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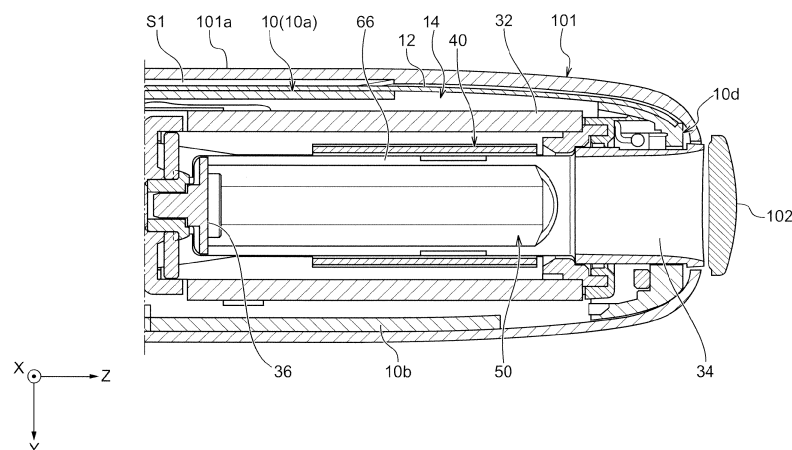
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(54) **FLAVOR INHALER**

(57) The present invention is directed to suppressing local occurrence of a high temperature on a housing. A flavor inhaler includes a first housing, an atomization unit contained inside the first housing and configured to generate heat, and a thermally conductive member having higher thermal conductivity than the first housing. The thermally conductive member is provided in proximity to or in contact with an outer surface of the first housing.

The first housing includes a first wall. The first wall includes a first region, and a second region configured to allow the heat generated in the atomization unit to be moved out of the first housing more effectively than the first region. The second region is located on the first wall so as to overlap the atomization unit in a planar view of the first wall. The thermally conductive member is provided so as to cover at least a part of the second region.

Fig. 10



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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, and a heater that heats the flavor generation article contained in the chamber (for example, refer to PTL 1).

CITATION LIST

PATENT LITERATURE

[0003] PTL 1: International Publication No. 2008-084759

SUMMARY OF INVENTION

TECHNICAL PROBLEM

[0004] Heat generated from the heater moves to around the heater due to heat transfer in various forms. If a member surrounding the heater therearound is made from a material having low thermal conductivity, the heat may stay and this member may accidentally locally have a high temperature. Especially, if a housing containing the heater locally has a high temperature in this manner, an uncomfortable feeling may be invoked in a user.

[0005] PTL 1 discloses that the local occurrence of a high temperature on the housing is suppressed by disposing a graphite sheet outside an inner housing made from resin. More specifically, PTL 1 discloses that the graphite sheet is disposed so as to extend over a contact region between a heating member and the inner surface of a first housing (the inner housing).

[0006] However, in PTL 1, since the graphite sheet is disposed outside the inner housing and the inner housing is made from low thermally conductive resin, the heat from the heating member can be locally transferred to the inner housing before being transferred to the graphite sheet. As a result, the inner housing may be locally deteriorated due to the heat from the heating member. One possible measure to avoid this problem is to increase the distance between the heating member and the inner housing, but this undesirably hinders a reduction in the size of the apparatus as a whole.

[0007] One of objects of the present invention is to suppress local occurrence of a high temperature on a housing.

SOLUTION TO PROBLEM

[0008] According to a first aspect, a flavor inhaler is provided. This flavor inhaler includes a first housing, an atomization unit contained inside the first housing and configured to generate heat, and a thermally conductive member having higher thermal conductivity than the first housing. The thermally conductive member is provided in proximity to or in contact with an outer surface of the first housing. The first housing includes a first wall. The first wall includes a first region, and a second region configured to allow the heat generated in the atomization unit to be moved out of the first housing more effectively than the first region. The second region is located on the first wall so as to overlap the atomization unit in a planar view of the first wall. The thermally conductive member is provided so as to cover at least a part of the second region.

[0009] According to the first aspect, the second region on the first wall allows the heat generated in the atomization unit to be effectively moved out of the first housing, and therefore the flavor inhaler can prevent the heat from staying in the first housing and suppress local occurrence of a high temperature on the first housing. Further, since the thermally conductive member covers at least a part of the second region, the flavor inhaler can facilitate further efficient dissipation of the heat from the atomization unit that reaches the second region with the aid of the thermally conductive member. The "thermally conductive member" in the present specification includes any member having higher thermal conductivity than the first housing without being limited to, for example, metal, silicon, graphite, and rubber.

[0010] According to a second aspect, in the first aspect, the first wall includes an opening or a cutout in the second region.

[0011] According to the second aspect, air subjected to the heat from the atomization unit can reach the thermally conductive member by passing through the opening or the cutout, and therefore the heat can be effectively transferred to the thermally conductive member compared to a configuration in which the second region is formed by, for example, a thin-walled portion.

[0012] According to a third aspect, in the first or second aspect, the first housing includes a second wall located opposite from the first wall and disposed so as to sandwich the atomization unit together with the first wall. The second region is provided only on the first wall, which is one of the first wall and the second wall. The thermally conductive member is provided only on an outer surface of the first wall, which is one of the first wall and the second wall.

[0013] According to the third aspect, the second region and the thermally conductive member are provided only on the first wall in the pair of opposite first wall and second wall of the first housing. In this manner, the second region and the thermally conductive member do not have to be provided on both the first wall and the second wall, and

the intended effect can be achieved by providing the second region and the thermally conductive member only on a wall that may be locally deteriorated due to the heat from the atomization unit. Due to that, the flavor inhaler can omit an unnecessary thermally conductive member, thereby curbing increases in the cost and the weight of the flavor inhaler.

[0014] According to a fourth aspect, in any of the first to third aspects, the atomization unit includes a containing unit containing a consumable, and a heating unit surrounding at least a part of the containing unit. The second region is located on the first wall so as to overlap the heating unit in the planar view of the first wall.

[0015] A region of the first wall overlapping the heating unit is located at a short distance from the heating unit in the planar view of the first wall, thereby being easily subjected to the heat from the heating unit compared to the other regions. According to the fourth aspect, since the second region is located so as to overlap the heating unit, the flavor inhaler allows the heat from the heating unit to be further effectively moved out of the first housing via the second region, and can suppress local occurrence of a high temperature on the first housing.

[0016] According to a fifth aspect, in the fourth aspect, the containing unit includes a tubular sidewall portion. The sidewall portion includes a contact portion in contact with the consumable when the consumable is contained in the containing unit, and a separation portion located circumferentially adjacent to the contact portion and spaced apart from the consumable. The sidewall portion of the containing unit is oriented in such a manner that the separation portion is pointed to the second region.

[0017] According to the fifth aspect, a space is provided between the separation portion of the containing unit and the consumable. Air can be present in this space, and therefore the transfer of the heat of the heated consumable to the separation portion is suppressed. Therefore, due to the sidewall portion oriented in such a manner that the separation portion is pointed to the second region, the flavor inhaler can suppress the transfer of the heat from the atomization unit to the second region, thereby suppressing the dissipation of the heat to outside the first housing. As a result, the flavor inhaler can suppress local occurrence of a high temperature on the first housing, and also improve the heating efficiency of the consumable.

[0018] According to a sixth aspect, in the fifth aspect, an air flow path is formed between the separation portion and the consumable when the consumable is contained in the containing unit.

[0019] According to the sixth aspect, since an air flow path is formed between the separation portion and the consumable, the air passing through the air flow path can absorb the heat in the separation portion, thereby cooling the separation portion. Therefore, due to the sidewall portion oriented in such a manner that the separation portion is pointed to the second region, the flavor inhaler can suppress the transfer of the heat from the atomization

unit to the second region, thereby suppressing the dissipation of the heat of the heating unit to outside the first housing. As a result, the flavor inhaler can suppress local occurrence of a high temperature on the first housing, and also improve the heating efficiency of the consumable.

[0020] According to a seventh aspect, in the fifth or sixth aspect, the heating unit includes a heating element. The heating element is disposed so as to heat the contact portion without contacting the separation portion.

[0021] According to the seventh aspect, the separation portion is not directly heated by the heating unit, and therefore can be less heated by the heating unit. Therefore, due to the sidewall portion oriented in such a manner that the separation portion is pointed to the second region, the flavor inhaler can further suppress the transfer of the heat from the atomization unit to the second region, thereby suppressing the dissipation of the heat to outside the first housing. As a result, the flavor inhaler can suppress local occurrence of a high temperature on the first housing, and also improve the heating efficiency of the consumable.

[0022] According to an eighth aspect, in any of the fourth to seventh aspects according to the second aspect, the atomization unit includes a heat insulation unit including aerogel surrounding the containing unit and the heating unit. The second region is located on the first wall so as to overlap the heat insulation unit in the planar view of the first wall. The first housing is out of contact with the heat insulation unit.

[0023] According to the eighth aspect, because the opening or the cutout overlaps the heat insulation unit including aerogel, the flavor inhaler can reduce the size of the first housing while preventing the first housing from contacting the heat insulation unit. Further, due to the first housing kept out of contact with the heat insulation unit, the flavor inhaler can suppress the transfer of the heat from the heat insulation unit to the first housing, thereby efficiently heating the atomization unit.

[0024] According to a ninth aspect, any of the first to eighth aspects further includes a second housing containing the first housing. The second housing includes a third wall having an inner surface that faces the outer surface of the first wall of the first housing. A space is provided between the first wall and the third wall.

