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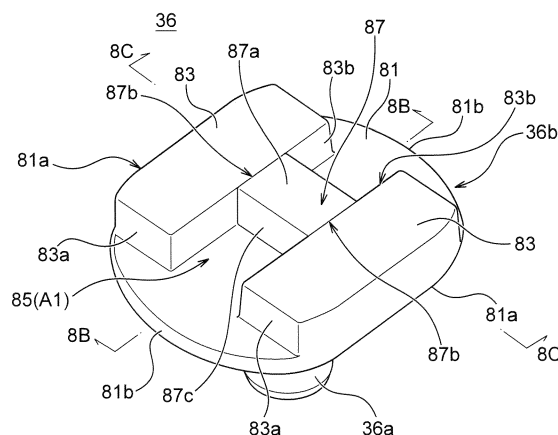
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(54) **FLAVOR ASPIRATOR**

(57) The present invention provides a flavor inhaler capable of increasing ventilation resistance. A flavor inhaler includes a containing unit including a containing space for heating a consumable including a solid-state aerosol generation substrate, an air flow path formed in

the containing unit and extending outside the consumable and inside the consumable, and an obstruction portion provided outside the consumable and on the air flow path. The obstruction portion is configured to obstruct a flow of air passing through the air flow path.

Fig. 8A



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). Such a flavor inhaler generates an aerosol that contains nicotine by heating a solid-state aerosol generation substrate (for example, a tobacco leaf) included in a stick-type consumable.

CITATION LIST

PATENT LITERATURE

[0003] PTL 1: International Publication No. 2020-074612

SUMMARY OF INVENTION

TECHNICAL PROBLEM

[0004] In recent years, there has been a tendency that the inner structure of the consumable used in such a flavor inhaler is simplified and the ventilation resistance of the consumable itself reduces. In this case, the flavor inhaler may fail to allow a user to acquire comfortable ventilation resistance even when inhaling the aerosol, making it difficult for the user to feel a satisfactory smoking sensation.

[0005] One of objects of the present invention is to provide a flavor inhaler capable of increasing ventilation resistance.

SOLUTION TO PROBLEM

[0006] According to a first aspect, a flavor inhaler is provided. This flavor inhaler includes a containing unit including a containing space for heating a consumable including a solid-state aerosol generation substrate, an air flow path formed in the containing unit and extending outside the consumable and inside the consumable, and an obstruction portion provided outside the consumable and on the air flow path. The obstruction portion is configured to obstruct a flow of air passing through the air flow path.

[0007] According to the first aspect, the flavor inhaler includes the obstruction portion on the air flow path, and therefore causes an increase in a pressure loss in the air flow path, and thus can increase ventilation resistance

of the flavor inhaler compared to a configuration in which the obstruction portion is absent. As a result, appropriately adjusting the size or the like of the obstruction portion allows the flavor inhaler to provide a smoking sensation that a user can be satisfied with. Further, the obstruction portion obstructs a flow of air that contains no aerosol outside the consumable and therefore can be prevented from being contaminated due to the aerosol condensed on the obstruction portion.

[0008] According to a second aspect, the flavor inhaler according to the first aspect further includes a heating unit configured to heat the consumable contained in the containing unit from outside.

[0009] According to a third aspect, in the flavor inhaler according to the first or second aspect, the containing unit includes a groove portion opened toward the containing space. At least a part of the air flow path is defined by the groove portion. The obstruction portion is contained in the groove portion.

[0010] According to the third aspect, the obstruction portion can obstruct the flow of the air passing through at least a part of the air flow path defined by the groove portion.

[0011] According to a fourth aspect, in the flavor inhaler according to the third aspect, a height of the obstruction portion is shorter than a depth of the groove portion.

[0012] According to the fourth aspect, the obstruction portion is completely contained inside the groove portion, which can prevent that the obstruction portion is in contact with the consumable contained in the containing unit and physically affects the consumable.

[0013] According to a fifth aspect, in the flavor inhaler according to the third aspect, a height of the obstruction portion is substantially equal to a depth of the groove portion.

[0014] According to the fifth aspect, this configuration means that a surface of the containing unit defining the groove portion and a surface of the obstruction portion are coplanar. Therefore, when an end surface of the consumable contained in the containing unit is in contact with the surface of the containing unit defining the groove portion, the end surface of the consumable can be supported by the containing unit and the obstruction portion. As a result, a supported area of the end surface of the consumable increases, which can prevent that the end surface of the consumable enters the groove portion and the air flow path in the groove portion is clogged.

[0015] According to a sixth aspect, in the flavor inhaler according to any of the third to fifth aspects, the obstruction portion has a first inclined surface that gradually narrows a width of the groove portion from an upstream side toward a downstream side in the air flow path.

[0016] According to the sixth aspect, a cross-sectional area of the air flow path gradually reduces due to the obstruction portion. Therefore, this configuration can adjust the cross-sectional area of the air flow path to increase the ventilation resistance, thereby achieving a further precise adjustment of the ventilation resistance.

[0017] According to a seventh aspect, in the flavor inhaler according to any of the third to sixth aspects, the obstruction portion has a second inclined surface that gradually reduces the depth of the groove portion from the upstream side toward the downstream side in the air flow path.

[0018] According to the seventh aspect, the cross-sectional area of the air flow path gradually reduces due to the obstruction portion. Therefore, this configuration can adjust the cross-sectional area of the air flow path to increase the ventilation resistance, thereby achieving a further precise adjustment of the ventilation resistance. Further, in the case where the end surface of the consumable contained in the containing unit is in contact with the containing unit defining the groove portion, when the aerosol generation substrate such as a tobacco leaf is spilled out of the end surface of the consumable onto the groove portion, the aerosol generation substrate can move along the second inclined surface. Therefore, the aerosol generation substrate can be prevented from staying on a part of the groove portion.

[0019] According to an eighth aspect, in the flavor inhaler according to any of the first to seventh aspects, the air flow path includes a first air flow path extending along a bottom surface of the containing unit. The obstruction portion is provided on the first air flow path.

[0020] Normally, the consumable contained in the containing unit can be heated from a side surface of the containing unit that is in contact with the consumable over a large area. According to the seventh aspect, the obstruction portion is provided on the first air flow path, and therefore the obstruction portion can be less heated. As a result, this configuration allows the obstruction portion to be made from a material such as low heat-resisting and highly workable resin compared to metal such as stainless steel, thereby achieving a further precise adjustment of the ventilation resistance.

[0021] According to a ninth aspect, in the flavor inhaler according to any of the first to eighth aspects, the obstruction portion is a protrusion portion formed on an inner surface of the containing unit. A width of the protrusion portion is substantially equal to a width of the air flow path.

[0022] According to the ninth aspect, in the case where the protrusion portion is disposed at a position that faces the end surface of the consumable contained in the containing unit, the flavor inhaler allows the air colliding against the obstruction portion to be guided to the end surface of the consumable, thus being able to facilitate the supply of the air to the consumable.

[0023] According to a tenth aspect, in the flavor inhaler according to any of the first to ninth aspects, the obstruction portion is disposed on a central axis of the consumable in a state that the consumable is placed at a desired position in the containing unit.

[0024] According to the tenth aspect, the flavor inhaler allows the air colliding against the obstruction portion to be guided to the end surface of the consumable, thus being able to facilitate the supply of the air to the con-

sumable.

[0025] According to an eleventh aspect, in the flavor inhaler according to any of the first to tenth aspects, the containing unit includes a tubular sidewall portion and a bottom wall portion. The sidewall portion includes a contact portion in contact with the consumable, and a separation portion located circumferentially adjacent to the contact portion and spaced apart from the consumable, in the state that the consumable is placed at the desired position in the containing unit. The air flow path is formed between the separation portion and the consumable and between the bottom wall portion and the consumable so as to establish communication with an opening of the containing unit in the state that the consumable is placed at the desired position in the containing unit.

[0026] According to the eleventh aspect, the flavor inhaler allows the air supplied from the opening of the containing unit to reach inside the user's mouth via the air flow path and the end surface of the consumable. As result, the flavor inhaler does not have to be provided with an additional flow path for introducing the air to supply to the consumable, and therefore can be structurally simplified.

[0027] According to a twelfth aspect, in the flavor inhaler according to the eleventh aspect according to any of the third to seventh aspects, the containing unit includes two of the contact portions located opposite from each other substantially in parallel with each other. The groove portion extends along the two contact portions of the containing unit.

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 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 illustrated in Fig. 5B in a state that the consumable is placed at a desired position in the chamber.

Fig. 8A is a perspective view of a bottom member.

Fig. 8B is a cross-sectional view of the bottom member as viewed from arrows 8B-8B illustrated in Fig. 8A.

Fig. 8C is a cross-sectional view of the bottom member as viewed from arrows 8C-8C illustrated in Fig. 8A.

Fig. 9 is a schematic perspective view illustrating an air flow path in the chamber.

Fig. 10 is a plan view illustrating another example of the bottom member.

Fig. 11 is a cross-sectional view illustrating further another example of the bottom member as viewed from arrows 11-11 illustrated in Fig. 8.

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, or an axial direction of a tubular heat insulation unit. 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 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, 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 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 slide 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, 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.

[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 solid-state smokable substance 111 (corresponding to one example of an aerosol generation substrate), 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 mouth-piece 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] 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.

[0039] 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 atomi-

zation 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.

[0040] 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), a 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 from outside. The heating unit 40 can be provided so as to contact the outer peripheral surface of the chamber 50.

[0041] 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 (constituting a part of the containing unit) 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 an air flow path is formed between the surface with which the consumable 110 is in abutment and the bottom member 36. 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 heating unit 40 may be provided on the inner surface of the chamber 50. The details of the chamber 50, the heating unit 40, and the bottom member 36 will be described below.

[0042] 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.

[0043] 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 includes a containing space 68 for heating the consumable 110 inside it. 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.

