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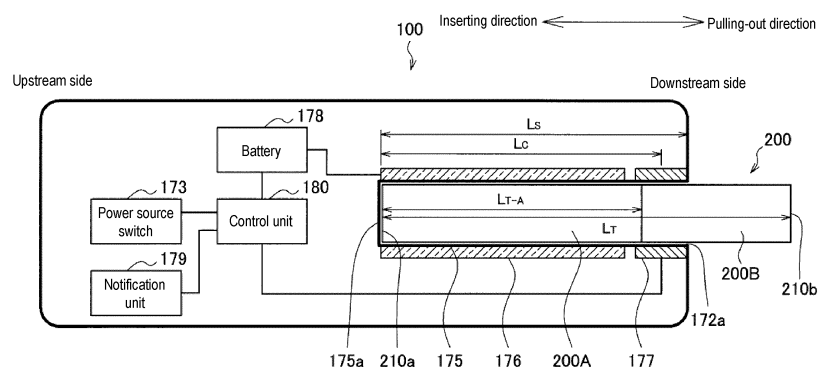
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(54) **SUCTION DEVICE, DEVICE FOR CONTROLLING SUCTION DEVICE, INFORMATION PROCESSING METHOD, AND PROGRAM**

(57) [Problem] To provide a mechanism capable of specifying the arrangement of a flavor component generating base material in a suction device. [Solution] This suction device is characterized by having: a retention part having an internal space; a pressure sensor for detecting

a pressure applied to the inner wall of the retention part; and a control unit for specifying the arrangement of a flavor component generation base material in the internal space of the retention part on the basis of the detection result from the pressure sensor.

Fig. 4



Description

TECHNICAL FIELD

[0001] The present invention relates to an inhaler, a control device for an inhaler, an information processing method, and a program.

BACKGROUND ART

[0002] Inhalers, such as an electronic cigarette, a nebulizer, and so on, each of which generates gas to which a flavor component that is to be sucked by a user has been added, have spread through the market. For example, a flavor component generating base-material which contributes to generation of gas to which flavor components have been added, such as a flavor source for adding flavor to an aerosol source for generating aerosol or to aerosol, is installed in an inhaler; and contents stored in the flavor component generating base-material are consumed every time when the flavor-component-added gas is generated. A user can taste the flavor together with the gas, by sucking (hereinafter, this action may be referred to as puffing) the flavor-component-added gas generated by each of the above inhalers.

[0003] For making it possible to generate flavor-component-added gas in a satisfactory manner, it is desirable that a flavor component generating base-material be installed correctly in an inhaler. In view of the above point, for example, Patent Literature 1 discloses a technique for detecting, by using an optical sensor, a state with respect to whether a cigarette has been inserted in a device which heats a cigarette inserted therein to make a flavor component be allowed to be sucked.

CITATION LIST

PATENT LITERATURE

[0004] PTL 1: Japanese Patent Application Public Disclosure No. H07-184627

SUMMARY OF INVENTION

TECHNICAL PROBLEM

[0005] However, the technique disclosed in Patent Literature 1 merely makes it possible to make a judgment regarding whether a cigarette has been inserted into the inside of a device, and does not make it possible to make a judgment regarding whether the cigarette has been installed correctly in the device. For example, if a cigarette is not installed in a correct position such as an innermost part or the like in the inside of a device and if the cigarette in such a state is heated, there is a risk that uneven heating or heating without an object to be heated occurs.

[0006] The present invention has been achieved in view of the above problem; and an object of the present

invention is to provide means that can specify arrangement of a flavor component generating base-material in an inhaler.

SOLUTION TO PROBLEM

[0007] For solving the above problem, according to a point of view of the present invention, an inhaler is provided, and the inhaler is characterized in that it comprises: a holding part comprising an inner space; a pressure sensor for detecting pressure applied to an inner wall of the holding part; and a control unit which specifies, based on result of detection by the pressure sensor, arrangement of a flavor component generating base-material in the inner space in the holding part.

[0008] The inhaler may further comprises a function part which applies, to the flavor component generating base-material held in the inner space of the holding part, a function that makes the flavor component generating base-material generate flavor-component-added gas.

[0009] The holding part may comprise an opening which makes the inner space communicate with an outer space; and the pressure sensor may detect pressure applied to part of the inner wall of the holding part, wherein the part of the inner wall is in a position that is closer to the side of the opening than the position to which the function is applied by the function part.

[0010] The flavor component generating base-material may comprise a flavor-component generating part and a part which is not the flavor-component generating part, wherein the parts are positioned in an order from an end to the other end, and each of which has hardness different from that of the other; and the control unit may specify that arrangement of the flavor component generating base-material corresponds to predetermined arrangement, if pressure corresponding to the hardness of the part which is not the flavor-component generating part is detected by the pressure sensor.

[0011] The predetermined arrangement may be arrangement wherein the flavor-component generating part and one part of the part which is not the flavor-component generating part are held in the inner space, and the other part of the part which is not the flavor-component generating part protrudes to the outer space from the opening.

[0012] The predetermined arrangement may be arrangement wherein the flavor-component generating part is positioned in the position to which the function part applies the function.

[0013] The holding part may comprise an opening which makes the inner space communicate with an outer space; the inhaler may comprise a first elastic member installed in a position, in part of the inner wall of the holding part, that is closer to the side of the opening than the position to which the function is applied by the function part; and the pressure sensor may detect pressure applied to the first elastic member.

[0014] Parts of the flavor component generating base-

material, from one end to the other end thereof, may have different degrees of hardness; the inhaler may comprise plural function parts; and the control unit may specify a position of the one end of the flavor component generating base-material in the inner space, and, based on the specified position, may select a function part, to which electric power is to be supplied, from the plural function parts.

[0015] The holding part may comprise an opening which makes the inner space communicate with an outer space; the flavor component generating base-material may be inserted into the inner space from the opening; and the pressure sensor may detect pressure applied to a part, which is positioned in an end part positioned in an inserting direction, of the inner wall of the holding part.

[0016] The inhaler may comprise a piston member which is installed in the part, which is positioned in the end part positioned in an inserting direction, of the inner wall of the holding part, and can move in the inserting direction; and the control unit may specify that arrangement of the flavor component generating base-material corresponds to predetermined arrangement, if pressure representing a state that the distance of movement of the piston member in the inserting direction has reached a predetermined threshold value is detected by the pressure sensor.

[0017] The flavor component generating base-material may comprise a second elastic member which protrudes in a transverse direction; the holding part may comprise an opening which makes the inner space communicate with an outer space, and a groove part which is formed on the inner wall and along which the second elastic member can slide when the flavor component generating base-material is inserted or pulled out; the groove part may comprise a first end positioned in the inserting direction, and a second end positioned between the first end and the opening and in the pulling-out direction, and position shift in a circumferential direction between a gate, which is formed in the opening, of the groove part and the first end part in the inner space may be large, compared with position shift in the circumferential direction between the gate and the second end part in the inner space; and the inhaler may further comprise a third elastic member which exerts elastic force, in the pulling-out direction, to the flavor component generating base-material.

[0018] The inhaler may comprise a fourth elastic member which protrudes in a transverse direction in the inner space, and may further comprise a sliding member which can slide, in the inner space, along the inner wall of the holding part, and a fifth elastic member which exerts elastic force, in the pulling-out direction, to the sliding member; the holding part may comprise an opening which makes the inner space communicate with an outer space, and a groove part which is formed on the inner wall and along which the fourth elastic member can slide when the sliding member is slid; and the groove part may comprise a first end positioned in the inserting direction, and

a second end positioned between the first end and the opening and in the pulling-out direction, and position shift in a circumferential direction between a gate, which is formed in the opening, of the groove part and the first end part in the inner space may be large, compared with position shift in the circumferential direction between the gate and the second end part in the inner space.

[0019] The holding part may comprise a first housing and a second housing which can be separated from or coupled to each other, and the flavor component generating base-material may be held between the first housing and the second housing in the state that the housings are being coupled with each other.

[0020] The control unit may control the state of supplying of electric power to the function part, based on specified arrangement of the flavor component generating base-material.

[0021] The control unit may change the state of supplying of electric power to the function part to a state that allows supplying of electric power to the function part, if it is specified that arrangement of the flavor component generating base-material corresponds to predetermined arrangement.

[0022] The inhaler may further comprise an operation input part; and the control unit may start supplying of electric power to the function part, if predetermined operation is inputted to the operation input part during the state that allows supplying of electric power to the function part.

[0023] The control unit may start supplying of electric power to the function part, if a suction action performed by a user is detected during the state that allows supplying of electric power to the function part.

[0024] The control unit may change the state of supplying of electric power to the function part to a state that does not allow supplying of electric power to the function part, if it is specified that arrangement of the flavor component generating base-material does not correspond to predetermined arrangement.

[0025] The inhaler may comprise a notification unit; and the control unit may control the notification unit to output notification corresponding to specified arrangement of the flavor component generating base-material.

[0026] The control unit may control the notification unit to output notification that becomes different according to judgment as to whether specified arrangement of the flavor component generating base-material corresponds to predetermined arrangement.

[0027] The notification unit may perform at least one of light emission, display, sound output, and vibration actions.

[0028] For solving the above problem, according to a different point of view of the present invention, a control device for an inhaler is provided, wherein the control device is characterized in that it comprises: a control unit which specifies, based on result of detection by a pressure sensor which detects pressure applied to an inner wall of a holding part which comprises an inner space,

arrangement of a flavor component generating base-material in the inner space of the holding part.

[0029] For solving the above problem, according to a different point of view of the present invention, an information processing method is provided, wherein the method is characterized in that it comprises: a process for specifying, based on result of detection by a pressure sensor which detects pressure applied to an inner wall of a holding part which comprises an inner space, arrangement of a flavor component generating base-material in the inner space of the holding part.

[0030] For solving the above problem, according to a different point of view of the present invention, a program is provided, wherein the program is that which makes a computer function as control unit which specifies, based on result of detection by a pressure sensor which detects pressure applied to an inner wall of a holding part which comprises an inner space, arrangement of a flavor component generating base-material in the inner space of the holding part.

ADVANTAGEOUS EFFECTS OF INVENTION

[0031] As explained above, according to the present invention, means that can specify a position of a flavor component generating base-material in an inhaler is provided.

BRIEF DESCRIPTION OF DRAWINGS

[0032]

Fig. 1 is a figure showing a construction example of an inhaler according to an embodiment of the present invention.

Fig. 2 is a general perspective view of an inhaler in the state that it is holding a flavor component generating base-material, according to an embodiment of the present invention.

Fig. 3 is a cross-section view of a smoking article.

Fig. 4 is a block diagram showing an example of a schematic construction of an inhaler in the state that it is holding a smoking article, according to a first embodiment.

Fig. 5 is a flow chart showing an example of a flow of a heating control process performed in an inhaler according to the above embodiment.

Fig. 6 is a block diagram showing an example of a schematic construction of an inhaler in the state that it is holding a smoking article, according to a second embodiment.

Fig. 7 is a block diagram showing an example of a schematic construction of an inhaler in the state that it is holding a smoking article, according to a third embodiment.

Fig. 8 is a block diagram showing an example of a schematic construction of an inhaler in the state that it is holding a smoking article, according to a fourth

embodiment.

Fig. 9 is a flow chart showing an example of a flow of a heating control process performed in an inhaler according to the above embodiment.

Fig. 10 is a figure schematically showing a procedure to insert a smoking article into an inhaler according to a first modified example.

Fig. 11 is a figure showing a schematic construction example of an inhaler according to a second modified example.

DESCRIPTION OF EMBODIMENTS

[0033] In the following description, preferred embodiments of the present invention will be explained in detail with reference to the attached figures. In this regard, in the specification and the figures, for omitting overlapping explanations, a reference number that is the same as that assigned to one component is assigned to the other component, in the case that the other component has a function/construction that is substantially the same as that of the one component.

<< 1. Basic Construction >>

[0034] In the following description, a basic construction example of an inhaler according to the present invention will be explained with reference to Figs. 1-3. Fig. 1 is a figure showing a construction example of an inhaler according to an embodiment of the present invention.

[0035] Fig. 1 is a general perspective view of an inhaler according to an embodiment of the present invention. Fig. 2 is a general perspective view of the inhaler in the state that it is holding a flavor component generating base-material, according to the embodiment of the present invention. In the present embodiment, the inhaler 100 is constructed to generate aerosol including a flavor, for example, by heating a flavor component generating base-material, such as a smoking article, which comprises an aerosol source and a filling article including a flavor source. In the present embodiment, a smoking article 200 is used as a flavor component generating base-material.

[0036] A person skilled in the art will understand that the smoking article 200 is a mere example of a flavor component generating base-material. An aerosol source included in a flavor component generating base-material may be solid or liquid. The aerosol source may be liquid such as polyhydric alcohol, such as glycerin or propylene glycol, or water, or the like, for example. The aerosol source may comprise a tobacco raw material or an extract originated from a tobacco raw material, which releases a fragrance-inhaling-taste component when it is heated. In the case that the inhaler 100 is an inhaler for medical use, such as a nebulizer or the like, the aerosol source may comprise a medicine that is to be sucked by a patient. The flavor component generating base-material may not comprise a flavor source, depending on intended use

thereof. Further, gas, to which flavor components generated from a flavor component generating base-material are to be added, is not limited to aerosol, and, for example, invisible vapor may be generated.

[0037] As shown in Figs. 1 and 2, the inhaler 100 comprises a top housing 171A, a bottom housing 171B, a cover 172, a power source switch 173, and a lid part 174. Further, as shown in Fig. 2, the inhaler 100 comprises a holding part 175 and a heating unit 176 therein. The outermost housing 171 of the inhaler 100 is constructed as a result that the top housing 171A and the bottom housing 171B are connected to each other. The housing 171 may have a size that fits in a hand of a user. In the above case, when a user uses the inhaler 100, the user can hold the inhaler 100 by a user's hand, and suck aerosol.

[0038] The top housing 171A comprises an opening (not shown in the figures), and the cover 172 is coupled to the top housing 171A to close the opening. As shown in Fig. 2, the cover 172 has an opening 172a into which the smoking article 200 can be inserted. The lid part 174 is constructed to open/close the opening 172a of the cover 172. Specifically, the lid part 174 is attached to the cover 172, and constructed to be able to move, along a surface of the cover 172, between a first position for closing the opening 172a and a second position for opening the opening 172a.

[0039] The power source switch 173 is used for switching between an ON state and an OFF state of operation of the inhaler 100. For example, in a state that the smoking article 200 has been inserted in the opening 172a and attached therein as shown in Fig. 2, a user can make the smoking article 200 be heated without combustion thereof, by manipulating the power source switch 173 to thereby supply electric power from a battery (not shown in the figures) to the heating unit 176. As a result that the smoking article 200 is heated, aerosol is generated from an aerosol source included in the smoking article 200, and flavor in a flavor source is taken in the aerosol. A user can suck aerosol including flavor, by sucking it from a part of the smoking article 200 projecting from the inhaler 100 (the part shown in Fig. 2).