[0025] According to the ninth aspect, because an air layer can be formed in the space provided between the first wall of the first housing and the third wall of the second housing, the flavor inhaler can suppress transfer to the third wall with respect to the heat from the atomization unit that is transferred to the first wall of the first housing. As a result, the flavor inhaler can reduce an uncomfortable feeling induced in the user when the user holds the second housing.

[0026] According to a tenth aspect, in any of the first to ninth aspects, the first housing includes the second wall located opposite from the first wall and disposed so as to sandwich the atomization unit together with the first

wall. The first wall is curved in such a manner that a distance thereof to the atomization unit in a direction in which the first wall and the second wall are located opposite from each other is reducing toward an outer peripheral edge thereof.

[0027] In the case where the first wall is curved in such a manner that the distance thereof to the atomization unit is reducing toward the outer peripheral edge thereof, the heat from the atomization unit can be locally transferred to the first wall compared to a configuration in which the first wall is flat. Even in such a case, according to the tenth aspect, since the second region overlaps the atomization unit, the second region allows the heat generated in the atomization unit to be effectively moved out of the housing, thereby contributing to preventing the heat from staying in the first housing. Further, since the thermally conductive member covers at least a part of the second region, the flavor inhaler can facilitate further efficient transfer of the heat from the atomization unit that reaches the second region with the aid of the thermally conductive member, and facilitate dissipation of the heat that reaches the second region.

BRIEF DESCRIPTION OF DRAWINGS

[0028]

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 front view of the flavor inhaler with an outer housing removed therefrom.

Fig. 4 is a front view of the flavor inhaler with the outer housing and a thermally conductive member removed therefrom.

Fig. 5 is a cross-sectional view of the flavor inhaler as viewed from arrows 5-5 illustrated in Fig. 1B.

Fig. 6A is a perspective view of a chamber.

Fig. 6B is a cross-sectional view of the chamber as viewed from arrows 6B-6B illustrated in Fig. 6A.

Fig. 7A is a cross-sectional view of the chamber as viewed from arrows 7A-7A illustrated in Fig. 6B.

Fig. 7B is a cross-sectional view of the chamber as viewed from arrows 7B-7B illustrated in Fig. 6B.

Fig. 8 is a perspective view of the chamber and a heating unit.

Fig. 9 is a cross-sectional view illustrated in Fig. 7B in a state that the consumable is placed at a desired position in the chamber.

Fig. 10 is a partial cross-sectional view of the flavor inhaler taken along a cross-section parallel with a Z axis that includes a second region of the inner housing.

DESCRIPTION OF EMBODIMENTS

[0029] In the following description, an embodiment 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.

[0030] 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. Further, the Y axis can also be said to be a direction perpendicular to the insertion direction of the consumable and a direction in which a first wall 10a and a second wall 10b, which will be described below, are located opposite from each other. 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 unit 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.

[0031] 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.

[0032] As illustrated in Figs. 1A to 1C, the flavor inhaler 100 includes an outer housing 101 (corresponding to one example of a second 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).

[0033] 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, 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.

[0034] 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.

[0035] 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, a current can be supplied from the external power source to the power source to recharge the power source by connecting the external power source to the terminal. Further, the flavor inhaler 100 may 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.

[0036] 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.

[0037] 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.

[0038] Fig. 3 is a front view of the flavor inhaler 100 with the outer housing 101 removed therefrom. Fig. 4 is a front view of the flavor inhaler 100 with the outer housing 101 and a thermally conductive member 12 removed therefrom. As illustrated in Fig. 4, an inner housing 10 is exposed when the outer housing 101 and the thermally conductive member 12 are removed. The inner housing 10 contains the atomization unit 30, which will be described below, a power source unit 20, and the like. 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. The inner housing 10 includes a first wall 10a and a second wall 10b located opposite from each other in the Y-axis direction (refer to Fig. 10), and a sidewall 10c connecting the first wall 10a and the second wall 10b. Fig. 4 illustrates the first wall 10a and the sidewall 10c. 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.

[0039] As described above, the inner housing 10 may be locally deteriorated due to heat from the atomization unit 30. In light thereof, in the present embodiment, the first wall 10a of the inner housing 10 includes a first region 16, and a second region 14 that allows the heat generated in the atomization unit 30 to be moved out of the housing 10 more effectively than the first region 16. More specifically, in the present embodiment, the second region 14 includes an opening 14a, and the first region 16 includes a region not including the opening 14a. As illustrated in Fig. 4, the atomization unit 30 is exposed via the opening 14a in a planar view of the first wall 10a (as viewed from the Y-axis direction). In other words, the second region

14 is located on the first wall 10a so as to overlap the atomization unit 30 in the planar view of the first wall 10a. Due to that, in the second region 14, the heat generated in the atomization unit 30 can be effectively moved out of the housing 10. As a result, the present embodiment can prevent the heat from staying in the inner housing 10, thereby suppressing local occurrence of a high temperature on the inner housing 10. The second region 14 may include a cutout without being limited to the opening 14a. Further, the second region 14 may include a plurality of openings 14a or a plurality of cutouts. The second region 14 may include a thin-walled portion thinner than the thickness of the first wall 10a in the first region 16.

[0040] Further, as illustrated in Fig. 3, preferably, the flavor inhaler 100 according to the present embodiment is provided with the thermally conductive member 12, which has higher thermal conductivity than the thermal conductivity of the inner housing 10, on the outer surface of the inner housing 10. The material of the thermally conductive member 12 is not limited, but the thermally conductive member 12 is preferably made from a less fragile or less deformable material from a viewpoint of its function of covering the opening 14a and can be made from, for example, metal such as aluminum, silicon, graphite, or rubber. Further, the thermally conductive member 12 preferably has a shape that makes the thermally conductive member 12 less fragile or less deformable from the viewpoint of its function of covering the opening 14a, and can have, for example, a sheet-like shape. Preferably, the thermally conductive member 12 is aluminum having a sheet-like shape or a plate-like shape 0.2 mm or greater in thickness.

[0041] The thermally conductive member 12 can be provided in proximity to or in contact with the outer surface of the inner housing 10. More specifically, for example, the thermally conductive member 12 can be glued to the outer surface of the inner housing 10. As illustrated in Fig. 3, the thermally conductive member 12 is provided so as to cover at least a part of the second region 14 illustrated in Fig. 4. In the example illustrated in Fig. 3, the thermally conductive member 12 is provided so as to cover the entire second region 14, and, more specifically, provided so as to cover the substantially entire region of the outer surface of the inner housing 10. The thermally conductive member 12 may be provided in a different manner therefrom as long as it is disposed so as to cover at least a part of the second region 14. However, because the effect of dissipating the heat by the thermally conductive member 12 is more improved as the area of the thermally conductive member 12 increases, the thermally conductive member 12 is preferably provided so as to, for example, cover 50% or more of the area of the outer surface of the inner housing 10. The material, the shape, and the like of the thermally conductive member 12 can be determined based on a temperature of a heat source (a heating unit 40, which will be described below), and a targeted exterior temperature. Preferably, the thermally conductive member 12 is pro-

vided so as to cause the outer housing 101 to have a temperature of 50 °C or lower. Further, preferably, the thermally conductive member 12 is provided on a flat portion of the outer surface of the inner housing 10. According to the present embodiment, since the thermally conductive member 12 covers at least a part of the second region 14, the flavor inhaler 100 can facilitate further efficient transfer of the heat from the atomization unit 30 that reaches the second region 14 with the aid of the thermally conductive member 12, and facilitate dissipation of the heat that reaches the second region 14. As a result, the flavor inhaler 100 can further suppress local occurrence of a high temperature on the inner housing 10.

[0042] The second region 14 may also be provided on the second wall 10b (Fig. 10b) without being limited to being provided only on the first wall 10b, and the thermally conductive member 12 may also be provided on the outer surface of the second wall 10b in this case. On the other hand, in the present embodiment, the second region 14 is provided only on the first wall 10a, which is one of the first wall 10a and the second wall 10b (refer to Fig. 10), and the thermally conductive member 12 is provided only on the outer surface of the first wall 10a, which is one of the first wall 10a and the second wall 10b. In this manner, the second region 14 and the thermally conductive member 12 do not have to be provided on both the first wall 10a and the second wall 10b, and the intended effect can be achieved by providing the second region 14 and the thermally conductive member 12 only on a wall that may be locally deteriorated due to the heat from the atomization unit 30. Due to that, the present embodiment can omit an unnecessary thermally conductive member 12, thereby curbing increases in the cost and the weight of the flavor inhaler 100.

[0043] Next, the inner structure of the flavor inhaler 100 will be described. Fig. 5 is a cross-sectional view of the flavor inhaler 100 as viewed from arrows 5-5 illustrated in Fig. 1B. As illustrated in Fig. 5, the power source unit 20 and the atomization unit 30 are provided in the inner space of the inner housing 10 of the flavor inhaler 100.

[0044] 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.

[0045] 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.

The details of the chamber 50 and the heating unit 40 will be described below.

[0046] The heat insulation unit 32 is disposed so as to surround the chamber 50 and the heating unit 40. The heat insulation unit 32 can be, for example, aerogel. 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.

[0047] 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. Further, a bottom member 36 may be provided on the bottom portion of the chamber 50 as illustrated. 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.

[0048] Next, the structure of the chamber 50 will be described. Fig. 6A is a perspective view of the chamber 50. Fig. 6B is a cross-sectional view of the chamber 50 as viewed from arrows 6B-6B illustrated in Fig. 6A. Fig. 7A is a cross-sectional view of the chamber 50 as viewed from arrows 7A-7A illustrated in Fig. 6B. Fig. 7B is a cross-sectional view of the chamber 50 as viewed from arrows 7B-7B illustrated in Fig. 6B. Fig. 8 is a perspective view of the chamber 50 and the heating unit 40. As illustrated in Figs. 6A and 6B, 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.

