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(72) Inventors:  
• **SUMII, Tateki**  
Tokyo 130-8603 (JP)  
• **TAMURA, Ryo**  
Tokyo 130-8603 (JP)  
• **YAMADA, Manabu**  
Tokyo 130-8603 (JP)

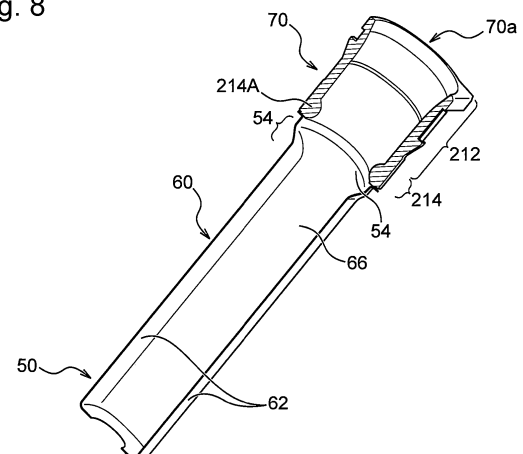
(71) Applicant: **Japan Tobacco Inc.**  
Tokyo 105-6927 (JP)

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

(54) **FLAVOUR INHALER, AND SMOKING SYSTEM**

(57) Provided is a flavour inhaler comprising an accommodating part that is configured to accommodate a consumable product, such as a smokable product. The accommodating part includes: an opening that is configured to allow insertion of the consumable product therein; a first space formation part that is connected to the opening and, together with the outer peripheral surface of the accommodated consumable product, forms a space over the entire periphery; a second space formation part that is positioned at the opposite side of the first space formation part from the opening and, together with the outer peripheral surface of the accommodated consumable product, forms a space over the entire periphery; a first support part that is positioned between the first space formation part and the second space formation part in the longitudinal direction of the accommodating part and presses the outer peripheral surface of the consumable product to support the consumable product; and a second support part that is positioned at the opposite side of the second space formation part from the opening in the longitudinal direction of the accommodating part and presses the outer peripheral surface of the consumable product to support the consumable product.

Fig. 8



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## Description

### TECHNICAL FIELD

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

### BACKGROUND ART

**[0002]** In the field of flavour inhalers, a guide has been provided in an accommodating part of a known flavour inhaler so as to appropriately accommodate a consumable product including a smokable product in the accommodating part. For example, Document 1 discloses techniques in which an opening part, through which a consumable product is inserted, is provided, and a plurality of raised parts are provided in a collar provided inside a housing of a flavour inhaler so as to hold the consumable product accommodated in the housing.

**[0003]** In the flavour inhaler, when the consumable product is inserted into the accommodating part, it is desired that the consumable product be smoothly inserted with low resistance. Meanwhile, after smoking has started, it is desired that the consumable product be sufficiently supported in the accommodating part so as not to allow dropping of the consumable product from the flavour inhaler during the smoking. Although these needs are in a trade-off relationship with each other, it is desired that both the needs be satisfied.

### CITATION LIST

### PATENT LITERATURE

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### SUMMARY OF INVENTION

### TECHNICAL PROBLEM

**[0005]** According to the present disclosure, a flavour inhaler and a smoking system that facilitate insertion of a consumable product into an accommodating part and that can appropriately hold the consumable product in the accommodating part are provided.

### SOLUTION TO PROBLEM

**[0006]** A first embodiment of the present disclosure is a flavour inhaler that includes an accommodating part configured to accommodate consumable product including a smokable product. The accommodating part has an opening configured to allow insertion of the consumable product therein, a first space formation part that is connected to the opening and forms a space throughout a periphery between the first space formation part and an outer peripheral surface of the accommodated consum-

able product, a second space formation part that is positioned at a farther side from the opening than the first space formation part and forms a space throughout the periphery between the second space formation part and the outer peripheral surface of the accommodated consumable product, a first support part that is positioned between the first space formation part and the second space formation part in a longitudinal direction of the accommodating part and presses the outer peripheral surface of the consumable product to support the consumable product, and a second support part that is positioned at a farther side from the opening than the second space formation part in the longitudinal direction of the accommodating part and presses the outer peripheral surface of the consumable product to support the consumable product.

**[0007]** According to the above-described first embodiment, in the accommodating part to accommodate the consumable product, the first space formation part connected to the opening, the first support part, the second space formation part, and the second support part are disposed in this order from the opening through which the consumable product is inserted. Thus, according to the first embodiment, the consumable product having passed through the opening is easily inserted due to the first space formation part, and the consumable product can be appropriately supported by the first support part and the second support part. Furthermore, according to the first embodiment, the consumable product pressed by the first support part and the second support part bulges at a portion corresponding to the second space formation part positioned between the first support part and the second support part and is engaged with the second space formation part. Thus, dropping of the consumable product can be suppressed.

**[0008]** A second embodiment of the present disclosure is the flavour inhaler according to the above-described first embodiment in which the accommodating part has a chamber having a heating region configured to heat the consumable product and a guide part configured to guide, to the chamber, the consumable product having been inserted from the opening. The second space formation part and the second support part are provided at the chamber. The first space formation part and the first support part are provided at the guide part.

**[0009]** According to the above-described second embodiment, the second space formation part and the second support part are provided in the chamber configured to heat the consumable product, and the first space formation part and the first support part are provided in the guide part configured to guide the consumable product having been inserted from the opening to the chamber. Thus, according to the second embodiment, the consumable product can be appropriately supported on one side and the other side of a border of the heating region by using the first support part disposed in a non-heating region and the second support part disposed in the heating region.

**[0010]** A third embodiment of the present disclosure is the flavour inhaler according to the above-described first and second embodiments in which the second support part has a set of contact parts that are configured to be in contact with the outer peripheral surface of the accommodated consumable product and disposed so as to be substantially equally spaced apart from each other in a peripheral direction of the accommodating part, and a set of connecting parts connecting the set of contact parts to each other.

**[0011]** According to the above-described third embodiment, in the second support part of the accommodating part, the contact parts to be in contact with the outer peripheral surface of the accommodated consumable product and the connecting parts not to be in contact with the outer peripheral surface of the consumable product are provided. Thus, according to the third embodiment, clearances are formed between the consumable product and the connecting parts, and air having flowed from the opening passes through these clearances and flows into the flavour inhaler. Accordingly, airflow paths appropriate for smoking can be formed.

**[0012]** A fourth embodiment of the present disclosure is the flavour inhaler according to the above-described third embodiment in which the first support part has a set of first protrusions that protrude from an inner wall surface of the first support part and are disposed so as to be substantially equally spaced apart from each other in the peripheral direction of the accommodating part. Each of the set of first protrusions is provided at a position that overlaps with a corresponding one of the set of contact parts when seen in the longitudinal direction of the accommodating part.

**[0013]** According to the above-described fourth embodiment, the first protrusions protrude from the inner wall surface of the first support part at the positions, when seen in the longitudinal direction of the accommodating part, overlapped with the contact parts to be in contact with the outer peripheral surface of the consumable product. Thus, according to the fourth embodiment, the consumable product can be supported at two portions in the longitudinal direction of the accommodating part at the same positions in the peripheral direction of the accommodating part. Furthermore, according to the fourth embodiment, the consumable product deformed by the first protrusions is retained in the accommodating part. Thus, dropping of the consumable product is suppressed.

**[0014]** A fifth embodiment of the present disclosure is the flavour inhaler according to the above-described fourth embodiment in which, when the consumable product is inserted into the opening and accommodated in the accommodating part in a direction substantially parallel to the longitudinal direction of the accommodating part, in a section perpendicular to the longitudinal direction of the accommodating part, each of the set of first protrusions protrudes to an inside of a virtual external shape indicating the outer peripheral surface of the con-

sumable product that has not been deformed.

**[0015]** According to the above-described fifth embodiment, when the consumable product is inserted into the opening and accommodated in the accommodating part at an appropriate angle, each of the set of first protrusions protrudes to the inside of a virtual external shape indicating the outer peripheral surface of the undeformed consumable product. Thus, according to the fifth embodiment, when the consumable product is appropriately accommodated, the consumable product can be grasped by the set of first protrusions.

**[0016]** A sixth embodiment of the present disclosure is the flavour inhaler according to the above-described fourth and fifth embodiments in which the set of first protrusions extend in the longitudinal direction of the accommodating part. The set of first protrusions have inclined parts such that, when a section in the longitudinal direction of the accommodating part is seen, a distance between the inclined parts and a center in a radial direction of the accommodating part reduces as a distance between the inclined parts and the opening increases.

**[0017]** According to the above-described sixth embodiment, the first protrusions of the first support part that support the consumable product inserted through the opening first have the inclined parts. When the section in the longitudinal direction of the accommodating part is seen, the distance between the inclined parts and the center in the radial direction of the accommodating part reduces as the distance between the inclined parts and the opening increases. Thus, according to the sixth embodiment, resistance generated when the consumable product is inserted into the flavour inhaler is low. This can suppress generation of uncomfortable feeling experienced by the user during the insertion.

**[0018]** A seventh embodiment of the present disclosure is the flavour inhaler according to the above-described fourth to sixth embodiments in which, when a section perpendicular to the longitudinal direction of the accommodating part is seen, each of the set of first protrusions has a first side, a second side, and a vertex connecting the first side and the second side to each other. An angle formed between the first side and the second side is an obtuse angle.

**[0019]** According to the above-described seventh embodiment, when the section perpendicular to the longitudinal direction of the accommodating part is seen, the first protrusions of the first support part protrude from the inner wall surface of the first support part to form an obtuse triangular shape. Thus, according to the seventh embodiment, the first protrusions have no sharp vertices. Accordingly, damage to the consumable product can be suppressed. Furthermore, according to the seventh embodiment, contact surfaces where the first protrusions and the consumable product are to be in contact with each other can be increased, and accordingly, dropping of the consumable product can be more effectively suppressed.

**[0020]** An eighth embodiment of the present disclosure

is the flavour inhaler according to the above-described seventh embodiment in which the set of first protrusions include a pair of first protrusions facing each other in the peripheral direction of the accommodating part. The pair of first protrusions facing each other each have a first surface that has the first side and extends in the longitudinal direction of the accommodating part, a second surface that has the second side and extends in the longitudinal direction, and a ridge that connects the first surface and the second surface to each other, has the vertex, and extends in the longitudinal direction. None of two ridges of the pair of protrusions facing each other is in parallel with the longitudinal direction. In a top view of the accommodating part seen from an opening side, the two ridges are inclined in directions opposite to each other with reference to a straight line connecting end parts of the two ridges positioned at an opposite side from the opening in the longitudinal direction or a straight line connecting end parts of the two ridges positioned at an opening side in the longitudinal direction.

**[0021]** According to the above-described eighth embodiment, two ridges, each of which connects the first surface and the second surface to each other, includes the vertex, and extends in the longitudinal direction in a corresponding one of the pair of the first protrusions, are inclined in the directions opposite to each other with reference to the straight line connecting the end parts positioned at the opposite side from the opening in the longitudinal direction of the accommodating part or the straight line connecting the end parts on the opening side in the longitudinal direction. Thus, according to the eighth embodiment, by using the pair of first protrusions that face each other and have the respective ridges inclined in the directions opposite to each other, clockwise or counterclockwise uniform torque is produced around the insertion direction of the consumable product. Thus, the consumable product can be smoothly inserted during the insertion, and dropping of the consumable product can be reliably suppressed after the insertion.

**[0022]** A ninth embodiment of the present disclosure is the flavour inhaler according to the above-described fourth to eighth embodiments in which the first support part has a set of second protrusions that protrude from the inner wall surface of the first support part and are provided so as to be substantially equally spaced apart from each other in the peripheral direction of the accommodating part. The set of second protrusions are provided at positions that overlap with the set of connecting parts when seen in the longitudinal direction of the accommodating part.

**[0023]** According to the ninth embodiment of the present disclosure, in the first support part of the accommodating part in which the first protrusions protruding from the inner wall surface are provided, the set of second protrusions are additionally provided at the positions, when seen in the longitudinal direction of the accommodating part, overlapped with the connecting parts that are not to be in contact with the consumable product. Thus,

according to the ninth embodiment, the consumable product can be reliably supported at the first support part and the second support part. Specifically, the consumable product pressed by the contact parts in the second support part bulges toward the connecting parts, and the bulged parts are retained at the second protrusions. Thus, dropping of the consumable product can be suppressed. Furthermore, in the first support part, the consumable product pressed by the first protrusions and deformed is retained at the second protrusions. Thus, dropping of the consumable product can be suppressed.

**[0024]** A tenth embodiment of the present disclosure is the flavour inhaler according to the above-described ninth embodiment in which, when the consumable product is inserted into the opening and accommodated in the accommodating part in the direction substantially parallel to the longitudinal direction of the accommodating part, in a section perpendicular to the longitudinal direction of the accommodating part, the set of second protrusions are positioned outside a virtual external shape indicating the outer peripheral surface of the consumable product that has not been deformed.

**[0025]** According to the above-described tenth embodiment, when the consumable product is inserted into the opening and accommodated in the accommodating part at an appropriate angle, each of the set of first protrusions protrudes to the inside of the virtual external shape indicating the outer peripheral surface of the undeformed consumable product while each of the set of second protrusions is positioned outside the virtual external shape. Thus, according to the tenth embodiment, when the consumable product is appropriately accommodated, the consumable product is grasped by the first protrusions while the consumable product is not firmly grasped by the second protrusions. However, when the consumable product wobbles, the second protrusions can support the consumable product.

**[0026]** An eleventh embodiment of the present disclosure is the flavour inhaler according to the above-described tenth embodiment in which each of the set of second protrusions has a curved part curved along the virtual external shape.

**[0027]** According to the above-described eleventh embodiment, each of the second protrusions provided in the first support part has the curved part curved along the virtual external shape indicating the outer peripheral surface of the accommodated consumable product. Thus, according to the eleventh embodiment, by using the curved parts curved along the external shape of the consumable product, the consumable product can be appropriately supported when the consumable product wobbles.

**[0028]** A twelfth embodiment of the present disclosure is the flavour inhaler according to the above-described ninth to eleventh embodiments in which third end parts of the set of second protrusions positioned at the opposite side from the opening in the longitudinal direction of the accommodating part are connected to the second space

formation part.

**[0029]** According to the above-described twelfth embodiment, the third end parts of the second protrusions positioned at the opposite side from the opening are positioned at a border between the first support part and the second space formation part. Thus, according to the twelfth embodiment, the consumable product bulged in the second space formation part is retained at the second protrusions having the third end parts facing the second space formation part. Thus, dropping of the consumable product can be further suppressed.

**[0030]** A thirteenth embodiment of the present disclosure is the flavour inhaler according to the above-described ninth to twelfth embodiments in which a shape of the set of first protrusions and a shape of the set of second protrusions are different from each other.

**[0031]** According to the above-described thirteenth embodiment, the shape of the first protrusions and the shape of the second protrusions provided in the first support part are different from each other. Thus, according to the thirteenth embodiment, the first protrusions and the second protrusions having different functions can have different shapes appropriate for the different functions.

**[0032]** A fourteenth embodiment of the present disclosure is the flavour inhaler according to the above-described ninth to thirteenth embodiments in which the set of first protrusions and the set of second protrusions are disposed such that the set of first protrusions and the set of second protrusions overlap at least partially with each other in the longitudinal direction of the accommodating part.

**[0033]** According to the above-described fourteenth embodiment, the first protrusions and the second protrusions provided in the first support part are disposed so as to be overlapped with each other in the longitudinal direction of the accommodating part. Thus, according to the fourteenth embodiment, the length of the first support part in the longitudinal direction can be reduced. This can contribute to size reduction of the accommodating part of the flavour inhaler.

**[0034]** A fifteenth embodiment of the present disclosure is the flavour inhaler according to the above-described thirteenth and fourteenth embodiments in which the set of first protrusions and the set of second protrusions extend in the longitudinal direction of the accommodating part. Each of the set of first protrusions has a first inclined surface that, when a section in the longitudinal direction is seen, extends from a first end part of the first protrusion positioned at the opposite side from the opening in the longitudinal direction and that is inclined such that a distance between the first inclined surface and the center of the accommodating part in the radial direction reduces as a distance between the first inclined surface and the opening reduces. Each of the set of second protrusions has a second inclined surface that, when a section in the longitudinal direction is seen, extends from a second end part of the second

protrusion positioned at the opening side in the longitudinal direction and that is inclined such that a distance between the second inclined surface and the center of the accommodating part in the radial direction reduces as a distance between the second inclined surface and the opening increases. The first inclined surface of each of the set of first protrusions and the second inclined surface of each of the set of second protrusions are disposed such that the first inclined surface and the second inclined surface overlap at least partially with each other in the longitudinal direction of the accommodating part. An inclination angle or a radius of curvature of the first inclined surface is substantially equal to an inclination angle or a radius of curvature of the second inclined surface.

**[0035]** According to the above-described fifteenth embodiment, the first inclined surfaces extending from the first end parts on the opposite side from the opening are provided in the first protrusions, the second inclined surfaces extending from the second end parts on the opening side are provided in the second protrusions, the first inclined surfaces and the second inclined surfaces are disposed so as to overlap with each other in the longitudinal direction of the accommodating part, and the first inclined surfaces and the second inclined surfaces have substantially the same inclination angle or radius of curvature. Thus, according to the fifteenth embodiment, ease of the insertion of the consumable product can be more effectively increased and dropping of the consumable product can be more effectively suppressed. Specifically, when the consumable product is inserted from the opening, the consumable product is grasped by the set of first protrusions first, and then, part of the deformed consumable product is retained at the pair of second protrusions. At this time, the degree of strength of grasping by the first protrusions is reduced while the degree of strength of grasping by the second protrusions is increased. This enables gradual grasping. Thus, resistance in insertion of the consumable product can be reduced, and dropping of the consumable product can be suppressed.

**[0036]** A sixteenth embodiment of the present disclosure is the flavour inhaler according to the above-described third embodiment in which the set of contact parts include a pair of contact parts facing each other in the peripheral direction of the accommodating part and the set of connecting parts include a pair of connecting parts facing each other in the peripheral direction of the accommodating part. The first support part has a plurality of first protrusions that protrude from an inner wall surface of the first support part. When a section perpendicular to the longitudinal direction of the accommodating part is seen, in a case where a first virtual line connecting centers of the pair of contact parts facing each other and a second virtual line connecting centers of the pair of connecting parts facing each other are drawn, the plurality of first protrusions are disposed such that none of the plurality of first protrusions intersects the first virtual line or the

second virtual line.

**[0037]** According to the above-described sixteenth embodiment, in the section perpendicular to the longitudinal direction of the accommodating part, none of the plurality of first protrusions protruding from the inner wall surface of the first support part intersects the first virtual line or the second virtual line. The first virtual line connects the centers of the pair of contact parts provided in the second support part of the accommodating part and to be in contact with the outer peripheral surface of the accommodated consumable product. The second virtual line connects the centers of the pair of connecting parts not to be in contact with the outer peripheral surface of the consumable product. Thus, according to the sixteenth embodiment, in the first support part, the following situations are suppressed: the first protrusions further press portions of the consumable product that overlap with the contact parts in the peripheral direction of the accommodating part; and the first protrusions block the airflow paths formed between the consumable product and the connecting parts.

**[0038]** A seventeenth embodiment of the present disclosure is the flavour inhaler according to the above-described third to sixteenth embodiments in which the chamber includes a heat source configured to supply heat to the heating region. The heat source is disposed such that the heat source and the second support part overlap with each other in the longitudinal direction of the accommodating part.

**[0039]** According to the above-described seventeenth embodiment, in the longitudinal direction of the accommodating part, the heat source configured to supply heat to the heating region of the chamber to heat the consumable product is disposed such that the heat source and the second support part overlap with each other. The second support part has the pair of contact parts in contact with the outer peripheral surface of the accommodated consumable product. Thus, according to the seventeenth embodiment, the consumable product can be heated with the heat source positioned near the contact parts to be in contact with the outer peripheral surface of the consumable product.

**[0040]** An eighteenth embodiment of the present disclosure is the flavour inhaler according to the above-described seventeenth embodiment in which the heat source is a film heater. The film heater is wound around an outer periphery of the chamber.

**[0041]** According to the above-described eighteenth embodiment, the heat source configured to supply heat to the heating region of the chamber to heat the consumable product is the film heater wound around the outer periphery of the chamber. Thus, according to the eighteenth embodiment, the consumable product can be heated with a simple configuration.

**[0042]** A nineteenth embodiment of the present disclosure is the flavour inhaler according to the above-described second to eighteenth embodiments in which an expression 1 below is satisfied:

$$L2 \geq L1/2 \quad (1)$$

where L1 is a length of the guide part in the longitudinal direction of the accommodating part, and L2 is a length of the first space formation part in the longitudinal direction.

**[0043]** According to the above-described nineteenth embodiment, in the guide part in which the first space formation part connected to the opening and the first support part supporting the consumable product are provided, the first space formation part has the length equal to or greater than 1/2 of the entire length of the guide part in the longitudinal direction. Thus, according to the nineteenth embodiment, since the first space formation part having a sufficient length is formed at a position connected to the opening of the accommodating part, the consumable product can be smoothly inserted.

**[0044]** A twentieth embodiment of the present disclosure is a smoking system that includes the flavour inhaler according to the above-described first to nineteenth embodiments and the consumable product.

**[0045]** According to the twentieth embodiment of the present disclosure, the smoking system that facilitates insertion of the consumable product into the accommodating part of the flavour inhaler and that can appropriately hold the consumable product in the accommodating part can be provided.

## BRIEF DESCRIPTION OF DRAWINGS

### [0046]

[Fig. 1A] Fig. 1A is a schematic front view of a flavour inhaler according to a first embodiment of the present disclosure.

[Fig. 1B] Fig. 1B is a schematic top view of the flavour inhaler.

[Fig. 1C] Fig. 1C is a schematic bottom view of the flavour inhaler.

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

[Fig. 3] Fig. 3 is a sectional view of the flavour inhaler seen in an arrow 3-3 direction illustrated in Fig. 1B.

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

[Fig. 4B] Fig. 4B is a sectional view of the chamber seen in an arrow 4B-4B direction illustrated in Fig. 4A.

[Fig. 5A] Fig. 5A is a sectional view of the chamber seen in an arrow 5A-5A direction illustrated in Fig. 4B.

[Fig. 5B] Fig. 5B is a sectional view of the chamber seen in an arrow 5B-5B direction illustrated in Fig. 4B.

