface and extending in parallel with each other. The flat portions are substantially parallel with the second major axis in the cross-section. The heating member is provided on the flat inner surface(s) or the flat outer surface(s) of the flat portion(s).

[0014] According to the fourth aspect, the heating member is not provided on the second major axis where the distance between the housing and the containing unit is relatively short, and therefore the flavor inhaler can increase the distance between the housing and the heating member and can further suppress a leak of the heat of the heating member to the housing.

[0015] According to a fifth aspect, in the fourth aspect according to the third aspect, the sidewall portion includes a curved portion connecting respective end portions of the pair of flat portions to each other in the cross-section. The air flow path is formed between the consumable and the curved portion.

[0016] According to the fifth aspect, the air flow path is formed between the curved portion and the consumable, and therefore air passing through the air flow path can absorb the heat in the curved portion, thereby cooling the curved portion. Further, the second major axis of the containing unit is substantially parallel with the flat portions, and this means that the curved portion is located on the second major axis. Therefore, due to the cooling of the curved portion located at a relatively short distance from the housing, a heat leak to the housing can be suppressed.

[0017] According to a sixth aspect, in any of the first to fifth aspects, the centroid of the housing and the centroid of the containing unit are substantially out of alignment with each other.

[0018] According to the sixth aspect, compared to a configuration in which the centroid of the containing unit is in alignment with the centroid of the housing, a large space can be formed inside the housing. As a result, the flavor inhaler can easily secure a space for accommodating components such as a power source in the housing.

[0019] According to a seventh aspect, in any of the first to sixth aspects, the first major axis is substantially perpendicular to the second major axis in the cross-section.

[0020] According to the seventh aspect, compared to a configuration in which the first major axis is not perpendicular to the second major axis, the surface along the second major axis of the containing unit can be further spaced apart from the surface along the first major axis of the housing. As a result, the flavor inhaler can suppress transfer of the heat of the containing unit to the housing and a leak of the heat.

[0021] According to an eighth aspect, and as the invention is defined, a length of the housing along the first major axis corresponds to a maximum length of the housing in the cross-section. A length of the containing unit along the second major axis corresponds to a maximum length of the containing unit in the cross-section.

BRIEF DESCRIPTION OF DRAWINGS

[0022]

Fig. 1A is a schematic front view of a flavor inhaler according to a present embodiment.

Fig. 1B is a schematic top view of the flavor inhaler according to the present embodiment.

Fig. 1C is a schematic bottom view of the flavor inhaler according to the present embodiment.

Fig. 2 is a schematic side cross-sectional view of a consumable.

Fig. 3 is a cross-sectional view of the flavor inhaler as viewed from arrows 3-3 illustrated in Fig. 1B.

Fig. 4A is a perspective view of a chamber.

Fig. 4B is a cross-sectional view of the chamber as viewed from arrows 4B-4B illustrated in Fig. 4A.

Fig. 5A is a cross-sectional view of the chamber as viewed from arrows 5A-5A illustrated in Fig. 4B.

Fig. 5B is a cross-sectional view of the chamber as viewed from arrows 5B-5B illustrated in Fig. 4B.

Fig. 6 is a perspective view of the chamber and a heating unit.

Fig. 7 is a cross-sectional view of the flavor inhaler as viewed from arrows 7-7 illustrated in Fig. 1.

Fig. 8 is a cross-sectional view in a cross-section perpendicular to an axial direction of the chamber in a state that the consumable is placed at a desired position in the chamber illustrated in Figs. 3 to 7.

Fig. 9A illustrates a cross-sectional view in a cross-section perpendicular to an axial direction of a chamber provided to a flavor inhaler according to another embodiment.

Fig. 9B illustrates a cross-sectional view in a cross-section perpendicular to an axial direction of a chamber provided to a flavor inhaler according to another embodiment.

Fig. 10 is a schematic view illustrating relative orientations of a chamber and an outer housing of a flavor inhaler 100 according to another embodiment.

DESCRIPTION OF EMBODIMENTS

[0023] In the following description, embodiments of the present invention will be described with reference to the drawings. In the drawings that will be described below, identical or corresponding components will be indicated by the same reference numerals, and redundant descriptions will be omitted.

[0024] 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 that will be described in the present specification, an X-Y-Z orthogonal coordinate system may be set for convenience of the description. In this coordinate system, a Z axis extends vertically upward. An X-Y plane is laid so as to cut across the flavor inhaler 100 horizontally. A Y axis is disposed so as to extend from the front side to the back side of the flavor inhaler 100. The Z axis can also be said to be an insertion direction of a consumable contained in a chamber 50 of an atomization unit 30, which will be described below, or an axial direction of the tubular chamber 50. In the present specification, the Z-axis direction may be simply referred to as the axial direction. Further, the X axis can also be said to be a first direction perpendicular to the axial direction, and the Y axis can also be said to be a second direction perpendicular to the axial direction and the first direction. Further, the X-axis direction can also be said to be a device longitudinal direction in a plane perpendicular to the insertion direction of the consumable or a direction in which a heating member and a power source unit are lined up. The Y-axis direction can also be said to be a device lateral direction in the plane perpendicular to the insertion direction of the consumable.

[0025] The flavor inhaler 100 according to the present embodiment is configured to, for example, generate an aerosol that contains a flavor by heating a stick-type consumable provided with a flavor source including an aerosol source.

[0026] As illustrated in Figs. 1A to 1C, the flavor inhaler 100 includes an outer housing 101 (corresponding to one example of a housing), a slide cover 102, and a switch unit 103. The outer housing 101 constitutes the outermost housing of the flavor inhaler 100, and is sized so as to be contained inside a user's hand. When the user uses the flavor inhaler 100, the user can inhale the aerosol while holding the flavor inhaler 100 with his/her hand. The outer housing 101 may be constructed by assembling a plurality of members. The outer housing 101 can be made from resin such as PEEK (polyetheretherketone).

[0027] The outer housing 101 includes a not-illustrated opening for receiving the consumable, and the slide cover 102 is slidably attached to the outer housing 101 so as to close this opening. More specifically, the slide cover 102 is configured movably along the outer surface of the outer housing 101 between a closing position (the position illustrated in Figs. 1A and 1B), at which the slide cover 102 closes the above-described opening of the outer housing 101, and an opening position, at which the slide cover 102 opens the above-described opening. For example, the user can move the slide cover 102 to the closing position and the opening position by operating the slide cover 102 manually. Due to that, the side cover 102 can permit or restrict access of the consumable to inside the flavor inhaler 100.

[0028] The switch unit 103 is used to switch on and off the actuation of the flavor inhaler 100. For example, the user can cause power to be supplied from a not-illustrated power source to the not-illustrated heating unit and the heating unit to heat the consumable without burning it by operating the switch unit 103 in a state that the consumable is inserted in the flavor inhaler 100. The switch unit 103 may be a switch provided outside the outer housing 101 or may be a switch located inside the outer housing 101. In the case where the switch is located inside the outer housing 101, the switch is indirectly pressed by pressing of the switch unit 103 on the surface of the outer housing 101. The present embodiment will be described citing the example in which the switch of the switch unit 103 is located inside the outer housing 101.

[0029] The flavor inhaler 100 may further include a not-illustrated terminal. The terminal can be an interface that connects the flavor inhaler 100 to, for example, an external power source. In a case where the power source provided to the flavor inhaler 100 is a rechargeable battery, the external power source can supply a current to the power source to recharge the power source by being connected to the terminal. Further, the flavor inhaler 100 can be configured in such a manner that data relating to the actuation of the flavor inhaler 100 can be transmitted to an external apparatus by connecting a data transmission cable to the terminal.

[0030] Next, the consumable used in the flavor inhaler

100 according to the present embodiment will be described. Fig. 2 is a schematic side cross-sectional view of the consumable 110. In the present embodiment, a smoking system can be constituted by the flavor inhaler 100 and the consumable 110. In the example illustrated in Fig. 2, the consumable 110 includes a smokable substance 111, a tubular member 114, a hollow filter unit 116, and a filter unit 115. The smokable substance 111 is wrapped with first rolling paper 112. The tubular member 114, the hollow filter unit 116, and the filter unit 115 are wrapped with second rolling paper 113 different from the first rolling paper 112. The second rolling paper 113 is also wrapped around a part of the first rolling paper 112 wrapped around the smokable substance 111. As a result, the tubular member 114, the hollow filter unit 116, and the filter unit 115, and the smokable substance 111 are joined with each other. However, the second rolling paper 113 may be omitted, and the tubular member 114, the hollow filter unit 116, and the filter unit 115, and the smokable substance 111 may be joined with each other using the first rolling paper 112. A lip release agent 117, which is used to make it difficult for the user's lip to stick to the second rolling paper 113, is applied to the outer surface near the end portion of the second rolling paper 113 on the filter unit 115 side. A portion of the consumable 110 to which the lip release agent 117 is applied functions as a mouthpiece of the consumable 110.

[0031] The smokable substance 111 can include the flavor source such as tobacco and the aerosol source. Further, the first rolling paper 112 wrapped around the smokable substance 111 can be a breathable sheet member. The tubular member 114 can be a paper tube or a hollow filter. The consumable 110 includes the smokable substance 111, the tubular member 114, the hollow filter unit 116, and the filter unit 115 in the illustrated example, but the configuration of the consumable 110 is not limited thereto. For example, the hollow filter unit 116 may be omitted, and the tubular member 114 and the filter unit 115 may be disposed adjacent to each other.

[0032] Next, the inner structure of the flavor inhaler 100 will be described. Fig. 3 is a cross-sectional view of the flavor inhaler 100 as viewed from arrows 3-3 illustrated in Fig. 1B. As illustrated in Fig. 3, an inner housing 10 is provided inside the outer housing 101 of the flavor inhaler 100. The inner housing 10 is made from, for example, resin, and, especially, can be made from polycarbonate (PC), ABS (Acrylonitrile-Butadiene-Styrene) resin, PEEK (polyetheretherketone), a polymer alloy containing a plurality of kinds of polymers, or the like, or metal such as aluminum. The inner housing 10 is preferably made from PEEK from viewpoints of heat resistance and strength. However, the material of the inner housing 10 is not especially limited. A power source unit 20 and the atomization unit 30 are provided in an inner space of the inner housing 10. Further, the outer housing 101 is made from, for example, resin, and, especially, can be made from polycarbonate (PC), ABS (Acrylonitrile-Butadiene-Styrene) resin, PEEK (polyetheretherketone), a polymer alloy containing a plurality of kinds of polymers, or the like, or metal such as aluminum.

[0033] The power source unit 20 includes a power source 21. The power source 21 can be, for example, a rechargeable battery or a non-rechargeable battery. The power source 21 is electrically connected to the atomization unit 30. Due to that, the power source 21 can supply power to the atomization unit 30 so as to appropriately heat the consumable 110.

