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

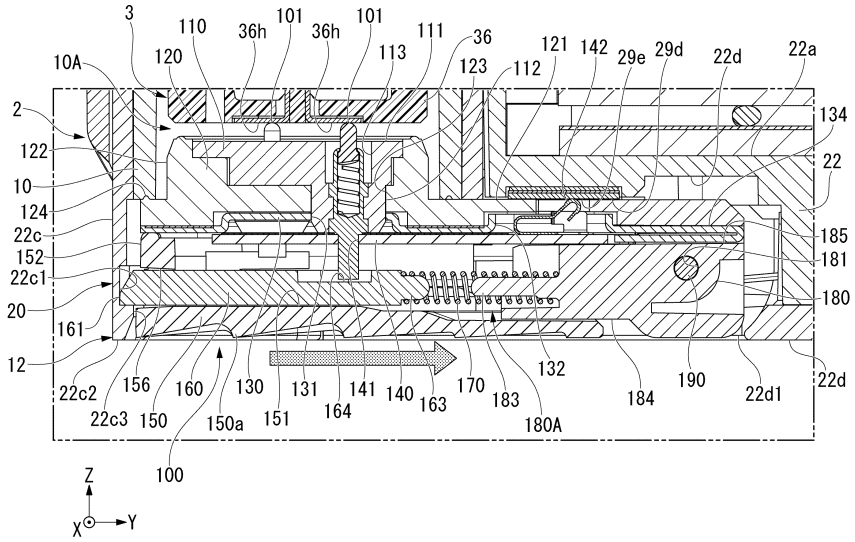
(72) Inventor: **WAKABAYASHI, Genya**
Tokyo 130-8603 (JP)

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

(54) CARTRIDGE ACCOMMODATION LID, BODY UNIT OF AEROSOL GENERATION DEVICE, AEROSOL GENERATION DEVICE, AND NON-COMBUSTION TYPE INHALER

(57) This cartridge housing lid includes a lid base that includes a rotation shaft provided thereto and rotates around the rotation shaft as a center, a locking piece connected to a rotation end part of the lid base via a first biasing member, and a slide cover that covers the locking piece and is attached to the lid base to be slidable in a biasing direction in which the locking piece is biased, wherein the slide cover includes a locking portion disposed on a side against which the locking piece is pressed by biasing of the first biasing member to lock the locking piece, and a guide portion that allows the locking piece moving away from the locking portion to move toward a side opposite to the side against which the locking piece is pressed.

FIG. 14



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Description

[Technical Field]

[0001] The present invention relates to a cartridge housing lid, a main body unit of an aerosol generator, an aerosol generator, and a non-combustion-type inhaler.

[Background Art]

[0002] Conventionally, a non-combustion-type inhaler through which aerosol is suctioned to allow a flavor to be tasted is known. As the kind of non-combustion-type inhaler, there is one which includes, for example, a cartridge that stores an aerosol source, a main body unit of an aerosol generator that houses the cartridge to be insertable and removable, and a flavor source container that adds a flavor to the aerosol atomized by the main body unit.

[0003] As this non-combustion-type inhaler, for example, an electronic cigarette described in Patent Document 1 below is known. In this electronic cigarette, a battery is removably housed in a case main body, and a cover of a pivot type (hinge type) for covering the battery is attached to the case main body.

[Citation List]

[Patent Document]

[0004] [Patent Document 1] Chinese Utility Model Publication No. 206808665

[Summary of Invention]

[PROBLEM TO BE SOLVED BY THE INVENTION]

[0005] The cover of the conventional technology described above includes a locking piece that engages with the case main body. The locking piece is attached to the cover via a spring. An opening that exposes an operation portion of the locking piece is formed on a surface of the cover. A user can unlock the cover by placing his or her finger on the operation portion of the locking piece through the opening of the cover and pulling the locking piece.

[0006] Incidentally, in a cartridge housing portion that houses a cartridge, a cover that blocks an opening thereof is required to have high airtightness so that aerosol does not leak out. In a configuration of the conventional technology described above, when the user closes the cover, a part of the cover surface (operation portion of the locking piece) that the user is touching moves. Therefore, it is difficult to close the cover, and in some cases, the cover may not be locked sufficiently, and this may impair airtightness.

[0007] An objective of the present invention is to prevent a curve surface touched by a user from moving when a cartridge housing lid is closed.

[MEANS TO SOLVE THE PROBLEM]

[0008] In order to achieve the above-described objective, a cartridge housing lid according to one aspect of the present invention includes a lid base that includes a rotation shaft provided thereto and rotates around the rotation shaft as a center, a locking piece connected to a rotation end part of the lid base via a first biasing member, and a slide cover that covers the locking piece and is attached to the lid base to be slidable in a biasing direction in which the locking piece is biased, wherein the slide cover includes a locking portion disposed on a side against which the locking piece is pressed by biasing of the first biasing member to lock the locking piece, and a guide portion that allows the locking piece moving away from the locking portion to move toward a side opposite to the side against which the locking piece is pressed.

[0009] According to the present aspect, when the cartridge housing lid is closed, since the locking piece covered with the slide cover moves inside the slide cover, it is possible to cause the cover surface touched by the user not to move.

[0010] In the cartridge housing lid described above, unevenness that extends in a direction intersecting the biasing direction may be formed on a cover surface of the slide cover facing a side opposite to the locking piece.

[0011] According to the present aspect, when the cartridge housing lid is opened, it is possible to slide the slide cover by hooking a user's finger or the like on the unevenness of the cover surface.

[0012] In the cartridge housing lid described above, an electrode disposed on a side of the locking piece opposite to the slide cover may be provided, wherein a long hole that extends in the biasing direction to avoid interference with the electrode may be provided in the locking piece.

[0013] According to the present aspect, even if the slide cover slides when the cartridge housing lid is opened, since the locking piece does not interfere with the electrode due to the long hole, an electrical contact between the electrode and the cartridge does not move, and friction and wear of the electrical contact can be suppressed.

[0014] A main body unit of an aerosol generator according to one aspect of the present invention may include a cartridge housing portion that houses a cartridge, and the cartridge housing lid described above which opens and closes an opening of the cartridge housing portion.

[0015] According to the present aspect, since the above-described cartridge housing lid is incorporated, the cartridge housing lid is easily closed, and airtightness of the cartridge housing portion is easily secured.

[0016] In the main body unit of an aerosol generator described above, the cartridge housing portion may include a surrounding wall that surrounds a circumferential

edge part of the cartridge housing lid in a state in which the cartridge housing lid is closed.

[0017] According to the present aspect, if the cartridge housing lid is closed, the circumferential edge part of the cartridge housing lid is completely covered with the surrounding wall of the main body unit. Therefore, even if the main body unit falls, damage to or displacement of the cartridge housing lid can be suppressed, and airtightness of the cartridge housing portion can be easily secured.

[0018] In the main body unit of an aerosol generator described above, the cartridge housing portion may include a locked piece having an inclined surface that moves the locking piece against biasing of the first biasing member when the cartridge housing lid is closed.

[0019] According to the present aspect, the locking piece can be moved by the inclined surface of the locked piece without sliding the slide cover when the cartridge housing lid is closed.

[0020] In the main body unit of an aerosol generator described above, the cartridge housing portion may include a collision wall with which a distal end of the locking piece collides due to biasing of the first biasing member after the locking piece passes the locked piece.

[0021] According to the present aspect, since a sound is generated by the locking piece colliding with the collision wall when the cartridge housing lid is closed, the user can recognize that the lock has been applied.

[0022] In the main body unit of an aerosol generator described above, the collision wall may be formed of a metal.

[0023] According to the present aspect, since a metallic acoustic effect can be obtained from the collision sound of the locking piece, the user can more easily recognize that the lock has been applied.

[0024] In the main body unit of an aerosol generator described above, a second biasing member that biases in a direction of opening the cartridge housing lid in a rotation direction of the cartridge housing lid may be provided.

[0025] According to the present aspect, if the cartridge housing lid is not sufficiently locked, since the cartridge housing lid opens due to the biasing of the second biasing member, it is easy for the user to recognize that the user has forgotten to close the cartridge housing lid.

[0026] In the main body unit of an aerosol generator described above, the cartridge housing lid may open at an acute angle with respect to the cartridge housing portion due to biasing of the second biasing member when a lock due to the locking piece is released.

[0027] According to the present aspect, even if the main body unit falls with the cartridge housing lid open, a probability that a load is applied in a direction in which the cartridge housing lid closes increases, and damage to the cartridge housing lid can be suppressed.

[0028] In the main body unit of an aerosol generator described above, a physical stopper which allows the cartridge housing lid to be opened at an acute angle or more may be provided.

[0029] According to the present aspect, if the cartridge housing lid attempts to open further from a state in which it is open at an acute angle due to the second biasing member, since the cartridge housing lid is allowed to open until it comes into contact with the physical stopper, this permissible amount can further reduce the probability that the cartridge housing lid will be damaged.

[0030] In the main body unit of an aerosol generator described above, the cartridge housing lid may include a seal portion that seals the opening of the cartridge housing portion, and the seal portion may include an annular protrusion that protrudes in a direction of closing the opening of the cartridge housing portion in the rotation direction of the cartridge housing lid.

[0031] According to the present aspect, since a direction of closing the cartridge housing lid and a direction in which the annular protrusion of the seal portion protrudes coincide with each other, airtightness of the cartridge housing portion is easily secured.

[0032] An aerosol generator according to one aspect of the present invention includes a main body unit described above, and a cartridge that stores an aerosol source and is inserted into the cartridge housing portion of the main body unit.

[0033] According to the present aspect, since the main body unit in which the above-described cartridge housing lid is incorporated is provided, the cartridge housing lid is easily closed, and airtightness of the cartridge housing portion is easily secured.

[0034] A non-combustion-type inhaler according to one aspect of the present invention includes an aerosol generator described above, and a flavor source container attached to the aerosol generator.

[0035] According to the present aspect, a flavor can be added to the aerosol.

[EFFECTS OF THE INVENTION]

[0036] According to one aspect of the present invention, it is possible to cause the cover surface touched by the user not to move when the cartridge housing lid is closed.

[Brief Description of Drawings]

[0037]

FIG. 1 is a left perspective view of an inhaler according to one embodiment.

FIG. 2 is a right perspective view of the inhaler according to one embodiment.

FIG. 3 is a front view of the inhaler according to one embodiment.

FIG. 4 is a plan view of the inhaler according to one embodiment.

FIG. 5 is a bottom view of the inhaler according to one embodiment.

FIG. 6 is an exploded perspective view of the inhaler

according to one embodiment from a bottom side.
FIG. 7 is a cross-sectional view taken along line VII-VII shown in FIG. 4.
FIG. 8 is an exploded perspective view of a mouthpiece according to one embodiment.
FIG. 9 is a cross-sectional view taken along line IX-IX shown in FIG. 5.
FIG. 10 is an exploded perspective view of a main body unit according to one embodiment.
FIG. 11 is an exploded perspective view of an inner assembly according to one embodiment.
FIG. 12 is an exploded perspective view of a heating module according to one embodiment.
FIG. 13 is an exploded perspective view of a cartridge housing lid according to one embodiment.
FIG. 14 is a longitudinal cross-sectional view of the cartridge housing lid according to one embodiment.
FIG. 15 is a plan cross-sectional view of the cartridge housing lid according to one embodiment.
FIG. 16 is a longitudinal cross-sectional view showing a state in which the cartridge housing lid according to one embodiment is unlocked.
FIG. 17 is an explanatory view showing a state in which the cartridge housing lid according to one embodiment is open due to a second biasing member.
FIG. 18 is a left side view of the inhaler according to one embodiment.
FIG. 19 is a left side view of the inhaler according to one embodiment in a state in which an outer case is removed.
FIG. 20 is a perspective view of a cover member according to one embodiment.
FIG. 21 is a rear view of the cover member according to one embodiment.
FIG. 22 is a cross-sectional view taken along line XXII-XXII shown in FIG. 3.
FIG. 23 is an enlarged view of a region A shown in FIG. 5.

[Description of Embodiments]

[0038] Hereinafter, a non-combustion-type inhaler (hereinafter, simply referred to as an inhaler) according to one embodiment of the present invention will be described with reference to the drawings.

[Inhaler]

[0039] FIG. 1 is a left perspective view of an inhaler 1 according to one embodiment. FIG. 2 is a right perspective view of the inhaler 1 according to one embodiment. FIG. 3 is a front view of the inhaler 1 according to one embodiment. FIG. 4 is a plan view of the inhaler 1 according to one embodiment. FIG. 5 is a bottom view of the inhaler 1 according to one embodiment. FIG. 6 is an exploded perspective view of the inhaler 1 according to one embodiment from a bottom side.

[0040] The inhaler 1 is a so-called non-combustion-type inhaler and obtains a flavor by suctioning aerosol atomized by heating through a flavor source.

[0041] As shown in FIG. 6, the inhaler 1 includes a main body unit 2, a cartridge 3 (also referred to as an atomization unit), a flavor source container 4, and a mouthpiece 5. The cartridge 3 is housed to be insertable into and removable from a cartridge housing portion 10 of the main body unit 2. The flavor source container 4 is detachably attached to a heating module 11 of the main body unit 2. The mouthpiece 5 is detachably attached to the flavor source container 4.

[0042] The main body unit 2 includes a housing 12. The housing 12 is formed in a rounded flat box shape as a whole. The housing 12 includes a pair of main surface portions 12A and a circumferential wall portion 12B. Here, "a pair" of main surface portions 12A means that one main surface portion (first main surface portion 12A1) and the other main surface portion (second main surface portion 12A2) are disposed to face each other, and is not limited to a meaning that the first main surface portion 12A1 and the second main surface portion 12A2 are identical even in detailed shapes.

[0043] When the housing 12 is assumed to be a hexahedron surrounded by six quadrangles, the pair of main surface portions 12A refer to portions that form a set of facing surfaces (in the present embodiment, surfaces with the largest area) of the hexahedron. Also, the circumferential wall portion 12B refers to a portion forming the remaining four surfaces of the hexahedron excluding the pair of main surface portions 12A. The circumferential wall portion 12B is also referred to as a portion that connects circumferential edges of the pair of main surface portions 12A that are disposed to face each other.

[0044] As shown in FIG. 1, the housing 12 includes an outer case 13, a display cover 14, and an inner case 20. The outer case 13 is formed by combining a first case 13A and a second case 13B. The first case 13A includes the first main surface portion 12A1 and a first circumferential wall portion 12B1 provided at a circumferential edge of the first main surface portion 12A1. Also, the second case 13B includes the second main surface portion 12A2 and a second circumferential wall portion 12B2 provided at a circumferential edge of the second main surface portion 12A2.

[0045] The first circumferential wall portion 12B1 of the first case 13A, the second circumferential wall portion 12B2 of the second case 13B, the display cover 14, and the inner case 20 form the circumferential wall portion 12B. A mating surface of the first circumferential wall portion 12B1 of the first case 13A and the second circumferential wall portion 12B2 of the second case 13B is formed in the circumferential wall portion 12B.

[0046] As shown in FIG. 3, four corner portions 12C (corner portions) are formed in the circumferential wall portion 12B. The four corner portions 12C include a first corner portion 12C1 at which the heating module 11 is disposed, a second corner portion 12C2 at which an

opening of the cartridge housing portion 10 (refer to FIG. 6) is disposed, a third corner portion 12C3 at which a charging terminal 21 (refer to FIG. 5) is disposed, and a fourth corner portion 12C4 at which an input device 15 (refer to FIG. 2) is disposed.

[0047] As shown in FIG. 2, the display cover 14 is provided from the heating module 11 disposed at the first corner portion 12C1 to the fourth corner portion 12C4. A through hole 14a in which the input device 15 (push button) is disposed is formed in the display cover 14. An outer surface of the display cover 14 is lower than an outer surface of the outer case 13. That is, the input device 15 is disposed in a recessed portion.

[0048] The input device 15 may be disposed at a position at or lower than the outer surface of the outer case 13. That is, at least a part of the input device 15 needs only be disposed at a position at or lower than the outer surface of the outer case 13. Preferably, the entirety of the input device 15 is disposed at a position at or lower than the outer surface of the outer case 13. In other words, it is preferable that a contact detection portion (button surface) of the input device 15 be disposed at a position not touching the outer surface of the outer case 13.

[0049] As shown in FIG. 1, a window 16 is provided between the first corner portion 12C1 and the second corner portion 12C2 of the circumferential wall portion 12B. From the window 16, a remaining amount of liquid in an aerosol source of the cartridge 3 stored inside the cartridge housing portion 10 can be ascertained. The window 16 is formed of an opening 13a provided in the outer case 13 and a cover member 17 covering the opening 13a. A first air inlet 18A (to be described later) that takes air (outside air) into the inside of the housing 12 is provided in a gap between the opening 13a and the cover member 17.

[0050] The outer case 13 has an exposed portion 13b that exposes a part of the inner case 20 in the second corner portion 12C2. A second air inlet 18B (to be described later) that takes air (outside air) into the inside of the housing 12 is provided in a gap between the inner case 20 and the outer case 13 in the exposed portion 13b. Note that, as shown in FIG. 2, the outer case 13 also has the exposed portion 13b that exposes a part of the inner case 20 at the third corner portion 12C3, but the second air inlet 18B is not provided at the third corner portion 12C3.

[0051] As shown in FIG. 6, an opening of the cartridge housing portion 10 is provided at the second corner portion 12C2. The opening of the cartridge housing portion 10 can be opened and closed by a cartridge housing lid 100 (to be described later) provided at a bottom part of the housing 12 (the inner case 20). As shown in FIG. 5, the charging terminal 21 is provided at the third corner portion 12C3. An opening 20a that exposes the charging terminal 21 is formed in the inner case 20.

[0052] Note that, in the following description, of the pair of main surface portions 12A (the first main surface portion 12A1 and the second main surface portion 12A2) described above, a side on which the first main surface portion 12A1 is disposed is referred to as a front side, and a side on which the second main surface portion 12A2 is disposed is referred to as a rear side. Also, in a plan view shown in FIG. 4, a side on which the heating module 11 is disposed is referred to as a left side, and a side on which the input device 15 is disposed is referred to as a right side. The heating module 11 protrudes from the housing 12 as shown in FIG. 3. A side from which the heating module 11 protrudes is referred to as an upper side, and a side opposite thereto is referred to as a lower side.

[0053] Also, in the drawings, an XYZ orthogonal coordinate system is set, and positional relationships of respective members may be described with reference to the XYZ orthogonal coordinate system. An X-axis direction is a front-rear direction (also referred to as a thickness direction) of the inhaler 1, a Y-axis direction is a left-right direction (also referred to as a width direction) of the inhaler 1, and a Z-axis direction is a vertical direction (also referred to as a height direction) of the inhaler 1.

[0054] That is, the first corner portion 12C1 (the heating module 11) is disposed at an upper left of the housing 12. The second corner portion 12C2 (the cartridge housing portion 10) is disposed at a lower left of the housing 12. The third corner portion 12C3 (the charging terminal 21) is disposed at a lower right of the housing 12. The fourth corner portion 12C4 is disposed at an upper right of the housing 12. Also, the first corner portion 12C1 (the heating module 11) and the third corner portion 12C3 (the charging terminal 21) are disposed on a diagonal line of the housing 12. The second corner portion 12C2 (the cartridge housing portion 10) and the fourth corner portion 12C4 (the input device 15) are disposed on a diagonal line of the housing 12.

[0055] Furthermore, positional relationships of respective members may be described with a main axis O of the cartridge housing portion 10 as a reference. The main axis O is a central axis of the cylindrical cartridge housing portion 10. A direction in which the main axis O extends may be referred to as an axial direction (the above-described Z-axis direction), a direction orthogonal to the main axis O may be referred to as a radial direction, and a direction of revolving around the main axis O may be referred to as a circumferential direction.

<Flavor source container>

[0056] The flavor source container 4 (also referred to as a tobacco capsule) shown in FIG. 6 stores a flavor source and adds flavor to the aerosol atomized by the cartridge 3. As raw material pieces constituting the flavor source, shredded tobacco or formed articles in which tobacco raw materials are formed into granules can be used. Also, the flavor source may be formed of plants other than tobacco (for example, mint, Chinese medicine, herbs, or the like). Also, a flavoring agent such as menthol

may be infused into the flavor source. Furthermore, the flavor source may be one in which a flavoring agent is supported on a plant-derived carrier (such as cellulose) or other carriers (including an inorganic carrier). The flavor source container 4 is attached to the heating module 11 of the main body unit 2.

[0057] FIG. 7 is a cross-sectional view taken along line VII-VII shown in FIG. 4.

[0058] As shown in FIG. 7, the flavor source container 4 includes a bottomed cylindrical container main body 41 and a filter 42 that covers an opening of the container main body 41. A circumferential wall 41a of the container main body 41 is inserted into the inside of a capsule holder 61 of the heating module 11. An upper side of the circumferential wall 41a of the container main body 41 protrudes from the capsule holder 61. The mouthpiece 5 is attached to the upper side of the circumferential wall 41a.

[0059] A flange portion 41b extending outward in the radial direction is provided in an annular shape on an outer surface of the circumferential wall 41a. The flange portion 41b is in contact with an upper end opening edge of the capsule holder 61 in the axial direction (Z-axis direction). A flavor source storage chamber 41c is formed inside the circumferential wall 41a of the container main body 41. A plurality of fine holes 41e penetrating in the axial direction are formed in a bottom wall 41d of the container main body 41.

[0060] The filter 42 is formed of, for example, a nonwoven fabric. The filter 42 is disposed inside the circumferential wall 41a of the container main body 41. Due to the filter 42, the opening of the container main body 41 is closed, and the flavor source storage chamber 41c is formed inside the flavor source container 4. The flavor source described above is stored in the flavor source storage chamber 41c.

<Mouthpiece>

[0061] FIG. 8 is an exploded perspective view of the mouthpiece 5 according to one embodiment.

[0062] As shown in FIG. 8, the mouthpiece 5 includes a cylindrical suction port 51 that is held in a user's mouth, and a suction port base 52 to which the suction port 51 is attached. The suction port 51 is a soft resin molded article formed of, for example, a resin material such as a silicone resin. The suction port base 52 is, for example, a hard resin molded article formed of a resin material such as a polypropylene resin.

[0063] As shown in FIG. 7, the suction port base 52 includes an insertion cylinder portion 52a inserted into the inside of the suction port 51, and an outer fitting cylinder portion 52b provided to be connected to a lower end of the insertion cylinder portion 52a and fitted onto the flavor source container 4. A step is formed on an outer surface between the insertion cylinder portion 52a and the outer fitting cylinder portion 52b, and an annular groove 52c recessed downward (to a -Z side) in the axial direction is formed on an upper surface of the step. An insertion portion 51a that is inserted into the annular groove 52c is formed at a lower end of the suction port 51.

<Cartridge>

[0064] The cartridge 3 shown in FIG. 6 stores a liquid aerosol source and atomizes the liquid aerosol source. The cartridge 3 is formed in a columnar shape and is housed inside the housing 12 from the cartridge housing portion 10 provided at the bottom part of the housing 12.

[0065] FIG. 9 is a cross-sectional view taken along line IX-IX shown in FIG. 5.

[0066] As shown in FIG. 9, the cartridge 3 includes a tank 31, a gasket 32, a mesh body 33, an atomization container 34, a heater 35, and a heater holder 36. The tank 31 stores the aerosol source. The tank 31 has translucency and allows a remaining amount of liquid in the aerosol source to be ascertained.

[0067] Here, the "translucency" includes a "transparent" state in which a transmittance is extremely high in properties of a substance through which light passes and the other side can be seen through the substance, and a state in which, although a substance has properties through which light passes similarly to the "transparent" state, a shape or the like on the other side through the substance cannot be clearly recognized unlike the "transparent" state because transmitted light is diffused or the transmittance is low. That is, even frosted glass, milky white plastic, or the like are also regarded as having translucency.