[0049] As illustrated in Figs. 6B and 7B, the sidewall portion 60 includes a contact portion 62 and a separation portion 66. When the consumable 110 is placed at a desired position in the chamber 50, the contact portion 62 contacts or presses a part of the consumable 110, and the separation 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 contact portion 62 has an inner surface 62a and an outer surface 62b. The separation portion 66 has an inner surface 66a and an outer surface 66b. As illustrated in Fig. 8, the heating unit 40 is disposed on the outer surface 62b of the contact portion 62. Preferably, the heating unit 40 is disposed on the outer surface 62b of the contact 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 contact portion 62 without a space created therebetween.

[0050] As illustrated in Figs. 6A and 7B, the outer surface 62b of the contact portion 62 is a flat surface. Since the outer surface 62b of the contact portion 62 is a flat surface, 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 contact portion 62 as illustrated in Fig. 8. As illustrated in Figs. 6B and 7B, the inner surface 62a of the contact portion 62 is a flat surface. Further, as illustrated in Figs. 6B and 7B, the contact portion 62 has an even thickness.

[0051] As illustrated in Figs. 6A, 6B, and 7B, the chamber 50 includes two contact portions 62 in the circumferential direction of the chamber 50, and the two contact portions 62 are located opposite from each other so as to extend in parallel with each other. Preferably, the distance between the inner surfaces 62a of the two contact 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 contact portions 62.

[0052] As illustrated in Fig. 7B, the inner surface 66a of the separation 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 separation portion 66 is disposed so as to be located circumferentially adjacent to the contact portion 62.

[0053] As illustrated in Fig. 6B, 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. 5 to

be disposed inside the chamber 50 while extending through the bottom portion 56. 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. Further, the bottom portion 56 can support a part of the consumable 110 in such a manner that the exposed end surface of the consumable 110 is in communication with a space 67 (refer to Fig. 9), which will be described below.

[0054] As illustrated in Figs. 6A and 6B, preferably, the chamber 50 includes a tubular non-holding portion 54 between the opening 52 and the sidewall portion 60. A space can be formed between the non-holding 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. 6A and 6B, preferably, the chamber 50 includes a first guide portion 58 having a tapering surface 58a connecting the inner surface of the non-holding portion 54 and the inner surface 62a of the contact portion 62.

[0055] As illustrated in Fig. 8, the heating unit 40 includes a heating element 42. The heating element 42 may be, for example, a heating track. Preferably, the heating element 42 is disposed so as to heat the contact portion 62 without contacting the separation portion 66 of the chamber 50. In other words, preferably, the heating element 42 is disposed only on the outer surface of the contact portion 62. The heating element 42 may have a difference in heating capability between a portion that heats the separation portion 66 of the chamber 50 and a portion that heats the contact portion 62. More specifically, the heating element 42 may be configured to heat the contact portion 62 to a higher temperature than the separation portion 66. For example, the layout density of the heating track in the heating element 42 can be adjusted on the contact portion 62 and the separation 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. 8, 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.

[0056] Fig. 9 is a cross-sectional view illustrated in Fig. 7B in the state that the consumable 110 is placed at the desired position in the chamber 50. As illustrated in Fig. 9, when the consumable 110 is placed at the desired position in the chamber 50, the consumable 110 can be pressed in contact with the contact portions 62 of the chamber 50. On the other hand, the space 67 is formed between the consumable 110 and each of the separation portions 66. The space 67 can be in communication with 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 the separation portion 66.

[0057] Next, the layout position and the layout manner of the atomization unit 30 in the inner housing 10 will be described. Fig. 10 is a partial cross-sectional view of the flavor inhaler 100 taken along a cross-section parallel with the Z axis that includes the second region 14 of the inner housing 10. In the illustrated cross-section, preferably, the second region 14 is located on the first wall 10a of the inner housing 10 so as to face the heating unit 40. In other words, preferably, the second region 14 is located on the first wall 10a so as to overlap the heating unit 40 in the planar view of the first wall 10a (as viewed from the Y-axis direction). A region of the first wall 10a overlapping the heating unit 40 is located at a short distance from the heating unit 40 in the planar view of the first wall 10a, thereby being easily subjected to the heat from the heating unit 40 compared to the other regions. According to the present embodiment, since the second region 14 is located so as to overlap the heating unit 40 in the planar view of the first wall 10a, the heat from the heating unit 40 can be further effectively moved out of the inner housing 10 via the second region 14. As a result, the present embodiment can further suppress local occurrence of a high temperature on the inner housing 10.

[0058] As illustrated, preferably, the sidewall portion 60 of the chamber 50 is oriented in such a manner that the separation portion 66 is pointed to the second region 14. In other words, preferably, the sidewall portion 60 is oriented in such a manner that the separation portion 66 is pointed toward the Y-axis negative direction. As described above, the space 67 is provided between the separation portion 66 and the consumable 110 when the consumable 110 is inserted in the chamber 50. Air can be present in this space 67, and therefore the transfer of the heat of the heated consumable 110 to the separation portion 66 is suppressed. Therefore, due to the sidewall portion 60 oriented in such a manner that the separation portion 66 is pointed to the second region 14, the present embodiment can suppress the transfer of the heat from the atomization unit 30 to the second region 14, thereby suppressing the dissipation of the heat to outside the inner housing 10. As a result, the present embodiment can suppress local occurrence of a high temperature on the inner housing 10, and also improve the heating efficiency of the consumable 110.

[0059] Further, as described above, in the present embodiment, since the air flow path (the space 67) is formed between the separation portion 66 and the consumable 110, the air passing through the air flow path can absorb the heat in the separation portion 66, thereby cooling the separation portion 66. Therefore, due to the sidewall portion 60 oriented in such a manner that the separation portion 66 is pointed to the second region 14, the present embodiment can suppress the transfer of the heat from

the atomization unit 30 to the second region 14, thereby suppressing the dissipation of the heat to outside the inner housing 10. As a result, the present embodiment can suppress local occurrence of a high temperature on the inner housing 10, and also improve the heating efficiency of the consumable 110.

[0060] As described above, the heating element 42 of the heating unit 40 is disposed so as to heat the contact portion 62 without contacting the separation portion 66 of the sidewall portion 60 of the chamber 50. In other words, the separation portion 66 is not directly heated by the heating unit 40, and therefore can be less heated by the heating unit 40. Therefore, due to the sidewall portion 60 oriented in such a manner that the separation portion 66 is pointed to the second region 14, the present embodiment can further suppress the transfer of the heat from the atomization unit 30 to the second region 14, thereby suppressing the dissipation of the heat to outside the inner housing 10. As a result, the present embodiment can suppress local occurrence of a high temperature on the inner housing 10, and also improve the heating efficiency of the consumable 110.

[0061] Further, in the illustrated cross-section, the second region 14 can be located on the first wall 10a of the inner housing 10 so as to face the heat insulation unit 32. In other words, the second region 14 can be located on the first wall 10a so as to overlap the heat insulation unit 32 in the planar view of the first wall 10a (as viewed in the Y-axis direction). At this time, preferably, the inner housing 10 is out of contact with the heat insulation unit 32 as illustrated. In the case where the heat insulation unit 32 is constituted by aerogel, the aerogel can be easily broken due to a stress from outside or a frictional force. In light thereof, the present embodiment includes the opening 14a overlapping the heat insulation unit 32, and therefore can reduce the size of the inner housing 10 while preventing the inner housing 10 from contacting the heat insulation unit 32. Further, due to the inner housing 10 kept out of contact with the heat insulation unit 32, the present embodiment can suppress the transfer of the heat from the heat insulation unit 32 to the inner housing 10, thereby efficiently heating the atomization unit 30.

[0062] As illustrated, the outer housing 101 contains the inner housing 10 inside it. The outer housing 101 includes a third wall 101a having an inner surface that faces the outer surface of the first wall 10a of the inner housing 10. Preferably, a space S1 is provided between the outer surface of the first wall 10a of the inner housing 10 and the inner surface of the third wall 101a of the outer housing 101. Due to that, an air layer is formed in the space S1 provided between the first wall 10a and the third wall 101a, and therefore the present embodiment can suppress transfer to the third wall 101a with respect to the heat from the atomization unit 30 that is transferred to the first wall 10a of the inner housing 10. As a result, the present embodiment can reduce an uncomfortable feeling induced in the user when the user holds the outer housing 101.

[0063] As illustrated, the first wall 10a of the inner housing 10 may be curved in such a manner that the distance thereof to the atomization unit 30 in the direction in which the first wall 10a and the second wall 10b are located opposite from each other (the Y-axis direction in the drawings) is reducing toward an outer peripheral edge 10d thereof (in the Z-axis positive direction in the drawings). In other words, the first wall 10a may be curved in such a manner that the distance to the second wall 10b is reducing toward the outer peripheral edge 10d thereof. In the case where the first wall 10a is curved in such a manner that the distance to the atomization unit 30 is reducing toward the outer peripheral edge 10d, the heat from the atomization unit 30 can be further locally transferred to the first wall 10a compared to a configuration in which the first wall 10a is flat. Even in such a case, according to the present embodiment, since the second region 14 overlaps the atomization unit 30, the second region 14 allows the heat generated in the atomization unit 30 to be effectively moved out of the housing 10, thereby contributing to preventing the heat from staying in the inner housing 10. Further, since the thermally conductive member 12 covers at least a part of the second region 14, the present embodiment can facilitate further efficient transfer of the heat from the atomization unit 30 that reaches the second region 14 with the aid of the thermally conductive member 12, and facilitate dissipation of the heat that reaches the second region 14.