[0034] As illustrated, the atomization unit 30 includes a chamber 50 (corresponding to one example of a containing unit) extending in the insertion direction of the consumable 110 (the Z-axis direction), the heating unit 40 surrounding a part of the chamber 50, a heat insulation unit 32, and a substantially tubular insertion guide member 34. The chamber 50 is configured to contain the consumable 110. The heating unit 40 is configured to heat the consumable 110 contained in the chamber 50 in contact with the outer peripheral surface of the chamber 50.

[0035] The flavor inhaler 100 further includes a first support unit 37 and a second support unit 38, which support the both ends of the chamber 50 and the heat insulation unit 32. The first support unit 37 is disposed so as to support the end portions of the chamber 50 and the heat insulation unit 32 on the slide cover 102 side (the Z-axis positive direction side). The second support unit 38 is disposed so as to directly or indirectly support the end portions of the chamber 50 and the heat insulation unit 32 on the Z-axis negative direction side. The first support unit 37 and the second support unit 38 can be made from, for example, elastomer such as silicone rubber. As illustrated, a bottom member 36 may be provided on the bottom portion of the chamber 50. The bottom member 36 can function as a stopper that positions the consumable 110 inserted in the chamber 50. The bottom member 36 has a recess/protrusion on a surface with which the consumable 110 is in abutment, and can define a space capable of supplying air to the surface with which the consumable 110 is in abutment. The bottom member 36 can be made from, for example, a resin material such as PEEK, metal, glass, or ceramic, but is not especially limited thereto. Further, the material for making the bottom member 36 may be a low thermally conductive member compared to the material for making the chamber 50. In a case where the bottom member 36 is joined with a bottom portion 56 of the chamber 50 (refer to Fig. 6B), an adhesive that can be made from a resin material such as epoxy resin or an inorganic material can be used therefor. The details of the chamber 50 and the heating unit 40 will be described below.

[0036] The heat insulation unit 32 is generally substantially tubular, and is disposed so as to surround the chamber 50. The heat insulation unit 32 can include, for example, an aerogel sheet. The insertion guide member 34 is made from a resin material such as PEEK, PC, or ABS, and is provided between the slide cover 102

located at the closing position and the chamber 50. In the present embodiment, the insertion guide member 34 can contact the chamber 50, and therefore the insertion guide member 34 is preferably made from PEEK from a viewpoint of heat resistance. When the slide cover 102 is located at the opening position, the insertion guide member 34 is in communication with outside the flavor inhaler 100, and guides insertion of the consumable 110 into the chamber 50 in reaction to insertion of the consumable 110 into the insertion guide member 34.

[0037] Next, the structure of the chamber 50 will be described. Fig. 4A is a perspective view of the chamber 50. Fig. 4B is a cross-sectional view of the chamber 50 as viewed from arrows 4B-4B illustrated in Fig. 4A. Fig. 5A is a cross-sectional view of the chamber 50 as viewed from arrows 5A-5A illustrated in Fig. 4B. Fig. 5B is a cross-sectional view of the chamber 50 as viewed from arrows 5B-5B illustrated in Fig. 4B. Fig. 6 is a perspective view of the chamber 50 and the heating unit 40. As illustrated in Figs. 4A and 4B, the chamber 50 can be a tubular member including an opening 52 via which the consumable 110 is inserted, and a tubular sidewall portion 60 containing the consumable 110. The chamber 50 is preferably made from a material heat-resisting and having a low coefficient of thermal expansion, and can be made from, for example, metal such as stainless steel, resin such as PEEK, glass, or ceramic.

[0038] As illustrated in Figs. 4B and 5B, the sidewall portion 60 includes a flat portion 62 and a curved portion 66. When the consumable 110 is placed at a desired position in the chamber 50, the flat portion 62 contacts or presses a part of the consumable 110, and the curved portion 66 is spaced apart from the consumable 110. The "desired position in the chamber 50" in the present specification refers to a position at which the consumable 110 is appropriately heated or a position of the consumable 110 when the user smokes. The flat portion 62 has a flat inner surface 62a and a flat outer surface 62b. The curved portion 66 has an inner surface 66a and an outer surface 66b. As illustrated in Fig. 6, the heating unit 40 is disposed on the outer surface 62b of the flat portion 62. Preferably, the heating unit 40 is disposed on the outer surface 62b of the flat portion 62 without a space created therebetween. The heating unit 40 may include an adhesion layer. In this case, preferably, the heating unit 40 including the adhesion layer is disposed on the outer surface 62b of the flat portion 62 without a space created therebetween.

[0039] Since the outer surface 62b of the flat portion 62 is flat, a band-shaped electrode 48 can be prevented from being deflected when the band-shaped electrode 48 is connected to the heating unit 40 disposed on the outer surface 62b of the flat portion 62 as illustrated in Fig. 6. Further, as illustrated in Figs. 4B and 5B, the flat portion 62 has an even thickness.

[0040] As illustrated in Figs. 4A, 4B, and 5B, the chamber 50 includes two flat portions 62 in the circumferential direction of the chamber 50, and the pair of flat portions 62 is parallel with each other. Preferably, the distance between the inner surfaces 62a of the pair of flat portions 62 is at least partially shorter than the width of a portion of the consumable 110 inserted in the chamber 50 that is disposed between the flat portions 62.

[0041] As illustrated in Fig. 5B, the inner surface 66a of the curved portion 66 can have a generally circular arc-shaped cross-section in a plane perpendicular to the longitudinal direction of the chamber 50 (the Z-axis direction). Further, the curved portion 66 is disposed so as to be located circumferentially adjacent to the flat portion 62. In other words, the curved portion 66 is configured to connect the respective end portions of the pair of flat portions 62 to each other.

[0042] As illustrated in Fig. 4B, the chamber 50 can include a hole 56a on the bottom portion 56 thereof so as to allow the bottom member 36 illustrated in Fig. 3 to be disposed inside the chamber 50 while extending through the bottom portion 56. The bottom member 36 can be fixed inside the bottom portion 56 of the chamber 50 using an adhesive or the like. The bottom member 36 provided on the bottom portion 56 can support a part of the consumable 110 inserted in the chamber 50 in such a manner that the end surface of the consumable 110 is at least partially exposed.

[0043] As illustrated in Figs. 4A and 4B, preferably, the chamber 50 includes a tubular portion 54 between the opening 52 and the sidewall portion 60. A space can be formed between the tubular portion 54 and the consumable 110 in the state that the consumable 110 is positioned at the desired position in the chamber 50. Further, as illustrated in Figs. 4A and 4B, preferably, the chamber 50 includes a first guide portion 58 having a tapering surface 58a connecting the inner surface of the tubular portion 54 and the inner surface 62a of the flat portion 62.

[0044] As illustrated in Fig. 6, the heating unit 40 includes a heating element 42 (corresponding to one example of a heating member). The heating element 42 may be, for example, a heating track. The heating element 42 may be provided on the outer surface of the chamber 50 or may be provided on the inner surface. Preferably, the heating element 42 is disposed so as to heat the flat portion 62 without contacting the curved portion 66 of the chamber 50. In other words, preferably, the heating element 42 is disposed only on the outer surface of the flat portion 62. The heating element 42 may include a portion that heats the curved portion 66 of the chamber 50 and a portion that heats the flat portion 62, and may have a difference between the respective heating capabilities. More specifically, the heating element 42 may be configured to heat the flat portion 62 to a higher temperature than the curved portion 66. For example, the layout density of the heating track in the heating element 42 can be adjusted on the flat portion 62 and the curved portion 66. Alternatively, the heating element 42 may be wrapped around the outer periphery of the chamber 50 while keeping a substantially constant heating capability throughout the entire circumference of the chamber 50. As illustrated in Fig. 6, preferably, the heating unit 40

includes an electric insulation member 44 covering at least one surface of the heating element 42, in addition to the heating element 42. In the present embodiment, the electric insulation member 44 is disposed so as to cover the both surfaces of the heating element 42.

[0045] Next, the relative orientations of the chamber 50 and the outer housing 101 according to the present embodiment will be described. Fig. 7 is a cross-sectional view of the flavor inhaler 100 as viewed from arrows 7-7 illustrated in Fig. 1. The illustration of the components except for the outer housing 101 and the chamber 50 is omitted in Fig. 7 for simplification of the description. As illustrated in Figs. 5B and 6, the chamber 50 according to the present embodiment has a flattened shape in the cross-section perpendicular to the axial direction. More specifically, the chamber 50 includes the pair of flat portions 62 parallel with each other, and the pair of curved portions 66 connecting the respective end portions of the pair of flat portions 62 to each other. Further, as illustrated in Fig. 7, the outer housing 101 according to the present embodiment has a flattened shape in the cross-section perpendicular to the axial direction. More specifically, as illustrated in Fig. 7, the outer housing 101 includes a first sidewall 101a and a second sidewall 101b opposite from the first sidewall 101a in the Y-axis direction.

[0046] In the cross-section illustrated in Fig. 7, the outer housing 101 has a first major axis A1 extending through a centroid of the outer housing 101. The centroid of the outer housing 101 in the present specification refers to a centroid assuming that the mass is uniform inside the outer edge of the outer housing 101 in the cross-section illustrated in Fig. 7. Further, the "first major axis" in the present specification refers to an axis located on a predetermined axis when a length of the outer housing 101 (a length between the outer surfaces) along the predetermined axis extending through the centroid of the outer housing 101 corresponds to a maximum length of the outer housing 101 in the cross-section perpendicular to the axial direction of the chamber 50 (the cross-section illustrated in Fig. 7). Therefore, the length of the outer housing 101 along the first major axis A1 illustrated in Fig. 7 corresponds to the maximum length of the outer housing 101 in the cross-section perpendicular to the axial direction of the chamber 50. Alternatively, the "first major axis" in the present specification can also be said to refer to an axis located on a predetermined axis when a length of the outer housing 101 (a length between the outer surfaces) along an axis that is perpendicular to the predetermined axis extending through the centroid of the outer housing 101 and extends through the centroid of the outer housing 101 corresponds to a minimum length of the outer housing 101 in the cross-section perpendicular to the axial direction of the chamber 50.

[0047] In the cross-section illustrated in Fig. 7, the chamber 50 has a second major axis A2 extending through a centroid of the chamber 50. The centroid of the chamber 50 in the present specification refers to a centroid assuming that the mass is uniform inside the outer edge of the chamber 50 in the cross-section illustrated in Fig. 7. Further, the "second major axis" in the present specification refers to an axis located on a predetermined axis when a length of the chamber 50 (a length between the outer surfaces) along the predetermined axis corresponds to a maximum length of the chamber 50 in the cross-section perpendicular to the axial direction of the chamber 50 (the cross-section illustrated in Fig. 7). Therefore, the length of the chamber 50 along the second major axis A2 illustrated in Fig. 7 corresponds to the maximum length of the chamber 50 in the cross-section perpendicular to the axial direction of the chamber 50. Alternatively, the "second major axis" in the present specification can also be said to refer to an axis located on a predetermined axis when a length of the chamber 50 (a length between the outer surfaces) along an axis that is perpendicular to the predetermined axis extending through the centroid of the chamber 50 and extends through the centroid of the chamber 50 corresponds to a minimum length of the chamber 50 in the cross-section perpendicular to the axial direction of the chamber 50.