[0040] In this regard, in this specification, a direction along that a flavor component generating base-material such as the smoking article 200 is inserted to the opening 172a is also referred to as an inserting direction, and a direction along that a flavor component generating base-material such as the smoking article 200 is pulled out from the opening 172a is also referred to as a pulling-out direction. In the case that it is not necessary to specifically distinguish between the inserting direction and the pulling-out direction, these directions are also collectively referred to as a longitudinal direction.

[0041] The holding part 175 comprises an inner space, and houses part of the smoking article 200 in the inner space and holds the smoking article 200. The holding part 175 comprises the opening 172a which makes the inner space communicate with an outer space, and holds the smoking article 200 inserted from the opening 172a

to the inner space. For example, the holding part 175 is a cylindrical body extending along the longitudinal direction, and defines a columnar inner space. The holding part 172 may be constructed in such a manner that, at least in part thereof in the longitudinal direction, an inner diameter is smaller than an outer diameter of the smoking article, and may hold the smoking article 200 inserted in the inner space by pressing the smoking article 200 from the outer periphery thereof. The holding part 175 also has a function to define a flow path of air supplied to the smoking article.

[0042] In the state that the smoking article 200 is being held by the holding part 175, if a user holds the part protruding from the opening 172a of the smoking article 200 in the user's mouth and performs a sucking action, air flows into the inside of the holding part 175 from a hole which is not shown in the figures. The air that has flown into the inside of the holding part 175 passes through the inside, and, together with aerosol generated from the smoking article 200, arrives at the inside of the mouth of the user. Thus, the side closer to the opening 172a of the holding part 175 is a downstream side, and the side opposite thereto is an upstream side. In the example shown in Fig. 2, the pulling out direction is that to the downstream side, and the inserting direction is that to the upstream side.

[0043] The heating unit 176 has a function to heat the smoking article 200 held in the inner space of the holding part 175 from the outer periphery of the smoking article 200, by heating the inner space of the holding part 175 from the outer periphery thereof. At least part of the holding part 175 may be the heating unit 176. For example, the heating unit 176 may be a cylindrical body extending along the longitudinal direction, and may be part of the construction of the holding part 175. Also, the heating unit 176 may be arranged on the circumference of the holding part 175, and may heat the smoking article 200 across the holding part 175. In this regard, the heating unit 176 is a mere example of a function part which applies, to a flavor component generating base-material held in the holding part, a function that makes the flavor component generating base-material generate flavor-component-added gas. Regarding the function applied to the flavor component generating base-material, the function is not limited to a heating function, and may be any function such as an ultrasonic vibration function or the like.

[0044] The construction of the inhaler 100 shown in each of Figs. 1 and 2 is a mere example of the inhaler according to the present invention. The inhaler according to the present invention can be constructed to have any one of various types of forms, wherein, in each form, flavor-component-added gas is generated from a flavor component generating base-material by holding the flavor component generating base-material and applying a function, and the generated gas is allowed to be sucked by a user.

[0045] Next, as an example of a flavor component gen-

erating base-material used in the inhaler 100 according to the present embodiment, the construction of the smoking article 200 will be explained. Fig. 3 is a cross-section view of the smoking article 200. In the embodiment shown in Fig. 3, the smoking article 200 comprises a base-material part 200A, which comprises a filling article 201 and first rolling paper 202 by which the filling article 201 is wound, and a suction opening part 200B which forms an end part opposite to the base-material part 200A. The base-material part 200A and the suction opening part 200B are connected by second rolling paper 203 which is different from the first rolling paper 202. In this regard, it is possible to connect the base-material part 200A and the suction opening part 200B by using the first rolling paper 202, i.e., by omitting the second rolling paper 203.

[0046] The suction opening part 200B in Fig. 3 comprises a paper tube part 204, a filter part 205, and a hollow segment part 206 positioned between the paper tube part 204 and the filter part 205. For example, the hollow segment part 206 comprises a filling layer including one or plural hollow channels, and a plug wrapper for covering the filling layer. Since the density of filled fibers in the filling layer is high, air and aerosol flows through the hollow channel only, and almost no air and aerosol flows through the filling layer, when suction action is performed. Regarding the smoking article 200, if it is desired to lower a decrease in the quantity of delivery of aerosol due to filtering of the aerosol components in the filter part 205, shortening the length of the filter part 205 and replacing that part by the hollow segment part 206 will be effective for increasing the quantity of delivery of the aerosol.

[0047] In the embodiment shown in Fig. 3, the suction opening part 200B comprises three segments. However, in the other embodiment, the suction opening part 200B may be constructed by using one or two segments, or may be constructed by using four or more segments. For example, it is possible to omit the hollow segment part 206, and form the suction opening part 200B by arranging the paper tube part 204 and the filter part 205 adjacent to each other.

[0048] In the embodiment shown in Fig. 3, regarding the length in the longitudinal direction of the smoking article 200, it is preferable to set it to 40-90 mm, more preferable to set it to 50-75 mm, and still more preferably to set it to 50-60 mm. Regarding the circumference of the smoking article 200, it is preferable to set it to 15-25 mm, more preferable to set it to that equal to or less than 17-24 mm, and still more preferably to set it to 20-22 mm. Further, regarding the smoking article 200, the length of the base-material part 200A may be 20 mm, the length of the first rolling paper 202 may be 20 mm, the length of the hollow segment part 206 may be 8 mm, and the length of the filter part 205 may be 7 mm. The length of each of the above segments may be changed appropriately, according to suitability to manufacture, required quality, and so on.

[0049] In the present embodiment, the filling article 201 in the smoking article 200 may comprise an aerosol

source which generates aerosol when it is heated at predetermined temperature. The kind of the aerosol source is not specifically limited, and extracted material and/or components obtained from various natural products may be selected as an aerosol source according to intended use. Glycerin, propylene glycol, triacetin, 1,3-butanediol, and a mixture thereof, for example, can be listed as aerosol sources. The aerosol source content of the filling article 201 is not specifically limited; and, in view of generation of sufficient quantity of aerosol and satisfactory addition of fragrance inhaling taste, the aerosol source content is usually equal to or greater than 5 weight percent, and is preferably equal to or greater than 10 weight percent, and is usually equal to or less than 50 weight percent, and is preferably equal to or less than 20 weight percent.

[0050] The filling article 201 in the smoking article 200 in the present embodiment may comprise shredded tobacco as a flavor source. The material of shredded tobacco is not specifically limited, and publicly known material such as a lamina, a stem, and so on may be used as the material. The range of the content of the filling article 201 in the smoking article 200, in the case that the circumference is 22 mm and the length is 20 mm, is, for example, 200-400 mg, and is preferably 250-320 mg. The water content of the filling article 201 is, for example, 8-18 weight percent, and is preferably 10-16 weight percent. In the case that the water content is that explained above, occurrence of staining at the time of rolling is suppressed, and suitability to rolling at the time of manufacture of the base-material part 200A is made satisfactory. There is no special limitation with respect to the size, the preparation method, and so on of the shredded tobacco used as the filling article 201. For example, dried tobacco leaves cut into pieces, each having the width of 0.8-1.2 mm, may be used. Alternatively, dried tobacco leaves are crushed and uniformized to become particles, regarding which the average particle size is approximately 20-200 μm , and the particles are processed to become a sheet, and the sheet cut into pieces, each having the width of 0.8-1.2 mm, may be used. Further, the above sheet formed via the sheet process may be processed to gather it without cutting it, and the gathered sheet may be used as the filling article 201. Further, the filling article 201 may comprise one kind or two or more kinds of flavors. The kinds of flavors are not specifically limited; however, in view of provision of satisfactory smoke flavor, a flavor is menthol, preferably.

[0051] In the present embodiment, each sheet of the first and second rolling paper 202 and 203 in the smoking article 200 may be constructed by use of base paper which has the basis weight of, for example, 20-65 gsm, preferably, 25-45 gsm. The thickness of each sheet of the first and second rolling paper 202 and 203 is not specifically limited; however, in view of rigidity, gas permeability, and easiness of adjustment at the time of paper manufacture, the thickness is set to 10-100 μm , preferably, set to 20-75 μm , and, more preferably, set to 30-50

μm.

[0052] In the present embodiment, filler may be included in the rolling paper 202 and 203 in the smoking article 200. The filler content may be equal to or greater than 10 weight percent and less than 60 weight percent, and, may preferably be 15-45 weight percent, with respect to the total weight of the first rolling paper 202 and the second rolling paper 203. In the present embodiment, it is preferable that the filler be 15-45 weight percent, with respect to a preferable range of basis weight (25-45 gsm). For example, calcium carbonate, titanium dioxide, kaolin, and so on may be used as filler. Paper including filler such as that explained above presents a white color that is preferable in view of appearance of paper used as rolling paper of the smoking article 200, and is able to keep its whiteness permanently. By including a large quantity of filler such as that explained above, the ISO whiteness of rolling paper can be raised to 83 % or more, for example. Further, in view of practicality in terms of use of it as rolling paper in the smoking article 200, it is preferable that the first rolling paper 202 and the second rolling paper 203 have the tensile strength of 8N/15mm or more. The tensile strength can be increased by reducing the filler content. Specifically, the tensile strength can be increased by reducing the filler content to that less than the upper limit of the filler content that has been shown with respect to each range of the basis weight illustrated in the above description.

<< 2. First Embodiment >>

[0053] The present embodiment has a form wherein a pressure sensor is installed in a downstream-side end part of a holding part, and the state of arrangement of a flavor component generating base-material in the holding part is specified based on result of detection by the pressure sensor.

(Construction Example)

[0054] Fig. 4 is a block diagram showing an example of a schematic construction of an inhaler 100 in the state that it is holding a smoking article 200, according to a first embodiment. As shown in Fig. 4, the inhaler 100 comprises a pressure sensor 177, a battery 178, a notification unit 179, and a control unit 180, in addition to the components explained with reference to Figs. 1 and 2. In this regard, representation of the same components (for example, the heating unit 176 and the pressure sensor 177) in the figure, that are represented in such a manner that they hold the holding part 175 between them from the top side and the bottom side of the holding part 175, represents the construction that components are installed in such a manner that they surround the holding part 175. In the following description, the above matter also apply to other block diagrams.

[0055] The pressure sensor 177 detects pressure applied to an inner wall of the holding part 175. The inner

wall of the holding part 175 is a wall defining the inner space of the holding part 175. For example, the pressure sensor 177 may detect pressure applied to at least one point in the inner wall, may detect a total value of pressure applied to a predetermined area of the inner wall, or may detect distribution of pressure applied to a predetermined area of the inner wall. The pressure sensor 177 is installed in a position, in the inner wall of the holding part 175, that is closer to the side of the opening 172a than the position heated by the heating unit 176, and detects pressure applied to the inner wall in the position where the pressure sensor 177 is installed. In the example shown in Fig. 4, the pressure sensor 177 is installed in the downstream-side end part of the holding part 175, and detects pressure applied to the inner wall of the downstream-side end part. For example, the holding part 175 is that holding the smoking article 200 in such a manner that it applies pressure to the outer periphery of the smoking article 200, and the pressure sensor 177 is installed in a part in the holding part 175 where the inner diameter thereof is smaller than the outer diameter of the smoking article 200. Thus, pressure applied to the above part is detected by the pressure sensor 177. The pressure sensor 177 is also able to detect attachment/detachment of the smoking article 200 to/from the inhaler 100, based on judgment as to whether or not the detected pressure is equal to or greater than a predetermined threshold value. Since the pressure sensor 177 is installed in the downstream-side end part of the holding part 175, the pressure sensor 177 can be separated from the heating unit 176 and failure of the pressure sensor 177 due to the heat can be prevented.

[0056] The inhaler 100 may comprise any sensors different from the pressure sensor 177. For example, the inhaler 100 may comprise a pressure sensor for detecting change in air pressure in the inside of the holding part 175 or a flow rate sensor for detecting a flow rate of aerosol, and presence/absence of suction action and the quantity of suction by a user may be detected by the above sensors. The above pressure sensor or flow rate sensor may be constructed to count the number of times of puffs performed by a user by using the inhaler 100. Further, the inhaler 100 may comprise a weight sensor for detecting the weight of the smoking article 200. Further, the inhaler 100 may comprise a sensor which accumulates time of electrical conduction to the heating unit 176. Further, the inhaler 100 may comprise a sensor for detecting an SOC (State of Charge), an integrated current value, a voltage, or the like of the battery 178. The integrated current value may be obtained by using a current integration method, an SOC-OCV (Open Circuit Voltage) method, or the like.

[0057] The battery 178 is a power source which stores electric power, and supplies electric power to the respective components in the inhaler 100, such as the heating unit 176, the notification unit 179, the pressure sensor 177, the control unit 180, and so on. The battery 178 may be a rechargeable battery or a non-rechargeable battery,

for example. The battery 178 may be charged by connecting it to an external electric power source via a predetermined port (not shown in the figure) of the inhaler 100. The battery 178 only may be able to be detached from the inhaler 100, and may be able to be replaced by a new battery 178.

[0058] The notification unit 179 may comprise a light emitting element such as an LED (Light Emitting Diode), a display, a speaker, a vibrator, and so on. The notification unit 179 is constructed to provide a user with some information by performing at least one of light emission, display, sound output, and vibration actions, as necessary. Further, the notification unit 179 may comprise a communication device, and transmit information to the other device such as a smartphone or the like to provide a user with the information via the other device.

[0059] The control unit 180 functions as an arithmetic processing unit and a control device, and controls overall operation in the inhaler 100. The control unit 180 may be an electronic circuit module constructed as a microprocessor or a microcomputer. The control unit 180 may be constructed to control operation of the inhaler 100 in accordance with computer-executable instructions stored in a storage unit which is not shown in the figure. The storage unit is a storage medium such as a ROM (Read Only Memory), a RAM (Random Access Memory), a flash memory, or the like. The storage unit may store, in addition to computer-executable instructions such as those explained above, setting data which are necessary for controlling the inhaler 100 and other data. For example, the storage unit may store various data such as methods for controlling the notification unit 179 (modes of light emission, vocalization, vibration, etc., and so on), values detected by the pressure sensor 177, history of heating by the heating unit 176, and so on. The control unit 180 reads data from the storage unit and uses the data for controlling the inhaler 100 as necessary, and stores data in the storage unit as necessary.