[Fig. 6] Fig. 6 is a perspective view illustrating the chamber and a heating part.

[Fig. 7] Fig. 7 is a sectional view illustrated in Fig. 5B

when a consumable product is disposed at a desired position in the chamber.

[Fig. 8] Fig. 8 is an exploded perspective view illustrating an internal structure of an accommodating part including an insertion guide member and the chamber.

[Fig. 9] Fig. 9 is a sectional view of the insertion guide member taken along a section perpendicular to the axial direction of the chamber illustrating arrangement of a pair of first protrusions in a peripheral direction.

[Fig. 10] Fig. 10 is a sectional view of the insertion guide member taken along the axial direction illustrating arrangement of the pair of first protrusions in the longitudinal direction.

[Fig. 11A] Fig. 11A is a sectional view taken along an axial direction illustrating main portions the insertion guide member and the chamber in which the consumable product is accommodated.

[Fig. 11B] Fig. 11B illustrates mutual arrangement of a first protrusions and the chamber according to a modification of the first embodiment.

[Fig. 12] Fig. 12 is an exploded perspective view illustrating an internal structure of the accommodating part according to a second embodiment.

[Fig. 13] Fig. 13 is a sectional view of an insertion guide taken along a section perpendicular to the axial direction illustrating arrangement of the first protrusions and second protrusions in the peripheral direction.

[Fig. 14] Fig. 14 is a sectional view of the insertion guide member taken along the axial direction illustrating arrangement of the first protrusions and the second protrusions in the longitudinal direction.

[Fig. 15] Fig. 15 is a sectional view of an insertion guide member taken along a section perpendicular to the axial direction illustrating arrangement of first protrusions and second protrusions in the peripheral direction according to a third embodiment.

[Fig. 16] Fig. 16 is a sectional view of the insertion guide member taken along the axial direction illustrating arrangement of the first protrusions and the second protrusions in the longitudinal direction.

[Fig. 17] Fig. 17 is a sectional view of the insertion guide member taken along a section perpendicular to the axial direction illustrating arrangement of the first protrusions in the peripheral direction according to a modification of the third embodiment.

[Fig. 18] Fig. 18 is a sectional view of the insertion guide member taken along the axial direction illustrating arrangement of the first protrusions in the longitudinal direction.

[Fig. 19] Fig. 19 is an exploded perspective view illustrating an internal structure of the accommodating part according to a fourth embodiment.

[Fig. 20] Fig. 20 is a sectional view of an insertion guide member taken along a section perpendicular to the axial direction illustrating arrangement of first

protrusions and the second protrusions in the peripheral direction.

[Fig. 21] Fig. 21 is a sectional view of the insertion guide member taken along the axial direction illustrating arrangement of the first protrusions and the second protrusions in the longitudinal direction.

[Fig. 22] Fig. 22 is a diagram in which, in the sectional view illustrated in Fig. 20, only the first protrusions are displaced to a top view

[Fig. 23] Fig. 23 is an enlarged perspective view of the first protrusion.

[Fig. 24] Fig. 24 is an enlarged top view of the first protrusions illustrating an inclination direction of ridges of the first protrusions.

[Fig. 25] Fig. 25 is an exploded perspective view illustrating an internal structure of the accommodating part according to a fifth embodiment.

[Fig. 26] Fig. 26 is a sectional view of an insertion guide taken along a section perpendicular to the axial direction illustrating arrangement of the first protrusions and second protrusions in the peripheral direction.

[Fig. 27] Fig. 27 is a sectional view of the insertion guide member taken along the axial direction illustrating arrangement of the first protrusions and the second protrusions in the longitudinal direction.

[Fig. 28] Fig. 28 is a sectional view seen in an arrow 28-28 direction illustrated in Fig. 27.

[Fig. 29] Fig. 29 is an exploded perspective view illustrating an internal structure of the accommodating part according to a sixth embodiment.

[Fig. 30] Fig. 30 is a sectional view of an insertion guide member taken along a section perpendicular to the axial direction illustrating arrangement of first protrusions in the peripheral direction.

[Fig. 31] Fig. 31 is a sectional view of the insertion guide member taken along the axial direction illustrating arrangement of the first protrusions in the axial direction.

## DESCRIPTION OF EMBODIMENTS

[First Embodiment]

**[0047]** Hereinafter, a first embodiment of the present disclosure will be described with reference to Figs. 1 to 11. In the drawings described below, the same or equivalent elements are denoted by the same reference numerals, and thereby duplicate description thereof is omitted.

**[0048]** Fig. 1A is a schematic front view of a flavour inhaler 100 according to the first embodiment of the present disclosure. Fig. 1B is a schematic top view of the flavour inhaler 100. Fig. 1C is a schematic bottom view of the flavour inhaler 100. In the drawings described herein, the X-Y-Z orthogonal coordinate system may be indicated for convenience of description. In this coordinate system, the Z axis is directed upward in the vertical direction, the X-Y plane is placed so as to cut the flavour

inhaler 100 in the horizontal direction, and the Y axis is placed so as to extend from a front surface to a rear surface of the flavour inhaler 100. The Z axis can be referred to as an insertion direction of a consumable product to be accommodated in a chamber 50 of an atomizing part 30, which will be described later, or an axial direction of the chamber 50. The X axis is perpendicular to the Y axis and the Z axis.

**[0049]** The flavour inhaler 100 according to the first embodiment generates an aerosol containing a flavour by, for example, heating a stick-shaped consumable product having a flavour source containing an aerosol source.

**[0050]** As illustrated in Figs. 1A to 1C, the flavour inhaler 100 includes an outer housing 101, a slide cover 102, a switch part 103, and terminals 104. The outer housing 101 serves as an outermost housing of the flavour inhaler 100 and has such a size that the flavour inhaler 100 can be held within the hand of a user. When the user uses the flavour inhaler 100, the user can hold the flavour inhaler 100 with the hand and inhale the aerosol. The outer housing 101 may be formed by assembling a plurality of members. The outer housing 101 may be formed of, for example, metal such as aluminum. The material of the outer housing 101 may include a member formed of resin, for example, polycarbonate (PC), acrylonitrile-butadiene-styrene (ABS) resin, polyetherether ketone (PEEK), a polymer alloy containing a plurality of types of polymers, or the like.

**[0051]** The outer housing 101 has an opening 101a for receiving the consumable product, and the slide cover 102 is slidably attached to the outer housing 101 so as to close the opening 101a. Specifically, the slide cover 102 is movable along an outer front surface of the outer housing 101 between a closing position (the position indicated in Figs. 1A and 1B) where the opening 101a of the outer housing 101 is closed by the slide cover 102 and an open position where the opening 101a is open. For example, when the slide cover 102 is manually operated by the user, the user can move the slide cover 102 to the closed position or the open position. Thus, access by the consumable product to inside the slide cover 102 or flavour inhaler 100 can be permitted or restricted. The opening 101a of the outer housing 101 is open outward corresponding to a first opening 70a of an insertion guide member 70 and a second opening 52 of the chamber 50.

**[0052]** The switch part 103 is used to switch on or off operation of the flavour inhaler 100. For example, when the switch part 103 is operated by the user while the consumable product is inserted in the flavour inhaler 100, electric power is supplied from a power supply 21 to a heating part 40, which will be described later, to heat the consumable product without burning the consumable product. The switch part 103 may be a switch provided outside the outer housing 101 or a switch positioned inside the outer housing 101. When the switch is positioned inside the outer housing 101, the switch is indir-

ectly pressed down when the switch part 103 in a front surface of the outer housing 101 is pressed down. In the first embodiment, an example in which the switch of the switch part 103 is positioned inside the outer housing 101 is described.

**[0053]** The terminals 104 are an interface such as a universal serial bus (USB) to connect the flavour inhaler 100 to, for example, an external power supply. In the case where the power supply included in the flavour inhaler 100 is a rechargeable battery, when the external power supply is connected to the terminals 104, the external power supply causes an electric current to flow to the power supply to allow recharging of the power supply. Furthermore, the flavour inhaler 100 can be configured so that the flavour inhaler 100 can transmit data related to the operation of the flavour inhaler 100 to an external device when a data transmission cable is connected to the terminals 104.

**[0054]** Next, the consumable product used in the flavour inhaler 100 according to the first embodiment is described. Fig. 2 is a schematic side sectional view of a consumable product 110. According to the first embodiment, a smoking system can be configured with the flavour inhaler 100 and the consumable product 110. In an example illustrated in Fig. 2, the consumable product 110 includes a smokable product 111, a tubular member 114, a hollow filter part 116, and a filter part 115.

**[0055]** The smokable product 111 is wrapped with first wrapping paper 112. The tubular member 114, the hollow filter part 116, and the filter part 115 are wrapped with second wrapping paper 113 different from the first wrapping paper 112. The second wrapping paper 113 is also wrapped around part of the first wrapping paper 112 wrapped around the smokable product 111. Thus, the tubular member 114, the hollow filter part 116, the filter part 115 are connected to the smokable product 111. However, the second wrapping paper 113 may be omitted. In this case, the tubular member 114, the hollow filter part 116, and the filter part 115 are connected to the smokable product 111 by using the first wrapping paper 112. To an outer surface of the second wrapping paper 113, a lip release agent 117 for facilitating release of the lip of the user from the second wrapping paper 113 is applied near an end part on the filter part 115 side. The part of the consumable product 110 to which the lip release agent 117 is applied functions as an inhalation port of the consumable product 110. A perforation may be provided in the hollow filter part 116 so as to be concentric with a peripheral direction of the hollow filter part 116. The perforation facilitates flowing of the air from the outside due to inhalation by the user, and the air flowing through the perforation can reduce the temperature of a component and the air flowing from the consumable product 110.

**[0056]** The smokable product 111 can include, for example, a flavour source such as tobacco and an aerosol source. Furthermore, the first wrapping paper 112 wrapped around the smokable product 111 can be a

sheet member having a permeability. The tubular member 114 can be a paper tube or a hollow filter. Although the consumable product 110 includes the smokable product 111, the tubular member 114, the hollow filter part 116, and the filter part 115 in the example illustrated in Fig. 2, the configuration of the consumable product 110 is not limited to this. For example, the hollow filter part 116 may be omitted to allow the tubular member 114 and the filter part 115 to be arranged adjacent to each other.

**[0057]** Next, internal structure of the flavour inhaler 100 is described. Fig. 3 is a sectional view of the flavour inhaler 100 seen in an arrow 3-3 direction illustrated in Fig. 1B. As illustrated in Fig. 3, a placement part 10 is provided inside the outer housing 101 of the flavour inhaler 100. In the placement part 10, accommodated items such as the atomizing part 30 and a power supply part 20, which will be described later, are placed. The placement part 10 can be formed of, for example, resin, in particular, formed of PC, ABS resin, PEEK, a polymer alloy containing a plurality of types of polymers, or the like. The placement part 10 may include a part formed of metal such as, for example, aluminum. Herein, from the viewpoints of thermal resistance, the workability, and the strength, the placement part 10 is preferably formed of PC. The power supply part 20 and the atomizing part 30 are provided in the internal space of the placement part 10. The power supply part 20 or the atomizing part 30 is not replaceable after the flavour inhaler 100 has been assembled. The outer housing 101 and the placement part 10 may be collectively referred to as a housing.

**[0058]** The power supply part 20 includes the power supply 21. The power supply 21 can be, for example, a rechargeable battery or a non-rechargeable battery. The power supply 21 is electrically connected to the atomizing part 30. Thus, the power supply 21 can supply electric power to the atomizing part 30 so as to appropriately heat the consumable product 110.

**[0059]** As illustrated in Fig. 3, the atomizing part 30 includes the chamber 50 extending in the insertion direction of the consumable product 110 (Z axis direction), the heating part 40 covering part of the chamber 50, a thermal insulation part 32, and the insertion guide member 70 having a substantially tubular shape. The chamber 50 accommodates the consumable product 110. The heating part 40 is in contact with an outer peripheral surface of the chamber 50 and heats the consumable product 110 accommodated in the chamber 50. As illustrated in Fig. 3, a bottom member 36 may be provided at a bottom part of the chamber 50. The bottom member 36 can function as a stopper with which the consumable product 110 inserted into the chamber 50 is positioned. The bottom member 36 has projections and depressions in a surface to be in contact with the consumable product 110, and a space through which air can be supplied to the surface to be in contact with the consumable product 110 can be defined. The bottom member 36 can be formed of, for example, resin, in particular, formed of PC, ABS resin, PEEK, a polymer alloy containing a plurality of types of polymers,

or the like, or formed of metal such as aluminum. In order to suppress transfer of heat to the thermal insulation part 32 or the like, the bottom member 36 is preferably formed of a raw material having a low thermal conductivity. A combination of the insertion guide member 70 and the chamber 50 is an example of an accommodating part of the present disclosure. The insertion guide member 70 is an example of a guide part of the present disclosure. The heating part 40 is an example of a heat source of the present disclosure.

**[0060]** The thermal insulation part 32 generally has a substantially tubular shape and is disposed so as to cover the chamber 50. The thermal insulation part 32 can include, for example, an aerogel sheet. The insertion guide member 70 is provided between the outer housing 101 and the chamber 50. When the insertion guide member 70 is inserted into the housing from the opening 101a of the outer housing 101, a nail is brought into engagement with the housing, and the insertion guide member 70 is unable to be moved to the outside of the housing. The insertion guide member 70 can be formed of, for example, resin, in particular, formed of PC, ABS resin, PEEK, polyetherimide (PEI) a polymer alloy containing a plurality of types of polymers, or the like. Alternatively, the insertion guide member 70 may be formed of metal, glass, ceramic, or the like. From the viewpoint of thermal resistance, the insertion guide member 70 is preferably formed of PEEK. When the slide cover 102 exists at the open position, the insertion guide member 70 communicates with the outside of the flavour inhaler 100. When the consumable product 110 is inserted into the first opening 70a of the insertion guide member 70, the insertion guide member 70 guides insertion of the consumable product 110 into the chamber 50. When the slide cover 102 exists at the open position, the slide cover 102 allows the first opening 70a of the insertion guide member 70 to be exposed to the outside and covers at least part of the insertion guide member 70 in the axial direction of the chamber 50. The first opening 70a is provided so as to correspond to the second opening 52 of the chamber 50, which will be described later. Referring to Fig. 3, a two-dot chain line indicates a state of the slide cover 102 that is closed so as to cover the entirety of the first opening 70a of the insertion guide member 70. The first opening 70a is an example of an opening of the accommodating part of the present disclosure.

**[0061]** The flavour inhaler 100 further includes a first holding part 37 and a second holding part 38 that support both ends of the chamber 50 and both ends of the thermal insulation part 32. The first holding part 37 is disposed so as to hold an end part of the chamber 50 and an end part of the thermal insulation part 32 on the negative side in the Z axis direction. The second holding part 38 is disposed so as to hold an end part of the chamber 50 and an end part of the thermal insulation part 32 on the slide cover 102 side (the positive side in the Z axis direction).

**[0062]** Next, the details of the chamber 50 and the heating part 40 are described. Fig. 4A is a perspective

view of the chamber 50. Fig. 4B is a sectional view of the chamber 50 seen in an arrow 4B-4B direction illustrated in Fig. 4A. Fig. 5A is a sectional view of the chamber 50 seen in an arrow 5A-5A direction illustrated in Fig. 4B. Fig. 5B is a sectional view of the chamber 50 seen in an arrow 5B-5B direction illustrated in Fig. 4B. Fig. 6 is a perspective view illustrating the chamber 50 and the heating part 40.

**[0063]** As illustrated in Figs. 4A and 4B, the chamber 50 can have a tubular shape including the second opening 52 into which the consumable product 110 is to be inserted and a tubular side wall part 60 that is to accommodate the consumable product 110. A flange part 52A is formed at the end part of the chamber 50 that defines the second opening 52. As illustrated in Fig. 3, the flange part 52A of the chamber 50 is connected to an end part of the insertion guide member 70 on the negative side in the Z axis direction. The chamber 50 is preferably formed of a material having thermal resistance and a small thermal expansion coefficient. For example, the chamber 50 can be formed of stainless steel or the like. Other than metal, the chamber 50 may be formed of resin such as PEEK, glass, ceramic, or the like. This allows effective heating of the consumable product 110 from the chamber 50. The shape of the chamber 50 is not limited to the tubular shape, and the chamber 50 may have a cup shape. The side wall part 60 is an example of a second support part of the present disclosure.

**[0064]** As illustrated in Figs. 4B and 5B, the side wall part 60 includes contact parts 62 and separated parts 66. When the consumable product 110 is disposed at a desired position in the chamber 50, the contact parts 62 are in contact with or press parts of the consumable product 110 in the axial direction of the chamber 50, and the separated parts 66 are kept separated from the consumable product 110. That is, the chamber 50 compresses the inserted consumable product 110 to hold the consumable product 110. Herein, the "desired position in the chamber 50" refers to a position where the consumable product 110 is appropriately heated or a position of the consumable product 110 to be smoked by the user. The contact parts 62 have respective inner surfaces 62a and respective outer surfaces 62b. The separated parts 66 have respective inner surfaces 66a and respective outer surfaces 66b. As illustrated in Fig. 6, the heating part 40 is disposed on the outer surfaces 62b of the contact parts 62. The heating part 40 is preferably disposed on the outer surfaces 62b of the contact parts 62 without a gap between the heating part 40 and the outer surfaces 62b. The heating part 40 may include an adhesive layer. In this case, the heating part 40 including the adhesive layer is preferably disposed on the outer surfaces 62b of the contact parts 62 without a gap between the heating part 40 and the outer surfaces 62b. The contact parts 62 are an example of a set of contact parts of the present disclosure. The separated parts 66 are an example of a set of connecting parts of the present disclosure. The shape of the side wall part 60 of the

chamber 50 is not limited to the shape including a pair of contact parts 62 and a pair of separated parts 66. An appropriate number of contact parts can be provided as long as the contact parts are disposed so as to be substantially equally spaced apart from each other in the peripheral direction of the chamber 50. Separated parts can be provided so as to connect these contact parts to each other.

**[0065]** As illustrated in Figs. 4A and 5B, the outer surfaces 62b of the contact parts 62 are flat surfaces. When the outer surfaces 62b of the contact parts 62 are flat surfaces, in the case where a strip-shaped electrode 48 is connected to the heating part 40 disposed on the outer surfaces 62b of the contact parts 62 as illustrated in Fig. 6, bending of the strip-shaped electrode 48 can be suppressed. As illustrated in Figs. 4B and 5B, the inner surfaces 62a of the contact parts 62 are flat surfaces. Furthermore, as illustrated in Figs. 4B and 5B, the thickness of the contact parts 62 is uniform.

**[0066]** As illustrated in Figs. 4A, 4B, and 5B, the chamber 50 has two contact parts 62 in the peripheral direction of the chamber 50, and two contact parts 62 face each other so as to be parallel to each other. Preferably, the distance between the inner surfaces 62a of two contact parts 62 is at least partially smaller than the width of a portion of the consumable product 110 to be inserted into the chamber 50, the portion being disposed between the contact parts 62.

**[0067]** As illustrated in Fig. 5B, the inner surfaces 66a of the separated parts 66 can have a generally arc-shaped section in a plane perpendicular to the longitudinal direction of the chamber 50 (Z axis direction). Furthermore, the separated parts 66 are disposed so as to be adjacent to the contact parts 62 in the peripheral direction. That is, the contact parts 62 and the separated parts 66 form a noncircular inner peripheral surface in a section perpendicular to the longitudinal direction of the chamber 50 (Z axis direction).

**[0068]** As illustrated in Fig. 4B, the chamber 50 can have a hole 56a in a bottom part 56 of the chamber 50 so that the bottom member 36 illustrated in Fig. 3 extends through the bottom member 36 and is disposed inside the chamber 50. The bottom member 36 can be fixed inside the bottom part 56 of the chamber 50 with an adhesive or the like. The adhesive interposed between the bottom member 36 and the bottom part 56 can include a resin material such as epoxy resin. Alternatively, instead of the above-described adhesive, an inorganic adhesive such as cement or a weld can be used. The bottom member 36 provided in the bottom part 56 can support part of the consumable product 110 inserted into the chamber 50 so that at least part of an end surface of the consumable product 110 is exposed. Furthermore, the bottom part 56 can support part of the consumable product 110 so that the exposed end surface of the consumable product 110 communicates with clearances 67 (see Fig. 7), which will be described later.

**[0069]** As illustrated in Figs. 4A, 4B, and 5A, the cham-

ber 50 preferably has a tubular non-holding part 54 between the second opening 52 and the side wall part 60. When the consumable product 110 is positioned at a desired position in the chamber 50, a gap can be formed between the non-holding part 54 and the consumable product 110. The width of the gap formed between the non-holding part 54 and the consumable product 110 may be substantially uniform throughout a periphery in the peripheral direction of the chamber 50 or varied in the peripheral direction of the chamber 50. For example, when seen in the longitudinal direction, the width of the gap at positions overlapping with the contact parts 62 may be greater than the width of the gap at positions overlapping with the separated parts 66. In contrast, when seen in the longitudinal direction, the width of the gap at the positions overlapping with the contact parts 62 may be smaller than the width of the gap at the positions overlapping with the separated parts 66. Furthermore, as illustrated in Figs. 4A and 4B, the chamber 50 preferably has first guide parts 58 that have tapered surfaces 58a connecting an inner surface of the non-holding part 54 and the inner surfaces 62a of the contact parts 62 to each other. The non-holding part 54 is an example of a second space formation part of the present disclosure.

**[0070]** As illustrated in Fig. 6, the heating part 40 includes a heating element 42. The heating element 42 may be, for example, a heating track or a film heater. Preferably, the heating element 42 is disposed such that the heating element heats the contact parts 62 of the chamber 50 and is not in contact with the separated parts 66 of the chamber 50. In other words, the heating element 42 is preferably disposed only on the outer surfaces of the contact parts 62. Part of the heating element 42 to heat the separated parts 66 of the chamber 50 and part of the heating element 42 to heat the contact parts 62 may have different heating abilities. Specifically, the heating element 42 may heat the contact parts 62 to a higher temperature than the temperature to which the heating element 42 heats the separated parts 66. For example, disposition density of the heating track of the heating element 42 at the contact parts 62 and the separated parts 66 can be adjusted. Alternatively, the heating element 42 with a substantially uniform heating ability throughout the periphery of the chamber 50 may be wound around an outer periphery of the chamber 50. As illustrated in Fig. 6, in addition to the heating element 42, the heating part 40 preferably includes an electrical insulation member 44 that covers at least one of surfaces of the heating element 42. According to the first embodiment, the electrical insulation member 44 is disposed so as to cover both the surfaces of the heating element 42.