[0048] Regarding the chamber 50 and the outer housing 101 having flattened shapes as illustrated in Fig. 7, if the chamber 50 is arranged in the outer housing 101 in such a manner that the first major axis A1 extends in parallel with the second major axis A2, surfaces of the chamber 50 along the second major axis A2, i.e., surfaces including the flattened portions 62 are supposed to face the first sidewall 101a and the second sidewall 101b of the outer housing 101. In this case, the surfaces along the second major axis A2 of the chamber 50, which have relatively large areas located in proximity to the first sidewall 101a and the second sidewall 101b of the outer housing 101, are supposed to face the first sidewall 101a and the second sidewall 101b, and this may cause an unintended heat leak from the outer housing 101 or make the user feel uncomfortable when using the flavor inhaler 100. In light thereof, in the present embodiment, the outer housing 101 and the chamber 50 are arranged in such a manner that the first major axis A1 and the second major axis A2 intersect with each other in the cross-section illustrated in Fig. 7.

[0049] Due to this arrangement, the first major axis A1 does not extend in parallel with the second major axis A2, and therefore the surfaces along the second major axis A2 of the chamber 50 can be prevented from facing the surfaces along the first major axis A1 of the outer housing 101 (the first sidewall 101a or the second sidewall 101b). As a result, compared to a configuration in which the surfaces along the second major axis A2 of the chamber 50 face the surfaces along the first major axis A1 of the outer housing 101, the present embodiment can reduce the areas of the surfaces along the second major axis A2 of the chamber 50 in proximity to the outer housing 101, and therefore can suppress transfer of the heat of the chamber 50 to the outer housing 101 and a leak of the heat.

[0050] In the present embodiment, preferably, the first major axis A1 is substantially perpendicular to the second major axis A2 in the cross-section illustrated in Fig. 7. Due to that, compared to a configuration in which the first major axis A1 is not perpendicular to the second major axis A2, the surfaces along the second major axis A2 of the chamber 50 can be further spaced apart from the surfaces along the first major axis A1 of the outer housing 101. As a result, the present embodiment can suppress transfer of the heat of the heating unit 40 to the outer housing 101 and a leak of the heat.

[0051] Further, in the present embodiment, preferably, the centroid of the outer housing 101 and the centroid of the chamber 50 are substantially out of alignment with each other as illustrated in Fig. 7. Due to that, compared to a configuration in which the centroid of the chamber 50 is in alignment with the centroid of the outer housing 101, a large space can be formed inside the outer housing 101. As a result, the present embodiment can easily secure a space for accommodating the components such as the power source 21 in the outer housing 101.

[0052] Fig. 8 is a cross-sectional view in the cross-section perpendicular to the axial direction of the chamber 50 in the state that the consumable 110 is placed at the desired position in the chamber 50 illustrated in Figs. 3 to 7. Fig. 8 illustrates an example in which the heating element 42 is provided only on each of the flat portions 62. An air flow path can be formed between the consumable 110 and the chamber 50 when the consumable 110 is positioned at the desired position in the chamber 50. More specifically, as illustrated in Fig. 8, when the consumable 110 is placed at the desired position in the chamber 50, the consumable 110 can be pressed in contact with the flat portions 62 of the chamber 50. On the other hand, a space 67 is formed between the consumable 110 and each of the curved portions 66. The space 67 can establish communication between the opening 52 of the chamber 50 and the end surface of the consumable 110 positioned in the chamber 50. Due to that, air introduced via the opening 52 of the chamber 50 can flow into the consumable 110 by passing through the space 67. In other words, an air flow path (the space 67) is formed between the consumable 110 and each of the curved portions 66.

[0053] As illustrated in Fig. 8, preferably, the heating element 42 does not intersect with the second major axis A2 in the cross-section perpendicular to the axial direction. In the case where the first major axis A1 intersects with the second major axis A2 as illustrated in Fig. 7, the chamber 50 can have a surface located farther away from the outer housing 101 than a surface of the chamber 50 on the second major axis A2 (the surfaces of the curved portions 66) is. More specifically, in the example illustrated in Fig. 7, the surfaces of the flat portions 62 of the chamber 50 are located farther away from the first sidewall 101a or the second sidewall 101b of the outer housing 101 than the surfaces of the curved portions 66 are Therefore, the example illustrated in Fig. 8 can increase the distance between the outer housing 101 and the heating element 42 compared to the configuration in which the heating element 42 intersects with the second major axis A2, and therefore can further suppress a leak of the heat of the heating element 42 to the outer housing 101. In a case where the heating element 42 has a sparse portion and a dense portion, preferably, the sparse portion of the heating element 42 intersects with the second major axis A2 and the dense portion of the heating element intersects with the first major axis A1.

[0054] Further, as illustrated in Fig. 8, preferably, the air flow path (the space 67) intersects with the second major axis A2 in the cross-section perpendicular to the axial direction. Accordingly, the air flow path (the space 67) is provided on the second major axis A2 where the distance between the outer housing 101 and the chamber 50 is relatively short, and therefore the air flow path (the space 67) functions as an air heat insulation layer and can contribute to suppressing transfer of the heat of the consumable 110 heated in the chamber 50 to outside the chamber 50. As a result, a leak of the heat to the chamber 50 can be suppressed.

[0055] Further, as illustrated in Fig. 8, preferably, the flat portions 62 are substantially parallel with the second major axis A2 and the heating element 42 is provided on the inner surface or the outer surface of each of the flat portions 62 in the cross-section perpendicular to the axial direction. This prevents the heating element 42 from being provided on the second major axis A2 where the distance between the outer housing 101 and the chamber 50 is relatively short, and therefore can increase the distance between the outer housing 101 and the heating element 42, thereby further suppressing a leak of the heat of the heating element 42 to the outer housing 101.

[0056] Further, as illustrated in Fig. 8, the present embodiment includes the air flow path (the space 67) formed between each of the curved portions 66 and the consumable 110, thereby allowing the air passing through the air flow path (the space 67) to absorb the heat in the curved portion 66 to cool the curved portion 66. Further, the second major axis A2 of the chamber 50 is substantially parallel with the flat portions 62, and this means that the curved portions 66 are located on the second major axis A2. Therefore, due to the cooling of the curved portions 66 located at a relatively short distance from the outer housing 101, a heat leak to the outer housing 101 can be suppressed.

[0057] Figs. 9A and 9B each illustrate a cross-sectional view in the cross-section perpendicular to the axial direction of the chamber 50 provided to the flavor inhaler 100 according to another embodiment. As illustrated in Fig. 9A, the chamber 50 may have a substantially elliptic cross-section in the cross-section perpendicular to the axial direction. Further, as illustrated in Fig. 9A, the heating element 42 may be provided on the inner surface of the chamber 50. The length of the chamber 50 along the second major axis A2 illustrated in Fig. 9A corresponds to the maximum length of the chamber 50 in the

cross-section perpendicular to the axial direction of the chamber 50. In the example illustrated in Fig. 9A, the heating element 42 neither intersects with the second major axis A2 in the cross-section perpendicular to the axial direction, similarly to the chamber 50 illustrated in Fig. 8. Further, since the chamber 50 illustrated in Fig. 9A has a substantially elliptic cross-section, inserting the consumable 110 having a circular cross-section into this chamber 50 leads to generation of a space between the consumable 110 and the chamber 50 and causes this space to be located on the second major axis A2.

[0058] As illustrated in Fig. 9B, the chamber 50 may have a substantially rectangular cross-section in the cross-section perpendicular to the axial direction. In the example illustrated in Fig. 9B, the heating element 42 is provided on the inner surface of the chamber 50 similarly to Fig. 9A. Unlike the second major axis A2 illustrated in Figs. 7, 8, and 9A, the length of the chamber 50 along the second major axis A2 illustrated in Fig. 9B does not correspond to the maximum length of the chamber 50 in the cross-section perpendicular to the axial direction of the chamber 50. On the other hand, in Fig. 9B, a length of the chamber 50 (a length between the outer surfaces) along an axis A3, which is perpendicular to the second major axis A2 extending through the centroid C1 of the chamber 50 and extends through the centroid C1 of the chamber 50, corresponds to the minimum length of the chamber 50 in the cross-section perpendicular to the axial direction of the chamber 50. In the example illustrated in Fig. 9B, the heating element 42 neither intersects with the second major axis A2 in the cross-section perpendicular to the axial direction, similarly to the chamber 50 illustrated in Fig. 8. Further, since the chamber 50 illustrated in Fig. 9B has a substantially rectangular cross-section, inserting the consumable 110 having a circular cross-section into this chamber 50 leads to generation of a space between the consumable 110 and the chamber 50 and causes this space to be located on the second major axis A2.

[0059] Fig. 10 is a schematic view illustrating the relative orientations of the chamber 50 and the outer housing 101 of the flavor inhaler 100 according to another embodiment. Fig. 10 illustrates only the chamber 50 and the outer housing 101 for simplification of the description. As illustrated in Fig. 10, the first major axis A1 of the outer housing 101 and the second major axis A2 of the chamber 50 do not have to be perpendicular to each other. Even in this case, the first major axis A1 and the second major axis A2 do not extend in parallel with each other, and therefore the surfaces along the second major axis A2 of the chamber 50 can be prevented from facing the surfaces along the first major axis A1 of the outer housing 101.

[0060] Having described the embodiments of the present invention, the present invention shall not be limited to the above-described embodiments, and various modifications are possible within the scope of the claims. Note that any shape and material not directly described or illustrated in the specification and drawings are still within the present disclosure.

[0061] For example, the flavor inhaler 100 according to the present embodiment includes a so-called counter-flow-type air flow path in which the air introduced via the opening 52 of the chamber 50 is supplied to the end surface of the consumable 110, but is not limited thereto and may include a so-called bottom flow-type air flow path in which air is supplied from the bottom portion 56 of the chamber 50 into the chamber 50. Further, the heating element 42 is not limited to the resistance heating-type element and may be an induction heating-type element. In this case, the heating element 42 can heat the chamber 50 by induction heating. Further, in a case where the consumable 110 includes a susceptor, the heating element 42 can heat the susceptor of the consumable 110 by induction heating.