[0060] The smoking article 200 is inserted into the holding part 175 and held thereby. In the state that the smoking article 200 is being held in the holding part 175, the longitudinal direction of the inhaler 100 and the longitudinal direction of the smoking article 200 coincide or approximately coincide with each other. In the following description, it is supposed that the longitudinal direction of the inhaler 100 and the longitudinal direction of the smoking article 200 coincide with each other, unless specifically explained. The smoking article 200 is inserted into the inner space of the holding part 175 from the opening 172a in such a manner that the base-material part 200A which is defined as the head is inserted first into the holding part 175, and is held in the state that at least part of the suction opening part 200B protrudes to the outer space. With respect to the ends of the smoking article 200 in the longitudinal direction, one end positioned in the base-material part 200A side is referred to as a tip 210a, and the other end positioned in the suction opening part 200B side is also referred to as a rear end 210b.

[0061] In this regard, the base-material part 200A includes, as contents, an aerosol source and a flavor source, to which flavor-component-added gas contributes. The base-material part 200A corresponds to a flavor component generating part of a flavor component generating base-material. On the other hand, the suction opening part 200B is a part, that is to be held in a user's mouth, for allowing suction of aerosol generated by the base-material part 200A, and does not include a flavor source or a aerosol source, typically. The suction opening part 200B corresponds to a part, which is not the flavor-component generating part, of a flavor component generating base-material.

(Operation)

- Specifying of Arrangement

[0062] The control unit 180 specifies, based on result of detection by the pressure sensor 177, arrangement of the smoking article 200 in the inner space of the holding part 175. Arrangement of the smoking article 200 in the holding part 175 refers to arrangement of the smoking article 200 inserted into the inner space of the holding part 175 in the longitudinal direction. If it is explained more simply, arrangement of the smoking article 200 in the holding part 175 refers to a position of the tip 210a of the smoking article 200 in the longitudinal direction, in other words, the depth that the smoking article 200 is inserted.

[0063] For example, the control unit 180 judges whether arrangement of the smoking article 200 in the holding part 175 corresponds to predetermined correct arrangement. The arrangement shown in Fig. 4 is an example of correct arrangement. Correct arrangement is that wherein the base-material part 200A and a part of the suction opening part 200B are held in the inner space of the holding part 175, and the other part of the suction opening part 200B protrudes from the opening 172a to the outer space. The longitudinal-direction length L_S from a bottom part 175a of the holding part 175 to the opening 172a is longer than the longitudinal-direction length L_{T-A} of the base-material part 200A, and shorter than the longitudinal-direction length L_T of the smoking article 200. Thus, for example, if the smoking article 200 is inserted in such a manner that the tip 210a of the smoking article 200 touches the bottom part 175a of the holding part 175 (i.e., reaches the innermost place), it is regarded that the arrangement of the smoking article 200 corresponds to the correct arrangement. In the other point of view, correct arrangement refers to arrangement wherein the smoking article 200 is positioned in a position heated by the heating unit 176. In the case that arrangement of the smoking article 200 corresponds to correct arrangement, heat is applied by the heating unit 176 to part, that is larger when compared with the part in the case that the arrangement of the smoking article 200 does not correspond to the correct arrangement, of the base-material

part 200A, uneven heating can be prevented, and flavor-component-added aerosol can be generated efficiently. Further, in the case that arrangement of the smoking article 200 corresponds to correct arrangement, heating by the heating unit 176 without an object to be heated can be prevented.

[0064] Regarding the smoking article 200, the smoking article 200 comprises the base-material part 200A and the suction opening part 200B which are positioned in an order in the longitudinal direction from the position of the tip 210a to the position of the rear end 210b, and hardness of one of them is different from that of the other. It is desirable to set the range of hardness of the base-material part 200A and the range of hardness of the suction opening part 200B in such a manner that they are separated from each other by more than a predetermined value for ensuring accuracy with respect to specifying of arrangement of the smoking article 200. Typically, the hardness of the base-material part 200A is uniform and the hardness of the suction opening part 200B is uniform, in the longitudinal direction; and the base-material part 200A is softer than the other, i.e., the suction opening part 200B is harder than the other.

[0065] The control unit 180 uses a difference between the hardness of the base-material part 200A and the hardness of the suction opening part 200B to specify arrangement of the smoking article 200 in the holding part 175. Specifically, the control unit 180 judges that arrangement of the smoking article 200 corresponds to correct arrangement, in the case that the pressure detected by the pressure sensor 177 is that within a range of pressure comprising pressure that is assumed to be detected when arrangement of the smoking article 200 corresponds to correct arrangement. In the present case, the longitudinal-direction length L_C from the bottom part 175a of the holding part 175 to the position where the pressure sensor 177 detects pressure is longer than the longitudinal-direction length L_{T-A} of the base-material part 200A and shorter than the longitudinal-direction length L_T of the smoking article 200. Thus, in the case that arrangement of the smoking article 200 corresponds to correct arrangement, the suction opening part 200B positions in the position where the pressure sensor 177 detects pressure, as shown in Fig. 4. Accordingly, the control unit 180 judges that arrangement of the smoking article 200 corresponds to correct arrangement, in the case that pressure corresponding to the hardness of the suction opening part 200B is detected by the pressure sensor 177. For example, the control unit 180 judges that arrangement of the smoking article 200 corresponds to correct arrangement, in the case that pressure detected by the pressure sensor 177 is equal to or greater than a predetermined threshold value. On the other hand, the control unit 180 judges that arrangement of the smoking article 200 does not correspond to the correct arrangement, in the case that pressure detected by the pressure sensor 177 is less than the predetermined threshold value. For example, the predetermined threshold value is any value

between a pressure value corresponding to the hardness of the base-material part 200A and a pressure value corresponding to the hardness of the suction opening part 200B.

[0066] Regarding operation modes of the inhaler 100, the modes may include a sleep mode, a standby mode, and heating mode. The sleep mode is an operation mode for monitoring pressing of the power source switch 173. The standby mode is an operation mode for monitoring arrangement of the smoking article 200 in the holding part 175 and monitoring judgement with respect to whether a condition to perform heating is satisfied. The heating mode is an operation mode for performing supplying of electric power to the heating unit 176. If the power source switch 173 is pressed when the operation mode of the inhaler 100 is the sleep mode, the mode changes to the standby mode. After the mode is changed to the standby mode, supplying of electric power from the battery 178 to the pressure sensor 177 is started, so that the pressure sensor 177 is brought to a state wherein it can detect pressure, and the above-explained process to specify arrangement of the smoking article 200 is performed. It may also be possible to continue specifying of arrangement of the smoking article 200 in the heating mode.

- Control Corresponding to Specified Arrangement

[0067] The control unit 180 controls, based on specified arrangement of the smoking article 200, the state with respect to supplying of electric power to the heating unit 176. In more detail, in the case that it is specified that arrangement of the smoking article 200 corresponds to correct arrangement, the control unit 180 changes the state with respect to supplying of electric power to the heating unit 176 to a state that allows supplying of electric power to the heating unit 176. The state that allows supplying of electric power to the heating unit 176 is a state wherein supplying of electric power to the heating unit 176 is performed if a predetermined condition (hereinafter, a heating performing condition) is satisfied in the state. On the other hand, in the case that it is specified that arrangement of the smoking article 200 does not correspond to correct arrangement, the control unit 180 changes the state with respect to supplying of electric power to the heating unit 176 to a state that does not allow supplying of electric power to the heating unit 176. The state that does not allow supplying of electric power to the heating unit 176 is a state wherein supplying of electric power to the heating unit 176 is not performed regardless of whether the heating performing condition is satisfied. Supplying of electric power to the heating unit 176 is allowed only when arrangement of the smoking article 200 corresponds to correct arrangement, so that it becomes possible to prevent occurrence of uneven heating and heating without an object to be heated.

[0068] The heating performing condition may be occurrence of an event that the power source switch 173 is pressed. In the above case, the control unit 180 starts

supplying of electric power to the heating unit 176, in the case that the power source switch 173 is pressed during the state that allows supplying of electric power to the heating unit 176. In more detail, the control unit 180 makes the battery 178 start supplying of electric power to the heating unit 176 to make the heating unit 176 perform heating. In the above case, a user can enjoy a good inhalation experience, during that uneven heating or heating without an object to be heated does not occur, by simply pressing the power source switch 173 and without specifically checking whether arrangement of the smoking article 200 corresponds to correct arrangement. In this regard, in the case that the operation mode of the inhaler 100 is the sleep mode, supplying of electric power to the heating unit 176 is started by pressing the power source switch 173 two times. First pressing action applied to the power source switch 173 is the action for making the inhaler 100 return to the standby mode from the sleep mode. Second pressing action applied to the power source switch 173 is the action for starting supplying of electric power to the heating unit 176. It should be reminded that the power source switch 173 is an example of an operation input part which accepts an input relating to operation from a user, and pressing of the power source switch 173 is an example of predetermined operation inputted to the operation input part. Alternatively, the operation input part may be constructed by using any input device, such as a lever, a touch sensor, or the like, for example; and the predetermined operation may be up and down movement of a lever or touching on a touch sensor.

[0069] In a different example, the heating performing condition may be occurrence of an event that an aerosol sucking action is performed by a user. In the above case, the control unit 180 starts supplying of electric power to the heating unit 176, in the case that an aerosol sucking action performed by a user is detected during the state that allows supplying of electric power to the heating unit 176. In the above case, a user can also enjoy a good inhalation experience, during that uneven heating or heating without an object to be heated does not occur, by simply performing sucking action and without specifically checking whether arrangement of the smoking article 200 corresponds to correct arrangement.

[0070] In a different example, the heating performing condition may be occurrence of an event that a smoking article 200 is attached in such a manner that arrangement thereof is correct. In the above case, the control unit 180 starts supplying of electric power to the heating unit 176, in the case that it is specified based on result of detection of pressure by the pressure sensor 177 that arrangement of the smoking article 200 corresponds to correct arrangement. Since heating is started right after the smoking article 200 is attached in such a manner that arrangement thereof is correct, it becomes possible to quickly allow a user to suck aerosol.

[0071] The control unit 180, when it has specified based on result of detection of pressure by the pressure

sensor 177 that arrangement of the smoking article 200 does not correspond to correct arrangement, stops supplying of electric power to the heating unit 176, immediately or after the elapse of a predetermined period of time, to stop heating. As a result, it becomes possible to prevent occurrence of uneven heating and heating without an object to be heated, when the smoking article 200 is pulled out from the holding part 175 or the position of the smoking article 200 is shifted by a user by mistake.

[0072] Regarding an example of control other than control of the heating unit 176, the control unit 180 may control the notification unit 179 to make it provide notification corresponding to specified arrangement of the smoking article 200. For example, the control unit 180 makes the notification unit 179 output emission light, a display, sound, or vibration corresponding to arrangement of the smoking article 200. In this regard, the control unit 180 may control the notification unit 179 to make it output different notification, according to judgment as to whether specified arrangement of the smoking article 200 corresponds to correct arrangement. For example, the notification unit 179 emits light having a different emission pattern or a different color, and/or outputs different sound, according to judgment as to whether arrangement of the smoking article 200 corresponds to correct arrangement. In the other example, the notification unit 179 provides notification if arrangement of the smoking article 200 corresponds to correct arrangement, and does not provide notification if arrangement of the smoking article 200 does not correspond to correct arrangement. In any case, a user can easily check whether arrangement of the smoking article 200 corresponds to correct arrangement.

(Flow of Process)

[0073] Fig. 5 is a flow chart showing an example of a flow of a heating control process performed in the inhaler 100 according to the present embodiment. At the time when the heating control process relating to the above flow is started, the operation mode of the inhaler 100 is the sleep mode. In the case that the mode is the standby mode, the process starts from step S106.

[0074] First, as shown in Fig. 5, the control unit 180 monitors a state as to whether the power source switch 173 has been pressed (step S102). If the power source switch 173 is pressed (step S102 / YES), the control unit 180 starts supplying of electric power from the battery 178 to the pressure sensor 177 (step S104). On the other hand, if the power source switch 173 is not pressed (step S102 / NO), the process returns to step S102 again. After step S104, the control unit 180 obtains result of detection of pressure by the pressure sensor 177 (step S106). Next, the control unit 180 specifies, based on the result of detection of pressure by the pressure sensor 177, arrangement of the smoking article 200 in the inner space of the holding part 175 (step S108). If it is judged that arrangement of the smoking article 200 corresponds to

correct arrangement (step S110 / YES), the control unit 180 changes the state with respect to supplying of electric power to the heating unit 176 to a state that allows supplying of electric power (step S112). On the other hand, if it is judged that arrangement of the smoking article 200 does not correspond to correct arrangement (step S110 / NO), the control unit 180 changes the state with respect to supplying of electric power to the heating unit 176 to a state that does not allow supplying of electric power (step S114). Thereafter, the process returns to step S110 again. After step S112, the control unit 180 judges whether the power source switch 173 has been pressed, and whether a suction action has been detected (step S116). If it is judged that the power source switch 173 has been pressed or a suction action has been detected (step S116 / YES), the control unit 180 performs supplying of electric power to the heating unit 176 to start heating of the smoking article 200 (step S118). Thereafter, the process is terminated. On the other hand, if it is judged that the power source switch 173 has not been pressed and a suction action has not been detected (step S116 / NO), the process returns to step S116 again.

(Effect)

[0075] As explained above, only when arrangement of the smoking article 200 in the holding part 175 corresponds to correct arrangement, supplying of electric power to the heating unit 176 is performed. That is, even if the smoking article 200 is inserted in the holding part 175, supplying of electric power to the heating unit 176 is not performed if arrangement of the smoking article 200 does not correspond to correct arrangement. Accordingly, occurrence of uneven heating and heating without an object to be heated can be prevented in a precise manner. Further, since judgment as to whether arrangement corresponds to correct arrangement is performed automatically by using a pressure sensor, convenience of a user can be raised.

(Supplement)

[0076] The inhaler 100 may comprise an additional pressure sensor positioned between the pressure sensor 177 and the heating unit 176 shown in Fig. 4. It is desirable that the longitudinal-direction length from the bottom part 175a of the holding part 175 to the position where the additional pressure sensor detects pressure be shorter than the longitudinal-direction length L_{T-A} of the base-material part 200A. In such a case, if arrangement of the smoking article 200 corresponds to the correct arrangement, the base-material part 200A positions on the position where the additional pressure sensor detects pressure. The control unit 180 specifies that arrangement of the smoking article 200 corresponds to the correct arrangement, if pressure corresponding to hardness of the suction opening part 200B is detected by the pressure sensor 177 and pressure corresponding to hardness of

the base-material part 200A is detected by the additional pressure sensor. Thus, in the case that the smoking article 200 is inserted to reach an excessively deep position so that the suction opening part 200B is inserted to be positioned on the position of the additional sensor, it is possible to specify that the above arrangement of the smoking article 200 does not correspond to correct arrangement.