[0044] As illustrated in Figs. 4B and 5B, 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, a position of the consumable 110 when the user smokes, or a position at which the consumable 110 is in contact with the bottom member 36, which will be described below. 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. 6, 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.

[0045] As illustrated in Figs. 4A and 5B, 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. 6. As illustrated in Figs. 4B and 5B, the inner surface 62a of the contact portion 62 is a flat surface. Further, as illustrated in Figs. 4B and 5B, the contact portion 62

has an even thickness.

[0046] As illustrated in Figs. 4A, 4B, and 5B, 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 substantially 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.

[0047] As illustrated in Fig. 5B, 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.

[0048] 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, and constitutes a bottom wall portion of the containing unit that contains the consumable 110. 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. 7), which will be described below.

[0049] 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 contact portion 62.

[0050] As illustrated in Fig. 6, 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. 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.

[0051] Fig. 7 is a cross-sectional view illustrated in Fig. 5B in the state that the consumable 110 is placed at the desired position in the chamber 50. As illustrated in Fig. 7, 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 an air flow path between the end surface of the consumable 110 positioned in the chamber 50 and the bottom member 36. 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, the air flow path (the space 67) is formed between the consumable 110 and each of the separation portions 66.

[0052] Next, the structure of the bottom member 36 according to the present embodiment and the air flow path in the flavor inhaler 100 according to the present embodiment will be described in detail. Fig. 8A is a perspective view of the bottom member 36. Fig. 8B is a cross-sectional view of the bottom member 36 as viewed from arrows 8B-8B illustrated in Fig. 8A. Fig. 8C is a cross-sectional view of the bottom member 36 as viewed from arrows 8C-8C illustrated in Fig. 8A. As illustrated in Figs. 8A to 8C, the bottom member 36 includes a shaft portion 36a and a flat plate portion 36b. As illustrated in Fig. 3, the shaft portion 36a protrudes out of the chamber 50 via the hole 56a of the chamber 50 (refer to Fig. 4B). One end of the shaft portion 36a is joined with a substantially central portion of one of the surfaces of the flat plate portion 36b. The flat plate portion 36b is shaped so as to substantially conform with the inner surface of the side-wall portion 60 of the chamber 50 in a planar view in the cross-section of the chamber 50 illustrated in Fig. 5B. More specifically, the flat plate portion 36b includes a flat surface portion 81 opposite from the surface with which the shaft portion 36a is joined, and this flat surface portion 81 includes a pair of linear portions 81a and circular arc-shaped portions 81b connecting the pair of linear portions 81a therebetween.

[0053] The flat plate portion 36b is disposed inside the chamber 50, and can be fixed to the inner surface of the bottom portion 56 of the chamber 50 using, for example,

an adhesive. The bottom member 36 may be formed integrally with the chamber 50. The bottom member 36 is disposed in such a manner that the flat surface portion 81 is pointed to the opening 52 of the chamber 50 in the state that the flat plate portion 36b of the bottom member 36 is fixed to the bottom portion 56 of the chamber 50. The bottom member 36 further includes a pair of elongated protrusion portions 83 on the flat surface portion 81. The pair of elongated protrusion portions 83 extends substantially in parallel with the linear portions 81a of the flat surface portion 81, respectively, and is disposed so as to be spaced apart from each other. In the example illustrated in Figs. 8A to 8C, the pair of elongated protrusion portions 83 is disposed on the linear portions 81a, respectively, and a part thereof is also disposed on the circular arc-shaped portions 81b. The pair of elongated protrusion portions 83 has end surfaces 83a in extension directions thereof and side surfaces 83b that face each other. Further, in the present embodiment, the side surfaces 83b of the pair of elongated protrusion portions 83 are flat, and a linear groove portion 85 is formed between the side surfaces 83b. This groove portion 85 is opened toward the containing space 68 of the chamber 50. The groove portion 85 defines a first air flow path A1 in communication with the end surface of the consumable 110 placed at the desired position in the chamber 50. This first air flow path A1 extends along the bottom surface of the containing unit constituted by the bottom member 36.

[0054] The bottom member 36 according to the present embodiment includes an obstruction portion 87 contained in the groove portion 85. In other words, the obstruction portion 87 is disposed outside the consumable 110 and on the first air flow path A1. The obstruction portion 87 can be, for example, a protrusion portion formed on the flat surface portion 81 in the groove portion 85. The obstruction portion 87 is configured to obstruct a flow of the air passing through the first air flow path A1. The obstruction portion 87 includes a bottom surface portion 87d joined with the flat surface portion 81 (refer to Fig. 8B), a top surface portion 87a opposite from the bottom surface portion 87d, a pair of first side surface portions 87b, and a pair of second side surface portions 87c. In the illustrated example, the pair of first side surface portions 87b is configured to extend in parallel with and in contact with the side surfaces 83b of the elongated protrusion portions 83. The obstruction portion 87 may be joined with the side surfaces 83b of the elongated protrusion portions 83 on the first side surface portions 87b. Further, in the illustrated example, the pair of second side surface portions 87c can be disposed so as to extend perpendicularly to the side surfaces 83b of the elongated protrusion portions 83.

[0055] In the example illustrated in Figs. 8A to 8C, the width of the obstruction portion 87 (a maximum length between the pair of first side surface portions 87b) is substantially equal to the width of the first air flow path A1 (the width of the groove portion 85). Further, in the example illustrated in Figs. 8A to 8C, the height of the ob-

struction portion 87 (a maximum length between the bottom surface portion 87d and the top surface portion 87a) is substantially equal to the depth of the groove portion 85 (i.e., the heights of the side surfaces 83b of the elongated protrusion portions 83). The "substantially equal" widths and heights here mean that they are equal even if a manufacturing error is present. The height of the obstruction portion 87 may be shorter than the depth of the groove portion 85 (i.e., the widths of the side surfaces 83b of the elongated protrusion portions 83). Further, the obstruction portion 87 may be disposed so as to be exposed from the groove portion 85 without being contained inside the groove portion 85.

[0056] Fig. 9 is a schematic perspective view illustrating the air flow path in the chamber 50. Fig. 9 illustrates the air flow path in the state that the consumable 110 is placed at the desired position in the chamber 50. As illustrated in Fig. 9, the groove portion 85 of the bottom member 36 (the first air flow path A1) can extend along the contact portions 62 of the chamber 50, more specifically, extend so as to be arranged substantially in parallel with the contact portions 62 of the chamber 50. Further, as illustrated in Fig. 9, the end surface of the consumable 110 is in contact with the top surfaces of the elongated protrusion portions 83 of the bottom member 36, by which the consumable 110 is positioned. As illustrated in Fig. 9, when the consumable 110 is placed at the desired position in the chamber 50, the obstruction portion 87 does not enter the consumable 110. The first air flow path A1 and a second air flow path A2 extending outside the consumable 110, and a third air flow path A3 extending inside the consumable 110 are formed in the chamber 50. The first air flow path A1 includes a first region 91 defined by the groove portion 85, and a second region 92 having a larger flow path area than the first region 91. The second region 92 is defined by the separation portion 66 of the chamber 50, the flat plate portion 36b of the bottom member 36, and the end surfaces 83a of the elongated protrusion portions 83. The second region 92 is located upstream of the first region 91 in the first air flow path A1.

[0057] As described in relation to Fig. 7, when the consumable 110 is placed at the desired position in the chamber 50, the space 67 is formed between the consumable 110 and each of the separation portions 66, and the second air flow path A2 is formed between the consumable 110 and each of the separation portions 66. The second air flow path A2 extends from the opening 52 of the chamber 50 to the flat surface portion 81 of the bottom member 36.

[0058] After passing through the second air flow path A2 from the opening 52 of the chamber 50 and reaching around the flat surface portion 81 of the bottom member 36, the air passes through the second region 92 of the first air flow path A1 and flows into the first region 91. While passing through the first region 91 of the first air flow path A1, the air collides against the obstruction portion 87 disposed in the first region 91 of the first air flow

path A1 according to the user's puffing behavior, and is introduced into the consumable 110. The air introduced in the consumable 110 can reach inside the user's mouth while being accompanied by the aerosol generated in the consumable 110 by passing through the third air flow path A3.

[0059] The present embodiment includes the obstruction portion 87 on the first air flow path A1, and therefore causes an increase in a pressure loss in the first air flow path A1, and thus can increase ventilation resistance of the flavor inhaler 100 compared to a configuration in which the obstruction portion 87 is absent. As a result, appropriately adjusting the size or the like of the obstruction portion 87 allows the flavor inhaler 100 to provide a smoking sensation that the user can be satisfied with. Further, since the obstruction portion 87 is located on the upstream side of the consumable 110 (outside the consumable 110), the obstruction portion 87 obstructs the flow of air that contains no aerosol and therefore can be prevented from being contaminated due to the aerosol condensed on the obstruction portion 87. The obstruction portion 87 is disposed on the first air flow path A1 defined by the groove portion 85 in the present embodiment, but is not limited thereto, and, for example, the groove portion 85 and/or the obstruction portion 87 may be disposed on the second air flow path A2 without.

[0060] Further, in the present embodiment, the height of the obstruction portion 87 is substantially equal to the depth of the groove portion 85, and this means that the surface of the bottom member 36 defining the groove portion 85 and the surface of the obstruction portion 87 are coplanar. Therefore, when the end surface of the consumable 110 contained in the chamber 50 is in contact with the surface of the bottom member 36 defining the groove portion 85, the end surface of the consumable 110 can be supported by the bottom member 36 and the obstruction portion 87. As a result, a supported area of the end surface of the consumable 110 increases, which can prevent that the end surface of the consumable 110 enters the groove portion 85 and the first air flow path A1 in the groove portion 85 is clogged. On the other hand, in the case where the height of the obstruction portion 87 is shorter than the height of the groove portion 85, the obstruction portion 87 is completely contained inside the groove portion 85, which can prevent that the obstruction portion 87 is in contact with the consumable 110 contained in the chamber 50 and physically affects the consumable 110.