REFERENCE SIGNS LIST

[0062]

42	heating element
50	chamber
60	sidewall portion
62	flat portion
66	curved portion
67	space
100	flavor inhaler
101	outer housing
110	consumable
A1	first major axis
A2	second major axis
C1	centroid

Claims

1. A flavor inhaler (100) comprising:

a housing (101);
a containing unit (50) contained in the housing (101) and configured to contain a consumable (110); and
a heating member (42) configured to heat the consumable (110) contained in the containing unit (50),
wherein the housing (101) has a first major axis (A1) extending through a centroid of the housing (101) in a cross-section perpendicular to an axial direction of the containing unit (50),
wherein the containing unit (50) has a second major axis (A2) extending through a centroid of the containing unit (50) in the cross-section,
wherein the first major axis (A1) intersects with the second major axis (A2) in the cross-section,
wherein a length of the housing (101) along the first major axis (A1) corresponds to a maximum length of the housing (101) in the cross-section,

and
wherein a length of the containing unit (50) along the second major axis (A2) corresponds to a maximum length of the containing unit (50) in the cross-section,

characterized in that the heating member (42) is provided on an inner surface (62a, 66a) or an outer surface (62b, 66b) of the containing unit (50), and
wherein the heating member (42) does not intersect with the second major axis (A2) in the cross-section.

2. The flavor inhaler (100) according to claim 1, further comprising an air flow path formed between the consumable (110) and the containing unit (50) when the consumable (110) is placed at a desired position in the containing unit (50),
wherein the air flow path intersects with the second major axis (A2) in the cross-section.

3. The flavor inhaler (100) according to claim 1 or 2, wherein the containing unit (50) includes a tubular sidewall portion (60), and

wherein the sidewall portion (60) includes a pair of flat portions (62) each having a flat inner surface (62a) and a flat outer surface (62b) and extending in parallel with each other,
wherein the flat portions (62) are substantially parallel with the second major axis (A2) in the cross-section, and
wherein the heating member (42) is provided on the flat inner surface(s) (62a) or the flat outer surface(s) (62b) of the flat portion(s) (62).

4. The flavor inhaler (100) according to claim 3 according to claim 2, wherein the sidewall portion (60) includes a curved portion (66) connecting respective end portions of the pair of flat portions (62) to each other in the cross-section, and
wherein the air flow path is formed between the consumable (110) and the curved portion (66).

5. The flavor inhaler (100) according to any one of claims 1 to 4, wherein the centroid of the housing (101) and the centroid of the containing unit (50) are substantially out of alignment with each other.

6. The flavor inhaler (100) according to any one of claims 1 to 5, wherein the first major axis (A1) is substantially perpendicular to the second major axis (A2) in the cross-section.

Patentansprüche

1. Aromainhalator (100), umfassend:

ein Gehäuse (101);
eine Aufnahmeeinheit (50), die in dem Gehäuse (101) enthalten und so konfiguriert ist, dass sie ein Verbrauchsmaterial (110) enthält; und
ein Heizelement (42), das zum Erhitzen des in der Aufnahmeeinheit (50) enthaltenen Verbrauchsmaterials (110) konfiguriert ist,
wobei das Gehäuse (101) eine erste Hauptachse (A1) aufweist, die sich durch einen Schwerpunkt des Gehäuses (101) in einem Querschnitt senkrecht zu einer axialen Richtung der Aufnahmeeinheit (50) erstreckt,
wobei die Aufnahmeeinheit (50) eine zweite Hauptachse (A2) aufweist, die sich durch einen Schwerpunkt der Aufnahmeeinheit (50) im Querschnitt erstreckt,
wobei sich die erste Hauptachse (A1) mit der zweiten Hauptachse (A2) im Querschnitt schneidet,
wobei eine Länge des Gehäuses (101) entlang der ersten Hauptachse (A1) einer maximalen Länge des Gehäuses (101) im Querschnitt entspricht, und
wobei eine Länge der Aufnahmeeinheit (50) entlang der zweiten Hauptachse (A2) einer maximalen Länge der Aufnahmeeinheit (50) im Querschnitt entspricht,
dadurch gekennzeichnet, dass das Heizelement (42) an einer Innenfläche (62a, 66a) oder einer Außenfläche (62b, 66b) der Aufnahmeeinheit (50) vorgesehen ist, und
wobei sich das Heizelement (42) im Querschnitt nicht mit der zweiten Hauptachse (A2) schneidet.

2. Aromainhalator (100) nach Anspruch 1, weiter umfassend einen Luftströmungsweg, der zwischen dem Verbrauchsmaterial (110) und der Aufnahmeeinheit (50) gebildet ist, wenn das Verbrauchsmaterial (110) an einer gewünschten Position in der Aufnahmeeinheit (50) angeordnet ist,
wobei sich der Luftströmungsweg mit der zweiten Hauptachse (A2) im Querschnitt schneidet.

3. Aromainhalator (100) nach Anspruch 1 oder 2, wobei die Aufnahmeeinheit (50) einen rohrförmigen Seitenwandabschnitt (60) einschließt, und

wobei der Seitenwandabschnitt (60) ein Paar flache Abschnitte (62) einschließt, die jeweils eine flache Innenfläche (62a) und eine flache Außenfläche (62b) aufweisen und sich parallel zueinander erstrecken,
wobei die flachen Abschnitte (62) im Querschnitt

im Wesentlichen parallel zu der zweiten Hauptachse (A2) verlaufen, und
wobei das Heizelement (42) auf der (den) flachen Innenfläche(n) (62a) oder der (den) flachen Außenfläche(n) (62b) des (der) flachen Abschnitts (Abschnitte) (62) vorgesehen ist.

4. Aromainhalator (100) nach Anspruch 3 und 2, wobei der Seitenwandabschnitt (60) einen gebogenen Abschnitt (66) einschließt, der die jeweiligen Endabschnitte des Paares von flachen Abschnitten (62) im Querschnitt miteinander verbindet, und
wobei der Luftströmungsweg zwischen dem Verbrauchsmaterial (110) und dem gebogenen Abschnitt (66) gebildet ist.

5. Aromainhalator (100) nach einem der Ansprüche 1 bis 4, wobei der Schwerpunkt des Gehäuses (101) und der Schwerpunkt der Aufnahmeeinheit (50) im Wesentlichen nicht miteinander ausgerichtet sind.

6. Aromainhalator (100) nach einem der Ansprüche 1 bis 5, wobei die erste Hauptachse (A1) im Wesentlichen senkrecht zur zweiten Hauptachse (A2) im Querschnitt verläuft.

Revendications

1. Inhalateur d'arôme (100) comprenant :

un boîtier (101) ;
une unité de contenant (50) contenue dans le boîtier (101) et configurée pour contenir un consommable (110) ; et
un élément chauffant (42) configuré pour chauffer le consommable (110) contenu dans l'unité de contenant (50),
dans lequel le boîtier (101) présente un premier axe majeur (A1) s'étendant à travers un centroïde du boîtier (101) dans une section transversale perpendiculaire à une direction axiale de l'unité de contenant (50),
dans lequel l'unité de contenant (50) présente un second axe majeur (A2) s'étendant à travers un centroïde de l'unité de contenant (50) dans la section transversale,
dans lequel le premier axe majeur (A1) croise le second axe majeur (A2) dans la section transversale,
dans lequel une longueur du boîtier (101) le long du premier axe majeur (A1) correspond à une longueur maximale du boîtier (101) dans la section transversale, et
dans lequel une longueur de l'unité de contenant (50) le long du second axe majeur (A2) correspond à une longueur maximale de l'unité de contenant (50) dans la section transversale,
caractérisé en ce que l'élément chauffant (42) est fourni sur une surface intérieure (62a, 66a) ou une surface extérieure (62b, 66b) de l'unité de contenant (50), et
dans lequel l'élément chauffant (42) ne coupe pas le second axe majeur (A2) dans la section transversale.

2. Inhalateur d'arôme (100) selon la revendication 1, comprenant en outre une voie d'écoulement d'air formée entre le consommable (110) et l'unité de contenant (50) lorsque le consommable (110) est placé en une position souhaitée dans l'unité de contenant (50),
dans lequel la voie d'écoulement d'air coupe le second axe majeur (A2) dans la section transversale.

3. Inhalateur d'arôme (100) selon la revendication 1 ou 2, dans lequel l'unité de contenant (50) inclut une partie de paroi latérale tubulaire (60), et

dans lequel la partie de paroi latérale (60) inclut une paire de parties plates (62) présentant chacune une surface intérieure plate (62a) et une surface extérieure plate (62b) et s'étendant en parallèle l'une de l'autre,
dans lequel les parties plates (62) sont substantiellement parallèles au second axe majeur (A2) dans la section transversale, et
dans lequel l'élément chauffant (42) est fourni sur la (les) surface(s) intérieure(s) plate(s) (62a) ou la (les) surface(s) extérieure(s) plate(s) (62b) de la (des) partie(s) plate(s) (62).

4. Inhalateur d'arôme (100) selon la revendication 3 selon la revendication 2, dans lequel la partie de paroi latérale (60) inclut une partie courbe (66) raccordant des parties d'extrémité respectives de la paire de parties plates (62) l'une à l'autre dans la section transversale, et
dans lequel la voie d'écoulement d'air est formée entre le consommable (110) et la partie courbe (66).

5. Inhalateur d'arôme (100) selon l'une quelconque des revendications 1 à 4, dans lequel le centroïde du boîtier (101) et le centroïde de l'unité de contenant (50) sont substantiellement désalignés l'un par rapport à l'autre.

6. Inhalateur d'arôme (100) selon l'une quelconque des revendications 1 à 5, dans lequel le premier axe majeur (A1) est substantiellement perpendiculaire au second axe majeur (A2) dans la section transversale.