<< 3. Second Embodiment >>

[0077] The present embodiment has a form wherein a pressure sensor is positioned in an upstream-side end part of a holding part, and arrangement of a flavor component generating base-material in the holding part is specified based on result of detection by the pressure sensor. In the following description, explanation of parts shared by the present embodiment and the first embodiment will be omitted, and parts of the present embodiment different from those of the first embodiment will be explained mainly.

(Construction Example)

[0078] Fig. 6 is a block diagram showing an example of a schematic construction of an inhaler 100 in the state that it is holding a smoking article 200, according to a second embodiment. As shown in Fig. 6, the inhaler 100 according to the present embodiment comprises components similar to those in the inhaler 100 according to the first embodiment that has been explained with reference to Fig. 4. In this regard, the construction of the pressure sensor 177 in the present embodiment is different from that in the first embodiment.

[0079] The pressure sensor 177 detects pressure applied to an inner wall of the holding part 175. In the present embodiment, the pressure sensor 177 detects pressure applied to an inner wall which is a part in the inner wall of the holding part 175 and is positioned in the end part in the inserting direction. In the example shown in Fig. 6, the pressure sensor 177 detects pressure added to the bottom part 175a of the holding part 175. In this regard, the bottom part 175a according to the present embodiment may be constructed as a piston member which can move in the inserting direction. The back side of the bottom part 175a is provided with a columnar convex part 175b which extends in the inserting direction. An elastic member 175c is constructed, for example, by using a compression coil spring, which is installed to surround the periphery of the convex part 175b, is compressed in the inserting direction, and exerts elastic force in the pulling-out direction. In the state that the smoking article 200 has been inserted into the holding part 175 and the tip 210a has been brought into contact with the bottom part 175a, if the smoking article 200 is further inserted, the bottom part 175a moves, in the inserting direction, from an initial position. Thereafter, if the smoking article 200 is pulled out from the holding part 175, the bottom part

175a is pushed back in the pulling-out direction by the elastic member 175c, and returns to the initial position. The construction of the piston member is not limited to that shown in Fig. 6, if movement such as that explained above can be realized.

(Operation)

[0080] The only difference between the operation of the inhaler 100 according to the present embodiment and that in the first embodiment resides in the process for specifying arrangement. In the following description, the above point will be explained in detail.

[0081] The control unit 180 according to the present embodiment specifies that arrangement of the smoking article 200 corresponds to correct arrangement, if pressure representing a state that the distance of movement of the bottom part 175a in the inserting direction has reached a predetermined threshold value is detected by the pressure sensor 177. In an example, the pressure sensor 177 may be connected to the elastic member 175c. In such a case, the control unit 180 specifies that arrangement of the smoking article 200 corresponds to correct arrangement, if pressure added to the pressure sensor 177 from the elastic member 175c has reached a predetermined threshold value. In the other example, the pressure sensor 177 may be installed in a position where the convex part 175 is brought in contact with the pressure sensor 177 when the distance of movement of the bottom part 175a in the inserting direction has reached a predetermined threshold value. In such a case, the control unit 180 specifies that arrangement of the smoking article 200 corresponds to correct arrangement, if an event that the convex part 175b is in contact with the pressure sensor 177 is detected. In this regard, regarding the construction for detecting the contact state, a contact sensor may be installed in place of the pressure sensor 177. On the other hand, the control unit 180 specifies that arrangement of the smoking article 200 does not correspond to correct arrangement, if pressure representing a state that the distance of movement of the bottom part 175a in the inserting direction has reached a predetermined threshold value is not detected by the pressure sensor 177.

(Flow of Process)

[0082] The flow of the process in the inhaler 100 according to the present embodiment is similar to that according to the first embodiment.

(Effect)

[0083] According to the present embodiment, since the pressure sensor 177 is installed in a position distant from the holding part 175, effect of heat from the heating unit 176 on the pressure sensor 177 can be further suppressed, compared with the case of the first embodiment.

Thus, it becomes possible to further prevent failure of the pressure sensor 177 due to heat.

<< 4. Third Embodiment >>

[0084] The present embodiment has a form wherein an elastic member is positioned in a downstream-side end part of a holding part, and pressure added to the elastic member is detected by a pressure sensor. In the following description, explanation of parts shared by the present embodiment and the first embodiment will be omitted, and parts of the present embodiment different from those of the first embodiment will be explained mainly.

(Construction Example)

[0085] Fig. 7 is a block diagram showing an example of a schematic construction of an inhaler 100 in the state that it is holding a smoking article 200, according to a third embodiment. As shown in Fig. 7, the inhaler 100 according to the present embodiment comprises an elastic member 181, in addition to components similar to those in the inhaler 100 according to the first embodiment that has been explained with reference to Fig. 4.

[0086] The elastic member 181 is installed in a position, in the inner wall of the holding part 175, that is closer to the side of the opening 172a than the position heated by the heating unit 176. For example, in the downstream-side end part of the holding part 175, the elastic member 181 further protrudes from the inner wall of the holding part 175 to the inner-space side, and is constructed in such a manner that the inner diameter of the inner space in the protruded part is smaller than the outer diameter of the smoking article 200. Further, the elastic member 181 holds the smoking article 200 by applying pressure from the periphery of the smoking article 200 inserted into the inner space of the holding part 175. The elastic member 181 is constructed by using any material such as rubber, sponge, or the like, for example. According to the above construction, positioning of the smoking article 200 can be made easier, and shifting of arrangement of the smoking article 200 out of correct arrangement can be prevented more strongly.

[0087] The pressure sensor 177 detects pressure applied to the elastic member 181. For example, the pressure sensor 177 may be an elastic gauge which detects pressure, based on deformation of the elastic member 181. The pressure, that is applied to the elastic member 181 when the elastic member 181 holds the smoking article 200 by applying pressure to the periphery of the smoking article 200, is detected by the pressure sensor 177. The pressure sensor 177 is also able to detect attachment/detachment of the smoking article 2300 to/from the inhaler 100, based on judgment as to whether the detected pressure is equal to or greater than a predetermined threshold value.

(Operation)

[0088] The operation of the inhaler 100 according to the present embodiment is similar to that according to the first embodiment.

(Flow of Process)

[0089] The flow of the process in the inhaler 100 according to the present embodiment is similar to that according to the first embodiment.

(Effect)

[0090] According to the present embodiment, the smoking article 200 is held by the elastic member 181. Thus, compared with the case in the first embodiment, positioning of the smoking article 200 can be made easier, and shifting of arrangement of the smoking article 200 out of correct arrangement can be prevented more strongly.

<< 5. Fourth Embodiment >>

[0091] The present embodiment has a form wherein a plurality of function parts is installed, and a function part which is to be activated is selected according to specified arrangement of a flavor component generating base-material. In the following description, explanation of parts shared by the present embodiment and the first embodiment will be omitted, and parts of the present embodiment different from those of the first embodiment will be explained mainly.

(Construction Example)

[0092] Fig. 8 is a block diagram showing an example of a schematic construction of an inhaler 100 in the state that it is holding a smoking article 200, according to a fourth embodiment. As shown in Fig. 8, the inhaler 100 according to the present embodiment comprises components similar to those in the inhaler 100 according to the first embodiment that has been explained with reference to Fig. 4. However, the inhaler 100 according to the present embodiment comprises a plurality of heating units 176 (a heating unit 176A and a heating unit 176B).

[0093] The plural heating units 176 are installed in different positions in the longitudinal direction, respectively. For example, the distance L_{H-A} from the bottom part 175a of the holding part 175 to the position where the heating unit 176A is installed is different from the distance L_{H-B} from the bottom part 175a of the holding part 175 to the position where the heating unit 176B is installed. Further, the plural heating units 176 heat, from the different positions in the longitudinal direction, respectively, the smoking article 200 held by the holding part 175. It should be reminded that, although Fig. 8 shows an example wherein two heating units 176 are installed, it may be possible

to install three or more heating units 176.

(Operation)

5 - Specifying of Arrangement

[0094] In the present embodiment, regarding the smoking article 200 in the part from one end to the other end thereof in the longitudinal direction, the smoking article 200 has a part having hardness different from that of other parts. For example, the hardness of the smoking article 200 gradually changes in the longitudinal direction. Change in the hardness may be uniform increase or uniform decrease. For ensuring accuracy of specifying of arrangement of the smoking article 200 that will be explained later, it is desirable that positions in the smoking article 200 in the longitudinal direction have one-to-one relationship with degrees of hardness.

[0095] The control unit 180 specifies arrangement of the smoking article 200 in the holding part 175, by using difference in degrees of hardness of parts in the smoking article 200 from one end to the other end thereof in the longitudinal direction. In more detail, the control unit 180 performs recognition with respect to the pressure detected by the pressure sensor 177 for determining to which specific pressure corresponding to a specific position in the smoking article 200 in the longitudinal direction the detected pressure corresponds. Thereafter, the control unit 180 specifies the position of the tip 210a of the smoking article 200 in the inner space of the holding part 175, based on the distance L_I between the position P_I of the smoking article 200 corresponding to the pressure detected by the pressure sensor 177 and the tip 210a of the smoking article 200.

35 - Control Corresponding to Specified Arrangement

[0096] The control unit 180 selects, from plural heating units 176, a heating unit 176 to which electric power is to be supplied, based on the specified position of the tip 210a of the smoking article 200 in the inner space of the holding part 175. In more detail, the control unit 180 selects, from the plural heating units 176, a heating unit 176, to which electric power is to be supplied, which applies heat from a position closer to the side of the opening 172a than the position of the tip 210a of the smoking article 200. For example, the control unit 180 calculates, based on the distance L_I , a distance L_R between the tip 210a of the smoking article 200 and the bottom part 175a of the holding part 175. Thereafter, the control unit 180 selects the heating units 176A and 176b if the distance L_R is shorter than the distance L_{H-B} , selects the heating unit 176A if the distance L_R is equal to or longer than the distance L_{H-B} and shorter than L_{H-A} , and does not select any of the heating units if the distance L_R is equal to or longer than the distance L_{H-A} . In the example shown in Fig. 8, the distance L_R is equal to or longer than the distance L_{H-B} and shorter than L_{H-A} , so that the control unit

180 selects the heating unit 176A as that to which electric power is to be supplied.

[0097] In this regard, after destination of supply of electric power is selected, the state with respect to supplying of electric power to the heating unit 176, which is selected as the destination of supply of electric power, is changed to a state that allows supplying of electric power. On the other hand, the state with respect to supplying of electric power to the heating unit 176, which is not selected as the destination of supply of electric power, is changed to a state that does not allow supplying of electric power.

[0098] As explained above, as result that a heating unit 176, which applies heat from a position where the smoking article 200 is not being inserted, in the plural heating units 176 is not selected as a destination of supply of electric power, occurrence of uneven heating and heating without an object to be heated can be prevented. Further, as a result that a heating unit 176, which applies heat from a position where the smoking article 200 is being inserted, in the plural heating units 176 is selected as a destination of supply of electric power, the smoking article 200 can be heated to generate aerosol even in the case that the smoking article 200, although it is being inserted, does not reach the innermost place of the holding part 175.

(Flow of Process)

[0099] Fig. 9 is a flow chart showing an example of a flow of a heating control process performed in the inhaler 100 according to the present embodiment. At the time when the heating control process relating to the above flow is started, the operation mode of the inhaler 100 is the sleep mode. In the case that the mode is the standby mode, the process starts from step S206.

[0100] The processes relating to steps S202-206 are similar to the processes relating to steps S102-106 explained with reference to Fig. 5. As shown in Fig. 9, after step S206, the control unit 180 specifies, based on result of detection of pressure by the pressure sensor 177, a position of the tip 210a of the smoking article 200 in the inner space of the holding part 175 (step S208). Next, based on the specified position of the tip 210a of the smoking article 200, the control unit 180 selects a heating unit 176, as a destination of supply of electric power, from the plural heating units 176 (step S210). Next, the control unit 180 changes the state with respect to supplying of electric power to the heating unit 176, that has been selected as a destination of supply of electric power, to a state that allows supplying of electric power (step S212). Next, the control unit 180 judges whether the power source switch 173 has been pressed, and whether a suction action has been detected (step S214). If it is judged that the power source switch 173 has been pressed or a suction action has been detected (step S214 / YES), the control unit 180 performs supplying of electric power to the heating unit 176, which has been selected as a destination of supply of electric power, to start heating of the

smoking article 200 (step S216). Thereafter, the process is terminated. On the other hand, if it is judged that the power source switch 173 has not been pressed and a suction action has not been detected (step S214 / NO), the process returns to step S214 again.

[0101] It should be reminded that the above explained flow of the process is an example, and the present invention is not limited by the above example. For example, processes relating to steps S212 and S214 may be omitted. In such a case, the inhaler 100 selects a heating unit 176 as a destination of supply of electric power, and, right after selection, performs supplying of electric power to the heating unit 176 selected as a destination of supply of electric power.

(Effect)

[0102] According to the present embodiment, even in the case that the smoking article 200 does not reach the innermost place of the holding part 175 although it is being inserted into the holding part 175, the smoking article 200 can be heated to generate aerosol while preventing occurrence of uneven heating or heating without an object to be heated.

<< 6. Modified Examples >>

< 6.1. First Modified Example >

[0103] In each of the above embodiment, judgment as to whether arrangement of the smoking article 100 corresponds to correct arrangement is made based on result of detection of pressure by the pressure sensor; however, the present invention is not limited by the above embodiments. For example, judgment as to whether arrangement of the smoking article 100 corresponds to correct arrangement may be made by using a physical mechanism. In the following description, the above point will be explained in detail.

(Construction Example)

[0104] Fig. 10 is a figure schematically showing a procedure to insert a smoking article 200 into an inhaler 100 according to a first modified example. An insertion procedure proceeds in accordance with step S302 to step S306. Step S302 shows a state before insertion. Step S304 shows a state during an inserting process. Step S306 shows a state after completion of insertion.

[0105] As shown in step S302, the smoking article 200 according to the present modified example comprises, in addition to the base-material part 200A and the suction opening part 200B, a stick holder 200C that is installed to cover the tip 210a of the base-material part 200A. The stick holder 200C comprises an elastic member 211 which protrudes in a transverse direction of the smoking article 200. In this regard, the transverse direction is a direction orthogonal to the longitudinal direction, so that,

for example, if the shape of the cross section of the stick holder 200C is circular, the transverse direction is a radial direction. The elastic member 211 is constructed by using an elastic member such as rubber or the like, for example, to have a columnar shape extending in the transverse direction, and exerts elastic force in a direction orthogonal to the transverse direction.