[0068] The tank 31 is formed in a topped cylinder shape. A through hole 31b is formed in a top wall 31a of the tank 31. A flow path tube 31c (also referred to as an inner circumferential wall) connected to the through hole 31b is vertically provided in the top wall 31a. The flow path tube 31c serves as a flow path for atomized aerosol. The flow path tube 31c is connected to an outer circumferential wall 31d of the tank 31 via a plurality of ribs 31e. The ribs 31e are disposed at regular intervals in the circumferential direction to be radial when viewed from the axial direction (refer to FIG. 22 to be described later).

[0069] As shown in FIG. 9, the outer circumferential wall 31d of the tank 31 extends to a lower side (-Z side) of a lower end of the flow path tube 31c. Two engaging holes 31f are formed near a lower end part of the outer circumferential wall 31d. The two engaging holes 31f are to fix the heater holder 36 to the tank 31. The two engaging holes 31f are disposed to face each other on both sides of the outer circumferential wall 31d with the main axis O sandwiched therebetween. Note that, in a state in which the cartridge 3 is housed in the cartridge housing portion 10, a central axis of the cartridge 3 coincides with or substantially coincides with the main axis O of the cartridge housing portion 10.

[0070] The gasket 32 is an annular plate member that covers a bottom part of an annular space (liquid storage chamber 31g) formed between the outer circumferential

wall 31d and the flow path tube 31c of the tank 31. The gasket 32 performs positioning of the mesh body 33 and maintains a posture of the mesh body 33. A plurality of openings 32a are formed in the gasket 32. The openings 32a are disposed at regular intervals in the circumferential direction. The mesh body 33 is in contact with the liquid storage chamber 31g via the openings 32a of the gasket 32 to be moistened.

[0071] The mesh body 33 is a porous member having a liquid absorbing property. The mesh body 33 is formed of, for example, a cotton-based fiber material, a glass-based fiber, or the like. The mesh body 33 is also formed in substantially the same annular shape as the gasket 32. That is, the flow path tube 31c can be inserted into a center of the mesh body 33 in the radial direction. The openings 32a of the gasket 32 are closed by the mesh body 33, and the liquid storage chamber 31g is formed inside the tank 31. The liquid aerosol source is stored in the liquid storage chamber 31g.

[0072] The atomization container 34 is formed of a member having elasticity, for example, a resin material such as a silicone resin. The atomization container 34 is formed in a bottomed cylindrical shape. An upper end opening edge of a circumferential wall 34a of the atomization container 34 is in contact with an outer circumferential edge of the mesh body 33 in the axial direction. That is, the mesh body 33 is sandwiched between the gasket 32 and the atomization container 34. A fitting portion 34b that fits into an inner surface of the outer circumferential wall 31d of the tank 31 is formed on an outer surface of the circumferential wall 34a of the atomization container 34.

[0073] An atomization chamber 34c is formed inside the circumferential wall 34a of the atomization container 34. The atomization chamber 34c is in communication with the flow path tube 31c of the tank 31. An opening 34e is formed in a bottom wall 34d of the atomization container 34. The heater 35 is disposed in the atomization chamber 34c.

[0074] The heater 35 is to atomize the liquid aerosol source. The heater 35 includes a wick 35a connected to the mesh body 33 and a heating wire 35b that heats the wick 35a.

[0075] The wick 35a is a porous and substantially columnar member having a liquid absorbing property. The wick 35a is curved and deformed into a substantially U-shape. More specifically, the wick 35a has two axial extension portions that extend in the axial direction and a radial extension portion that connects the two axial extension portions. The two axial extension portions are disposed to overlap in the X-axis direction, and each of them is connected to the mesh body 33. Therefore, the aerosol source absorbed by the mesh body 33 is suctioned up by the wick 35a.

[0076] The heating wire 35b is spirally wound around the radial extension portion of the wick 35a. Both end parts of the heating wire 35b extend toward the side on the heater holder 36 in the axial direction. Both end parts of the heating wire 35b are electrically connected to two planar electrodes 36h provided on a lower surface of a bottom wall 36d of the heater holder 36. When the heating wire 35b is energized through the two planar electrodes 36h, the wick 35a is heated. When the wick 35a is heated, the aerosol source absorbed by the wick 35a is atomized.

[0077] The heater holder 36 is formed in a bottomed cylindrical shape. The circumferential wall 36a of the heater holder 36 is inserted outside the circumferential wall 34a of the atomization container 34 and inside the outer circumferential wall 31d of the tank 31. An upper end opening edge of the circumferential wall 36a is in contact with the fitting portion 34b of the atomization container 34 in the axial direction. Two engaging pieces 36b engaging with the two engaging holes 31f of the outer circumferential wall 31d of the tank 31 are formed at an upper end of the circumferential wall 36a. The gasket 32, the mesh body 33, and the atomization container 34 are incorporated in that order between the tank 31 and the heater holder 36 in the axial direction.

[0078] A lower side of the circumferential wall 36a of the heater holder 36 is exposed from the tank 31. The lower side of the circumferential wall 36a has approximately the same outer diameter as the outer circumferential wall 31d of the tank 31. Also, two intake holes 36c penetrating in the radial direction are formed on the lower side of the circumferential wall 36a. The two intake holes 36c are disposed to face each other on both sides of the circumferential wall 36a with the main axis O sandwiched therebetween.

[0079] The two intake holes 36c causes the outside of the cartridge 3 (a cartridge housing space 10A of the cartridge housing portion 10) to be in communication with the atomization chamber 34c. Note that, an intake hole 36e penetrating in the axial direction is also formed in the bottom wall 36d of the heater holder 36, but may be omitted. The intake hole 36e also causes the outside of the cartridge 3 (the cartridge housing space 10A of the cartridge housing portion 10) to be in communication with the atomization chamber 34c.

[0080] A plate-shaped separation wall 36f is erected in the axial direction on the bottom wall 36d of the heater holder 36. Also, the separation wall 36f extends in the radial direction, and both end parts thereof are connected to an inner surface of the circumferential wall 36a. Two slits penetrating in the axial direction are formed in the bottom wall 36d. The two slits are disposed with the separation wall 36f sandwiched therebetween, and into which bent portions of the two planar electrodes 36h are inserted. The separation wall 36f prevents short-circuiting between the two planar electrodes 36h and both end parts of the heating wire 35b connected to the two planar electrodes 36h.

<Main body unit>

[0081] FIG. 10 is an exploded perspective view of the main body unit 2 according to one embodiment.

[0082] As shown in FIG. 10, the main body unit 2

includes an inner assembly 20A in which various parts are incorporated into the inner case 20. The inner assembly 20A, together with a plate-shaped cushion material 19, is sandwiched between the first case 13A and the second case 13B of the outer case 13 to be covered on a front side and a rear side thereof.

[0083] FIG. 11 is an exploded perspective view of the inner assembly 20A according to one embodiment. Note that, FIG. 11 shows a state in which the heating module 11 and the cartridge housing lid 100 are removed from the inner assembly 20A.

[0084] As shown in FIG. 10, the inner assembly 20A includes an inner case main body 22, a power supply 23, a main substrate 24, a display device 25, a sensor 26, a light source 27, a vibrator 28, and a flexible printed circuit board 29.

[0085] The inner case main body 22 is a hard resin molded article formed of a resin material such as, for example, a polycarbonate resin or an ABS resin. The inner case main body 22 includes the cartridge housing portion 10 that houses the cartridge 3 and a power supply housing portion 22A that houses the power supply 23. The cartridge housing portion 10 is formed in a cylindrical shape extending in the Z-axis direction. The power supply housing portion 22A is provided to be connected to a +Y side of the cartridge housing portion 10 and is formed in a semi-cylindrical shape extending in the Z-axis direction.

[0086] A cartridge contact portion 22b is fitted into an opening of the cartridge housing portion 10 on an upper side (+Z side) in the axial direction. The cartridge contact portion 22b is an elastic body formed of a resin material such as, for example, a silicone resin. As shown in FIG. 7, the cartridge contact portion 22b includes a first ring portion 22b1, a cylindrical portion 22b2, and a second ring portion 22b3. An annular protrusion 10B protruding inward in the radial direction is formed on an inner wall surface of the cartridge housing portion 10 on an upper side (+Z side) in the axial direction.

[0087] The first ring portion 22b1 is disposed on an upper side (+Z side) of the annular protrusion 10B in the axial direction. The first ring portion 22b1 has an outer diameter larger than an inner diameter of the annular protrusion 10B and extends to the inner wall surface of the cartridge housing portion 10. The first ring portion 22b1 is in contact with the bottom wall 41d of the flavor source container 4 inside the capsule holder 61. A surface side of the first ring portion 22b1 facing the bottom wall 41d of the flavor source container 4 may be a flat surface, or a groove may be formed in accordance with a shape of a leg portion of the bottom wall 41d.

[0088] The first ring portion 22b1 serves as a slip stopper for the flavor source container 4 and a seal chamber for the fine holes 41e of the flavor source container 4. Note that, the first ring portion 22b1 may not be in contact with the bottom wall 41d of the flavor source container 4. In that case, a seal portion that prevents introduction of outside air can be formed at a contact portion in the flange portion 41b between the flavor source container 4 and the capsule holder 61. The cylindrical portion 22b2 is disposed radially inside the annular protrusion 10B. The cylindrical portion 22b2 connects an inner diameter side of the first ring portion 22b1 and an inner diameter side of the second ring portion 22b3 in the axial direction.

[0089] The second ring portion 22b3 is disposed on a lower side (-Z side) of the annular protrusion 10B in the axial direction. The second ring portion 22b3 has an outer diameter larger than the inner diameter of the annular protrusion 10B, is in contact with a lower surface of the annular protrusion 10B, and is formed in an inverted truncated cone shape in which a diameter thereof decreases toward a lower side in the axial direction. A seal ring 22b4 is formed at a lower end of the second ring portion 22b3. Due to the seal ring 22b4, a contact of the second ring portion 22b3 to the cartridge 3 becomes nonplanar contact, and a contact pressure with respect to the cartridge 3 increases.

[0090] A communication hole 22b5 is formed at a center of the first ring portion 22b1, the cylindrical portion 22b2, and the second ring portion 22b3. The communication hole 22b5 causes the through hole 21b of the tank 31 of the cartridge 3 described above to be in communication with the fine holes 41e of the flavor source container 4. The seal ring 22b4 of the second ring portion 22b3 is formed in a double ring shape. The seal ring 22b4 is in contact with the top wall 31a of the tank 31 around the through hole 31b of the cartridge 3, and thereby a highly airtight double seal can be formed.

[0091] FIG. 12 is an exploded perspective view of the heating module 11 according to one embodiment.

[0092] As shown in FIG. 12, the heating module 11 includes a heater portion 60, the capsule holder 61 that houses the heater portion 60, and a design ring 62 that is fitted onto the capsule holder 61.

[0093] The heater portion 60 includes a film heater 60a, a pipe member 60b, and a shrink tube 60c. The film heater 60a is one in which a heating element such as, for example, a heating wire is sandwiched between heat-resistant films. The film heater 60a is wound in a cylindrical shape around an outer circumferential surface of the pipe member 60b.

[0094] The flavor source container 4 attached to the capsule holder 61 is inserted inside the pipe member 60b. The pipe member 60b is formed of, for example, a metal material having excellent thermal conductivity such as, for example, stainless steel. The shrink tube 60c is attached to an outer side of the film heater 60a in the radial direction, and brings the film heater 60a into close contact with an outer circumferential surface of the pipe member 60b using elastic shrinkage, heat shrinkage, or the like.

[0095] The capsule holder 61 is a hard resin molded article formed of a resin material such as, for example, a polycarbonate resin or an ABS resin. The capsule holder 61 has a cylindrical shape extending in the axial direction, and a diameter thereof on an upper side in the axial

direction is reduced into a truncated cone shape. A snap fit 61a is provided at a lower end part of the capsule holder 61 in the axial direction. The snap fit 61a fits into a protruding portion 10a formed on an outer circumferential surface of the cartridge housing portion 10 shown in FIG. 11.

[0096] As shown in FIG. 12, the design ring 62 fits onto an outer circumferential surface of the capsule holder 61. A stepped portion 61b to which the design ring 62 fits is formed on the outer circumferential surface of the capsule holder 61. The design ring 62 has a different color and gloss from the capsule holder 61 to improve a design of the main body unit 2. The design ring 62 is formed of, for example, an alumite-treated aluminum material or the like.

[0097] As shown in FIG. 11, a stopper ring 22c is fitted onto a lower end part 10b of the cartridge housing portion 10. Similarly to the design ring 62, the stopper ring 22c is formed of, for example, an alumite-treated aluminum material or the like. A first opening 10c is formed in a circumferential surface on a left side (-Y side) of the cartridge housing portion 10. The first opening 10c is formed in a long hole shape extending in the axial direction.

[0098] The cover member 17 is adhered to the circumferential surface on the left side (-Y side) of the cartridge housing portion 10 via an adhesive sheet 17b. The cover member 17 has translucency and closes the first opening 10c. Therefore, a remaining amount of liquid in the aerosol source of the cartridge 3 housed in the cartridge housing portion 10 can be ascertained through the cover member 17 and the first opening 10c.

[0099] Two communication holes 17a are formed in the cover member 17. Also, two communication holes 10d in communication with the two communication holes 17a are also formed in the cartridge housing portion 10. The communication holes 17a and 10d causes each of the first air inlet 18A and the second air inlet 18B shown in FIG. 1 to be in spatial communication with the cartridge housing space 10A inside the cartridge housing portion 10.

[0100] The power supply housing portion 22A has an opening on the front side (+X side) and houses the power supply 23 from the opening. The power supply 23 is formed in a columnar shape extending in the Z-axis direction. The power supply 23 is electrically connected to the main substrate 24 via a wiring. The power supply 23 is, for example, a storage battery (secondary battery) and can be charged via the charging terminal 21 provided on the main substrate 24. Note that, the power supply 23 is not limited to a chargeable and dischargeable secondary battery, and may be a super capacitor or the like. Also, the power supply 23 may be a primary battery. Note that, if the power supply 23 is a primary battery, the charging terminal 21 is not necessary.

[0101] The inner case main body 22 includes a top plate 22B, a side plate 22C, and a bottom plate 22D that surround the power supply housing portion 22A. Note that, the cartridge housing portion 10 is disposed at a position facing the side plate 22C in the left-right direction (Y-axis direction), and all four sides of the power supply 23 are surrounded by the top plate 22B, the side plate 22C, the bottom plate 22D, and the cartridge housing portion 10.

[0102] The top plate 22B faces an upper end part of the power supply 23 with a gap therebetween in the Z-axis direction. A disc-shaped cushion material 23a is inserted into the gap between the top plate 22B and the power supply 23. Also, the bottom plate 22D faces a lower end part of the power supply 23 with a gap therebetween in the Z-axis direction. The disc-shaped cushion material 23a is inserted into the gap between the bottom plate 22D and the power supply 23.

[0103] The top plate 22B holds the display device 25 and the input device 15. The display device 25 is, for example, an organic EL display, a liquid crystal display, or the like. The display device 25 is electrically connected to the main substrate 24 via a flexible printed circuit board 25a. The display device 25 is disposed on a lower side (-Z side) of the display cover 14. The display cover 14 is snap-fitted to both left and right end parts of the top plate 22B. The display cover 14 has translucency and allows a display surface of the display device 25 to be ascertained.

[0104] The input device 15 is, for example, a push button. The input device 15 includes a switch button 15a, a switch holder 15b, and a switch substrate 15c. The switch substrate 15c is provided at a second end part 29b of the flexible printed circuit board 29. The switch button 15a is disposed on the switch substrate 15c. The switch button 15a is assembled to the side on the display cover 14 via the switch holder 15b. Note that, the input device may be a touch panel. That is, the input device 15 needs only be a contact detection portion.

[0105] A second opening 10e is formed on a circumferential surface on a right side (+Y side) of the cartridge housing portion 10. The second opening 10e is formed in a long hole shape extending in the axial direction. A sensor holder 26a is adhered to a circumferential surface on a right side (-Y side) of the cartridge housing portion 10 via an adhesive sheet 26c. The sensor holder 26a holds the sensor 26. The sensor 26 is a so-called puff sensor that detects user's suction. As the sensor 26, a pressure sensor that detects a pressure, an airflow sensor that detects a flow of air, a temperature sensor that detects a temperature, or the like can be exemplified. In the sensor 26 of the present embodiment, a side facing the cartridge housing portion 10 serves as a detection portion. The detection portion detects, for example, behavior of a diaphragm that deforms according to pressure fluctuations as a change in capacitance.

[0106] A pedestal portion 26b is formed in the sensor holder 26a. The light source 27 is placed on the pedestal portion 26b. The light source 27 is, for example, an LED light, or the like. The sensor holder 26a has translucency and also serves as a light guide member that guides light of the light source 27 into the cartridge housing portion

10. This sensor holder 26a is formed of, for example, a polycarbonate resin. The polycarbonate resin provides the sensor holder 26a that holds the sensor 26 with appropriate hardness and satisfactory translucency so that it can also serve as a light guide member. As the translucency of the sensor holder 26a, it is preferable to have a lower transmittance than transparency in such a manner that transmitted light is diffused.

[0107] The light source 27 is electrically connected to a sub-substrate 27a. Also, the vibrator 28 is electrically connected to the sub-substrate 27a via a wiring. The vibrator 28 is in contact with the side on the second case 13B (refer to FIG. 22 described later). The vibrator 28 operates at a predetermined timing (for example, at a timing at which the input device 15 is pressed, or the like) to cause the outer case 13 to vibrate. The sub-substrate 27a is electrically connected to the main substrate 24 via a third end part 29c of the flexible printed circuit board 29.

[0108] The main substrate 24 is held by the side plate 22C. The main substrate 24 has a plate shape extending along an X-Z plane. The charging terminal 21 is mounted on the lower end part of the main substrate 24. The main substrate 24 is connected to various electronic parts described above directly or indirectly via the flexible printed circuit board 29.

[0109] Here, the "main substrate" refers to a largest substrate among substrates housed inside the housing 12. The main substrate 24 is larger than the sub-substrate 27a, the switch substrate 15c of the input device 15, or the like described above. Note that, if only one substrate is housed inside the housing 12, that substrate is the "main substrate". Also, if two substrates of the same size are housed inside the housing 12, a substrate in which an arithmetic unit for electronic control such as a CPU or a microcomputer is provided is referred to as the "main substrate".

[0110] The flexible printed circuit board 29 includes a first end part 29a electrically connected to the main substrate 24, the second end part 29b electrically connected to the switch substrate 15c, the third end part 29c electrically connected to the sub-substrate 27a, and a fourth end part 29d in which a contact pad 29e is provided. The contact pad 29e (the fourth end part 29d) is held by the bottom plate 22D. A cap member 22d that covers the charging terminal 21 is attached to the bottom plate 22D. Also, a bearing portion 22D1 on which the cartridge housing lid 100 is mounted is formed on the bottom plate 22D.

<Cartridge housing lid>

[0111] The cartridge housing lid 100 shown in FIG. 6 opens and closes the cartridge housing portion 10 provided at the bottom part of the housing 12. The cartridge housing lid 100 of a pivot type (hinge type) is attached to the housing 12 (the inner case 20).

[0112] FIG. 13 is an exploded perspective view of the cartridge housing lid 100 according to one embodiment. FIG. 14 is a longitudinal cross-sectional view of the cartridge housing lid 100 according to one embodiment. FIG. 15 is a plan cross-sectional view of the cartridge housing lid 100 according to one embodiment. FIG. 16 is a longitudinal cross-sectional view showing a state in which the cartridge housing lid 100 according to one embodiment is unlocked.

[0113] As shown in FIG. 13, the cartridge housing lid 100 includes a protruding electrode 101, an electrode holder 110, a seal portion 120, a metal holder 130, an electrode substrate 140, a slide cover 150, a locking piece 160, a first biasing member 170, a lid base 180, a rotation shaft 190, and a second biasing member 200.

[0114] As shown in FIG. 14, the protruding electrode 101 is inserted into the cartridge housing space 10A inside the cartridge housing portion 10 in a state in which the cartridge housing lid 100 is closed. A distal end part of the protruding electrode 101 is biased to the +Z side by a spring member housed inside the protruding electrode 101, and is displaceable in the Z-axis direction. That is, the distal end part of the protruding electrode 101 extends toward the cartridge 3 and is displaced to the -Z side when the cartridge 3 is inserted. Even in that state, the distal end part of the protruding electrode 101 is biased to the +Z side, and therefore reliable contact with the cartridge 3 can be ensured.

[0115] In the present embodiment, three protruding electrodes 101 are provided so that position alignment with the two planar electrodes 36h of the cartridge 3 is not necessary. As shown in FIG. 6, the two planar electrodes 36h of the cartridge 3 are each formed in a semicircular shape disposed with a phase difference of 180° in the circumferential direction. In contrast, the protruding electrodes 101 are disposed at 120° intervals at positions corresponding to three vertices of an equilateral triangle as shown in FIG. 13. Therefore, at least two of the three protruding electrodes 101 come into contact with the two planar electrodes 36h. Therefore, the heater 35 of the cartridge 3 can be caused to reliably generate heat by being energized from the protruding electrodes 101.

[0116] The electrode holder 110 is a hard resin molded article formed of a resin material such as, for example, a polyamide resin. As shown in FIG. 13, the electrode holder 110 includes a disc-shaped top plate portion 111 and three protruding portions 112 that protrude downward from a lower surface of the top plate portion 111. Three through holes 113 into which the protruding electrodes 101 are inserted are formed in the top plate portion 111. The three through holes 113 are formed at positions corresponding to the three protruding portions 112.

[0117] The seal portion 120 is a soft resin molded article formed of, for example, a resin material such as a silicone resin. The seal portion 120 includes a plate-shaped base portion 121 and a cylindrical portion 122 that protrudes upward from an upper surface of the base portion 121. In the base portion 121, a left side (-Y side) is formed in a semicircular shape in a plan view, and a right side (+Y side) is formed in a rectangular shape in a plan

view.

[0118] The cylindrical portion 122 is disposed on a left side (-Y side) of the base portion 121. The electrode holder 110 is inserted inside the cylindrical portion 122. Three through holes 123 into which the three protruding portions 112 of the electrode holder 110 are inserted are formed inside the cylindrical portion 122. An upper end of the cylindrical portion 122 is disposed above the top plate portion 111 of the inserted electrode holder 110, and supports a bottom part of the cartridge 3 when the distal end parts of the protruding electrodes 101 move downward.

[0119] An annular protrusion 124 protruding upward is formed around the cylindrical portion 122 on the upper surface of the base portion 121. That is, the annular protrusion 124 protrudes in a direction of closing the opening of the cartridge housing portion 10 (in a tangential direction of counterclockwise in the present embodiment) in a rotation direction of the cartridge housing lid 100 (circumferential direction around the X-axis). As shown in FIG. 14, the annular protrusion 124 is in contact with a lower end opening edge of the cartridge housing portion 10 from below and is elastically deformed. Therefore, the opening of the cartridge housing portion 10 is airtightly sealed over the entire circumference.

[0120] Returning to FIG. 13, the metal holder 130 is formed of a metal material with high strength such as, for example, stainless steel. The metal holder 130 is formed, for example, by press-processing a metal plate. Three through holes 131 in communication with the three through holes 123 of the seal portion 120 are formed in the metal holder 130. The three protruding portions 112 of the electrode holder 110 are inserted into the three through holes 131 of the metal holder 130.