Fig. 1A

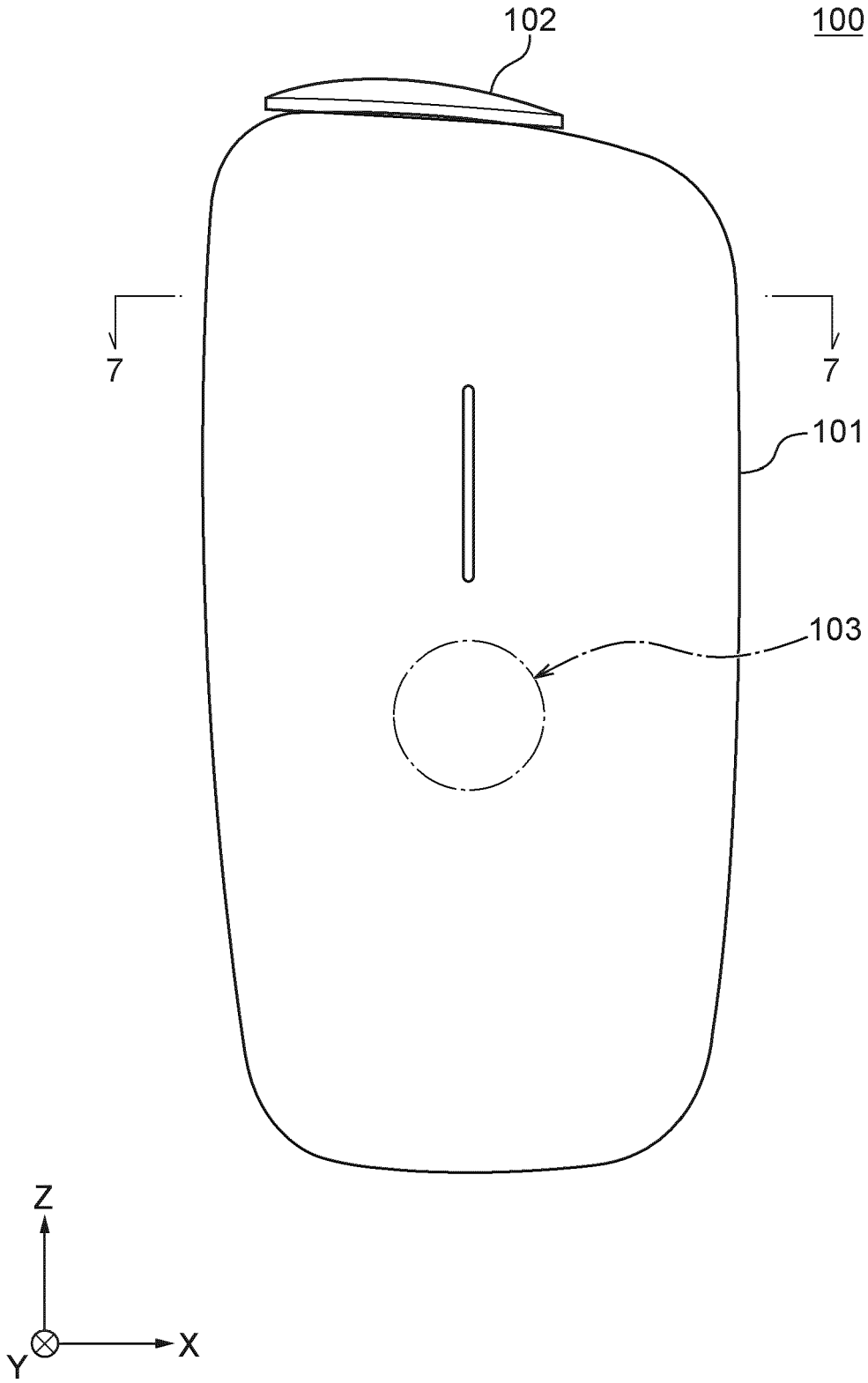


Fig. 1B

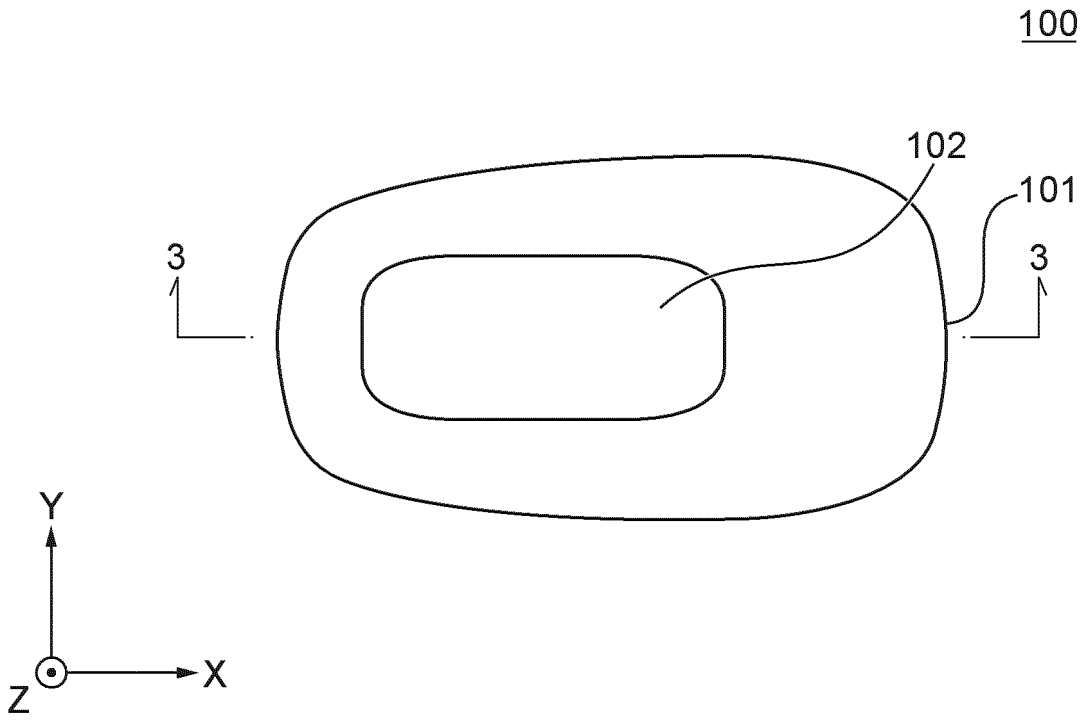
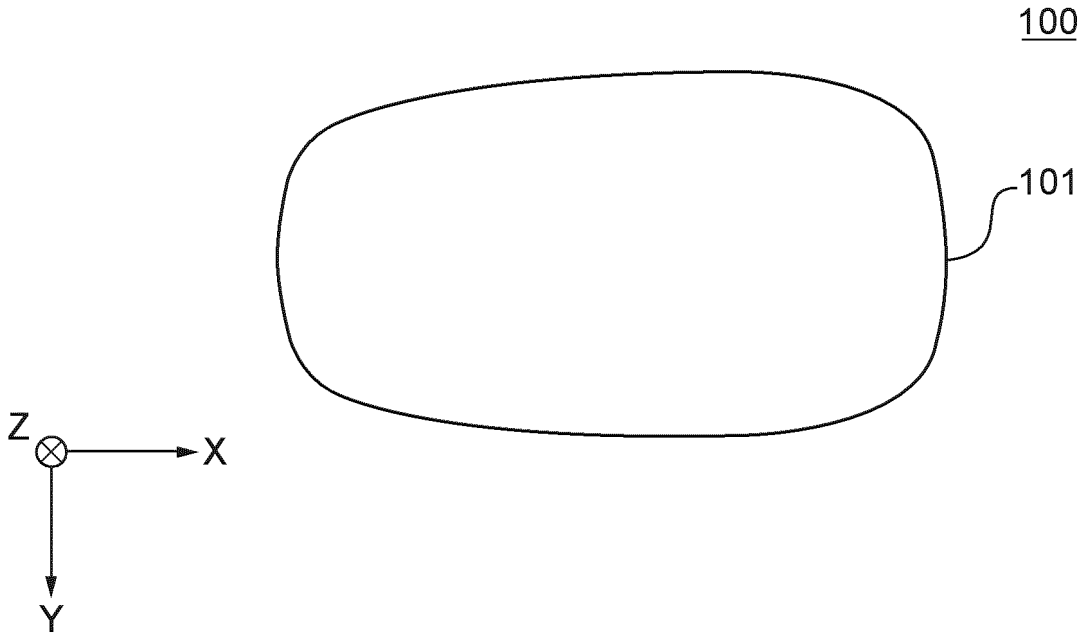


