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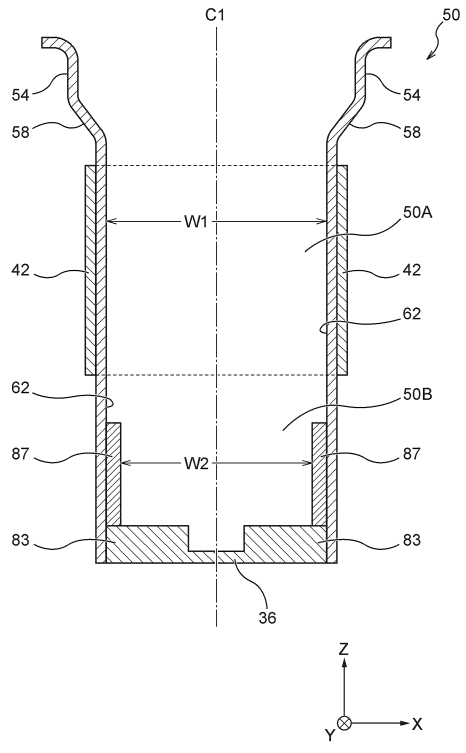
(54) **FLAVOR INHALER AND SMOKING SYSTEM**

(57) There is provided a flavor inhaler including an accommodating portion that includes an opening that allows insertion of a smoking article formed on one end, and that houses the smoking article; a heating unit that is disposed along an axial direction of the accommodating portion, and that heats the smoking article housed in the accommodating portion; and a grasping portion that grasps a side surface of the smoking article housed in the accommodating portion, wherein an inner side surface of the accommodating portion includes a first region that overlaps the heating unit in a cross-sectional view orthogonal to the axial direction of the accommodating portion, and a second region that is a region other than the first region, and that is present along the axial direction of the accommodating portion, between an other end of the accommodating portion and an end portion of the heating unit on the other end side, and the grasping portion is provided in the second region.

Fig. 9



EP 4 321 042 A1

Description

TECHNICAL FIELD

[0001] The present disclosure relates to a flavor inhaler and a smoking system.

BACKGROUND ART

[0002] Conventionally, it is known to provide a flavor inhaler that uses a smoking article such as a stick, with a mechanism for grasping the stick that is inserted in a chamber of the flavor inhaler to prevent the stick from falling. For example, PTL 1 is to be referred to. According to PTL 1, a protrusion for grasping the smoking article is provided at a position that overlaps an internal heater of the chamber in a vertical direction.

CITATION LIST

PATENT LITERATURE

[0003] PTL 1: Japanese Translation of PCT International Application Publication No. 2020-516268

SUMMARY OF INVENTION

TECHNICAL PROBLEM

[0004] To generate an aerosol in a flavor inhaler, a smoking article inserted in a chamber is heated by a heating element. In this case, a heated region of the smoking article near the heating element is possibly locally thinned due to being heated. Accordingly, if the smoking article is grasped near the heated region, grasping is possibly not sufficiently performed.

[0005] The present disclosure provides a flavor inhaler and a smoking system with which a grasping force on a smoking article inserted in a chamber may be sufficiently secured.

SOLUTION TO PROBLEM

[0006] A first aspect of the present disclosure is a flavor inhaler including: an accommodating portion that includes an opening that allows insertion of a smoking article formed on one end, and that houses the smoking article; a heating unit that is disposed along an axial direction of the accommodating portion, and that heats the smoking article housed in the accommodating portion; and a grasping portion that grasps a side surface of the smoking article housed in the accommodating portion, wherein an inner side surface of the accommodating portion includes a first region that overlaps the heating unit in a cross-sectional view orthogonal to the axial direction of the accommodating portion, and a second region that is a region other than the first region, and that is present along the axial direction of the accommodating portion, between an other end of the accommodating portion and an end portion of the heating unit on the other end side, and the grasping portion is provided in the second region.

[0007] In the first aspect described above, the grasping portion for grasping the smoking article inside the accommodating portion is provided in the second region that is sectioned off from the first region where the heating unit is disposed along the axial direction of the accommodating portion. Therefore, according to the first aspect, the smoking article is grasped in a non-heating region that is not in contact with the heating unit, and a sufficient grasping force may thus be secured for the smoking article housed in the accommodating portion.

[0008] A second aspect of the present disclosure is the flavor inhaler according to the first aspect, wherein formula (1) and formula (2) are satisfied in relation to a cross-sectional view of a cross section cut along a center axis of the accommodating portion and passing through the grasping portion:

$$W1 \geq W2 \quad \ldots (1)$$

$$W3 \geq W2 \quad \ldots (2),$$

where, in the formula (1) and the formula (2), W1 is a length of the first region in a radial direction, W2 is a length of the second region in the radial direction, and W3 is a length of the smoking article in the radial direction, in the first region.

[0009] In the second aspect described above, in the cross-sectional view of the cross section cut along the center axis of the accommodating portion and passing through the grasping portion, because the grasping portion protrudes inward in the radial direction, the length, in the radial direction, of the second region where the grasping portion is provided is smaller than the length, in the radial direction, of the first region where the grasping portion is not provided. Furthermore, in the cross-sectional view, the length, in the radial direction, of the second region where the grasping portion is provided is smaller than the length, in the radial direction, of the smoking article that is in the first region and that is not pressed by the grasping portion. Therefore, according to the second aspect, because an internal space of the accommodating portion in the non-heating region that is not in contact with the heating unit is compressed inward in the radial direction, a sufficient grasping force may be secured for the smoking article housed in the accommodating portion.

[0010] A third aspect of the present disclosure is the flavor inhaler according to the second aspect, wherein the grasping portion is a protruding portion, in the second region, that protrudes toward inside of the accommodating portion.

[0011] In the third aspect described above, the grasping portion for grasping the smoking article is formed as

the protruding portion that protrudes toward inside of the accommodating portion. Therefore, according to the third aspect, a grasping force toward inside of the accommodating portion may be sufficiently applied to the smoking article housed in the accommodating portion.

[0012] A fourth aspect of the present disclosure is the flavor inhaler according to the third aspect, wherein a bottom member that forms a bottom portion of the accommodating portion is provided at the other end of the accommodating portion, the bottom member is formed integrally with or as a separate member from the accommodating portion, and the protruding portion is provided near the bottom portion.

[0013] In the fourth aspect described above, the bottom member is provided to form the bottom portion of the accommodating portion, and the grasping portion for grasping the smoking article is provided near the bottom portion. Therefore, according to the fourth aspect, the smoking article may be stably grasped near the bottom portion of the accommodating portion. Furthermore, in the fourth aspect, freedom in structure of the accommodating portion is increased because the bottom member is formed integrally with or as a separate member from the accommodating portion.

[0014] A fifth aspect of the present disclosure is the flavor inhaler according to the fourth aspect, wherein the protruding portion extends from the bottom portion of the accommodating portion toward the one end.

[0015] In the fifth aspect described above, the grasping portion for grasping the smoking article is formed as the protruding portion that extends vertically upward from the bottom portion of the accommodating portion and toward inside of the accommodating portion. Therefore, according to the fifth aspect, a grasping force toward inside may be sufficiently applied, near the bottom portion of the accommodating portion, to the smoking article housed in the accommodating portion.

[0016] A sixth aspect of the present disclosure is the flavor inhaler according to the fifth aspect, wherein the protruding portion includes a sloping portion near an end portion on the one end side of the accommodating portion, the sloping portion sloping farther away from the center axis of the accommodating portion as the one end is neared.

[0017] In the sixth aspect described above, the sloping portion that slopes away from the center axis of the accommodating portion is provided at a tip of the protruding portion that extends vertically upward from the bottom portion of the accommodating portion and toward inside of the accommodating portion. Therefore, according to the sixth aspect, the protruding portion may be prevented from obstructing insertion when the smoking article is inserted into the accommodating portion.

[0018] A seventh aspect of the present disclosure is the flavor inhaler according to the third to sixth aspects, wherein the protruding portion includes a pair of ridge portions.

[0019] In the seventh aspect described above, the protruding portion that extends vertically upward from the bottom portion of the accommodating portion and toward inside of the accommodating portion includes the pair of ridge portions. Therefore, according to the seventh aspect, the pair of ridge portions sandwich the side surface of the smoking article, and the smoking article may be stably grasped inside the accommodating portion.

[0020] An eighth aspect of the present disclosure is the flavor inhaler according to the seventh aspect, wherein the protruding portion slopes more toward the center axis of the accommodating portion, the farther away from the other end of the accommodating portion.

[0021] In the eighth aspect described above, the protruding portion including the pair of ridge portions is sloped toward the center axis of the accommodating portion. Therefore, according to the eighth aspect, when pressed and spread radially out by the smoking article that is inserted into the accommodating portion, the pair of ridge portions press the smoking article radially inward in reaction, and the smoking article may be stably grasped inside the accommodating portion.

[0022] A ninth aspect of the present disclosure is the flavor inhaler according to the first to eighth aspects, wherein, in a cross-sectional view passing through a center axis of the accommodating portion, the grasping portion is provided at a position that is separated from the heating unit along the axial direction of the accommodating portion to the other end side of the accommodating portion.

[0023] In the ninth aspect described above, the grasping portion is provided vertically below the heating unit. Therefore, according to the ninth aspect, when a compression chamber that has a non-circular shape and that may increase heating efficiency for the smoking article is adopted as the accommodating portion, the smoking article that is inserted is pressed at a compressed part of the accommodating portion where the heating unit is disposed and the side surface of the smoking article is grasped by the grasping portion at a vertically lower position, and the smoking article is thereby fixed in the internal space of the accommodating portion.

[0024] A tenth aspect of the present disclosure is the flavor inhaler according to the first to ninth aspects, wherein the smoking article includes a flavor source-filled portion that is filled with a flavor source, and the grasping portion grasps the flavor source-filled portion of the smoking article that is housed in the accommodating portion.

[0025] In the tenth aspect described above, of the smoking article, the grasping portion grasps the flavor source-filled portion that is filled with the flavor source, and thus, a holding force is increased compared to a case where a different part with less density is grasped.

[0026] An eleventh aspect of the present disclosure is a smoking system including a smoking article and a flavor inhaler, wherein the flavor inhaler includes an accommodating portion that includes an opening that allows insertion of the smoking article formed on one end, and that houses the smoking article, a heating unit that is disposed

along an axial direction of the accommodating portion, and that heats the smoking article housed in the accommodating portion, and a grasping portion that grasps a side surface of the smoking article housed in the accommodating portion, an inner side surface of the accommodating portion includes a first region that overlaps the heating unit in a cross-sectional view orthogonal to the axial direction of the accommodating portion, and a second region that is a region other than the first region, and that is present along the axial direction of the accommodating portion, between an other end of the accommodating portion and an end portion of the heating unit on the other end side, and the grasping portion is provided in the second region.

[0027] In the eleventh aspect described above, the grasping portion for grasping the smoking article inside the accommodating portion is provided in the second region that is sectioned off from the first region where the heating unit is disposed along the axial direction of the accommodating portion. Therefore, according to the eleventh aspect, the smoking article is grasped in a non-heating region that is not in contact with the heating unit, and a sufficient grasping force may thus be secured for the smoking article housed in the accommodating portion.

[0028] A twelfth aspect of the present disclosure is the smoking system according to the eleventh aspect, wherein the smoking article includes a flavor source-filled portion that is filled with a flavor source, and the grasping portion of the flavor inhaler grasps the flavor source-filled portion of the smoking article that is housed in the accommodating portion.

[0029] In the twelfth aspect described above, in the smoking system, the grasping portion grasps the smoking article at the flavor source-filled portion that is filled with the flavor source, and thus, a holding force for the smoking article inside the flavor inhaler may be increased compared to a case where a different part with less density is grasped.

[0030] A thirteenth aspect of the present disclosure is the smoking system according to the eleventh or twelfth aspect, wherein the smoking article includes a conductive member inside a flavor source used for filling, the heating unit of the flavor inhaler generates a magnetic field that varies over time, and the conductive member of the smoking article generates heat based on a variation in the magnetic field.

[0031] In the thirteenth aspect described above, a flavor is generated when the conductive member embedded in the flavor source filling the flavor inhaler generates heat due to the varying magnetic field generated by the flavor inhaler. Therefore, according to the thirteenth aspect, in the smoking system, a flavor can be generated without causing the flavor inhaler itself to generate heat.

[0032] A fourteenth aspect of the present disclosure is the smoking system according to the thirteenth aspect, wherein the conductive member includes a plurality of members that are discretely disposed inside the flavor source.

[0033] In the fourteenth aspect described above, a plurality of conductive members that are disposed away from each other are embedded in the flavor source of the smoking article. Therefore, according to the fourteenth aspect, freedom in structure of a smoking article where a member to be heated is embedded may be increased.

BRIEF DESCRIPTION OF DRAWINGS

[0034]

[Fig. 1A] Fig. 1A is a schematic front view of a flavor inhaler according to a first embodiment.

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

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

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

[Fig. 3] Fig. 3 is a cross-sectional view of the flavor inhaler taken along arrows 3-3 shown in Fig. 1B.

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

[Fig. 4B] Fig. 4B is a cross-sectional view of the chamber taken along arrows 4B-4B shown in Fig. 4A.

[Fig. 5A] Fig. 5A is a cross-sectional view of the chamber taken along arrows 5A-5A shown in Fig. 4B.

[Fig. 5B] Fig. 5B is a cross-sectional view of the chamber taken along arrows 5B-5B shown in Fig. 4B.

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

[Fig. 7] Fig. 7 is a cross-sectional view shown in Fig. 5B, where the consumable is disposed at a desired position inside the chamber.

[Fig. 8] Fig. 8 is a perspective view of a bottom member.

[Fig. 9] Fig. 9 is a cross-sectional view of the chamber taken along arrows 9-9 shown in Fig. 5B, Fig. 9 showing a relative arrangement of a heating element and an extending portion according to the first embodiment.

[Fig. 10] Fig. 10 is a plan view showing the chamber from vertically above.

[Fig. 11] Fig. 11 is a cross-sectional view of the chamber, Fig. 11 showing a relative arrangement of the heating element and an extending portion according to a modification of the first embodiment.

[Fig. 12] Fig. 12 is a cross-sectional view of a chamber according to a second embodiment, Fig. 12 showing a relative arrangement of an internal heater and an extending portion.

[Fig. 13] Fig. 13 is a cross-sectional view of a chamber according to a third embodiment, Fig. 13 showing a relative arrangement of a susceptor portion and an extending portion.

[Fig. 14] Fig. 14 is a cross-sectional view of a chamber according to a modification of the third embodiment, Fig. 14 showing a relative arrangement of an

embedded susceptor and the extending portion.

[Fig. 15] Fig. 15 is a cross-sectional view of a chamber according to a fourth embodiment, Fig. 15 showing a relative arrangement of a high frequency generation device and an extending portion.

DESCRIPTION OF EMBODIMENTS

<First Embodiment

[0035] Hereinafter, a first embodiment of the present disclosure will be described with reference to the drawings. In the drawings described below, same or corresponding structural elements will be denoted by a same reference sign, and redundant description thereof will be omitted.

[0036] Fig. 1A is a schematic front view of a flavor inhaler 100 according to the first embodiment. Fig. 1B is a schematic top view of the flavor inhaler 100 according to the first embodiment. Fig. 1C is a schematic bottom view of the flavor inhaler 100 according to the first embodiment. In the drawings described in the present specification, an X-Y-Z orthogonal coordinate system may be added for the sake of description. In the coordinate system, a Z-axis faces vertically upward, an X-Y plane cuts the flavor inhaler 100 in a horizontal direction, and a Y-axis extends from a front surface to a back surface of the flavor inhaler 100. The Z-axis may also be said to be an insertion direction of a consumable that is to be housed in a chamber 50 of an atomizing unit 30 described later, or an axial direction of a heat insulating portion that has a cylindrical shape. Furthermore, an X-axis may be said to be a first direction that is orthogonal to the axial direction, and the Y-axis may be said to be a second direction that is orthogonal to the axial direction and the first direction. Moreover, an X-axis direction may be said to be a longitudinal direction of the flavor inhaler 100 on a plane that is orthogonal to the insertion direction of the consumable, and a Y-axis direction may be said to be a transverse direction of the flavor inhaler 100 on the plane that is orthogonal to the insertion direction of the consumable.

[0037] For example, the flavor inhaler 100 according to the first embodiment generates an aerosol including a flavor by heating a stick-shaped consumable including a flavor source including an aerosol source.