[0121] A rectangular opening 132 is formed on a right side (+Y side) of the three through holes 131 of the metal holder 130. Also, a pair of slide rails 133 are formed on the metal holder 130. The pair of slide rails 133 are formed by bending both sides of the metal holder 130 in the X-axis direction into a crank shape. Also, an insertion portion 134 is formed further to the right side (+Y side) than the opening 132 of the metal holder 130. The insertion portion 134 is inserted into an insertion groove 185 formed in the lid base 180 in the Y-axis direction.

[0122] The electrode substrate 140 is a rigid substrate in which a conductor wiring such as copper is provided on an insulator such as, for example, polychlorinated biphenyl. The electrode substrate 140 is attached to a lower surface of the metal holder 130 by fitting or adhesion. Three through holes 141 in communication with the three through holes 131 of the metal holder 130 are formed in the electrode substrate 140. The three protruding electrodes 101 protruding from lower ends of the three through holes 123 of the seal portion 120 are inserted into the three through holes 141 of the electrode substrate 140.

[0123] Three spring contacts 142 are provided on a right side (+Y side) of the three through holes 141 of the electrode substrate 140. The three spring contacts 142 are disposed at positions corresponding to the opening 132 of the metal holder 130. The three spring contacts 142 are electrically connected to the three protruding electrodes 101 via a conductor wiring which is not shown in the drawings. As shown in FIG. 14, the three spring contacts 142 are in contact with the contact pad 29e in a state in which the cartridge housing lid 100 is closed. That is, in a state in which the cartridge housing lid 100 is closed, the three protruding electrodes 101 are electrically connected to the main substrate 24 via the contact pad 29e and are controlled for energization.

[0124] Returning to FIG. 13, the slide cover 150 is a hard resin molded article formed of a resin material such as, for example, a polycarbonate resin or an ABS resin. The slide cover 150 includes a cover bottom wall 151 that forms a lower surface (cover surface) of the cartridge housing lid 100, and a cover circumferential wall 152 that protrudes upward from a circumferential edge part of the cover bottom wall 151. In the cover bottom wall 151, a left side (-Y side) is formed in a semicircular shape in a plan view, and a right side (+Y side) is formed in a rectangular shape in a plan view.

[0125] A left side (-Y side) of the cover circumferential wall 152 is formed in a semicircular arc shape in a plan view. A right side (+Y side) of the cover circumferential wall 152 extends parallel to the left-right direction (Y-axis direction) from both end parts of the semicircular arc-shaped portion. An upper end part 152a of the semicircular arc-shaped portion of the cover circumferential wall 152 is in contact with the lower surface of the metal holder 130 to be slidable in the Y-axis direction. Also, a through hole 156 through which a claw portion 161 of the locking piece 160 is inserted in the Y-axis direction and disposed is formed in the semicircular arc-shaped portion of the cover circumferential wall 152.

[0126] Inside the parallel portions of the cover circumferential wall 152, a pedestal portion 153, a cover slide groove 154, and a lock release groove 155 are each provided in pairs at the front and rear. The pair of pedestal portions 153 are in contact with the electrode substrate 140, which is disposed inside the cover circumferential wall 152, to be slidable in the Y-axis direction. The pair of slide rails 133 of the metal holder 130 engage with the pair of cover slide grooves 154 to be slidable in the Y-axis direction. A pair of locked portions 162 of the locking piece 160 engage with the pair of lock release grooves 155 to be slidable in the Y-axis direction.

[0127] As shown in FIG. 15, the pair of lock release grooves 155 each include a locking portion 155a and a guide portion 155b. The locking portion 155a is a wall portion that is disposed on a side (-Y side) against which the locking piece 160 is pressed by biasing of the first biasing member 170 in the Y-axis direction and locks the locking piece 160. The guide portion 155b is a groove portion that allows the locking piece 160 moving away from the locking portion 155a to move toward a side (+Y side) opposite to the side against which the locking piece

160 is pressed.

[0128] Here, the "side against which the locking piece 160 is pressed" can be rephrased as a front side (-Y side) in a biasing direction if the first biasing member 170 is a coil spring. Also, the "side opposite to the side against which the locking piece 160 is pressed" can be rephrased as a rear side (+Y side) in the biasing direction if the first biasing member 170 is a coil spring. Note that, if the first biasing member 170 is assumed to be a torsion spring and the locking piece 160 is rotationally biased, a front side in a rotational direction (also referred to as a downstream side in the rotational direction) of the locking piece 160 is the "side against which the locking piece 160 is pressed," and a rear side in the rotational direction (also referred to as an upstream side in the rotational direction) of the locking piece 160 is the "side opposite to the side against which the locking piece 160 is pressed".

[0129] The locking portion 155a forms an end part on a left side (-Y side) of the lock release groove 155. The locking portion 155a forms an X-Z plane that faces the locked portion 162 of the locking piece 160 in the Y-axis direction and is in surface contact with the locked portion 162. The guide portion 155b extends to a right side (+Y side) from the locking portion 155a. An end part on the right side (+Y side) of the guide portion 155b is open. The slide rail 133 of the metal holder 130 is disposed on a side (+Y side) opposite to the side against which the locking piece 160 is pressed. The slide rail 133 faces the locked portion 162 of the locking piece 160 with a gap therebetween in the Y-axis direction. That is, the slide rail 133 prevents the locked portion 162 from coming off the guide portion 155b.

[0130] As shown in FIG. 14, unevenness 150a extending in a direction intersecting the biasing direction (Y-axis direction) of the first biasing member 170 is formed on a cover surface (lower surface of the cover bottom wall 151) of the slide cover 150 facing a side opposite to the locking piece 160 (-Z side). As shown in FIG. 5, the unevenness 150a of the present embodiment extends in the X-axis direction orthogonal to the biasing direction (Y-axis direction), and has recessed portions and protruding portions formed alternately in the biasing direction. Therefore, the slide cover 150 can be slid in the Y-axis direction by hooking a user's finger or the like on the unevenness 150a. Note that, the unevenness 150a is not limited to a linear groove (or a protrusion) extending in the X-axis direction, but may be a V-shaped groove (or a protrusion) in a bottom view.

[0131] As shown in FIG. 13, a pair of protruding portions 157 are provided on upper end parts of the parallel portions of the cover circumferential wall 152 to protrude upward. The pair of protruding portions 157 are disposed on a side (+Y side) opposite to the side against which the locking piece 160 is pressed with respect to a pair of front and rear edge parts 135 provided at a semicircular portion on a left side (-Y side) of the metal holder 130. The pair of edge parts 135 face the pair of protruding portions 157 in the Y-axis direction. That is, the pair of edge parts 135 prevent the slide cover 150 biased by the first biasing member 170 from coming off.

[0132] The locking piece 160 is a hard resin molded article formed of a resin material such as, for example, a polyacetal resin. The locking piece 160 includes a claw portion 161, the pair of locked portions 162, and a spring attachment portion 163. The claw portion 161 is formed on a front side (-Y side) of the locking piece 160 in the biasing direction. As shown in FIG. 15, the claw portion 161 protrudes from the through hole 156 of the cover circumferential wall 152 to the front side (-Y side) in the biasing direction with the locked portion 162 in contact with the locking portion 155a of the slide cover 150. In this state, the claw portion 161 is locked to the stopper ring 22c. Therefore, the cartridge housing lid 100 is locked in a closed state.

[0133] As shown in FIG. 14, the stopper ring 22c includes a collision wall 22c1, a surrounding wall 22c2, and a locked piece 22c3. The collision wall 22c1 is a portion into which the claw portion 161 in a locked state is inserted, and a thickness of the stopper ring 22c is partially reduced. Therefore, the collision wall 22c1 is easily vibrated, and when the locking piece 160 collides therewith at the time of closing the cartridge housing lid 100, a metallic sound like a clicking sound is generated from the collision wall 22c1, and the user can recognize that the lock has been applied.

[0134] The surrounding wall 22c2 surrounds the cover circumferential wall 152 of the slide cover 150 in a state in which the cartridge housing lid 100 is closed. The surrounding wall 22c2 extends to a position below the lower surface (cover surface) of the cover bottom wall 151. The surrounding wall 22c2 only needs to extend to at least the same position as the lower surface of the cover bottom wall 151. Preferably, the surrounding wall 22c2 only needs to extend to a position below the lower surface of the cover bottom wall 151. If the surrounding wall 22c2 extends below the lower surface of the cover bottom wall 151 as in the present embodiment, since the cover surface of the cartridge housing lid 100 is disposed at a position not touching a lower end of the surrounding wall 22c2, the cartridge housing lid 100 can be completely surrounded.

[0135] The locked piece 22c3 is provided to protrude from a lower side of the collision wall 22c1 to the right side (+Y side) on an inner wall surface of the stopper ring 22c. In the locked piece 22c3, an upper surface side is planar and a lower surface side is inclined. The locked piece 22c3 can move the locking piece 160 to the right side (+Y side) against the biasing of the first biasing member 170 due to the inclined surface on the lower surface side when the cartridge housing lid 100 is closed. Also, after the locking piece 160 has passed the locked piece 22c3, the locked piece 22c3 can lock the claw portion 161 that has protruded to the -Y side due to the biasing of the first biasing member 170 on its plane on the upper surface side.

[0136] Returning to FIG. 13, the pair of locked portions

162 are provided on both sides of the locking piece 160 in the X-axis direction. The pair of locked portions 162 are formed in a rectangular plate shape in a plan view. The spring attachment portion 163 is provided on a rear side (+Y side) of the locking piece 160 in the biasing direction. One end part of the first biasing member 170 is fixed to the spring attachment portion 163. A long hole 164 extending in the Y-axis direction (biasing direction) to avoid interference with the protruding electrode 101 is provided on an upper surface side of the locking piece 160 configured as described above. Three long holes 164 corresponding to the three protruding electrodes 101 are formed. A length of each of the long holes 164 in the Y-axis direction is a length corresponding to a movement stroke of the locking piece 160 in the Y-axis direction.

[0137] The first biasing member 170 is formed of a spring member such as, for example, a coil spring. Note that, the first biasing member 170 is not limited to a spring member as long as it can bias the locking piece 160 in the -Y side, and may be an elastic body such as rubber. The other end part of the first biasing member 170 on the +Y side is attached to a spring attachment portion 183 provided at a rotation end part 180A of the lid base 180 as shown in FIG. 14. Note that, the rotation end part 180A of the lid base 180 can also be referred to as a swinging end of the lid base 180 that swings about the rotation shaft 190.

[0138] The lid base 180 is a hard resin molded article formed of a resin material such as, for example, a polycarbonate resin or an ABS resin. The lid base 180 includes an insertion hole 181 and an accommodating groove 182 as shown in FIG. 13, and the spring attachment portion 183, a slide groove 184, and the insertion groove 185 as shown in FIG. 14. As shown in FIG. 13, the insertion hole 181 penetrates the lid base 180 in the X-axis direction. The rotation shaft 190 is inserted into the insertion hole 181. The rotation shaft 190 is formed of, for example, a metal material with high strength such as, for example, stainless steel.

[0139] The accommodating groove 182 is disposed on an extension line of the insertion hole 181. The second biasing member 200 is accommodated in the accommodating groove 182 as shown in FIG. 15. The second biasing member 200 is formed of a spring member such as, for example, a torsion spring. Note that, the second biasing member 200 is not limited to a spring member as long as it biases in a direction of opening the cartridge housing lid 100 (counterclockwise around the rotation shaft 190 in the present embodiment) in the rotation direction of the cartridge housing lid 100, and may be an elastic body such as rubber.

[0140] FIG. 17 is an explanatory view showing a state in which the cartridge housing lid 100 according to one embodiment is open due to the second biasing member 200. Note that, in FIG. 17, the main body unit 2 is shown upside down assuming that the cartridge 3 is inserted.

[0141] The cartridge housing lid 100 opens at an acute angle $\theta 1$ as shown in FIG. 17 due to biasing of the second biasing member 200 when it is unlocked by the locking piece 160. The acute angle $\theta 1$ is set to, for example, approximately 85° with respect to a bottom surface of the main body unit 2 (the housing 12). Note that, the acute angle $\theta 1$ is not limited to 85° as long as it is an angle that allows the cartridge 3 to be inserted into the cartridge housing portion 10 without interfering with the cartridge housing lid 100.

[0142] The main body unit 2 includes a physical stopper 22d1 that allows the cartridge housing lid 100 to be opened at the acute angle $\theta 1$ or more. The physical stopper 22d1 of the present embodiment is formed of a cap member 22d attached to the inner case main body 22. The cartridge housing lid 100 can be opened to an angle $\theta 2$ at which the slide groove 184 of the lid base 180 comes into contact with the physical stopper 22d1. The angle $\theta 2$ is set to be, for example, an obtuse angle of approximately 95° with respect to the bottom surface of the main body unit 2 (the housing 12). Note that, the angle $\theta 2$ may be an acute angle instead of the obtuse angle or may be a right angle of 90° as long as it is larger than the acute angle $\theta 1$.

[0143] As shown in FIG. 14, the slide groove 184 is formed on a lower surface side of the lid base 180. The slide groove 184 is a portion on which the cover bottom wall 151 of the slide cover 150 slides and is recessed upward by a thickness of the cover bottom wall 151. The insertion portion 134 of the metal holder 130 is inserted into the insertion groove 185 as described above.

<Air inlet>

[0144] FIG. 18 is a left side view of the inhaler 1 according to one embodiment. FIG. 19 is a left side view of the inhaler 1 according to one embodiment in a state in which the outer case 13 is removed. Note that, in FIG. 19, a first air flow path 70 and a second air flow path 80 are expressed by adding a dot pattern to improve visibility of them.

[0145] As shown in FIG. 18, the first air inlet 18A and the second air inlet 18B are formed in the circumferential wall portion 12B of the housing 12.

[0146] The first air inlet 18A takes air into the cartridge housing space 10A from the window 16 between the adjacent corner portions 12C (in the present embodiment, the first corner portion 12C1 and the second corner portion 12C2) of the circumferential wall portion 12B. The housing 12 includes the opening 13a formed between the adjacent corner portions 12C of the circumferential wall portion 12B and the cover member 17 provided in the opening 13a, and the first air inlet 18A is formed in a gap between the cover member 17 and the opening 13a.

[0147] FIG. 20 is a perspective view of the cover member 17 according to one embodiment. FIG. 21 is a rear view of the cover member 17 according to one embodiment. FIG. 22 is a cross-sectional view taken along line XXII-XXII shown in FIG. 3.

[0148] As shown in FIG. 20, the cover member 17

includes a first outer protrusion 17A, a plate portion 17B, an inner protrusion 17C (refer to FIG. 21), and a second outer protrusion 17D.

[0149] The first outer protrusion 17A is formed on a surface of the plate portion 17B facing the outside (-Y side). As shown in FIG. 22, the first outer protrusion 17A is inserted into the opening 13a of the outer case 13. The cover member 17 has translucency, and a remaining amount of liquid in the aerosol source of the cartridge 3 housed in the cartridge housing portion 10 can be ascertained through the first outer protrusion 17A.

[0150] The first outer protrusion 17A is formed in a long hole shape extending in a main axis direction (Z-axis direction) similarly to the opening 13a of the outer case 13. The first outer protrusion 17A is slightly smaller than the opening 13a. The first air inlet 18A is formed in a gap between the first outer protrusion 17A and the opening 13a. Note that, a part of the first outer protrusion 17A may be in contact with an inner wall surface of the opening 13a. The first air inlet 18A is an inlet of the first air flow path 70 that takes outside air into the housing 12 due to user's suction.

[0151] The first air inlet 18A is formed in an annular shape along an opening edge of the opening 13a (also referred to as a circumferential edge of the first outer protrusion 17A) of the outer case 13. A size of the first air inlet 18A is preferably such that it cannot be completely blocked by the user's finger. For example, a dimension of the first air inlet 18A in the main axis direction (Z-axis direction) is preferably equal to or larger than a first interphalangeal width (for example, 2.0 cm or more) of an average adult's thumb. Also, a distance in the X-axis direction between two slits extending parallel to each other in the main axis direction of the first air inlet 18A may be equal to or larger than a first interphalangeal width of an average adult's thumb.

[0152] Note that, the first air inlet 18A may have only one or two slits extending parallel to the main axis direction as long as the size thereof cannot to be blocked by the user's finger. That is, the first air inlet 18A may be formed in a slit shape along the opening edge of the opening 13a of the outer case 13.

[0153] The plate portion 17B is disposed to overlap an inner side of the outer case 13. The plate portion 17B is interposed between the outer case 13 and the cartridge housing portion 10. The side on the cartridge housing portion 10 (+Y side) of the plate portion 17B is curved along a circumferential surface of the cartridge housing portion 10. Also, the side on the outer case 13 (-Y side) of the plate portion 17B is curved along an inner wall surface of the circumferential wall portion 12B.

[0154] As shown in FIG. 20, the communication hole 17a in communication with the cartridge housing space 10A is formed in the plate portion 17B. Also, the first air flow path 70 and a case fitting hole 17b1 are formed in the plate portion 17B. Two communication holes 17a are formed with the first outer protrusion 17A sandwiched therebetween in the X-axis direction. Two sets of the case fitting holes 17b1 are formed in the plate portion 17B, two above and two below the communication holes 17a, with the first outer protrusion 17A sandwiched therebetween in the X-axis direction. The outer case 13 is fitted into the four case fitting holes 17b1 in total with claws.

[0155] As shown in FIG. 22, the communication holes 17a are disposed at locations at which the cover member 17 and the outer case 13 overlap. That is, the communication holes 17a are disposed inside the outer case 13 and are covered with the outer case 13. Therefore, the communication holes 17a cannot be visually noticeable from the outside of the outer case 13. Also, the communication holes 17a cannot be directly blocked with a finger unless the outer case 13 is removed.

[0156] The communication holes 17a cause the first air inlet 18A to be in fluid communication with the inside of the cartridge housing portion 10. The communication holes 17a are in communication with the communication holes 10d formed in the cartridge housing portion 10, and cause the first air inlet 18A to be in fluid communication with the inside of the cartridge housing portion 10 over a short distance. Note that, if the communication holes 10d are not formed, air taken into the inside of the housing 12 from the communication holes 17a flows into the inside of the cartridge housing portion 10 through all the gaps in the cartridge housing portion 10.

[0157] The first air flow path 70 forms a space (flow path) that connects the first air inlet 18A and the communication holes 17a. As shown in FIG. 20, the first air flow path 70 has a flat surface portion 71 and two recessed portions 72. The flat surface portion 71 is formed around the first outer protrusion 17A on the plate portion 17B. The flat surface portion 71 is a part of a curved surface of the plate portion 17B on the side on the outer case 13 (-Y side) made into a flat surface, and is recessed to the +Y side from a surface of the first outer protrusion 17A. A pair of second outer protrusions 17D are disposed above and below the first outer protrusion 17A with the flat surface portion 71 sandwiched therebetween. The pair of second outer protrusions 17D support a mating surface of the outer case 13 from the inside.

[0158] The two recessed portions 72 are formed at an end edge on the +X side and an end edge on the -X side of the flat surface portion 71. The recessed portions 72 each have a bottom surface that is lower on the +Y side than the flat surface portion 71. That is, the recessed portion 72 is recessed to the -Y side with respect to the flat surface portion 71. The communication hole 17a is formed on the bottom surface of the recessed portion 72. The bottom surface of the recessed portion 72 is formed to be wider than an opening area of the communication hole 17a.

[0159] As shown in FIG. 21, the inner protrusion 17C is formed on an inner surface of the plate portion 17B on the side of the cartridge housing portion 10 (+Y side). As shown in FIG. 22, the inner protrusion 17C is inserted into the first opening 10c formed on the circumferential surface of the cartridge housing portion 10. The inner pro-

trusion 17C is formed in a long hole shape extending in the main axis direction (Z-axis direction) similarly to the first opening 10c of the cartridge housing portion 10.

[0160] As shown in FIG. 18, the second air inlet 18B takes air into the cartridge housing space 10A from the second corner portion 12C2 of the circumferential wall portion 12B. The housing 12 includes the inner case 20 and the outer case 13 that covers the inner case 20 and has the exposed portion 13b in which a part of the inner case 20 is exposed at the corner portion 12C. The second air inlet 18B is formed in a gap between the inner case 20 and the outer case 13 in the exposed portion 13b.

[0161] FIG. 23 is an enlarged view of a region A shown in FIG. 5.

[0162] As shown in FIG. 23, the second air inlet 18B is formed in an arc shape in the gap between the inner case 20 and the outer case 13. The second air inlet 18B opens toward the -Z side. That is, the second air inlet 18B is at a different location from the first air inlet 18A, and has a direction of the opening different from that of the first air inlet 18A, which faces the -Y side, by 90°.

[0163] Returning to FIG. 18, an edge part of the exposed portion 13b of the outer case 13 is convexly curved to the +Z side. The housing 12 has a protruding portion 90 around the second air inlet 18B. The protruding portion 90 is formed by the outer case 13. That is, the protruding portion 90 is formed by a step between the inner case 20 and the outer case 13. That is, even if the user's finger touches the periphery of the second air inlet 18B, since the protruding portion 90 (the outer case 13) around the exposed portion 13b serves as a step and forms a gap between itself and the user's finger, the second air inlet 18B is less likely to be blocked. Note that, the protruding portion 90 is not limited to being formed by the outer case 13, and may be formed by causing a part of the inner case 20 to protrude.

[0164] The housing 12 includes the first air flow path 70 that causes the first air inlet 18A to be in communication with the communication hole 17a, and the second air flow path 80 that causes the second air inlet 18B to be in communication with the communication hole 17a. The second air flow path 80 extends to the +Z side from the exposed portion 13b of the second corner portion 12C2, and reaches the communication hole 17a via a part of the first air flow path 70. The second air flow path 80 is bent into an angulated U-shape (substantially C-shape) until it reaches a joining position with the first air flow path 70. As shown in FIG. 19, the bent portion of the second air flow path 80 is formed to bypass a pair of inner case side protrusions 81 provided on an outer surface of the inner case 20 and an outer case side protrusion 82 (refer to FIG. 10) that fits into the pair of inner case side protrusions 81.

[0165] As shown in FIG. 18, the first air flow path 70 has a flow path length to the communication hole 17a smaller than that of the second air flow path 80. That is, the first air flow path 70 has lower airflow resistance than the second air flow path 80. Therefore, a larger amount of air flows through the first air flow path 70 than through the second air flow path 80. Therefore, in normal use, the first air inlet 18A serves as a main air inlet, and the second air inlet 18B serves as a sub air inlet when the first air inlet 18A is blocked.

[0166] The communication hole 17a has a flow path cross-sectional area smaller than either the first air inlet 18A or the second air inlet 18B. Therefore, even if either the first air inlet 18A or the second air inlet 18B is blocked, since the flow path cross-sectional area is finally reduced at the communication hole 17a, a flow rate and flow velocity of the air suctioned into the cartridge housing space 10A can be kept substantially constant. That is, the communication hole 17a functions as an air resistance rate controlling portion.

[0167] Note that, in the present embodiment, two communication holes 17a are provided, but what is compared here is the flow path cross-sectional area on one side (one) of the two communication holes 17a. That is, the flow path cross-sectional area of one of the communication holes 17a needs only be smaller than an opening area of the first air inlet 18A (refer to FIG. 18) in the gap between the opening 13a of the outer case 13 and the first outer protrusion 17A of the cover member 17. Also, the flow path cross-sectional area of one of the communication holes 17a needs only be smaller than an opening area of the second air inlet 18B (refer to FIG. 23) in the gap between the outer case 13 and the inner case 20 in the exposed portion 13b of the second corner portion 12C2. More preferably, the flow path cross-sectional area of one of the communication holes 17a needs only be smaller than a minimum flow path cross-sectional area of each of the first air flow path 70 and the second air flow path 80.