Fig. 1C



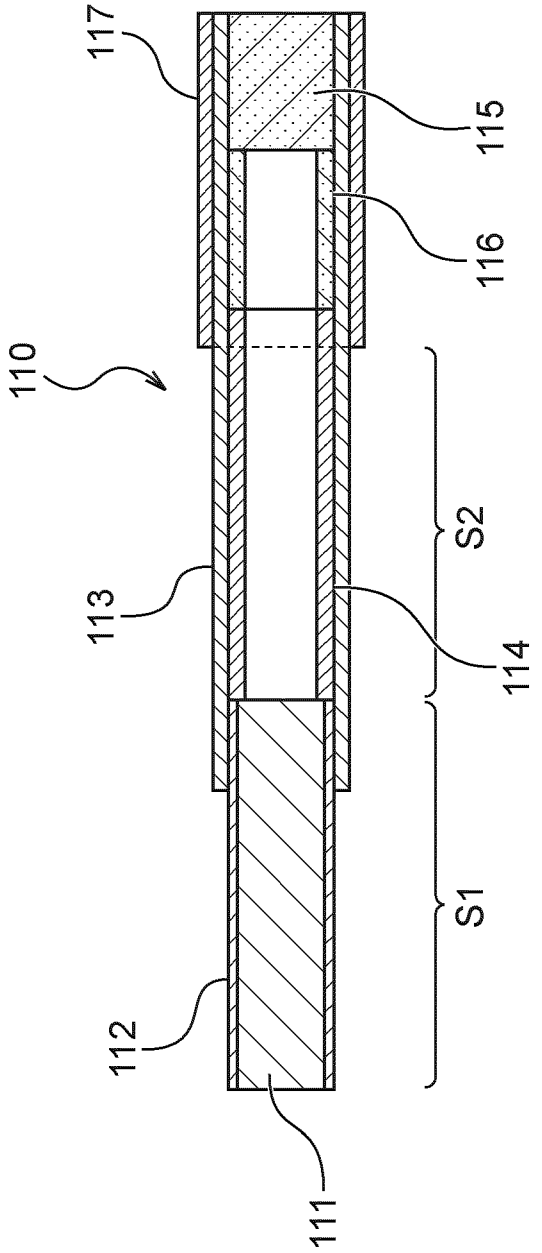


Fig. 2

Fig. 3

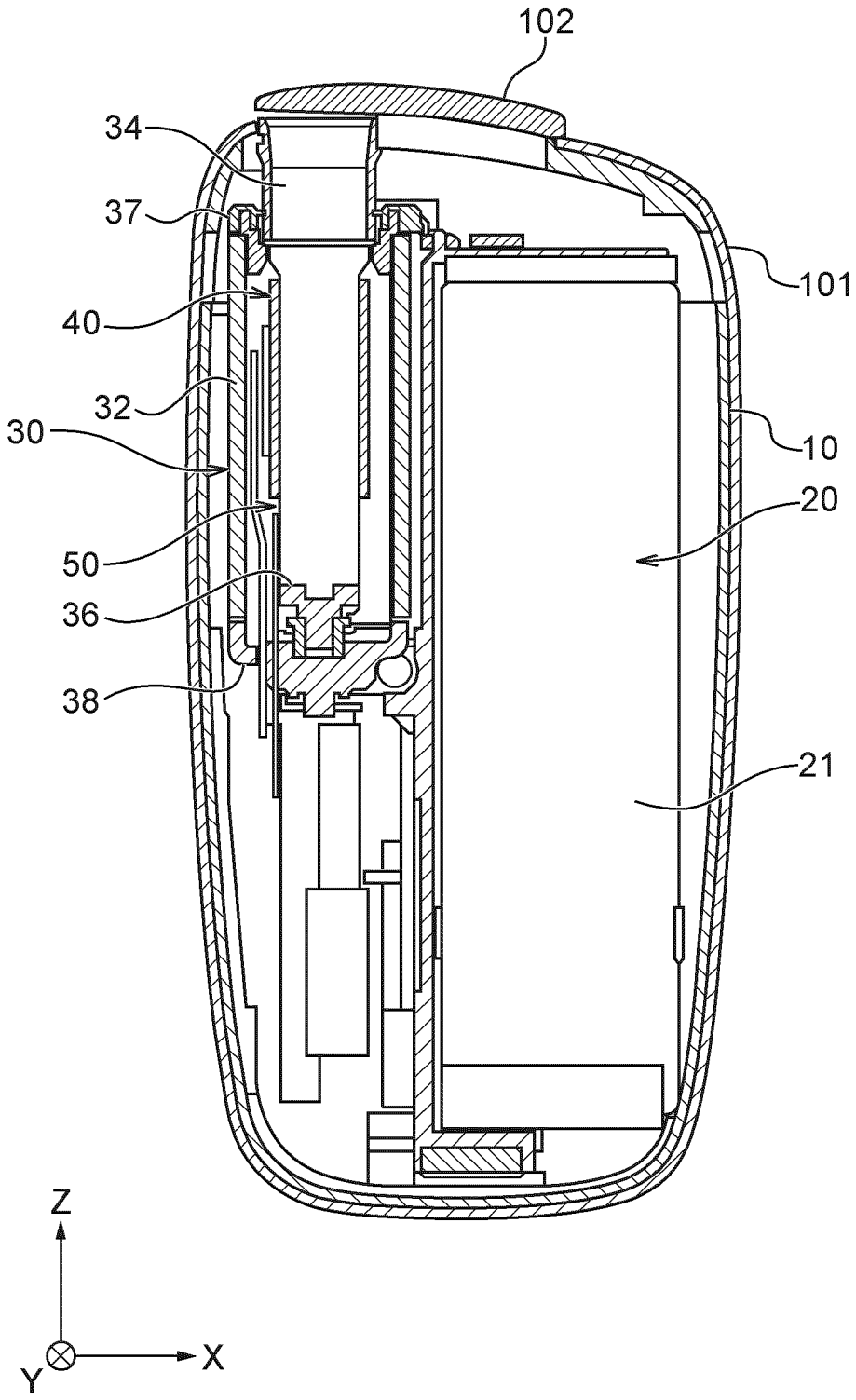


Fig. 4A

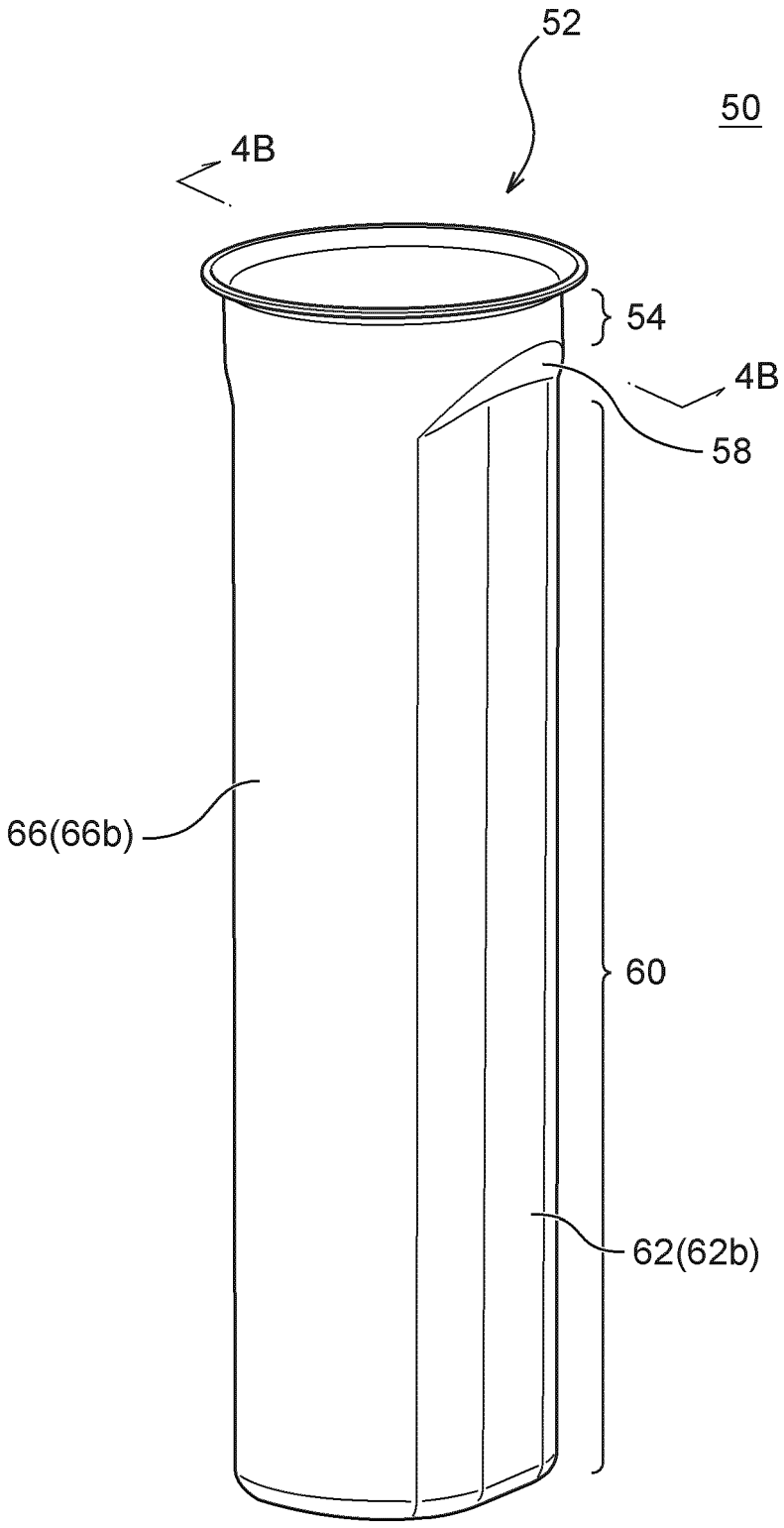


Fig. 4B