[0061] Further, in the present embodiment, the obstruction portion 87 has a width substantially equal to the width of the first region 91 of the first air flow path A1, thereby allowing the air colliding against the obstruction portion 87 to be guided to the end surface of the consumable 110, thus being able to facilitate the supply of the air to the consumable 110.

[0062] Normally, the consumable 110 contained in the chamber 50 can be heated from the side surface (the contact portion 62) of the chamber 50 that is in contact

with the consumable 110 over a large area like the present embodiment. In the present embodiment, the obstruction portion 87 is provided on the first air flow path A1, and therefore the obstruction portion 87 can be less heated. As a result, the present embodiment allows the obstruction portion 87 to be made from a material such as low heat-resisting and highly workable resin (for example, PEEK) compared to metal such as stainless steel, thereby achieving a further precise adjustment of the ventilation resistance.

[0063] As illustrated in Fig. 9, preferably, the obstruction portion 87 is disposed on a central axis C1 of the consumable 110 in the state that the consumable 110 is placed at the desired position in the chamber 50. This allows the air colliding against the obstruction portion 87 to be guided to the end surface of the consumable 110, thereby being able to facilitate the supply of the air to the consumable 110. The central axis C1 here refers to an axis extending in the insertion direction through a centroid of the outline of the consumable 110 in a plane perpendicular to the insertion direction of the consumable 110. Further or alternatively, the obstruction portion 87 may be disposed on a central axis of the bottom portion 56 of the chamber 50. The central axis of the bottom portion here refers to an axis extending in the axial direction of the chamber 50 through a centroid of the outline of the bottom surface of the bottom portion 56 of the chamber 50. In the case where the consumable 110 is heated from outside, the aerosol is easily generated on the outer peripheral side of the consumable 110, and therefore it is preferable that a large amount of air passes through on the outer peripheral side of the consumable 110. For this reason, preferably, the second side surface portions 87c are located between the central axis C1 of the consumable 110 and the outer edge of the consumable 110 when being viewed from the axial direction of the chamber 50 in the state that the consumable 110 is placed at the desired position in the chamber 50. This causes the air to pass near the outer periphery of the consumable 110 when the air passing through inside the groove portion 85 is introduced into the consumable 110 by colliding against the second side surface portions 87c, thereby allowing the aerosol to be efficiently delivered.

[0064] Further, as illustrated in Fig. 9, preferably, the first air flow path A1 and the second air flow path A2 are formed between each of the separation portions 66 and the consumable 110 and between the flat surface portion 81 of the bottom member 36 (corresponding to one example of the bottom wall portion) and the consumable 110 so as to establish communication with the opening 52 of the chamber 50. This allows the air supplied from the opening 52 of the chamber 50 to reach inside the user's mouth via the first air flow path A1 and the second air flow path A2, and the end surface of the consumable 110. As result, the flavor inhaler 100 does not have to be provided with an additional flow path for introducing the air to supply to the consumable 110, and therefore can be structurally simplified.

[0065] In the present embodiment, the consumable 110 is positioned due to the end surface of the consumable 110 held by the upper surfaces of the elongated protrusion portions 83 of the bottom member 36, and therefore a space is formed between the consumable 110 and the flat surface portion 81 of the bottom member 36. Therefore, even if the end portion of the consumable 110 is crushed and the smokable substance 111 spills out from the consumable 110, the smokable substance 111 is accommodated in the space. As a result, the present embodiment can prevent the first air flow path A1 from being closed, thereby securing an air flow path.

[0066] Especially, in the present embodiment, the second region 92 upstream in the first air flow path A1 is formed so as to have a wider width (flow path area) compared to the downstream first region 91 as illustrated in Fig. 9. The wide second region 92 is preferable to accommodate spilled chopped pieces of the consumable 110. On the other hand, air resistance preferable for the smoking sensation of the user of the flavor inhaler is generated due to the air flowing through the first air flow path A1 shaped so as to taper from the second region 92 to the first region 91.

[0067] Fig. 10 is a plan view illustrating another example of the bottom member 36. The bottom member 36 illustrated in Fig. 10 is different compared to the bottom member 36 illustrated in Figs. 8A to 8C only in terms of the shape of the obstruction portion 87. As illustrated in Fig. 10, the pair of elongated protrusion portions 83 each includes a first end portion 83c and a second end portion 83d, and the obstruction portion 87 provided on the bottom member 36 is formed so as to extend linearly between the first end portion 83c of one of the elongated protrusion portions 83 and the second end portion 83d of the other of the elongated protrusion portions 83. In other words, the obstruction portion 87 has a pair of first inclined surfaces 88 inclined with respect to the side surfaces 83b of the elongated protrusion portions 83 on the first side surfaces 87b thereof. In the illustrated example, the pair of first inclined surfaces 88 is flat.

[0068] As illustrated in Fig. 10, the first inclined surfaces 88 of the obstruction portion 87 are configured to gradually narrow the width of the groove portion 85 from the upstream side toward the downstream side in the first air flow path A1. Due to that, the cross-sectional area of the first air flow path A1 gradually reduces due to the obstruction portion 87. Therefore, the present configuration can adjust the cross-sectional area of the first air flow path A1 to increase the ventilation resistance, thereby achieving a further precise adjustment of the ventilation resistance. The height of the obstruction portion 87 illustrated in Fig. 10 may be substantially equal to the depth of the groove portion 85 or may be shorter than that.

[0069] Fig. 11 is a cross-sectional view illustrating further another example of the bottom member 36 as viewed from arrows 8B-8B illustrated in Fig. 8A. The bottom member 36 illustrated in Fig. 11 is different compared to the bottom member illustrated in Figs. 8A to 8C only in

terms of the shape of the obstruction portion 87. As illustrated in Fig. 11, the obstruction portion 87 provided on the bottom member 36 has second inclined surfaces 89 on the first side surface portions 87b thereof. The second inclined surfaces 89 extend between the top surface portion 87a and the circular arc-shaped portions 81b of the flat surface portion 81. The second inclined surfaces 89 extend between the top surface portion 87a and the circular arc-shaped portions 81b of the flat surface portion 81 in the illustrated example, but are not limited thereto and may extend between the top surface portion 87a and the flat surface portion 81 located between the circular arc-shaped portions 81b. The height of the obstruction portion 87 is shorter than the depth of the groove portion 85 in the illustrated example, but may be substantially equal to the depth of the groove portion 85. The obstruction portion 87 illustrated in Fig. 11 includes a portion contained inside the groove portion 85 and a portion located outside the groove portion 85. More specifically, as illustrated in Fig. 11, portions of the obstruction portion 87 located near the circular arc-shaped portions 81b are located outside the groove portion 85.

[0070] As illustrated in Fig. 11, the second inclined surfaces 89 of the obstruction portion 87 are configured to gradually reduce the depth of the groove portion 85 from the upstream side toward the downstream side in the first air flow path A1. Due to that, the cross-sectional area of the first air flow path A1 gradually reduces due to the obstruction portion 87. Therefore, the present configuration can adjust the cross-sectional area of the first air flow path A1 to increase the ventilation resistance, thereby achieving a further precise adjustment of the ventilation resistance. Further, when the aerosol generation substrate such as a tobacco leaf is spilled out of the end surface of the consumable 110 onto the groove portion 85, the aerosol generation substrate can move along the second inclined surfaces 89. Therefore, the aerosol generation substrate can be prevented from staying on a part of the groove portion 85.

[0071] 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 present embodiment has been described citing the example in which the single obstruction portion 87 is provided on the bottom member 36, but the obstruction portion 87 is not limited thereto and a plurality of obstruction portions 87 may be provided on the bottom member 36 or another member. Further, 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 cham-

ber 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

[0072]

36	bottom member
50	chamber
68	containing space
85	groove portion
87	obstruction portion
88	first inclined surface
89	second inclined surface
100	flavor inhaler
110	consumable
111	smokable substance
A1	first air flow path
A2	second air flow path
A3	third air flow path
C1	central axis

Claims

1. A flavor inhaler comprising:

a containing unit including a containing space for heating a consumable including a solid-state aerosol generation substrate;
an air flow path formed in the containing unit and extending outside the consumable and inside the consumable; and
an obstruction portion provided outside the consumable and on the air flow path, the obstruction portion being configured to obstruct a flow of air passing through the air flow path.

2. The flavor inhaler according to claim 1, further comprising a heating unit configured to heat the consumable contained in the containing unit from outside.

3. The flavor inhaler according to claim 1 or 2, wherein the containing unit includes a groove portion opened toward the containing space,

wherein at least a part of the air flow path is defined by the groove portion, and
wherein the obstruction portion is contained in

the groove portion.

4. The flavor inhaler according to claim 3, wherein a height of the obstruction portion is shorter than a depth of the groove portion. 5
5. The flavor inhaler according to claim 3, wherein a height of the obstruction portion is substantially equal to a depth of the groove portion. 10
6. The flavor inhaler according to any one of claims 3 to 5, wherein the obstruction portion has a first inclined surface that gradually narrows a width of the groove portion from an upstream side toward a downstream side in the air flow path. 15
7. The flavor inhaler according to any one of claims 3 to 6, wherein the obstruction portion has a second inclined surface that gradually reduces the depth of the groove portion from the upstream side toward the downstream side in the air flow path. 20
8. The flavor inhaler according to any one of claims 1 to 7, wherein the air flow path includes a first air flow path extending along a bottom surface of the containing unit, and wherein the obstruction portion is provided on the first air flow path. 25
9. The flavor inhaler according to any one of claims 1 to 8, wherein the obstruction portion is a protrusion portion formed on an inner surface of the containing unit, and wherein a width of the protrusion portion is substantially equal to a width of the air flow path. 30 35
10. The flavor inhaler according to any one of claims 1 to 9, wherein the obstruction portion is disposed on a central axis of the consumable in a state that the consumable is placed at a desired position in the containing unit. 40
11. The flavor inhaler according to any one of claims 1 to 10, wherein the containing unit includes a tubular sidewall portion and a bottom wall portion, 45

wherein the sidewall portion includes a contact portion in contact with the consumable, and a separation portion located circumferentially adjacent to the contact portion and spaced apart from the consumable, in the state that the consumable is placed at the desired position in the containing unit, and wherein the air flow path is formed between the separation portion and the consumable and between the bottom wall portion and the consumable so as to establish communication with an opening of the containing unit in the state that 50 55

the consumable is placed at the desired position in the containing unit.