[0106] The holding part 175 according to the present modified example comprises a groove part 182 along which the elastic member 211 can slide when the smoking article 200 is inserted or pulled out. The groove part 182 is formed in the inner wall of the holding part 175. The smoking article 200 is inserted into the holding part 175 after the position of a gate 182A of the groove part 182 formed in the opening 172a and the position of the elastic member 211 are aligned with each other. The elastic member 211 slides along the inside of the groove part 182 in the inserting direction when the smoking article 200 is inserted, and slides along the inside of the groove part 182 in the pulling-out direction when the smoking article 200 is pulled out. Hereinafter, the axis passing through the gate 182A and extending in the longitudinal direction is also referred to as a central axis 182B. As shown in Fig. 10, the groove part 182 is bent toward the direction of the circumference of the inner space of the holding part 175. In a section wherein position shift d from the position of the gate 182A in the circumferential direction (i.e., position shift from the central axis 182B in the circumferential direction) exceeds 0, the elastic member 211 is in a state that it is being bent in the circumferential direction and the tip thereof slides along the inside of the groove part 182. In the above state, the elastic member 211 exerts elastic force that works to move it back in the direction toward the central axis 182B. The groove part 182 comprises a first end 183 (183A and 183B) positioned in the inserting direction, and a second end 184 positioned between the first end 183 and the opening 172a and in the pulling-out direction. Further, the inhaler 100 comprises an elastic member 185 which exerts, to the smoking article 200, elastic force in the pulling-out direction. The elastic member 185 is constructed by using a compression coil spring or the like, for example.

[0107] As shown in step S304, when the smoking article 200 is inserted in the inserting direction by a hand of a user, the elastic member 185 is compressed while the smoking article 200 is being inserted. At the time when the inserted smoking article 200 has reached the innermost place, the elastic member 211 reaches the first end part 183. At that time, the position shift d_1 in the circumferential direction between the gate 128A and the first end part 183 is large, compared with the position shift d_2 in the circumferential direction between the gate 128A and the second end part 184. In the example shown in Fig. 10, it is shown that $d_1 > 0$ and $D_2 = 0$. Thus, in the state that the elastic member 211 has reached the first end part 183, the elastic member 211 exerts elastic force that works to move it back in the direction toward the

central axis 182B. In the above state, if a user takes a user's hand off the smoking article 200, the elastic member 211 attempts to move back in the direction toward the central axis 182B, i.e., exerts elastic force that works to move it in the direction toward the second end part 184, with respect to which the position shift from the central axis 182B is smaller. As a result, the elastic member 211 slides along the inside of the groove part 182 from the first end part 183 to the second end part 184, and, by the elastic force exerted from the elastic member 185 while it is sliding, the smoking article 200 is pushed back in the pulling out direction. Thereafter, when the elastic member 211 has reached the second end part 184, pushing-back action in the pulling out direction is terminated. In this regard, in the case that the tip part, which is to be in contact with the groove part 182, of the elastic member 211 is covered by a metal or the like, sound of collision may be generated when the elastic member 211 (the tip part thereof) collides, as a result of pushing-back, with the second end part 184.

[0108] Step S306 shows a state that the elastic member 211 has been pushed back and has reached the second end part 184. The correct arrangement of the smoking article 200 according to the present modified example refers to the state shown in step S306.

[0109] On the other hand, when pulling out the smoking article 200, a user once pushes it until the elastic member 211 reaches the first end part 183. Thereafter, the user pulls out the smoking article 200 in such a manner that, while it is being pulled out, it is rotated in a direction along that the elastic member 211 is moved away from the central axis 182B. In this manner, the smoking article 200 can be pulled out from the holding part 175.

(Effect)

[0110] According to the present modified example, a user inserts the smoking article 200 in the inserting direction by a user's hand, and, thereafter, can recognize that arrangement of the smoking article 200 corresponds to correct arrangement, when action that the elastic member 211 is pushed back until it reaches the second end part 184 is completed. More simply, a user can also recognize that arrangement of the smoking article 200 corresponds to correct arrangement, by hearing sound of collision between the elastic member 211 and the second end part 184. Further, according to the present modified example, it becomes possible to prevent unsatisfactory insertion of the smoking article 200, so that occurrence of uneven heating and heating without an object to be heated can be prevented.

(Supplement 1)

[0111] It should be reminded that the inhaler 100 according to the present modified example may comprise a pressure sensor 177. For example, the pressure sensor 177 may be installed in a manner explained in relation

to each of the above embodiments, and arrangement of the smoking article 200 may be specified thereby. In the other example, a pressure sensor 177 may be installed in the second end part 184, and arrangement of the smoking article 200 may be specified based on result as to whether the state that the elastic member 211 has reached the second end part 184 is detected by the pressure sensor 177. Further, a process corresponding to specified arrangement of the smoking article 200 may be performed.

(Supplement 2)

[0112] Further, although an example in which the stick holder 200C is installed on the smoking article 200 is illustrated in Fig. 10, the present invention is not limited by the above example. For example, the stick holder 200C may not be installed on the smoking article 200, and may be installed, in the inhaler 100, as a sliding member which slides in the inner space of the holding part 175. Such a sliding member is installed in the inner space of the holding part 175 in such a manner that it can slide, along an inner wall of the holding part 175, in the inner space of the holding part 175. Similar to the stick holder 200C shown in Fig. 10, the sliding member comprises an elastic member 211 protruding in the transverse direction in the inner space of the holding part 175. In this regard, the transverse direction is a direction orthogonal to the longitudinal direction, so that, for example, if the shape of the cross section of the inner space of the holding part 175 is circular, the transverse direction is a radial direction.

[0113] Other constructions are similar to those shown in Fig. 10. For example, the holding part 175 comprises a groove part 182 along which the elastic member 211 can slide when the sliding member slides. The sliding member slides in the inner space of the holding part 175 in the inserting direction or the pulling-out direction when the smoking article 200 is inserted or pulled out. In conjunction with the above sliding, the elastic member 200 slides along the inside of the groove part 182 in the inserting direction when the smoking article 200 is inserted, and slides along the inside of the groove part 182 in the pulling-out direction when the smoking article 200 is pulled out. The groove part 182 comprises a first end 183 and a second end 184. Further, the inhaler 100 comprises an elastic member 185 which exerts, to the sliding member, elastic force in the pulling-out direction.

[0114] The inserting/pulling-out procedure for inserting/pulling-out the smoking article into/from the inhaler 100 is also similar to that explained above with reference to Fig. 10. However, in the inserting procedure, the smoking article 200 is inserted into the holding part 175 in such a manner that the sliding member is pushed by the tip of the smoking article 200 and the sliding member slides in the inserting direction. A user can insert the smoking article 200 with sliding movement of the sliding member in the inserting direction. On the other hand, in the pulling-

out procedure, the elastic member 185 exerts elastic force in the pulling-out direction, that is applied to the sliding member, to push the sliding member back to a position in the pulling-out direction in the holding part 175. In relation to the above action, the user can pull out the smoking article 200 from the holding part 175.

[0115] According to the present construction, since it is unnecessary for the smoking article 200 to have the stick holder 200C, the cost required for manufacturing the smoking article 200 can be reduced, compared with that in the case of the construction in which the smoking article 200 has the stick holder 200C.

< 6.1. Second Modified Example >

[0116] Regarding each of the above embodiments, although an example in which the smoking article 200 is inserted from the opening 172a into the inner space of the holding part 175 has been explained, the present invention is not limited by the above example. In the following description, the other example will be explained.

(Construction Example)

[0117] Fig. 11 is a figure showing a schematic construction example of an inhaler 100 according to a second modified example. As shown in Fig. 11, the holding part 175 according to the present modified example comprises a first housing 190A and a second housing 190B which can be separated from or coupled to each other. For example, the first housing 190A is coupled to the second housing 190B via a rotation axis 191, and can be rotated about the rotation axis 191 as the center of rotation. Thus, the first housing 190A and the second housing 190B are separated by rotating them in a direction for separating them from each other, and are coupled with each other by rotating them until they are brought to be in contact with each other. It should be reminded that, in Fig. 11, illustration of the constructions of the heating unit 176 and so on are omitted.

[0118] For inserting the smoking article 200 into the inhaler 100, first, the first housing 190A and the second housing 190B are brought to a state wherein they are separated from each other, and the smoking article 200 is put in a groove part 192 in the second housing 190B. While maintaining the above state, the first housing 190A is rotated until it is brought to be in contact with the second housing 190B, and is fixed during the contact state, and, as a result, the first housing 190A and the second housing 190B are coupled with each other. The holding part 175 holds the smoking article 200 between the first housing 190A and the second housing 190B which are in a state that they are being coupled with each other. For example, a pressure sensor 177 is installed in the groove part 192 in the second housing 190B, and detects pressure applied thereto when the smoking article 200 is held between the housings.

(Supplement)

[0119] It should be reminded that arrangement of the smoking article 200 may be specified based on result of detection by the pressure sensor and by using the method explained in relation to each of the above embodiments. Further, a process corresponding to specified arrangement of the smoking article 200 may be performed.

<< 7. Conclusion >>

[0120] Embodiments of the present invention have been explained in detail with reference to Figs. 1-11. As explained above, according to each embodiment, the inhaler 100 comprises a holding part for holding the smoking article 200 in the internal space, and a pressure sensor 177 for detecting pressure applied to the inner wall of the holding part 175. Further, the inhaler 100 specifies, based on result of detection by the pressure sensor 177, arrangement of the smoking article 200 in the holding part 175. In addition to judgment as to whether the smoking article 200 has been inserted into the holding part 175, the inhaler 100 can specify whether arrangement of the smoking article 200 in the holding part 175 corresponds to correct arrangement. Further, since the pressure sensor 177 is not affected by ambient light, accuracy of detection can be improved, compared with the case that a light sensor is used.

[0121] In the above description, preferred embodiments of the present invention have been explained in detail with reference to the attached figures; however, the present invention is not limited by the examples explained above. It is obvious to a person, who has ordinary skill in the technical field to which the present invention pertains, that it is possible to conceive of various kinds of modified examples or rectified examples within the scope of the technical idea disclosed in the claims; and it is understood that they are also those pertaining to the scope of the technique of the present invention.

[0122] For example, regarding each of the above embodiments, it has been explained that arrangement of the smoking article 200 in the holding part 175 refers to arrangement of the smoking article 200 inserted into the inner space of the holding part 175 in the longitudinal direction; however, the present invention is not limited to the above example. For example, arrangement of the smoking article 200 in the holding part 175 may refer to an angle of the smoking article 200 inserted into the inner space of the holding part 175. In this regard, the angle of the smoking article 200 is an angle formed between an axis in the longitudinal direction of the inhaler 100 and an axis in the longitudinal direction of the smoking article. For example, plural pressure sensors 177 are installed side by side in the longitudinal direction in the inner wall of the holding part 175, and the angle of the smoking article 200 is specified based on a slope with respect to values of pressure detected by the plural pressure sensors 177.

[0123] Further, each of the above-explained embodiments may be combined with the other embodiment in an appropriate manner. For example, the first embodiment may be combined with the second embodiment. In such a case, pressure sensors are installed in both the downstream-side end part and the upstream-side end part of the holding part, and arrangement of the flavor component generating base-material in the holding part is specified based on result of detection by these pressure sensors. In the above case, accuracy with respect to specifying of arrangement of the flavor component generating base-material can be improved, compared with the case wherein one of the pressure sensors only is installed.

[0124] It should be reminded that the inhaled 100 explained in this specification may be realized as a single device, or a device comprising a different device as a component thereof or comprising different devices as components constituting the device. For example, in the functional constructions in the inhaler 100 explained with reference to Fig. 4 and so on, the control unit 180 may be installed in a control device, that is for the inhaler 100, in a smart phone, a server, of the like which is connected to the inhaler 100 via a network or the like. In the above case, the inhaler 100 transmits result of detection by the pressure sensor 177 to the control device. Next, the control device specifies arrangement of the smoking article 200 based on the result of detection by the pressure sensor 177, generates control information (for example, an instruction to start heating by the heating unit 176) corresponding to the specified arrangement, and transmits the generated control information to the inhaler 100. Thereafter, the inhaler 100 performs a process instructed in the control information received from the control device.

[0125] It should be reminded that the series of processes performed by the respective devices explained in the present specification may be realized by using any one of software, hardware, and a combination of software and hardware. Programs, that are components of the software, are stored in advance in a storage medium (a non-transitory medium: a non-transitory media) implemented in the inside or the outside of the respective devices, for example. Further, for example, each program is read into a RAM when a computer is operated, and is executed by a processor such as a CPU. The above storage medium is, for example, a magnetic disk, an optical disk, a magneto-optical disk, a flash memory, or the like. Further, the above-explained computer program may be delivered via a network without using a storage medium, for example.

[0126] Further, the processes explained by using each of the flow charts and sequence diagrams in the present specification may not necessarily be performed in the illustrated order. Some processing steps may be performed in a parallel manner. Further, an additional processing step may be adopted, and some processing steps may be omitted.

REFERENCE SIGNS LIST

[0127]

100	Suction device
171	Housing
171A	Top housing
171B	Bottom housing
172	Cover
172a	Opening
173	Power source switch
174	Lid part
175	Holding part
175a	Bottom part
175b	Convex part
175c	Elastic member
176	Heating unit
177	Pressure sensor
178	Battery
179	Notification unit
180	Control unit
181	Elastic member
182	Groove part
182A	Gate
182B	Central axis
183	First end part
184	Second end part
185	Elastic member
190A	First housing
190B	Second housing
191	Rotation axis
192	Groove part
200	Smoking article
200A	Base-material part
200B	Suction opening part
201	Filling article
202	First rolling paper
203	Second rolling paper
204	Paper tube part
205	Filter part
206	Hollow segment part
210a	Tip
210b	Rear end
211	Elastic member

Claims

1. An inhaler **characterized in that** it comprises:

a holding part comprising an inner space,
a pressure sensor for detecting pressure applied
to an inner wall of the holding part, and
a control unit which specifies, based on result
of detection by the pressure sensor, arrange-
ment of a flavor component generating base-
material in the inner space in the holding part.

2. The inhaler as recited in Claim 1, wherein the inhaler
is **characterized in that** it comprises a function part
which applies, to the flavor component generating
base-material held in the inner space of the holding
part, a function that makes the flavor component
generating base-material generate flavor-compo-
nent-added gas.

3. The inhaler as recited in Claim 2, **characterized in that**:

the holding part comprises an opening which
makes the inner space communicate with an
outer space, and

the pressure sensor detects pressure applied to
part of the inner wall of the holding part, wherein
the part of the inner wall is in a position that is
closer to the side of the opening than the position
to which the function is applied by the function
part.