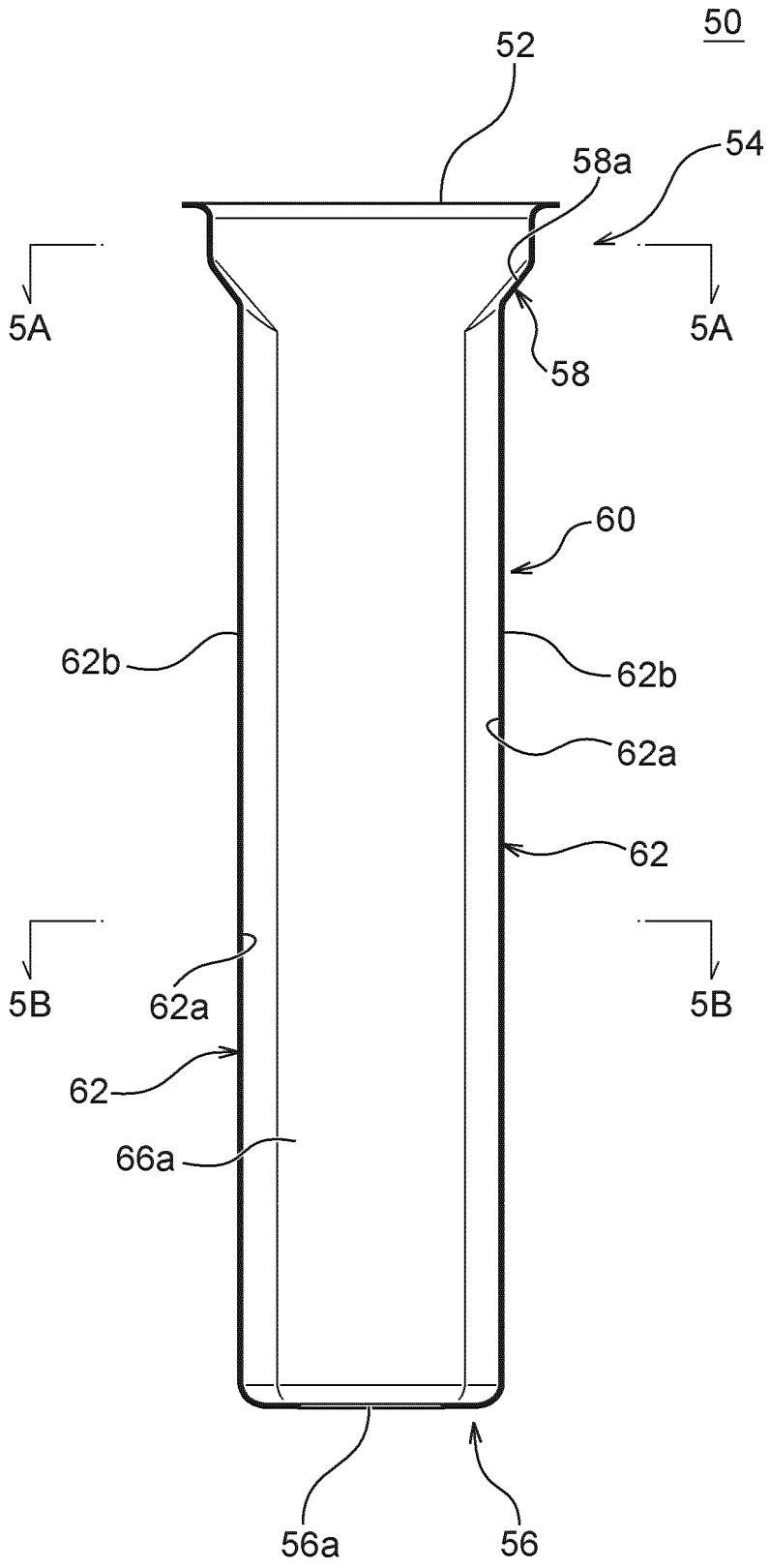


Fig. 5A

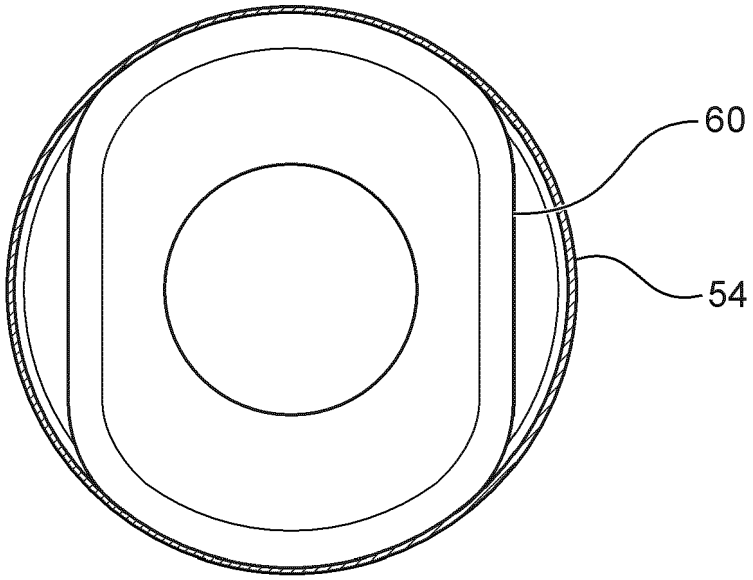


Fig. 5B

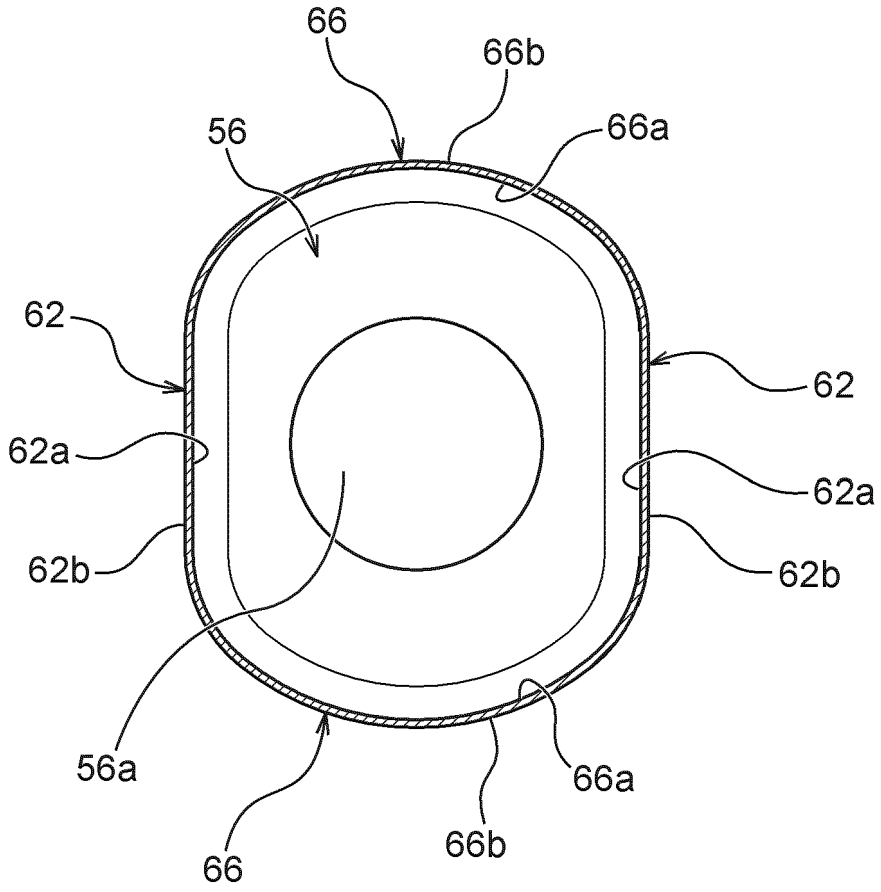
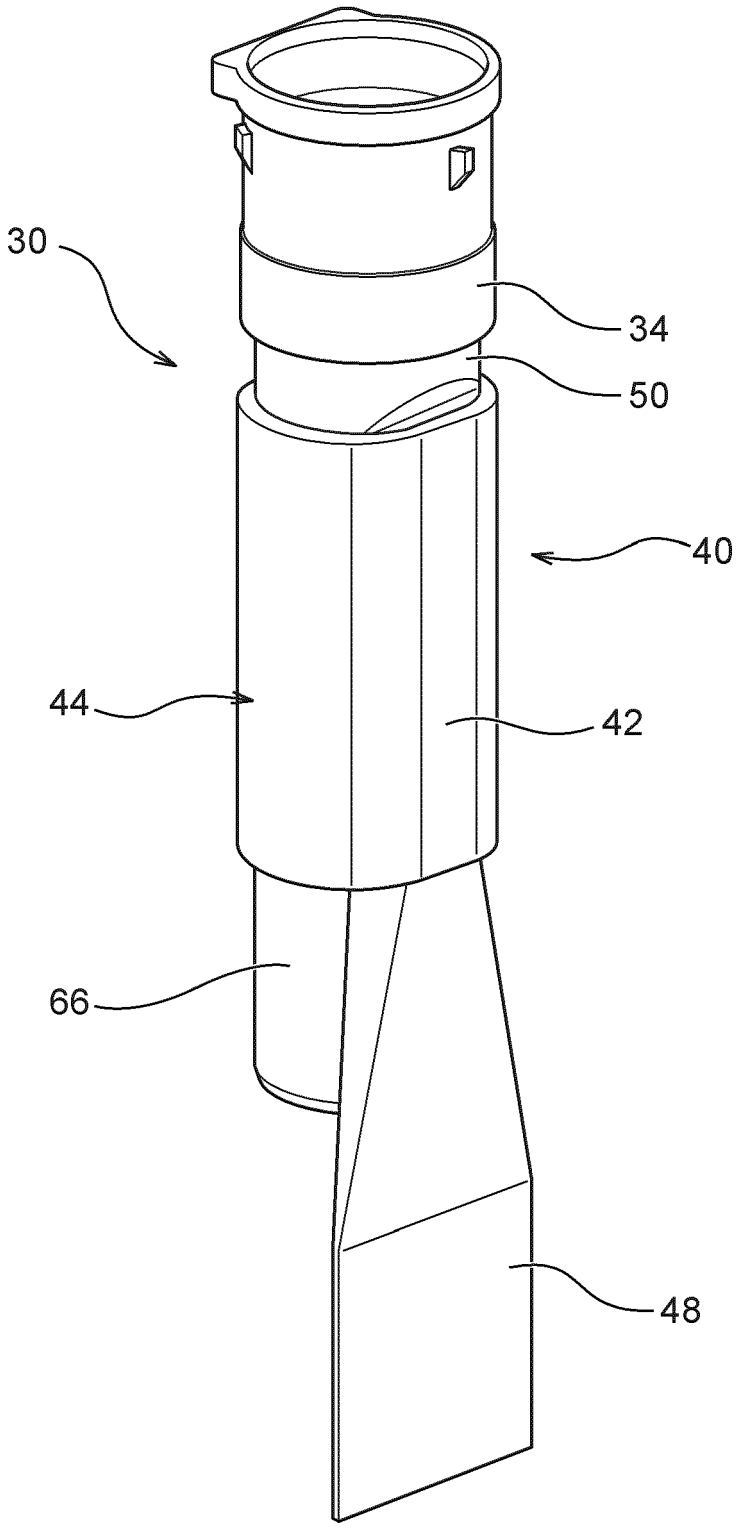