<Assembly method of inhaler>

[0168] As shown in FIG. 6, in assembling the inhaler 1, first, the cartridge housing lid 100 provided at the bottom part of the housing 12 of the main body unit 2 is opened. Specifically, as shown in FIG. 16, a finger is placed on the unevenness 150a provided on a cover surface of the slide cover 150, and the slide cover 150 is moved to the +Y side.

[0169] As shown in FIG. 15, the slide cover 150 is locked to the locked portion 162 of the locking piece 160. Therefore, when the slide cover 150 is moved to the +Y side, the locking piece 160 can be moved to the +Y side, and a locked state against the stopper ring 22c due to the locking piece 160 can be released as shown in FIG. 16.

[0170] Here, the long hole 164 extending in the biasing direction (Y-axis direction) to avoid interference with the protruding electrode 101 is provided in the locking piece 160. Therefore, even if the slide cover 150 slides when the cartridge housing lid 100 is opened, the locking piece 160 does not interfere with the protruding electrode 101 due to the long hole 164.

[0171] When the locked state is released, the cartridge housing lid 100 opens due to the biasing of the second biasing member 200. When the cartridge housing lid 100 is opened, the cartridge 3 is housed in the cartridge housing portion 10. When the cartridge 3 is housed in the cartridge housing portion 10, the cartridge housing lid 100 is closed against the biasing of the second biasing member 200.

[0172] When the cartridge housing lid 100 is closed, first, the claw portion 161 of the locking piece 160 comes into contact with the inclined surface on a lower side of the locked piece 22c3, and the locking piece 160 moves to the +Y side against the biasing of the first biasing member 170. Therefore, the locking piece 160 can get over the locked piece 22c3.

[0173] Here, the guide portion 155b that allows the locking piece 160 to move to the +Y side is provided in the slide cover 150. Therefore, only the locking piece 160 moves inside the slide cover 150, and when the cartridge housing lid 100 is closed, it is possible to cause the cover surface (the slide cover 150) touched by the user can be to move.

[0174] The locking piece 160 collides with the collision wall 22c1 of the stopper ring 22c due to the biasing of the first biasing member 170 after passing the locked piece 22c3. Due to a collision sound at this time, the user can recognize that the lock has been applied. When the cartridge housing lid 100 is locked, the cover circumferential wall 152 of the slide cover 150 is completely covered with the surrounding wall 22c2 of the stopper ring 22c.

[0175] As described above, insertion of the cartridge 3 is completed. Note that, the flavor source container 4 and the mouthpiece 5 may be attached to the heating module 11 of the main body unit 2 before the cartridge 3 is inserted, but if not, the flavor source container 4 and the mouthpiece 5 may be attached to the heating module 11 after the cartridge 3 is inserted, thereby completing the assembly of the inhaler 1.

<Method of use of inhaler>

[0176] When the above-described inhaler 1 is used, the user first presses the input device 15 shown in FIG. 2. At this time, for example, the main body unit 2 may be programmed to be activated by pressing the input device 15 a plurality of times. When the main body unit 2 is activated, for example, the heating module 11 heats the flavor source container 4 to enhance the flavor.

[0177] Next, the user suctions while holding the mouthpiece 5 in the user's mouth. Then, air inside the cartridge housing portion 10 flows, and the sensor 26 shown in FIG. 22 detects a puff. When the sensor 26 detects the puff, the heating wire 35b of the cartridge 3 shown in FIG. 9 is energized, and the heating wire 35b generates heat. When the heating wire 35b generates heat, the liquid aerosol source impregnated in the wick 35a is heated and atomized. The atomized aerosol is suctioned up along with air (outside air) taken in by the suction.

[0178] As shown in FIG. 22, air (outside air) is normally taken in mainly from the first air inlet 18A in the gap between the outer case 13 and the cover member 17. The air taken in from the first air inlet 18A flows into the inside of the cartridge housing portion 10 via the flat surface portion 71 and the recessed portion 72 of the first air flow path 70, the communication hole 17a, and the communication hole 10d. The air that has flowed into the inside of the cartridge housing portion 10 flows into the atomization chamber 34c via the intake hole 36c and the opening 34e of the cartridge 3 as shown in FIG. 9.

[0179] The atomized aerosol fills the atomization chamber 34c, and is suctioned upward together with the air that has flowed into the atomization chamber 34c through the flow path tube 31c, the through hole 31b, and the communication hole 22b5 of the cartridge contact portion 22b. Thereafter, mixed gas of the atomized aerosol and the air enters a user's mouth through the flavor source container 4 and the mouthpiece 5. Therefore, the user can taste the flavor.

[Operation and effects]

[0180] The cartridge housing lid 100 described above includes the lid base 180 that includes the rotation shaft 190 provided thereto and rotates around the rotation shaft 190 as a center, the locking piece 160 connected to the rotation end part 180A of the lid base 180 via the first biasing member 170, and the slide cover 150 covering the locking piece 160 and attached to the lid base 180 to be slidable in a biasing direction in which the locking piece 160 is biased, in which the slide cover 150 includes the locking portion 155a disposed on a side against which the locking piece 160 is pressed by biasing of the first biasing member 170 to lock the locking piece 160, and the guide portion 155b that allows the locking piece 160 moving away from the locking portion 155a to move toward a side opposite to the side against which the locking piece 160 is pressed.

[0181] According to this configuration, when the cartridge housing lid 100 is closed, since the locking piece 160 covered with the slide cover 150 moves inside the slide cover 150, it is possible to cause the cover surface of the slide cover 150 touched by the user not to move.

[0182] Also, in the present embodiment, the unevenness 150a extending in a direction intersecting the biasing direction is formed on the cover surface of the slide cover 150 facing a side opposite to the locking piece 160.

[0183] According to this configuration, when the cartridge housing lid 100 is opened, it is possible to slide the slide cover 150 by hooking a user's finger or the like on the unevenness 150a of the cover surface.

[0184] Also, in the present embodiment, the protruding electrode 101 (electrode) disposed on a side of the locking piece 160 opposite to the slide cover 150 is provided, and the long hole 164 extending in the biasing direction to avoid interference with the protruding electrode 101 is

provided in the locking piece 160.

[0185] According to this configuration, even if the slide cover 150 slides when the cartridge housing lid 100 is opened, since the locking piece 160 does not interfere with the protruding electrode 101 due to the long hole 164, an electrical contact between the protruding electrode 101 and the cartridge 3 does not move, and friction and wear of the electrical contact can be suppressed.

[0186] The main body unit 2 of an aerosol generator of the present embodiment includes the cartridge housing portion 10 that houses the cartridge 3, and the cartridge housing lid 100 that opens and closes the opening of the cartridge housing portion 10.

[0187] According to this configuration, since the above-described cartridge housing lid 100 is incorporated, the cartridge housing lid 100 is easily closed, and airtightness of the cartridge housing portion 10 is easily secured.

[0188] Also, in the present embodiment, the cartridge housing portion 10 includes the surrounding wall 22c2 that surrounds the cover circumferential wall 152 (circumferential edge part) of the cartridge housing lid 100 in a state in which the cartridge housing lid 100 is closed.

[0189] According to this configuration, if the cartridge housing lid 100 is closed, the cover circumferential wall 152 of the cartridge housing lid 100 is completely covered with the surrounding wall 22c2 of the main body unit 2. Therefore, even if the main body unit 2 falls, damage to or displacement of the cartridge housing lid 100 can be suppressed, and airtightness of the cartridge housing portion 10 can be easily secured.

[0190] Also, in the present embodiment, the cartridge housing portion 10 includes the locked piece 22c3 having an inclined surface that moves the locking piece 160 against the biasing of the first biasing member 170 when the cartridge housing lid 100 is closed.

[0191] According to this configuration, the locking piece 160 can be moved by the inclined surface of the locked piece 22c3 without sliding the slide cover 150 when the cartridge housing lid 100 is closed.

[0192] Also, in the present embodiment, the cartridge housing portion 10 includes the collision wall 22c1 with which a distal end of the locking piece 160 collides due to biasing of the first biasing member 170 after the locking piece 160 passes the locked piece 22c3.

[0193] According to this configuration, since a sound is generated by the locking piece 160 colliding with the collision wall 22c1 when the cartridge housing lid 100 is closed, the user can recognize that the lock has been applied.

[0194] Also, in the present embodiment, the collision wall 22c1 is formed of a metal.

[0195] According to this configuration, since a metallic acoustic effect can be obtained from the collision sound of the locking piece 160, the user can more easily recognize that the lock has been applied.

[0196] Also, in the present embodiment, the second biasing member 200 which biases in a direction of opening the cartridge housing lid 100 in a rotation direction of the cartridge housing lid 100 is provided.

[0197] According to this configuration, if the cartridge housing lid 100 is not sufficiently locked, since the cartridge housing lid 100 opens due to the biasing of the second biasing member 200, it is easy for the user to recognize that the user has forgotten to close the cartridge housing lid 100.

[0198] Also, in the present embodiment, when the lock due to the locking piece 160 is released, the cartridge housing lid 100 opens at an acute angle $\theta 1$ with respect to the cartridge housing portion 10 due to the biasing of the second biasing member 200.

[0199] According to this configuration, even if the main body unit 2 falls with the cartridge housing lid 100 opened, a probability that a load is applied in a direction in which the cartridge housing lid 100 closes increases, and damage to the cartridge housing lid 100 can be suppressed.

[0200] Also, in the present embodiment, the physical stopper 22d1 that allows the cartridge housing lid 100 to be opened at an acute angle $\theta 1$ or more is provided.

[0201] According to this configuration, if the cartridge housing lid 100 attempts to open further from a state in which it is open at an acute angle $\theta 1$ due to the second biasing member 200, since the cartridge housing lid 100 is allowed to open until it comes into contact with the physical stopper 22d1, this permissible amount can further reduce the probability that the cartridge housing lid 100 will be damaged.

[0202] Also, in the present embodiment, the cartridge housing lid 100 includes the seal portion 120 that seals the opening of the cartridge housing portion 10, and the seal portion 120 includes the annular protrusion 124 that protrudes in a direction of closing the opening of the cartridge housing portion 10 in the rotation direction of the cartridge housing lid 100.

[0203] According to this configuration, since a direction of closing the cartridge housing lid 100 and a direction in which the annular protrusion 124 of the seal portion 120 protrudes coincide with each other, airtightness of the cartridge housing portion 10 is easily secured.

[0204] The aerosol generator of the present embodiment includes the main body unit 2, and the cartridge 3 that stores the aerosol source and is inserted into the cartridge housing portion 10 of the main body unit 2.

[0205] According to this configuration, since the main body unit 2 in which the above-described cartridge housing lid 100 is incorporated is provided, the cartridge housing lid 100 is easily closed, and airtightness of the cartridge housing portion 10 is easily secured.

[0206] The non-combustion-type inhaler of the present embodiment includes the aerosol generator described above and the flavor source container 4 attached to the aerosol generator.

[0207] According to this configuration, a flavor can be added to the aerosol.

[0208] Also, in the present embodiment, the following operation and effects can also be obtained.

[0209] The main body unit 2 of the aerosol generator of the present embodiment described above includes the housing 12 in which the cartridge housing space 10A is provided therein, in which the housing 12 includes the pair of the main surface portions 12A, the circumferential wall portion 12B connecting the pair of main surface portions 12A and in which the plurality of corner portions 12C are provided, the first air inlet 18A taking air into the cartridge housing space 10A from between the pair of main surface portions 12A or the adjacent corner portions 12C of the circumferential wall portion 12B, and the second air inlet 18B taking air into the cartridge housing space 10A from the corner portion 12C of the circumferential wall portion 12B.

[0210] According to this configuration, locations of the first air inlet 18A and the second air inlet 18B are completely different, thereby it is difficult to block both the first air inlet 18A and the second air inlet 18B.

[0211] Note that, the first air inlet 18A may be provided not only between the adjacent corner portions 12C of the circumferential wall portion 12B but also in the pair of main surface portions 12A. That is, a through hole for forming the first air inlet 18A may be provided in either one of the pair of main surface portions 12A. Even in this case, both the first air inlet 18A and the second air inlet 18B being blocked can be suppressed.

[0212] Also, in the present embodiment, the housing 12 includes the inner case 20 and the outer case 13 that covers the inner case 20 and has the exposed portion 13b in which a part of the inner case 20 is exposed at the corner portion 12C, in which the second air inlet 18B is formed in a gap between the inner case 20 and the outer case 13 in the exposed portion 13b.

[0213] According to this configuration, the second air inlet 18B is formed in a gap between the inner case 20 and the outer case 13 exposed in the corner portion 12C of the housing 12 and has a completely different form from the first air inlet 18A formed at a position other than the corner portion 12C of the housing 12, thereby it is difficult to block both the first air inlet 18A and the second air inlet 18B.

[0214] Also, in the present embodiment, an edge part of the exposed portion 13b is curved.

[0215] According to this configuration, since the edge part of the exposed portion 13b is not straight line but is curved, even if it is touched by a user's finger, the second air inlet 18B is less likely to be blocked completely.

[0216] Also, in the present embodiment, the housing 12 has the protruding portion 90 around the second air inlet 18B.

[0217] According to this configuration, even if the user's finger touches the periphery of the second air inlet 18B, since the protruding portion around the exposed portion 13b serves as a step and forms a gap between itself and the user's finger, the second air inlet 18B is less likely to be blocked.

[0218] Also, in the present embodiment, the housing 12 has the protruding portion 90 around the second air inlet 18B, and the protruding portion 90 is formed by the outer case 13.

[0219] According to this configuration, since the protruding portion 90 around the exposed portion 13b is formed integrally with the outer case 13, formation of the protruding portion 90 is facilitated.

[0220] Also, in the present embodiment, the housing 12 includes the communication hole 17a in communication with the cartridge housing space 10A, the first air flow path 70 that causes the first air inlet 18A to be in communication with the communication hole 17a, and the second air flow path 80 that causes the second air inlet 18B to be in communication with the communication hole 17a, in which the first air flow path 70 has lower airflow resistance than the second air flow path 80.

[0221] With this configuration, since a larger amount of air flows through the first air flow path 70 than through the second air flow path 80, the first air inlet 18A and the second air inlet 18B can be suitably used as a main air inlet and a sub air inlet.

[0222] Also, in the present embodiment, the first air flow path 70 has a flow path length to the communication hole 17a smaller than that of the second air flow path 80.

[0223] According to this configuration, the first air flow path 70 has lower airflow resistance than the second air flow path 80, thereby it is easy to suction air from the main first air inlet 18A.

[0224] Also, in the present embodiment, the communication hole 17a has a flow path cross-sectional area smaller than either the first air inlet 18A or the second air inlet 18B.

[0225] According to this configuration, even if either the first air inlet 18A or the second air inlet 18B is blocked, since the flow path cross-sectional area is finally reduced at the communication hole 17a, a flow rate and flow velocity of the air suctioned into the cartridge housing space 10A can be kept substantially constant.

[0226] Also, according to the present embodiment, the housing 12 includes the opening 13a formed between the adjacent corner portions 12C of the circumferential wall portion 12B and the cover member 17 provided in the opening 13a, and the first air inlet 18A is formed in a gap between the cover member 17 and the opening 13a.

[0227] According to this configuration, since the first air inlet 18A is formed in a gap between the opening 13a of the housing 12 and the cover member 17 provided in the opening 13a, the first air inlet 18A is less likely to be blocked by a finger.

[0228] The aerosol generator of the present embodiment includes the main body unit 2 and the cartridge 3 that stores the aerosol source and is inserted into the cartridge housing space 10A of the main body unit 2.

[0229] According to this configuration, since the main body unit 2 described above is incorporated, complete blockage of the air inlet by the user can be suppressed.

[0230] The non-combustion-type inhaler of the present embodiment includes the aerosol generator described above and the flavor source container 4 attached to the

aerosol generator.

[0231] According to this configuration, a flavor can be added to the aerosol.

<Modified example>

[0232] Although preferred embodiments of the present invention have been described above, the present invention is not limited to these embodiments. Additions, omissions, substitutions, and other changes to the configuration can be made within a scope not departing from the spirit of the present invention. The present invention is not to be considered as being limited by the foregoing description and is only limited by the scope of the appended claims.

[0233] For example, in the embodiment described above, the inhaler 1 configured to allow the flavor source container 4 to be detached and attached has been described as an example of an aerosol generator that generates aerosol without combustion, but the present invention is not limited only to the configuration. As another example of the aerosol generator, a configuration that does not include the flavor source container 4 such as an electronic cigarette (a configuration with only a mouthpiece that does not store a flavor source) may be used. In this case, a flavor-containing aerosol source is stored in the cartridge 3, and flavor-containing aerosol is generated by the aerosol generator.

[0234] That is, in the embodiment described above, one including the main body unit 2 and the cartridge 3 without including the flavor source container 4 may also be referred to as an aerosol generator. Also, one including only the main body unit 2 without including the flavor source container 4 and the cartridge 3 may also be referred to as a main body unit of an aerosol generator.

[0235] Note that, the aerosol source is not limited to a liquid, and may be a solid.

[0236] In the embodiment described above, a configuration in which the cartridge housing portion 10 is formed in a cylindrical shape surrounding the periphery of the cartridge 3 has been described, but the present invention is not limited only to the configuration. The cartridge housing portion 10 needs only be a configuration in which the cartridge 3 can be held. That is, the cartridge housing portion 10 is not limited to a cylindrical shape, and may have a triangular cylindrical shape, a square cylindrical shape, other polygonal cylindrical shapes, or irregular shapes other than polygonal cylindrical shapes.

[0237] In the above-described embodiment, a configuration in which the housing 12 is formed in a rounded flat box shape as a whole has been described, but the configuration is not limited only to the configuration. A shape of the housing 12 may be a rectangular parallelepiped, other polyhedron, or a solid other than a polyhedron.

[0238] In the above-described embodiment, a configuration in which the main body unit 2 is activated by pressing the input device 15 has been described, but the main body unit 2 may be configured to be activated only by puff detection of the sensor 26 without having the input device 15.

[0239] In addition, the components in the above-described embodiment can be appropriately replaced with well-known components within a range not departing from the spirit of the present invention, and the modified examples described above may be combined as appropriate.

[Industrial Applicability]

[0240] The present invention relates to a cartridge housing lid, a main body unit of an aerosol generator, the aerosol generator, and a non-combustion-type inhaler, and it is possible to cause a cover surface touched by a user not to move when the cartridge housing lid is closed.

[Reference Signs List]

[0241]

1 Inhaler
2 Main body unit
3 Cartridge
4 Flavor source container
5 Mouthpiece
10 Cartridge housing portion
10a Protruding portion
10A Cartridge housing space
10b Lower end part
10B Annular protrusion
10c First opening
10d Communication hole
10e Second opening
11 Heating module
12 Housing
12A Main surface portion
12A1 First main surface portion
12A2 Second main surface portion
12B Circumferential wall portion
12B1 First circumferential wall portion
12B2 Second circumferential wall portion
12C Corner portion
12C1 First corner portion
12C2 Second corner portion
12C3 Third corner portion
12C4 Fourth corner portion
13 Outer case
13a Opening
13A First case
13b Exposed portion
13B Second case
14 Display cover
14a Through hole
15 Input device
15a Switch button

15b Switch holder
15c Switch substrate
16 Window
17 Cover member
17a Communication hole
17A First outer protrusion
17b Adhesive sheet
17B Plate portion
17b1 Case fitting hole
17C Inner protrusion
170 Second outer protrusion
18A First air inlet
18B Second air inlet
19 Cushion material
20 Inner case
20a Opening
20A Inner assembly
21 Charging terminal
21b Through hole
22 Inner case main body
22A Power supply housing portion
22b Cartridge contact portion
22B Top plate
22b1 First ring portion
22b2 Cylindrical portion
22b3 Second ring portion
22b4 Seal ring
22b5 Communication hole
22c Stopper ring
22C Side plate
22c1 Collision wall
22c2 Surrounding wall
22c3 Locked piece
22d Cap member
22D Bottom plate
22d1 Physical stopper
22D1 Bearing portion
23 Power supply
23a Cushion material
24 Main substrate
25 Display device
25a Flexible printed circuit board
26 Sensor
26a Sensor holder
26b Pedestal portion
26c Adhesive sheet
27 Light source
27a Sub-substrate
28 Vibrator
29 Flexible printed circuit board
29a First end part
29b Second end part
29c Third end part
29d Fourth end part
29e Contact pad
31 Tank
31a Top wall
31b Through hole
31c Flow path tube
31d Outer circumferential wall
31e Rib
31f Engaging hole
31g Liquid storage chamber
32 Gasket
32a Opening
33 Mesh body
34 Atomization container
34a Circumferential wall
34b Fitting portion
34c Atomization chamber
34d Bottom wall
34e Opening
35 Heater
35a Wick
35b Heating wire
36 Heater holder
36a Circumferential wall
36b Engaging piece
36c Intake hole
36d Bottom wall
36e Intake hole
36f Separation wall
36h Planar electrode
41 Container main body
41a Circumferential wall
41b Flange portion
41c Flavor source storage chamber
41d Bottom wall
41e Fine hole
42 Filter
51 Suction port
51a Insertion portion
52 Suction port base
52a Insertion cylinder portion
52b Outer fitting cylinder portion
52c Annular groove
60 Heater portion
60a Film heater
60b Pipe member
60c Shrink tube
61 Capsule holder
61a Snap fit
61b Stepped portion
62 Design ring
70 First air flow path
71 Flat surface portion
72 Recessed portion
80 Second air flow path
81 Inner case side protrusion
82 Outer case side protrusion
90 Protruding portion
100 Cartridge housing lid
101 Protruding electrode
110 Electrode holder
111 Top plate portion
112 Protruding portion

113 Through hole
120 Seal portion
121 Base portion
122 Cylindrical portion
123 Through hole
124 Annular protrusion
130 Metal holder
131 Through hole
132 Opening
133 Slide rail
134 Insertion portion
135 Edge part
137 Protruding portion
140 Electrode substrate
141 Through hole
142 Spring contact
150 Slide cover
150a Unevenness
151 Cover bottom wall
152 Cover circumferential wall
152a Upper end part
153 Pedestal portion
154 Cover slide groove
155 Lock release groove
155a Locking portion
155b Guide portion
156 Through hole
157 Protruding portion
160 Locking piece
161 Claw portion
162 Locked portion
163 Spring attachment portion
164 Long hole
170 First biasing member
180 Lid base
180A Rotation end part
181 Insertion hole
182 Accommodating groove
183 Spring attachment portion
184 Slide groove
185 Insertion groove
190 Rotation shaft
200 Second biasing member
A Region
O Main axis
$\theta 1$ Acute angle
$\theta 2$ Angle

Claims

1. A cartridge housing lid comprising:

a lid base that includes a rotation shaft provided thereto and rotates around the rotation shaft as a center;
a locking piece connected to a rotation end part of the lid base via a first biasing member; and
a slide cover that covers the locking piece and is attached to the lid base to be slidable in a biasing direction in which the locking piece is biased, wherein
the slide cover includes:

a locking portion disposed on a side against which the locking piece is pressed by biasing of the first biasing member to lock the locking piece; and
a guide portion that allows the locking piece moving away from the locking portion to move toward a side opposite to the side against which the locking piece is pressed.

2. The cartridge housing lid according to claim 1, wherein
unevenness that extends in a direction intersecting the biasing direction is formed on a cover surface of the slide cover facing a side opposite to the locking piece.

3. The cartridge housing lid according to claim 1 or 2, further comprising an electrode disposed on a side of the locking piece opposite to the slide cover, wherein a long hole that extends in the biasing direction to avoid interference with the electrode is provided in the locking piece.

4. A main body unit of an aerosol generator comprising:

a cartridge housing portion that houses a cartridge; and
a cartridge housing lid according to any one of claims 1 to 3 which opens and closes an opening of the cartridge housing portion.

