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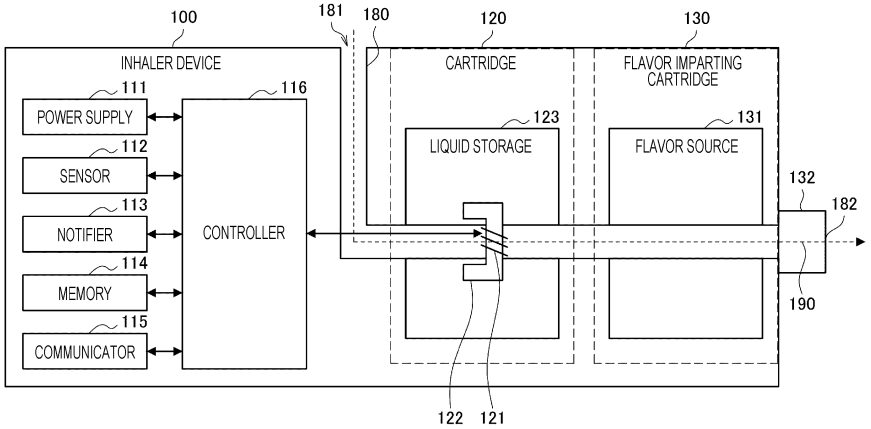
(54) AEROSOL GENERATION SYSTEM

(57) [Problem] To provide a mechanism such that it is possible to provide a novel puffing experience. [Solution] An aerosol generation system comprising a housing which has an opening, an insertion part into which a portion of an aerosol generation product is inserted, and a first supporting part which supports the insertion part, wherein the first supporting part is movably disposed inside of the housing so as to support the insertion part in a first condition in which the entirety of the insertion part is accommodated inside of the housing, or a second condition in which at least a portion of the insertion part projects outside of the housing from the opening.

FIG. 1



EP 4 265 133 A1

Description

Technical Field

[0001] The present invention relates to an aerosol generation system.

Background Art

[0002] Inhaler devices that generate material to be inhaled by users, such as electronic cigarettes and nebulizers, are widespread. For example, an inhaler device uses a substrate containing an aerosol source for generating an aerosol, a flavor source for imparting a flavor component to the generated aerosol, and the like, to generate the aerosol having the flavor component imparted. The user can taste a flavor by inhaling the aerosol generated by the inhaler device and having the flavor component imparted. Hereinafter, an action of the user inhaling the aerosol is also referred to as a puff or a puff action.

[0003] In recent years, inhaler devices of a type in which a substrate formed in a stick shape is inserted are widespread, and techniques related to this type are actively developed. For example, Patent Literature 1 below discloses a technique for identifying the type of a substrate by reading identification information given to a portion inserted into an inhaler device of a substrate formed in a stick shape, with a sensor provided inside the inhaler device.

Citation List

Patent Literature

[0004] Patent Literature 1: JP 2012-513750 A

Summary of Invention

Technical Problem

[0005] However, with only an inhaler device of the type in which a substrate formed in a stick shape is inserted, there is a concern that the user's puff experience will be uniform.

[0006] The present invention is made in view of the above-described problem, and an object of the present invention is to provide a mechanism capable of providing a new puff experience.

Solution to Problem

[0007] To address the above-described problem, an aspect of the present invention provides an aerosol generation system including a housing having an opening; an insertion portion into which a portion of an aerosol-source item is inserted; and a first support that supports the insertion portion. The first support is disposed to be movable inside the housing so as to support the insertion portion in a first state in which an entirety of the insertion portion is accommodated inside the housing or a second state in which at least a portion of the insertion portion protrudes outside the housing from the opening.

[0008] The aerosol generation system may further include a detector that detects information on the aerosol-source item.

[0009] In the first state, the detector may be disposed such that a detection range is located closer to the opening than the insertion portion.

[0010] In the first state, the detector may be disposed such that the detection range is located at a portion of the aerosol-source item inserted into the insertion portion, the portion protruding from the insertion portion.

[0011] The aerosol generation system may further include a second support that supports the detector. The second support may be disposed to be movable in accordance with movement of the first support.

[0012] The first support and the second support may be slidable inside the housing. A slidable direction of the first support may be different from a slidable direction of the second support.

[0013] The first state may be a state in which the first support has slid to an end portion far from the opening in a slidable range of the first support. The second state may be a state in which the first support has slid to an end portion close to the opening in the slidable range of the first support.

[0014] In the first state, the second support may be in a state slid to an end portion close to the opening in a slidable range of the second support. In the second state, the second support may be in a state slid to an end portion far from the opening in the slidable range of the second support.

[0015] The first support may have a first inclined surface inclined in a direction toward the second support from a side close to the opening to a side far from the opening. The second support may have a second inclined surface inclined in a direction toward the first support from a side far from the opening to a side close to the opening. The first inclined surface and the second inclined surface may be slidably in contact with each other. The aerosol generation system may further include an elastic body that urges the second support in a direction toward the opening in the slidable direction of the second support portion.

[0016] The detector may be a photoelectric sensor or a magnetic sensor.

[0017] The aerosol generation system may include a detection controller that controls operation of the detector in accordance with a change in a state of the first support.

[0018] The detection controller may cause the detector to detect the information on the aerosol-source item with a change in the state of the first support to the first state for a first time after the aerosol-source item is inserted into the insertion portion as a trigger.

[0019] The aerosol generation system may further include a generation controller that controls operation of a

generator that generates an aerosol using the aerosol-source item inserted into the insertion portion so as to generate the aerosol in response to detection of a puff action of inhaling the aerosol.

[0020] The aerosol generation system may further include an operation portion that is able to receive a user's operation. A position of the first support may change in accordance with the user's operation on the operation portion.