Fig. 6



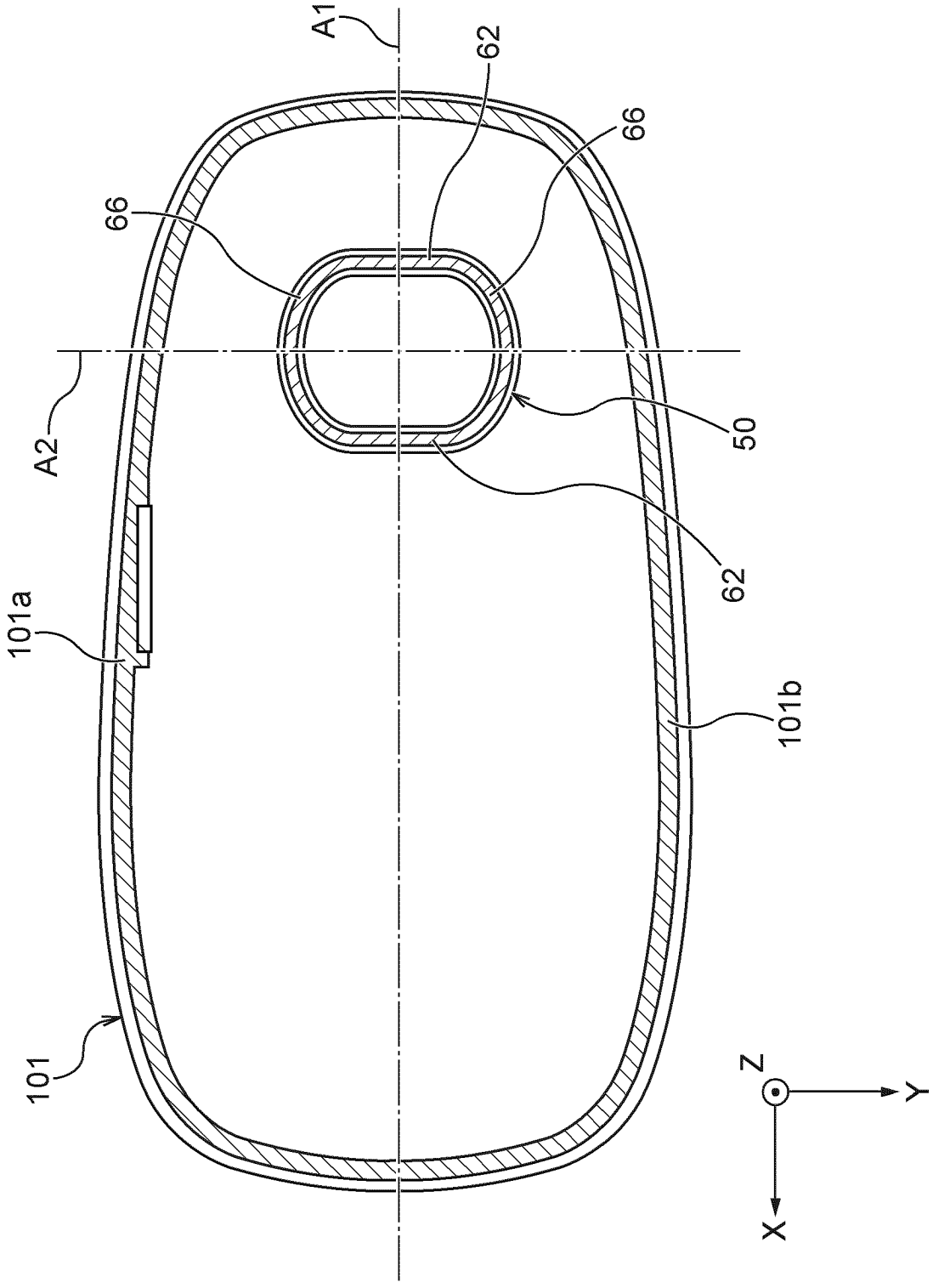


Fig. 7

Fig. 8

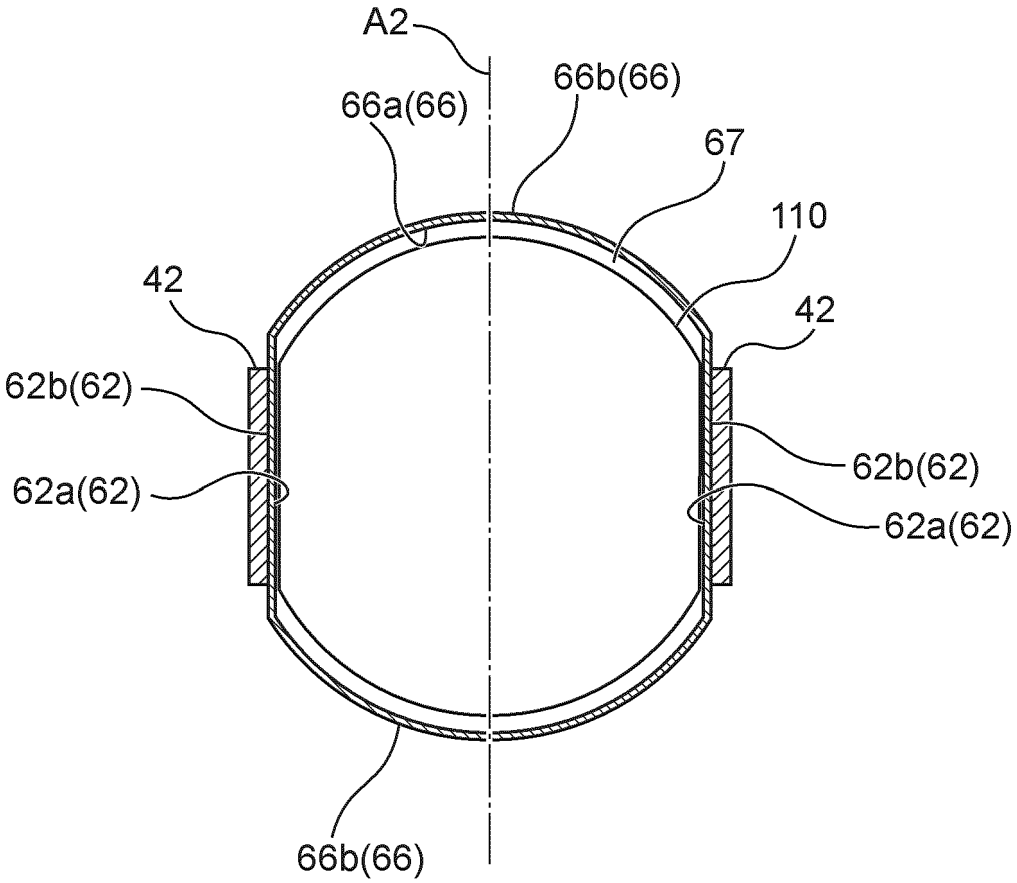


Fig. 9A

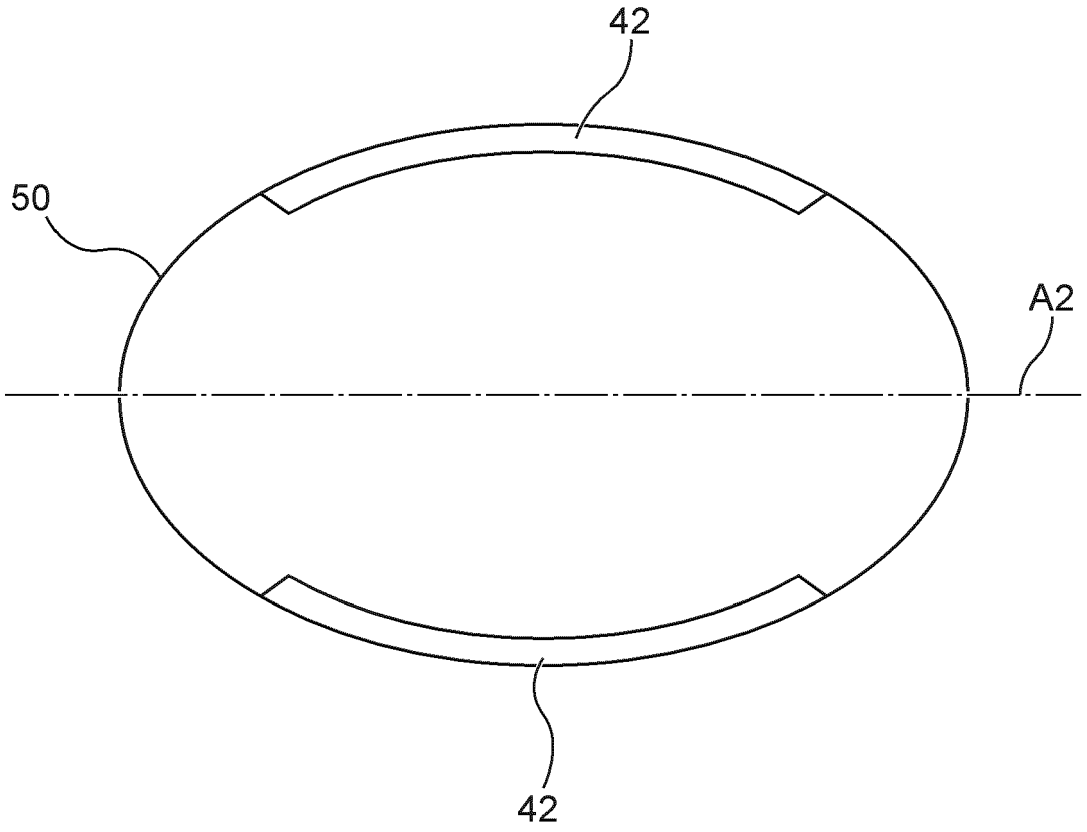


Fig. 9B

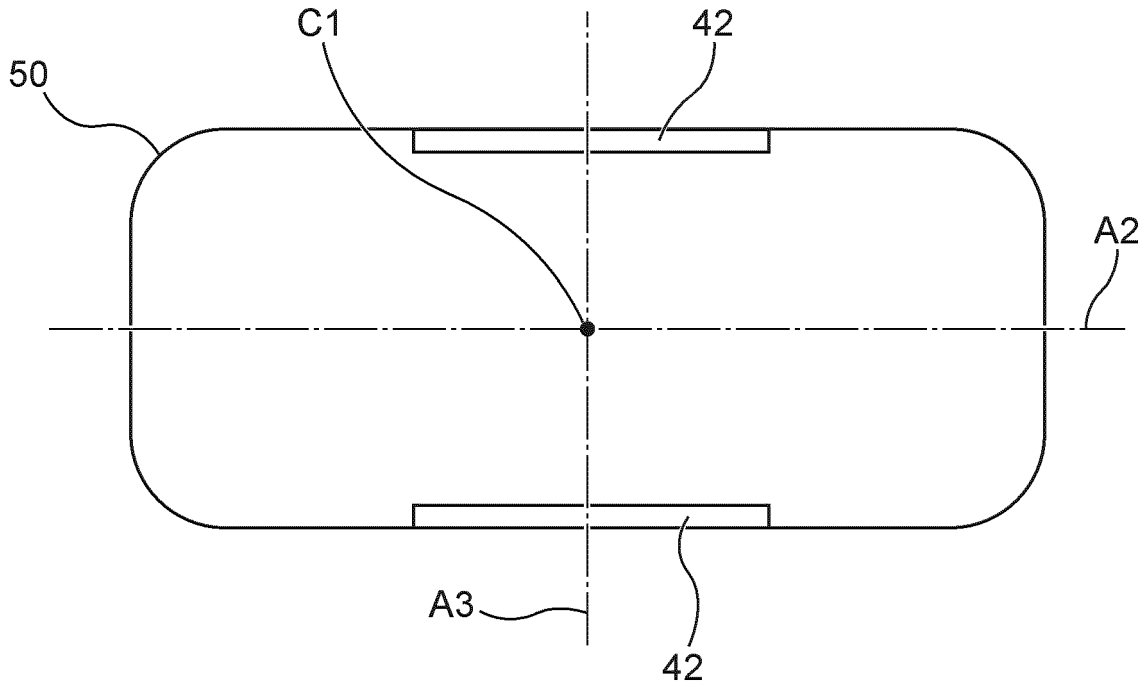
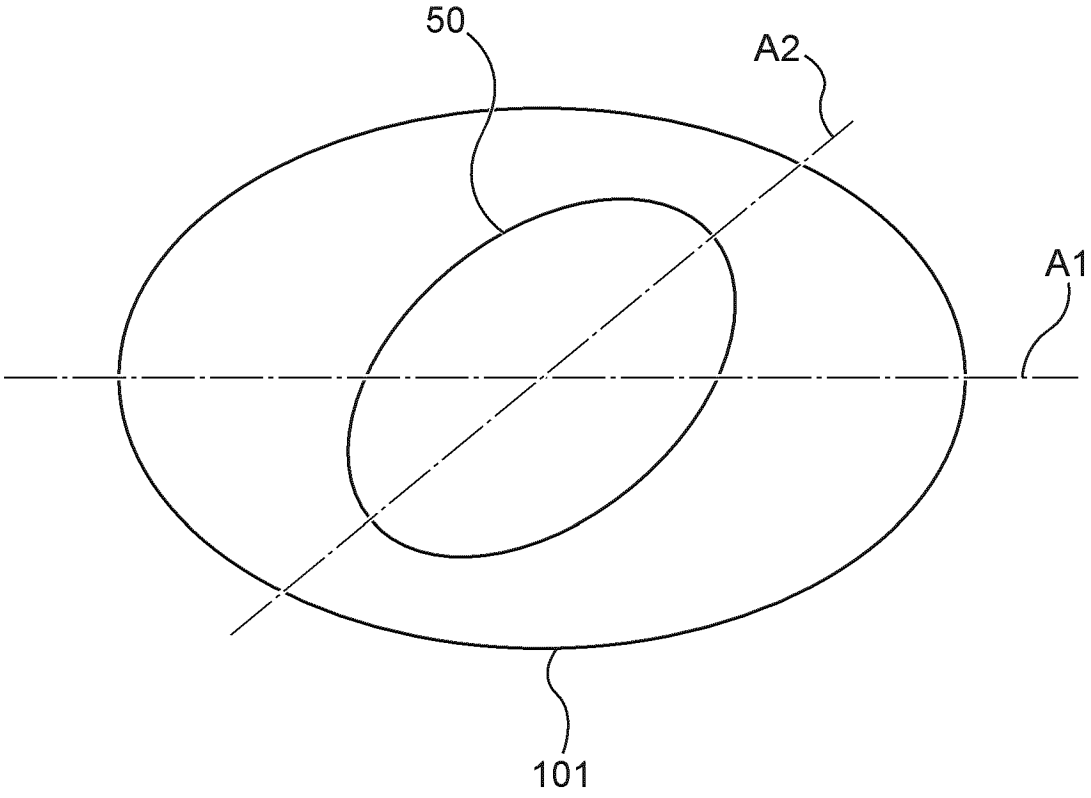


Fig. 10



REFERENCES CITED IN THE DESCRIPTION

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