12. The flavor inhaler according to claim 11 according to any one of claims 3 to 7, wherein the containing unit includes two of the contact portions located opposite from each other substantially in parallel with each other, and wherein the groove portion extends along the two contact portions of the containing unit.

Fig. 1A

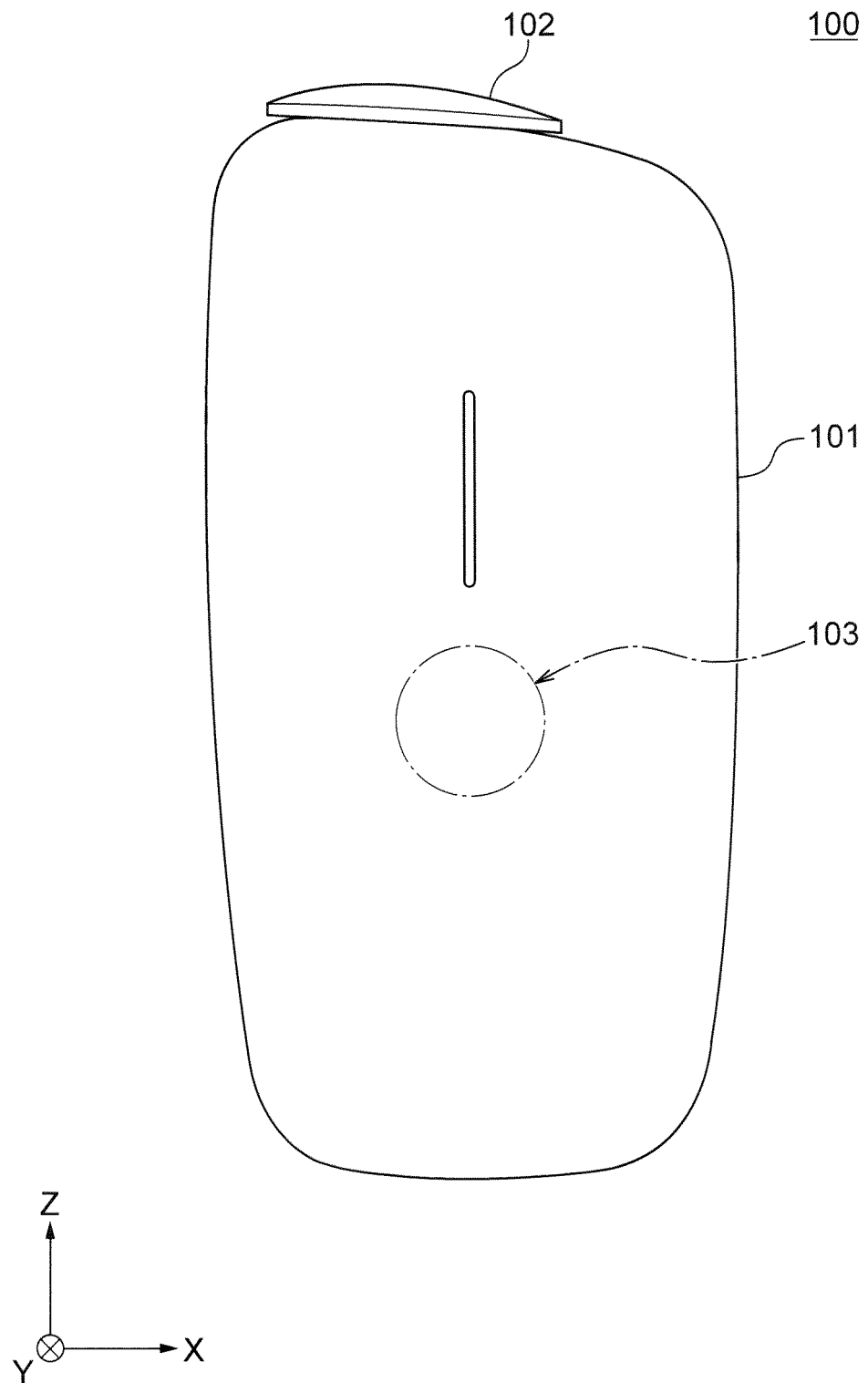


Fig. 1B

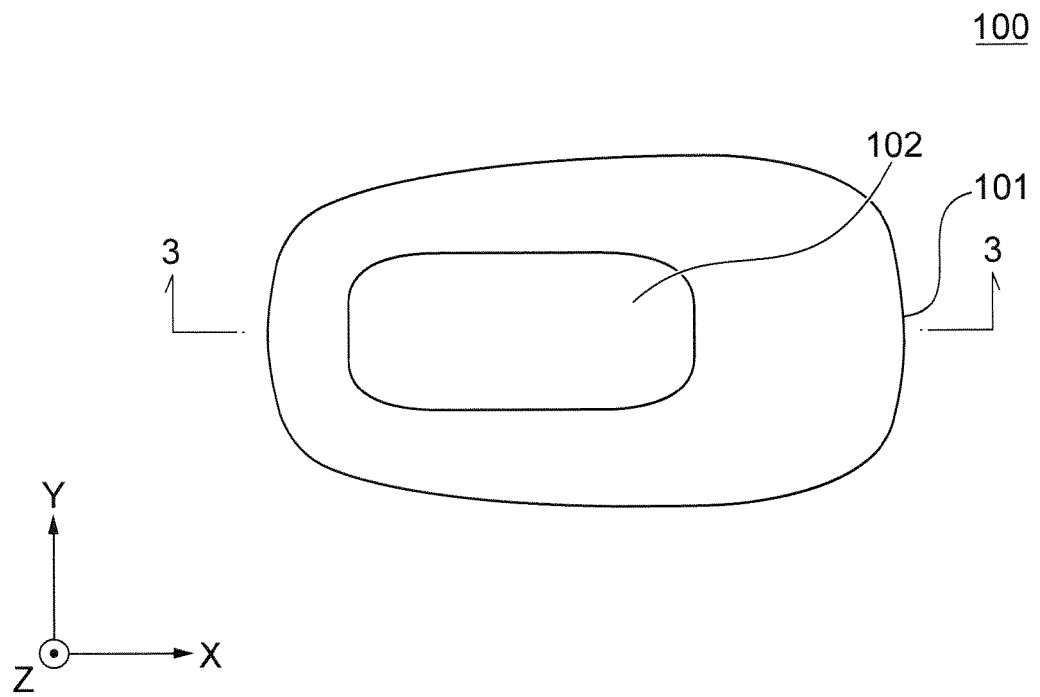


Fig. 1C

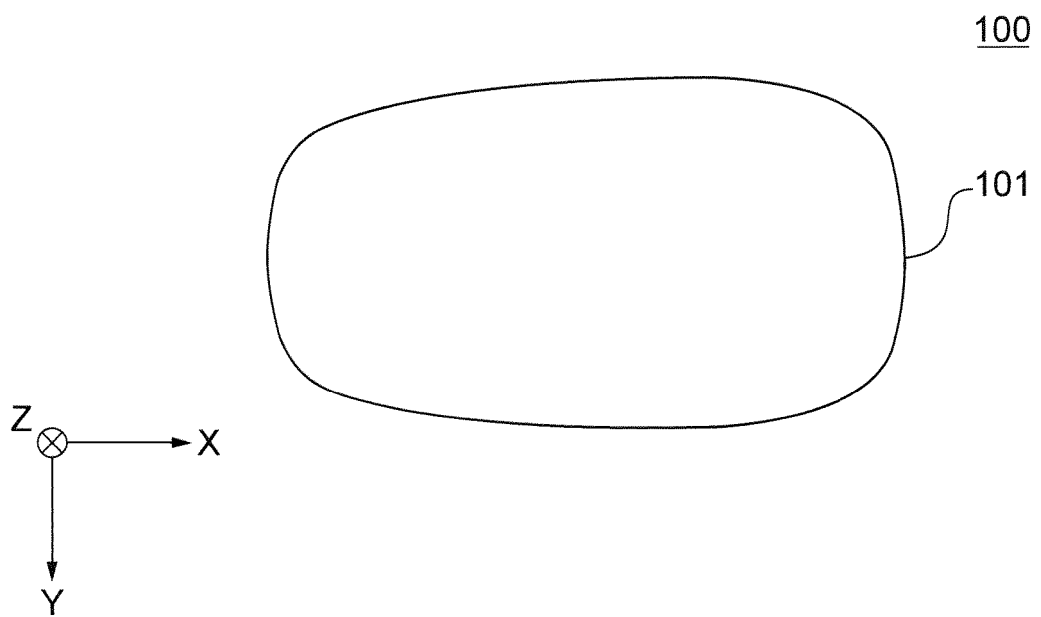


Fig. 2

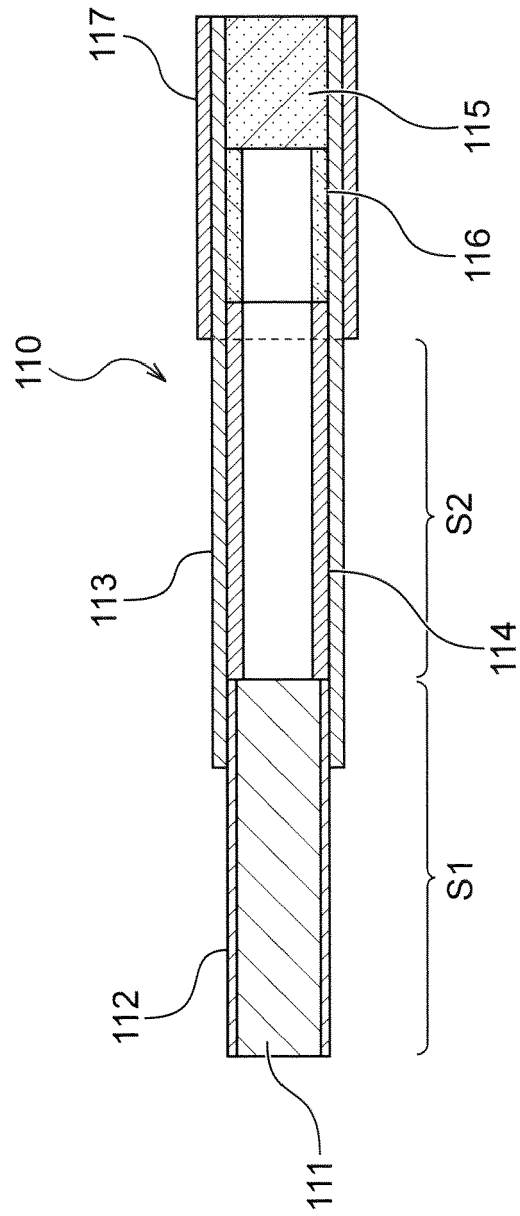


Fig. 3

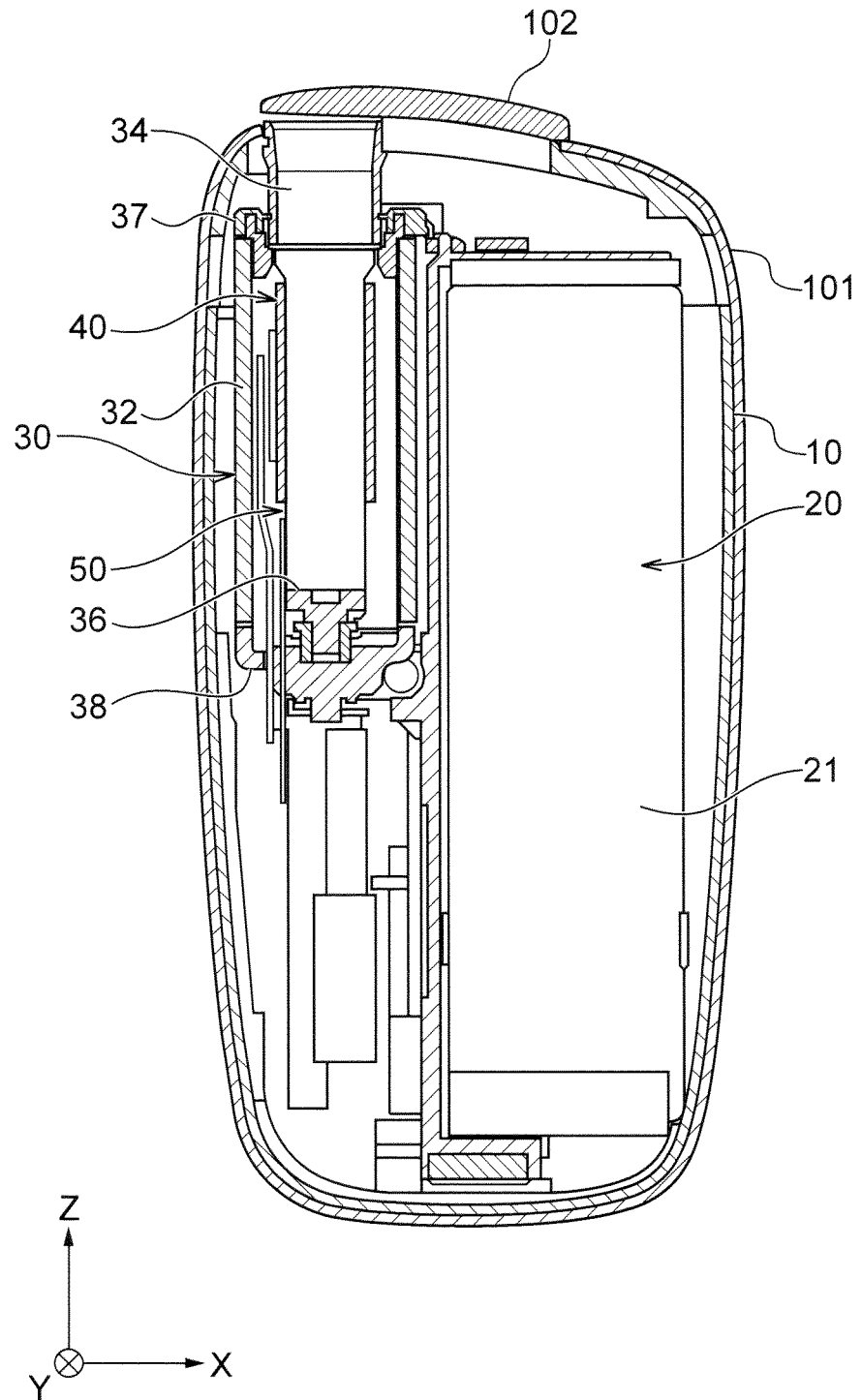


Fig. 4A

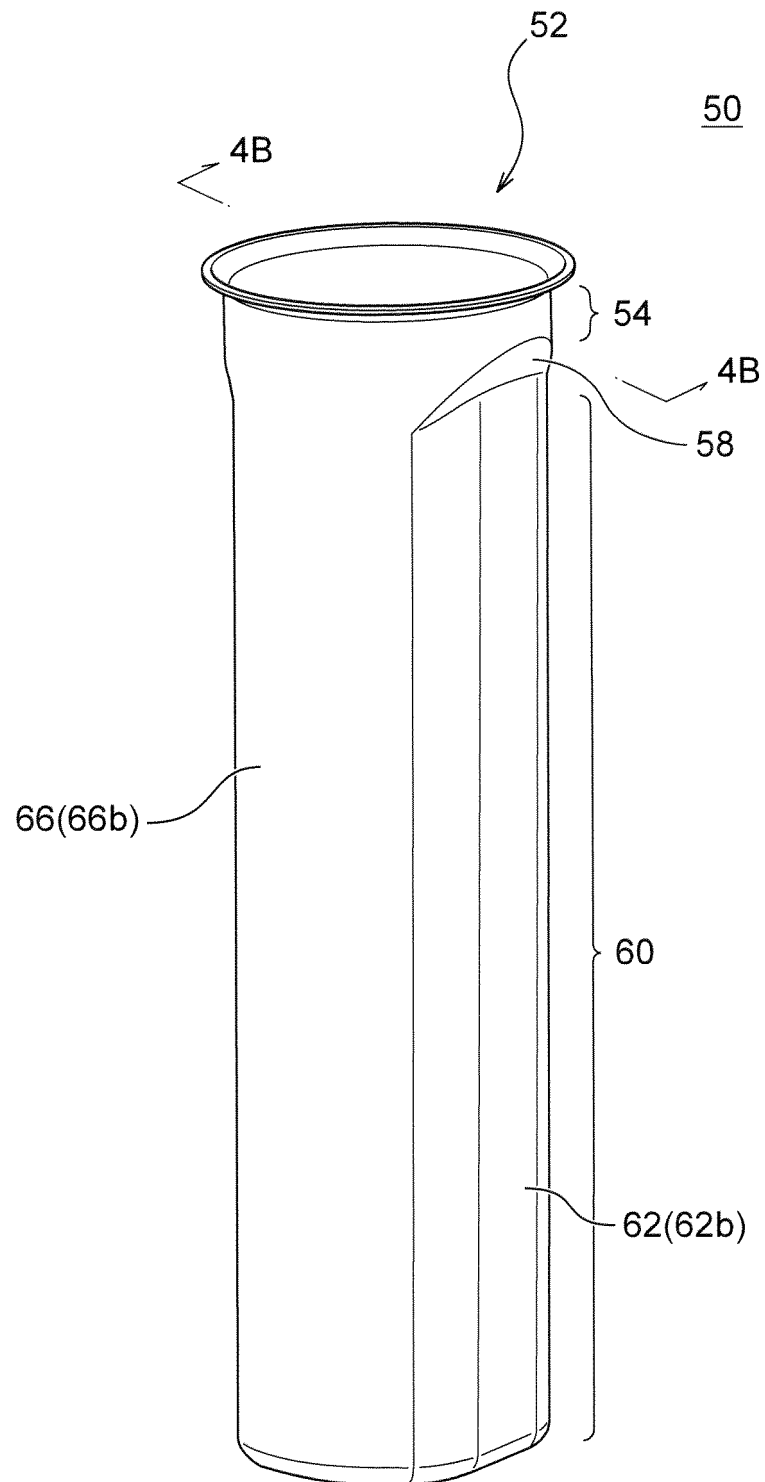


Fig. 4B