4. The inhaler as recited in Claim 3, **characterized in that**:

the flavor component generating base-material
comprises a flavor-component generating part
and a part which is not the flavor-component
generating part, wherein the parts are posi-
tioned in an order from an end to the other end,
and each of which has hardness different from
that of the other, and
the control unit specifies that arrangement of the
flavor component generating base-material cor-
responds to predetermined arrangement, if
pressure corresponding to the hardness of the
part which is not the flavor-component generat-
ing part is detected by the pressure sensor.

5. The inhaler as recited in Claim 4, **characterized in that**: the predetermined arrangement is arrange-
ment wherein the flavor-component generating part
and one part of the part which is not the flavor-com-
ponent generating part are held in the inner space,
and the other part of the part which is not the flavor-
component generating part protrudes to the outer
space from the opening.

6. The inhaler as recited in Claim 4 or 5, **characterized in that**: the predetermined arrangement is arrange-
ment wherein the flavor-component generating part
is positioned in the position to which the function part
applies the function.

7. The inhaler as recited in any one of Claims 2-6, **characterized in that**:

the holding part comprises an opening which
makes the inner space communicate with an

outer space,
the inhaler comprises a first elastic member installed in a position, in part of the inner wall of the holding part, that is closer to the side of the opening than the position to which the function is applied by the function part, and
the pressure sensor detects pressure applied to the first elastic member.

8. The inhaler as recited in any one of Claims 2-7, characterized in that:

parts of the flavor component generating base-material, from one end to the other end thereof, have different degrees of hardness,
the inhaler comprises plural function parts, and the control unit specifies a position of the one end of the flavor component generating base-material in the inner space, and, based on the specified position, selects a function part, to which electric power is to be supplied, from the plural function parts.

9. The inhaler as recited in any one of Claims 1-8, characterized in that:

the holding part comprises an opening which makes the inner space communicate with an outer space,
the flavor component generating base-material is inserted into the inner space from the opening, and
the pressure sensor detects pressure applied to a part, which is positioned in an end part positioned in an inserting direction, of the inner wall of the holding part.

10. The inhaler as recited in Claim 9, characterized in that:

the inhaler comprises a piston member which is installed in the part, which is positioned in the end part positioned in an inserting direction, of the inner wall of the holding part, and can move in the inserting direction, and
the control unit specifies that arrangement of the flavor component generating base-material corresponds to predetermined arrangement, if pressure representing a state that the distance of movement of the piston member in the inserting direction has reached a predetermined threshold value is detected by the pressure sensor.

11. The inhaler as recited in any one of Claims 1-10, characterized in that:

the flavor component generating base-material

comprises a second elastic member which protrudes in a transverse direction,
the holding part comprises an opening which makes the inner space communicate with an outer space, and a groove part which is formed on the inner wall and along which the second elastic member can slide when the flavor component generating base-material is inserted or pulled out,
the groove part comprises a first end positioned in the inserting direction, and a second end positioned between the first end and the opening and in the pulling-out direction, and position shift in a circumferential direction between a gate, which is formed in the opening, of the groove part and the first end part in the inner space is large, compared with position shift in the circumferential direction between the gate and the second end part in the inner space, and
the inhaler further comprises a third elastic member which exerts elastic force, in the pulling-out direction, to the flavor component generating base-material.

12. The inhaler as recited in any one of Claims 1-10, characterized in that:

the inhaler comprises a fourth elastic member which protrudes in a transverse direction in the inner space, and further comprises a sliding member which can slide, in the inner space, along the inner wall of the holding part, and a fifth elastic member which exerts elastic force, in the pulling-out direction, to the sliding member,
the holding part comprises an opening which makes the inner space communicate with an outer space, and a groove part which is formed on the inner wall and along which the fourth elastic member can slide when the sliding member is slid, and
the groove part comprises a first end positioned in the inserting direction, and a second end positioned between the first end and the opening and in the pulling-out direction, and position shift in a circumferential direction between a gate, which is formed in the opening, of the groove part and the first end part in the inner space is large, compared with position shift in the circumferential direction between the gate and the second end part in the inner space.

13. The inhaler as recited in any one of Claims 1-12, characterized in that: the holding part comprises a first housing and a second housing which can be separated from or coupled to each other, and the flavor component generating base-material is held between the first housing and the second housing in

the state that the housings are being coupled with each other.

14. The inhaler as recited in Claim 2 or any one of Claims 3-13 dependent on Claim 2, **characterized in that:** the control unit controls the state of supplying of electric power to the function part, based on specified arrangement of the flavor component generating base-material. 5
15. The inhaler as recited in Claim 14, **characterized in that:** the control unit changes the state of supplying of electric power to the function part to a state that allows supplying of electric power to the function part, if it is specified that arrangement of the flavor component generating base-material corresponds to predetermined arrangement. 10
16. The inhaler as recited in Claim 15, **characterized in that:** 15
the inhaler further comprises an operation input part, and
the control unit starts supplying of electric power to the function part, if predetermined operation is inputted to the operation input part during the state that allows supplying of electric power to the function part. 25
17. The inhaler as recited in Claim 15 or 16, **characterized in that:** the control unit starts supplying of electric power to the function part, if a suction action performed by a user is detected during the state that allows supplying of electric power to the function part. 30
18. The inhaler as recited in any one of Claims 14-17, **characterized in that:** the control unit changes the state of supplying of electric power to the function part to a state that does not allow supplying of electric power to the function part, if it is specified that arrangement of the flavor component generating base-material does not correspond to predetermined arrangement. 40
19. The inhaler as recited in any one of Claims 1-18, **characterized in that:** 45
the inhaler comprises a notification unit, and
the control unit controls the notification unit to output notification corresponding to specified arrangement of the flavor component generating base-material. 50
20. The inhaler as recited in Claim 19, **characterized in that:** the control unit controls the notification unit to output notification that becomes different according to judgment as to whether specified arrangement of 55

the flavor component generating base-material corresponds to predetermined arrangement.

21. The inhaler as recited in Claim 19 or 20, **characterized in that:** the notification unit performs at least one of light emission, display, sound output, and vibration actions.
22. A control device for an inhaler, **characterized in that** it comprises:
a control unit which specifies, based on result of detection by a pressure sensor which detects pressure applied to an inner wall of a holding part which comprises an inner space, arrangement of a flavor component generating base-material in the inner space of the holding part.
23. An information processing method, **characterized in that** it comprises:
a process for specifying, based on result of detection by a pressure sensor which detects pressure applied to an inner wall of a holding part which comprises an inner space, arrangement of a flavor component generating base-material in the inner space of the holding part.
24. A program which makes a computer function as a control unit which specifies, based on result of detection by a pressure sensor which detects pressure applied to an inner wall of a holding part which comprises an inner space, arrangement of a flavor component generating base-material in the inner space of the holding part.