[0038] As shown 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 forms an outermost housing of the flavor inhaler 100, and has a size that can be fitted in a hand of a user. At the time of using the flavor inhaler 100, a user may hold the flavor inhaler 100 in the hand, and may inhale the aerosol. The outer housing 101 may be formed by assembling a plurality of members. For example, the outer housing 101 may be formed of polycarbonate, acrylonitrile-butadiene-styrene (ABS) resin, polyether ether ketone (PEEK), a polymer alloy containing a plurality of types of polymers, or metal such as aluminum.

[0039] The outer housing 101 includes an opening, not shown, for receiving a consumable, and the slide cover 102 is slidably attached to the outer housing 101 to close the opening. More specifically, the slide cover 102 is movable along an outer surface of the outer housing 101, between a close position of closing the opening in the outer housing 101 (a position shown in Figs. 1A and 1B) and an open position of opening the opening. For example, the slide cover 102 may be moved between the close position and the open position by the user manually operating the slide cover 102. The slide cover 102 may thus allow or restrict access of the consumable into the flavor inhaler 100.

[0040] The switch unit 103 is used to switch between on and off of operation of the flavor inhaler 100. For example, as described later, when a user operates the switch unit 103 in a state where the consumable is inserted in the flavor inhaler 100, power may be supplied from a power source 21 to a heating device 40, and the consumable may be heated without being burnt. Additionally, the switch unit 103 may be a switch that is provided outside the outer housing 101, or may be a switch positioned inside the outer housing 101. In the case where the switch is positioned inside the outer housing 101, the switch is indirectly pressed when the switch unit 103 on a surface of the outer housing 101 is pressed. In the first embodiment, an example is described where the switch of the switch unit 103 is positioned inside the outer housing 101.

[0041] The flavor inhaler 100 may further include a terminal, not shown. The terminal may be an interface for connecting the flavor inhaler 100 to an external power source, for example. In the case where the power source of the flavor inhaler 100 is a rechargeable battery, current may be supplied from the external power source to the power source and the power source may be charged when the external power source is connected to the terminal. Furthermore, data about operation of the flavor inhaler 100 may be transmitted to an external device by connecting a data transmission cable to the terminal.

[0042] Next, a consumable that is used with the flavor inhaler 100 according to the first embodiment will be described. Fig. 2 is a schematic cross-sectional side view of a consumable 110. In the first embodiment, a smoking system may be formed by the flavor inhaler 100 and the consumable 110. In the example shown in Fig. 2, the consumable 110 includes a smokable substance 111, a cylindrical member 114, a hollow filter portion 116, and a filter portion 115. The smokable substance 111 is wrapped with a first rolling paper 112. The cylindrical member 114, the hollow filter portion 116, and the filter portion 115 are wrapped with a 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 that is wrapped around the smokable substance 111. The cylindrical member 114, the hollow filter portion 116, and the filter portion 115 are thus joined to the smokable substance 111. Additionally, the second

rolling paper 113 may be omitted, and the cylindrical member 114, the hollow filter portion 116, and the filter portion 115 may instead be joined to the smokable substance 111 using the first rolling paper 112. A lip release agent 117 is applied on an outer surface of the second rolling paper 113, around an end portion on the filter portion 115 side, to prevent lips of the user from sticking to the second rolling paper 113. The part of the consumable 110 where the lip release agent 117 is applied functions as a mouthpiece of the consumable 110. The consumable 110 is an example of a smoking article of the present disclosure. The smokable substance 111 is an example of a flavor source of the present embodiment.

[0043] The smokable substance 111 may include a flavor source, such as chopped or granular tobacco, and an aerosol source, for example. Furthermore, the first rolling paper 112 wrapped around the smokable substance 111 may be a breathable sheet member. The cylindrical member 114 may be a paper tube or a hollow filter. In the example shown in Fig. 2, the consumable 110 includes the smokable substance 111, the cylindrical member 114, the hollow filter portion 116, and the filter portion 115, but the structure of the consumable 110 is not limited thereto. For example, the hollow filter portion 116 may be omitted, and the cylindrical member 114 and the filter portion 115 may be disposed next to each other.

[0044] Next, an internal structure of the flavor inhaler 100 will be described. Fig. 3 is a cross-sectional view of the flavor inhaler 100 taken along arrows 3-3 shown in Fig. 1B. As shown in Fig. 3, an inner housing 10 is provided inside the outer housing 101 of the flavor inhaler 100. For example, the inner housing 10 may be formed of polycarbonate (PC), acrylonitrile-butadiene-styrene (ABS) resin, PEEK, a polymer alloy containing a plurality of types of polymers, or metal such as aluminum, but the material of the inner housing 10 is not particularly specified. A power source unit 20 and the atomizing unit 30 are provided in an internal space of the inner housing 10. Moreover, a circuit unit, not shown, is provided in the internal space of the inner housing 10.

[0045] For example, the circuit unit includes a microprocessor and the like, and is capable of controlling supply of power from the power source unit 20 to the atomizing unit 30. The circuit unit may thus control heating of the consumable 110 by the atomizing unit 30.

[0046] The power source unit 20 includes the power source 21 that is electrically connected to the circuit unit. For example, the power source 21 may be a rechargeable battery or a non-rechargeable battery. The power source 21 is electrically connected to the atomizing unit 30 via the circuit unit. The power source 21 may thus supply power to the atomizing unit 30 so that the consumable 110 is appropriately heated.

[0047] As shown in Fig. 3, the atomizing unit 30 includes the chamber 50 extending in the insertion direction of the consumable 110 (a Z-axis direction), the heating device 40 surrounding a part of the chamber 50, a heat insulating portion 32, and an insertion guide member 34 having a substantially cylindrical shape. The chamber 50 houses the consumable 110. The heating device 40 is in contact with an outer circumferential surface of the chamber 50, and the heating device 40 heats the consumable 110 that is housed in the chamber 50. As shown in Fig. 3, a bottom member 36 may be provided at a bottom portion of the chamber 50. The bottom member 36 may function as a stopper for positioning the consumable 110 that is inserted in the chamber 50. The bottom member 36 is uneven at a surface where the consumable 110 abuts against, and an air passage is formed between the surface where the consumable 110 abuts against and the bottom member 36. Additionally, a pair of extending portions 87 extend vertically upward from the bottom member 36. Details of the chamber 50, the heating device 40, the bottom member 36, and the extending portions 87 will be given later. The chamber 50 is an example of an accommodating portion of the present disclosure.

[0048] The heat insulating portion 32 is substantially cylindrical as a whole, and is disposed to surround the chamber 50. The heat insulating portion 32 may include an aerogel sheet, for example. The insertion guide member 34 is formed of a resin material such as PEEK, PC, or ABS, and is provided between the slide cover 102 in the close position and the chamber 50. When the slide cover 102 is in the open position, the insertion guide member 34 communicates with outside of the flavor inhaler 100, and guides insertion of the consumable 110 into the chamber 50 when the consumable 110 is inserted in the insertion guide member 34.

[0049] Next, a 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 taken along arrows 4B-4B shown in Fig. 4A. Fig. 5A is a cross-sectional view of the chamber 50 taken along arrows 5A-5A shown in Fig. 4B. Fig. 5B is a cross-sectional view of the chamber 50 taken along arrows 5B-5B shown in Fig. 4B. Fig. 6 is a perspective view of the chamber 50 and the heating device 40. As shown in Figs. 4A and 4B, the chamber 50 may be a cylindrical member including an opening 52 through which the consumable 110 is inserted, and a cylindrical side wall portion 60 for housing the consumable 110. The chamber 50 includes, on inside, an accommodating space 68 for heating the consumable 110. A flange portion 52a is formed on an end portion of the chamber 50 demarcating the opening 52. The chamber 50 is desirably formed of a material that has heat resistance and that has small thermal expansion coefficient, and may be formed of metal such as stainless steel, resin such as PEEK, glass, ceramic or the like, for example. The consumable 110 may thus be efficiently heated in the chamber 50.

[0050] As shown in Figs. 4B and 5B, the side wall portion 60 includes a contact portion 62 and a separated portion 66. When the consumable 110 is disposed at a desired position inside the chamber 50, the contact portion 62 contacts or presses a part of the consumable 110, and the separated portion 66 is separate from the con-

sumable 110. Additionally, in the present specification, "desired position inside the chamber 50" refers to a position where the consumable 110 is appropriately heated, a position of the consumable 110 when the user smokes, or a position where the consumable 110 contacts the bottom member 36 described later. The contact portion 62 includes an inner surface 62a and an outer surface 62b. The separated portion 66 includes an inner surface 66a and an outer surface 66b. As shown in Fig. 6, the heating device 40 is disposed on the outer surface 62b of the contact portion 62. The heating device 40 is desirably disposed on the outer surface 62b of the contact portion 62 with no gap in between.

[0051] As shown in Figs. 4A and 5B, the outer surface 62b of the contact portion 62 is flat. In the case where a strip-shaped electrode 48 is connected to the heating device 40 disposed on the outer surface 62b of the contact portion 62 as shown in Fig. 6, because the outer surface 62b of the contact portion 62 is flat, the strip-shaped electrode 48 may be prevented from being bent. As shown in Figs. 4B and 5B, the inner surface 62a of the contact portion 62 is flat. Furthermore, as shown in Figs. 4B and 5B, a thickness of the contact portion 62 is uniform.

[0052] As shown in Figs. 4A, 4B, and 5B, the chamber 50 includes two contact portions 62 in a circumferential direction of the chamber 50, and the two contact portions 62 face each other in parallel. A distance between at least parts of the inner surfaces 62a of the two contact portions 62 is desirably smaller than a width of a part where the consumable 110 that is inserted in the chamber 50 is disposed between the contact portions 62.

[0053] As shown in Fig. 5B, the inner surface 66a of the separated portion 66 may have, as a whole, an arc-shaped cross-section on a plane orthogonal to a longitudinal direction (the Z-axis direction) of the chamber 50. Furthermore, the separated portion 66 is disposed adjacent to the contact portions 62 in the circumferential direction.

[0054] As shown in Fig. 4B, the chamber 50 may include a hole 56a in a bottom portion 56 to allow the bottom member 36 shown in Fig. 3 to penetrate and be disposed inside the chamber 50. The bottom member 36 may be fixed on an inside of the bottom portion 56 of the chamber 50 by an adhesive or the like, and forms a bottom wall portion of the accommodating portion that houses the consumable 110. The bottom member 36 provided on the bottom portion 56 supports a part of the consumable 110 that is inserted in the chamber 50 in such a way that at least a part of an end surface of the consumable 110 is exposed. Furthermore, the bottom portion 56 may support a part of the consumable 110 in such a way that the end surface of the consumable 110 that is exposed communicates with a gap 67 described later (see Fig. 7). The bottom member 36 is uneven at the surface where the consumable 110 abuts against, and may, but not limited to, be formed of a resin material such as PEEK, metal, glass, or ceramic.

[0055] As shown in Figs. 4A and 4B, the chamber 50 desirably includes a cylindrical non-holding portion 54 between the opening 52 and the side wall portion 60. A gap may be formed between the non-holding portion 54 and the consumable 110 in a state where the consumable 110 is positioned at the desired position inside the chamber 50. Furthermore, as shown in Figs. 4A and 4B, the chamber 50 desirably includes a first guide portion 58 including a tapered surface 58a that connects an inner surface of the non-holding portion 54 and the inner surface 62a of the contact portion 62.

[0056] As shown in Fig. 6, the heating device 40 includes a heating element 42. The heating element 42 may be a heating track, for example. The heating element 42 is disposed to heat the contact portion 62 without coming into contact with the separated portion 66 of the chamber 50. More specifically, the heating element 42 is disposed only on the outer surface of the contact portion 62. As shown in Fig. 6, in addition to the heating element 42, the heating device 40 desirably includes an electrically insulating member 44 that covers at least one surface of the heating element 42. In the first embodiment, the electrically insulating member 44 is disposed to cover both surfaces of the heating element 42. The heating element 42 is an example of a heating unit of the present disclosure.

[0057] More specifically, when power is supplied to the strip-shaped electrode 48 shown in Fig. 6, current flows to the heating element 42 of the heating device 40, and the heating element 42 generates heat. However, power supplied to the electrode 48 does not reach the electrically insulating member 44 of the heating device 40. Accordingly, of the heating device 40 covering a periphery of the chamber 50, only the heating element 42 generates heat. Furthermore, as described above, the heating element 42 is not in contact with the separated portion 66 of the chamber 50, and is disposed only on the outer surface of the contact portion 62. According to such a configuration, the heating device 40 covering the periphery of the chamber 50 directly heats only the contact portion 62 pressing a part of the consumable 110.

[0058] Fig. 7 is a cross-sectional view shown in Fig. 5B, where the consumable 110 is disposed at the desired position inside the chamber 50. As shown in Fig. 7, when the consumable 110 is disposed at the desired position inside the chamber 50, the consumable 110 may be pressed by coming into contact with the contact portion 62 of the chamber 50. The gap 67 is formed between the consumable 110 and the separated portion 66. The gap 67 may communicate with the opening 52 in the chamber 50 and an air passage between the end surface of the consumable 110 positioned inside the chamber 50 and the bottom member 36. Accordingly, air flowing in from the opening 52 in the chamber 50 may pass through the gap 67 and flow into the consumable 110. In other words, an air passage is formed between the consumable 110 and the separated portion 66.

[0059] Next, a structure of the bottom member 36 ac-

cording to the first embodiment will be described in detail. Fig. 8 is a perspective view of the bottom member 36. The bottom member 36 includes an axial portion 36a and a flat plate portion 36b. As shown in Fig. 3, the axial portion 36a protrudes outside the chamber 50 through the hole 56a (see Fig. 4B) in the chamber 50. One end of the axial portion 36a is coupled with a substantially central part of one surface of the flat plate portion 36b. On a cross-section of the chamber 50 shown in Fig. 5B, the flat plate portion 36b has a shape that substantially coincides with an inner surface of the side wall portion 60 of the chamber 50 in plan view. More specifically, the flat plate portion 36b includes a flat surface portion 81 on an opposite side to the surface where the axial portion 36a is coupled, and the flat surface portion 81 includes a pair of linear portions 81a, and arc-shaped portions 81b that connect the pair of linear portions 81a.

[0060] The flat plate portion 36b is disposed inside the chamber 50, and may be fixed to an inner surface of the bottom portion 56 of the chamber 50 by an adhesive, for example. Additionally, the bottom member 36 may be integrally formed with the chamber 50. In a state where the flat plate portion 36b of the bottom member 36 is fixed to the bottom portion 56 of the chamber 50, the flat surface portion 81 is disposed facing the opening 52 in the chamber 50. The bottom member 36 further includes a pair of ridge portions 83 on the flat surface portion 81. The pair of ridge portions 83 each extend substantially in parallel with the linear portion 81a of the flat surface portion 81, and are disposed away from each other.

[0061] In the example shown in Fig. 8, the pair of ridge portions 83 are each disposed on the linear portion 81a, and are each also partly disposed on the arc-shaped portions 81b. The pair of ridge portions 83 include end surfaces 83a in an extending direction, side surfaces 83b that face each other, and top surfaces 83c. Furthermore, in the first embodiment, the side surfaces 83b of the pair of ridge portions 83 are flat, and a linear groove portion 85 is formed between the side surfaces 83b. The groove portion 85 is open toward the accommodating space 68 in the chamber 50. The groove portion 85 demarcates an air passage that communicates with an end surface of the consumable 110 that is disposed at the desired position inside the chamber 50. The air passage extends along a bottom surface of the accommodating portion formed by the chamber 50 and the bottom member 36. The groove portion 85 is formed passing through a center part of the flat surface portion 81 of the bottom member 36.

[0062] Furthermore, as shown in Fig. 8, the pair of extending portions 87 extend vertically upward from the top surfaces 83c of the pair of ridge portions 83. The extending portion 87 abuts against or is adjacent to the inner surface 62a of the contact portion 62 that contacts and presses the consumable 110 in the chamber 50, and grasps an outer periphery of the consumable 110 inside the chamber 50. The pair of extending portions 87 are examples of a grasping portion and a protruding portion of the present disclosure.

[0063] Next, a detailed description with reference to Fig. 9 will be given of a relative positional relationship between the heating element 42 of the heating device 40 and the extending portions 87 near the chamber 50 of the first embodiment.