**[0071]** Fig. 7 is a sectional view illustrated in Fig. 5B when the consumable product 110 is disposed at the desired position in the chamber 50. As illustrated in Fig. 7, when the consumable product 110 is disposed at the desired position in the chamber 50, the consumable product 110 can be brought into contact with and pressed by the contact parts 62 of the chamber 50. Meanwhile, the

clearances 67 are formed between the consumable product 110 and the separated parts 66. The clearances 67 can communicate with the second opening 52 of the chamber 50 and the end surface of the consumable product 110 positioned in the chamber 50. Thus, air having flowed from the second opening 52 of the chamber 50 can pass through the clearances 67 and flow into the consumable product 110. In other words, airflow paths (clearances 67) are formed between the consumable product 110 and the separated parts 66.

(Details of Accommodating Part according to First Embodiment)

**[0072]** Hereinafter, in view of the relationship between the chamber 50 and the inserted consumable product 110, an internal structure of the insertion guide member 70 is described in detail. Fig. 8 is an exploded perspective view illustrating an internal structure of the accommodating part including the insertion guide member 70 and the chamber 50. Fig. 9 is a sectional view of the insertion guide member 70 taken along a section perpendicular to the axial direction of the chamber 50 illustrating arrangement of a pair of first protrusions 214A in the peripheral direction. The section perpendicular to the axial direction of the chamber 50 is the X-Y plane, and the axial direction of the chamber 50 is the insertion direction of the consumable product 110 and the Z axis direction. Fig. 10 is a sectional view of the insertion guide member 70 taken along the axial direction of the chamber 50 illustrating arrangement of the pair of first protrusions 214A in the longitudinal direction. Fig. 11 is a sectional view taken along the axial direction of the chamber 50 illustrating main portions the insertion guide member 70 and the chamber 50 in which the consumable product 110 is accommodated. The axial direction of the insertion guide member 70 and the axial direction of the chamber 50 are examples of the longitudinal direction of the accommodating part of the present disclosure.

**[0073]** As illustrated in Figs. 8 and 9, the pair of first protrusions 214A are provided on an inner wall surface of the insertion guide member 70. The pair of first protrusions 214A protrude toward the center in a radial direction of the insertion guide member 70 and face each other in a peripheral direction of the insertion guide member 70. As illustrated in Figs. 8 and 10, in the insertion guide member 70, a part in the axial direction of the insertion guide member 70 where the first protrusions 214A are provided is referred to as a non-protruding part 212 and a part in the axial direction of the insertion guide member 70 where the first protrusions 214A are provided is referred to as a protruding part 214. Here, the width of a gap formed between the non-protruding part 212 of the insertion guide member 70 and the consumable product 110 may be substantially uniform throughout the periphery in the peripheral direction of the insertion guide member 70 or varied in the peripheral direction of the insertion guide member 70. For example, when seen in the long-

itudinal direction, the width of the gap at positions overlapping with the contact parts 62 may be greater than the width of the gap at positions overlapping with the separated parts 66. In contrast, when seen in the longitudinal direction, the width of the gap at the positions overlapping with the contact parts 62 may be smaller than the width of the gap at the positions overlapping with the separated parts 66. The non-protruding part 212 of the insertion guide member 70 is an example of a first space formation part of the present disclosure. The protruding part 214 of the insertion guide member 70 is an example of a first support part of the present disclosure. The first protrusions 214A provided on the inner wall surface of the insertion guide member 70 are not limited to two first protrusions 214A facing each other in the peripheral direction of the insertion guide member 70. As long as the first protrusions 214A are disposed so as to be substantially equally spaced apart from each other in the peripheral direction of the insertion guide member 70, the number of the first protrusions 214A can be appropriately changed.

**[0074]** A one-dot chain line illustrated in Fig. 9 is a virtual circle 226 indicating an outer peripheral surface of an undeformed consumable product 110 when the consumable product 110 is inserted into the first opening 70a and accommodated in the accommodating part at an appropriate angle. As illustrated in Fig. 9, the pair of first protrusions 214A protrude to the inside of the virtual circle 226. The shape of the outer peripheral surface of the undeformed consumable product 110 is not limited to the circular shape. There can be various cases in which the undeformed consumable product 110 has a substantially rectangular shape and a substantially triangular shape. The virtual circle 226 is an example of a virtual external shape of the present disclosure.

**[0075]** As described above, the end part of the insertion guide member 70 on the negative side in the Z axis direction is connected to the flange part 52A of the chamber 50. As illustrated in Fig. 8, the non-holding part 54 defined between the flange part 52A of the chamber 50 and the side wall part 60 illustrated in Fig. 4A is connected to the protruding part 214 of the insertion guide member 70 with the flange part 52A interposed therebetween. Furthermore, as described above and illustrated in Figs. 4A and 4B, the non-holding part 54 of the chamber 50 is connected to the side wall part 60 including the contact parts 62 and the separated parts 66. Furthermore, as described above and illustrated in Figs. 5A and 5B, the contact parts 62 are members to be in contact with or press part of the consumable product 110 when the consumable product 110 is disposed at the desired position in the chamber 50, and the separated parts 66 are members separated from the consumable product 110 in this case. Thus, as illustrated in Fig. 8, the accommodating part including the insertion guide member 70 and the chamber 50 includes the non-protruding part 212 of the insertion guide member 70, the protruding part 214 of the insertion guide member 70, the non-

holding part 54 of the chamber 50, and the contact parts 62 of the side wall part 60 of the chamber 50 in this order in a direction separating from the first opening 70a of the insertion guide member 70 in the axial direction of the insertion guide member 70 and the chamber 50 (that is, in the negative Z direction).

**[0076]** Fig. 11 illustrates, together with the inserted consumable product 110, mutual arrangement of the non-protruding part 212 of the insertion guide member 70, the protruding part 214 of the insertion guide member 70, the non-holding part 54 of the chamber 50, and the contact parts 62 of the side wall part 60 of the chamber 50.

**[0077]** As illustrated in Fig. 8, the pair of first protrusions 214A provided on the inner wall surface of the insertion guide member 70 are disposed so as to correspond to the contact parts 62 of the side wall part 60 of the chamber 50 in the peripheral direction. That is, when seen from the first opening 70a of the insertion guide member 70, the first protrusions 214A of the insertion guide member 70 and the contact parts 62 of the chamber 50 are disposed such that the first protrusions 214A of the insertion guide member 70 and the contact parts 62 of the chamber 50 appear to be superposed on each other in the peripheral direction. Additional first protrusions disposed so as to be superposed on the connecting parts 66 may be provided on the inner wall surface of the insertion guide member 70 in addition to the first protrusions 214A illustrated in Fig. 8. In this case, the first protrusions 214A disposed so as to be superposed on the contact parts 62 protrude more toward the center in a radial direction of the chamber 50 than the additional first protrusions 214A disposed so as to be superposed on the connecting parts 66.

**[0078]** Furthermore, as illustrated in Figs. 8 to 10, the pair of first protrusions 214A provided on the inner wall surface of the insertion guide member 70 have shapes congruent with each other, specifically, sagittal shapes or hemispherical shapes. The shape of the first protrusions 214A is not limited to these and may be, for example, a bow shape or a rectangular shape.

**[0079]** Furthermore, as illustrated in Fig. 10, in the axial direction of the insertion guide member 70, a length L2 of the non-protruding part 212 and a length L1 of the entirety of the insertion guide member 70 satisfy an expression 1 below:

$$L2 \geq L1/2 \quad (1).$$

**[0080]** Furthermore, in the axial direction of the insertion guide member 70, the length L2 of the non-protruding part 212 and a length L3 of the protruding part 214 satisfy an expression 2 below:

$$L2 \geq L3 \quad (2).$$

**[0081]** Furthermore, the smoking system can be configured with a combination of the flavour inhaler 100

according to the first embodiment and the consumable product 110.

**[0082]** According to the first embodiment, the protruding part 214 of the insertion guide member 70 has been described as a part having the pair of first protrusions 214A. However, the configuration of the protruding part 214 of the insertion guide member 70 is not limited to this. It is sufficient that the protruding part 214 include a plurality of first protrusions 214A that are spaced apart from each other in the peripheral direction of the insertion guide member 70 and that protrude from the inner wall surface of the protruding part 214 toward the center of the insertion guide member 70 in the radial direction. When the plurality of first protrusions 214A are disposed at positions deviated from each other in the axial direction, a region between an end part on the first opening 70a side included in a first protrusion 214A closest to the first opening 70a, and an end part on the opposite side from the first opening 70a included in a first protrusion 214A farthest from the first opening 70a forms the protruding part 214 of the insertion guide member 70.

**[0083]** Furthermore, when a section perpendicular to the axial direction of the insertion guide member 70 is seen, the plurality of first protrusions 214A may be disposed so as to be point-symmetrically with respect to the central axis of the insertion guide member 70.

(Operation of First Embodiment)

**[0084]** In the accommodating part including the combination of the insertion guide member 70 and the chamber 50 in the flavour inhaler 100 according to the first embodiment of the present disclosure, the non-protruding part 212 connected to the first opening 70a, the protruding part 214 where the first protrusions 214A are provided, the non-holding part 54 of the chamber 50, and the contact parts 62 of the side wall part 60 of the chamber 50 are arranged in this order from the first opening 70a through which the consumable product 110 is inserted. Accordingly, with the accommodating part according to the first embodiment, the consumable product 110 having passed through the first opening 70a is easily inserted due to provision of the non-protruding part 212, and the consumable product 110 can be appropriately supported by the protruding part 214 and the contact parts 62. Furthermore, with the accommodating part according to the first embodiment, the consumable product 110 pressed by the protruding part 214 and the contact parts 62 bulges at a portion corresponding to the non-holding part 54 of the chamber 50 positioned between the protruding part 214 and the contact parts 62 and is engaged with the non-holding part 54. Thus, dropping of the consumable product 110 can be suppressed.

**[0085]** Furthermore, in the accommodating part according to the first embodiment, the non-holding part 54 and the contact parts 62 are provided in the chamber 50 that heats the consumable product 110, and the non-

protruding part 212 and the protruding part 214 are provided in the insertion guide member 70 that guides the consumable product 110 having been inserted from the first opening 70a to the chamber 50. Accordingly, with the accommodating part according to the first embodiment, the consumable product 110 can be appropriately supported on one side and the other side of the flange part 52A and the second opening 52 of the chamber 50 that serve as a border of a heating region by using the protruding part 214 disposed in a non-heating region and the contact parts 62 disposed in the heating region.

**[0086]** Furthermore, in the accommodating part according to the first embodiment, the contact parts 62 to be in contact with the outer peripheral surface of the accommodated consumable product 110 and the separated parts 66 not to be in contact with the outer peripheral surface of the consumable product 110 are provided in the side wall part 60 of the chamber 50. Accordingly, with the accommodating part according to the first embodiment, the clearances 67 are formed between the consumable product 110 and the separated parts 66, and the air having flowed from the first opening 70a passes through the clearances 67 and flows into the flavour inhaler. Thus, the airflow paths appropriate for smoking can be formed.

**[0087]** Furthermore, in the accommodating part according to the first embodiment, when seen in the axial direction of the chamber 50, the first protrusions 214A protrude from the protruding part 214 at the positions that overlap with the contact parts 62 to be in contact with the outer peripheral surface of the consumable product 110. Accordingly, with the accommodating part according to the first embodiment, the consumable product can be supported at two portions in the axial direction of the chamber 50 at the same positions in the peripheral direction of the chamber 50. Furthermore, the consumable product 110 deformed by the first protrusions 214A is retained in the chamber 50. Thus, dropping of the consumable product 110 is suppressed.

**[0088]** Furthermore, in the accommodating part according to the first embodiment, when the consumable product 110 is inserted into the first opening 70a and accommodated in the accommodating part at an appropriate angle, the pair of first protrusions 214A each protrude to the inside of the virtual circle 226 indicating the outer peripheral surface of the undeformed consumable product 110. Accordingly, with the accommodating part according to the first embodiment, when the consumable product 110 is appropriately accommodated, the consumable product 110 can be grasped by the pair of first protrusions 214A.

**[0089]** Furthermore, in the flavour inhaler 100 according to the first embodiment, in the axial direction of the chamber 50, the heating part 40 that supplies heat to the heating region of the chamber 50 to heat the consumable product 110 is disposed such that the heating part 40 and the side wall part 60 of the chamber 50 overlap with each other. The side wall part 60 has the pair of contact parts 62

in contact with the outer peripheral surface of the accommodated consumable product 110. Accordingly, with the accommodating part according to the first embodiment, the consumable product 110 can be heated with the heating part 40 positioned near the contact parts 62 to be in contact with the outer peripheral surface of the consumable product 110.

**[0090]** Furthermore, in the flavour inhaler 100 according to the first embodiment, the heating part 40 may include the heating element 42 as the film heater wound around the outer periphery of the chamber 50. Accordingly, with the accommodating part according to the first embodiment, the consumable product 110 can be heated with a simple configuration.

**[0091]** Furthermore, in the accommodating part according to the first embodiment, in the insertion guide member 70 in which the non-protruding part 212 connected to the first opening 70a and the protruding part 214 supporting the consumable product 110 are provided, the non-protruding part 212 has the length equal to or greater than 1/2 of the entire length of the insertion guide member 70 in the longitudinal direction. Accordingly, with the accommodating part according to the first embodiment, since the non-protruding part 212 having a sufficient length is formed at a position connected to the first opening 70a, the consumable product 110 can be smoothly inserted.

**[0092]** Furthermore, in the accommodating part according to the first embodiment, in the insertion guide member 70, the non-protruding part 212 has a greater length than the length of the protruding part 214 in the longitudinal direction. Accordingly, with the accommodating part according to the first embodiment, since a space longer than the protruding part 214 that supports the consumable product 110 is formed with the consumable product 110, the consumable product 110 can be smoothly inserted.

**[0093]** With the smoking system obtained by combining the flavour inhaler 100 according to the first embodiment and the consumable product 110 with each other, the smoking system can be provided with which the consumable product 110 is easily inserted into the accommodating part of the flavour inhaler 100 and the consumable product 110 can be appropriately held in the accommodating part.

#### [Modification of First Embodiment]

**[0094]** As described above, the configuration of the side wall part 60 of the chamber 50 is not limited to that illustrated in Figs. 4A to 7. As described above, the first protrusions provided in the insertion guide member 70 are not limited to the pair of first protrusions 214A facing each other in the peripheral direction of the insertion guide member 70. As an example of the first protrusions, a modification of the first embodiment is illustrated in Fig. 11B. Fig. 11B corresponds to Fig. 9 according to the first embodiment and illustrates the first protrusions super-

posed on the external shape of the chamber 50 positioned at the lower side in the axial direction (the negative side in the Z axis direction).

**[0095]** In the modification of the first embodiment, the shape of the chamber 50 is changed so as to have a substantially triangular section when seen in the axial direction, and three 214A corresponding to the shape of the chamber 50 are provided in the protruding part 214 of the insertion guide member 70.

**[0096]** As illustrated in Fig. 11B, the side wall part 60 of the chamber 50 according to the modification of the first embodiment includes contact parts 62A at three sides and three separated parts 66A positioned near the vertices of the triangular shape. When the consumable product 110 is disposed at the desired position in the chamber 50, the contact parts 62A are in contact with or press part of the consumable product 110 in the axial direction of the chamber, and the separated parts 66A are separated from the consumable product 110.

**[0097]** As illustrated in Fig. 11B, the pair of first protrusions 214A provided on the inner wall surface of the insertion guide member 70 according to the modification of the first embodiment are disposed so as to correspond to the contact parts 62A of the side wall part 60 of the chamber 50 in the peripheral direction. That is, when seen from the first opening 70a of the insertion guide member 70, the first protrusions 214A of the insertion guide member 70 and the contact parts 62A of the chamber 50 are disposed such that the first protrusions 214A of the insertion guide member 70 and the contact parts 62A of the chamber 50 appear to be superposed on each other in the peripheral direction.

#### [Second Embodiment]

**[0098]** Hereinafter, a second embodiment according to the present disclosure will be described with reference to Figs. 12 to 14. Fig. 12 is an exploded perspective view illustrating an internal structure of a combination of an insertion guide member 270 and the chamber 50 according to the second embodiment. Fig. 13 is a sectional view of the insertion guide member 270 taken along a section perpendicular to the axial direction illustrating arrangement of the pair of first protrusions 214A and a pair of second protrusions 224B in the peripheral direction. Fig. 14 is a sectional view of the insertion guide member 270 taken along the axial direction illustrating arrangement of the first protrusions 214A and the second protrusions 224B in the longitudinal direction. Elements that are the same as or equivalent to the elements of the first embodiment are denoted by the same reference numerals, and thereby duplicate description thereof is omitted.

**[0099]** In a flavour inhaler according to the second embodiment, the configuration of the insertion guide member 270 is different compared to that of the flavour inhaler 100 according to the first embodiment. That is, as illustrated in Figs. 12 to 14, in the insertion guide member 270 according to the second embodiment, the pair of

second protrusions 224B are provided in addition to the pair of first protrusions 214A in the protruding part 214.

**[0100]** As illustrated in Fig. 12, the pair of second protrusions 224B provided on the inner wall surface of the insertion guide member 270 are disposed so as to correspond to the separated parts 66 of the side wall part 60 of the chamber 50 in the peripheral direction. That is, when seen from the first opening 70a of the insertion guide member 270, the second protrusions 224B of the insertion guide member 270 and the separated parts 66 of the chamber 50 are disposed such that the second protrusions 224B of the insertion guide member 270 and the separated parts 66 of the chamber 50 appear to be superposed on each other in the peripheral direction.

**[0101]** As illustrated in Fig. 13, the pair of first protrusions 214A are disposed so as to face each other in the peripheral direction of the insertion guide member 270. Likewise, the pair of second protrusions 224B are disposed so as to face each other in the peripheral direction of the insertion guide member 270.

**[0102]** As illustrated in Fig. 13, the first protrusions 214A according to the second embodiment protrude to the inside of the virtual circle 226 similarly to the first embodiment. In contrast, as illustrated in Fig. 13, the pair of second protrusions 224B are positioned outside the virtual circle 226.

**[0103]** The second protrusions 224B provided on the inner wall surface of the insertion guide member 270 are not limited to two second protrusions 224B facing each other in the peripheral direction of the insertion guide member 270. As long as the second protrusions 224B are disposed so as to be substantially equally spaced apart from each other in the peripheral direction of the insertion guide member 270, the number of the second protrusions 224B can be appropriately changed.

**[0104]** Furthermore, as illustrated in Figs. 12 to 14, the pair of second protrusions 224B provided on the inner wall surface of the insertion guide member 270 have shapes congruent with each other, specifically, sagittal shapes or hemispherical shapes.

**[0105]** Furthermore, as illustrated in Figs. 12 to 14, the pair of first protrusions 214A and the pair of second protrusions 224B are disposed on the inner wall surface of the protruding part 214 of the insertion guide member 270 such that the pair of first protrusions 214A and the pair of second protrusions 224B overlap at least partially with each other in the longitudinal direction of the accommodating part.

(Operation of Second Embodiment)

**[0106]** In the accommodating part including a combination of the insertion guide member 270 and the chamber 50 according to the second embodiment, in the protruding part 214 that supports the consumable product 110, the pair of second protrusions 224B are provided in addition to the first protrusions 214A at positions where the second protrusions 224B and the separated

parts 66, which are not in contact with the consumable product 110, of the side wall part 60 of the chamber 50 overlap with each other when seen in the longitudinal direction of the accommodating part. Accordingly, with the accommodating part according to the second embodiment, the consumable product 110 can be reliably supported at the contact parts 62 and the protruding part 214. Specifically, the consumable product 110 pressed by the contact parts 62 at the side wall part 60 of the chamber 50 bulges toward the separated parts 66, and the bulged parts are retained at the second protrusions 224B. Thus, dropping of the consumable product 110 can be suppressed. Furthermore, in the insertion guide member 270, the consumable product 110 pressed by the first protrusions 214A and deformed is retained at the second protrusions 224B. Thus, dropping of the consumable product 110 can be suppressed.

**[0107]** Furthermore, in the accommodating part according to the second embodiment, when the consumable product 110 is inserted into the first opening 70a and accommodated in the accommodating part at an appropriate angle, the first protrusions 214A protrude to the inside of the virtual circle 226 indicating the outer peripheral surface of the undeformed consumable product 110 while the pair of second protrusions 224B are positioned outside the virtual circle 226. Accordingly, with the accommodating part according to the second embodiment, when the consumable product 110 is appropriately accommodated, the consumable product 110 is grasped by the first protrusions 214A while the consumable product 110 is not firmly grasped by the second protrusions 224B. However, when the consumable product 110 wobbles, the second protrusions 224B can support the consumable product 110.

**[0108]** Furthermore, in the accommodating part according to the second embodiment, the pair of second protrusions 224B that face each other and are provided in the protruding part 214 supporting the consumable product 110 have shapes congruent with each other. Accordingly, with the accommodating part according to the second embodiment, by using symmetrical positions and forms in the peripheral direction of the accommodating part, the consumable product 110 can be supported when the consumable product 110 wobbles.

**[0109]** Furthermore, in the accommodating part according to the second embodiment, the first protrusions 214A and the second protrusions 224B provided in the protruding part 214 are disposed so as to overlap with each other in the longitudinal direction of the accommodating part. Accordingly, with the accommodating part according to the second embodiment, the length of the protruding part 214 in the longitudinal direction can be reduced. This can contribute to size reduction of the accommodating part of the flavour inhaler.

[Third Embodiment]

**[0110]** Hereinafter, a third embodiment of the present

disclosure will be described with reference to Figs. 15 and 16. Fig. 15 is a sectional view of an insertion guide member 370 taken along a section perpendicular to the axial direction illustrating arrangement of a pair of first protrusions 234A and a pair of second protrusions 234B in the peripheral direction. Fig. 16 is a sectional view of the insertion guide member 370 taken along the axial direction illustrating arrangement of the first protrusions 234A and the second protrusions 234B in the longitudinal direction. Elements that are the same as or equivalent to the elements of the first embodiment or the second embodiment are denoted by the same reference numerals, and thereby duplicate description thereof is omitted.