[0064] Having described the embodiment of the present invention, the present invention shall not be limited to the above-described embodiment, and various modifications are possible within the scope of the technical idea disclosed in the claims, specification, and drawings. Note that any shape and material not directly described or illustrated in the specification and drawings are still within the scope of the technical idea of the present invention insofar as they allow the present invention to achieve the actions and effects thereof. For example, the flavor inhaler 100 according to the present embodiment includes a so-called counterflow-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

[0065]

10 inner housing
 10a first wall
 10b second wall
 10d outer peripheral edge
 12 thermally conductive member
 14 second region
 14a opening
 16 first region
 30 atomization unit
 32 heat insulation unit
 40 heating unit
 32 heating element
 50 chamber
 52 opening
 60 sidewall portion
 62 contact portion
 66 separation portion
 67 space
 100 flavor inhaler
 101 outer housing
 101a third wall
 110 consumable
 S1 space

Claims

1. A flavor inhaler comprising:

a first housing;
 an atomization unit contained inside the first housing and configured to generate heat; and
 a thermally conductive member having higher thermal conductivity than the first housing, the thermally conductive member being provided in proximity to or in contact with an outer surface of the first housing;
 wherein the first housing includes a first wall, wherein the first wall includes a first region, and a second region configured to allow the heat generated in the atomization unit to be moved out of the first housing more effectively than the first region,
 wherein the second region is located on the first wall so as to overlap the atomization unit in a planar view of the first wall, and
 wherein the thermally conductive member is provided so as to cover at least a part of the second region.

2. The flavor inhaler according to claim 1, wherein the first wall includes an opening or a cutout in the second region.

3. The flavor inhaler according to claim 1 or 2, wherein the first housing includes a second wall located opposite from the first wall and disposed so as to sandwich the atomization unit together with the first wall,

wherein the second region is provided only on the first wall, which is one of the first wall and the second wall, and
 wherein the thermally conductive member is provided only on an outer surface of the first wall, which is one of the first wall and the second wall.

4. The flavor inhaler according to any one of claims 1 to 3, wherein the atomization unit includes a containing unit containing a consumable, and a heating unit surrounding at least a part of the containing unit, and wherein the second region is located on the first wall so as to overlap the heating unit in the planar view of the first wall.

5. The flavor inhaler according to any one of claims 1 to 4, wherein the containing unit includes a tubular sidewall portion,

wherein the sidewall portion includes a contact portion in contact with the consumable when the consumable is contained in the containing unit, and a separation portion located circumferentially adjacent to the contact portion and spaced apart from the consumable, and
 wherein the sidewall portion of the containing unit is oriented in such a manner that the separation portion is pointed to the second region.

6. The flavor inhaler according to claim 5, wherein an air flow path is formed between the separation portion and the consumable when the consumable is contained in the containing unit.

7. The flavor inhaler according to claim 5 or 6, wherein the heating unit includes a heating element, and wherein the heating element is disposed so as to heat the contact portion without contacting the separation portion.

8. The flavor inhaler according to any one of claims 4 to 7 according to claim 2, wherein the atomization unit includes a heat insulation unit including aerogel surrounding the containing unit and the heating unit,

wherein the second region is located on the first wall so as to overlap the heat insulation unit in the planar view of the first wall, and
 wherein the first housing is out of contact with the heat insulation unit.

9. The flavor inhaler according to any one of claims 1 to 8, further comprising a second housing containing the first housing,

wherein the second housing includes a third wall having an inner surface that faces the outer surface of the first wall of the first housing, and

wherein a space is provided between the first wall and the third wall.

10. The flavor inhaler according to any one of claims 1 to 9, wherein the first housing includes the second wall located opposite from the first wall and disposed so as to sandwich the atomization unit together with the first wall, and wherein the first wall is curved in such a manner that a distance thereof to the atomization unit in a direction in which the first wall and the second wall are located opposite from each other is reducing toward an outer peripheral edge thereof.