[0064] Fig. 9 is a cross-sectional view of the chamber taken along arrows 9-9 shown in Fig. 5B, Fig. 9 showing a relative arrangement of the heating element 42 and the extending portion 87. More specifically, a center axis C1 of the chamber 50 extends in the Z-axis direction in Fig. 9, and of the side surfaces of the chamber 50, the contact portions 62 that contact the consumable 110 are shown. As described above, the heating element 42 of the heating device 40 is disposed on the outer surface 62b of the contact portion 62 of the chamber 50, and thus, Fig. 9 shows a pair of heating elements 42 on radially outer sides of the contact portions 62 of the chamber 50. Additionally, as shown in Figs. 4A and 4B, the first guide portion 58 and the non-holding portion 54 of the chamber 50 are positioned above the heating elements 42 in the Z-axis direction.

[0065] Furthermore, the bottom member 36 forming the bottom portion of the chamber 50 is shown in Fig. 9, at a lower part in the Z-axis direction. As described above, the extending portion 87 protrudes from the inner surface 62a of the contact portion 62 in a radially inward direction relative to the center axis C1 of the chamber 50, and thus, in Fig. 9, the pair of extending portions 87 extend in the Z-axis direction. Now, as shown in Fig. 9, the extending portion 87 does not overlap the heating element 42 along the Z-axis direction. That is, an end portion of the extending portion 87 in a Z-axis positive direction does not reach a height of an end portion of the heating element 42 in a Z-axis negative direction.

[0066] In an internal space of the chamber 50, a region that extends along the Z-axis direction and that corresponds to a part where the heating elements 42 are disposed is given as a first region 50A, and a region that is sectioned off from the first region 50A and that is demarcated by an end surface of the first region 50A in the Z-axis negative direction and the bottom member 36 is given as a second region 50B. The first region 50A is a part that is directly heated by the heating element 42. In the first embodiment, the extending portions 87 are provided only in the second region 50B, and the extending portions 87 do not reach the first region 50A.

[0067] A state is considered where the consumable 110 is disposed at the desired position inside the chamber 50. In this case, a tip of the consumable 110 is in contact with the top surfaces 83c of the pair of ridge portions 83 on the bottom member 36 shown in Fig. 8, and is supported by the top surfaces 83c of the ridge portions 83 from vertically below (that is, the Z-axis negative direction). Furthermore, because the extending portions 87, each having a thickness in a radial direction toward the center axis C1 of the chamber 50, extend vertically upward from the top surfaces 83c of the ridge portions

83, an outer surface of the consumable 110, near the tip, is pressed radially inward by the extending portions 87. That is, the consumable 110 is grasped by the extending portions 87, and the consumable is stably held inside the chamber 50.

[0068] The internal space of the chamber 50 shown in Fig. 9 may also be expressed as follows. Fig. 9 shows a cross-section of the chamber 50 that passes through the center axis C1 of the chamber 50 and the extending portions 87. In the cross-section in Fig. 9, in the second region 50B, the extending portions 87 protrude radially inward toward the center axis C1 of the chamber 50, and thus, following formula (1) is established.

$$W1 \geq W2 \quad \ldots (1)$$

Here, W1 is a length of the first region 50A in the radial direction, and W2 is a length of the second region 50B in the radial direction. Furthermore, in the state where the consumable 110 is disposed at the desired position inside the chamber 50, the consumable 110 is, in the second region 50B, pressed radially inward toward the center axis C1 of the chamber 50 by the extending portions 87, and thus, following formula (2) is established.

$$W3 \geq W2 \quad \ldots (2)$$

Here, although not shown, W3 is a length, in the radial direction, of the consumable 110 in the first region 50A in the case where the consumable 110 is disposed at the desired position in Fig. 9. In formulas (1) and (2) above, an equal state is established for a part of the second region 50B where the extending portions 87 are not disposed. Additionally, the length of the internal space of the chamber 50 or the consumable 110 in the radial direction refers to a distance in a direction orthogonal to the center axis C1 in a cross-sectional view passing through the center axis C1 of the chamber 50. Fig. 9 shows an X-Z plane orthogonal to the Y-axis, and thus, a direction in the X-axis direction is the length in the radial direction. However, the length of the internal space of the chamber 50 in the radial direction is not limited to be in the X-axis direction. The length of the internal space of the chamber 50 in the radial direction is defined as appropriate on the X-Y plane depending on which cross-section passing through the center axis C1 of the chamber 50 is used. A specific description will be given with reference to Fig. 10. Fig. 10 is a plan view of the chamber 50 seen from the Z-axis positive direction (that is, from a vertically upward direction). A dashed line S1 corresponds to the cross-sectional view passing through the center axis C1 of the chamber 50 shown in Fig. 9, and a length of the dashed line S1 is the length in the radial direction in the cross-sectional view. However, a cross-sectional view that passes through the separated portions 66 as indicated by a dashed line S2 is also conceivable, and in this case, a length of the dashed line S2 is the length in the radial direction in the cross-sectional view. The length, in the radial direction, of the consumable 110 disposed at the desired position inside the chamber 50 is also defined in the same manner as for the chamber 50.

[0069] The extending portions 87 for grasping the consumable 110 are disposed in the second region 50B that does not overlap the heating elements 42 along the Z-axis direction, and thus, the consumable 110 is grasped at a part that is different from the part that is directly heated by the heating elements 42. In the first region 50A, the outer surface of the consumable 110 disposed at the desired position inside the chamber 50 is possibly locally thinned due to being heated by the heating elements 42. The extending portions 87 in the first embodiment grasp the outer surface of the consumable 110 in the second region 50B that is sectioned off from the first region 50A, and thus, the consumable 110 may be stably held without being affected by heating by the heating elements 42.

[0070] As shown in Fig. 2, a part of the consumable 110 near the tip is wrapped with the first rolling paper 112, and is filled with the smokable substance 111. In the first embodiment, of the consumable 110, a part filled with the smokable substance 111 is grasped by the extending portions 87, and thus, a holding force is increased compared to a case where a different part with less density is grasped.

[0071] In the first embodiment, a description is given assuming that the extending portions 87 for grasping the outer surface of the consumable 110 extend from the top surfaces 83c of the pair of ridge portions 83 on the bottom member 36. However, a structure of the extending portions 87 is not limited to such an example. The extending portions 87 may be disposed in the second region 50B as appropriate as long as the extending portions 87 do not enter the first region 50A. For example, the extending portions 87 may be provided at positions separate from the bottom member 36.

[0072] Furthermore, in the first embodiment, the extending portions 87 are described to be provided in contact with or adjacent to the inner surfaces 62a of the contact portions 62 of the chamber 50. However, the extending portions 87 are not limited to be disposed in such a manner. The extending portions 87 may be disposed on an inner circumferential surface of the chamber 50 as appropriate as long as the extending portions 87 do not enter the first region 50A. For example, the extending portions 87 may be disposed on the inner surfaces 66a of the separated portions 66 of the chamber 50.

[0073] Furthermore, in the first embodiment, a pair of extending portions 87 are described to be provided. However, the number of extending portions 87 is not limited to two, and the number may be changed as appropriate as long as the outer surface of the consumable 110 may be sufficiently grasped. For example, one extending portion may be provided, or three or more extending portions may be provided. Furthermore, one ring-shaped extend-

ing portion may be provided.

<Modification of First Embodiment>

[0074] In the following, a modification of the first embodiment of the present disclosure will be described with reference to Fig. 11. When compared with the flavor inhaler 100 according to the first embodiment, a flavor inhaler according to the modification of the first embodiment is different from the first embodiment only with respect to a structure of an extending portion 187 for grasping the consumable 110. Additionally, structural elements same as or corresponding to those in the first embodiment will be denoted by the same reference signs, and a redundant description will be omitted. The extending portion 187 is an example of the grasping portion and the protruding portion of the present disclosure.

[0075] Fig. 11 is a cross-sectional view of the chamber, Fig. 11 showing a relative arrangement of the heating element 42 and the extending portion 187 according to the modification of the first embodiment. Fig. 11 omits illustration of the center axis C1 of the chamber 50, the first guide portion 58 and the non-holding portion 54, and the bottom member 36. Furthermore, Fig. 11 omits illustration of the bottom member 36. The extending portions 187 according to the modification of the first embodiment may be formed to extend from the top surfaces 83c of the pair of ridge portions 83 on the bottom member 36. As described in the first embodiment, the extending portions 187 may be disposed in the second region 50B as appropriate as long as the extending portions 187 do not enter the first region 50A.

[0076] As shown in Fig. 11, the extending portion 187 as a whole is sloped relative to the center axis C1 of the chamber 50, radially more inward along the Z-axis positive direction. Furthermore, an end portion 187A of the extending portion 187 in the Z-axis positive direction is sloped relative to the center axis C1 of the chamber 50 to be separated more radially outward as it gets closer to the tip. The end portion 187A is an example of a sloping portion of the present disclosure.

[0077] The extending portions 187 according to the modification of the first embodiment are, as a whole, sloped radially inward, and thus, when pressed and spread radially outward by the consumable 110 that is inserted, the extending portions 187 press the consumable 110 radially inward in reaction, and a greater grasping force may be obtained. Furthermore, the extending portions 187 include the end portions 187A in the Z-axis positive direction, the end portions 187A being sloped such that the tips are separated in the radially outward direction, and thus, the extending portions 187 may be prevented from interfering with the consumable 110 at the time when the consumable 110 is disposed at the desired position. That is, the consumable 110 may be prevented from being obstructed at the time of being inserted into the chamber 50.

[0078] Additionally, the two characteristics of the extending portion 187 according to the modification of the first embodiment, or in other words, that the extending portion 187 is sloped radially inward as a whole, and the structure of the end portion 187A do not have to be adopted in combination. The flavor inhaler of the present disclosure is also able to adopt only one of the two.

<Second Embodiment: Internal Heater>

[0079] In the following, a second embodiment of the present disclosure will be described with reference to Fig. 12. Additionally, structural elements same as or corresponding to those in the first embodiment will be denoted by the same reference signs, and a redundant description will be omitted.

[0080] A flavor inhaler according to the second embodiment is different from the flavor inhaler 100 according to the first embodiment with respect to a structure of a chamber 250. That is, as shown in Figs. 3 and 6, in the first embodiment, an outer periphery of the chamber 50 is covered by the heating device 40 including the heating elements 42; however, the chamber 250 according to the second embodiment is not covered by the heating device. The flavor inhaler according to the second embodiment includes, instead of the heating device 40 of the first embodiment, an internal heater 202 disposed around a center axis of the chamber 250 as shown in Fig. 12, and a heater support portion 204 that supports the internal heater 202 from vertically below. The chamber 250 is an example of the accommodating portion of the present disclosure. The internal heater 202 is an example of the heating unit of the present disclosure.

[0081] When the consumable 110 is inserted into the chamber 250, the internal heater 202 enters inside the consumable 110. When the consumable 110 is disposed at a desired position inside the chamber 250, the internal heater 202 is positioned inside a part, of the consumable 110, that is wrapped with the first rolling paper 112 and filled with the smokable substance 111 (see Fig. 2). According to such an arrangement, the flavor inhaler according to the second embodiment may generate an aerosol including a flavor as appropriate by heating the smokable substance 111 from within by the internal heater 202.

[0082] Fig. 12 is a cross-sectional view of the chamber 250 of the second embodiment, corresponding to Figs. 9 and 11 of the first embodiment. As with Fig. 11, Fig. 12 omits illustration of the center axis C1 of the chamber 250, the first guide portion 58 and the non-holding portion 54, and the bottom member 36. For example, the heater support portion 204 may, but does not have to, extend from the bottom member 36 forming a bottom portion of the chamber 250.

[0083] In the second embodiment, two regions are defined inside the chamber 250 by arrangement of the internal heater 202. In an internal space of the chamber 250, a region that extends along the Z-axis direction and that corresponds to a part where the internal heater 202

is disposed is given as a first region 250A, and a region that is sectioned off from the first region 250A and that is demarcated by an end surface of the first region 250A in the Z-axis negative direction and the bottom portion of the chamber 250 is given as a second region 250B. The first region 250A is a part where inside of the consumable 110 is directly heated by the internal heater 202.

[0084] Extending portions 287 of the second embodiment are formed in the same manner as the extending portions 87 of the first embodiment, and the extending portions 287 grasp the outer surface of the consumable 110 that is inserted in the chamber 250. The extending portions 287 are provided in the second region 250B, and the extending portions 287 do not reach the first region 250A. The extending portions 287 are an example of the grasping portion and the protruding portion of the present disclosure.

[0085] The extending portions 287 for grasping the consumable 110 are disposed in the second region 250B that does not overlap the internal heater 202 along the Z-axis direction, and thus, the consumable 110 is grasped at a part that is different from a part that is directly heated from inside by the internal heater 202. In the first region 250A, the consumable 110 disposed at the desired position inside the chamber 250 is possibly locally thinned due to being heated from inside by the internal heater 202. The extending portions 287 of the second embodiment grasp the outer surface of the consumable 110 in the second region 250B that is sectioned off from the first region 250A, and thus, the consumable 110 may be stably held without being affected by heating from the internal heater 202.

[0086] As shown in Fig. 2, a part of the consumable 110 near the tip is wrapped with the first rolling paper 112, and is filled with the smokable substance 111. In the second embodiment, of the consumable 110, a part filled with the smokable substance 111 is grasped by the extending portions 287, and thus, a holding force is increased compared to a case where a different part with less density is grasped.

<Third Embodiment: Heating by Electromagnetic Induction>

[0087] In the following, a third embodiment of the present disclosure will be described with reference to Fig. 13. Additionally, structural elements same as or corresponding to those in the first embodiment will be denoted by the same reference signs, and a redundant description will be omitted.

[0088] Fig. 13 is a cross-sectional view of a chamber 350 of the third embodiment, corresponding to Figs. 9 and 11 of the first embodiment. As with Fig. 11, Fig. 13 omits illustration of the center axis C1 of the chamber 350, the first guide portion 58 and the non-holding portion 54, and the bottom member 36.

[0089] A flavor inhaler according to the third embodiment is different from the flavor inhaler 100 according to the first embodiment with respect to a structure of the chamber 350. That is, as shown in Figs. 3 and 6, in the first embodiment, the outer periphery of the chamber 50 is covered by the heating device 40 including the heating elements 42; however, the chamber 350 according to the third embodiment is not covered by the heating device. The flavor inhaler according to the third embodiment includes, instead of the heating device 40 of the first embodiment, an induction coil 342 that is disposed wound around an outer periphery of the chamber 350 shown in Fig. 13. The chamber 350 is an example of the accommodating portion of the present disclosure.

[0090] The chamber 50 according to the first embodiment may be formed of metal such as stainless steel, resin such as PEEK, glass, ceramic, or the like, for example, but the chamber 350 of the third embodiment includes a susceptor portion 350a formed by a conductive body, and a support portion 350b formed by an insulating body. The susceptor portion 350a is provided at least at a part where the induction coil 342 is wound. When alternating current flows through the induction coil 342, the susceptor portion 350a generates heat and heats the outer surface of the consumable 110 that is inserted in the chamber 350. The support portion 350b is provided near a bottom portion of the chamber 350, and does not generate heat when alternating current flows through the induction coil 342. The susceptor portion 350a may be formed of metal such as stainless steel, and the support portion 350b may be formed of resin such as PEEK, glass, or ceramic, for example. The susceptor portion 350a and the induction coil 342 are an example of the heating unit of the present disclosure.

[0091] Heat generation by the susceptor portion 350a of the chamber 350 according to the third embodiment will be described. When alternating current flows through the induction coil 342 wound around an outer periphery of the susceptor portion 350a, a magnetic field that varies over time is generated near the chamber 350. A variation in the magnetic field generates electromotive force due to Faraday's law of induction, and due to Lenz's law, eddy current flows in the susceptor portion 350a in an opposite direction from the alternating current flowing through the coil to cancel the variation in the magnetic field. The susceptor portion 350a generates heat by Joule heat due to the eddy current. At this time, with respect to the support portion 350b, because the support portion 350b is formed by an insulating body, eddy current is not generated, and also, heat conduction from the susceptor portion 350a is prevented.

[0092] In the third embodiment, two regions are defined inside the chamber 350 by arrangement of the induction coil 342. In an internal space of the chamber 350, a region that extends along the Z-axis direction and that corresponds to a part where the induction coil 342 is disposed is given as a first region 350A, and a region that is sectioned off from the first region 350A and that is demarcated by an end surface of the first region 350A in the Z-axis negative direction and the bottom portion of

the chamber 350 is given as a second region 350B. The first region 350A is a part where the outer surface of the consumable 110 is directly heated by the Joule heat generated at the susceptor portion 350a.