5. The main body unit of an aerosol generator according to claim 4, wherein
the cartridge housing portion includes a surrounding wall that surrounds a circumferential edge part of the cartridge housing lid in a state in which the cartridge housing lid is closed.

6. The main body unit of an aerosol generator according to claim 4 or 5, wherein
the cartridge housing portion includes a locked piece having an inclined surface that moves the locking piece against biasing of the first biasing member when the cartridge housing lid is closed.

7. The main body unit of an aerosol generator according to claim 6, wherein
the cartridge housing portion includes a collision wall with which a distal end of the locking piece collides due to biasing of the first biasing member after the locking piece passes the locked piece.

8. The main body unit of an aerosol generator according to claim 7, wherein
the collision wall is formed of a metal.

9. The main body unit of an aerosol generator according to any one of claims 4 to 8, further comprising a second biasing member that biases in a direction of opening the cartridge housing lid in a rotation direction of the cartridge housing lid.

10. The main body unit of an aerosol generator according to claim 9, wherein
the cartridge housing lid opens at an acute angle with respect to the cartridge housing portion due to biasing of the second biasing member when a lock due to the locking piece is released.

11. The main body unit of an aerosol generator according to claim 10, comprising a physical stopper which allows the cartridge housing lid to be opened at an acute angle or more.

12. The main body unit of an aerosol generator according to any one of claims 4 to 10, wherein

the cartridge housing lid includes a seal portion that seals the opening of the cartridge housing portion, and
the seal portion includes an annular protrusion that protrudes in a direction of closing the opening of the cartridge housing portion in the rotation direction of the cartridge housing lid.

13. An aerosol generator comprising:

a main body unit according to any one of claims 4 to 12; and
a cartridge that stores an aerosol source and is inserted into the cartridge housing portion of the main body unit.

14. A non-combustion-type inhaler comprising:

an aerosol generator according to claim 13; and
a flavor source container attached to the aerosol generator.

FIG. 1

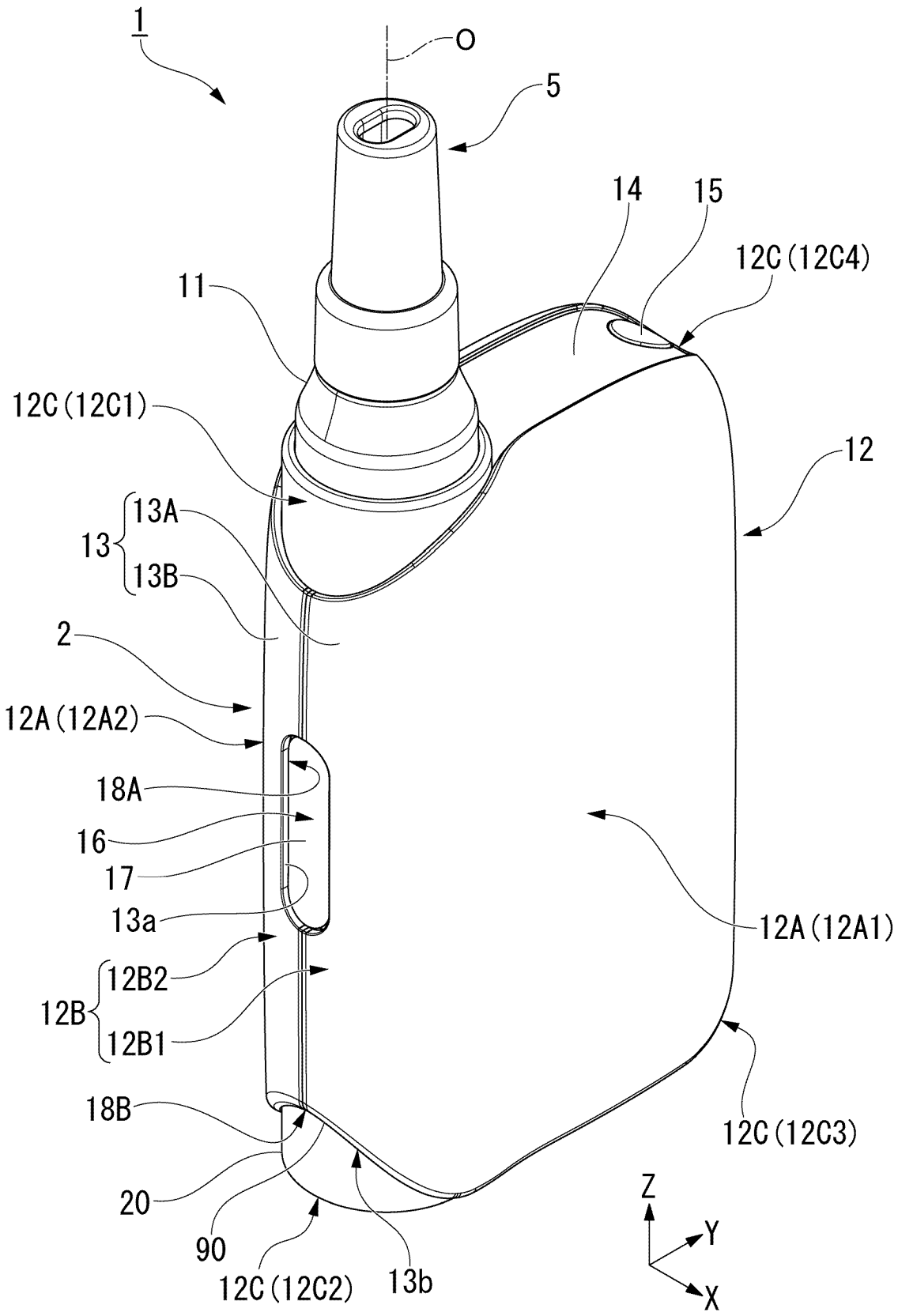

1
O
5
14
15
12C (12C4)
11
12C (12C1)
12
13
13A
13B
2
12A (12A2)
18A
16
17
13a
12A (12A1)
12B
12B2
12B1
18B
12C (12C3)
20
90
12C (12C2)
13b
Z
Y
X

FIG. 2

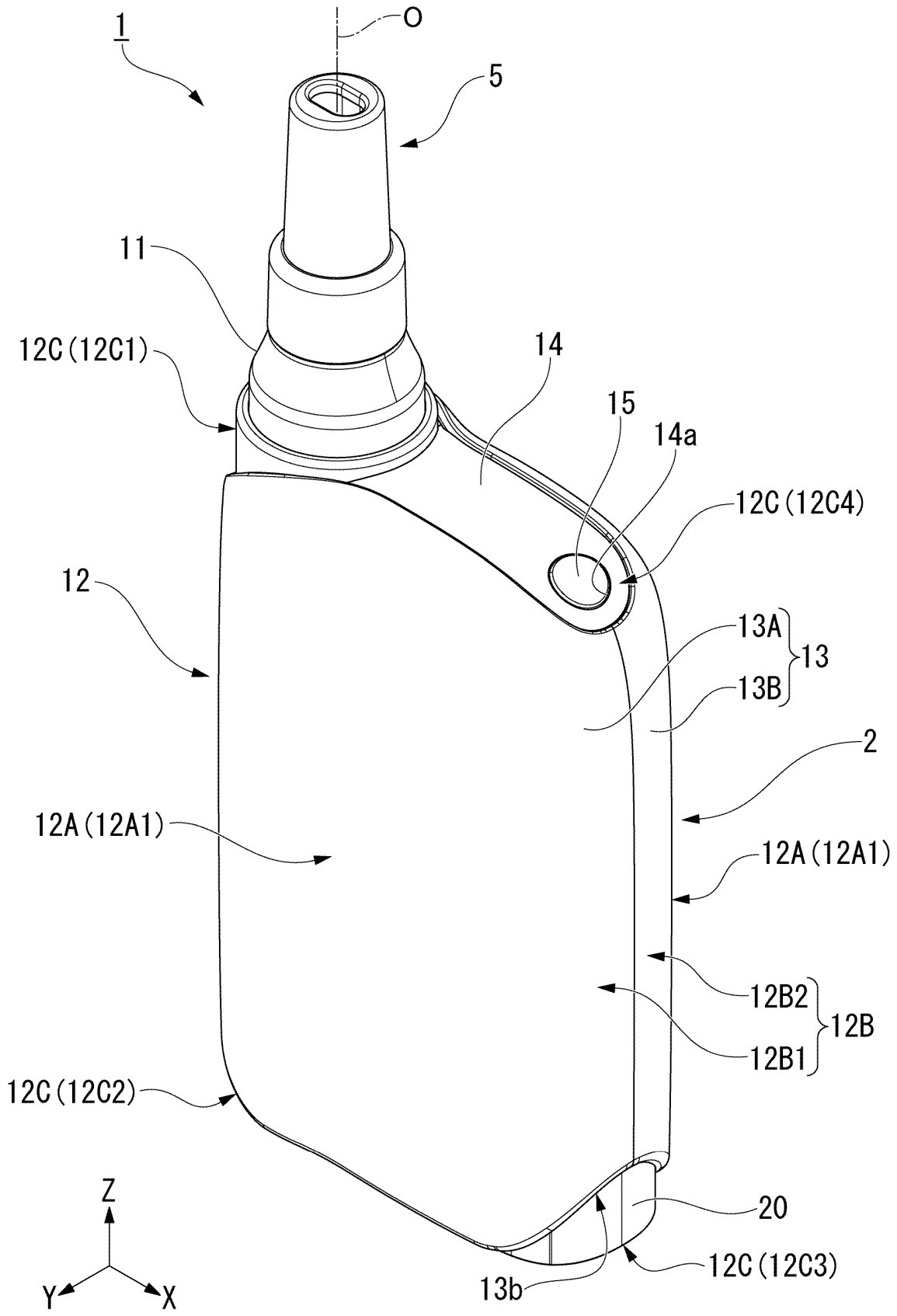

1
O
5
11
12C (12C1)
14
15
14a
12C (12C4)
12
13A
13
13B
2
12A (12A1)
12A (12A1)
12B2
12B
12B1
12C (12C2)
Z
Y
X
20
12C (12C3)
13b

FIG. 3

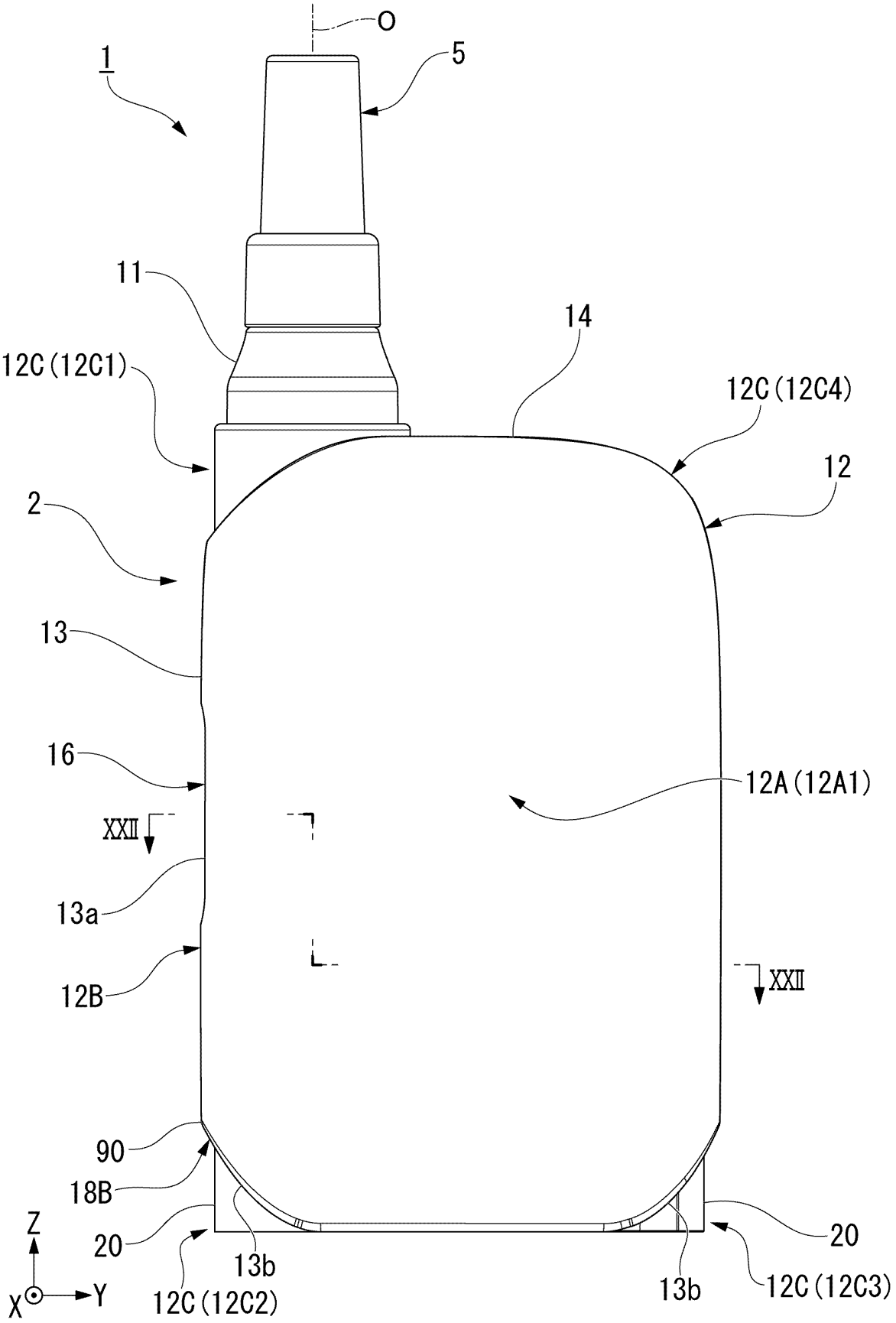

O
1
5
11
14
12C(12C1)
12C(12C4)
12
2
13
16
12A(12A1)
XXII
13a
12B
XXII
90
18B
20
20
13b
13b
12C(12C2)
12C(12C3)
Z
Y
X

FIG. 4

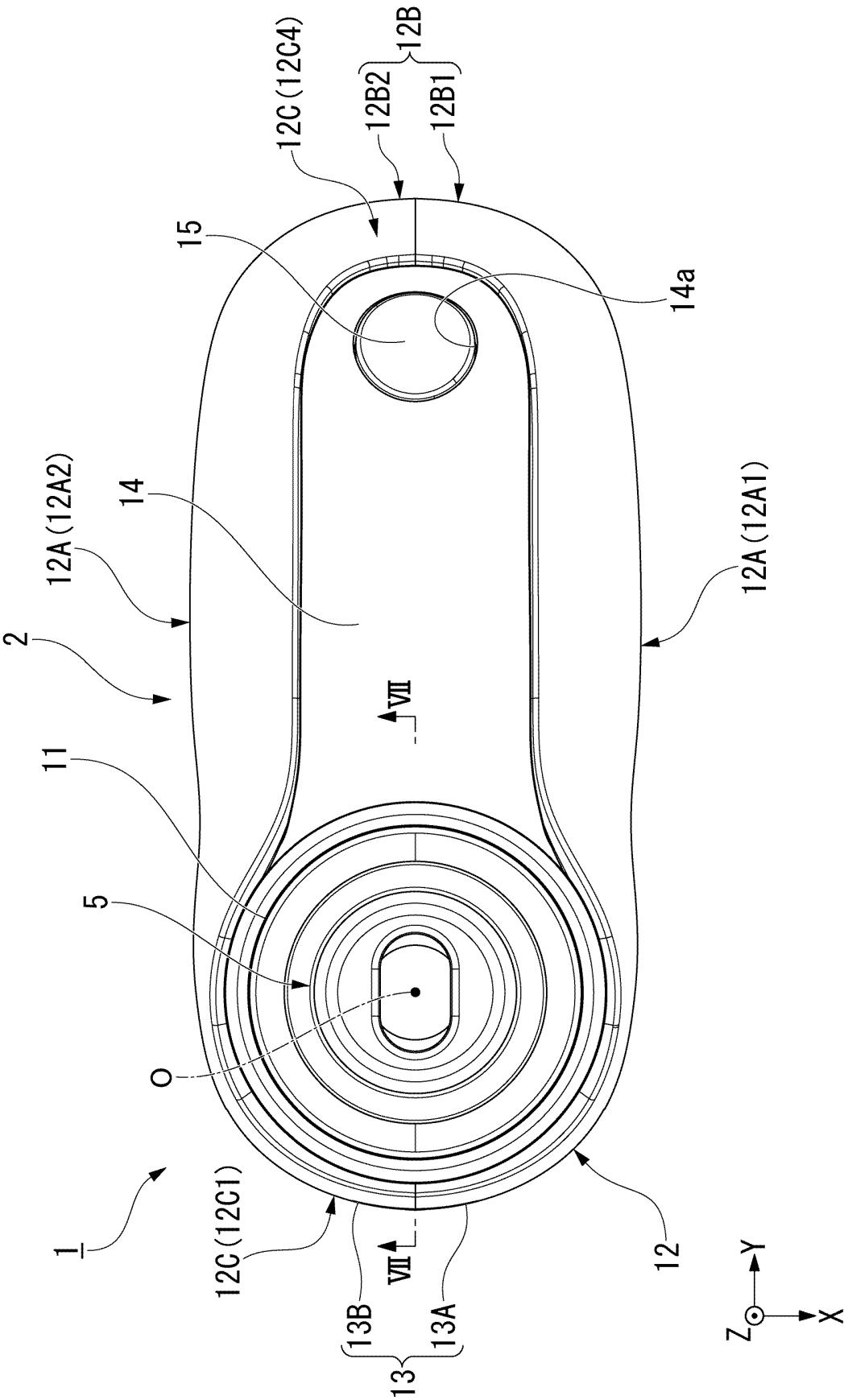

12C(12C4)
12B2
12B
12B1
15
14a
12A(12A2)
14
12A(12A1)
2
VII
11
5
O
1
12C(12C1)
VII
12
13B
13A
13
Y
Z
X

FIG. 5

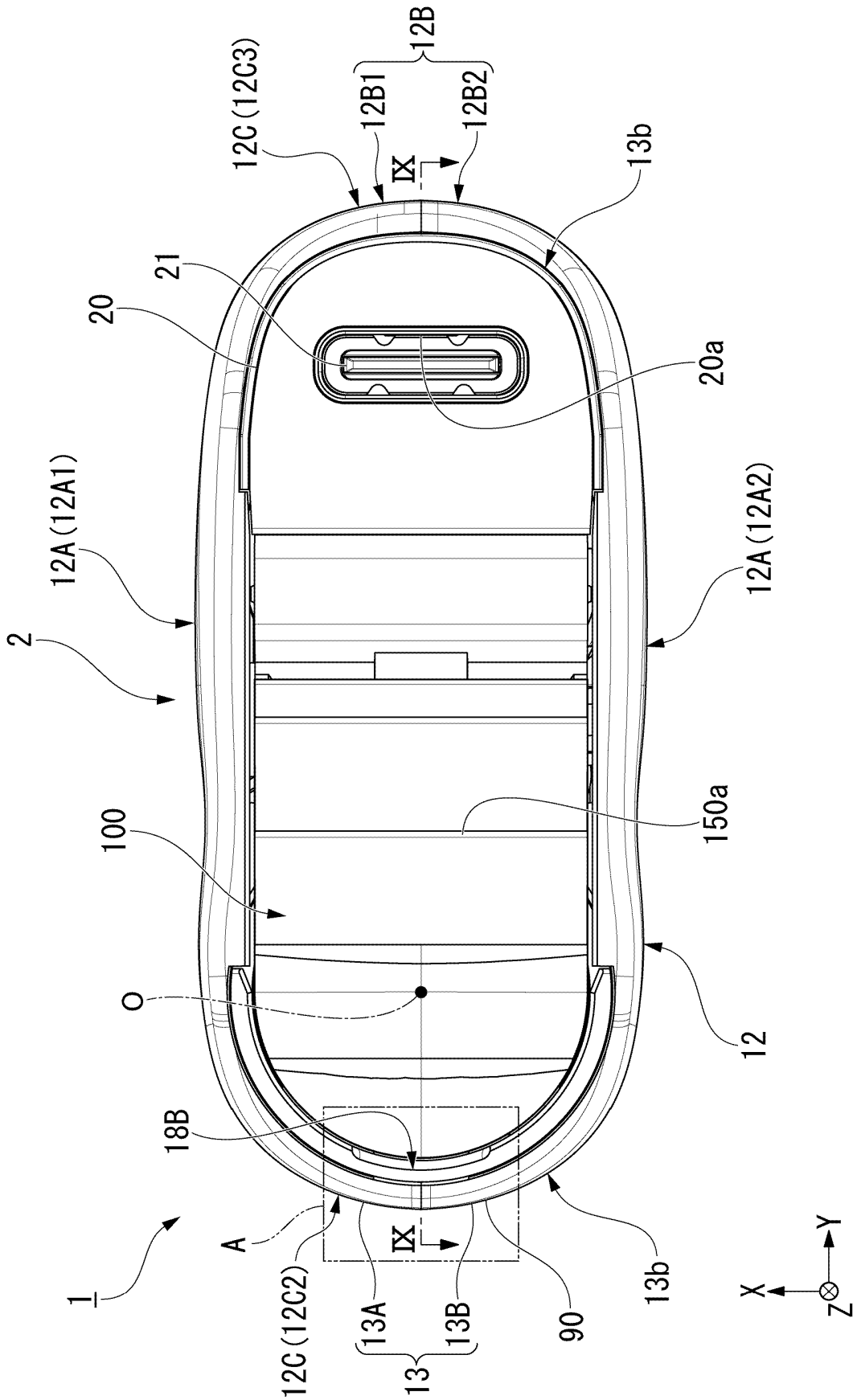

12C (12C3)
12B1
12B
12B2
IX
13b
21
20
20a
12A (12A1)
12A (12A2)
2
100
150a
O
12
18B
A
IX
1
12C (12C2)
13A
13B
13
90
13b
X
Y
Z