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Fig. 1A

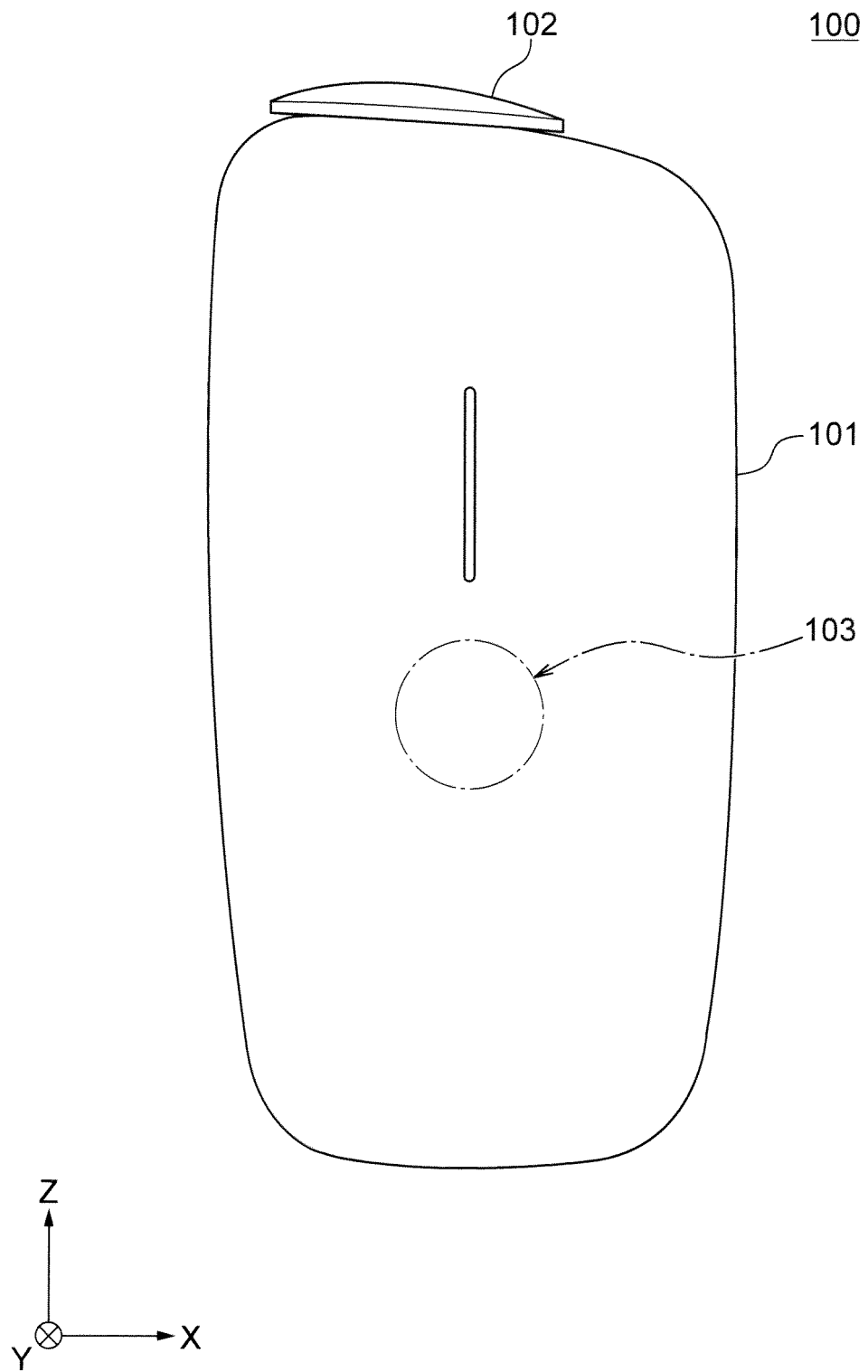


Fig. 1B

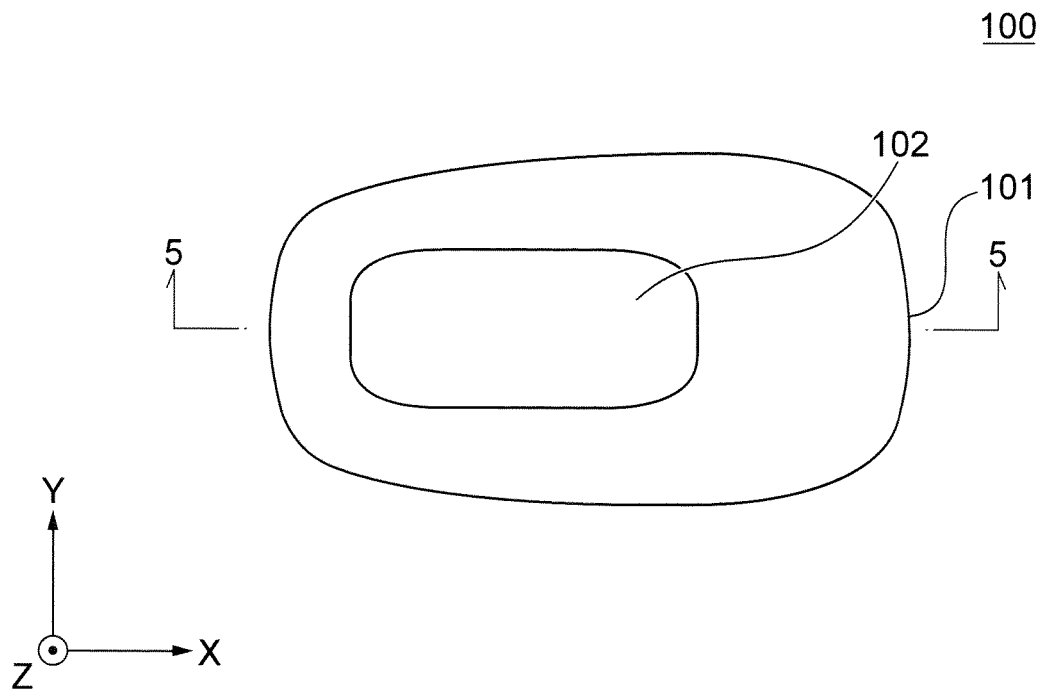


Fig. 1C

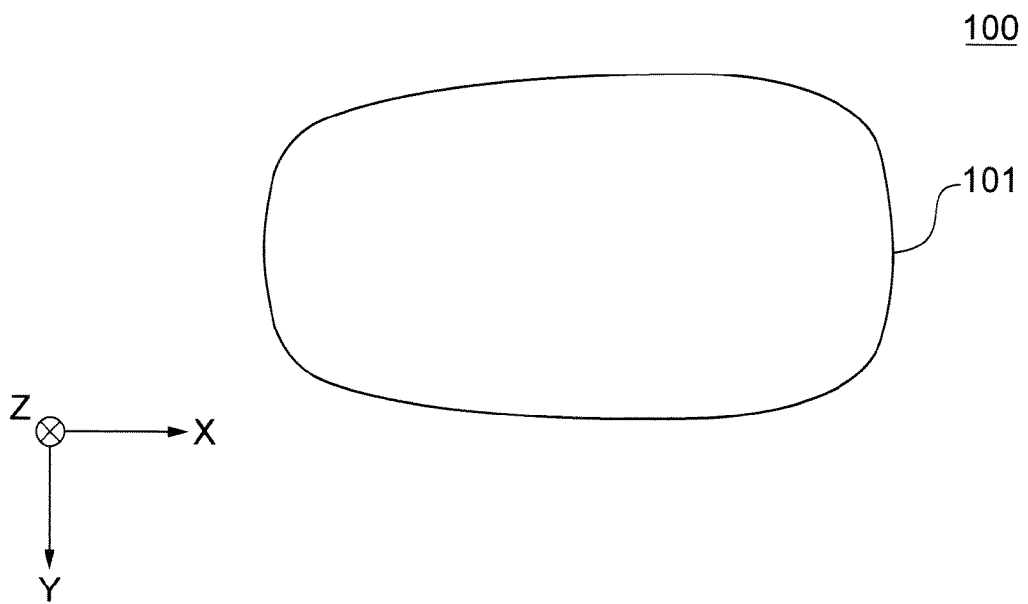


Fig. 2

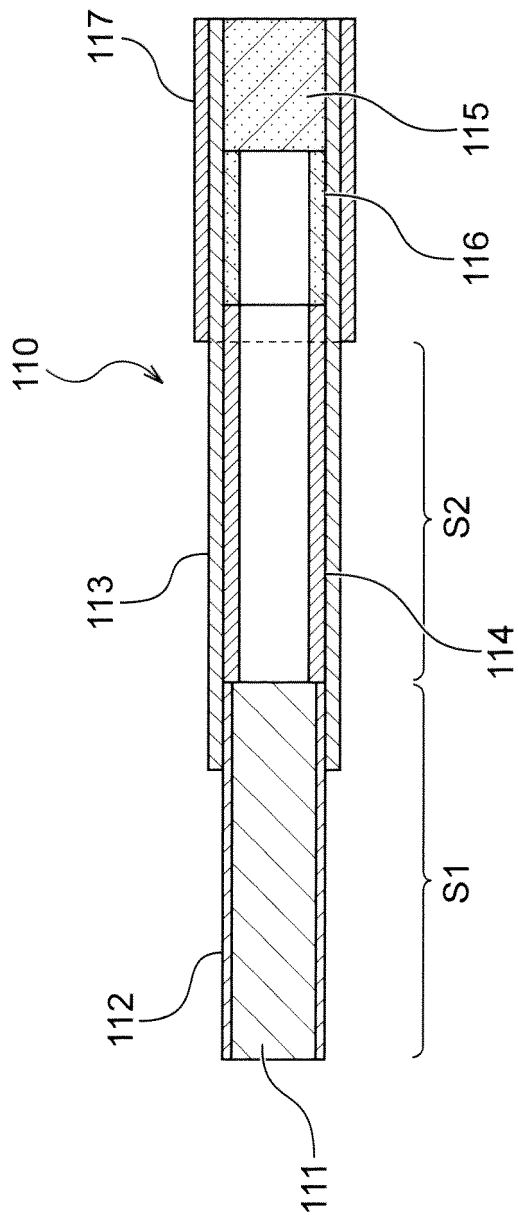


Fig. 3

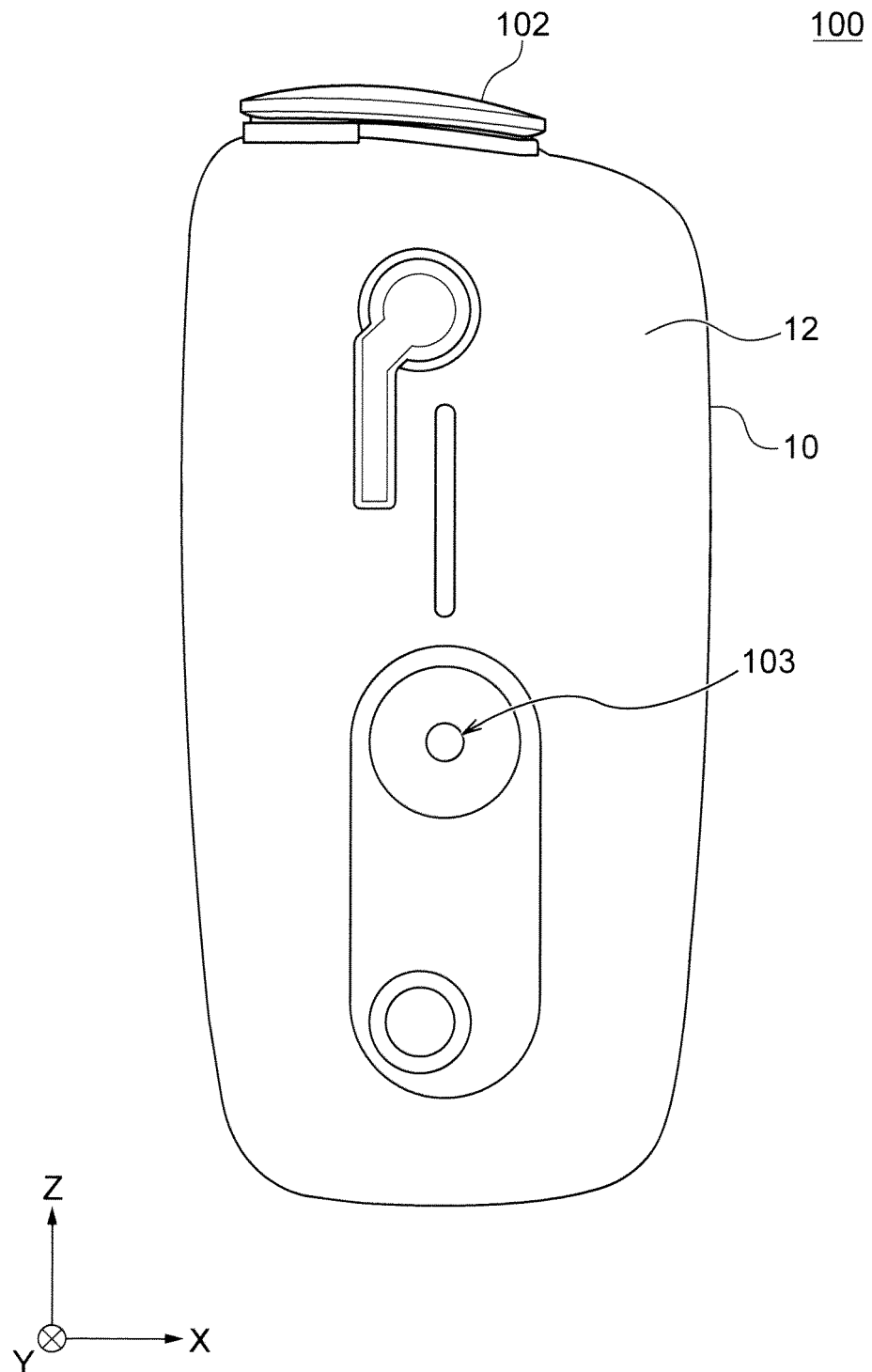


Fig. 4

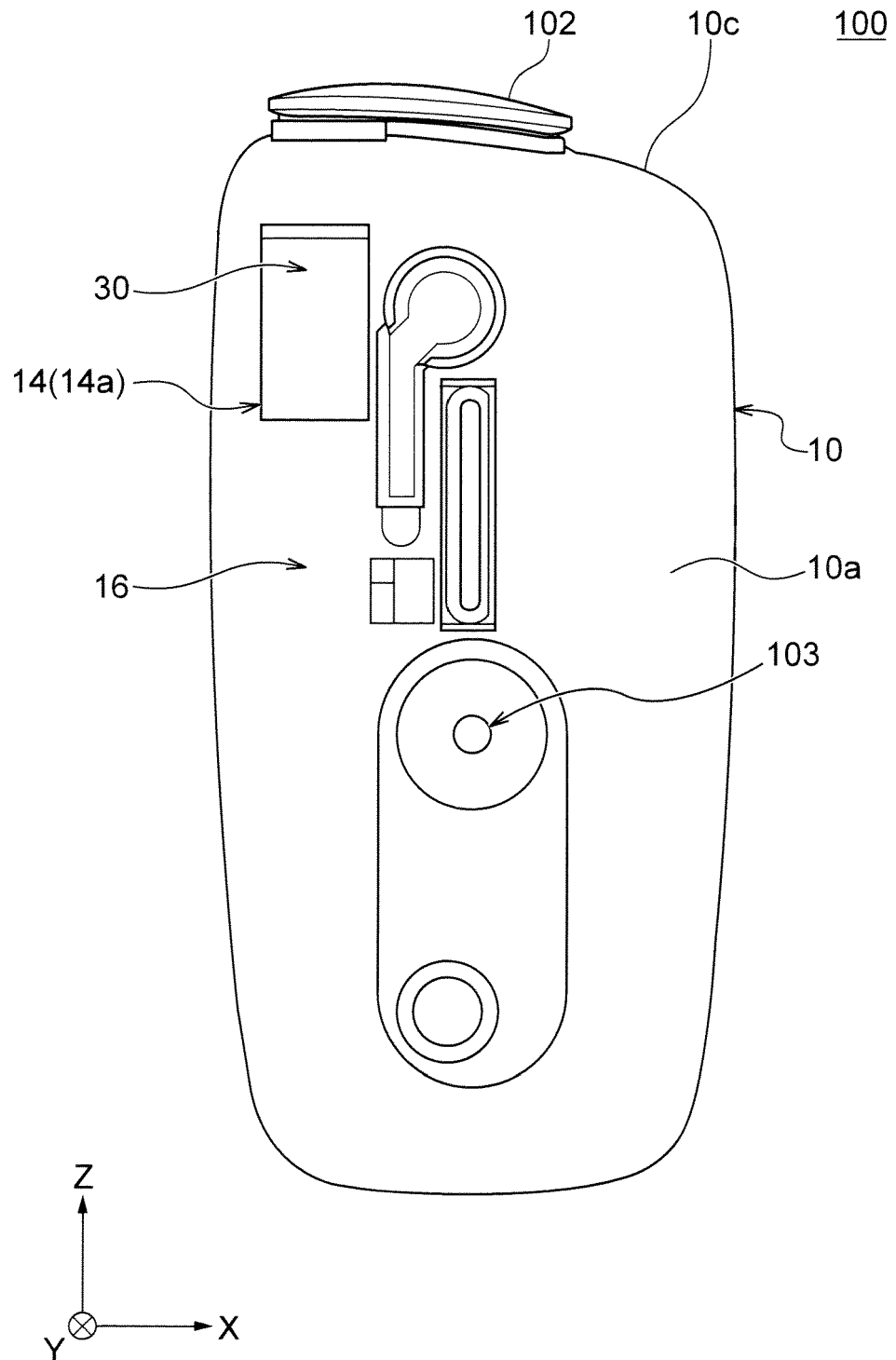


Fig. 5

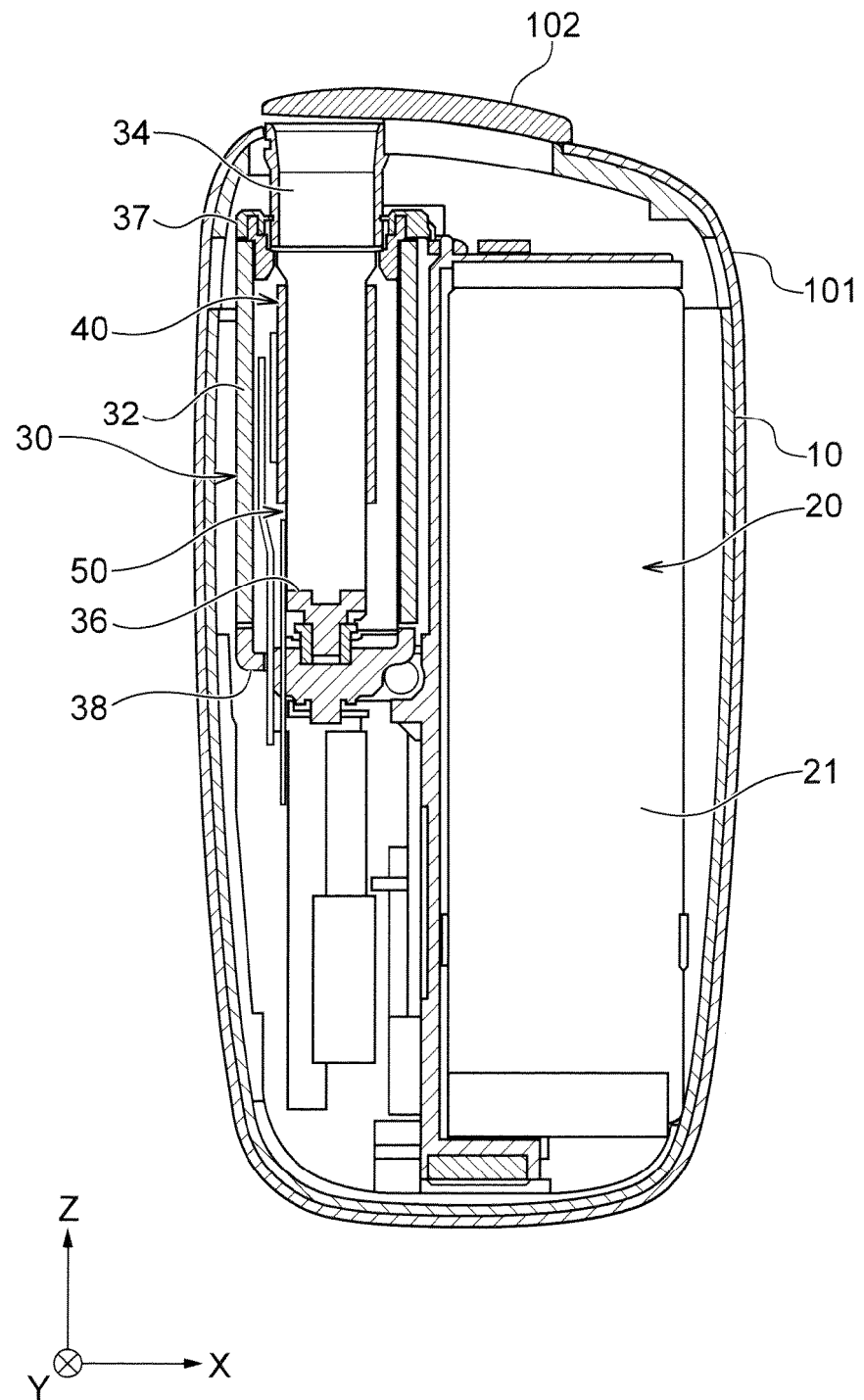


Fig. 6A

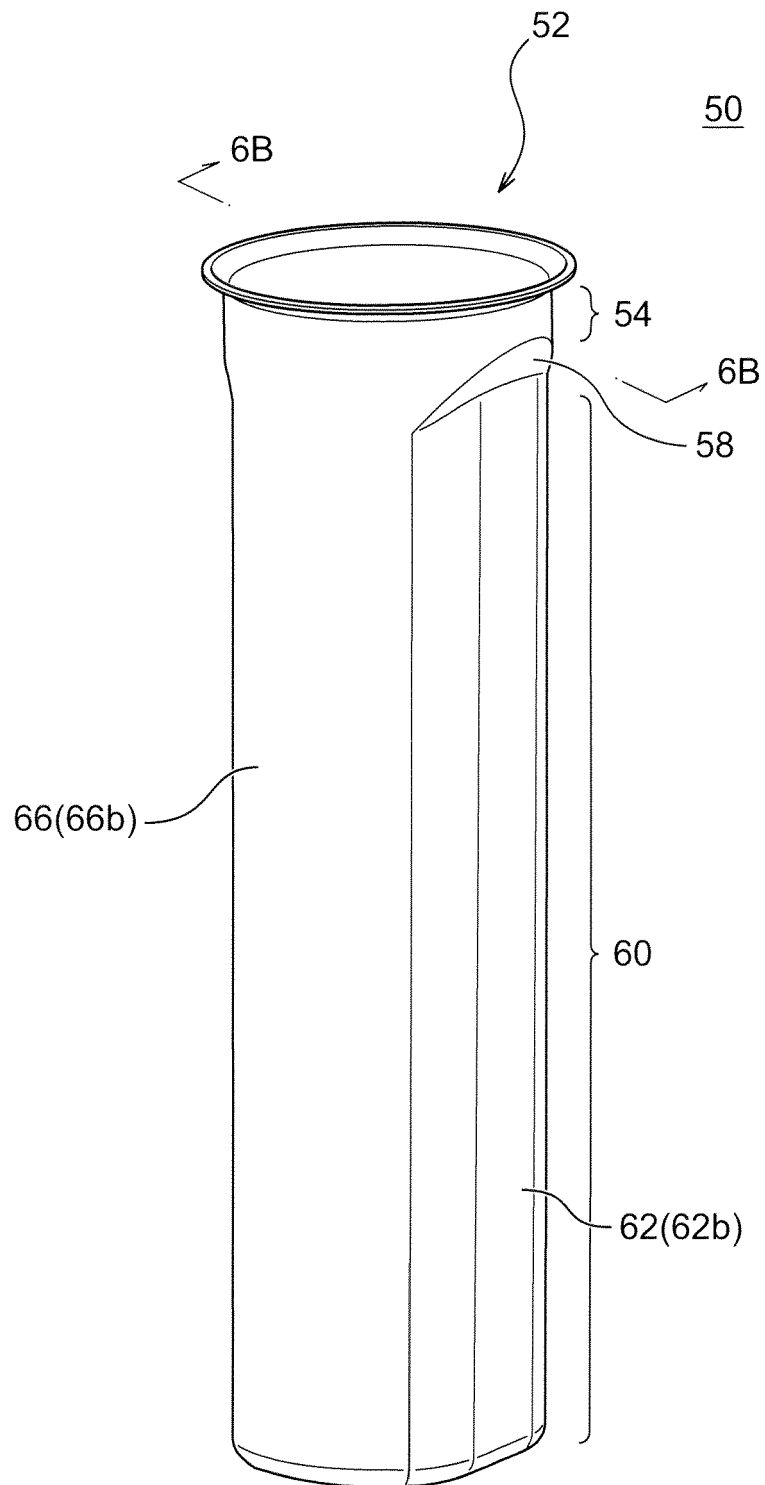


Fig. 6B

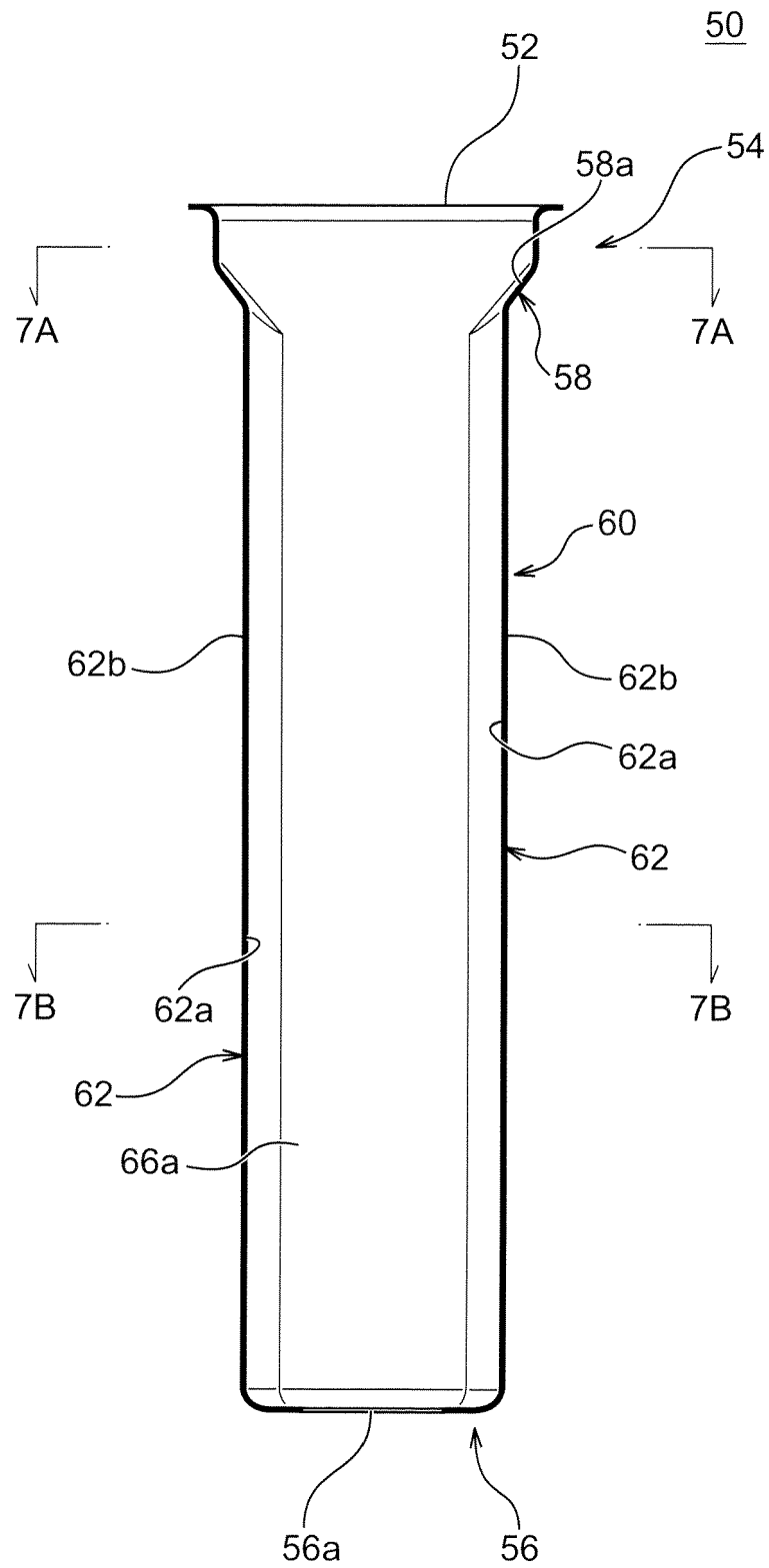


Fig. 7A

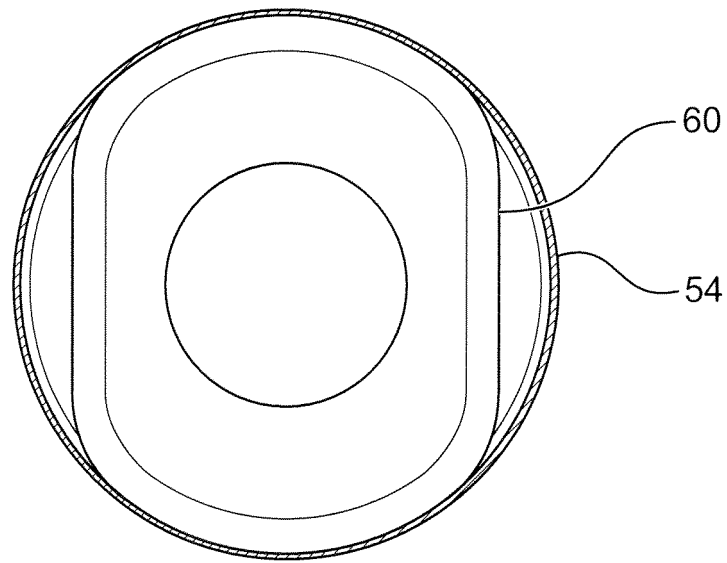


Fig. 7B

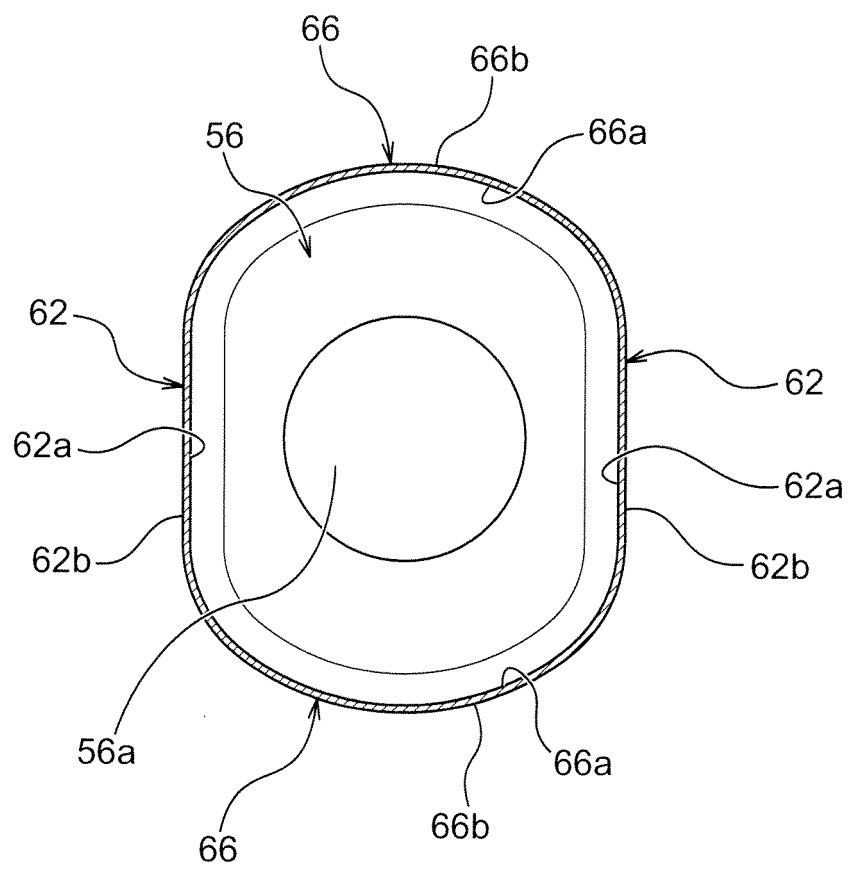


Fig. 8

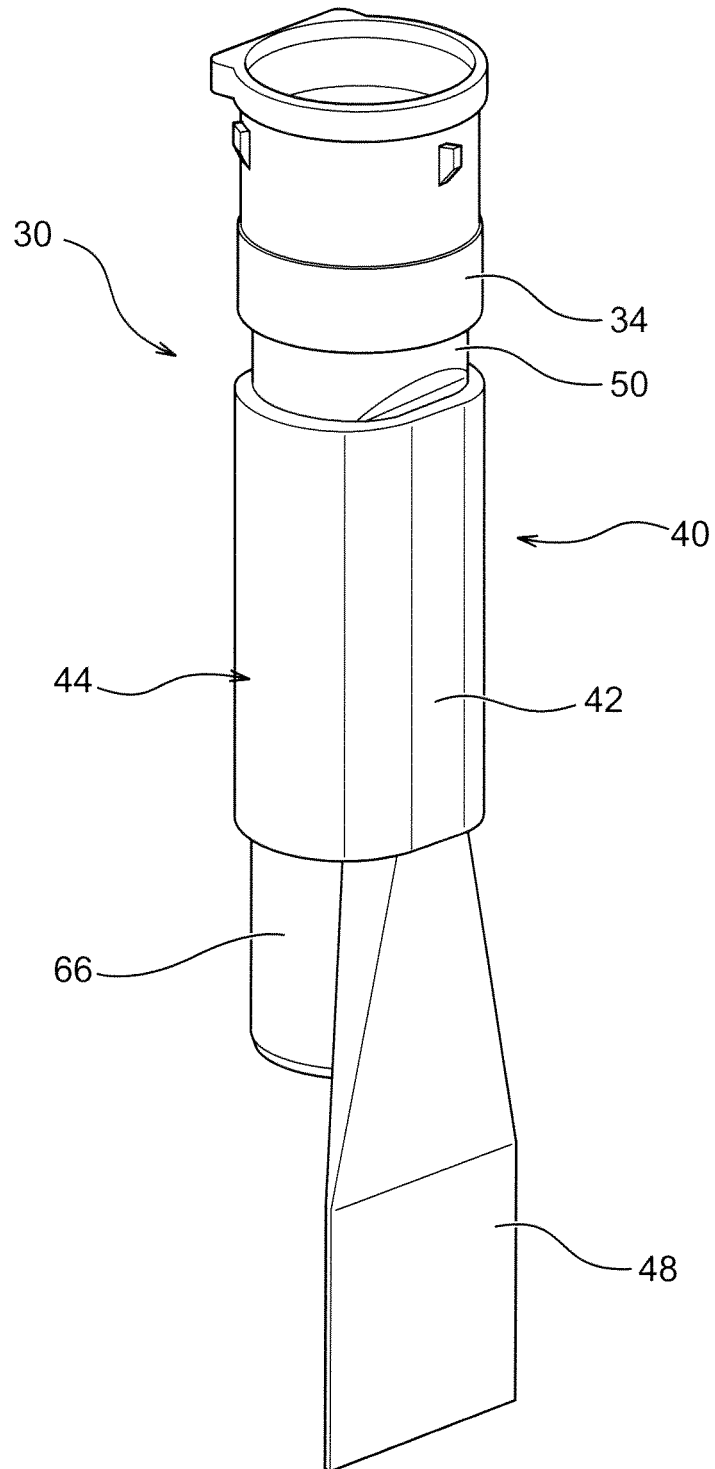