[0093] Extending portions 387 of the third embodiment are formed in the same manner as the extending portions 87 of the first embodiment, and the extending portions 387 grasp the outer surface of the consumable 110 that is inserted in the chamber 350. The extending portions 387 are provided in the second region 350B, and the extending portions 387 do not reach the first region 350A. The extending portions 387 are an example of the grasping portion and the protruding portion of the present disclosure.

[0094] Because the extending portions 387 that grasp the consumable 110 are disposed in the second region 350B where the support portion 350b that is formed by an insulating body and that does not overlap the induction coil 342 along the Z-axis direction is provided, the consumable 110 is grasped at a part that is different from a part directly heated by the Joule heat generated at the susceptor portion 350a and to which heat from the susceptor portion 350a is not easily transferred. In the first region 350A, the consumable 110 disposed at the desired position inside the chamber 350 is possibly locally thinned due to being heated from outside by the Joule heat generated at the susceptor portion 350a. The extending portions 387 of the third embodiment grasp the outer surface of the consumable 110 in the second region 350B that is sectioned off from the first region 350A, and thus, the consumable 110 may be stably held without being affected by the Joule heat generated at the susceptor portion 350a.

[0095] As shown in Fig. 2, a part of the consumable 110 near the tip is wrapped with the first rolling paper 112, and is filled with the smokable substance 111. In the third embodiment, of the consumable 110, a part filled with the smokable substance 111 is grasped by the extending portions 387, and thus, a holding force is increased compared to a case where a different part with less density is grasped.

[0096] Additionally, a description is given above assuming that the chamber 350 includes the support portion 350b formed by an insulating body, but the part corresponding to the insulating body is not a necessary structural element of the chamber 350 according to the third embodiment. The chamber 350 may also be entirely, including the susceptor portion 350a, integrally formed by a conductive body. Also in this case, the Joule heat due to the alternating current flowing through the induction coil 342 is generated only at the susceptor portion 350a where the induction coil 342 is wound, and the second region 350B is not directly heated by the Joule heat. However, with such a structure, heat conduction from the first region 350A to the second region 350B is increased compared to a case where the support portion 350b formed by an insulating body is provided.

<Modification of Third Embodiment: Smoking Article with Embedded Susceptor>

[0097] In the following, a modification of the third embodiment of the present disclosure will be described with reference to Fig. 14. Additionally, structural elements same as or corresponding to those in the first embodiment will be denoted by the same reference signs, and a redundant description will be omitted.

[0098] Fig. 14 is a cross-sectional view of a chamber 355 of the modification of the third embodiment, corresponding to Figs. 9 and 11 of the first embodiment. As with Fig. 11, Fig. 14 omits illustration of a center axis C1 of the chamber 355, the first guide portion 58 and the non-holding portion 54, and the bottom member 36.

[0099] A flavor inhaler according to the modification of the third embodiment is different from the flavor inhaler according to the third embodiment with respect to a structure of the chamber 355. That is, in the third embodiment, the chamber 350 includes a conductive body such as the susceptor portion 350a, but the chamber 355 according to the modification of the third embodiment is entirely formed by an insulating body. For example, the chamber 355 may be formed of resin such as PEEK, glass, or ceramic. The chamber 355 is an example of the accommodating portion of the present disclosure.

[0100] When compared with the consumable 110 of the first embodiment, a consumable 410 according to the modification of the third embodiment includes a conductive embedded susceptor 412 shown in Fig. 14. When compared with the consumable 110 shown in Fig. 2, the consumable 410 according to the modification of the third embodiment may include the conductive embedded susceptor 412 inside the smokable substance 111. As shown in Fig. 14, the embedded susceptor 412 is provided disposed at a position that corresponds to the induction coil 342 in the Z-axis direction when the consumable 410 is disposed at a desired position in the chamber 355. The embedded susceptor 412 and the induction coil 342 are an example of the heating unit of the present disclosure. The consumable 410 is an example of the smoking article of the present disclosure. The embedded susceptor 412 is an example of a conductive member of the present disclosure.

[0101] Heat generation by the embedded susceptor 412 of the consumable 410 that is inserted in the chamber 355 according to the modification of the third embodiment will be described. When alternating current flows through the induction coil 342 wound around an outer periphery of a predetermined part of the chamber 355, a magnetic field that varies over time is generated near the chamber 355. A variation in the magnetic field generates electromotive force due to Faraday's law of induction, and due to Lenz's law, eddy current flows in the embedded susceptor 412 in an opposite direction from the alternating current flowing through the coil to cancel the variation in the magnetic field. The embedded susceptor 412 generates heat by Joule heat due to the eddy current.

[0102] In the modification of the third embodiment, two regions are defined inside the chamber 355 by arrangement of the embedded susceptor 412 (or the induction coil 342) disposed at a desired position of the chamber 355. In an internal space of the chamber 355, a region that extends along the Z-axis direction and that corresponds to a part where the embedded susceptor 412 is disposed is given as a first region 355A, and a region that is sectioned off from the first region 355A and that is demarcated by an end surface of the first region 355A in the Z-axis negative direction and a bottom portion of the chamber 355 is given as a second region 355B. The first region 355A is a part where inside of the consumable 410 is directly heated by the Joule heat generated at the embedded susceptor 412.

[0103] The extending portions 387 are formed in the same manner as the extending portions 87 of the first embodiment, and the extending portions 387 grasp an outer surface of the consumable 410 that is inserted in the chamber 355. The extending portions 387 are provided in the second region 355B, and the extending portions 387 do not reach the first region 355A. The extending portions 387 are an example of the grasping portion and the protruding portion of the present disclosure.

[0104] The extending portions 387 for grasping the consumable 410 are disposed in the second region 355B that does not overlap the embedded susceptor 412 and the induction coil 342 in the Z-axis direction, and thus, the consumable 410 is grasped at a part that is different from the part that is directly heated by the Joule heat generated at the embedded susceptor 412. The consumable 410 that is disposed at a desired position inside the chamber 355 is possibly locally thinned in the first region 355A due to being heated from inside by the Joule heat generated at the embedded susceptor 412. The extending portions 387 according to the modification of the third embodiment grasp the outer surface of the consumable 410 in the second region 355B that is sectioned off from the first region 355A, and thus, the consumable 410 may be stably held without being affected by the Joule heat generated at the embedded susceptor 412.

[0105] As shown in Fig. 2 with respect to the consumable 110 of the first embodiment, a part of the consumable 410 near a tip is wrapped with the first rolling paper 112, and is filled with the smokable substance 111. In the modification of the third embodiment, of the consumable 410, a part filled with the smokable substance 111 is grasped by the extending portions 387, and thus, a holding force is increased compared to a case where a different part with less density is grasped.

[0106] A description is given above assuming that the embedded susceptor 412 as a single member is provided at a predetermined position inside the consumable 410. However, the embedded susceptor of the consumable 410 is not limited to be a single member, and a large number of susceptors in the form of particles or small pieces and made of a conductive material may be embedded in predetermined positions of the consumable 410. Also in this case, the first region 355A and the second region 355B described above may be defined in the internal space of the chamber 355 by taking, as the first region, a region that extends along the Z-axis direction and that corresponds to an arrangement part of the particles or the small pieces that actually contribute to heating of the consumable 410.

<Fourth Embodiment: Dielectric Heating by High Frequency>

[0107] In the following, a fourth embodiment of the present disclosure will be described with reference to Fig. 15. Additionally, structural elements same as or corresponding to those in the first embodiment will be denoted by the same reference signs, and a redundant description will be omitted.

[0108] Fig. 15 is a cross-sectional view of a chamber 450 of the fourth embodiment, corresponding to Figs. 9 and 11 of the first embodiment. As with Fig. 11, Fig. 15 omits illustration of a center axis C1 of the chamber 450, the first guide portion 58 and the non-holding portion 54, and the bottom member 36.

[0109] A flavor inhaler according to the fourth embodiment is different from the flavor inhaler 100 according to the first embodiment with respect to a structure of the chamber 450. That is, as shown in Figs. 3 and 6, in the first embodiment, the outer periphery of the chamber 50 is covered by the heating device 40 including the heating elements 42; however, the chamber 450 according to the fourth embodiment is not covered by the heating device. The flavor inhaler according to the fourth embodiment includes, instead of the heating device 40 of the first embodiment, a high frequency generation device 442 that is disposed on an outer periphery of the chamber 450 shown in Fig. 15. The chamber 450 is an example of the accommodating portion of the present disclosure. The high frequency generation device 442 is an example of the heating unit of the present disclosure.

[0110] Furthermore, like the chamber 355 according to the modification of the third embodiment, the chamber 450 according to the fourth embodiment is entirely formed by an insulating body. For example, the chamber 450 may be formed of resin such as PEEK, glass, or ceramic.

[0111] Heating of the smokable substance 111 in the consumable 110 that is inserted in the chamber 355 of the fourth embodiment will be described. When the high frequency generation device 442 is operated, an electric field that varies over time at a high frequency is generated in an internal space of the chamber 450. Oscillation of the electric field shakes a microlattice structure of the smokable substance 111 that is a dielectric body, and the smokable substance 111 generates heat by microlattice vibration, and an aerosol is generated as appropriate.

[0112] In the fourth embodiment, two regions are defined inside the chamber 450 by arrangement of the high

frequency generation device 442. In an internal space of the chamber 450, a region that extends along the Z-axis direction and that corresponds to a part where the high frequency generation device 442 is disposed is given as a first region 450A, and a region that is sectioned off from the first region 450A and that is demarcated by an end surface of the first region 450A in the Z-axis negative direction and a bottom portion of the chamber 450 is given as a second region 450B. The first region 450A is a part where the smokable substance 111 in the consumable 110 is directly heated by operation of the high frequency generation device 442.

[0113] Extending portions 487 are formed in the same manner as the extending portions 87 of the first embodiment, and the extending portions 487 grasp the outer surface of the consumable 110 that is inserted in the chamber 450. The extending portions 487 are provided in the second region 450B, and the extending portions 487 do not reach the first region 450A. The extending portions 487 are an example of the grasping portion and the protruding portion of the present disclosure.

[0114] The extending portions 487 for grasping the consumable 110 are disposed in the second region 450B that does not overlap the high frequency generation device 442 in the Z-axis direction, and thus, the consumable 110 is grasped at a part that is different from the part that is directly heated by the oscillating electric field generated by the high frequency generation device 442. The consumable 110 that is disposed at a desired position inside the chamber 450 is possibly locally thinned in the first region 450A due to being heated the oscillating electric field generated by the high frequency generation device 442. The extending portions 487 according to the fourth embodiment grasp the outer surface of the consumable 110 in the second region 450B that is sectioned off from the first region 450A, and thus, the consumable 110 may be stably held without being affected by heat generation by the oscillating electric field generated by the high frequency generation device 442.

[0115] As shown in Fig. 2, a part of the consumable 110 near the tip is wrapped with the first rolling paper 112, and is filled with the smokable substance 111. In the fourth embodiment, of the consumable 110, a part filled with the smokable substance 111 is grasped by the extending portions 487, and thus, a holding force is increased compared to a case where a different part with less density is grasped.

[0116] Heretofore, each embodiment of the present disclosure has been described, but the present disclosure is not limited to the embodiments described above, and various modifications may be made within the scope of the technical idea described in the claims, the specification, and the drawings. Particularly, the embodiments and the modifications may be combined as appropriate. Any shapes or materials not directly described in the specification and the drawings fall within the scope of the technical idea of the present disclosure as long as the advantageous effects of the present disclosure may be achieved by the same. For example, the flavor inhaler 100 of the present disclosure includes a so-called counter-flow air passage with which air flowing in from the opening 52 in the chamber 50 is supplied to the end surface of the consumable 110, but such a case is not restrictive, and a so-called bottom-flow air passage with which air is supplied from the bottom portion 56 of the chamber 50 into the chamber 50 may instead be provided.

REFERENCE SIGNS LIST

[0117]

10	inner housing
20	power source unit
21	power source
30	atomizing unit
32	heat insulating portion
34	insertion guide member
36	bottom member
36a	axial portion
36b	flat plate portion
40	heating device
42	heating element
44	electrically insulating member
48	electrode
50	chamber
50A	first region
50B	second region
52	opening
52a	flange portion
54	non-holding portion
56	bottom portion
56a	hole
58	first guide portion
58a	tapered surface
60	side wall portion
62	contact portion
62a	inner surface
62b	outer surface
66	separated portion
66a	inner surface
66b	outer surface
67	gap
68	accommodating space
81	flat surface portion
81a	linear portion
81b	arc-shaped portion
83	ridge portion
83a	end surface
83b	side surface
83c	top surface
85	groove portion
87	extending portion
100	flavor inhaler
101	outer housing
102	slide cover

103	switch unit
110	consumable
111	smokable substance
112	first rolling paper
113	second rolling paper
114	cylindrical member
115	filter portion
116	hollow filter portion
117	lip release agent
187	extending portion
187A	end portion
202	internal heater
204	heater support portion
250	chamber
250A	first region
250B	second region
287	extending portion
342	induction coil
350	chamber
350A	first region
350B	second region
350a	susceptor portion
350b	support portion
355	chamber
355A	first region
355B	second region
387	extending portion
410	consumable
412	susceptor portion
442	high frequency generation device
450	chamber
450A	first region
450B	second region
487	extending portion
C1	center axis

Claims

1. A flavor inhaler comprising:

an accommodating portion that includes an opening that allows insertion of a smoking article formed on one end, and that houses the smoking article;
a heating unit that is disposed along an axial direction of the accommodating portion, and that heats the smoking article housed in the accommodating portion; and
a grasping portion that grasps a side surface of the smoking article housed in the accommodating portion, wherein
an inner side surface of the accommodating portion includes

a first region that overlaps the heating unit in a cross-sectional view orthogonal to the axial direction of the accommodating portion, and
a second region that is a region other than the first region, and that is present along the axial direction of the accommodating portion, between an other end of the accommodating portion and an end portion of the heating unit on the other end side, and

the grasping portion is provided in the second region.

2. The flavor inhaler according to claim 1, wherein formula (1) and formula (2) are satisfied in relation to a cross-sectional view of a cross section cut along a center axis of the accommodating portion and passing through the grasping portion:

$$W1 \geq W2 \quad \ldots (1)$$

$$W3 \geq W2 \quad \ldots (2),$$

where, in the formula (1) and the formula (2),

W1 is a length of the first region in a radial direction,
W2 is a length of the second region in the radial direction, and
W3 is a length of the smoking article in the radial direction, in the first region.

3. The flavor inhaler according to claim 2, wherein the grasping portion is a protruding portion, in the second region, that protrudes toward inside of the accommodating portion.

4. The flavor inhaler according to claim 3, wherein

a bottom member that forms a bottom portion of the accommodating portion is provided at the other end of the accommodating portion,
the bottom member is formed integrally with or as a separate member from the accommodating portion, and
the protruding portion is provided near the bottom portion.

5. The flavor inhaler according to claim 4, wherein the protruding portion extends from the bottom portion of the accommodating portion toward the one end.

6. The flavor inhaler according to claim 5, wherein the protruding portion includes a sloping portion near an end portion on the one end side of the accommodating portion, the sloping portion sloping farther away from the center axis of the accommodating portion as the one end is neared.

7. The flavor inhaler according to any one of claims 3 to 6, wherein the protruding portion includes a pair of ridge portions.

8. The flavor inhaler according to claim 7, wherein the protruding portion slopes more toward the center axis of the accommodating portion, the farther away from the other end of the accommodating portion.

9. The flavor inhaler according to any one of claims 1 to 8, wherein, in a cross-sectional view passing through a center axis of the accommodating portion, the grasping portion is provided at a position that is separated from the heating unit along the axial direction of the accommodating portion to the other end side of the accommodating portion.

10. The flavor inhaler according to any one of claims 1 to 9, wherein

    the smoking article includes a flavor source-filled portion that is filled with a flavor source, and
    the grasping portion grasps the flavor source-filled portion of the smoking article that is housed in the accommodating portion.