**[0111]** In a flavour inhaler according to the third embodiment, the configuration of the insertion guide member 370 is different compared to that of the flavour inhaler 100 according to the first embodiment and that of the flavour inhaler according to the second embodiment. That is, as illustrated in Figs. 15 to 16, in the insertion guide member 370 according to the third embodiment, the first protrusions 234A and the second protrusions 234B provided in a protruding part 234 have different shapes. The insertion guide member 370 according to the third embodiment includes a non-protruding part 232 and the protruding part 234 in the axial direction.

**[0112]** Specifically, as illustrated in Fig. 16, the pair of first protrusions 234A extend in the axial direction of the insertion guide member 370 and have respective inclined parts 236. When a section in the axial direction of the insertion guide member 370 is seen, the distance between the inclined parts 236 and the center in the radial direction of the insertion guide member 370 reduces as the distance between the inclined parts 236 and the first opening 70a increases.

**[0113]** The inclination angle of the inclined parts 236 is preferably from 0.5 to 30°. Alternatively, the inclined parts may have an arc shape instead of a substantially linear shape. In this case, the radius of curvature of the arc shape is preferably R0.5 to R10.

**[0114]** Furthermore, as illustrated in Fig. 15, the pair of second protrusions 234B have curved parts 238 curved along the virtual circle 226 indicating the outer peripheral surface of the undeformed consumable product 110.

**[0115]** Furthermore, as illustrated in Fig. 16, third end parts 240 of the second protrusions 234B positioned at the opposite side from the first opening 70a in the axial direction of the insertion guide member 370 are connected to the non-holding part 54 of the chamber 50.

**[0116]** Furthermore, as illustrated in Figs. 15 to 16, the shape of the first protrusions 234A and the shape of the second protrusions 234B are different from each other.

(Operation of Third Embodiment)

**[0117]** In the accommodating part according to the third embodiment, the first protrusions 234A of the protruding part 214 that support the consumable product 110

inserted through the first opening 70a first have the inclined parts 236. When a section in the longitudinal direction of the accommodating part is seen, the distance between the inclined parts 236 and the center in the radial direction of the accommodating part reduces as the distance between the inclined parts 236 and the first opening 70a increases. Accordingly, with the accommodating part according to the third embodiment, resistance generated when the consumable product 110 is inserted into the flavour inhaler is low. This can suppress generation of uncomfortable feeling experienced by the user during the insertion.

**[0118]** Furthermore, in the accommodating part according to the third embodiment, the second protrusions 234B provided in the protruding part 234 have the curved parts 238 curved along the virtual circle 226 indicating the outer peripheral surface of the undeformed consumable product 110. Accordingly, with the accommodating part according to the third embodiment, by using the curved parts 238 curved along the external shape of the consumable product 110, the consumable product 110 can be appropriately supported when the consumable product 110 wobbles.

**[0119]** Furthermore, in the accommodating part according to the third embodiment, the third end parts 240 of the second protrusions 234B positioned at the opposite side from the first opening 70a are positioned at a border between the protruding part 234 and the non-holding part 54 of the chamber 50. Accordingly, with the accommodating part according to the third embodiment, the consumable product 110 bulged in the non-holding part 54 of the chamber 50 is retained at the second protrusions 234B having the third end parts 240 facing the non-holding part 54. Thus, dropping of the consumable product 110 can be further suppressed.

**[0120]** Furthermore, in the accommodating part according to the third embodiment, the shape of the first protrusions 234A and the shape of the second protrusions 234B provided in the protruding part 234 are different from each other. Accordingly, with the accommodating part according to the third embodiment, the first protrusions 234A and the second protrusions 234B having different functions can have different shapes appropriate for the different functions.

[Modification of Third Embodiment]

**[0121]** As will be described at the last part of the present description, regarding the embodiments of the present disclosure, the elements can be appropriately deformed or combined with each other as long as there is no interference with each other. As an example, a modification of the third embodiment is illustrated in Figs. 17 and 18. Figs. 17 and 18 respectively correspond to Figs. 15 and 16 according to the third embodiment. According to the modification of the third embodiment, the insertion guide member according to the third embodiment is changed such that the pair of second protrusions 234B

are removed from the insertion guide member.

[Fourth Embodiment]

**[0122]** Hereinafter, a fourth embodiment of the present disclosure will be described with reference to Figs. 19 to 24. Fig. 19 is an exploded perspective view illustrating an internal structure of a combination of an insertion guide member 470 and the chamber 50 according to the fourth embodiment. Fig. 20 is a sectional view of the insertion guide member 470 taken along a section perpendicular to the axial direction illustrating arrangement of a pair of first protrusions 244A and the pair of second protrusions 234B in the peripheral direction. Fig. 21 is a sectional view of the insertion guide member 470 taken along the axial direction illustrating arrangement of the first protrusions 244A and the second protrusions 234B in the longitudinal direction. Fig. 22 is a diagram in which, in the sectional view illustrated in Fig. 20, only the first protrusions 244A are displaced to a top view. Fig. 23 is an enlarged perspective view of the first protrusion 244A. Fig. 24 is an enlarged top view of the first protrusions 244A illustrating an inclination direction of ridges 246C of the first protrusions 244A. Elements that are the same as or equivalent to the elements of the first to third embodiments are denoted by the same reference numerals, and thereby duplicate description thereof is omitted.

**[0123]** In a flavour inhaler according to the fourth embodiment, the configuration of the insertion guide member 470 is different compared to that of the flavour inhaler 100 according to the first embodiment and that of the flavour inhaler according to the second and third embodiments. That is, as illustrated in Figs. 19 to 23, in the insertion guide member 370 according to the fourth embodiment, the first protrusions 244A provided in a protruding part 244 have different shape from the shape of the first protrusions of the first to third embodiments. In contrast, the second protrusions 234B similar to or the same as those of the third embodiment are provided in the protruding part 244. The insertion guide member 470 according to the fourth embodiment has a non-protruding part 242 and the protruding part 244 in the axial direction.

**[0124]** Specifically, as illustrated in Fig. 20, when a section perpendicular to the axial direction of the insertion guide member 470 is seen, the pair of first protrusions 244A each have a first side 246a, a second side 246b, a vertex 246c connecting the first side 246a and the second side 246b. An angle formed between the first side 246a and the second side 246b is an obtuse angle.

**[0125]** In particular, the obtuse angle formed between the first side 246a and the second side 246b is preferably smaller than or equal to  $160^\circ$ .

**[0126]** As illustrated in Figs. 19 and 21 to 23, the first protrusion 244A extends in the axial direction of the insertion guide member (Z axis direction). A surface that includes the first side 246a illustrated in Fig. 21 and extends in the axial direction is a first surface 246A. A surface that includes the second side 246b illustrated in

Fig. 21 and extends in the axial direction is a second surface 246B. A substantially straight line that connects the first surface 246A and the second surface 246B to each other, includes the vertex 246c illustrated in Fig. 21, and extends in the axial direction is the ridge 246C. In Figs. 22 and 23, the first surfaces 246A, the second surfaces 246B, and the ridges 246C of the first protrusions 244A are illustrated. The ridges 246C of the first protrusions 244A are not parallel to the axial direction (can be indicated as a dot in Figs. 22 and 24). In particular, as illustrated in Fig. 24, in top view, two ridges 246C are inclined in directions opposite to each other with reference to a straight line (a broken line illustrated in Fig. 24) that connects end parts 246D positioned at the opposite side from the first opening 70a in the axial direction of the ridges 246C.

**[0127]** In the above description, the inclination of two ridges 246C has been described with reference to the straight line connecting the end parts 246D. However, two ridges 246C are also inclined in directions opposite to each other with reference to a straight line that connects end parts 246E positioned at the first opening 70a side in the axial direction of the ridges 246C illustrated in Fig. 23.

(Operation of Fourth Embodiment)

**[0128]** In the accommodating part according to the fourth embodiment, when a section perpendicular to the axial direction of the accommodating part is seen, the first protrusions 244A of the protruding part 244 protrude from the inner wall surface of the protruding part 244 to form an obtuse triangular shape. Accordingly, with the accommodating part according to the fourth embodiment, the first protrusions 244A have no sharp vertices. Thus, damage to the consumable product 110 can be suppressed. In the accommodating part according to the fourth embodiment, contact surfaces where the first protrusions 244A and the consumable product 110 are to be in contact with each other can be increased, and accordingly, dropping of the consumable product 110 can be more effectively suppressed.

**[0129]** In particular, since the obtuse angle formed between the first side 246a and the second side 246b is smaller than or equal to  $160^\circ$ , damage to the consumable product is prevented and the consumable product can be grasped such that the outer peripheral surface of the consumable product is hooked onto the vertex.

**[0130]** Furthermore, in the accommodating part according to the fourth embodiment, two ridges 246C, each of which connects the first surface 246A and the second surface 246B to each other, includes the vertex 246c, and extends in the axial direction in a corresponding one of the pair of the first protrusions 244A, are inclined in directions opposite to each other with reference to the straight line connecting 246D positioned at the opposite side from the first opening 70a in the axial direction of the accommodating part. Accordingly, with the accommodating part according to the fourth embodiment, by using the

pair of first protrusions 244A that face each other and have the respective ridges inclined in the directions opposite to each other, clockwise or counterclockwise uniform torque is produced around the insertion direction of the consumable product. Thus, the consumable product can be smoothly inserted during the insertion, and dropping of the consumable product can be reliably suppressed after the insertion.

**[0131]** The first protrusions 244A according to the fourth embodiment have been described as protrusions that, in the peripheral direction, face each other and are paired with each other. However, the number of the first protrusions 244A is not limited to two. For example, three or four first protrusions 244A can be provided. In this case, the inclination direction of the ridges 246C of the first protrusions 244A is appropriately changed so as to perform the operation of the above-described production of torque.

[Fifth Embodiment]

**[0132]** Hereinafter, a fifth embodiment of the present disclosure will be described with reference to Figs. 25 to 28. Fig. 25 is an exploded perspective view illustrating an internal structure of a combination of an insertion guide member 570 and the chamber 50 according to the fifth embodiment. Fig. 26 is a sectional view of the insertion guide member 570 taken along a section perpendicular to the axial direction illustrating arrangement of a pair of first protrusions 254A and a pair of second protrusions 254B in the peripheral direction. Fig. 27 is a sectional view of the insertion guide member 570 taken along the axial direction illustrating arrangement of the first protrusions 254A and the second protrusions 254B in the longitudinal direction. Fig. 28 is a sectional view seen in an arrow 28-28 direction illustrated in Fig. 27. Elements that are the same as or equivalent to the elements of the first to fourth embodiments are denoted by the same reference numerals, and thereby duplicate description thereof is omitted.

**[0133]** In a flavour inhaler according to the fifth embodiment, the configuration of the insertion guide member 570 is different compared to that of the flavour inhaler 100 according to the first embodiment and that of the flavour inhaler according to the second to fourth embodiments. That is, as illustrated in Figs. 25 to 28, in the insertion guide member 570 according to the fifth embodiment, the first protrusions 254A and the second protrusions 254B provided in a protruding part 254 have different shapes from the shapes of the first protrusions and the second protrusions of the first to fourth embodiments. The insertion guide member 570 according to the fifth embodiment has a non-protruding part 252 and the protruding part 254 in the axial direction.

**[0134]** As illustrated in Figs. 25 and 27, the first protrusions 254A extend in the axial direction of the insertion guide member 570 and the second protrusions 254B extend in the axial direction of the insertion guide member

570. As illustrated in Fig. 27, when a section in the axial direction of the insertion guide member 570 is seen, each of the pair of first protrusions 254A has a first inclined surface 256A extending from a first end part 258A of the first protrusion 254A positioned at the opposite side from the first opening 70a in the axial direction. The first inclined surface 256A is inclined such that the distance between the first inclined surface 256A and the center in a radial direction of the insertion guide member 570 reduces as the distance between the first inclined surface 256A and the first opening 70a reduces. Furthermore, as illustrated in Fig. 28, when a section in the axial direction of the insertion guide member 570 is seen, each of the pair of second protrusions 254B has a second inclined surface 256B extending from a second end part 258B of the second protrusion 254B positioned at the first opening 70a side in the axial direction of the insertion guide member 570. The second inclined surface 256B is inclined such that the distance between the second inclined surface 256B and the center in the radial direction of the insertion guide member 570 reduces as the distance between the second inclined surface 256B and the first opening 70a increases. Furthermore, as illustrated in Fig. 27, the first inclined surface 256A of the first protrusion 254A and the second inclined surface 256B of the second protrusion 254B are disposed so as to overlap at least partially with each other in the axial direction of the insertion guide member 570. Here, with reference to the axial direction of the insertion guide member 570, the inclination angle or the radius of curvature of the first inclined surface 256A is substantially the same as the inclination angle or the radius of curvature of the second inclined surface 256B. However, the inclination angle and the radius of curvature of the first inclined surface 256A can be different from the inclination angle and the radius of curvature of the second inclined surface 256B.

(Operation of Fifth Embodiment)

**[0135]** In the accommodating part according to the fifth embodiment, the first inclined surfaces 256A extending from the first end parts 258A on the opposite side from the first opening 70a are provided in the first protrusions 254A, the second inclined surfaces 256B extending from the second end parts 258B on the first opening 70a side are provided in the second protrusions 254B, the first inclined surfaces 256A and the second inclined surfaces 256B are disposed so as to overlap with each other in the axial direction of the insertion guide member 570, and the first inclined surfaces 256A and the second inclined surfaces 256B have substantially the same inclination angle or radius of curvature. Accordingly, with the accommodating part according to the fifth embodiment, ease of the insertion of the consumable product 110 can be more effectively increased and dropping of the consumable product 110 can be more effectively suppressed. Specifically, when the consumable product 110 is inserted from the first opening 70a, the consumable product 110 is

grasped by the pair of first protrusions 254A first, and then, part of the deformed consumable product 110 is retained at the pair of second protrusions 254B. At this time, the degree of strength of grasping by the first protrusions 254A is reduced while the degree of strength of grasping by the second protrusions 254B is increased. This enables gradual grasping. Thus, resistance in insertion of the consumable product 110 can be reduced, and dropping of the consumable product 110 can be suppressed.

[Sixth Embodiment]

**[0136]** Hereinafter, a sixth embodiment of the present disclosure will be described with reference to Figs. 29 to 31. Fig. 29 is an exploded perspective view illustrating an internal structure of a combination of an insertion guide member 670 and the chamber 50 according to the sixth embodiment. Fig. 30 is a sectional view of the insertion guide member 670 taken along a section perpendicular to the axial direction illustrating arrangement of four first protrusions 264A in the peripheral direction. Fig. 31 is a sectional view of the insertion guide member 670 taken along the axial direction illustrating arrangement of the first protrusions 264A in the longitudinal direction. Elements that are the same as or equivalent to the elements of the first to fifth embodiments are denoted by the same reference numerals, and thereby duplicate description thereof is omitted.

**[0137]** In a flavour inhaler according to the sixth embodiment, the configuration of the insertion guide member 670 is different compared to that of the flavour inhaler 100 according to the first embodiment and that of the flavour inhaler according to the second to fifth embodiments. That is, as illustrated in Fig. 30, the insertion guide member 670 according to the sixth embodiment is different from the insertion guide member according to the first to fifth embodiment in that the insertion guide member 670 according to the sixth embodiment has four first protrusions 264A provided in a protruding part 264. As illustrated in Fig. 30, the first protrusions 264A protrude to the inside of the virtual circle 226 indicating the outer peripheral surface of the undeformed consumable product 110. The insertion guide member 670 according to the sixth embodiment has a non-protruding part 262 and the protruding part 264 in the axial direction.

**[0138]** Fig. 30 is a diagram in which the sectional view of the side wall part 60 of the chamber 50 (see Figs. 5A and 5B) is superposed on the sectional view of the insertion guide member 670. A first virtual line 162 is a straight line connecting the centers of the pair of contact parts 62 of the side wall part 60 to each other. A second virtual line 166 is a straight line connecting the centers of the pair of separated parts 66 of the side wall part 60 to each other. As illustrated in Fig. 30, none of a plurality of first protrusions 264A provided in the protruding part 264 is disposed so as to intersect the first virtual line 162 or the second virtual line 166 in the peripheral direction of the

insertion guide member 670.

**[0139]** Furthermore, as illustrated in Fig. 30, four first protrusions 264A are provided in the protruding part 264 of the insertion guide member 670.

(Operation of Sixth Embodiment)

**[0140]** In the accommodating part according to the sixth embodiment, in the section perpendicular to the axial direction of the accommodating part, none of the plurality of first protrusions 264A protruding from the inner wall surface of the protruding part 264 of the insertion guide member 670 intersects the first virtual line 162 or the second virtual line 166. The first virtual line 162 connects the centers of the pair of contact parts 62 provided in the side wall part 60 of the chamber 50 and to be in contact with the outer peripheral surface of the accommodated consumable product 110. The second virtual line 166 connects the centers of the pair of separated parts 66 not to be in contact with the outer peripheral surface of the consumable product 110. Accordingly, with the accommodating part according to the sixth embodiment, in the protruding part 264 of the insertion guide member 670, the following situations are suppressed: the first protrusions 264A further press portions of the consumable product 110 that overlap with the contact parts 62 in the peripheral direction of the accommodating part; and the first protrusions 264A block the airflow paths (the clearances 67) formed between the consumable product 110 and the separated parts 66.

**[0141]** In particular, when four first protrusions 264A are provided, preferable airflow paths can be ensured.

**[0142]** Although the first to sixth embodiments of the present disclosure have been described above, the present disclosure is not limited to the above-described embodiments. Various changes are possible within the scope of the claims and the technical concept described herein and the drawings. Specifically, within a range in which the features of the embodiments are not interfere with each other, the features of the examples can be appropriately combined with each other. Any shapes or materials not described herein or the drawings are within the technical concept of the present disclosure as long as those shapes or materials perform the operation of the present disclosure. For example, the flavour inhaler 100 of the present disclosure has the airflow paths of a so-called counterflow type in which the air flowing in from the second opening 52 of the chamber 50 is supplied to the end surface of the consumable product 110. However, this is not limiting, and the flavour inhaler 100 may have airflow paths of a so-called bottom flow type in which the air is supplied from the bottom part 56 of the chamber 50 to the inside of the chamber 50. The heating element 42 is not limited to a heating element of a resistance heating type but may be a heating element of an induction heating type. In this case, the heating element 42 can heat the chamber 50 by using the induction heating. Furthermore, when the consumable product 110 has a susceptor, the

heating element 42 can heat the susceptor of the consumable product 110 by using the induction heating.

#### REFERENCE SIGNS LIST

##### [0143]

20 power supply part  
 21 power supply  
 30 atomizing part  
 32 thermal insulation part  
 36 bottom member  
 37 first holding part  
 38 second holding part  
 40 heating part  
 42 heating element  
 44 electrical insulation member  
 48 electrode  
 50 chamber  
 52 second opening  
 52A flange part  
 54 non-holding part  
 56 bottom part  
 56a hole  
 58 first guide part  
 58a tapered surface  
 60 side wall part  
 62 contact part  
 62A contact part  
 62a inner surface  
 62b outer surface  
 66 separated part  
 66A separated part  
 66a inner surface  
 66b outer surface  
 67 clearance  
 70 insertion guide member  
 70a first opening  
 100 flavour inhaler  
 101 outer housing  
 101a opening  
 102 slide cover  
 103 switch part  
 104 terminal  
 110 consumable product  
 111 smokable product  
 112 first wrapping paper  
 113 second wrapping paper  
 114 tubular member  
 115 filter part  
 116 hollow filter part  
 117 lip release agent  
 162 first virtual line  
 166 second virtual line  
 212 non-protruding part  
 214 protruding part  
 214A first protrusion  
 224B second protrusion

226 virtual circle  
 232 non-protruding part  
 234 protruding part  
 234A first protrusion  
 5 234B second protrusion  
 236 inclined part  
 238 curved part  
 240 third end part  
 242 non-protruding part  
 10 244 protruding part  
 244A first protrusion  
 246a first side  
 246A first surface  
 246b second side  
 15 246B second surface  
 246c vertex  
 246C ridge  
 246D end part  
 252 non-protruding part  
 20 254 protruding part  
 254A first protrusion  
 254B second protrusion  
 256A first inclined surface  
 256B second inclined surface  
 25 258A first end part  
 258B second end part  
 262 non-protruding part  
 264 protruding part  
 264A first protrusion  
 30 270 insertion guide member  
 370 insertion guide member  
 470 insertion guide member  
 570 insertion guide member  
 670 insertion guide member

#### Claims

##### 1. A flavour inhaler comprising:

40 an accommodating part configured to accommodate a consumable product including a smokable product,  
 wherein the accommodating part has

45 an opening configured to allow insertion of the consumable product therein,  
 a first space formation part that is connected to the opening and forms a space throughout a periphery between the first space formation part and an outer peripheral surface of the accommodated consumable product,  
 a second space formation part that is positioned at a farther side from the opening than the first space formation part and forms a space throughout the periphery between the second space formation part and the outer peripheral surface of the accommodated consumable product,

50

55

- a first support part that is positioned between the first space formation part and the second space formation part in a longitudinal direction of the accommodating part and presses the outer peripheral surface of the consumable product to support the consumable product, and  
 a second support part that is positioned at a farther side from the opening than the second space formation part in the longitudinal direction of the accommodating part and presses the outer peripheral surface of the consumable product to support the consumable product.
2. The flavour inhaler according to claim 1,  
 wherein the accommodating part has  
 a chamber having a heating region configured to heat the consumable product, and a guide part configured to guide, to the chamber, the consumable product having been inserted from the opening, and  
 wherein the second space formation part and the second support part are provided at the chamber, and  
 the first space formation part and the first support part are provided at the guide part.
3. The flavour inhaler according to claim 1 or 2,  
 wherein the second support part has  
 a set of contact parts that are configured to be in contact with the outer peripheral surface of the accommodated consumable product and disposed so as to be substantially equally spaced apart from each other in a peripheral direction of the accommodating part, and  
 a set of connecting parts connecting the set of contact parts to each other.
4. The flavour inhaler according to claim 3,  
 wherein the first support part has a set of first protrusions that protrude from an inner wall surface of the first support part and are disposed so as to be substantially equally spaced apart from each other in the peripheral direction of the accommodating part, and  
 wherein each of the set of first protrusions is provided at a position that overlaps with a corresponding one of the set of contact parts when seen in the longitudinal direction of the accommodating part.
5. The flavour inhaler according to claim 4,  
 wherein, when the consumable product is inserted into the opening and accommodated in the accommodating part in a direction substantially parallel to the longitudinal direction of the accommodating part, in a section perpendicular to the longitudinal direction of the accommodating part, each of the set of first protrusions protrudes to an inside of a virtual external shape indicating the outer peripheral surface of the consumable product that has not been deformed.
6. The flavour inhaler according to claim 4 or 5,  
 wherein the set of first protrusions extend in the longitudinal direction of the accommodating part, and  
 wherein the set of first protrusions have inclined parts such that, when a section in the longitudinal direction of the accommodating part is seen, a distance between the inclined parts and a center in a radial direction of the accommodating part reduces as a distance between the inclined parts and the opening increases.
7. The flavour inhaler according to any one of claims 4 to 6,  
 wherein, when a section perpendicular to the longitudinal direction of the accommodating part is seen, each of the set of first protrusions has a first side,  
 a second side, and  
 a vertex connecting the first side and the second side to each other, and  
 wherein an angle formed between the first side and the second side is an obtuse angle.
8. The flavour inhaler according to claim 7,  
 wherein the set of first protrusions include a pair of first protrusions facing each other in the peripheral direction of the accommodating part, wherein the pair of first protrusions facing each other each have  
 a first surface that has the first side and extends in the longitudinal direction of the accommodating part,  
 a second surface that has the second side and extends in the longitudinal direction, and  
 a ridge that connects the first surface and the second surface to each other, has the vertex, and extends in the longitudinal direction,  
 wherein none of two ridges of the pair of protrusions facing each other is in parallel with the longitudinal direction, and

wherein, in a top view of the accommodating part seen from an opening side, the two ridges are inclined in directions opposite to each other with reference to a straight line connecting end parts of the two ridges positioned at an opposite side from the opening in the longitudinal direction or a straight line connecting end parts of the two ridges positioned at an opening side in the longitudinal direction.