Fig. 1

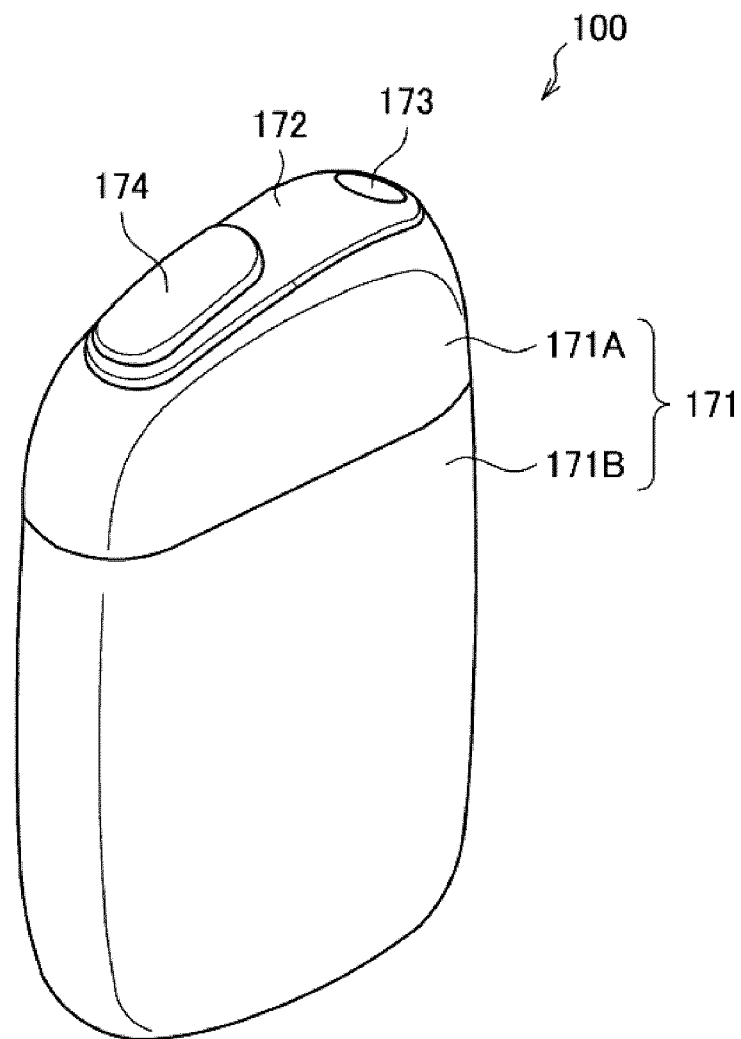


Fig. 2

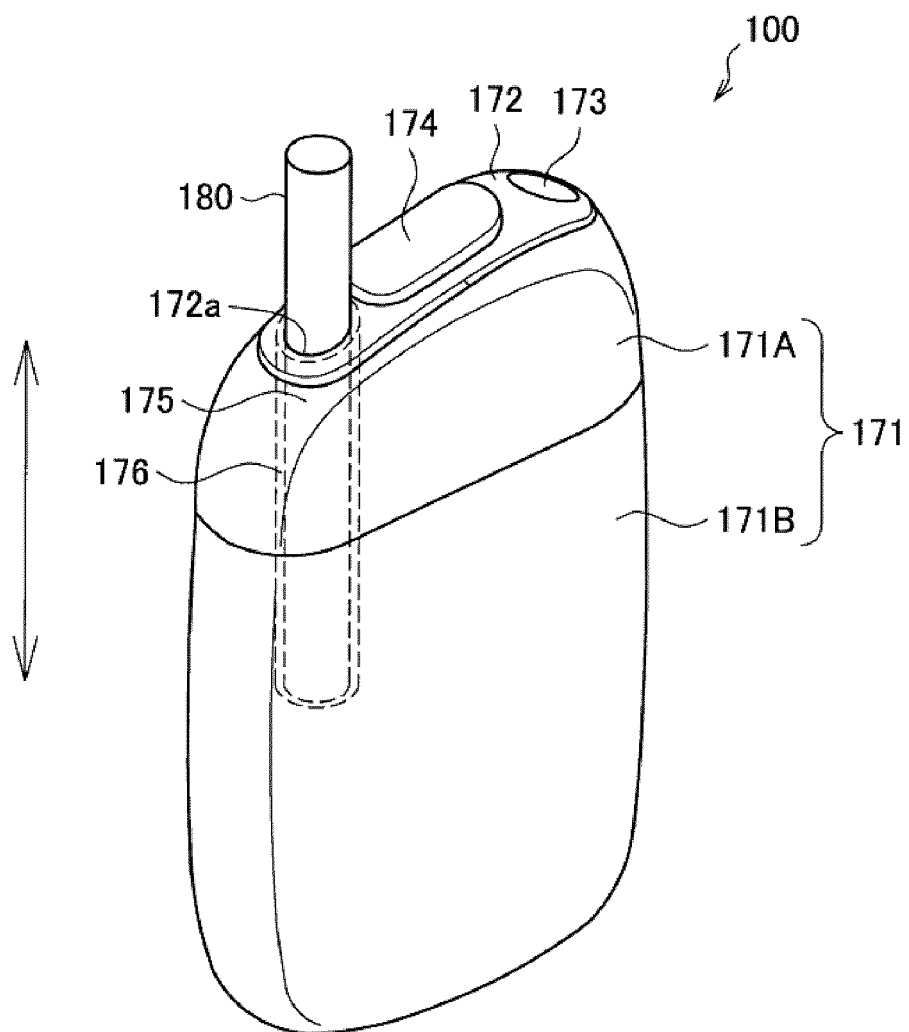


Fig. 3

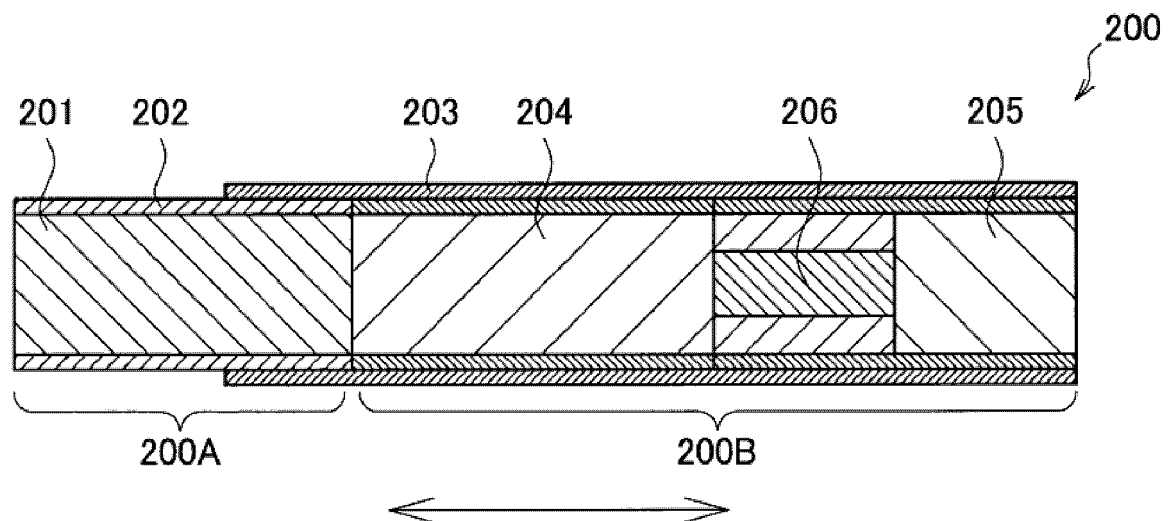


Fig. 4

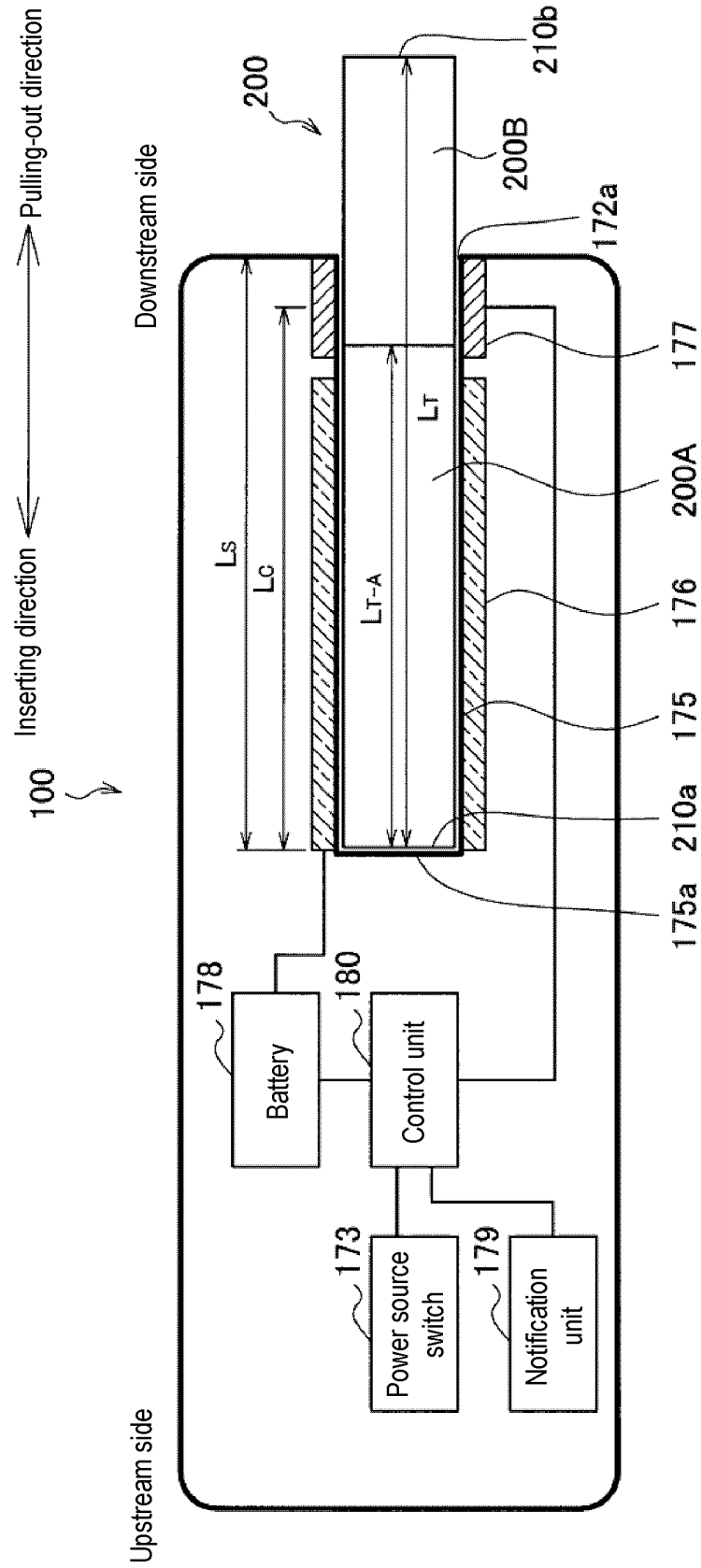


Fig. 5

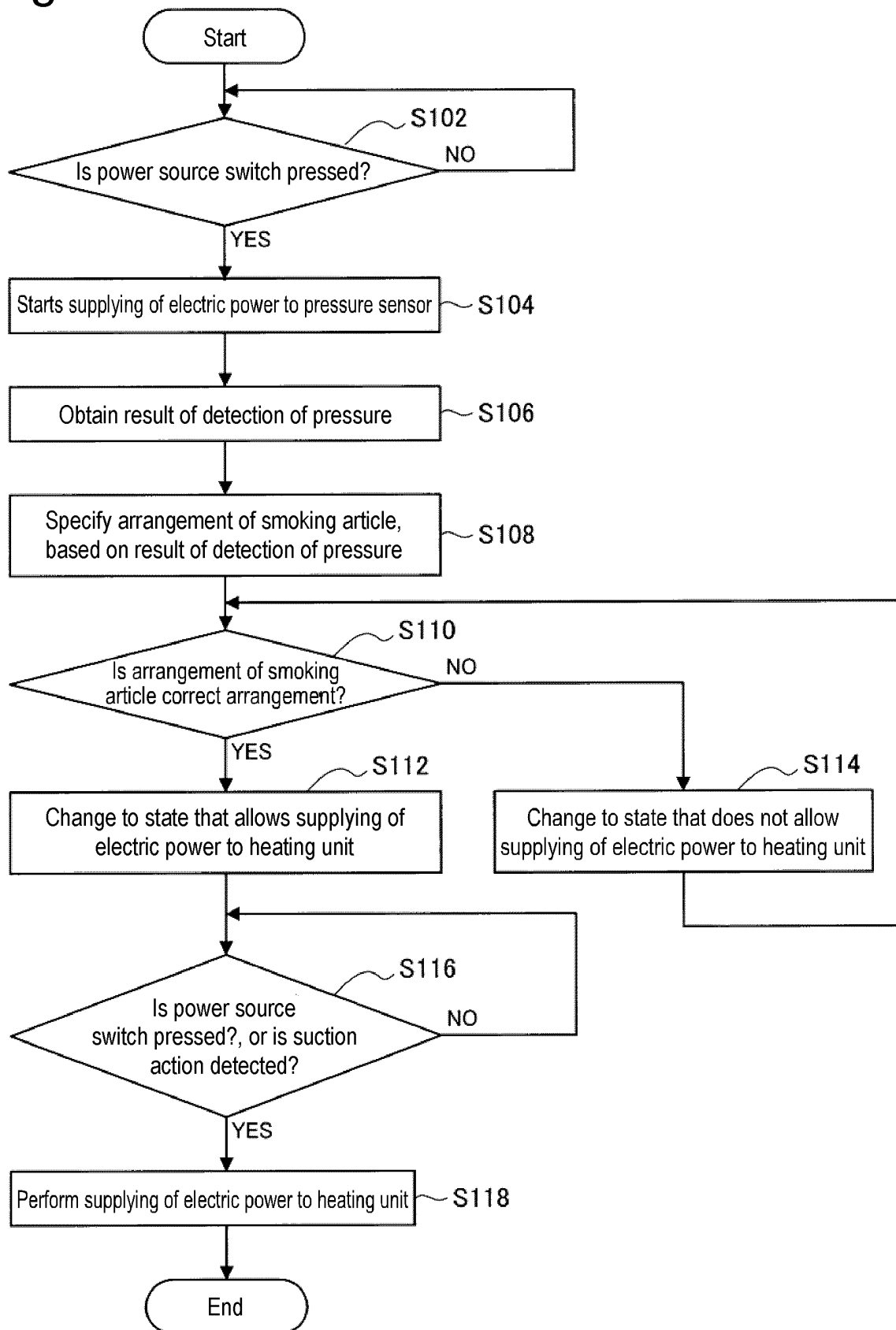


Fig. 6

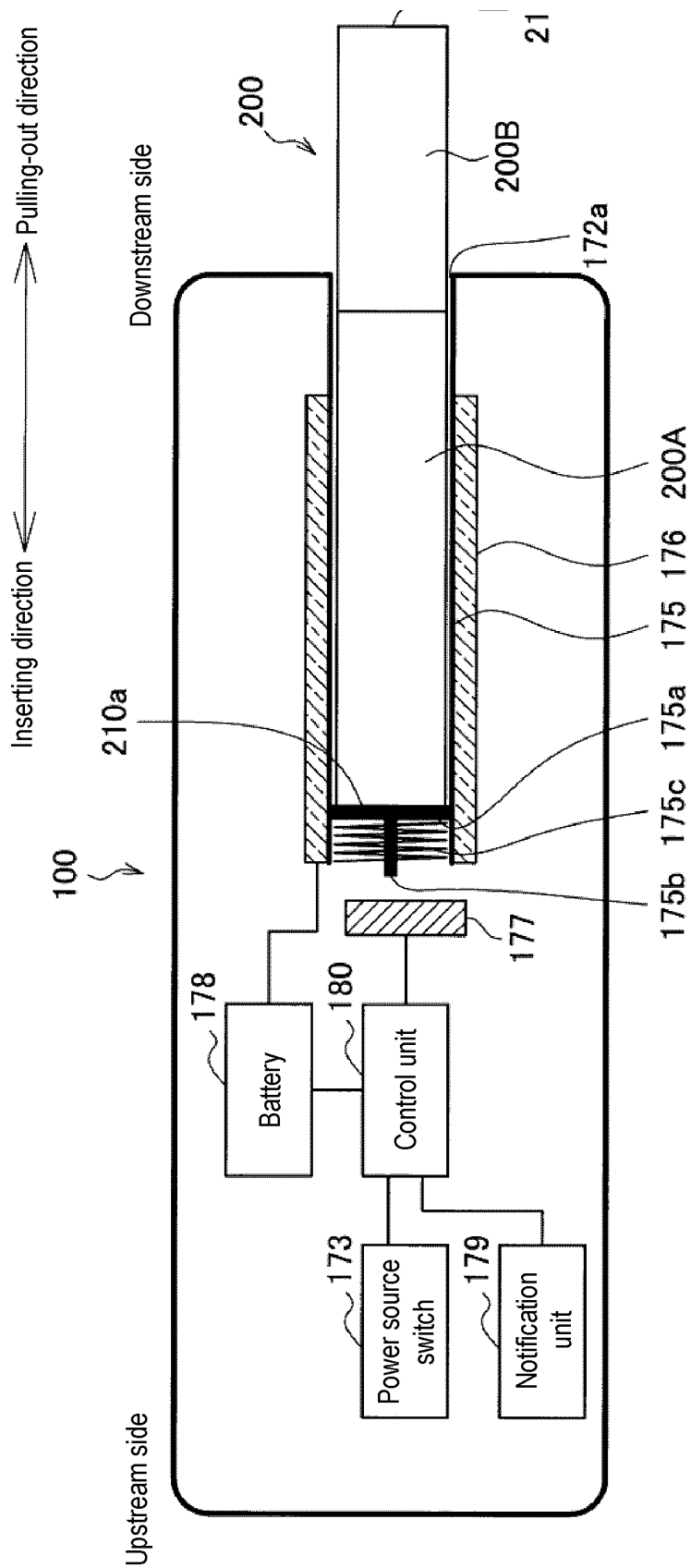


Fig. 7

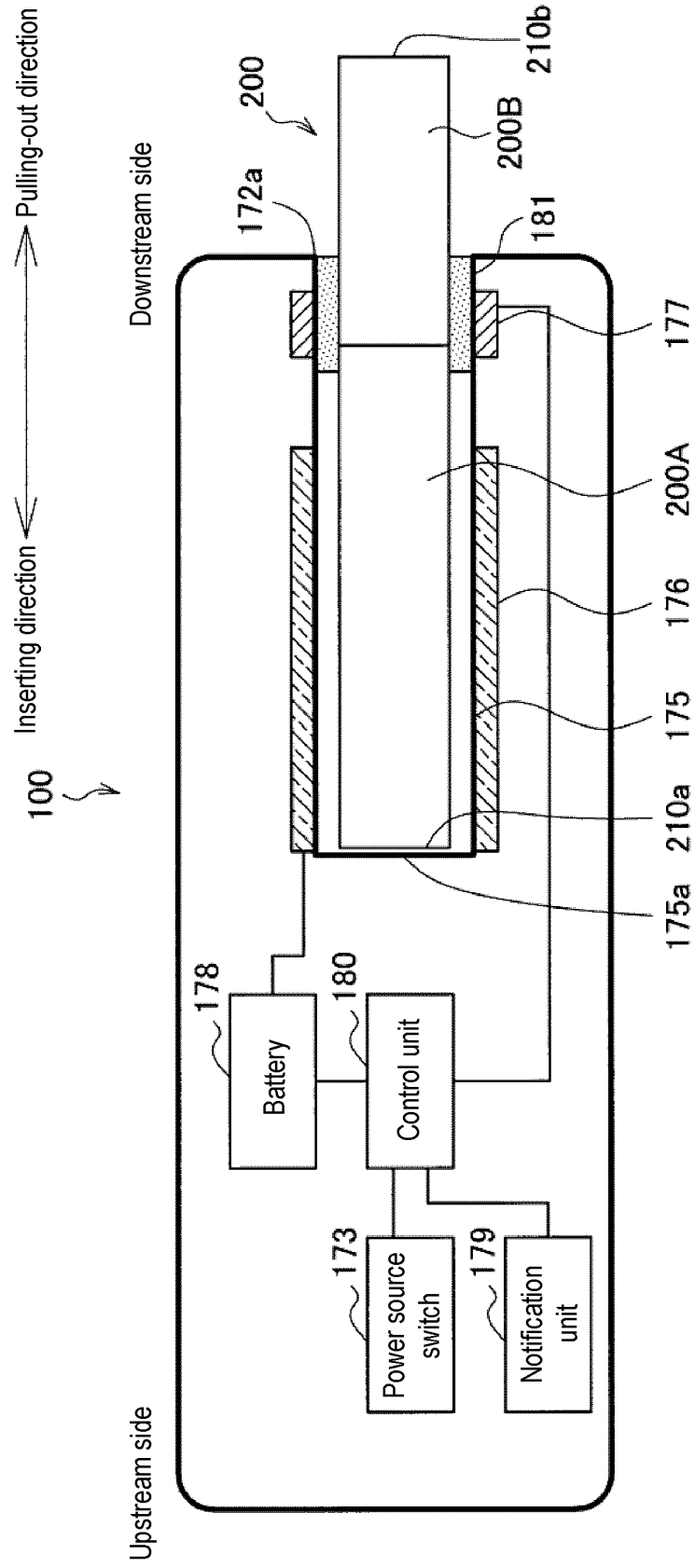


Fig. 8

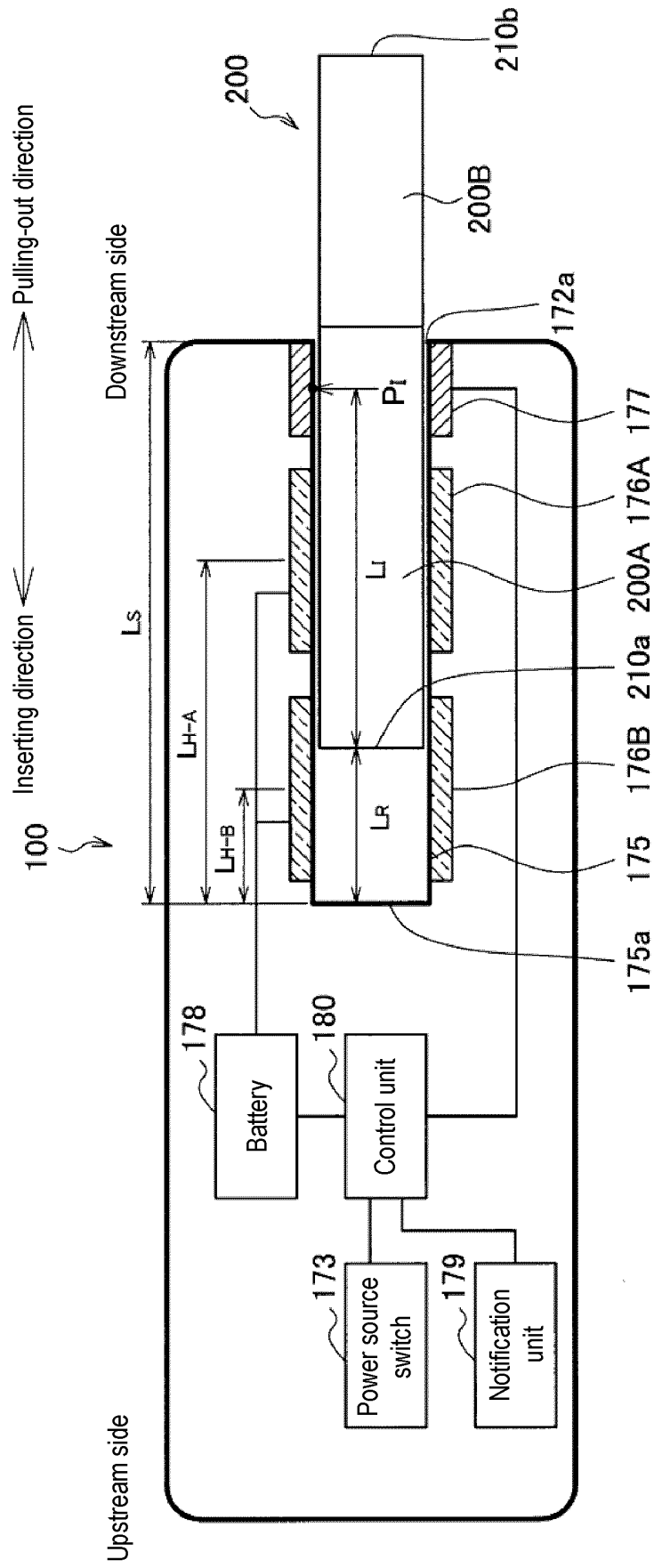


Fig. 9

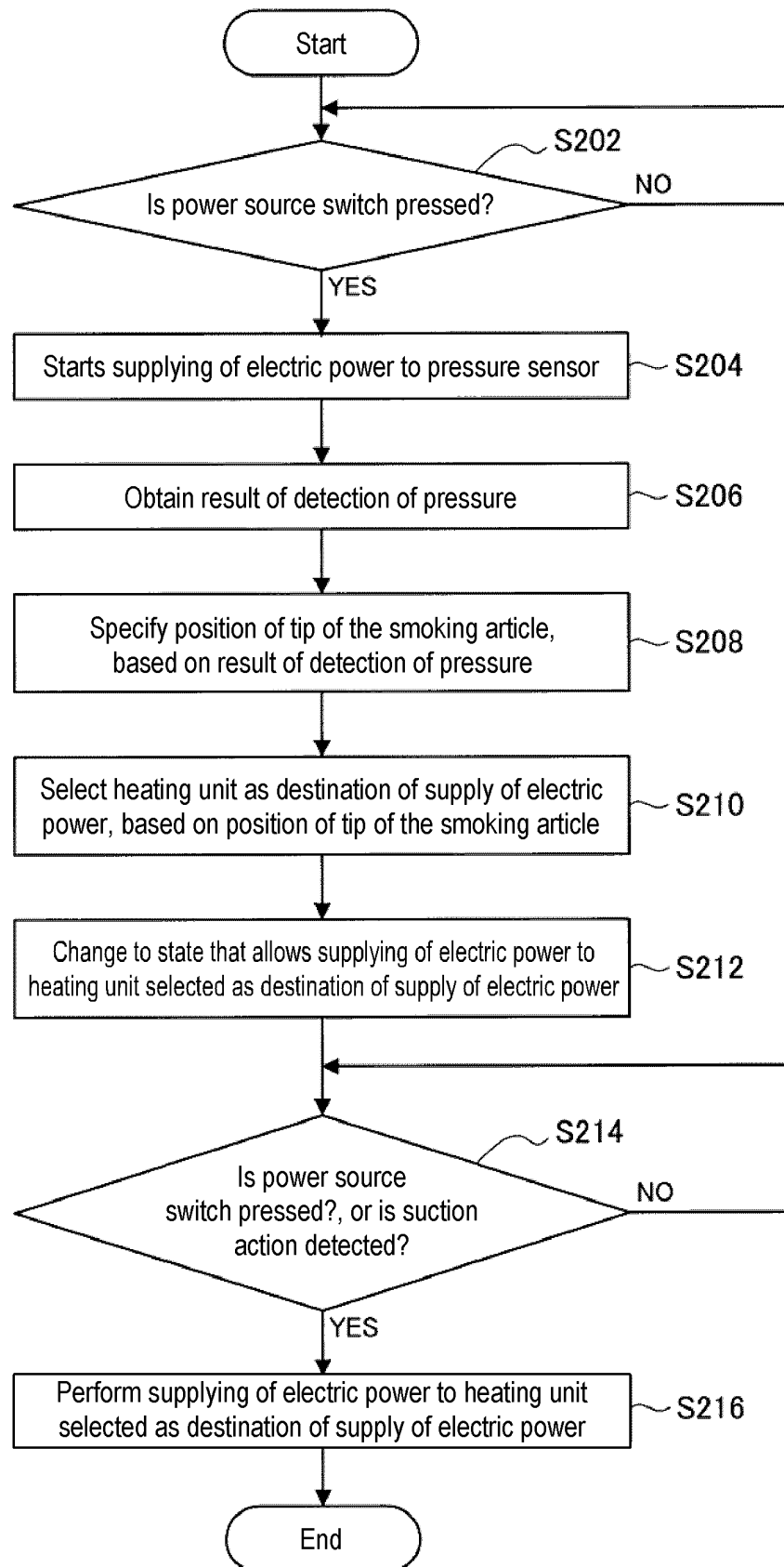


Fig. 10

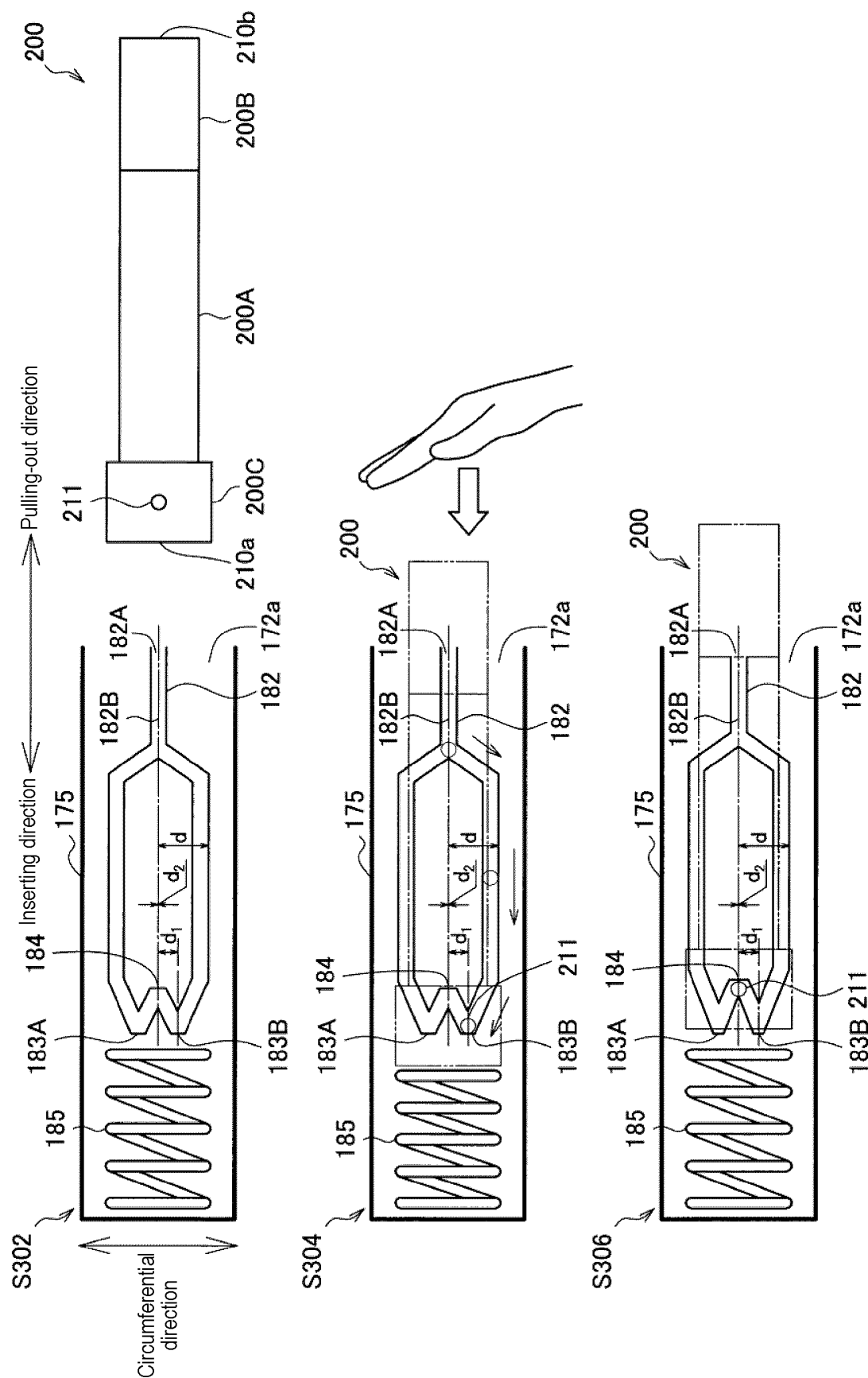
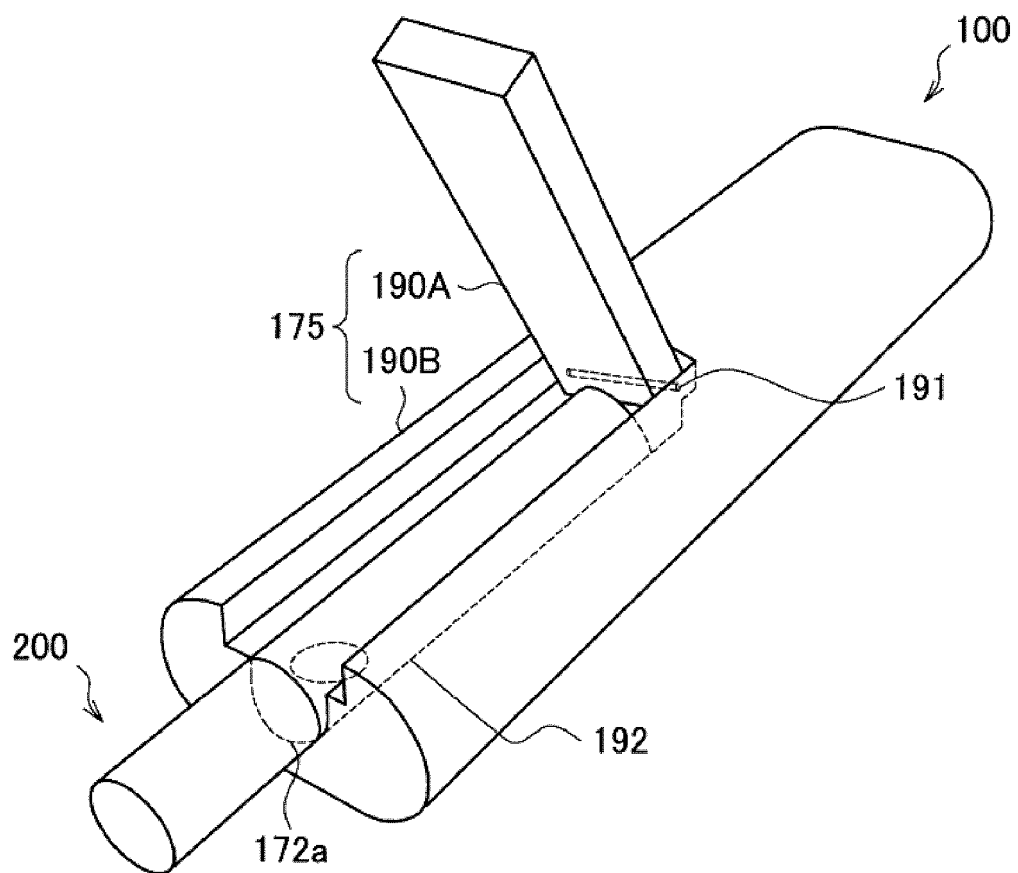


Fig. 11



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INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2019/007656

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A. CLASSIFICATION OF SUBJECT MATTER
Int. Cl. A24F47/00 (2006.01) i

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)
Int. Cl. A24F47/00

15

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

Published examined utility model applications of Japan 1922-1996
Published unexamined utility model applications of Japan 1971-2019
Registered utility model specifications of Japan 1996-2019
Published registered utility model applications of Japan 1994-2019

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

20

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y A	JP 2005-517421 A (PHILIP MORRIS PRODUCTS INC.) 16 June 2005, paragraphs [0007]-[0017], [0048], [0049], fig. 1-5 & WO 2003/070031 A1, page 3, line 9 to page 7, line 5, page 15, line 28 to page 16, line 15, fig. 1-5 & US 2003/0154991 A1	1-7, 9, 13-24 8, 10-12
Y	JP 2001-246762 A (SEIKO INSTRUMENTS INC.) 11 September 2001, abstract (Family: none)	1-7, 9, 13-24
Y	GB 2534213 A (NGIP RESEARCH LTD.) 20 July 2016, fig. 8, 9 (Family: none)	13-21

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☒ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

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

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

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

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

"&" document member of the same patent family

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Date of the actual completion of the international search
22.05.2019

Date of mailing of the international search report
04.06.2019

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

Authorized officer

Telephone No.

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

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2019/007656

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6053176 A (PHILIP MORRIS INCORPORATED) 25 April 2000, entire text, all drawings (Family: none)	1-24
A	JP 2014-518095 A (BRITISH AMERICAN TOBACCO (INVESTMENTS) LIMITED) 28 July 2014, entire text, all drawings & US 2014/0360515 A1 & WO 2013/034454 A1	1-24

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

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP H07184627 B [0004]