Fig. 9

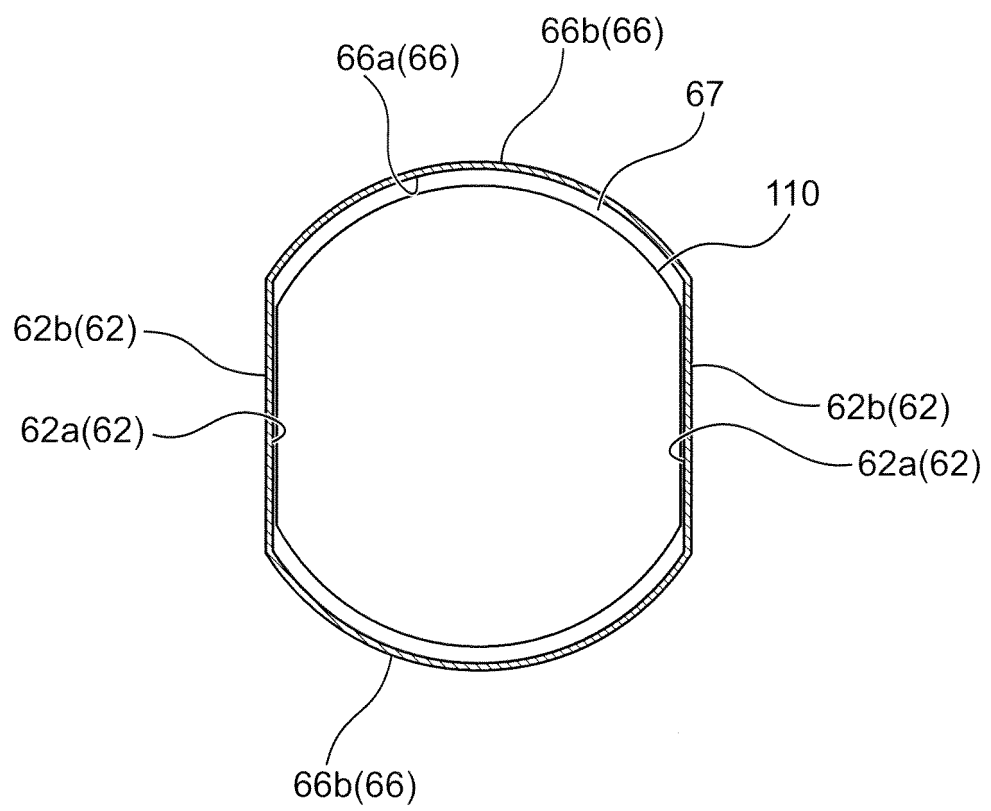
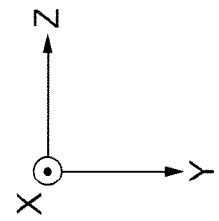
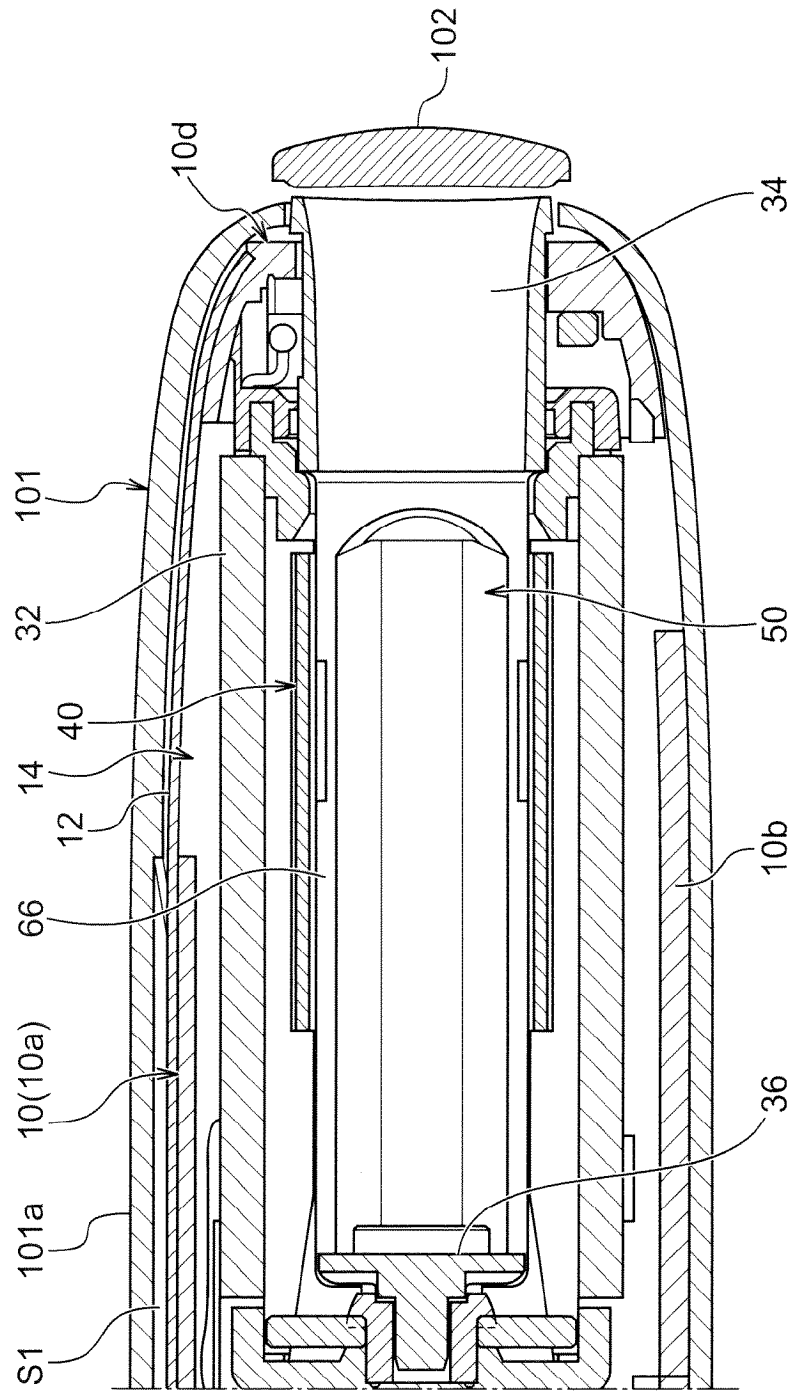


Fig. 10



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INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2020/046182

A. CLASSIFICATION OF SUBJECT MATTER

A24F 40/40 (2020.01) i

FI: A24F40/40

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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)

A24F40/40

15

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

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	WO 2020/084759 A1 (JAPAN TOBACCO INC.) 30 April 2020 (2020-04-30) paragraphs [0021]-[0045], fig. 5-10	1, 3-4, 9-10 2, 5-8
A	JP 8-511176 A (PHILIP MORRIS PRODUCTS INC.) 26 November 1996 (1996-11-26) entire text, all drawings	1-10

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

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* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

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

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

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

"&" document member of the same patent family

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Date of the actual completion of the international search
14 January 2021 (14.01.2021)Date of mailing of the international search report
26 January 2021 (26.01.2021)

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Name and mailing address of the ISA/
Japan Patent Office
3-4-3, Kasumigaseki, Chiyoda-ku,
Tokyo 100-8915, Japan

Authorized officer

Telephone No.

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/JP2020/046182

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Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
WO 2020/084759 A1	30 Apr. 2020	(Family: none)	
JP 8-511176 A	26 Nov. 1996	US 5665262 A	
		WO 1995/027412 A1	

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

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- WO 2008084759 A [0003]