9. The flavour inhaler according to any one of claims 4 to 8,

wherein the first support part has a set of second protrusions that protrude from the inner wall surface of the first support part and are provided so as to be substantially equally spaced apart from each other in the peripheral direction of the accommodating part, and

wherein the set of second protrusions are provided at positions that overlap with the set of connecting parts when seen in the longitudinal direction of the accommodating part.

10. The flavour inhaler according to claim 9, wherein, when the consumable product is inserted into the opening and accommodated in the accommodating part in the direction substantially parallel to the longitudinal direction of the accommodating part, in a section perpendicular to the longitudinal direction of the accommodating part, each of the set of second protrusions is positioned outside a virtual external shape indicating the outer peripheral surface of the consumable product that has not been deformed.

11. The flavour inhaler according to claim 10, wherein each of the set of second protrusions has a curved part curved along the virtual external shape.

12. The flavour inhaler according to any one of claims 9 to 11, wherein third end parts of the set of second protrusions positioned at the opposite side from the opening in the longitudinal direction of the accommodating part are connected to the second space formation part.

13. The flavour inhaler according to any one of claims 9 to 12, wherein a shape of the set of first protrusions and a shape of the set of second protrusions are different from each other.

14. The flavour inhaler according to any one of claims 9 to 13, wherein the set of first protrusions and the set of second protrusions are disposed such that the set of

first protrusions and the set of second protrusions overlap at least partially with each other in the longitudinal direction of the accommodating part.

15. The flavour inhaler according to claim 13 or 14,

wherein the set of first protrusions and the set of second protrusions extend in the longitudinal direction of the accommodating part,

wherein each of the set of first protrusions has a first inclined surface that, when a section in the longitudinal direction is seen, extends from a first end part of the first protrusion positioned at the opposite side from the opening in the longitudinal direction and that is inclined such that a distance between the first inclined surface and the center of the accommodating part in the radial direction reduces as a distance between the first inclined surface and the opening reduces,

wherein each of the set of second protrusions has a second inclined surface that, when a section in the longitudinal direction is seen, extends from a second end part of the second protrusion positioned at the opening side in the longitudinal direction and that is inclined such that a distance between the second inclined surface and the center of the accommodating part in the radial direction reduces as a distance between the second inclined surface and the opening increases,

wherein the first inclined surface of each of the set of first protrusions and the second inclined surface of each of the set of second protrusions are disposed such that the first inclined surface and the second inclined surface overlap at least partially with each other in the longitudinal direction of the accommodating part, and wherein an inclination angle or a radius of curvature of the first inclined surface is substantially equal to an inclination angle or a radius of curvature of the second inclined surface.

16. The flavour inhaler according to claim 3,

wherein the set of contact parts include a pair of contact parts facing each other in the peripheral direction of the accommodating part, wherein the set of connecting parts include a pair of connecting parts facing each other in the peripheral direction of the accommodating part, wherein the first support part has a plurality of first protrusions that protrude from an inner wall surface of the first support part, and wherein, when a section perpendicular to the longitudinal direction of the accommodating part is seen, in a case where a first virtual line connecting centers of the pair of contact parts facing

each other and a second virtual line connecting centers of the pair of connecting parts facing each other are drawn, the plurality of first protrusions are disposed such that none of the plurality of first protrusions intersects the first virtual line or the second virtual line. 5

17. The flavour inhaler according to any one of claims 3 to 16, 10

wherein the chamber includes a heat source configured to supply heat to the heating region, and wherein the heat source is disposed such that the heat source and the second support part overlap with each other in the longitudinal direction of the accommodating part. 15

18. The flavour inhaler according to claim 17, 20

wherein the heat source is a film heater, and wherein the film heater is wound around an outer periphery of the chamber.

19. The flavour inhaler according to any one of claims 2 to 18, 25

wherein an expression 1 below is satisfied:

$$L2 \geq L1/2 \quad (1) \quad 30$$

where L1 is a length of the guide part in the longitudinal direction of the accommodating part, and L2 is a length of the first space formation part in the longitudinal direction. 35

20. A smoking system comprising:

the flavour inhaler according to any one of claims 1 to 19; and the consumable product. 40