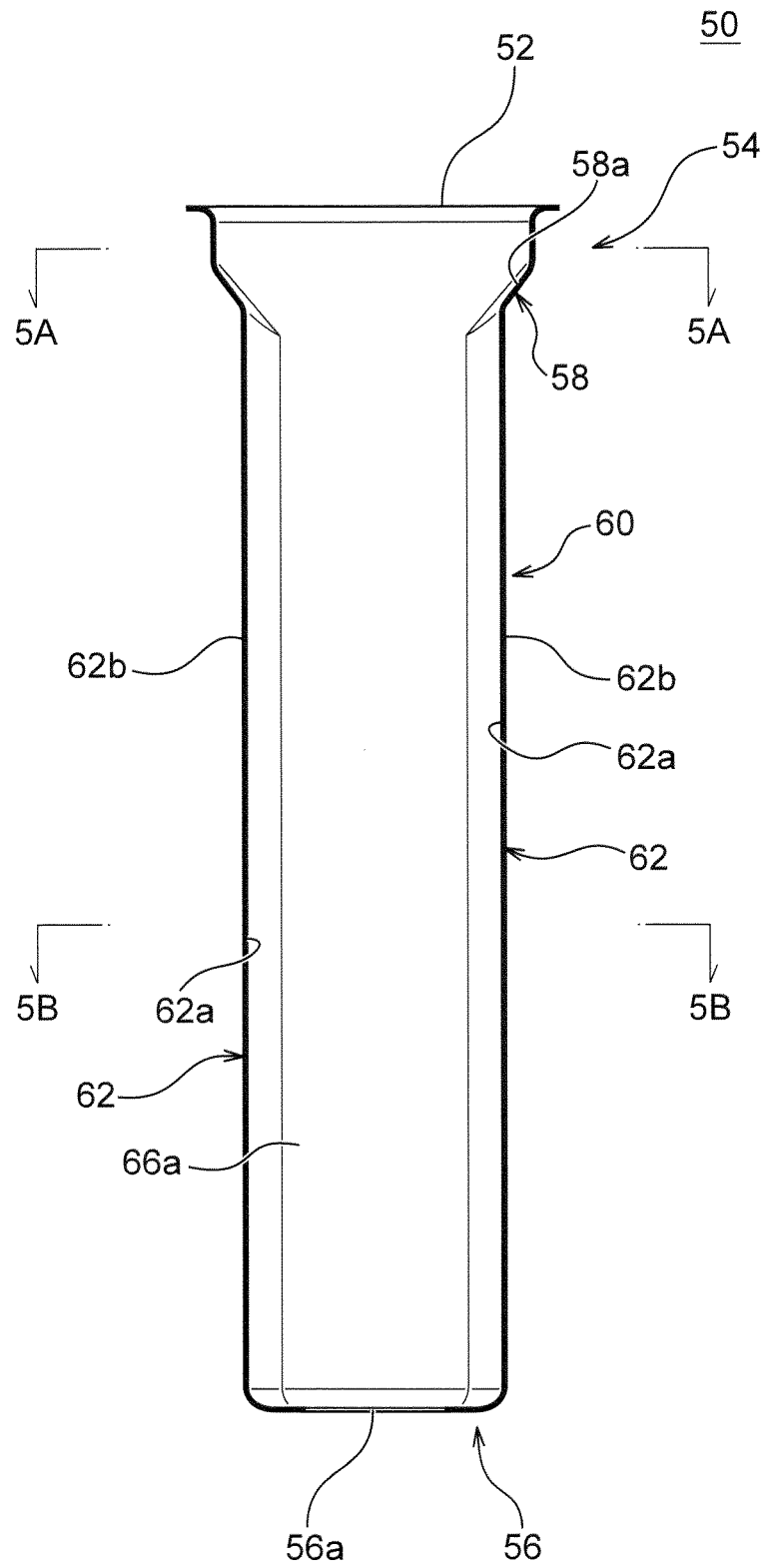


Fig. 5A

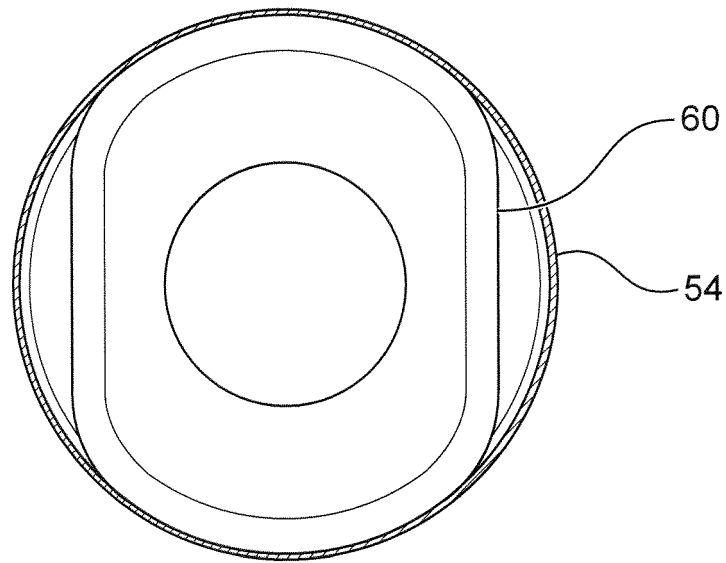


Fig. 5B

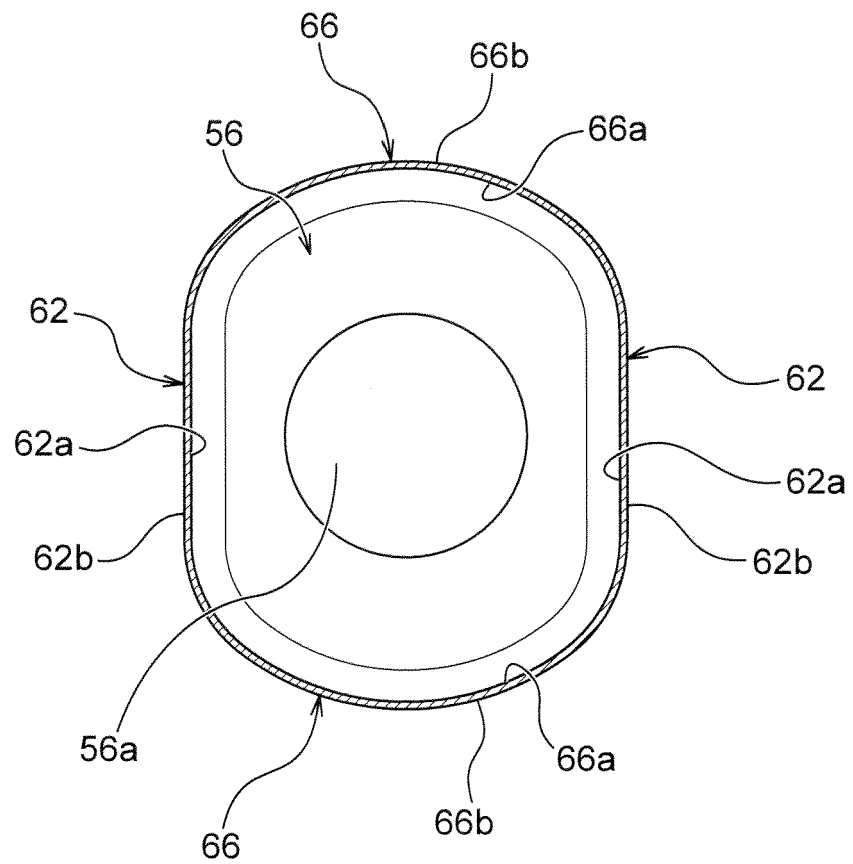


Fig. 6

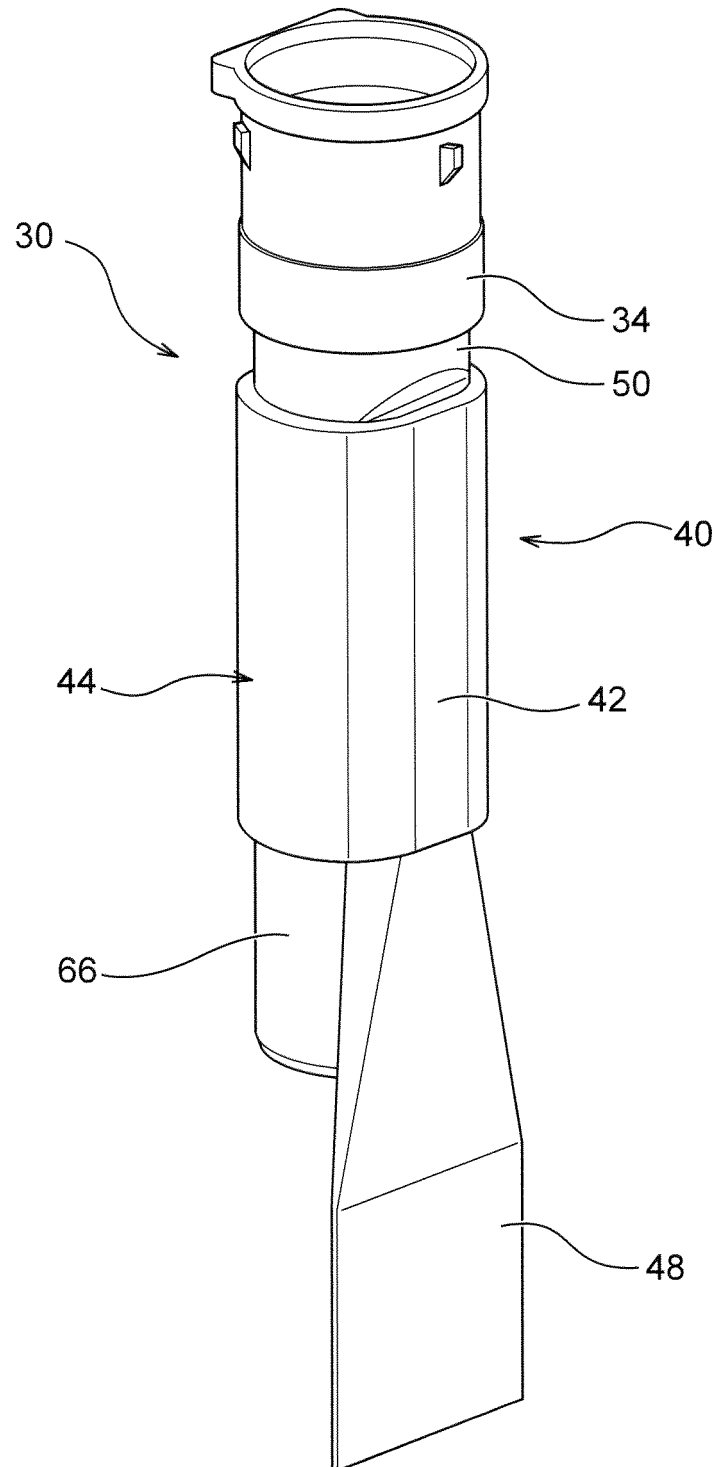


Fig. 7

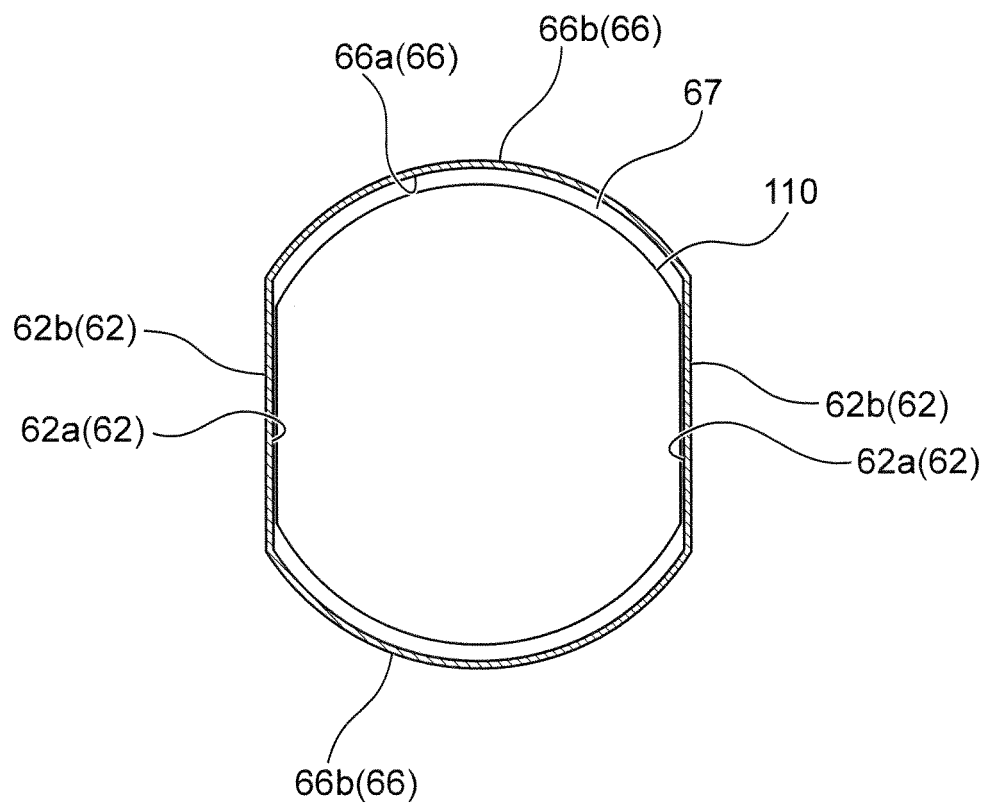


Fig. 8A

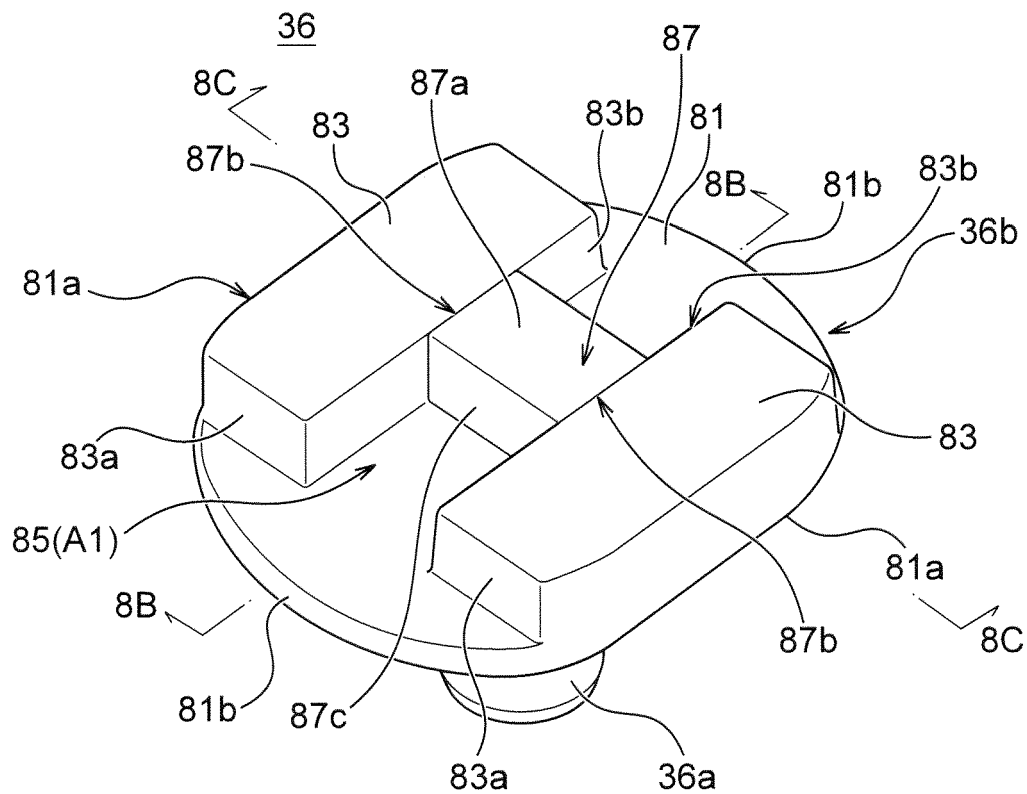


Fig. 8B

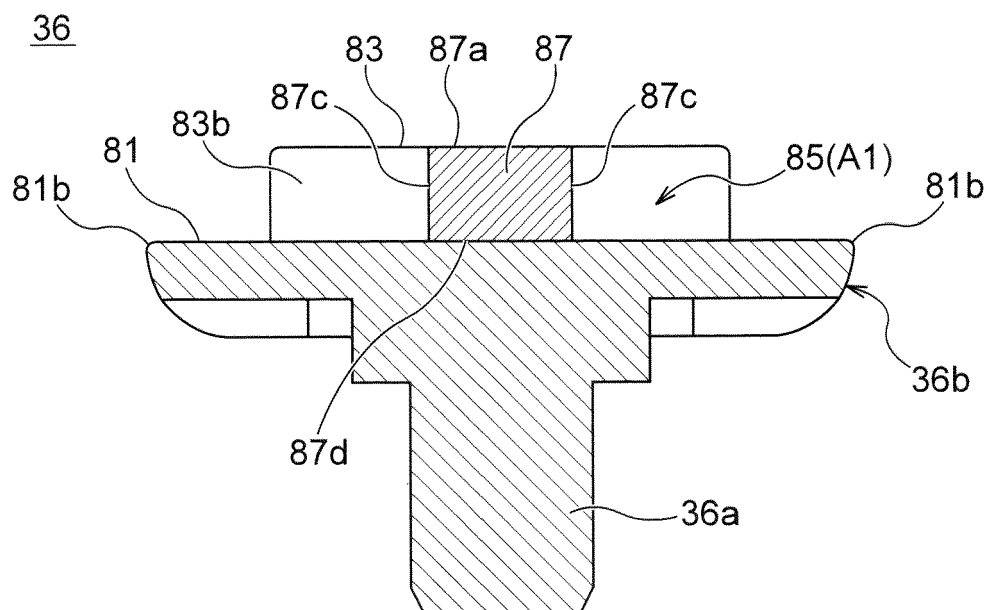


Fig. 8C

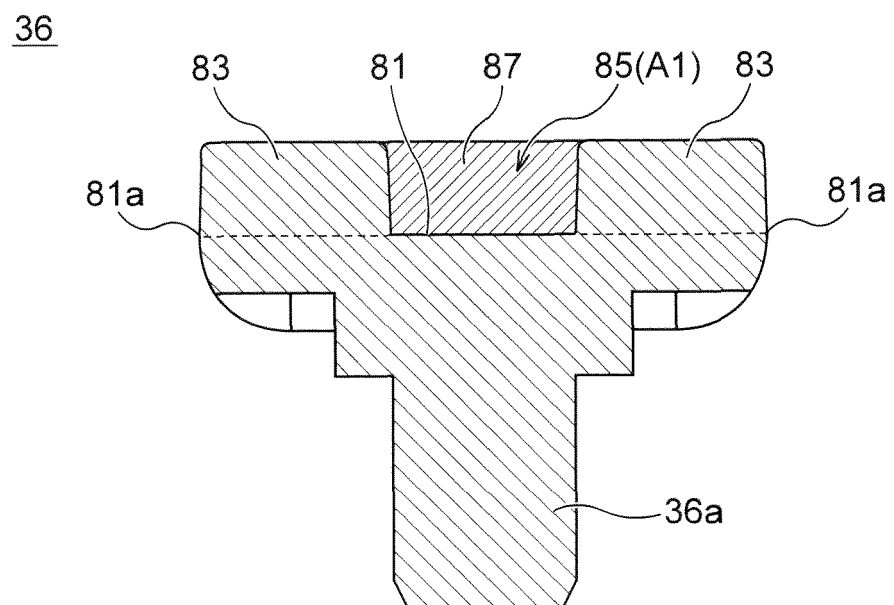


Fig. 9

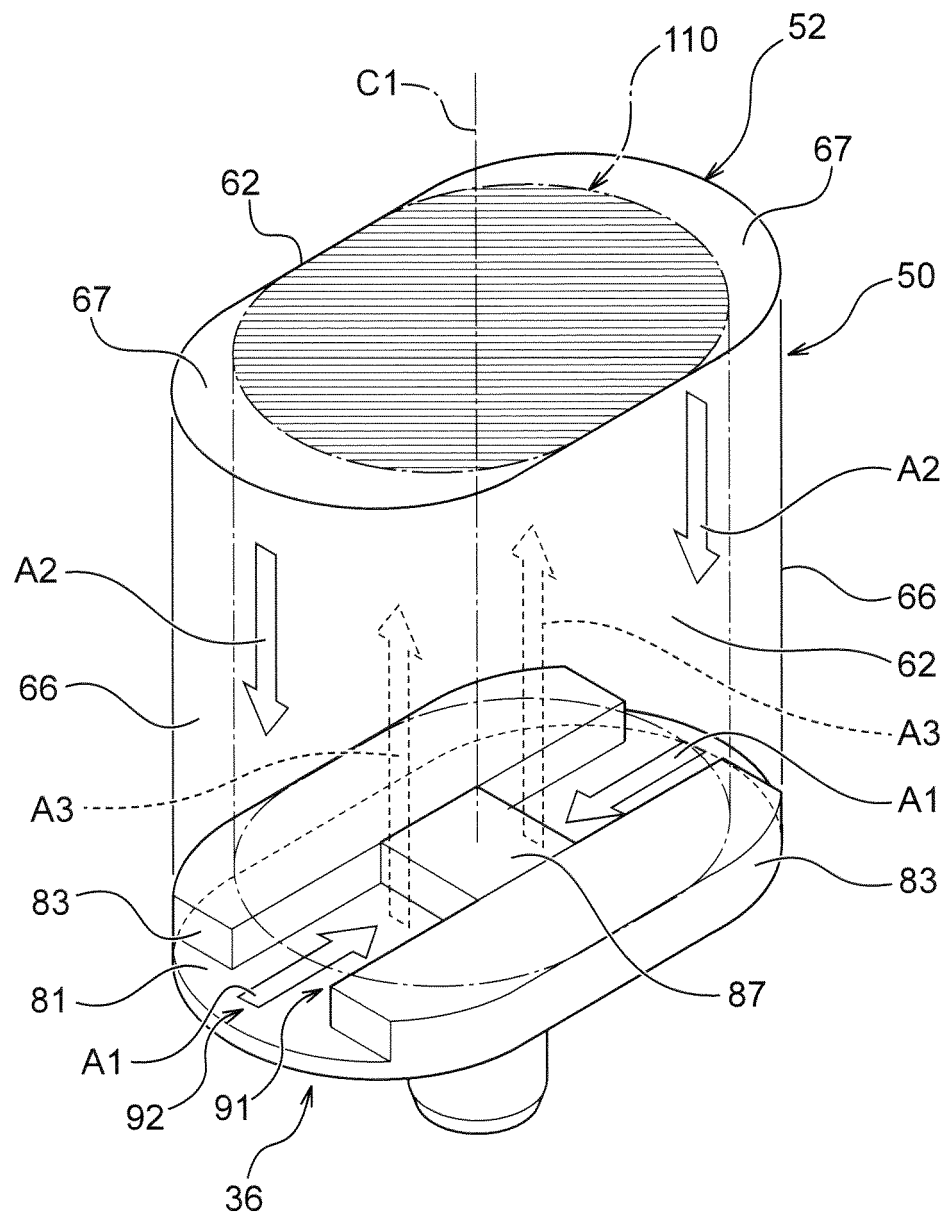


Fig. 10

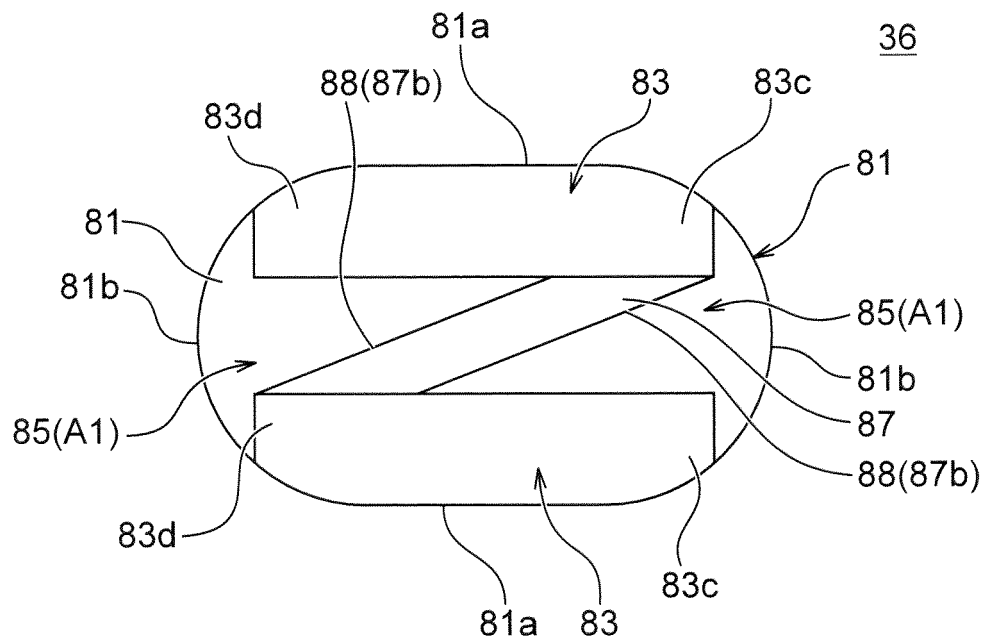
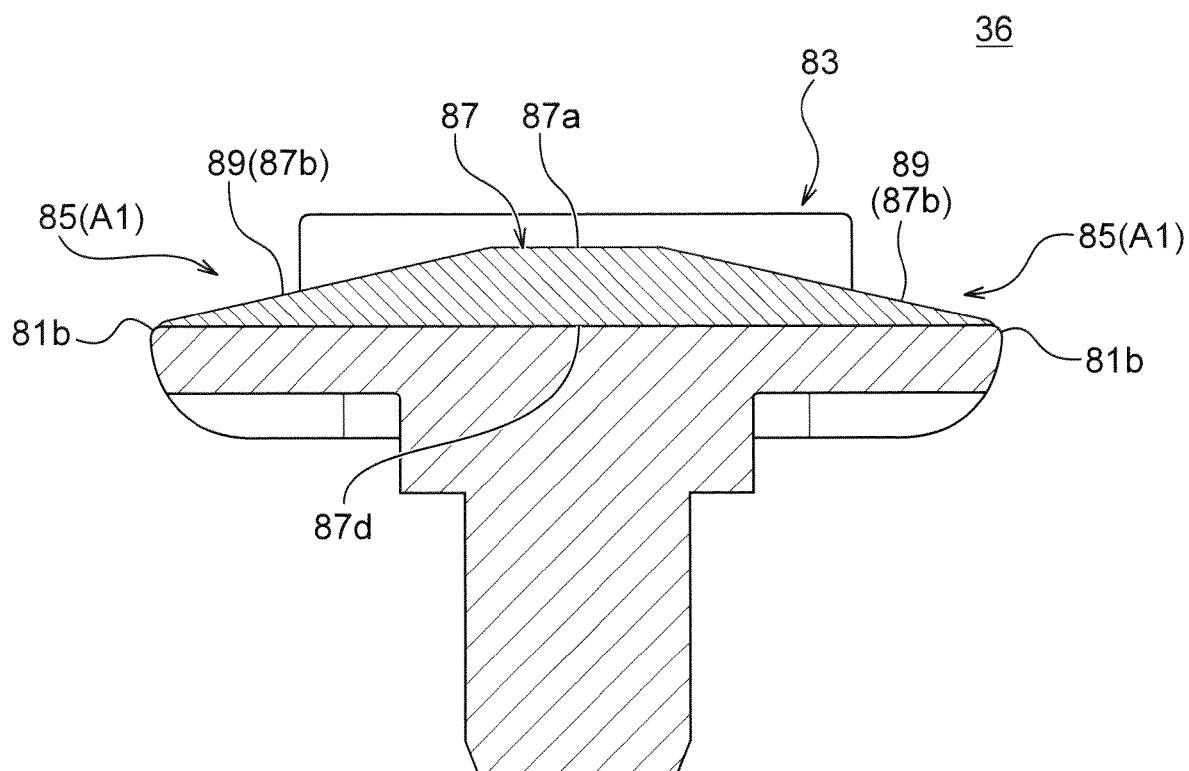


Fig. 11



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2020/046184