FIG. 6

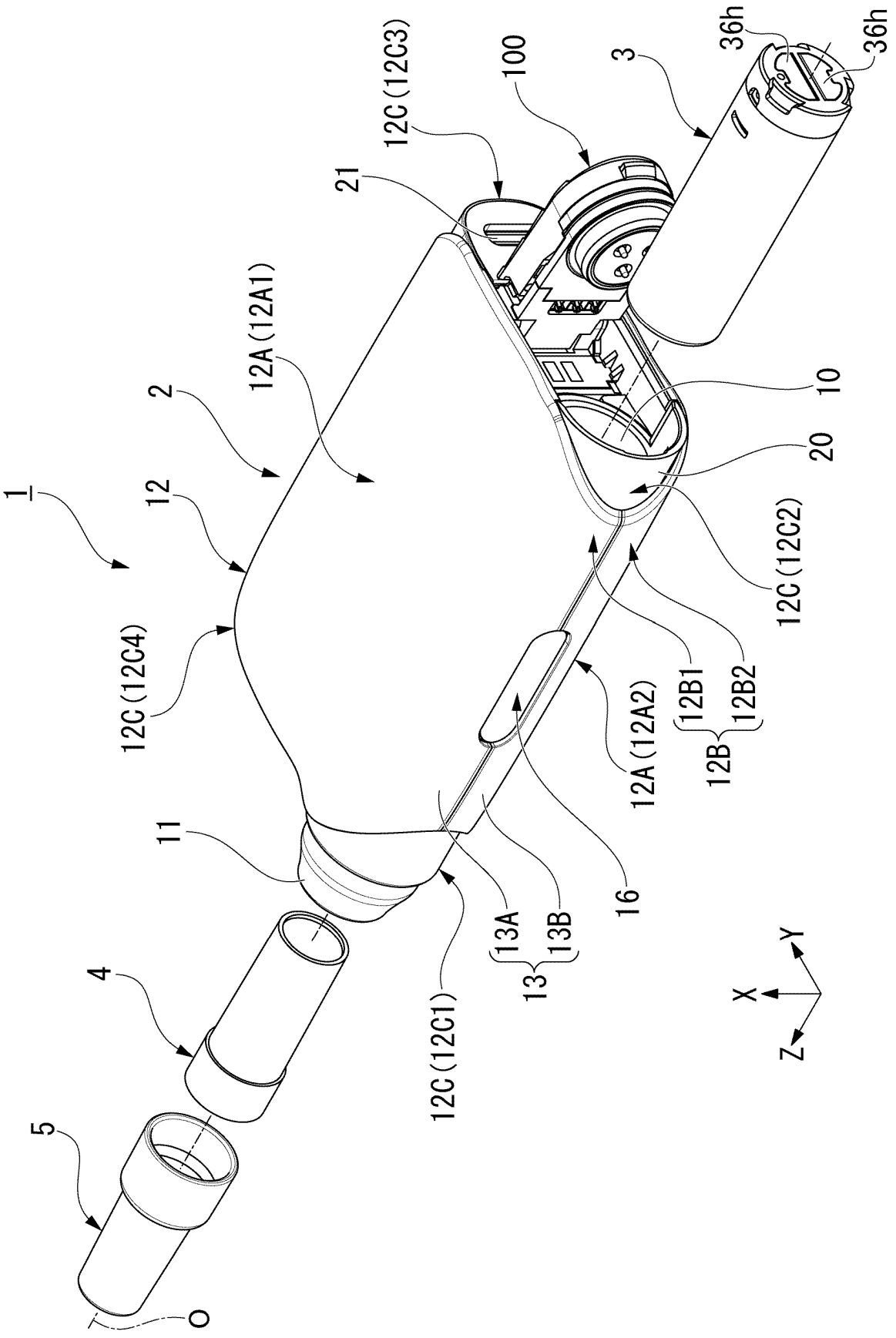

1
2
3
4
5
10
11
12
12A(12A1)
12A(12A2)
12B
12B1
12B2
12C(12C1)
12C(12C2)
12C(12C3)
12C(12C4)
13
13A
13B
16
20
21
36h
36h
100
O
X
Y
Z

FIG. 7

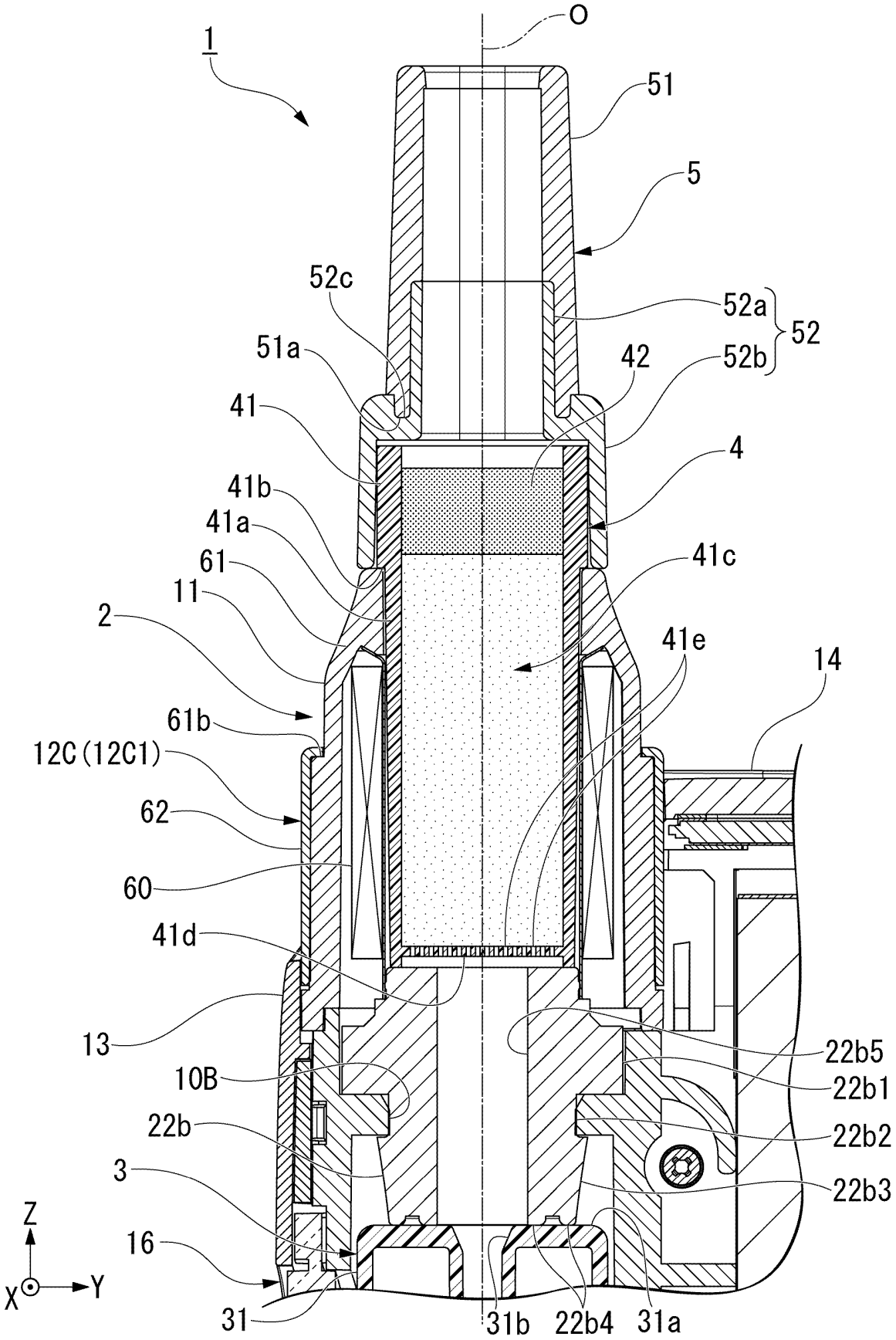

O
1
51
5
52c
52a
52
51a
42
52b
41
4
41b
41a
61
41c
11
2
41e
14
61b
12C(12C1)
62
60
41d
13
22b5
10B
22b1
22b
22b2
3
22b3
16
31
31b
22b4
31a
Z
X
Y

FIG. 8

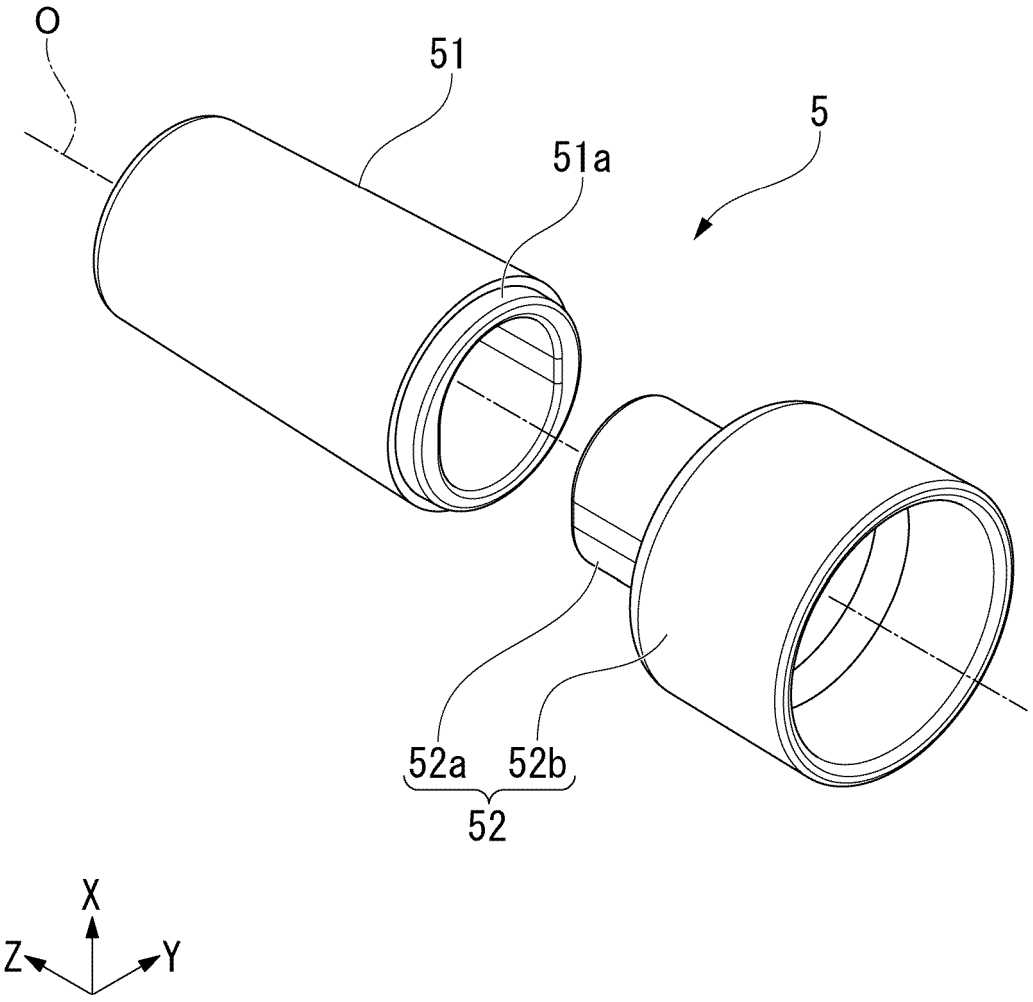


FIG. 9

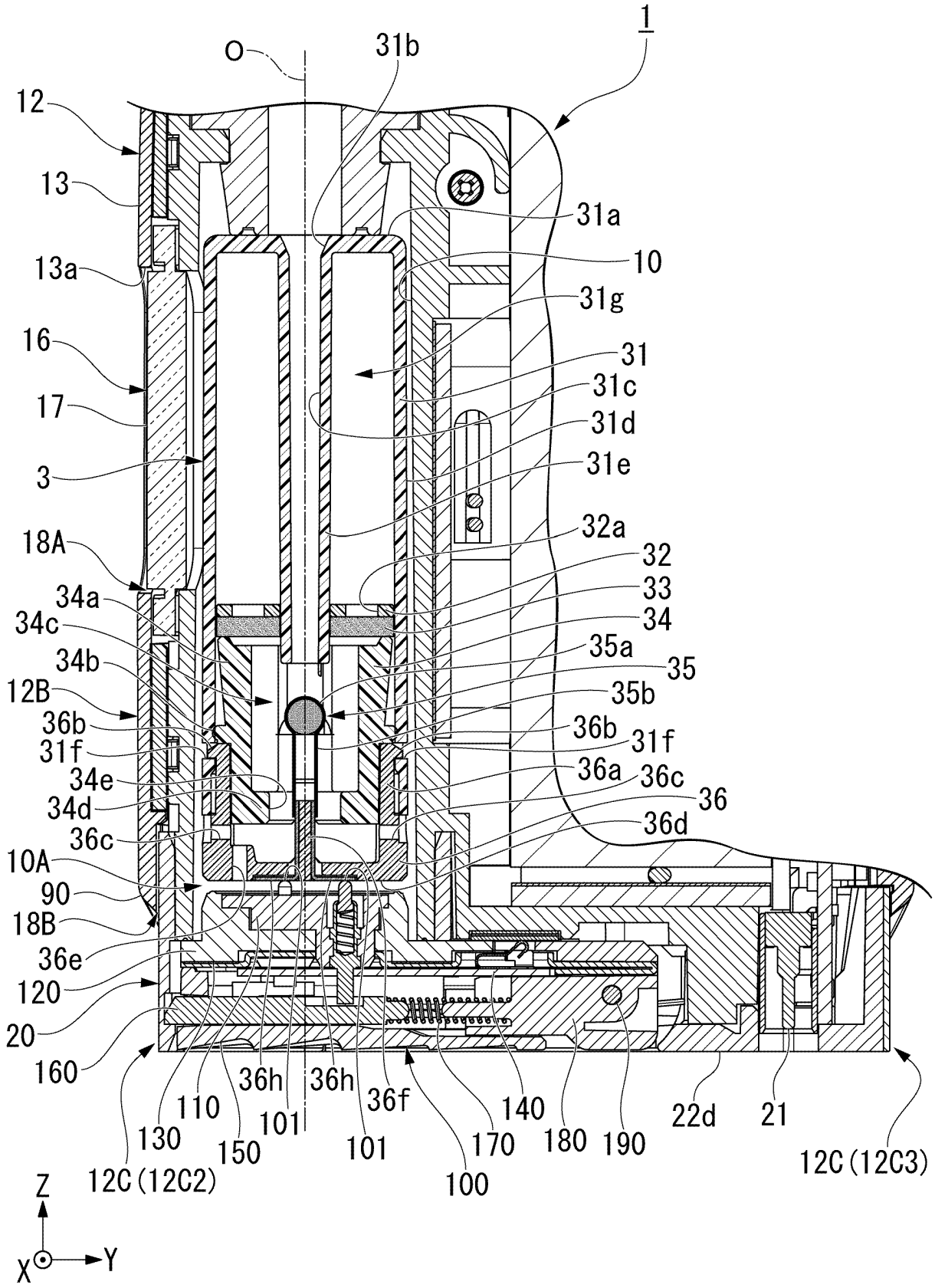

1
O
31b
12
13
31a
13a
10
31g
16
31
17
31c
31d
3
31e
18A
32a
32
34a
33
34c
34
34b
35a
35
12B
35b
36b
31f
36b
31f
34e
36a
36c
34d
36
36c
36d
10A
90
18B
36e
120
20
160
36h
36h
110
36f
140
130
101
101
150
170
180
190
22d
21
12C(12C2)
100
12C(12C3)
Z
X
Y

FIG. 10

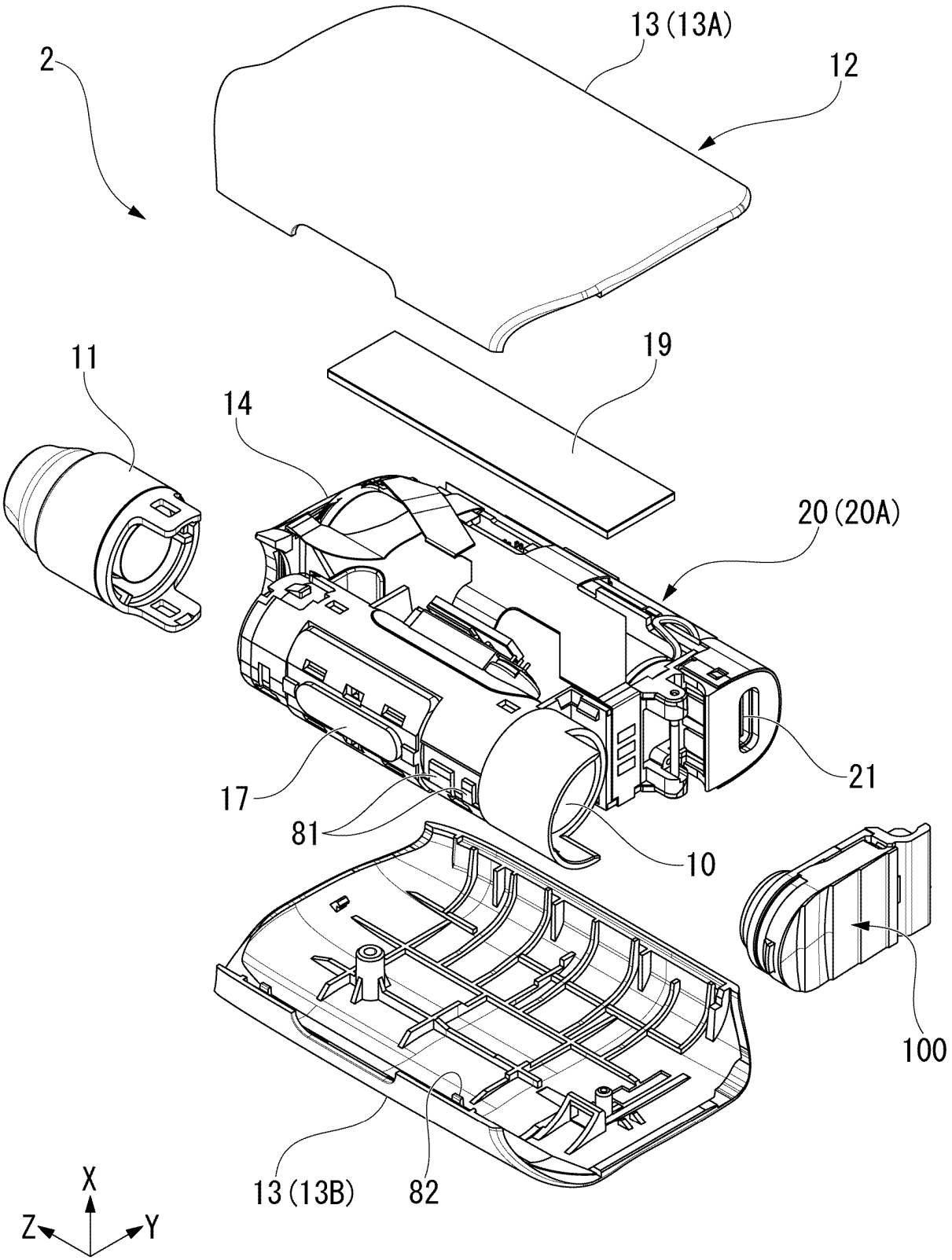


FIG. 11

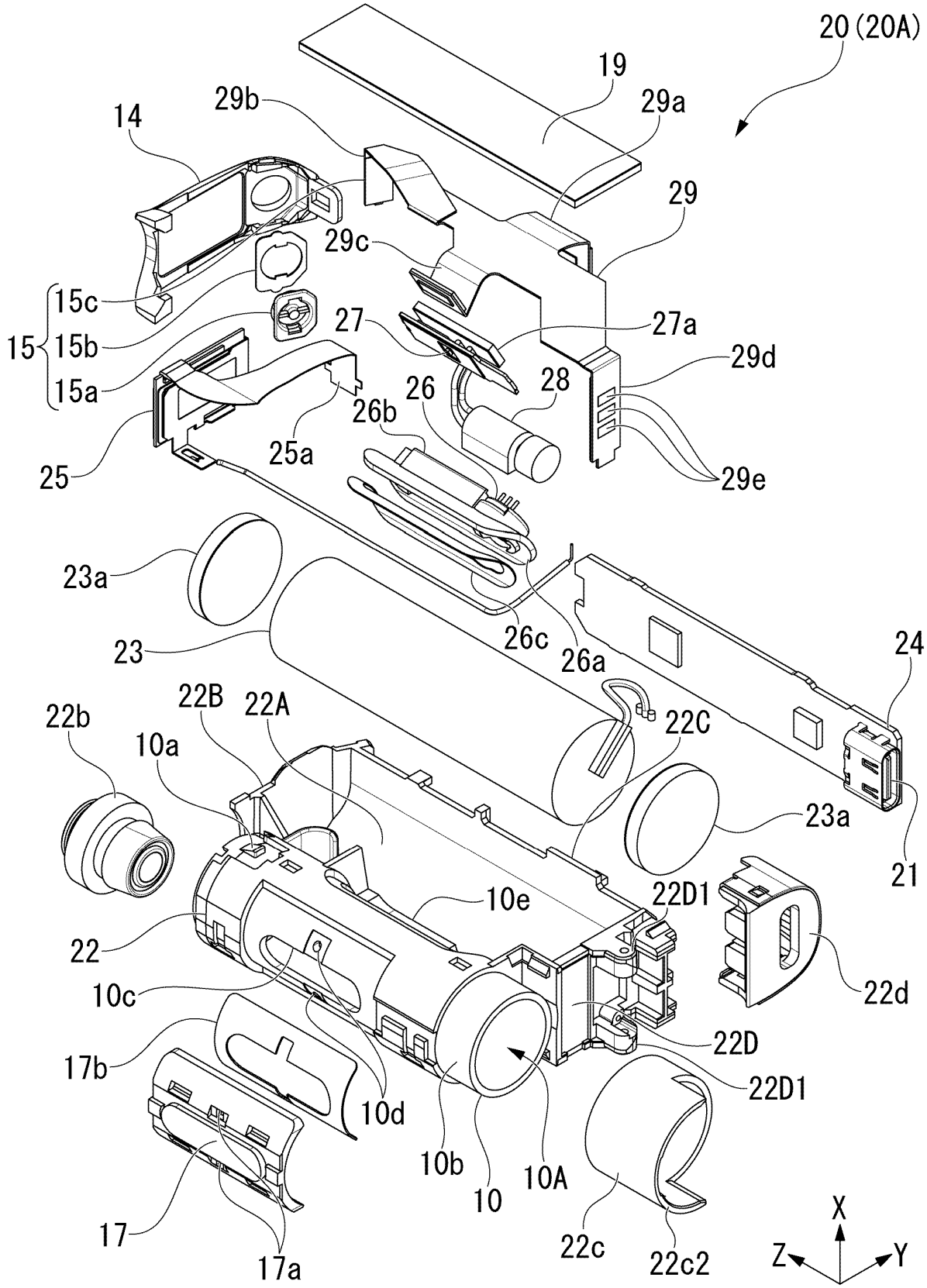

20 (20A)
19
29a
29b
14
29
29c
15c
15
15b
15a
27
27a
29d
26
28
26b
25
25a
29e
23a
23
26c
26a
24
22B
22A
22b
10a
22C
23a
21
22D1
10e
22
22d
10c
22D
17b
22D1
10d
10b
10A
10
17
22c
22c2
17a
X
Z
Y