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Fig. 1A

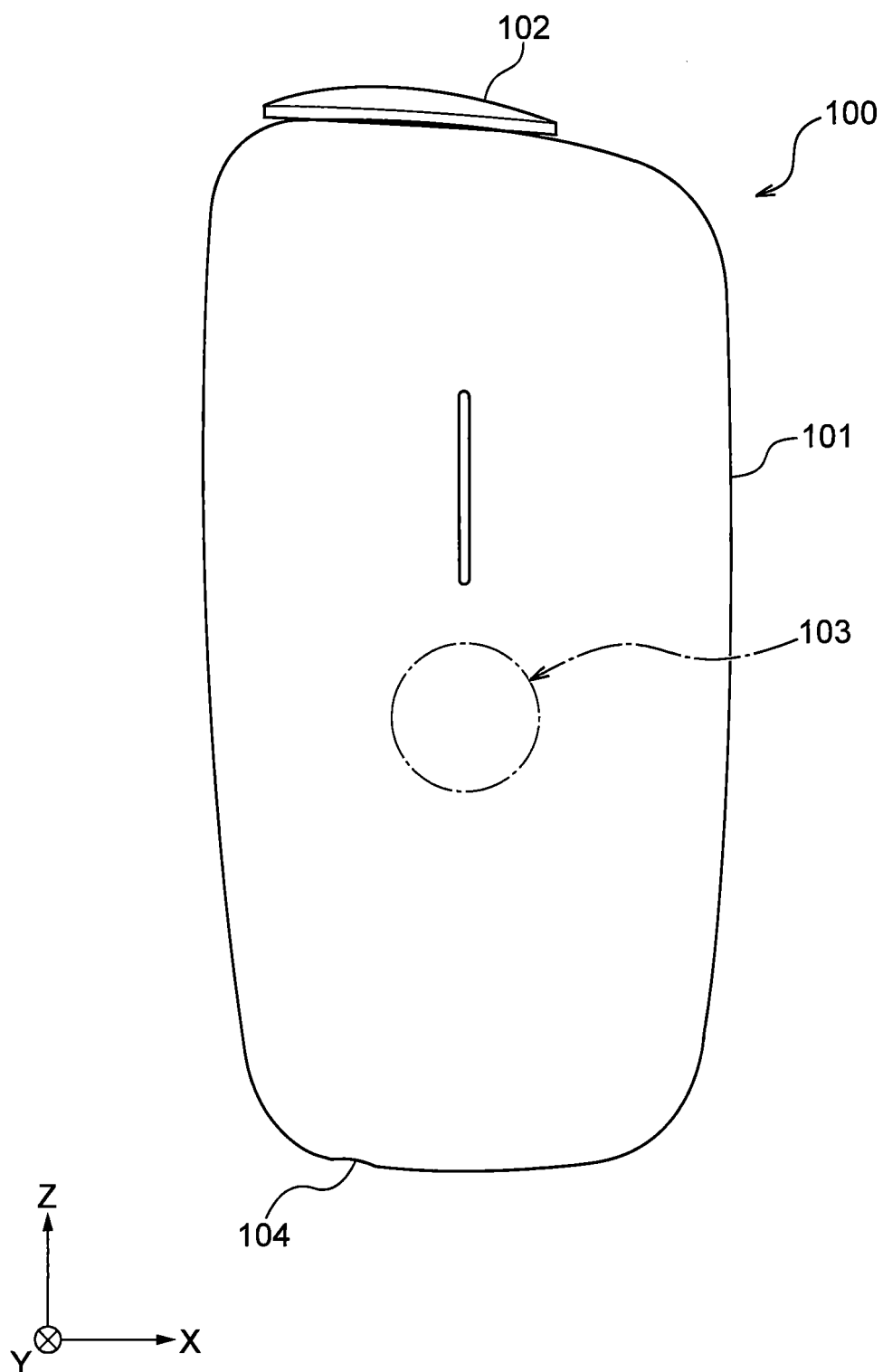


Fig. 1B

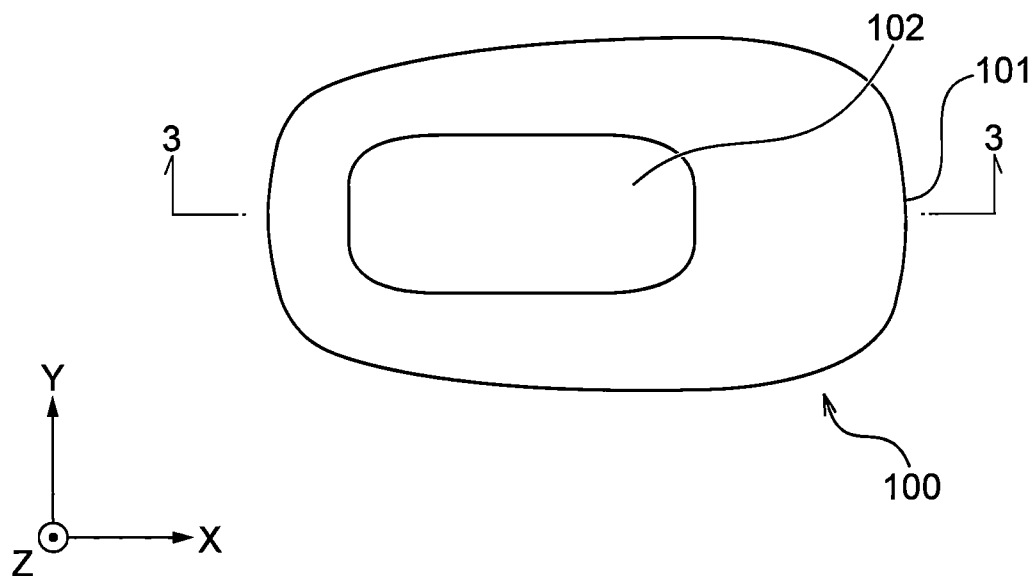


Fig. 1C

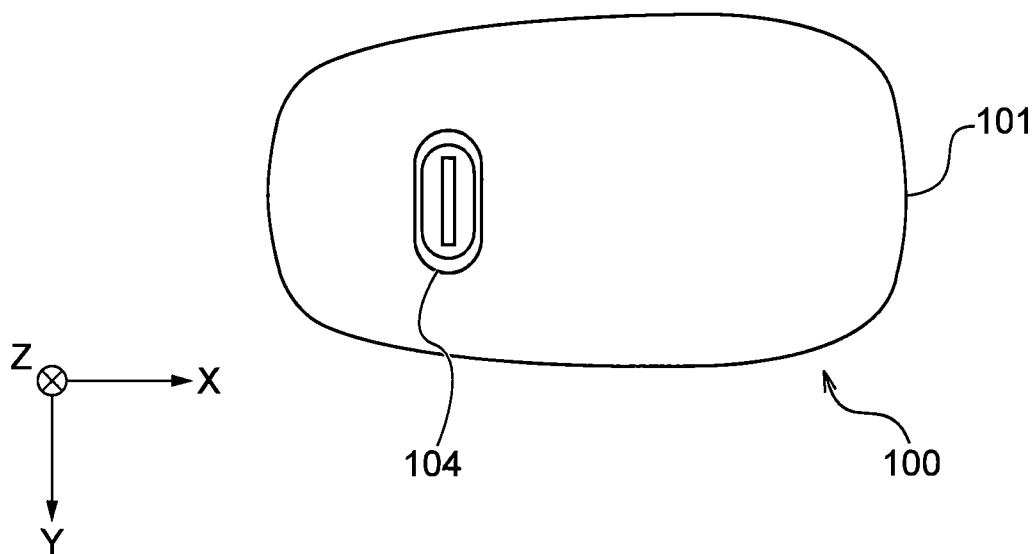


Fig. 2

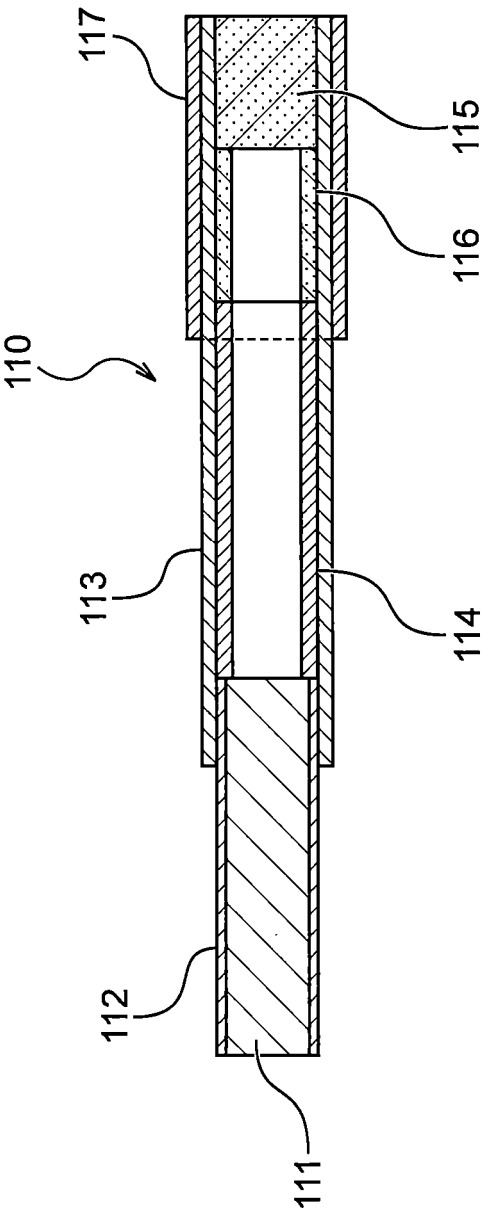


Fig. 3

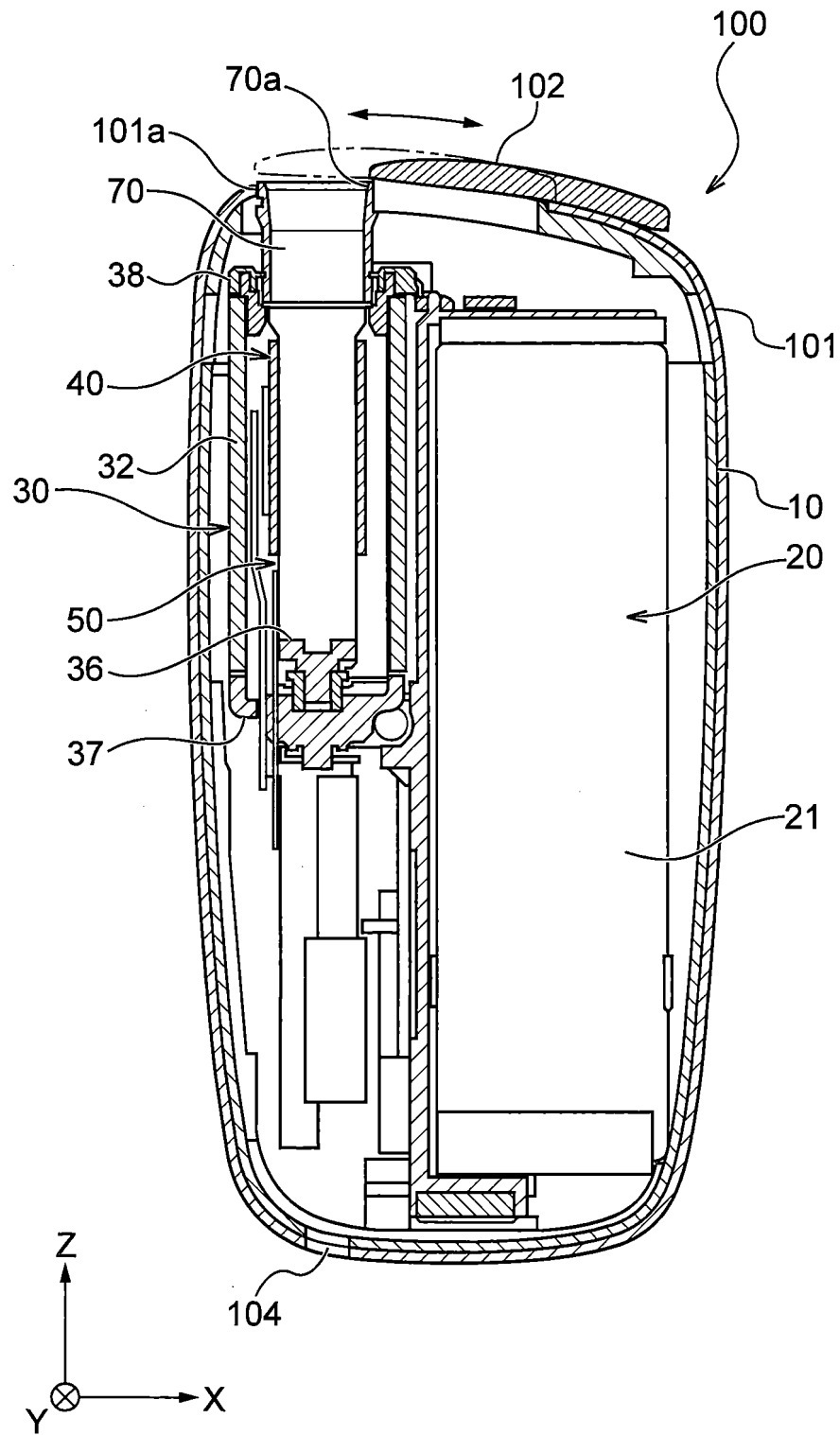


Fig. 4A

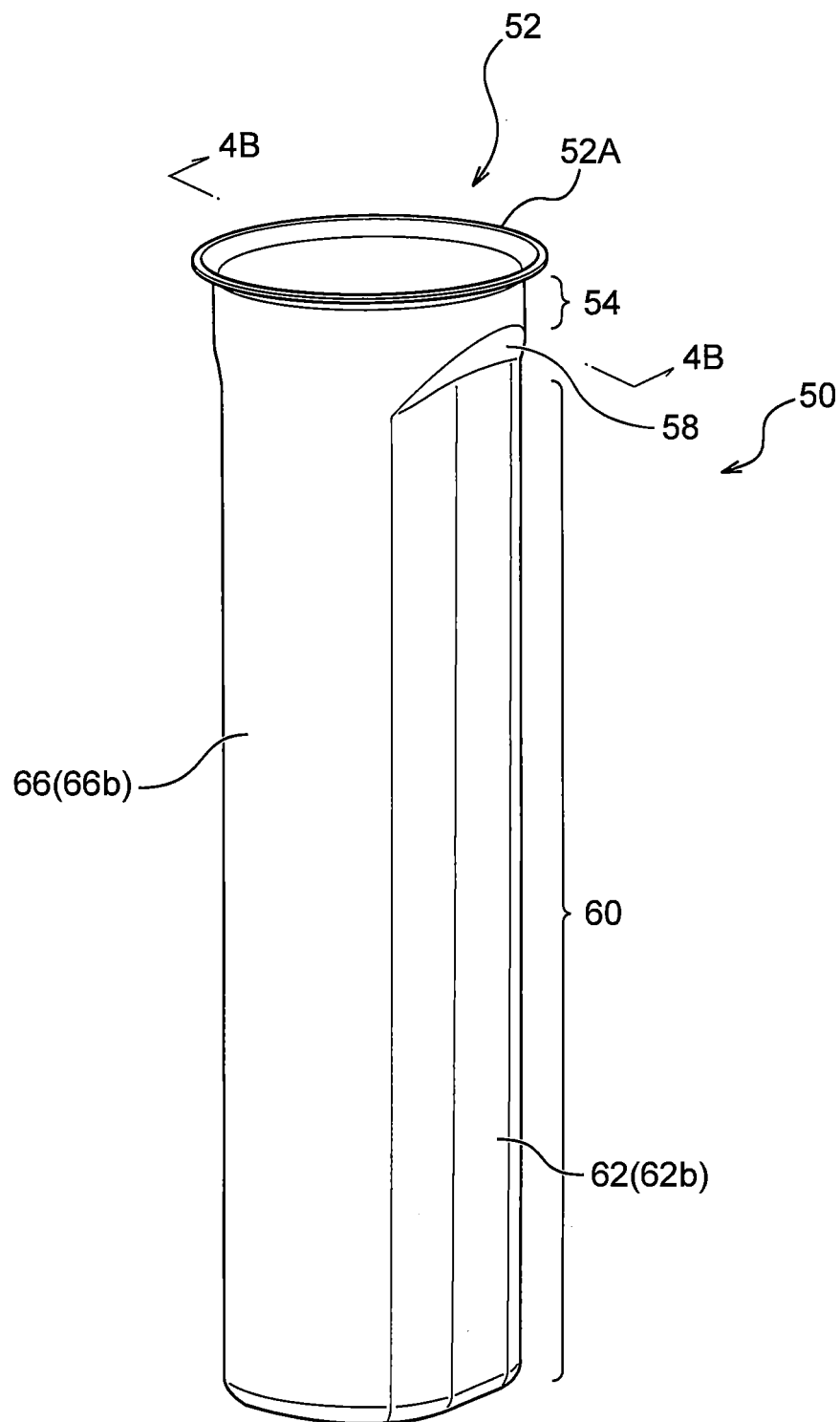


Fig. 4B

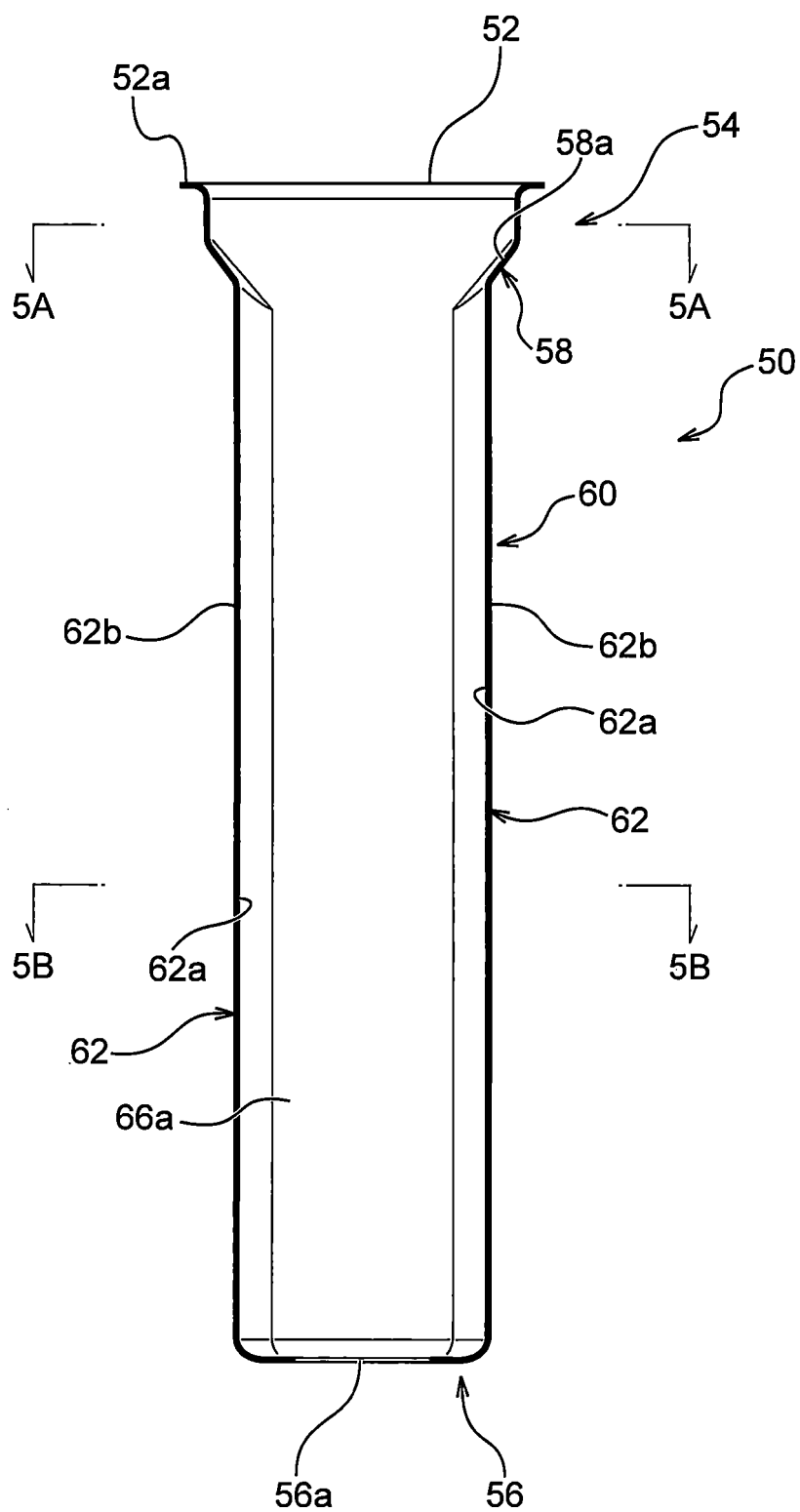


Fig. 5A

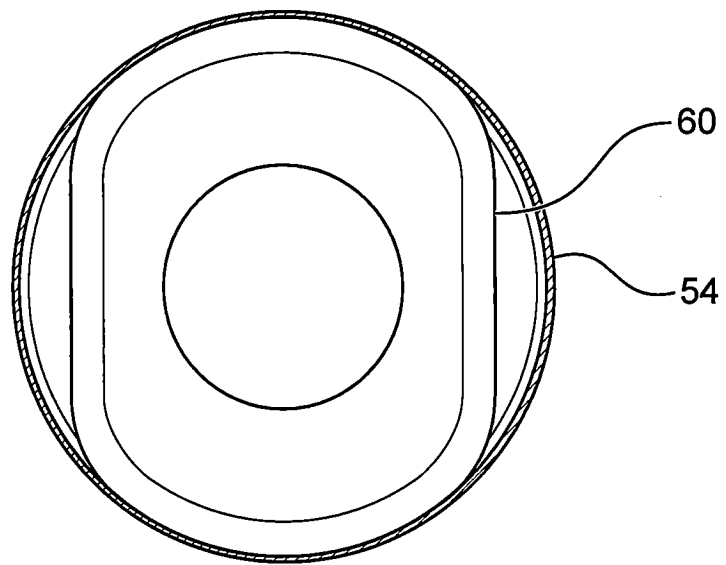


Fig. 5B

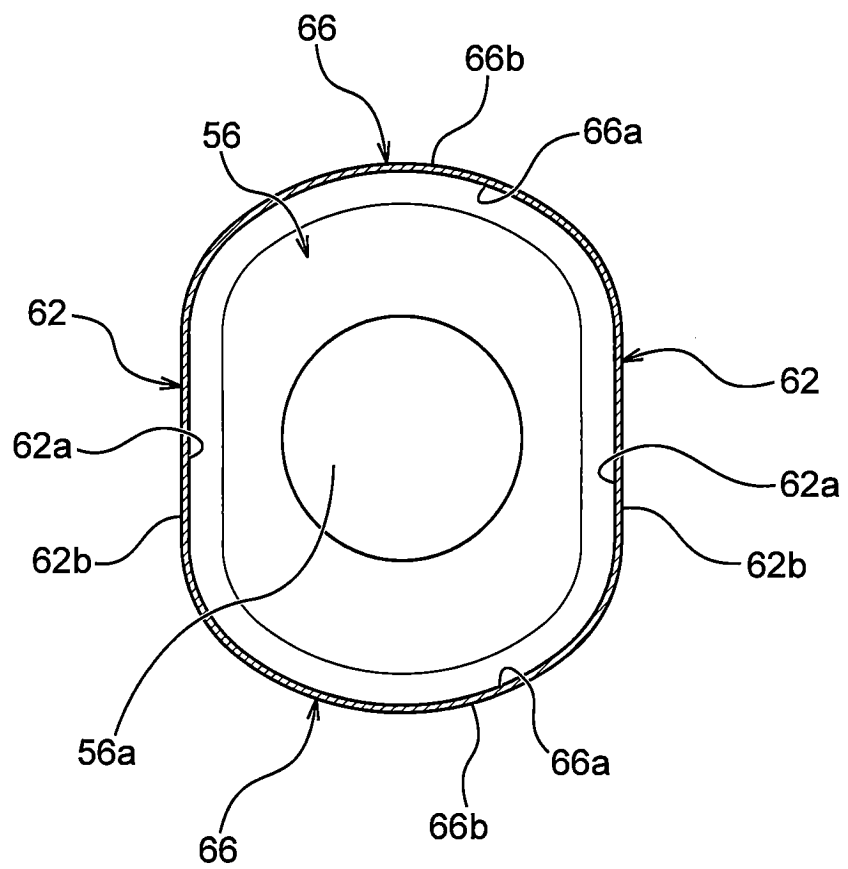


Fig. 6

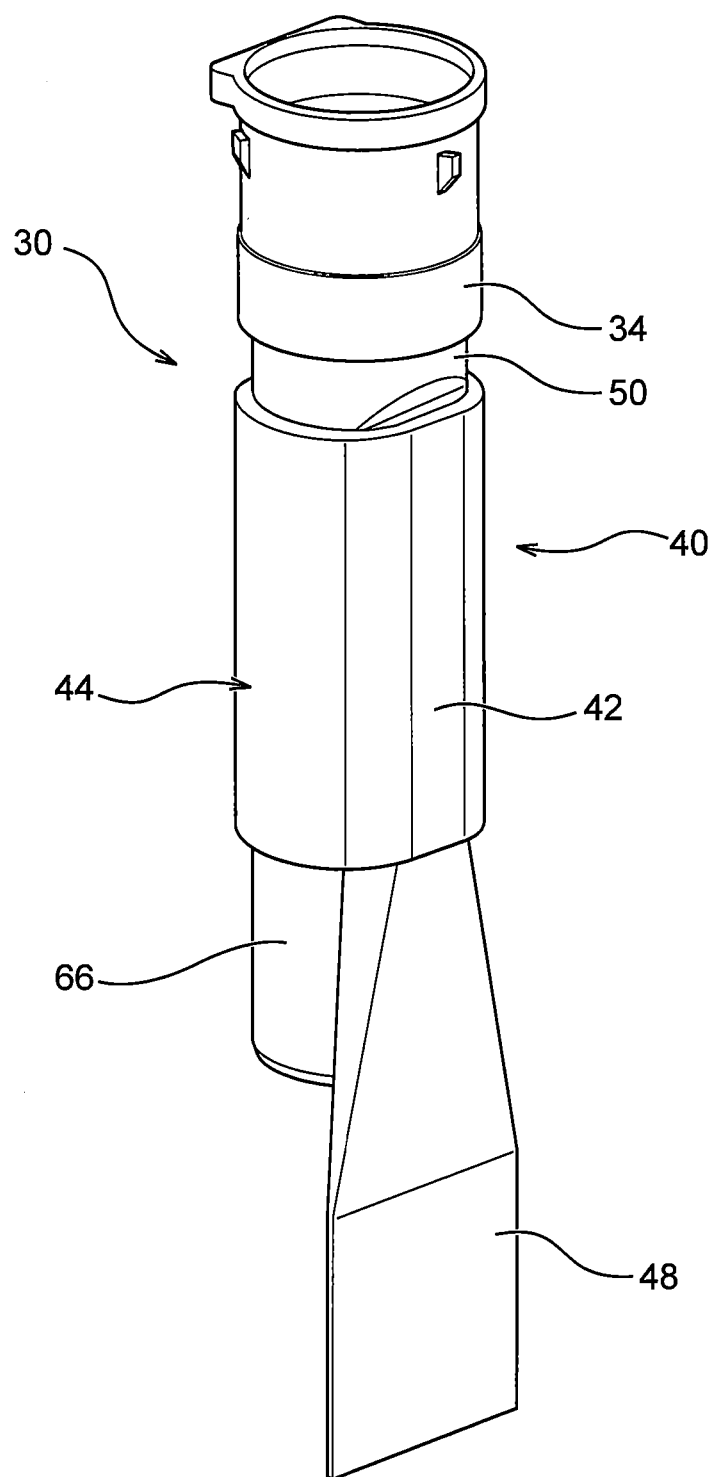


Fig. 7

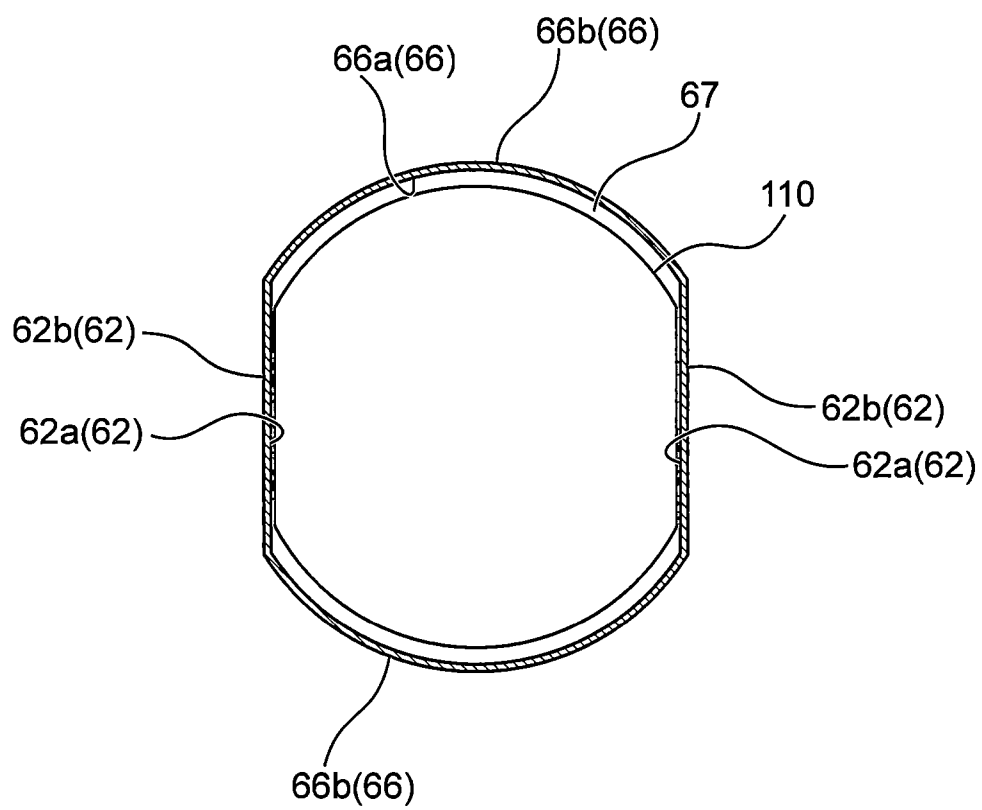


Fig. 8

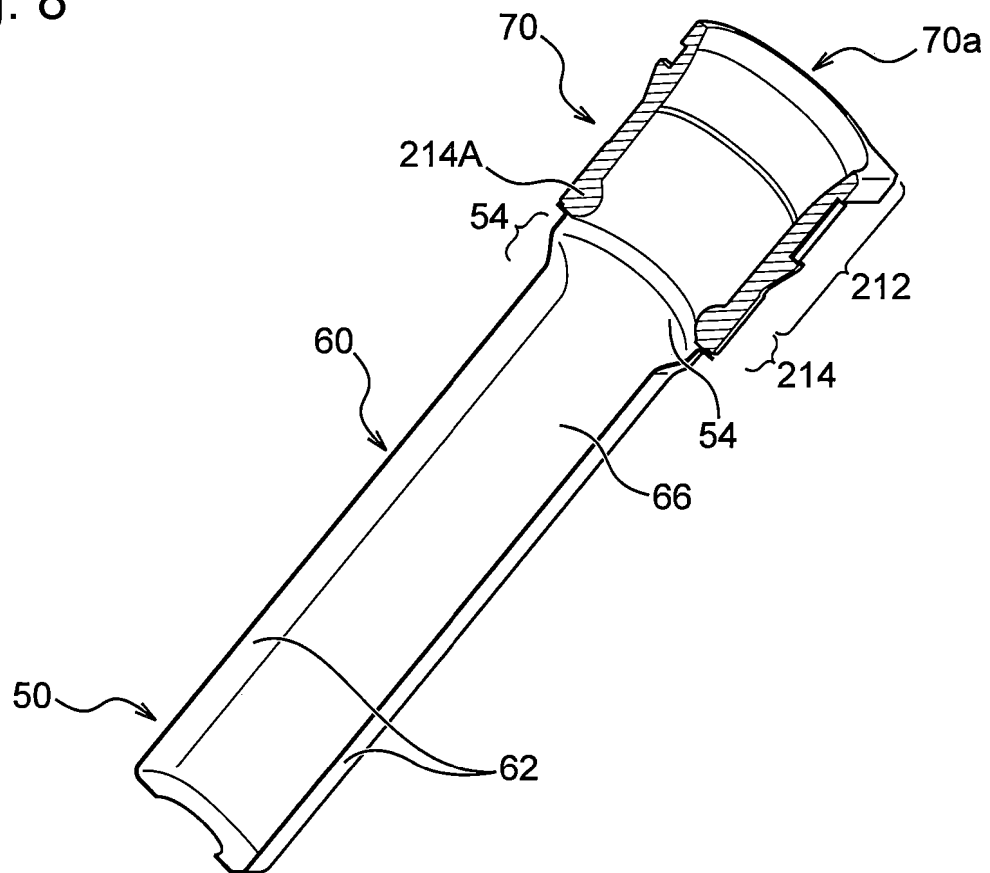


Fig. 9

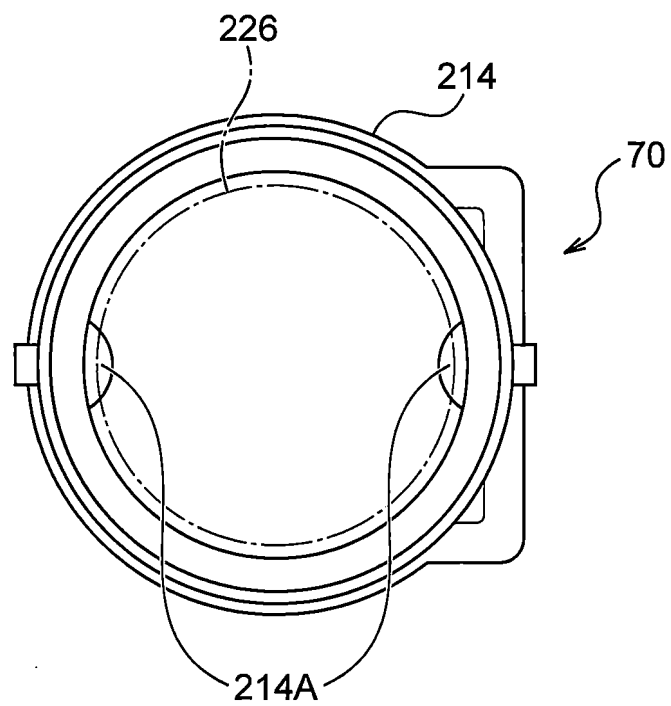


Fig. 10

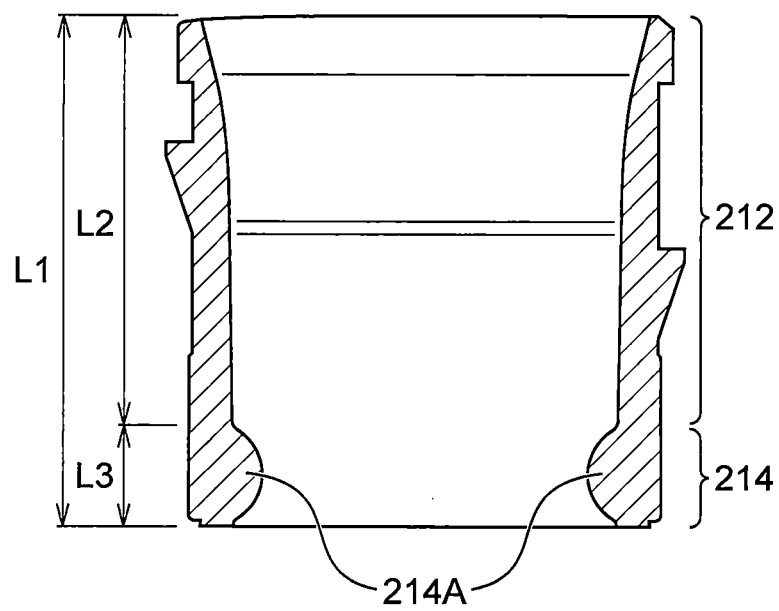


Fig. 11A

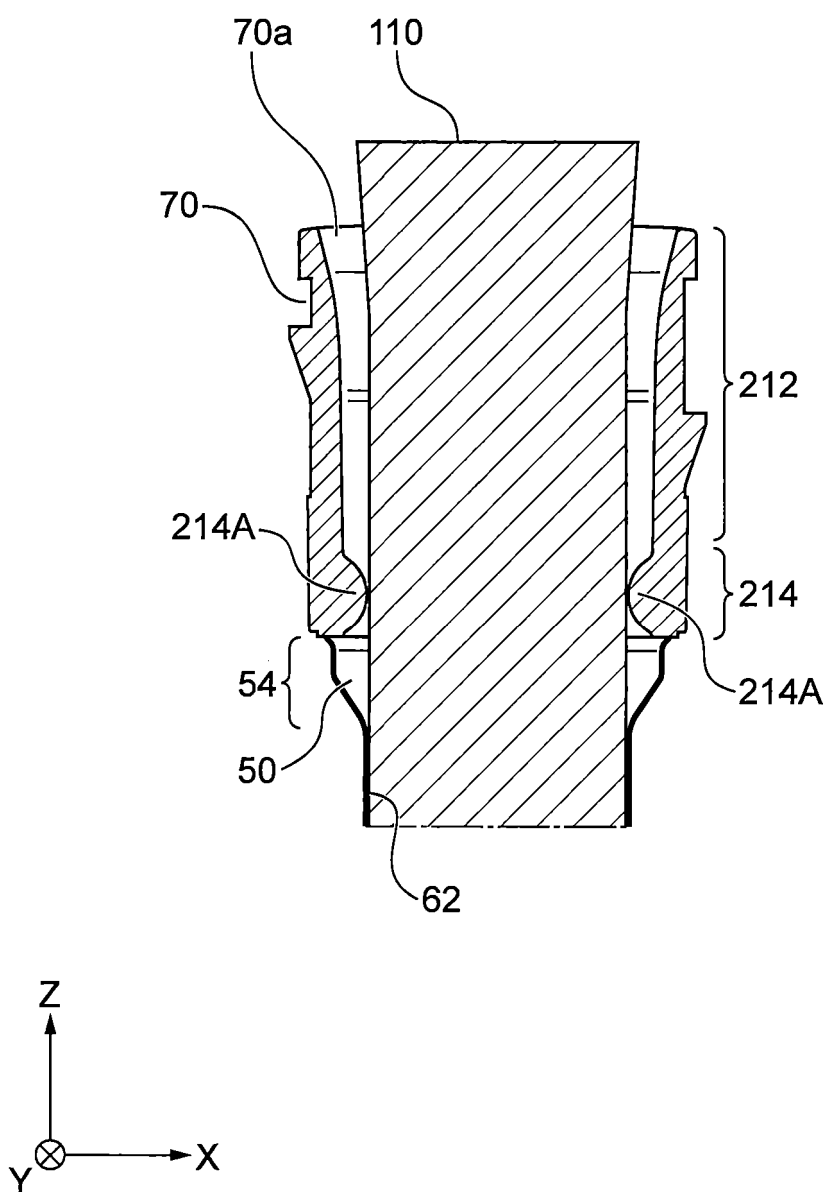


Fig. 11B

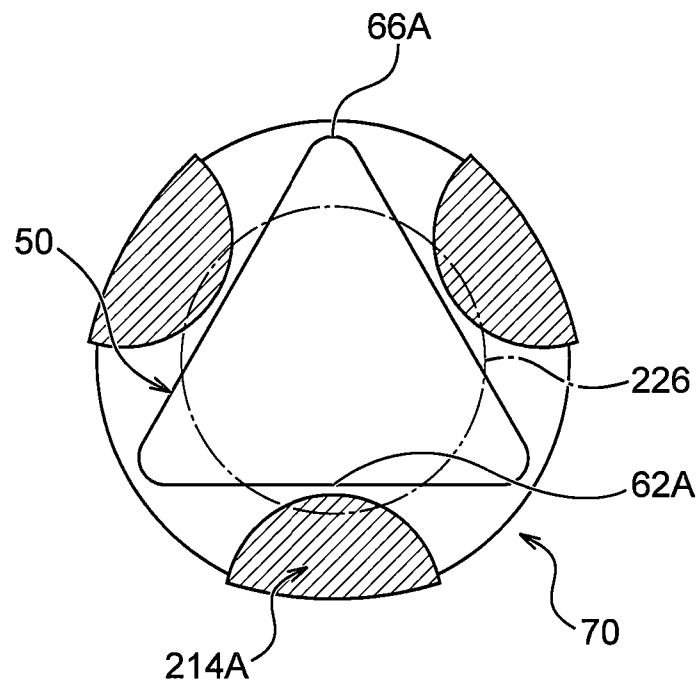


Fig. 12

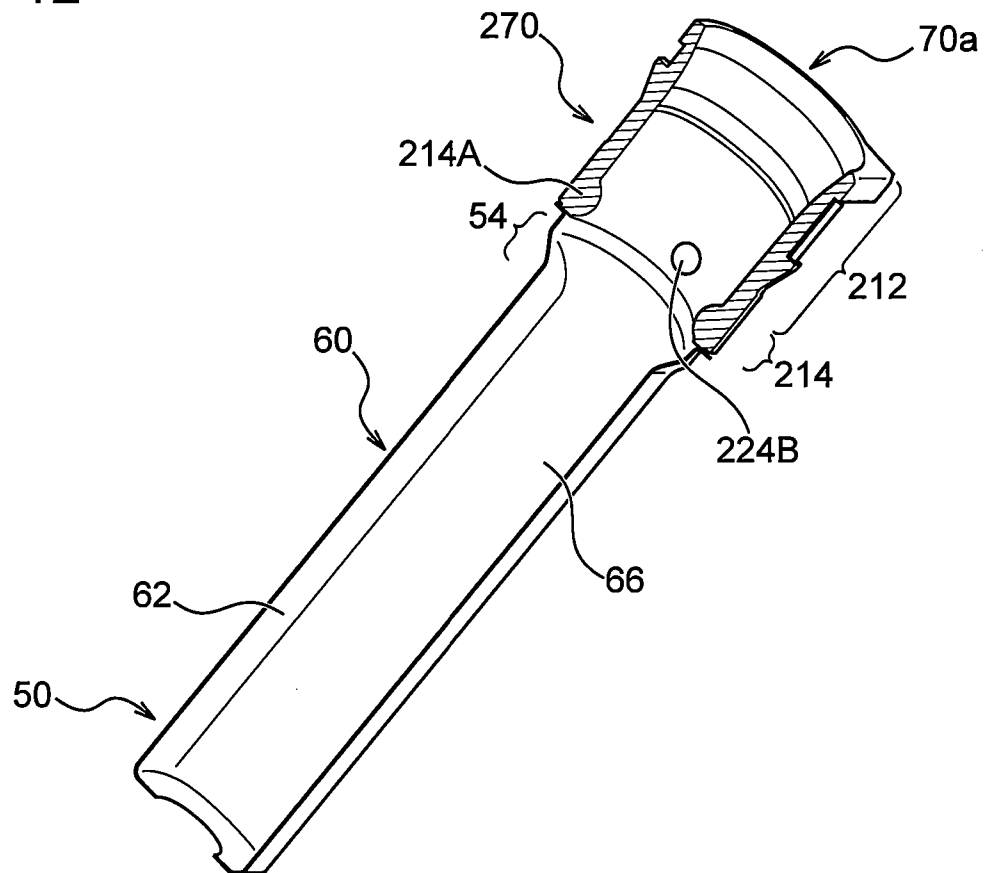


Fig. 13

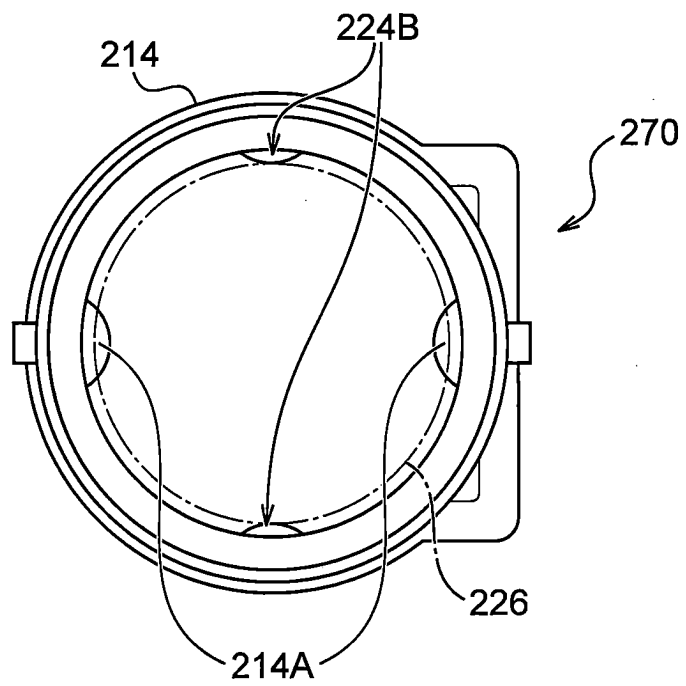


Fig. 14

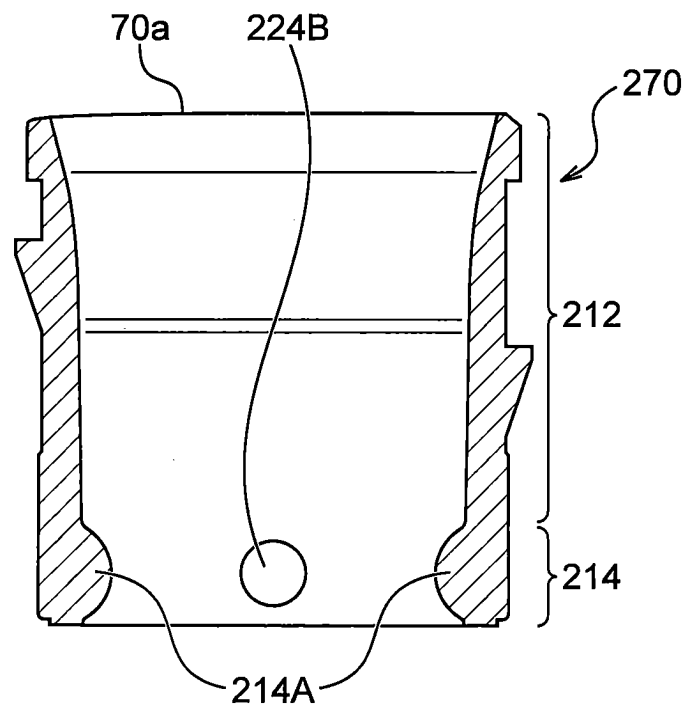


Fig. 15

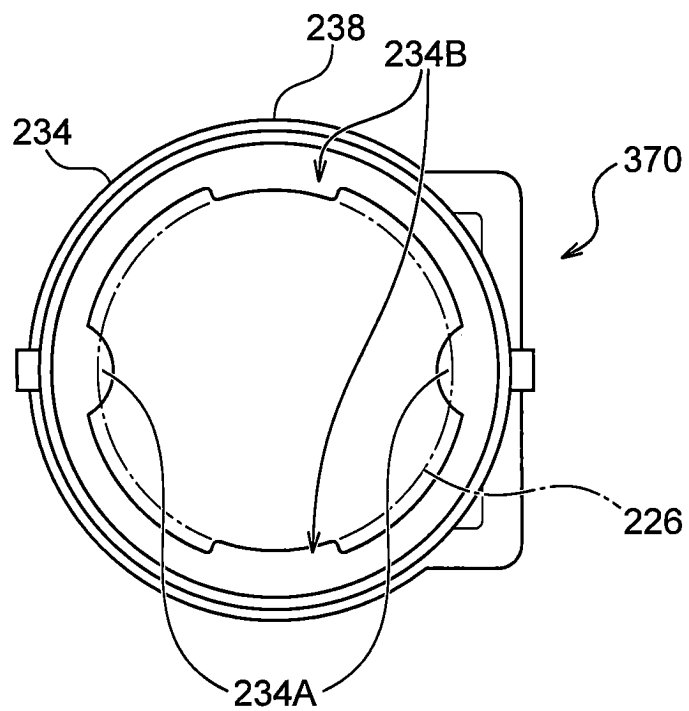


Fig. 16

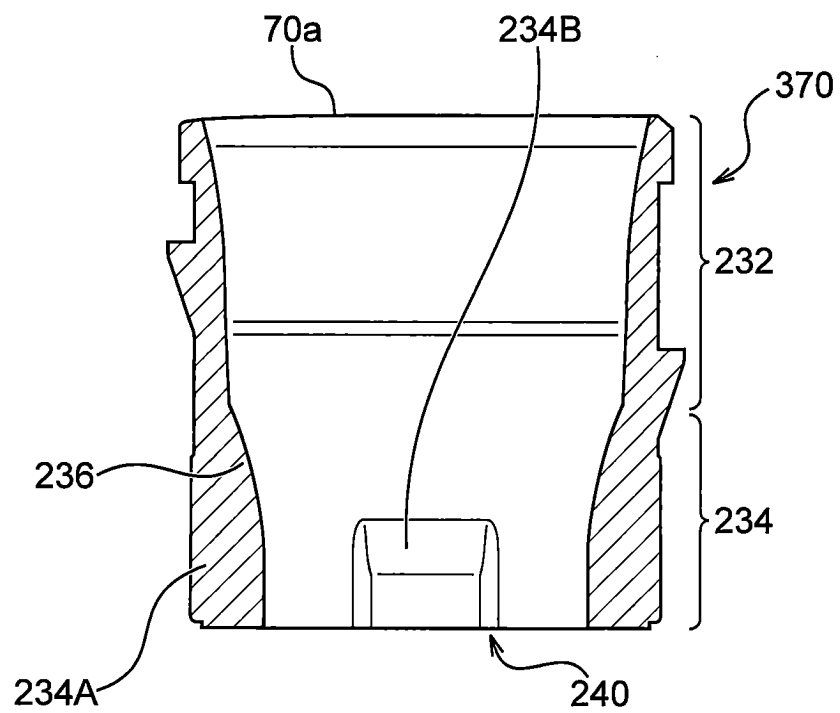


Fig. 17

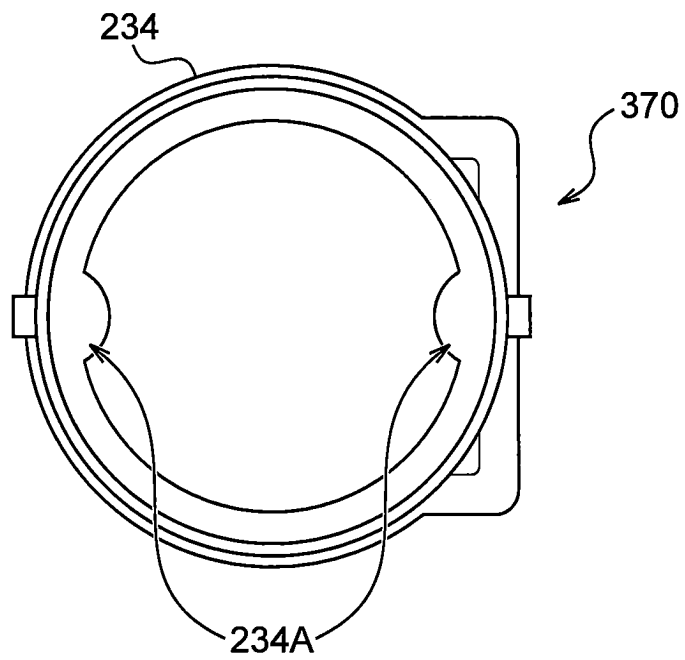


Fig. 18

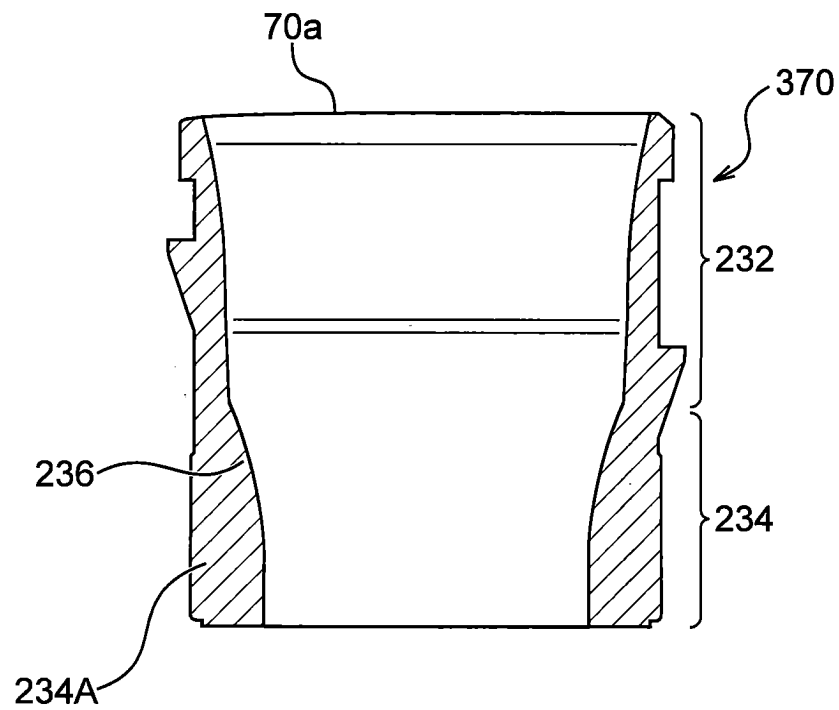


Fig. 19

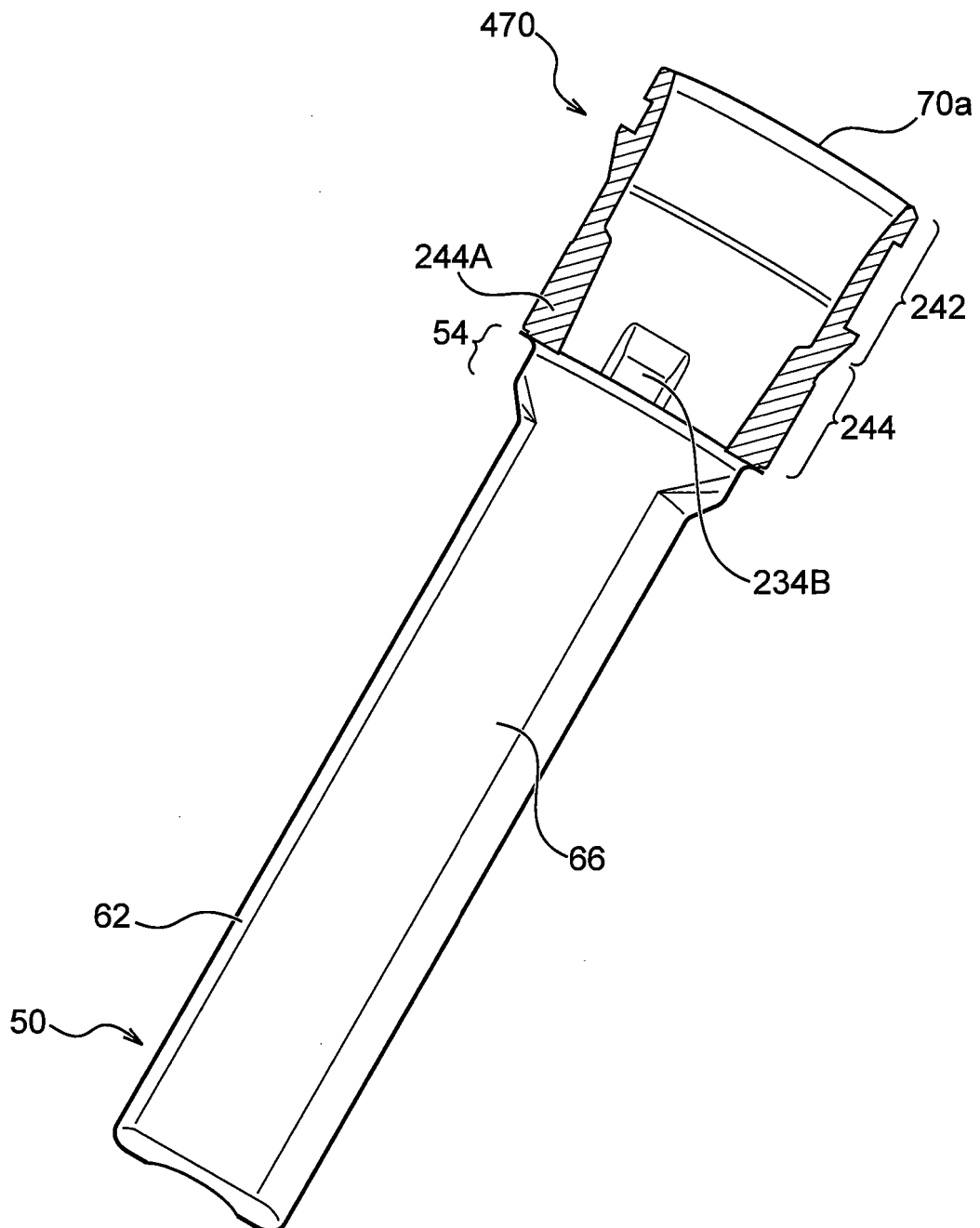


Fig. 20

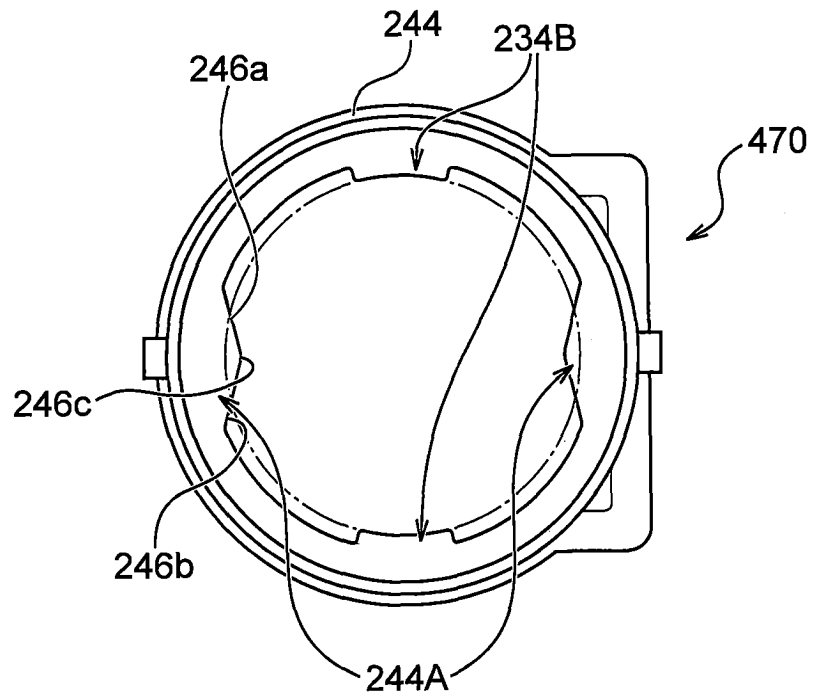


Fig. 21

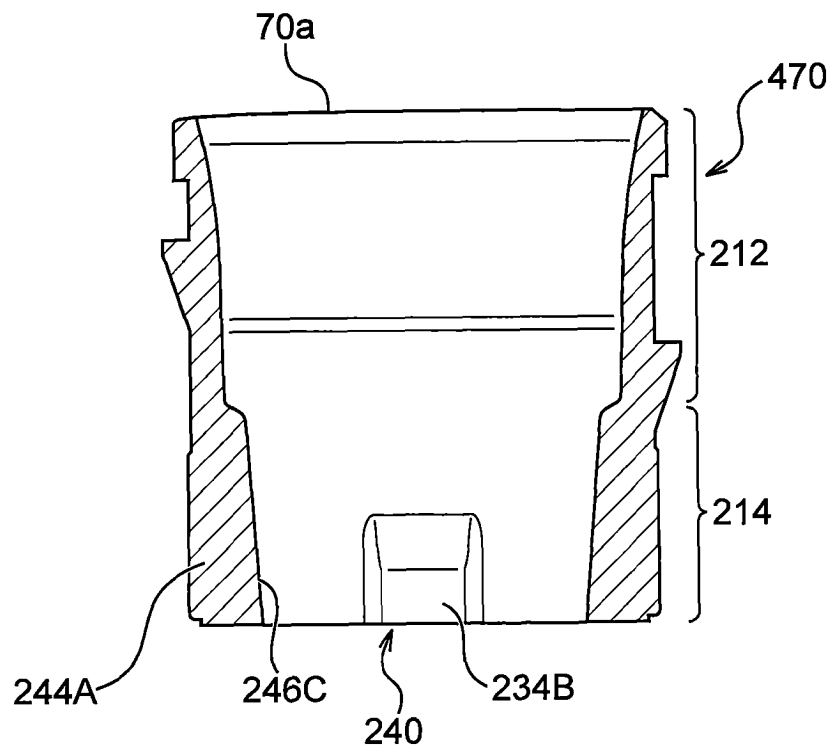


Fig. 22

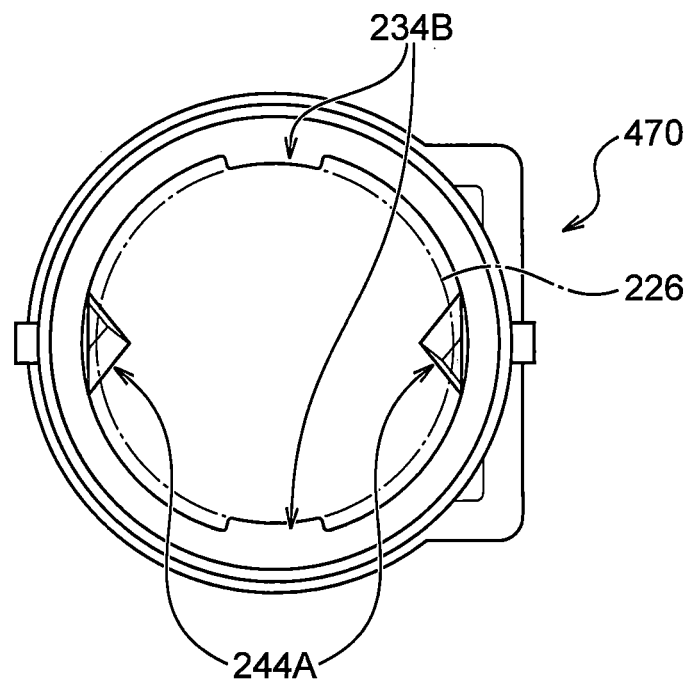


Fig. 23

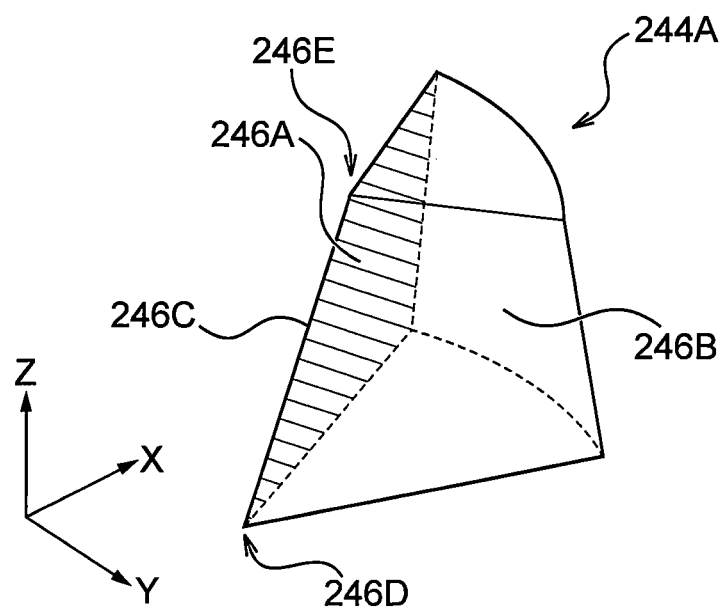


Fig. 24

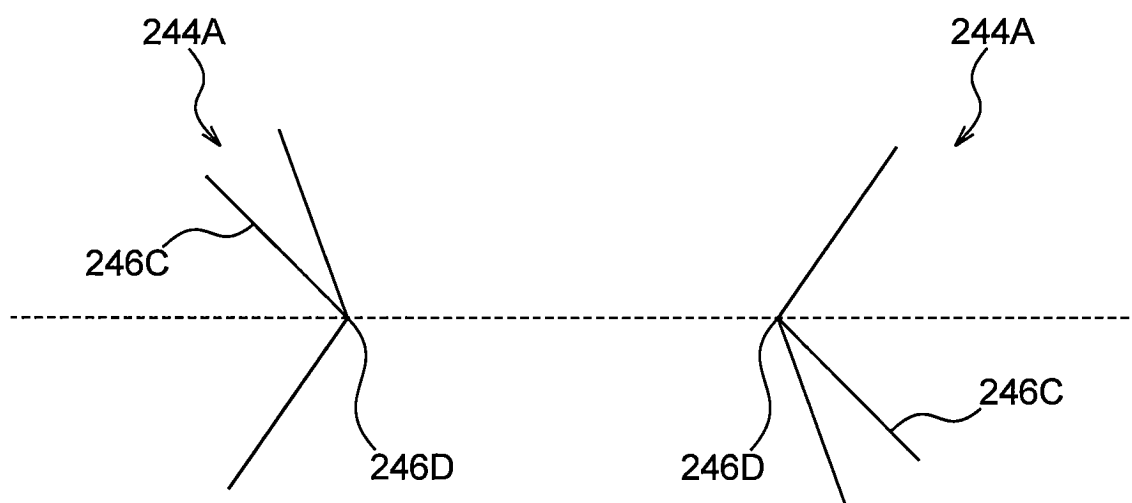


Fig. 25

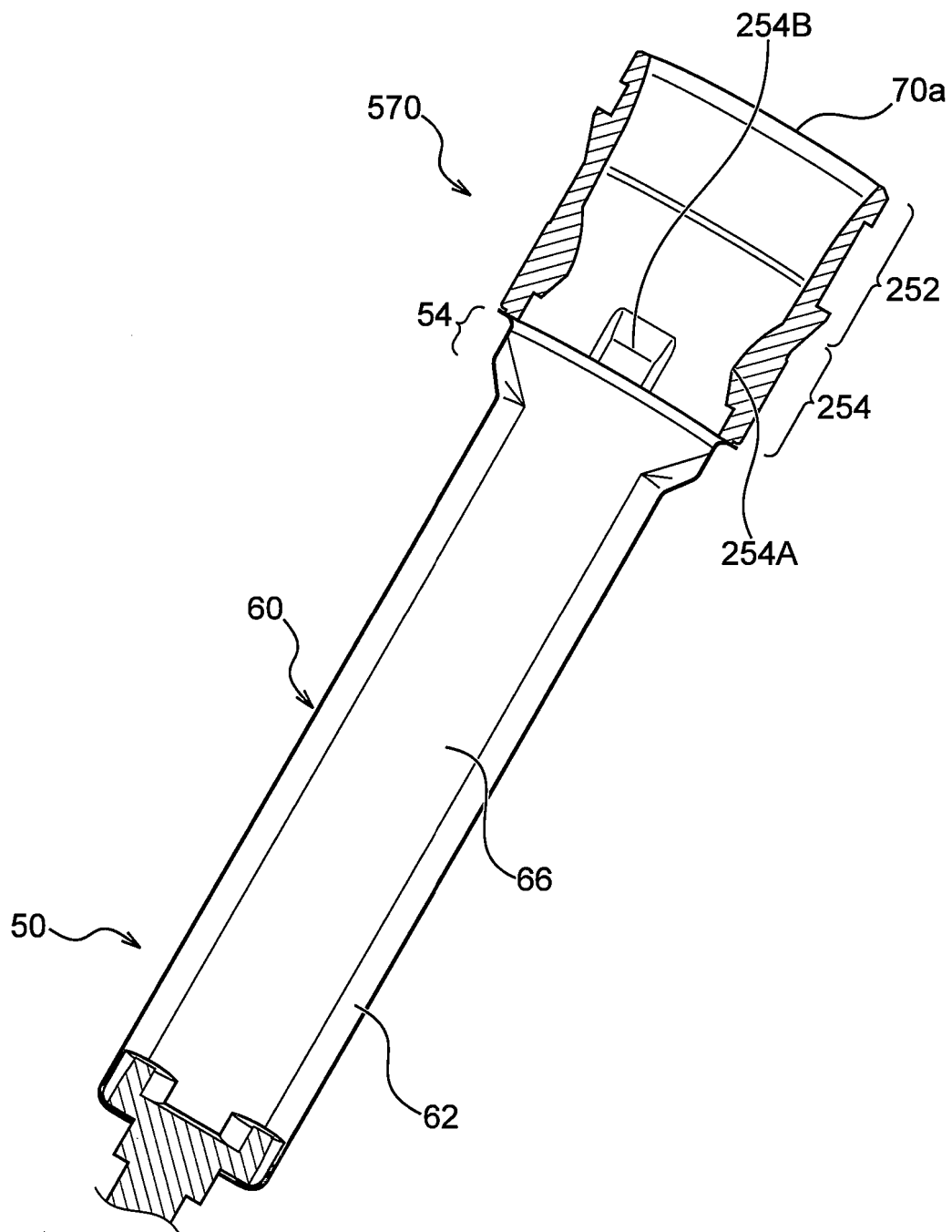


Fig. 26

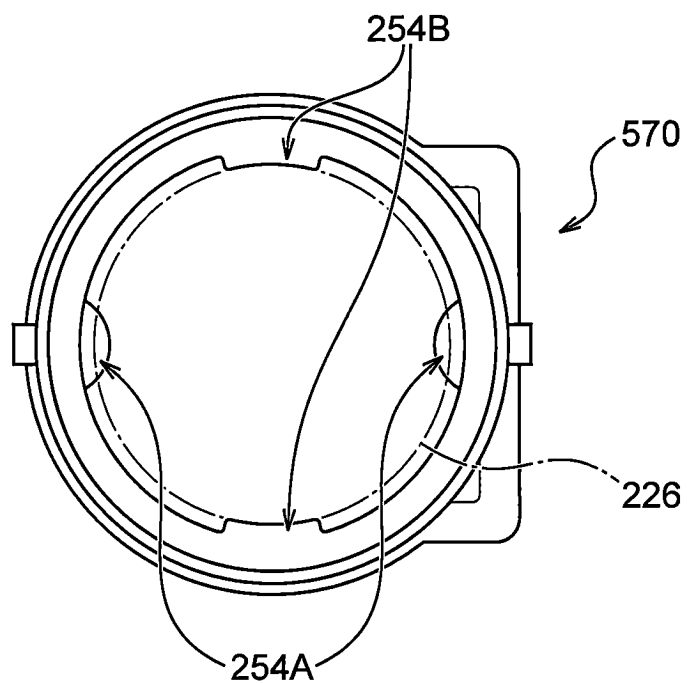


Fig. 27

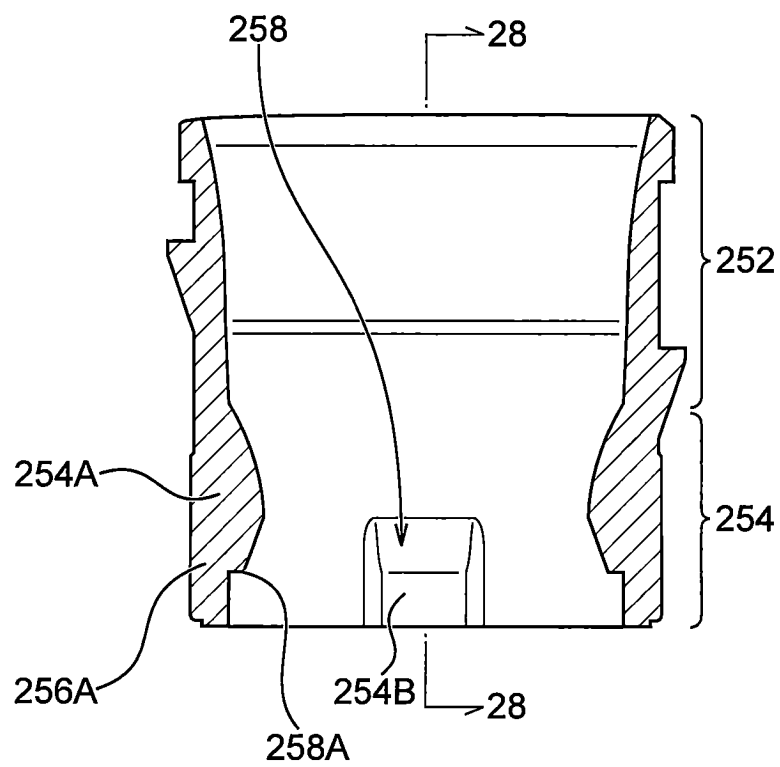


Fig. 28

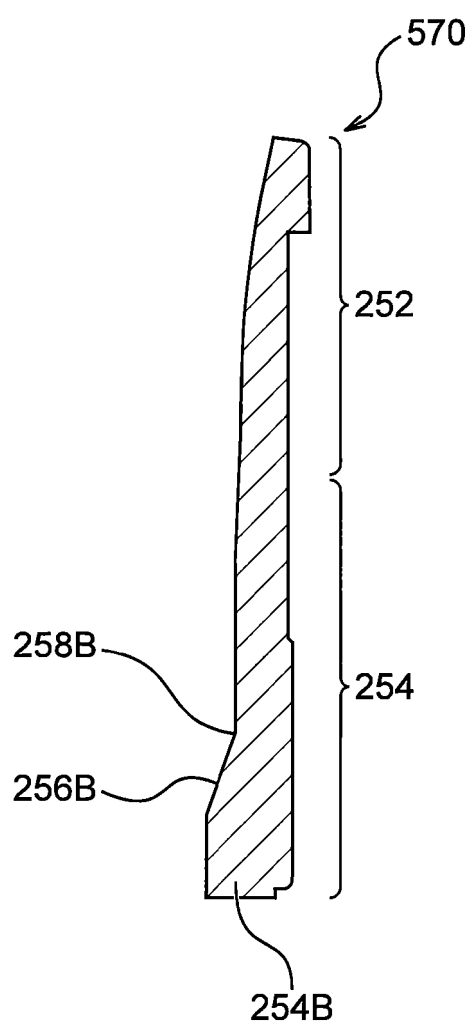


Fig. 29

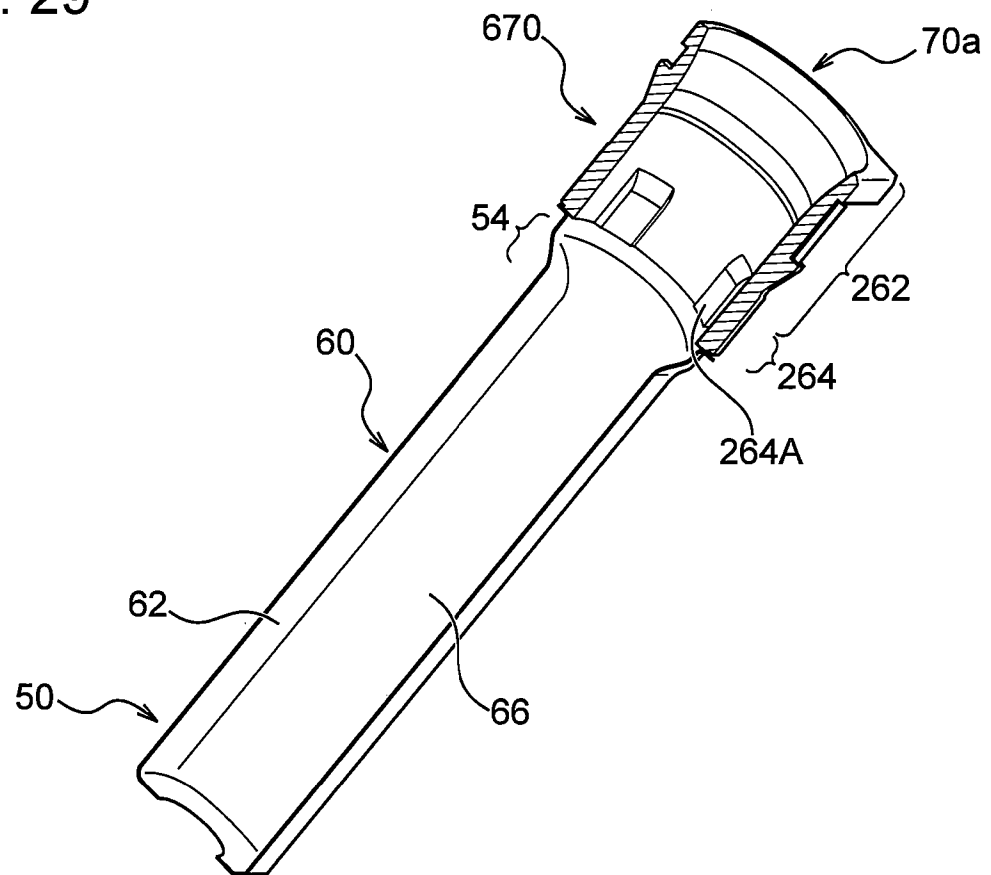


Fig. 30

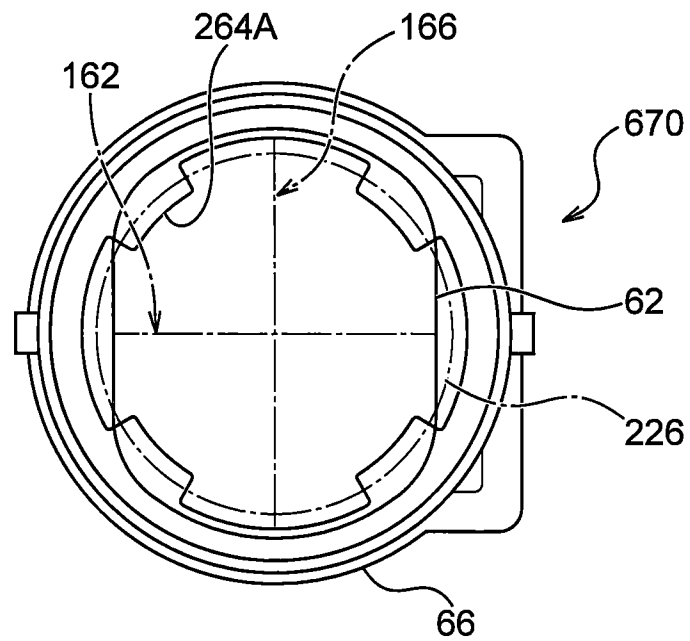
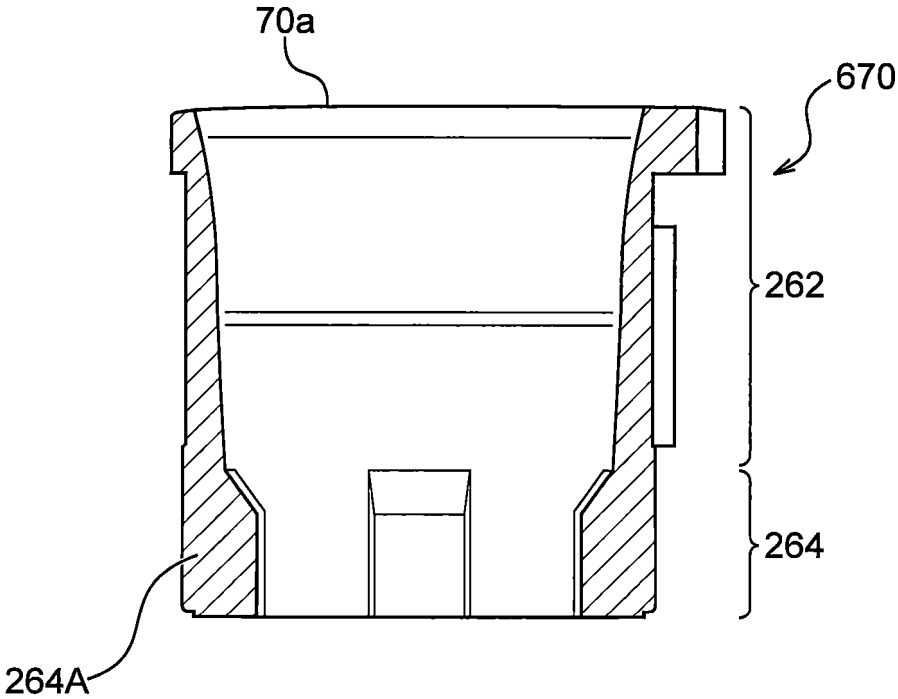


Fig. 31



## INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2021/046190

**A. CLASSIFICATION OF SUBJECT MATTER**

A24F 40/20(2020.01)i

FI: A24F40/20

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

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

A24F40/00-A24F47/00