11. A smoking system comprising a smoking article and a flavor inhaler, wherein

    the flavor inhaler includes

        an accommodating portion that includes an opening that allows insertion of the smoking article formed on one end, and that houses the smoking article,
        a heating unit that is disposed along an axial direction of the accommodating portion, and that heats the smoking article housed in the accommodating portion, and
        a grasping portion that grasps a side surface of the smoking article housed in the accommodating portion, an inner side surface of the accommodating portion includes
        a first region that overlaps the heating unit in a cross-sectional view orthogonal to the axial direction of the accommodating portion, and
        a second region that is a region other than the first region, and that is present along the axial direction of the accommodating portion, between an other end of the accommodating portion and an end portion of the heating unit on the other end side, and

    the grasping portion is provided in the second region.

12. The smoking system according to claim 11, wherein

    the smoking article includes a flavor source-filled portion that is filled with a flavor source, and
    the grasping portion of the flavor inhaler grasps the flavor source-filled portion of the smoking article that is housed in the accommodating portion.

13. The smoking system according to claim 11 or 12, wherein

    the smoking article includes a conductive member inside a flavor source used for filling,
    the heating unit of the flavor inhaler generates a magnetic field that varies over time, and
    the conductive member of the smoking article generates heat based on a variation in the magnetic field.

14. The smoking system according to claim 13, wherein the conductive member includes a plurality of members that are discretely disposed inside the flavor source.

Fig. 1A

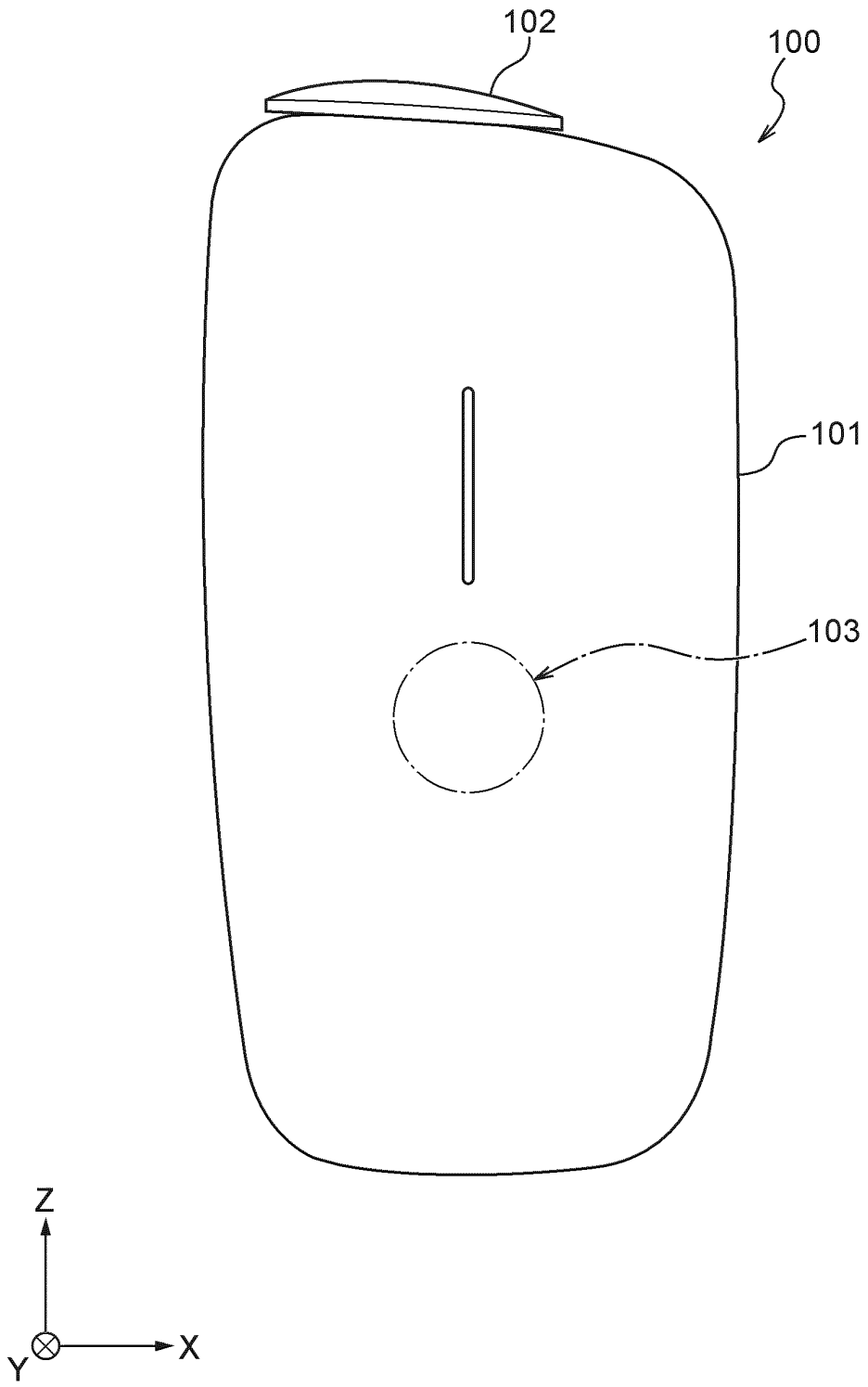


Fig. 1B

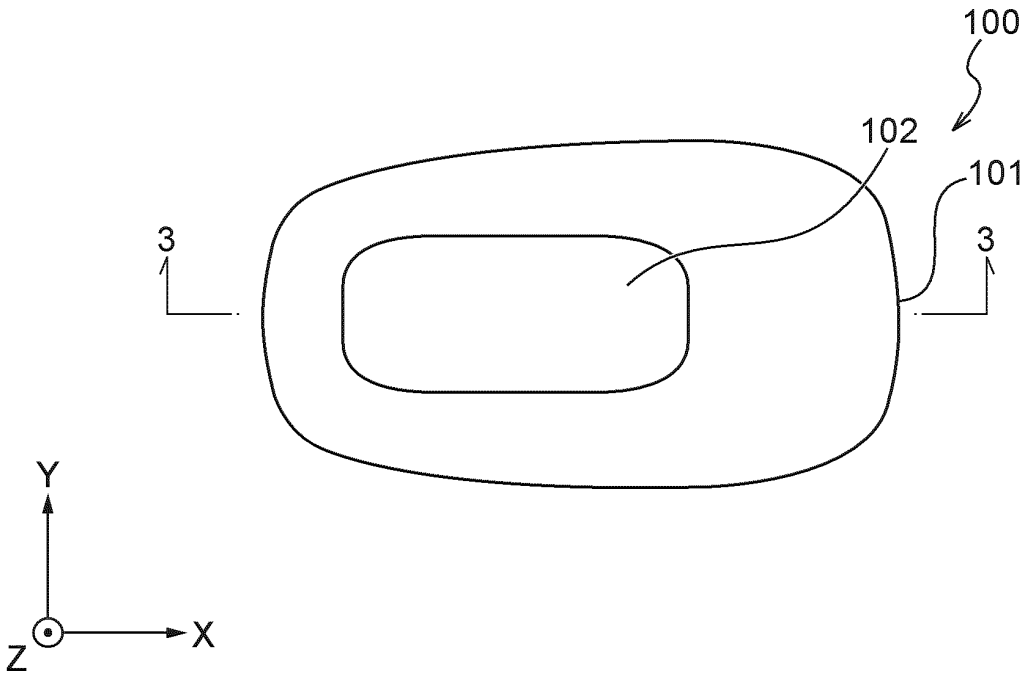
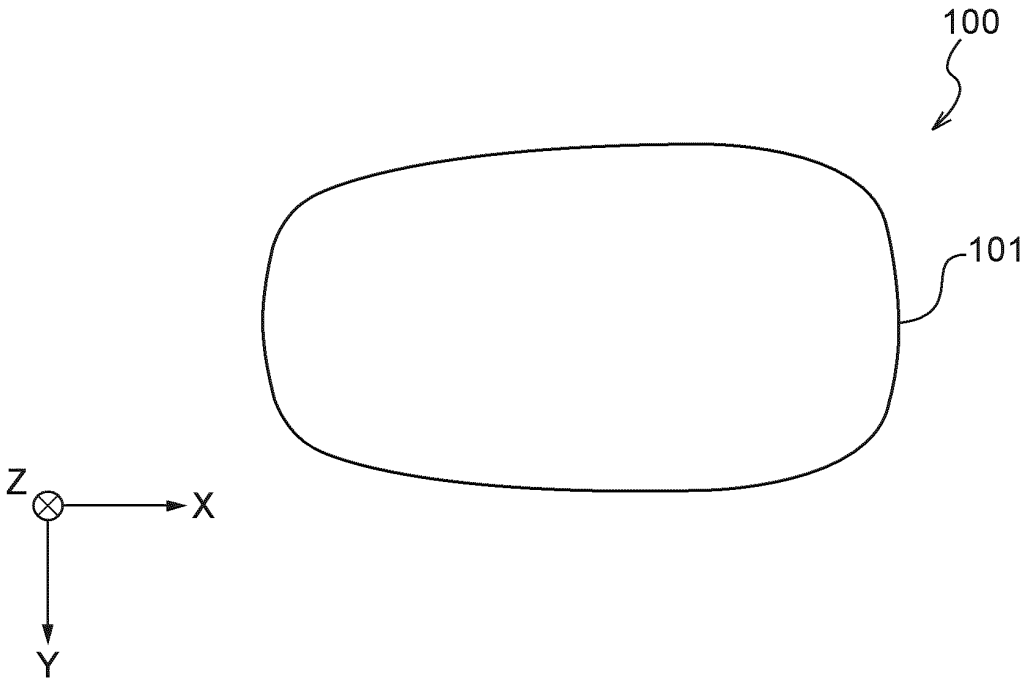