FIG. 12

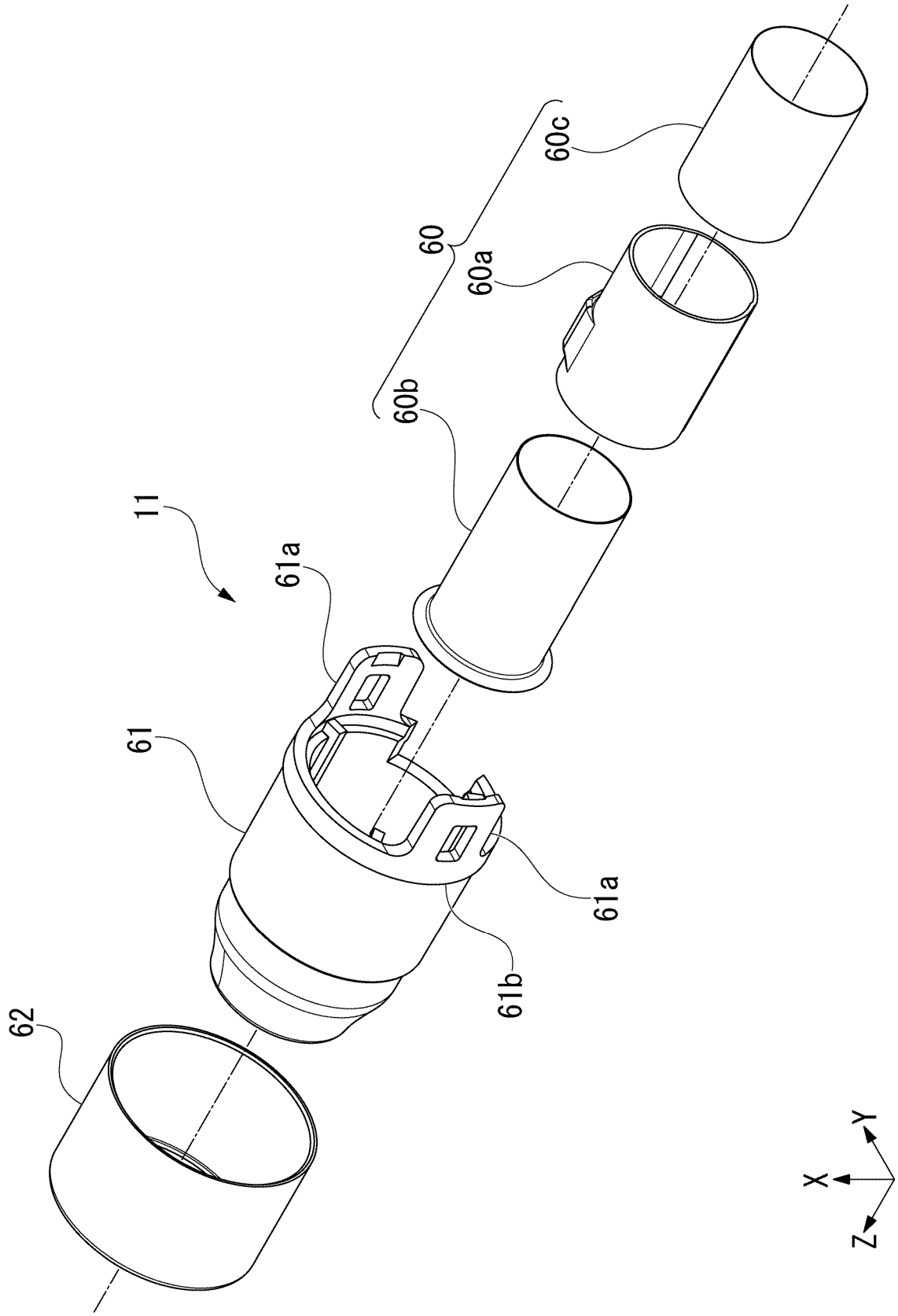


FIG. 13

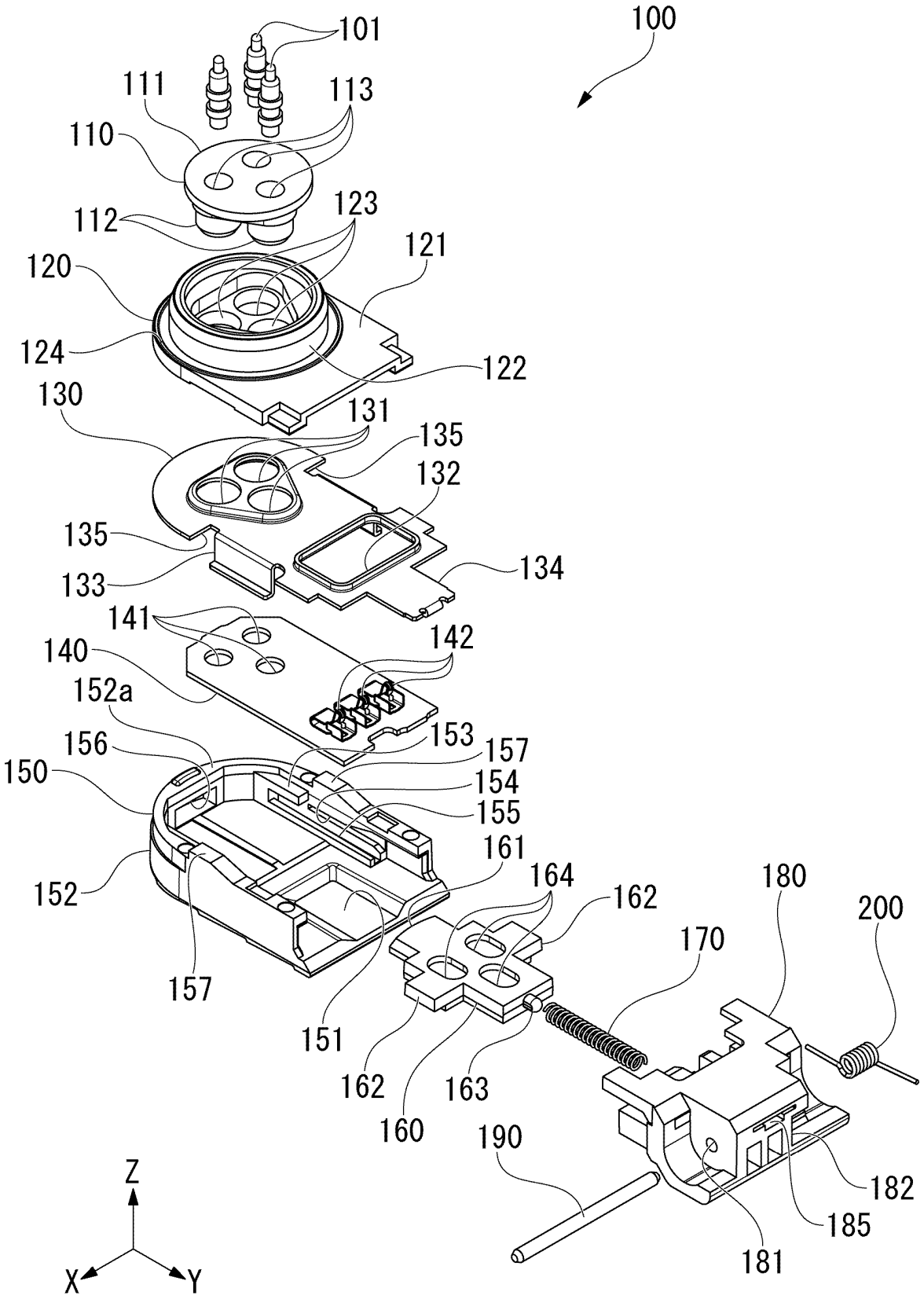

100
101
111
113
110
112
123
121
120
124
122
130
131
135
132
135
133
134
141
142
140
152a
153
156
157
150
154
155
161
164
162
180
200
170
152
157
151
162
163
160
190
182
185
181
Z
X
Y

FIG. 14

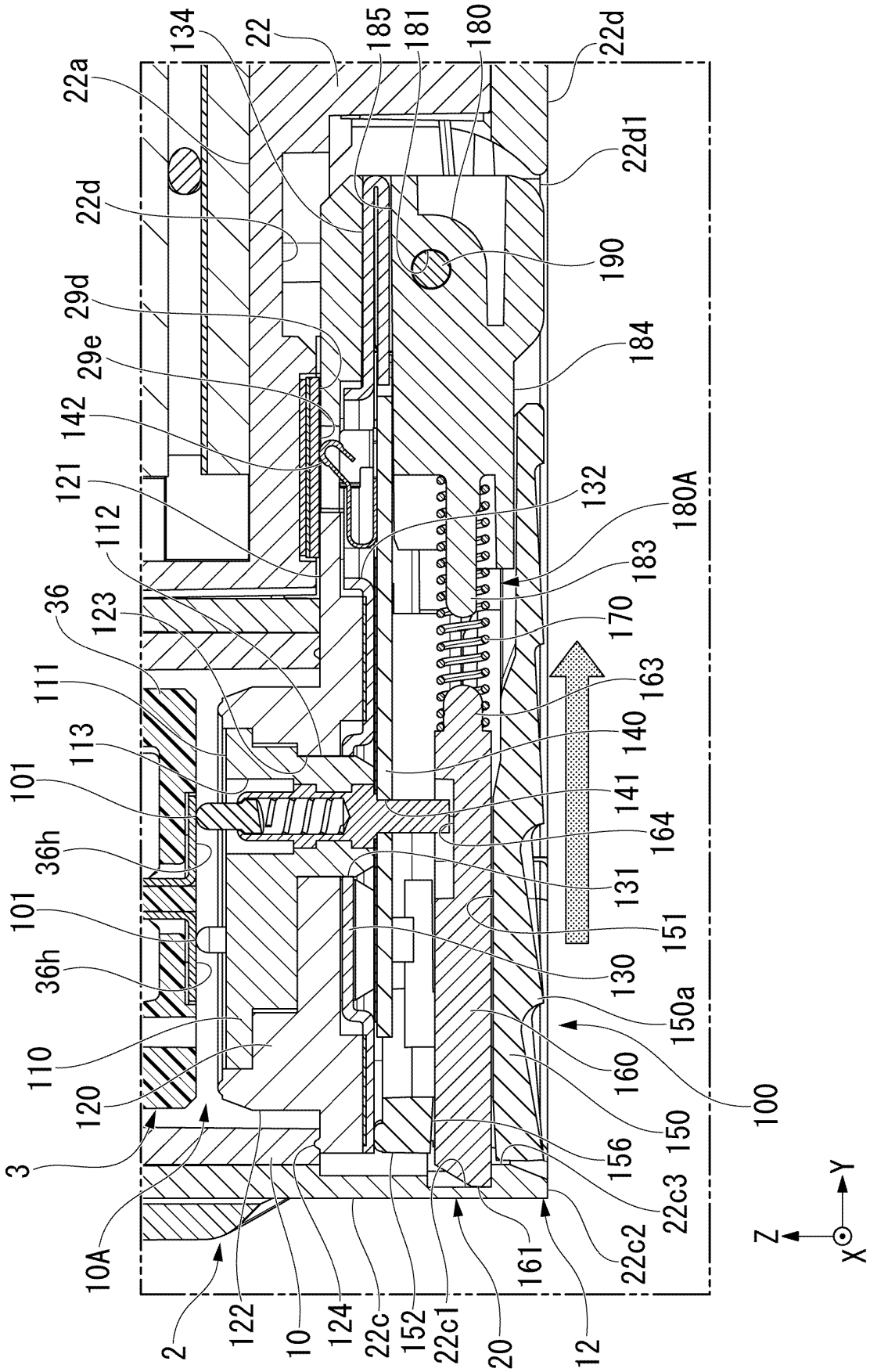

134
22
185
181
180
22d
22a
22d1
22d
190
29d
184
29e
142
121
132
180A
112
183
36
123
170
111
163
113
140
101
141
36h
164
131
101
151
36h
130
150a
110
160
120
100
150
3
156
22c3
22c2
10A
161
2
122
10
124
22c
152
22c1
20
12
Z
Y
X

FIG. 15

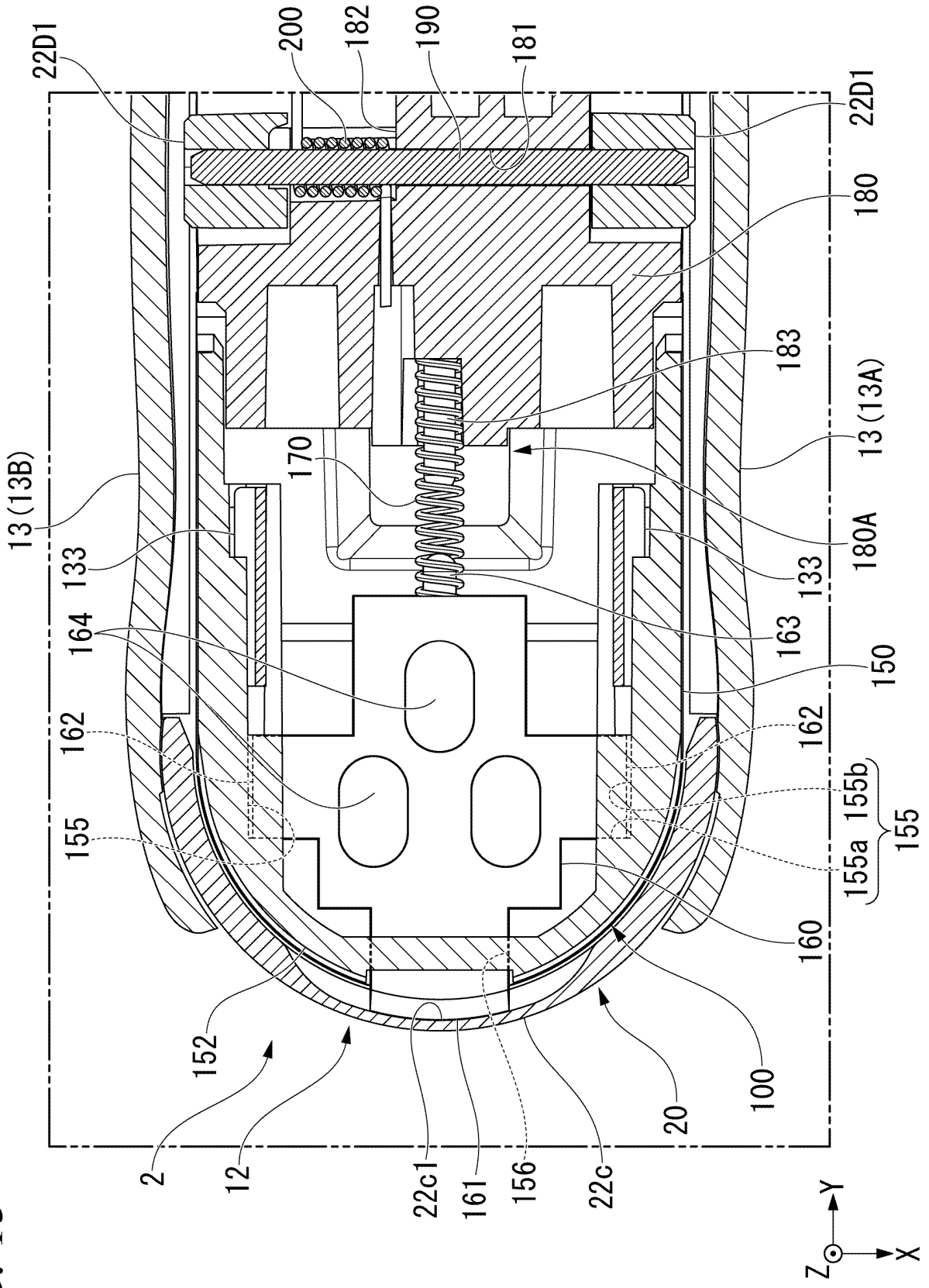

22D1
200
182
190
181
22D1
180
183
13 (13A)
13 (13B)
170
133
180A
133
164
163
150
162
162
155
155b
155a
155
160
152
100
20
2
12
22c1
161
156
22c
Y
Z
X

FIG. 16

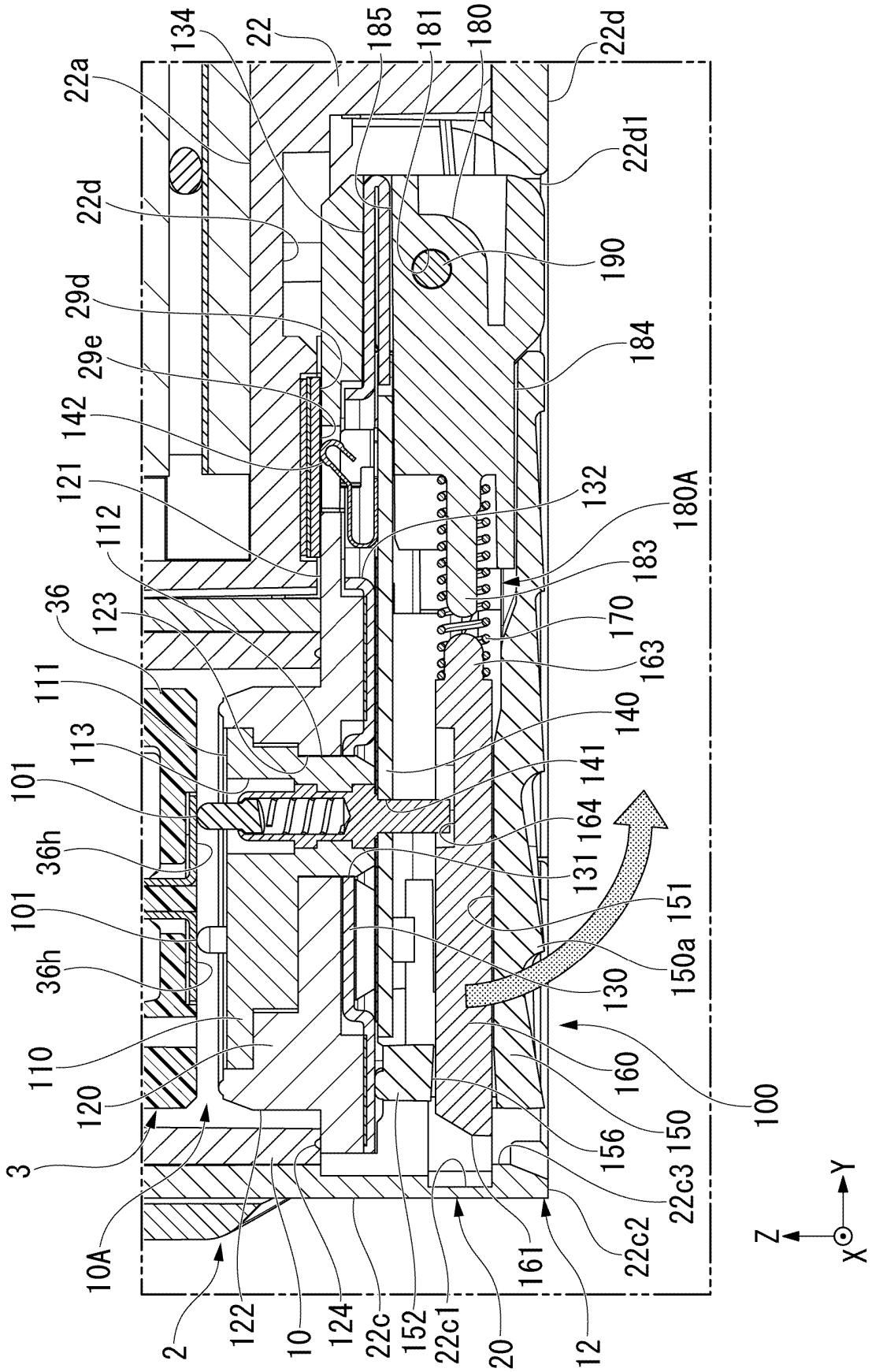

134
22
185
181
180
22d
22a
22d1
22d
190
29d
184
29e
142
121
132
180A
112
183
36
123
170
111
163
140
113
141
101
164
36h
131
151
101
150a
36h
130
110
160
120
100
3
156
150
22c3
22c2
10A
161
122
124
22c
152
22c1
20
12
2
Z
Y
X

FIG. 17

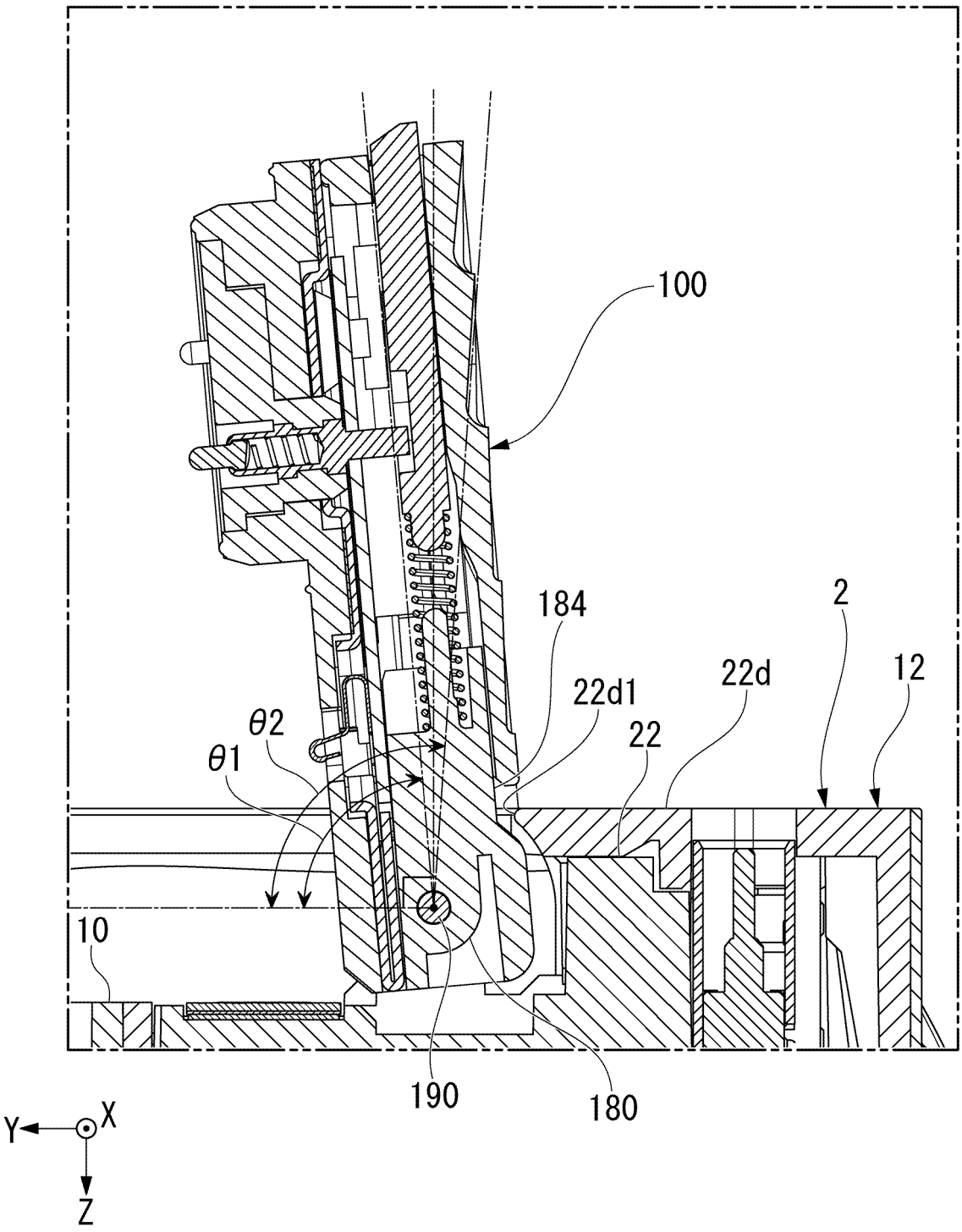


FIG. 18

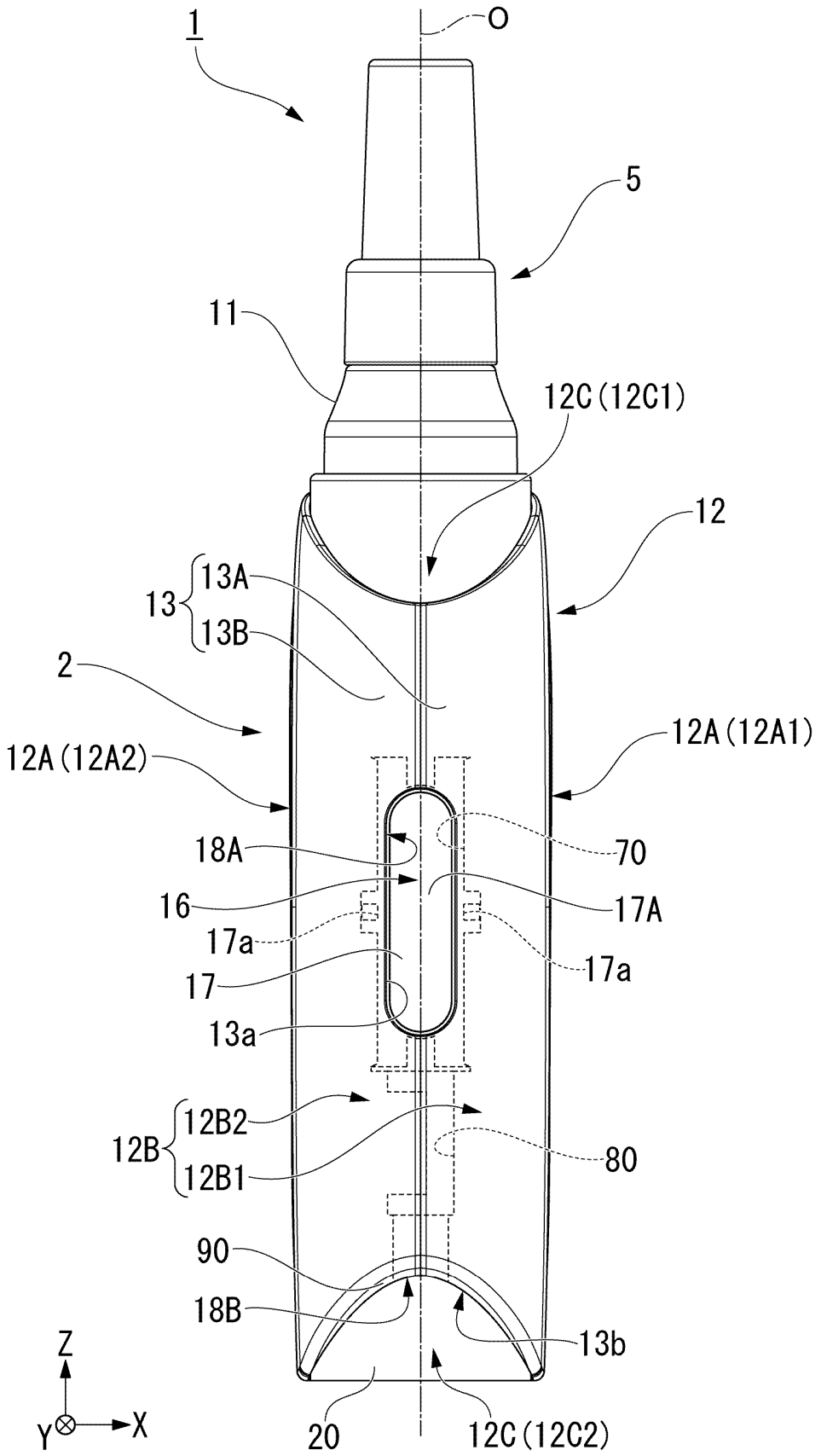

1
O
5
11
12C (12C1)
12
13
13A
13B
2
12A (12A2)
12A (12A1)
18A
70
16
17A
17a
17a
17
13a
12B
12B2
12B1
80
90
18B
13b
20
12C (12C2)
Z
Y
X