A. CLASSIFICATION OF SUBJECT MATTER

A24F 40/40 (2020.01) i

FI: A24F40/40

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A24F40/00-A24F47/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Published examined utility model applications of Japan 1922-1996

Published unexamined utility model applications of Japan 1971-2021

Registered utility model specifications of Japan 1996-2021

Published registered utility model applications of Japan 1994-2021

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2020/074612 A1 (JT INTERNATIONAL S.A.) 16 April 2020 (2020-04-16) columns 4-41, fig. 1-12	1-2, 8-11 3-7, 12
A	JP 2018-504134 A (PHILIP MORRIS PRODUCTS S.A.) 15 February 2018 (2018-02-15) entire text, all drawings	1-12



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

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

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

"P" document published prior to the international filing date but later than the priority date claimed

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

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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

"&" document member of the same patent family

Date of the actual completion of the international search
04 January 2021 (04.01.2021)Date of mailing of the international search report
12 January 2021 (12.01.2021)Name and mailing address of the ISA/
Japan Patent Office
3-4-3, Kasumigaseki, Chiyoda-ku,
Tokyo 100-8915, Japan

Authorized officer

Telephone No.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/JP2020/046184

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
WO 2020/074612 A1	16 Apr. 2020	(Family: none)	
JP 2018-504134 A	15 Feb. 2018	US 2018/0049472 A1	
		entire text, all	
		drawings	
		CN 107205494 A	
		KR 10-2019-0029780 A	
		EP 3253234 A1	

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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