Fig. 1C



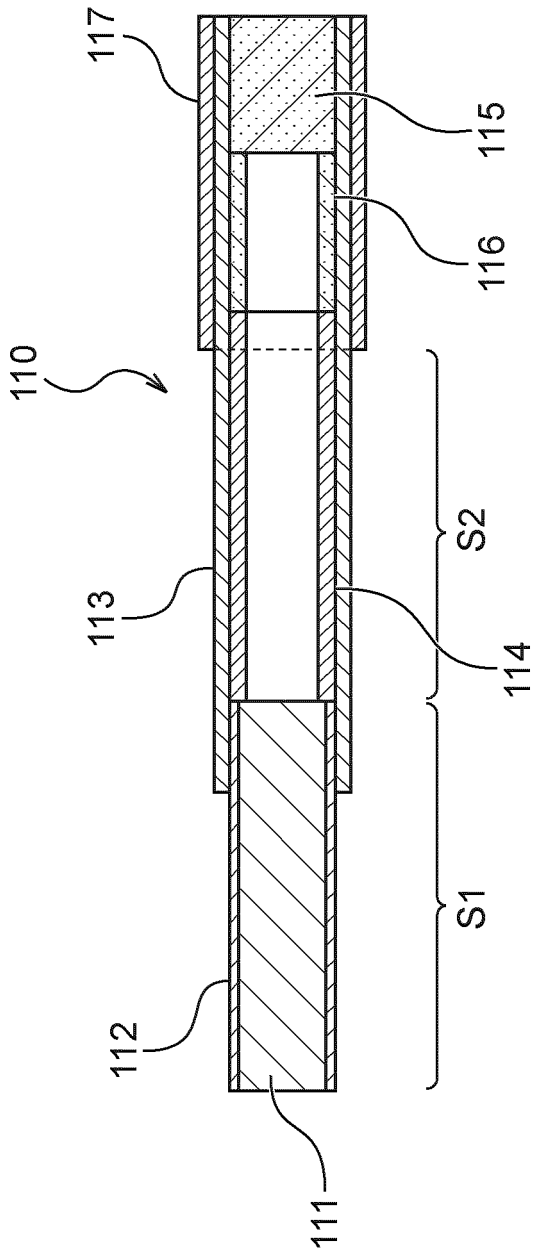


Fig. 2

Fig. 3

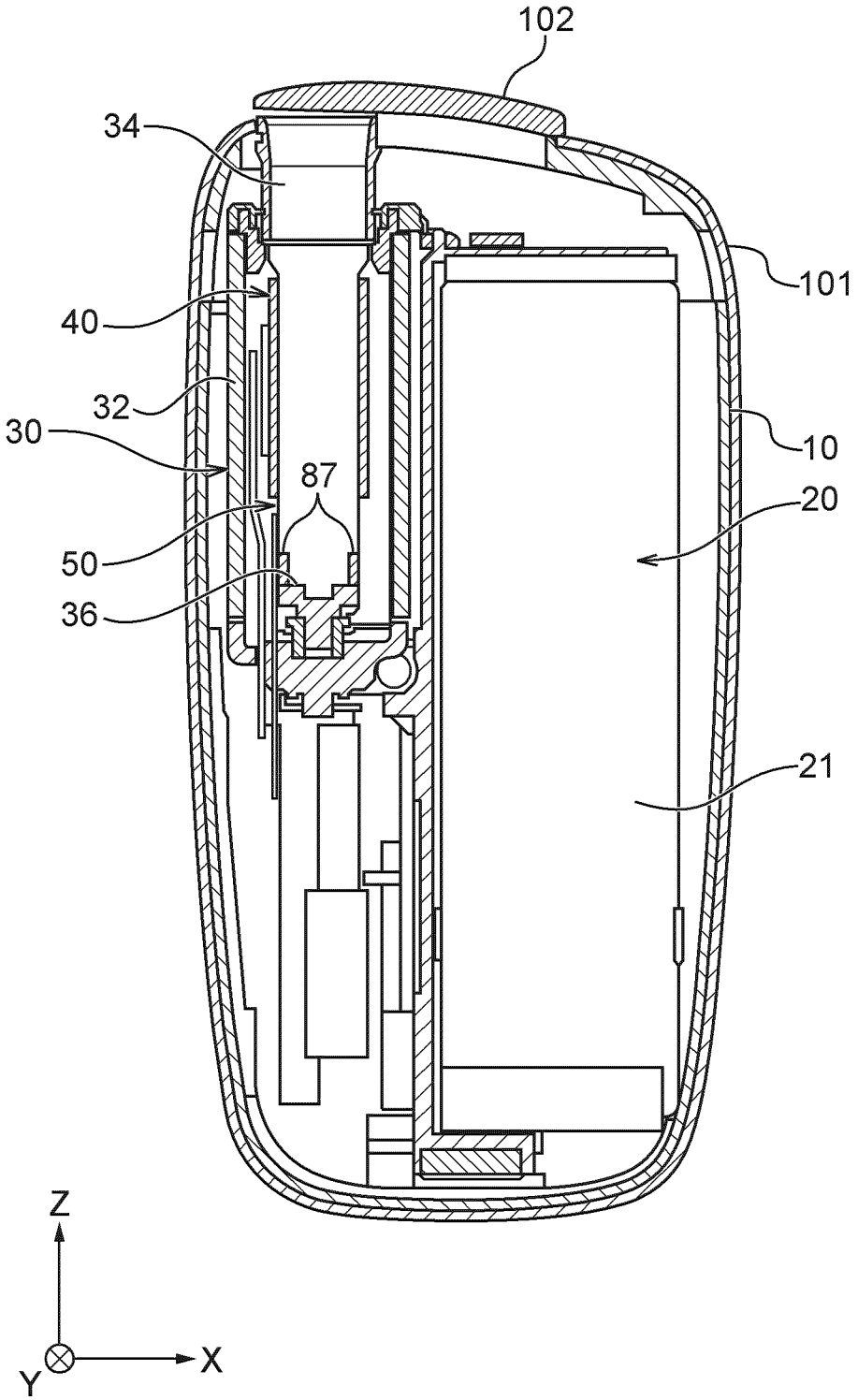


Fig. 4A

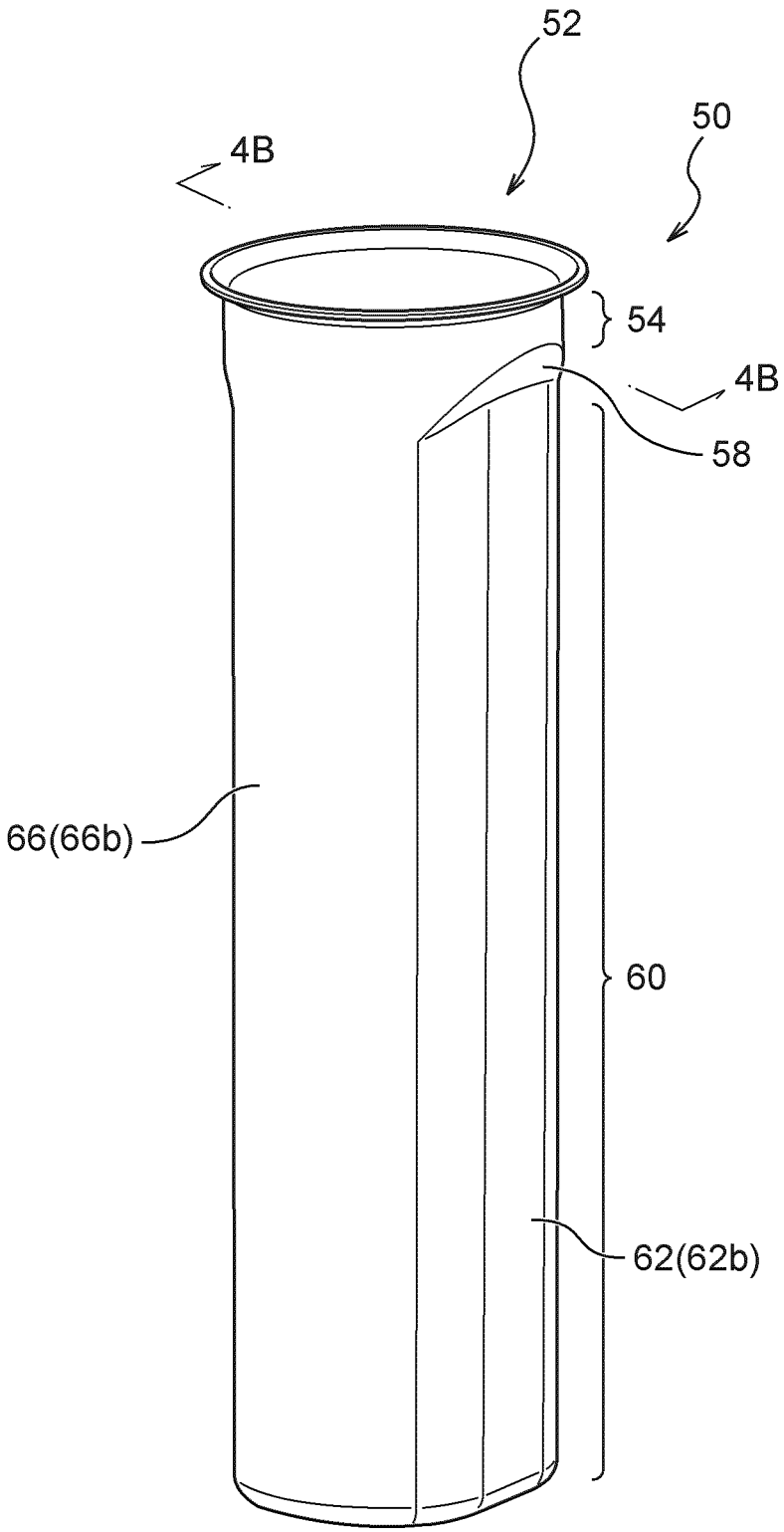


Fig. 4B

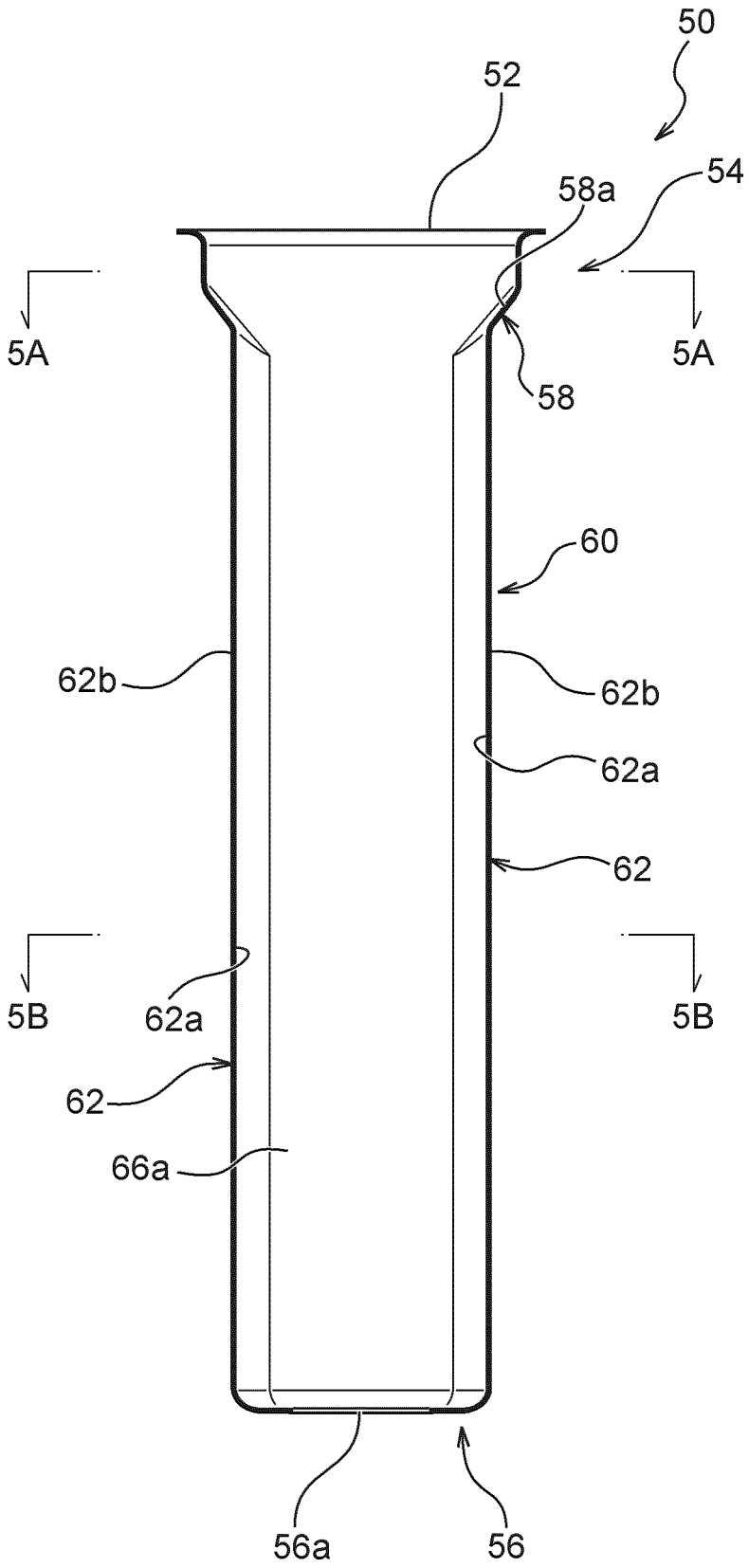


Fig. 5A

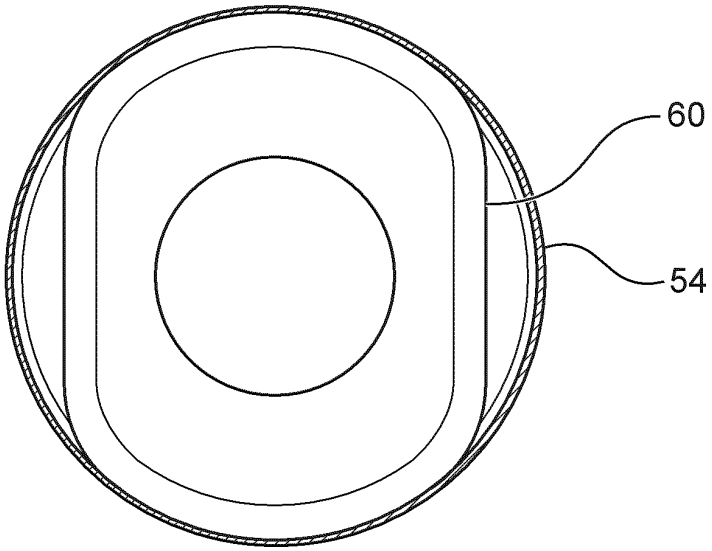


Fig. 5B

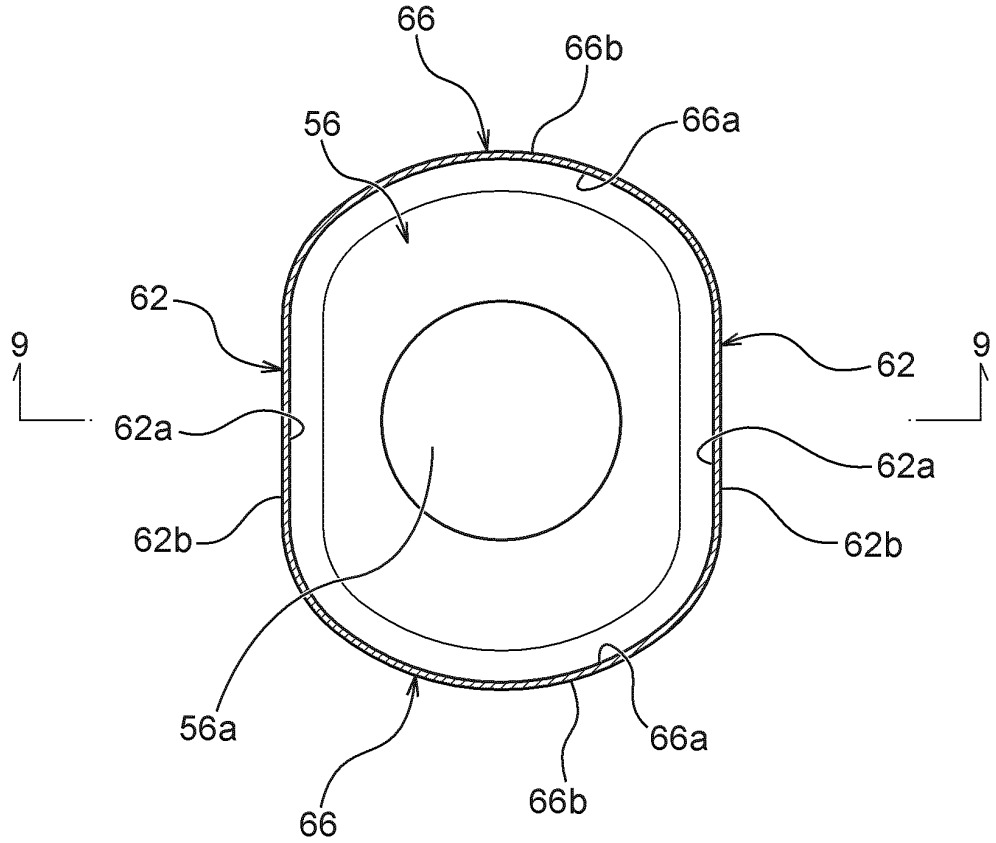


Fig. 6

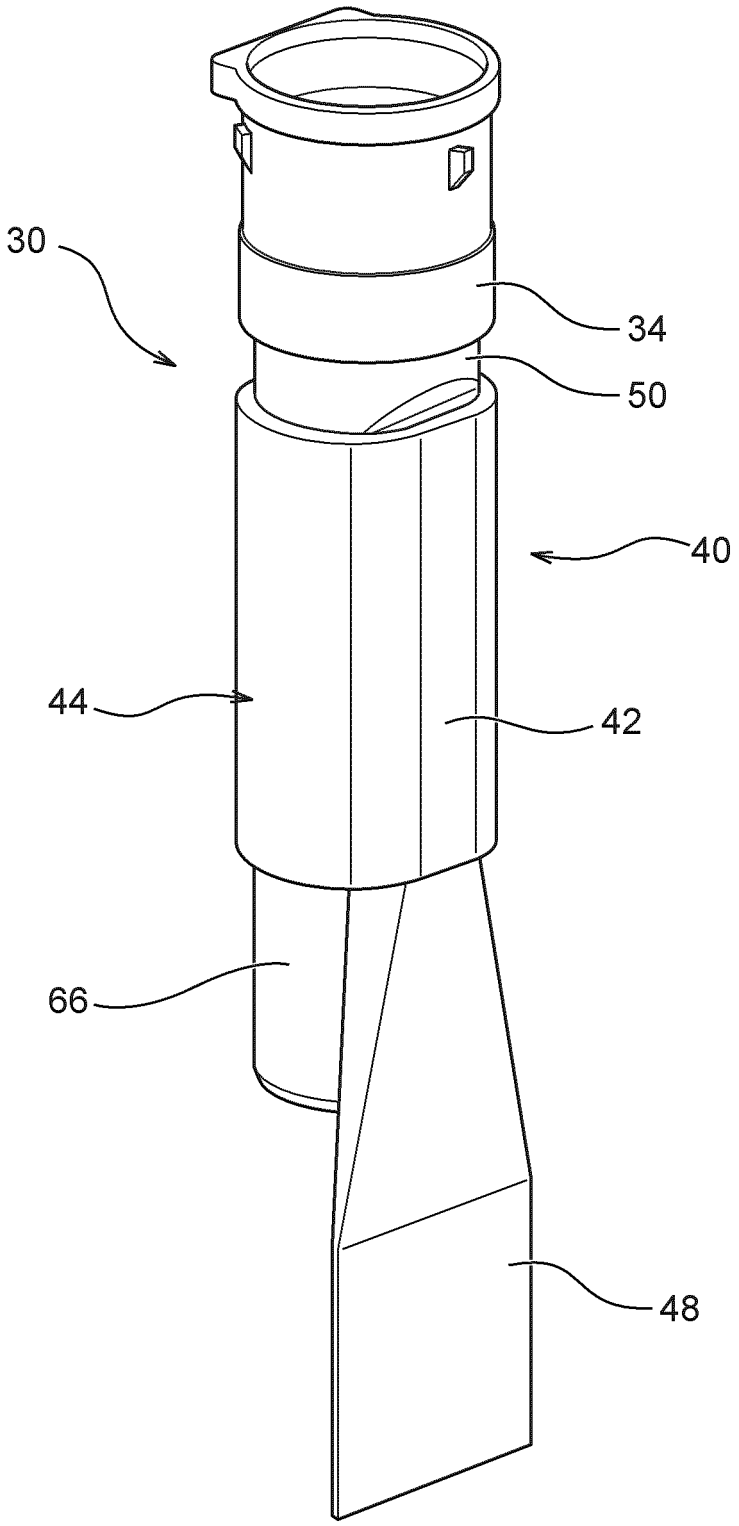


Fig. 7

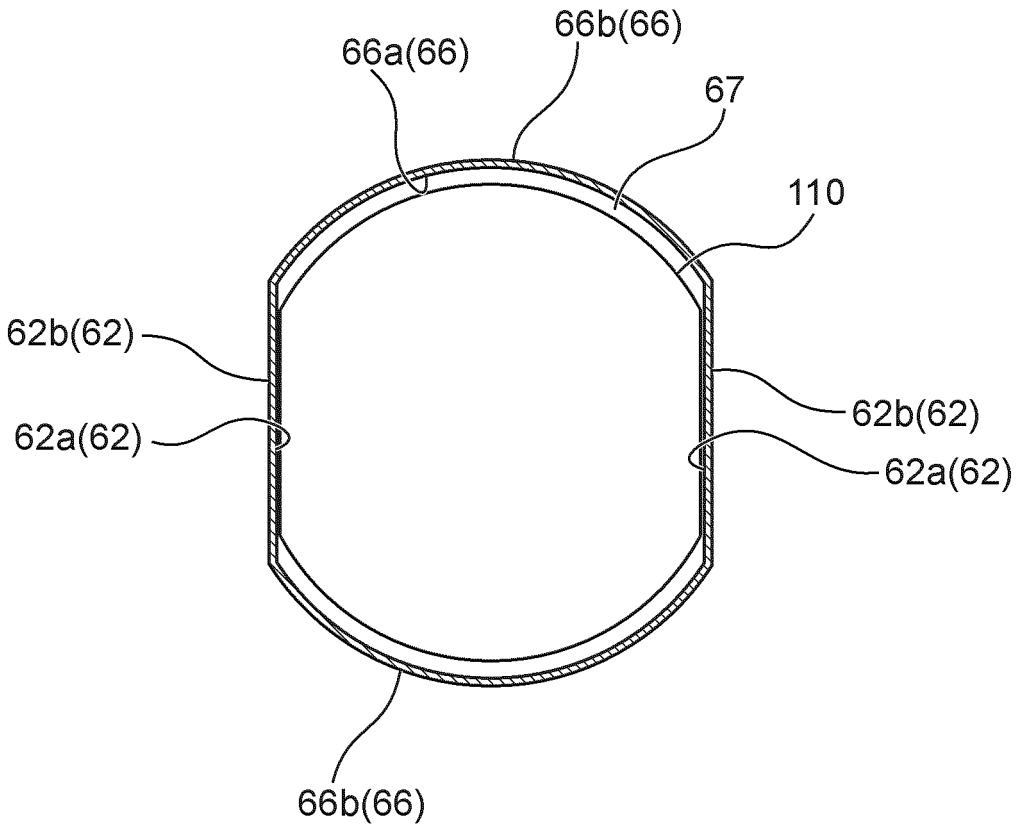
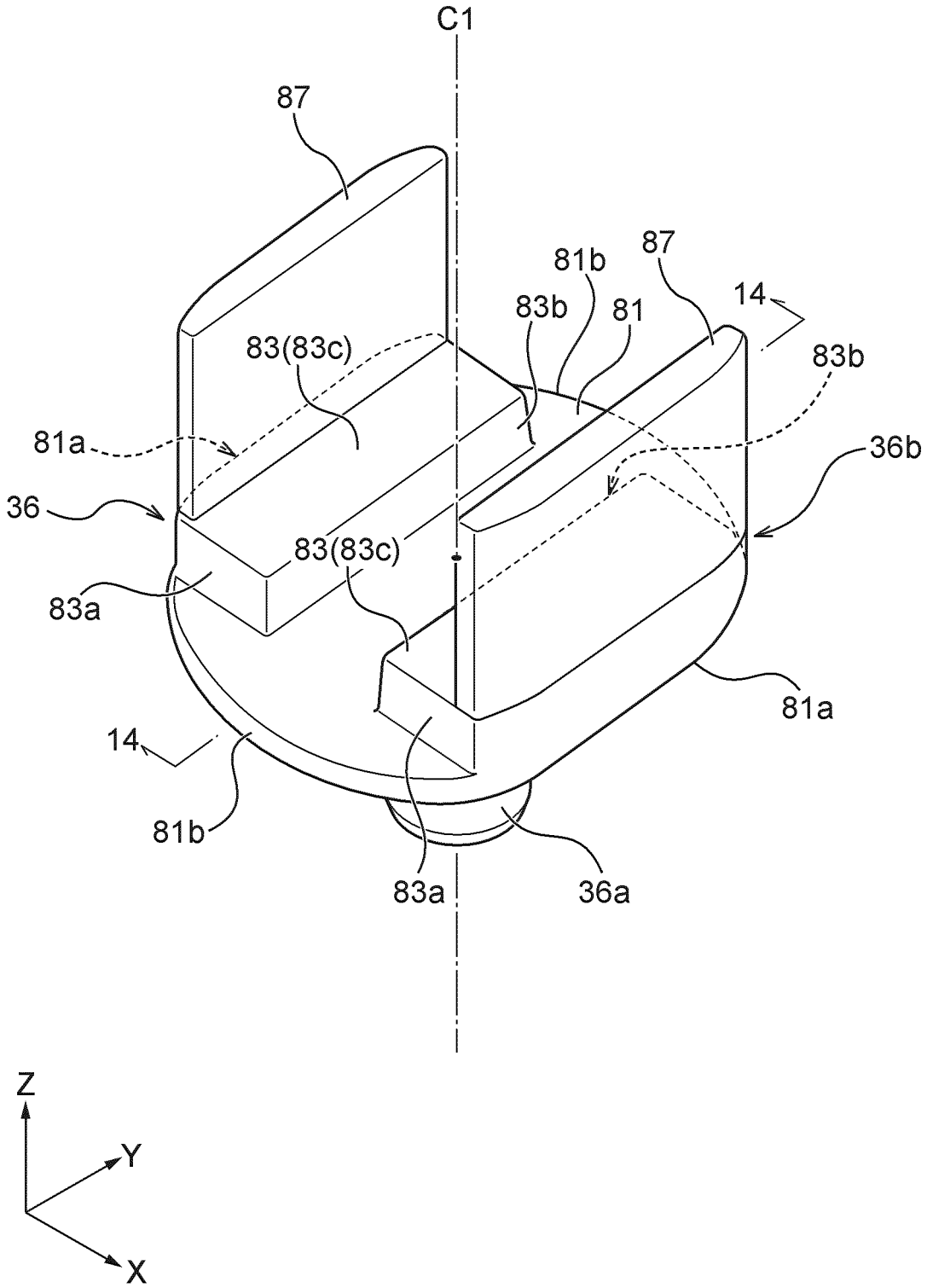


Fig. 8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81a
14
81b
83a
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Z
Y
X