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

Published examined utility model applications of Japan 1922-1996

Published unexamined utility model applications of Japan 1971-2022

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. |
|-----------|--------------------------------------------------------------------------------------------------|-----------------------|
| X         | JP 2020-516268 A (KT & G CORP.) 11 June 2020 (2020-06-11)<br>paragraphs [0038]-[0285], fig. 1-30 | 1-7, 9, 13-14, 20     |
| Y         |                                                                                                  | 17-20                 |
| A         |                                                                                                  | 8, 10-12, 15-16       |
| Y         | WO 2020/074602 A1 (JT INTERNATIONAL S.A.) 16 April 2020 (2020-04-16)<br>fig. 6                   | 17-20                 |

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

|                                                                                                                                                                         |                                                                                                                                                                                                                                                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
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| "E" earlier application or patent but published on or after the international filing date                                                                               | "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 |
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| "O" document referring to an oral disclosure, use, exhibition or other means                                                                                            |                                                                                                                                                                                                                                                  |
| "P" document published prior to the international filing date but later than the priority date claimed                                                                  |                                                                                                                                                                                                                                                  |

|                                                                                                                                            |                                                                              |
|--------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| Date of the actual completion of the international search<br><b>06 January 2022</b>                                                        | Date of mailing of the international search report<br><b>18 January 2022</b> |
| Name and mailing address of the ISA/JP<br><b>Japan Patent Office (ISA/JP)<br/>3-4-3 Kasumigaseki, Chiyoda-ku, Tokyo 100-8915<br/>Japan</b> | Authorized officer<br><br>Telephone No.                                      |

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

INTERNATIONAL SEARCH REPORT  
Information on patent family members

International application No.  
**PCT/JP2021/046190**

| Patent document<br>cited in search report | Publication date<br>(day/month/year) | Patent family member(s)                                                                                                 | Publication date<br>(day/month/year) |
|-------------------------------------------|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
| JP 2020-516268 A                          | 11 June 2020                         | US 2020/0154765 A1<br>paragraphs [0066]-[0312], fig.<br>1-30<br>EP 3610741 A1<br>CN 207604513 U<br>KR 10-2018-0070436 A |                                      |
| WO 2020/074602 A1                         | 16 April 2020                        | CN 112804894 A                                                                                                          |                                      |

**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

- WO 2017194763 A [0004]