FIG. 19

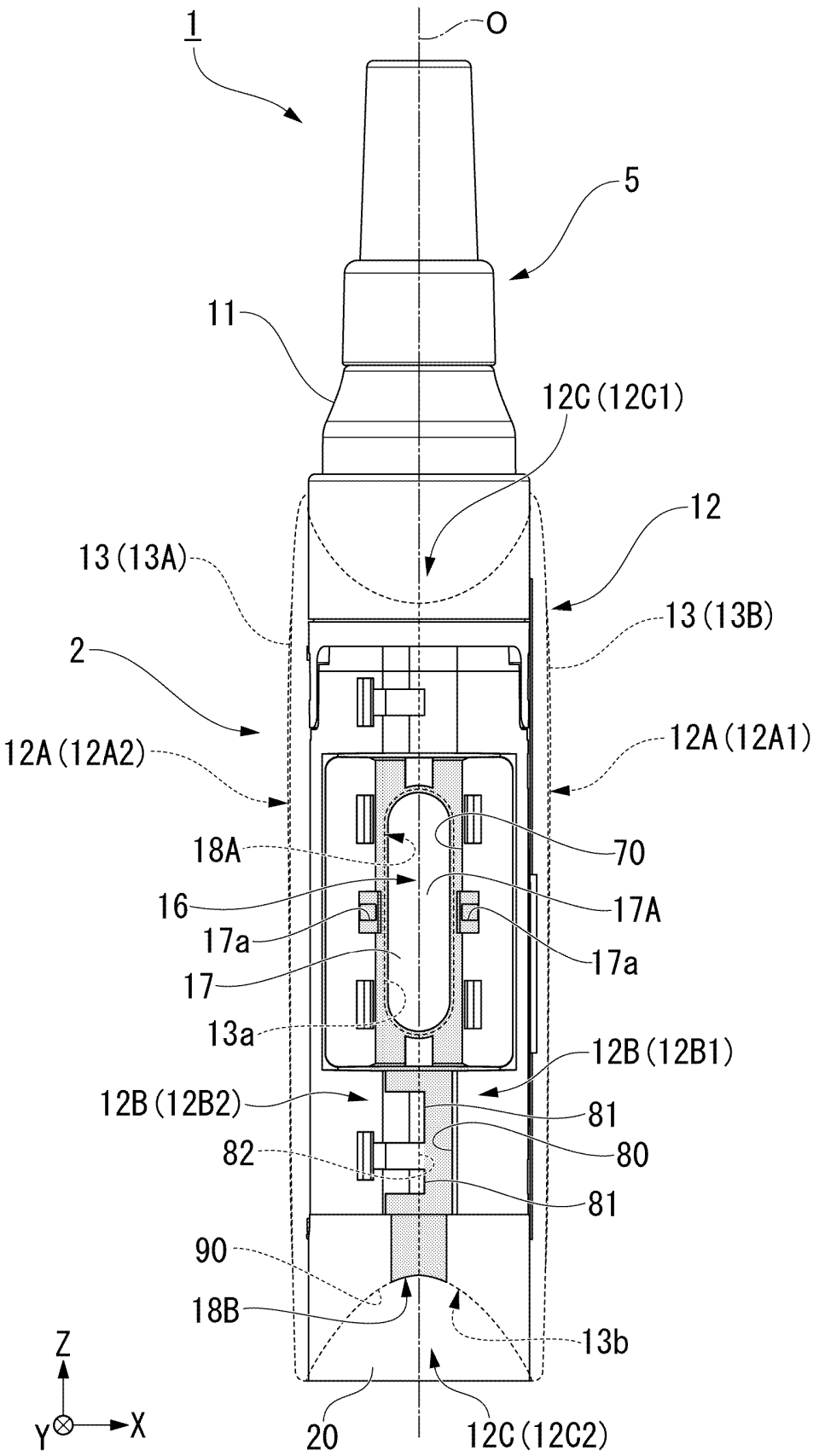

1
O
5
11
12C (12C1)
12
13 (13A)
13 (13B)
2
12A (12A2)
12A (12A1)
18A
70
16
17A
17a
17a
17
13a
12B (12B1)
12B (12B2)
81
82
80
81
90
18B
13b
Z
Y
X
20
12C (12C2)

FIG. 20

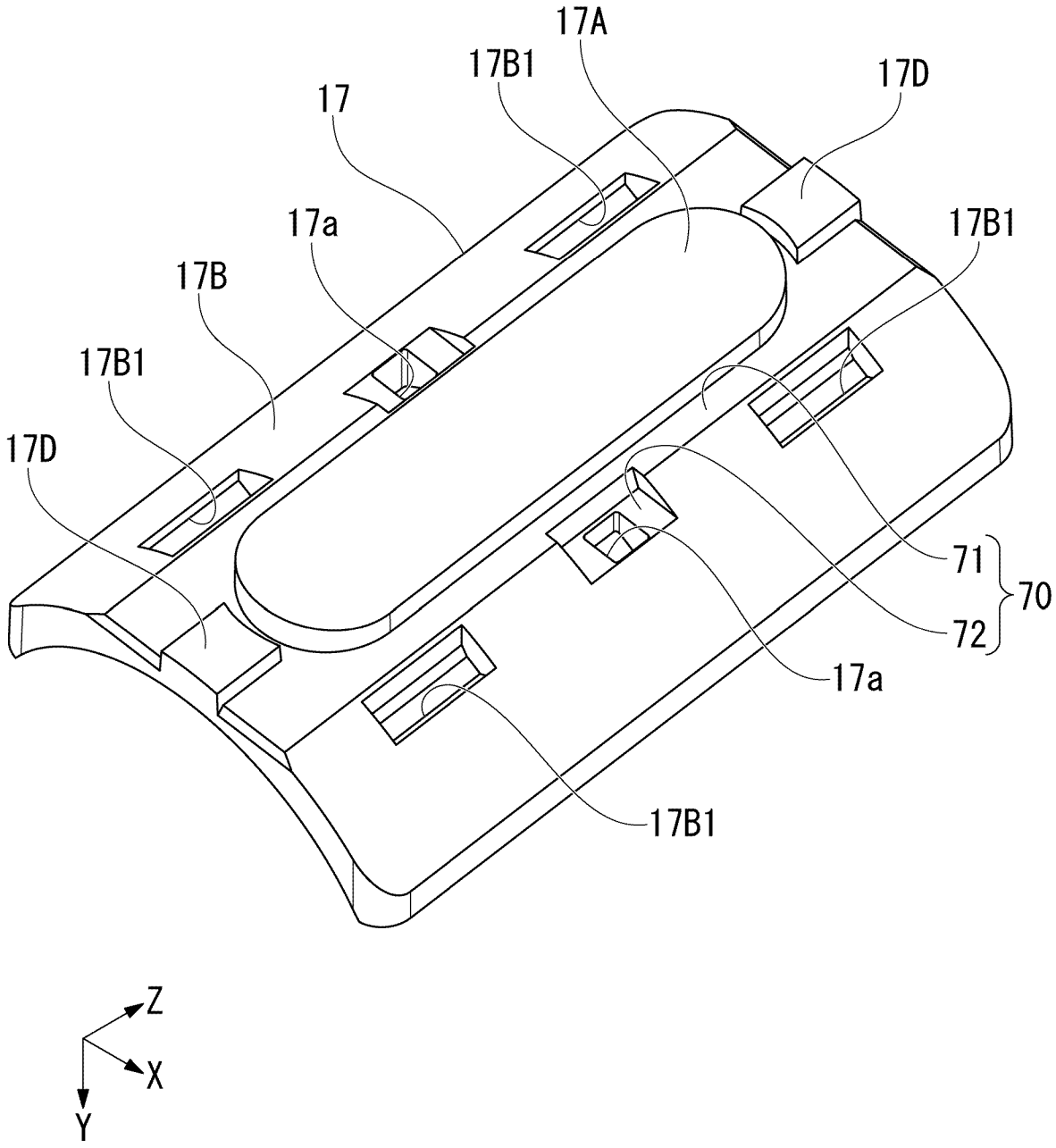


FIG. 21

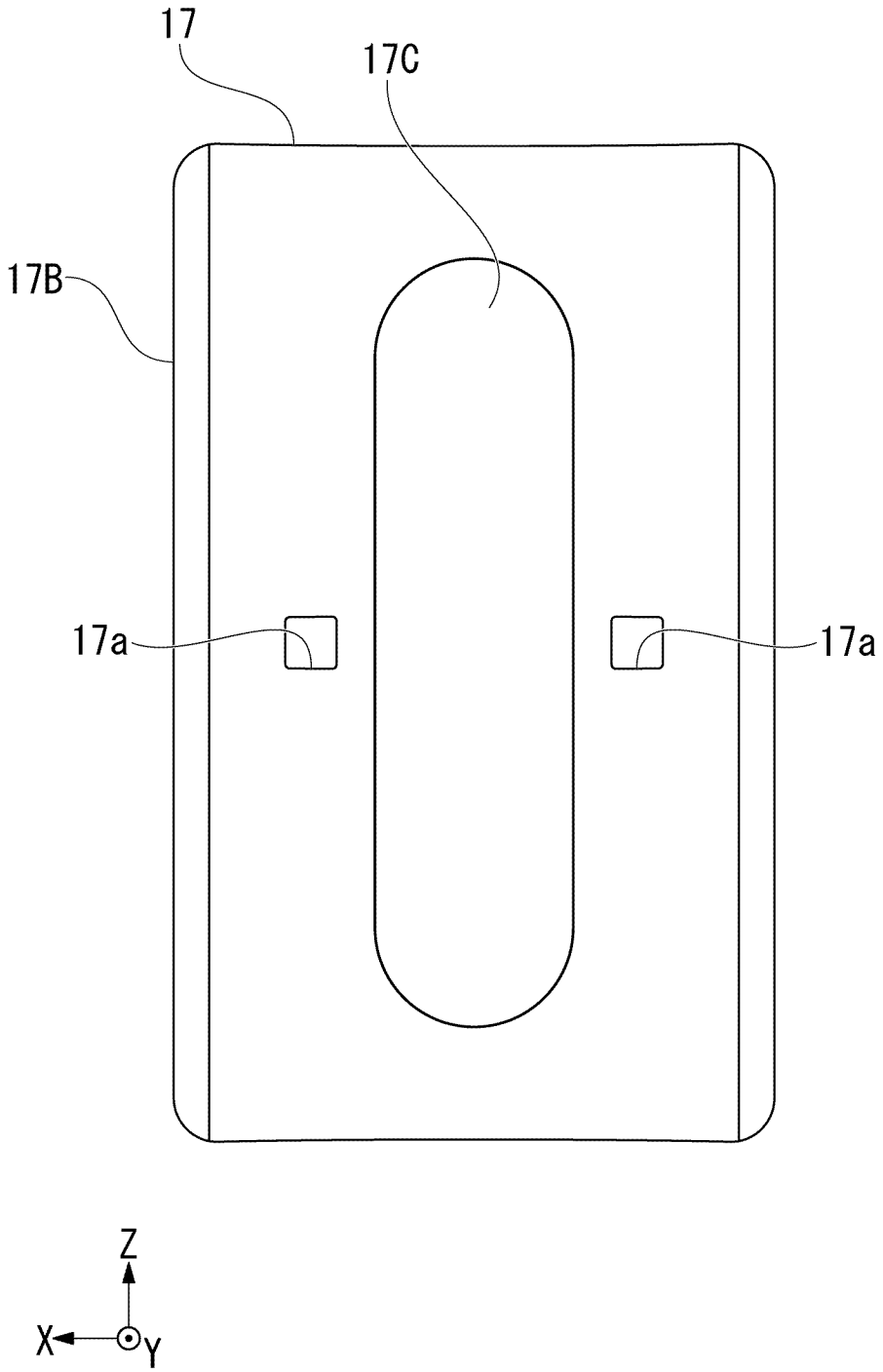


FIG. 22

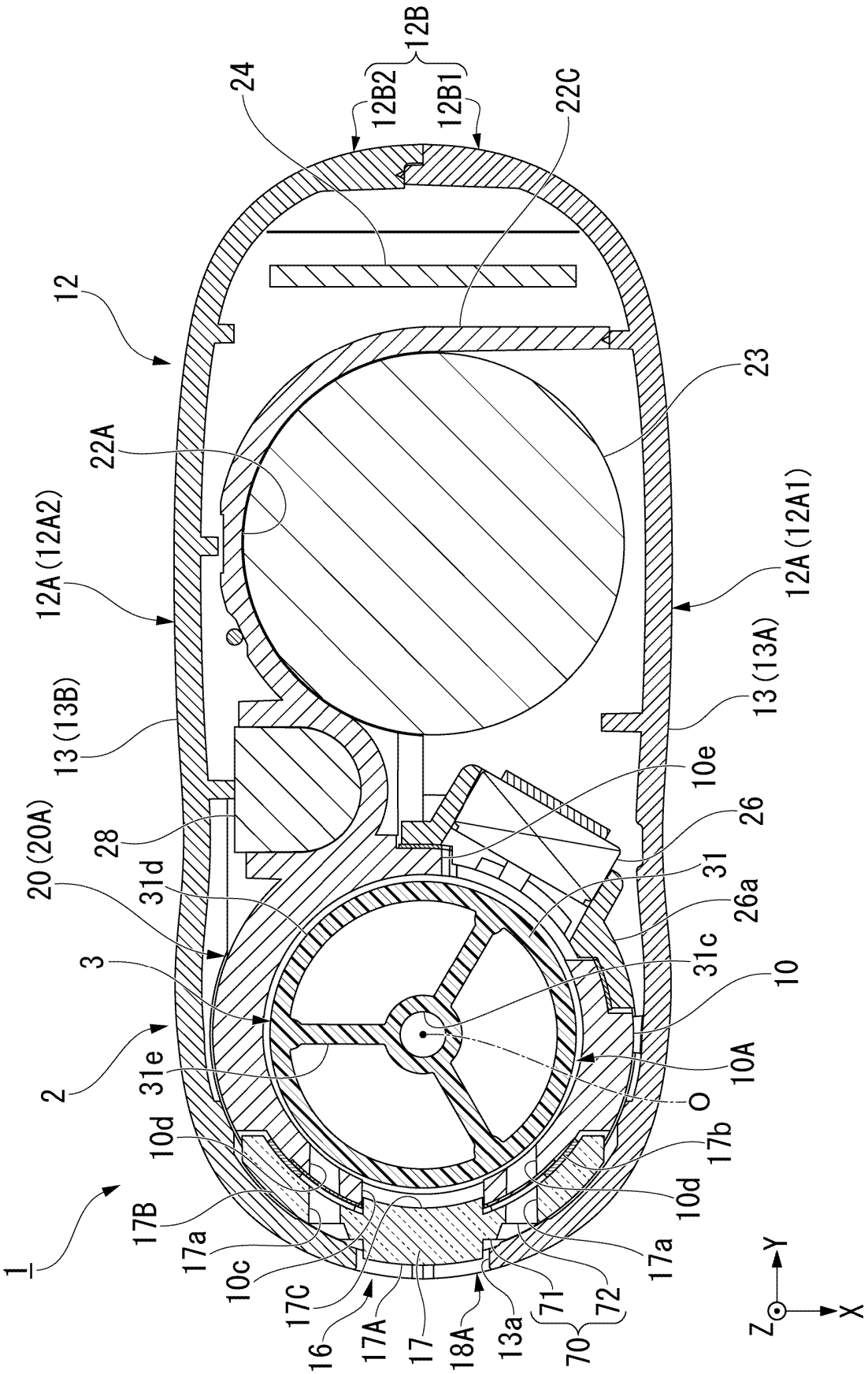
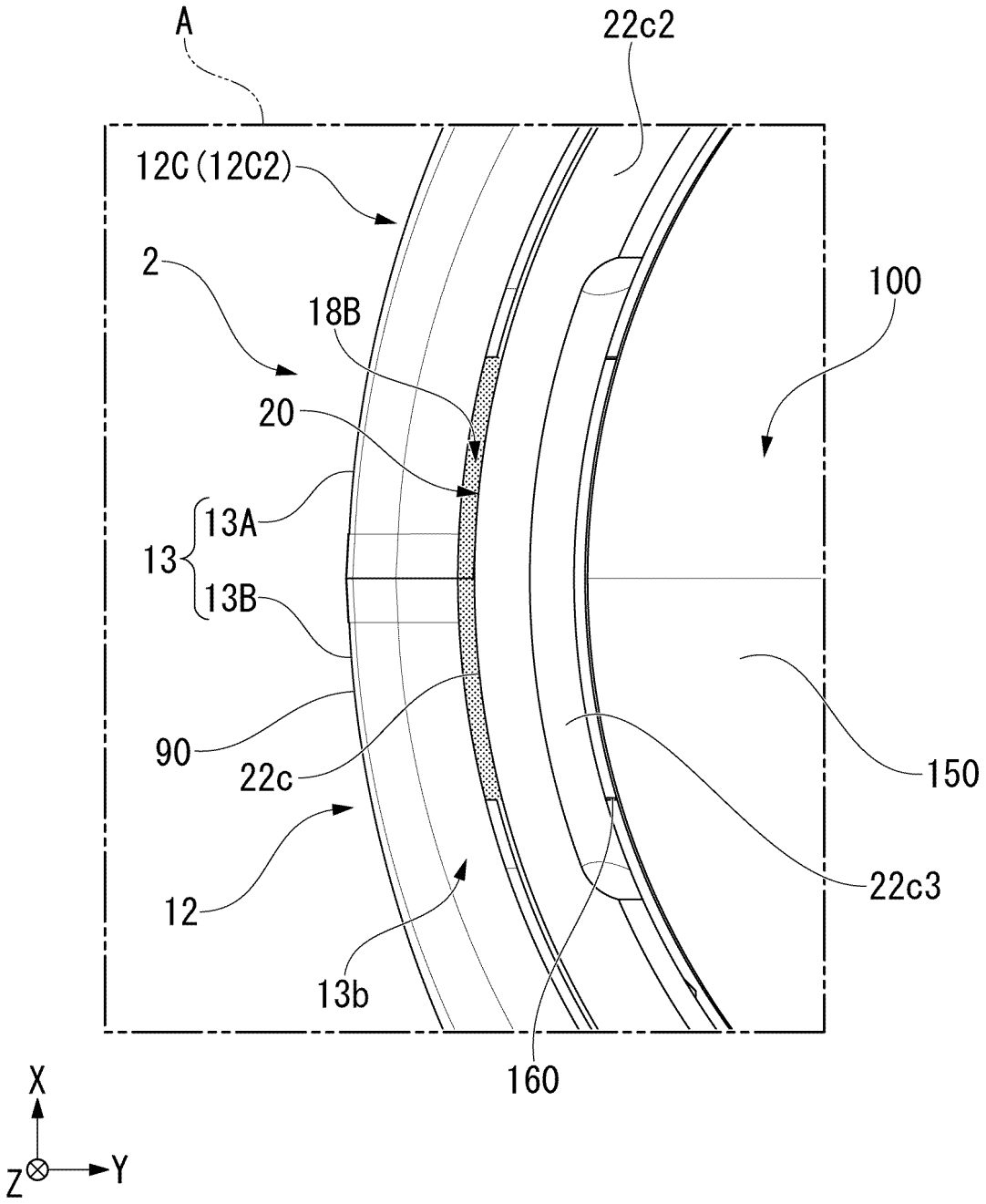

12B
12B2
12B1
24
22C
12
23
22A
12A (12A2)
12A (12A1)
13 (13B)
13 (13A)
10e
28
26
20 (20A)
31d
31
26a
3
31c
10
2
31e
10A
O
10d
17b
17B
10d
17a
17a
10c
17C
16
17A
17
18A
13a
71
72
70
1
Y
Z
X

FIG. 23


A
22c2
12C (12C2)
2
18B
100
20
13A
13
13B
90
22c
150
12
22c3
13b
160
X
Z
Y

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2021/045452

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 1971-2022
Registered utility model specifications of Japan 1996-2022
Published registered utility model applications of Japan 1994-2022

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.
A	JP 2021-510507 A (NICOVENTURES TRADING LIMITED) 30 April 2021 (2021-04-30) entire text, all drawings	1-14
A	US 2019/0223499 A1 (SHENZHEN IVPS TECHNOLOGY CO., LTD.) 25 July 2019 (2019-07-25) entire text, all drawings	1-14
A	WO 2017/194751 A1 (BRITISH AMERICAN TOBACCO (INVESTMENTS) LIMITED) 16 November 2017 (2017-11-16) entire text, all drawings	1-14

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

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

Date of the actual completion of the international search	Date of mailing of the international search report
01 February 2022	**15 February 2022**
Name and mailing address of the ISA/JP **Japan Patent Office (ISA/JP)** **3-4-3 Kasumigaseki, Chiyoda-ku, Tokyo 100-8915** **Japan**	Authorized officer Telephone No.

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

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/JP2021/045452

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
JP 2021-510507 A	30 April 2021	US 2021/0093001 A1 entire text, all drawings WO 2019/145451 A1 KR 10-2020-0099593 A	
US 2019/0223499 A1	25 July 2019	EP 3513670 A1 CN 208016915 U CA 3020144 A1	
WO 2017/194751 A1	16 November 2017	(Family: none)	

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

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- CN 206808665 **[0004]**