Fig. 9

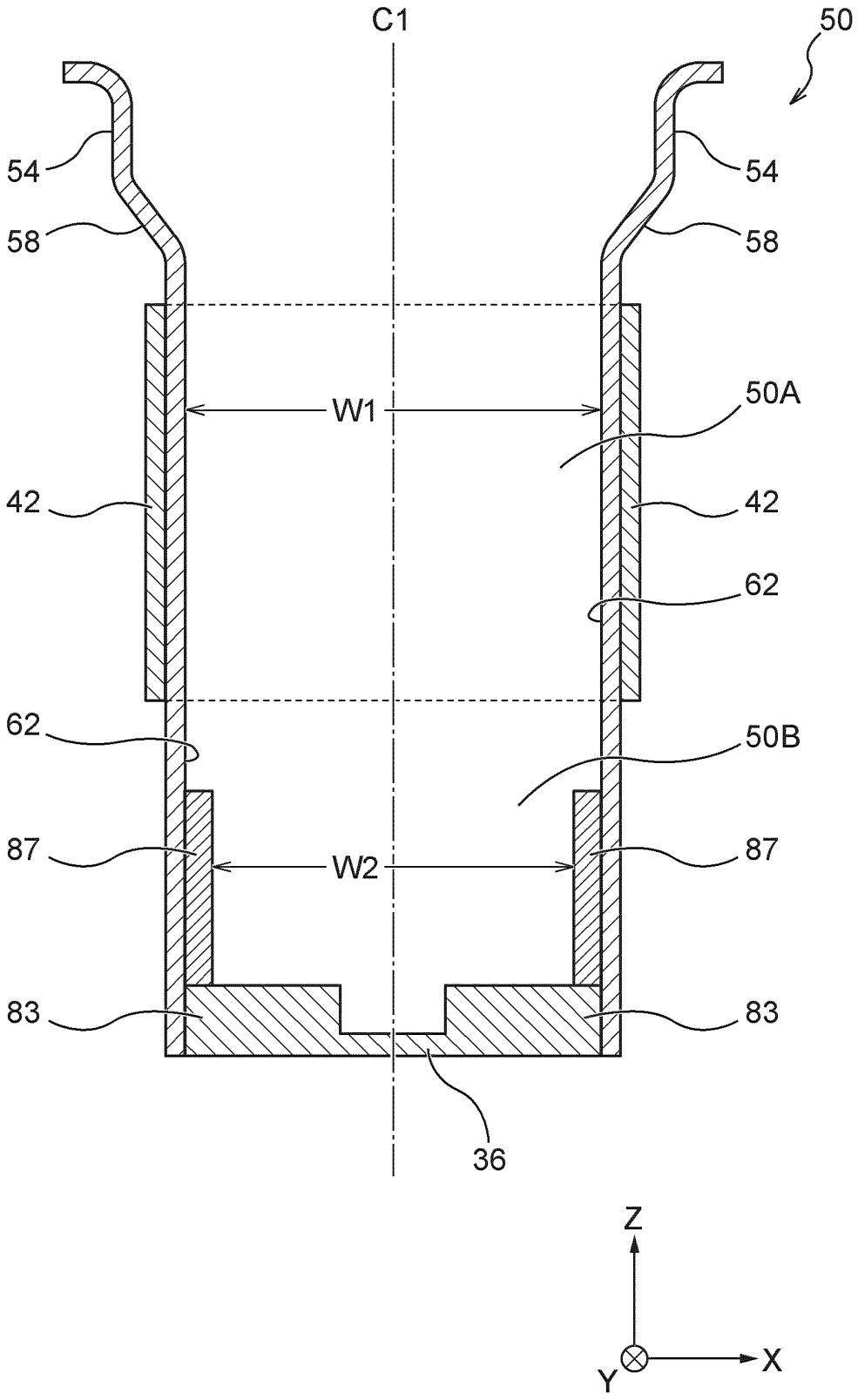


Fig. 10

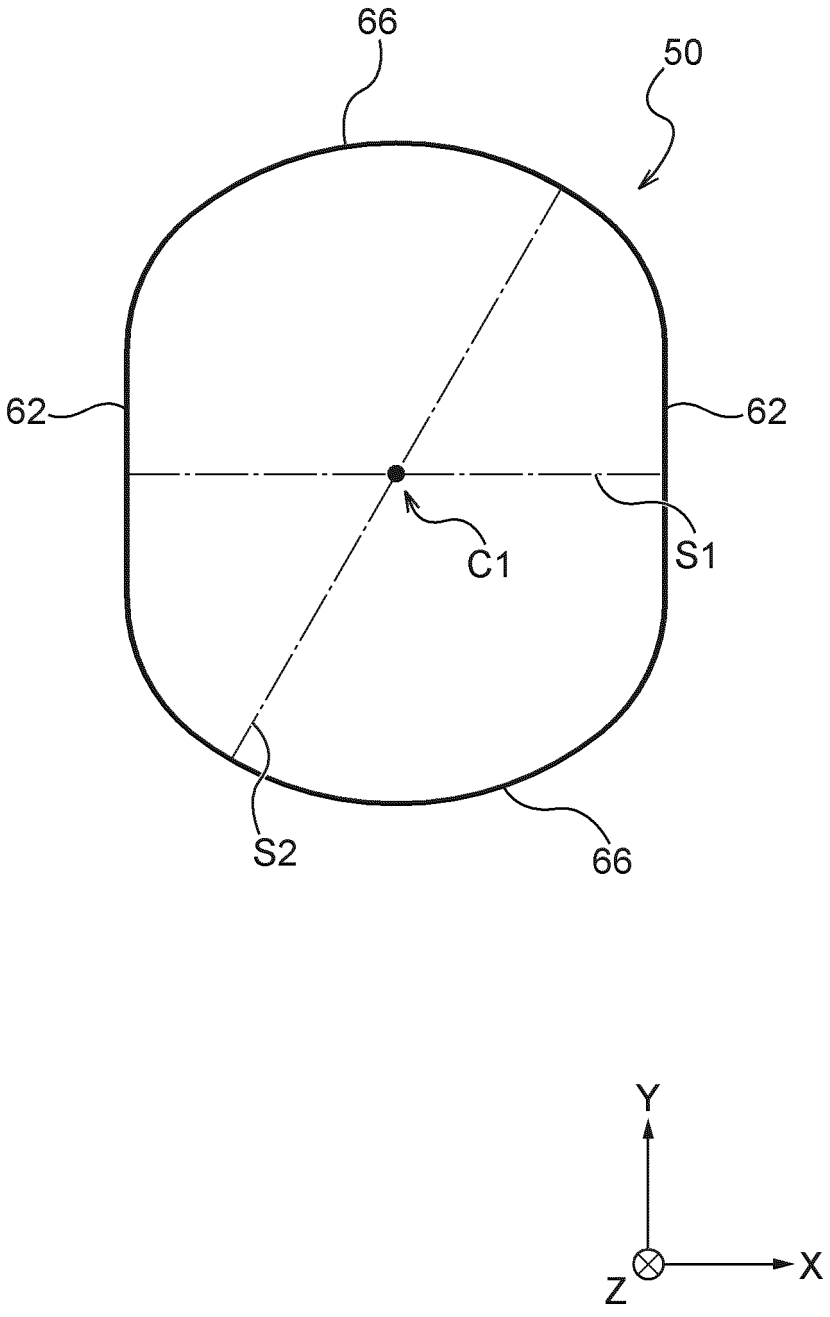


Fig. 11

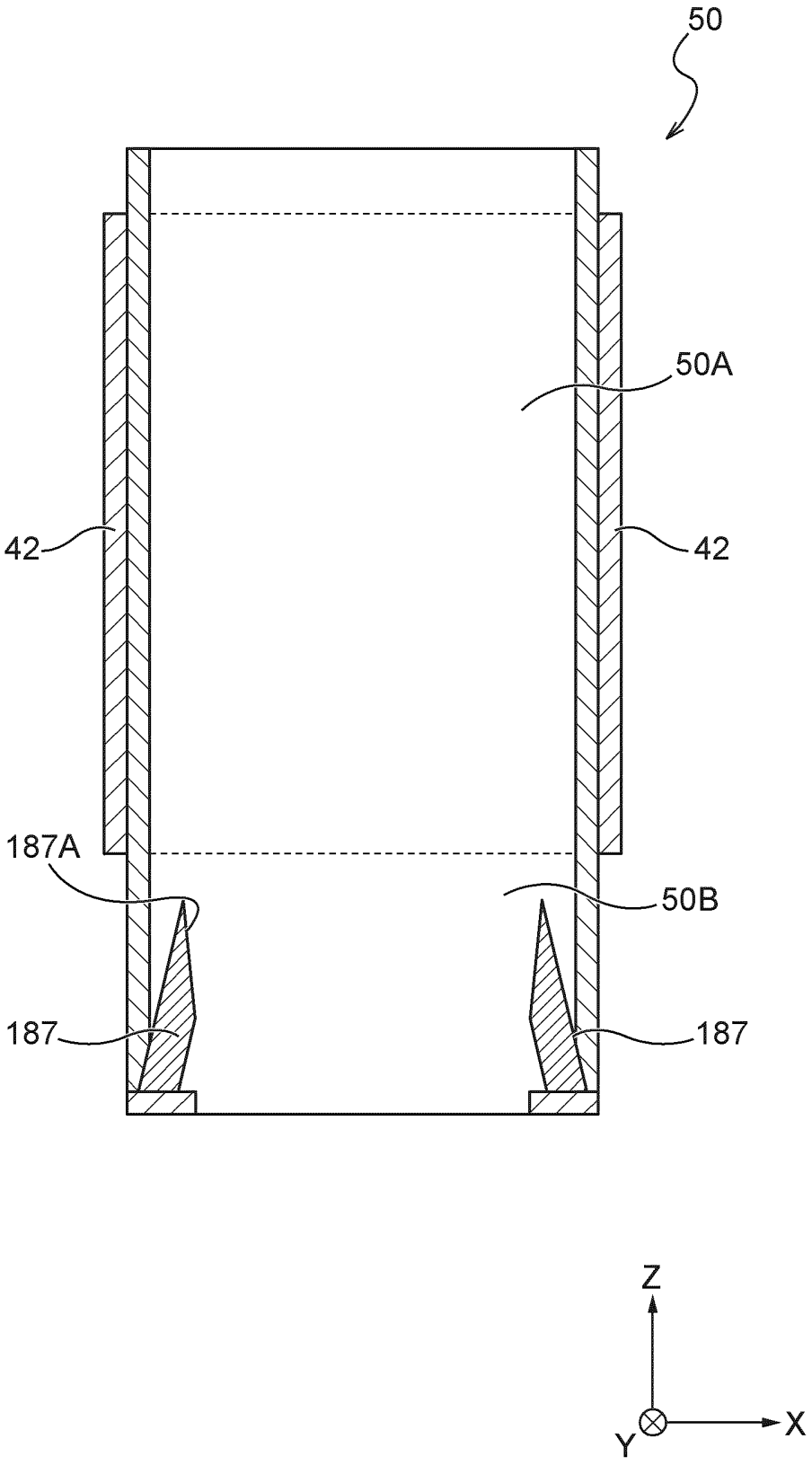


Fig. 12

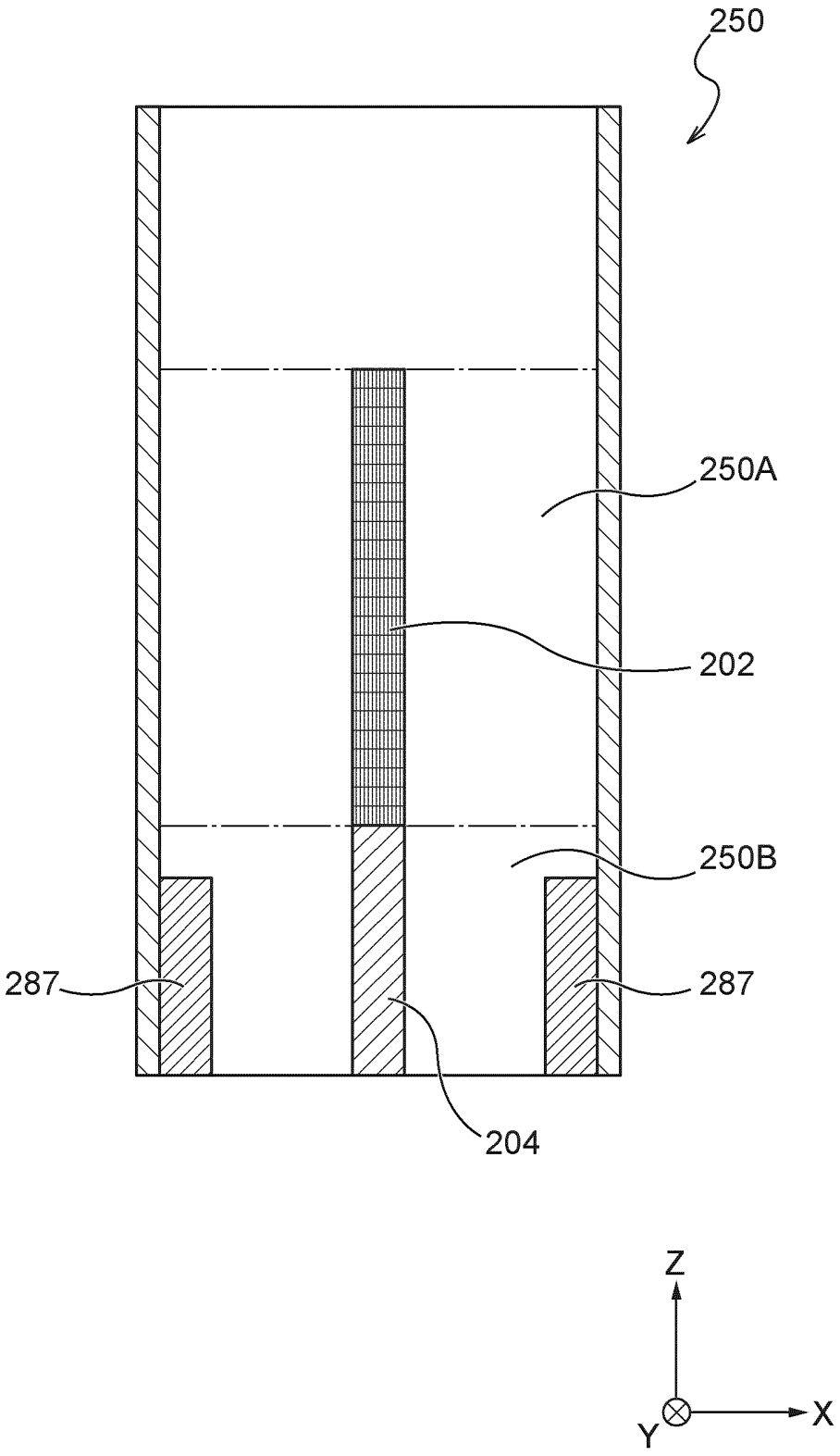


Fig. 13

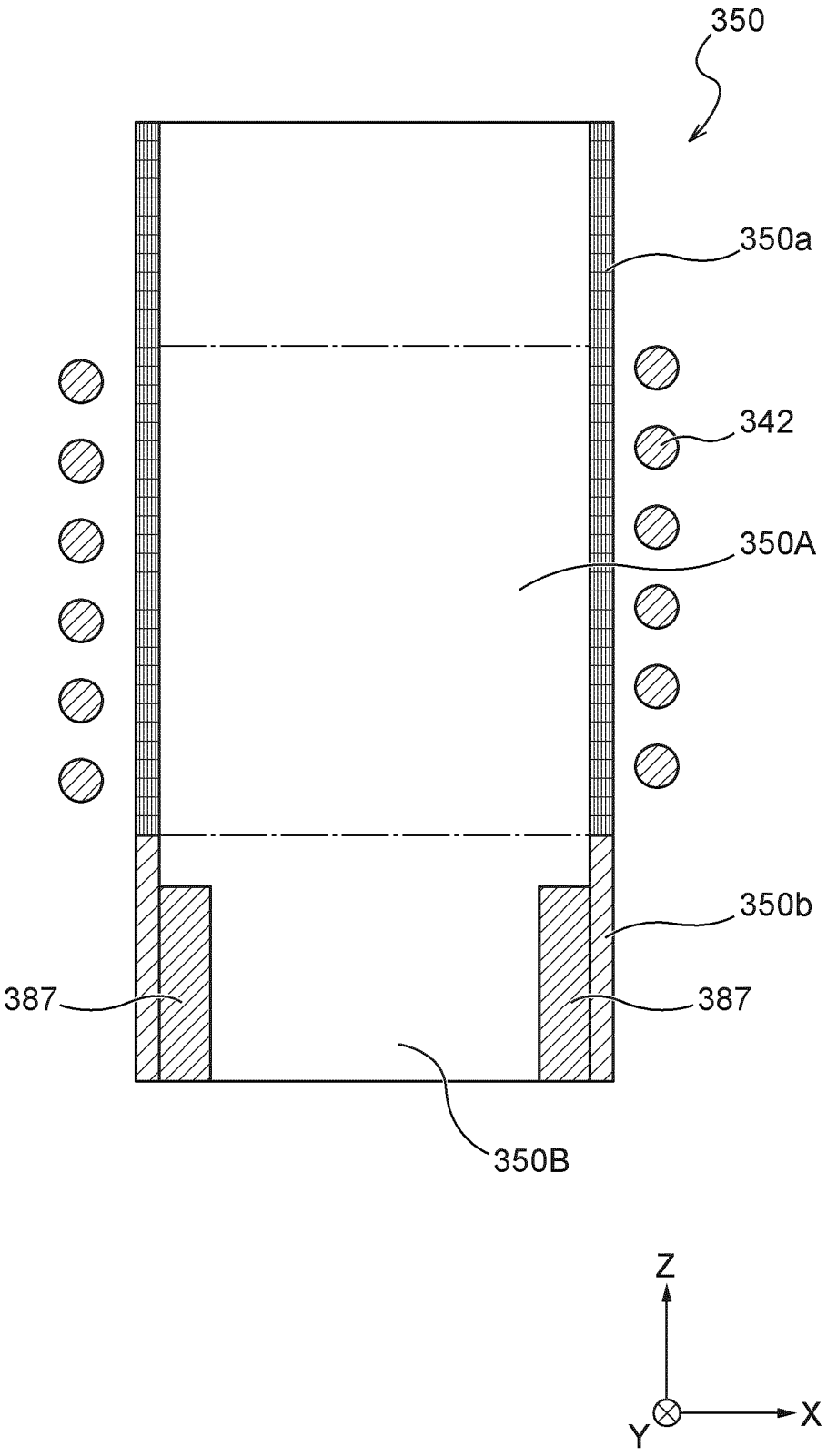


Fig. 14

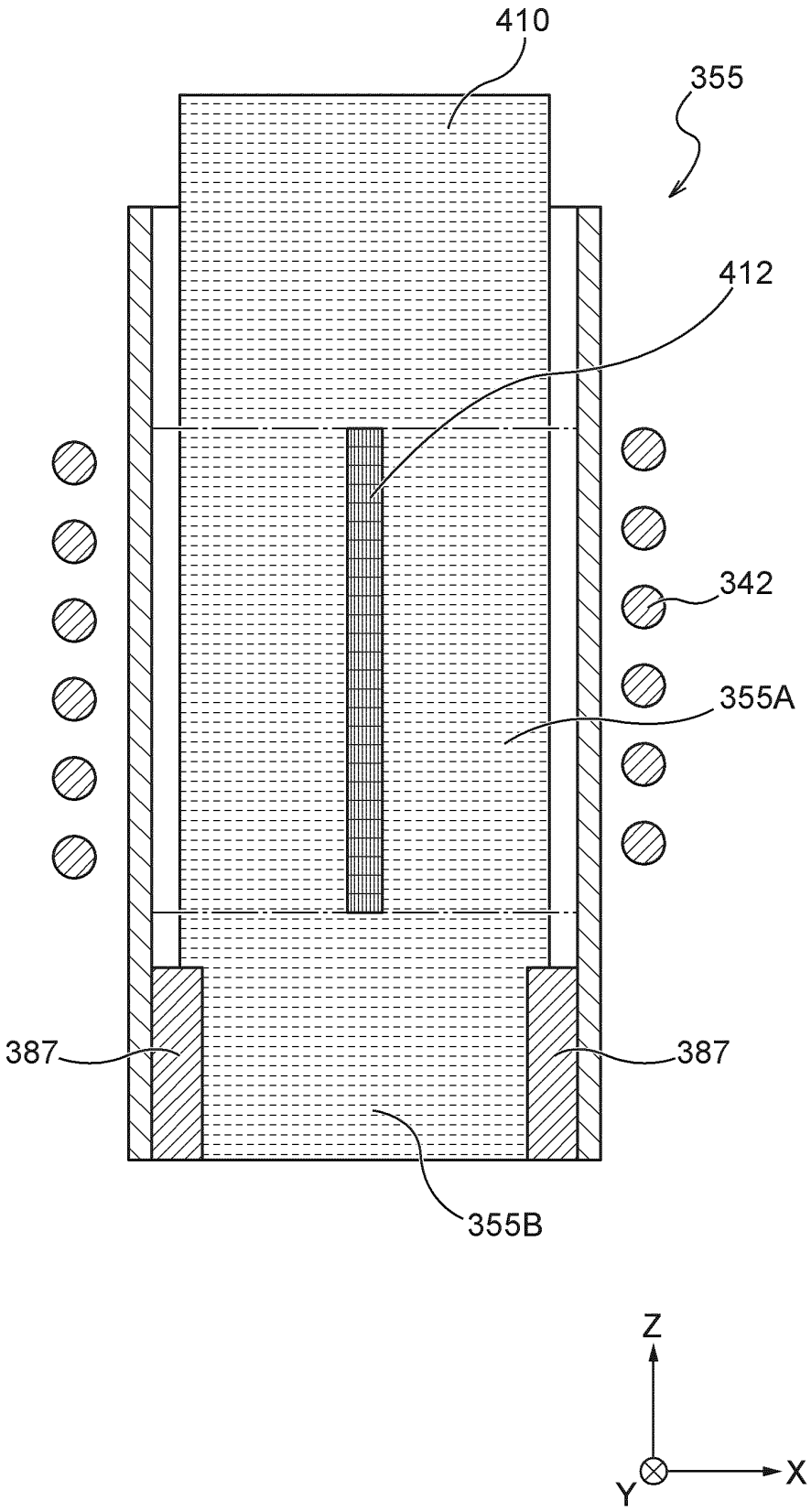
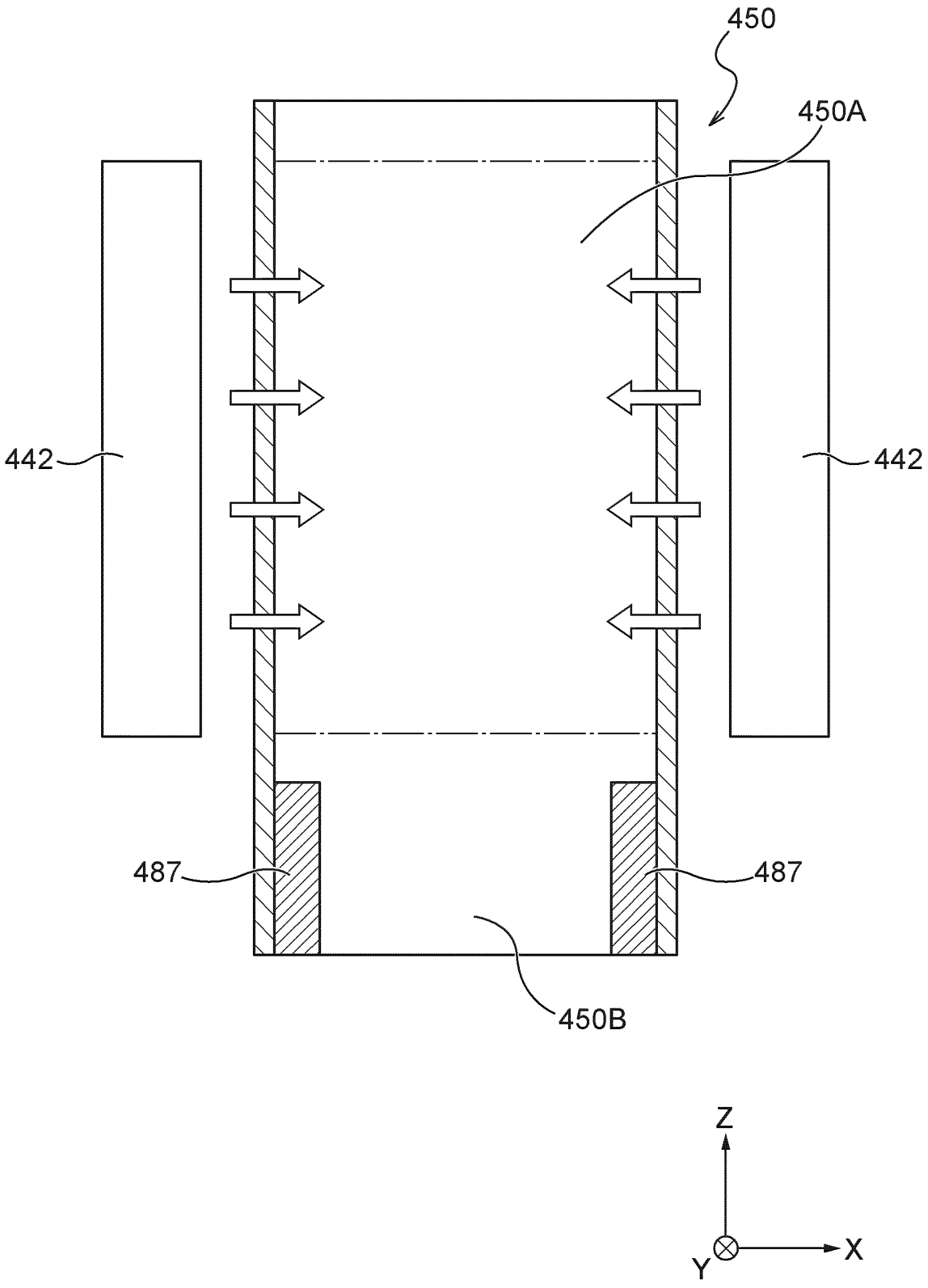


Fig. 15



INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2021/015031

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)
A24F40/40

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

Published examined utility model applications of Japan	1922-1996
Published unexamined utility model applications of Japan	1971-2021
Registered utility model specifications of Japan	1996-2021
Published registered utility model applications of Japan	1994-2021

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 2020/100927 A1 (JAPAN TOBACCO INC) 22 May 2020 (2020-05-22) paragraphs [0016]-[0019], [0030]-[0031], fig. 1-3	1-14
Y	WO 2018/172389 A1 (PHILIP MORRIS PRODUCTS S.A.) 27 September 2018 (2018-09-27) page 15, line 23 to page 17, line 21, fig. 7-9	1-14
Y	WO 2019/140749 A1 (SHANGHAI NEW TOBACCO PRODUCT RESEARCH INSTITUTE CO., LTD) 25 July 2019 (2019-07-25) page 10, line 22 to page 11, line 30, fig. 5-7	1-14
Y	JP 2018-529323 A (BRITISH AMERICAN TOBACCO (INVESTMENTS) LIMITED) 11 October 2018 (2018-10-11) paragraphs [0044]-[0050], fig. 1-6	13-14

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

* Special categories of cited documents:
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"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
09 June 2021 (09.06.2021)	22 June 2021 (22.06.2021)

Name and mailing address of the ISA/	Authorized officer
Japan Patent Office 3-4-3, Kasumigaseki, Chiyoda-ku, Tokyo 100-8915, Japan	Telephone No.

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

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/JP2021/015031

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
WO 2020/100927 A1	22 May 2020	(Family: none)	
WO 2018/172389 A1	27 Sep. 2018	(Family: none)	
WO 2019/140749 A1	25 Jul. 2019	CN 108451028 A KR 10-2020-0044047 A	
JP 2018-529323 A	11 Oct. 2018	US 2017/0055575 A1 paragraphs [0054]-[0060], fig. 1-6 WO 2017/036959 A1 EP 3344081 A1 CN 107949285 A	

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

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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