[0021] The operation portion may be a slider.

[0022] The aerosol generation system may include a lid that is able to open or close the opening.

[0023] The lid may be disposed to be slidable outside the housing.

[0024] The lid may be transparent or semitransparent.

[0025] The aerosol-source item may have an identifier to which identification information is given, at a portion protruding from the insertion portion in a state inserted into the insertion portion.

[0026] The aerosol generation system may include the aerosol-source item.

Advantageous Effects of Invention

[0027] As described above, according to the present invention, the mechanism capable of providing a new puff experience is provided.

Brief Description of Drawings

[0028]

[FIG. 1] FIG. 1 is a schematic diagram of an inhaler device according to a configuration example.

[FIG. 2] FIG. 2 is an overall perspective view of the inhaler device according to the present embodiment.

[FIG. 3] FIG. 3 is an overall perspective view of the inhaler device according to the present embodiment.

[FIG. 4] FIG. 4 is an end view illustrating the entirety of an internal configuration of the inhaler device according to the present embodiment.

[FIG. 5] FIG. 5 is an end view illustrating a portion of the internal configuration of the inhaler device according to the present embodiment.

[FIG. 6] FIG. 6 is an end view illustrating a portion of the internal configuration of the inhaler device according to the present embodiment.

[FIG. 7] FIG. 7 is a flowchart presenting an example of a flow of processing executed in the inhaler device according to the present embodiment.

Description of Embodiments

[0029] Hereinafter, preferred embodiments of the present invention will be described in detail with reference to the accompanying drawings. In this description and the drawings, structural elements having substantially the same functional configuration are denoted by the same reference numeral, and redundant description thereof will be omitted.

1. Logical Configuration Example of Inhaler Device

[0030] An inhaler device generates material to be inhaled by a user. In the example described below, the material generated by the inhaler device is an aerosol. Alternatively, the material generated by the inhaler device may be gas.

[0031] FIG. 1 is a schematic diagram schematically illustrating an example of a logical configuration of an inhaler device. As illustrated in FIG. 1, an inhaler device 100 according to the present configuration example includes a power supply 111, a sensor 112, a notifier 113, a memory 114, a communicator 115, and a controller 116.

[0032] The inhaler device 100 generates an aerosol using an aerosol-source item. The aerosol-source item is an item that contributes to generation of an aerosol by the inhaler device 100. A cartridge 120 and a flavor imparting cartridge 130 illustrated in FIG. 1 are examples of the aerosol-source item. The cartridge 120 and the flavor imparting cartridge 130 are detachably attached to the inhaler device 100.

[0033] The cartridge 120 includes a heater 121, a liquid guide 122, and a liquid storage 123. The flavor imparting cartridge 130 includes a flavor source 131 and a mouthpiece 132. In the inhaler device 100, an airflow path 180 passing through the cartridge 120 and the flavor imparting cartridge 130 is formed.

[0034] The power supply 111 stores electric power. The power supply 111 supplies electric power to the structural elements of the inhaler device 100 under the control of the controller 116. The power supply 111 may be a rechargeable battery such as a lithium ion secondary battery.

[0035] The sensor 112 acquires various items of information regarding the inhaler device 100. In an example, the sensor 112 may be a pressure sensor such as a condenser microphone, a flow sensor, or a temperature sensor, and acquire a value generated in accordance with the user's inhalation. In another example, the sensor 112 may be an input device that receives information input by the user, such as a button or a switch.

[0036] The notifier 113 provides information to the user. The notifier 113 may be a light-emitting device that emits light, a display device that displays an image, a sound output device that outputs sound, or a vibration device that vibrates.

[0037] The memory 114 stores various items of information for operation of the inhaler device 100. The memory 114 may be a non-volatile storage medium such as flash memory.

[0038] The communicator 115 is a communication interface capable of communication in conformity with any wired or wireless communication standard. Such a communication standard may be, for example, Wi-Fi (registered trademark) or Bluetooth (registered trademark).

[0039] The controller 116 functions as an arithmetic processing unit and a control circuit, and controls the overall operations of the inhaler device 100 in accordance with various programs. The controller 116 includes an electronic circuit such as a central processing unit (CPU) and a microprocessor, for example.

[0040] The liquid storage 123 stores an aerosol source. The aerosol source is atomized to generate an aerosol. The aerosol source is a liquid such as polyhydric alcohol and water. Examples of the polyhydric alcohol include glycerine and propylene glycol. The aerosol source may include a flavor component that is either derived from tobacco or not derived from tobacco. For the inhaler device 100 that is a medical inhaler such as a nebulizer, the aerosol source may include a medicine.

[0041] The liquid guide 122 guides, from the liquid storage 123, the aerosol source that is the liquid stored in the liquid storage 123, and holds the aerosol source. The liquid guide 122 is, for example, a wick formed by twining fiber material such as glass fiber or porous material such as porous ceramic. In this case, the capillary action of the wick guides the aerosol source stored in the liquid storage 123.

[0042] The heater 121 heats the aerosol source to atomize the aerosol source and generate the aerosol. In the example illustrated in FIG. 1, the heater 121 includes a coil wound around the liquid guide 122. When the heater 121 produces heat, the aerosol source held by the liquid guide 122 is heated and atomized to generate the aerosol. The heater 121 produces heat when receiving electric power from the power supply 111. In an example, the electric power may be supplied in response to the sensor 112 detecting a start of the user's inhalation and/or an input of predetermined information. Subsequently, the supply of the electric power may be stopped in response to the sensor 112 detecting an end of the user's inhalation and/or an input of predetermined information.

[0043] The flavor source 131 is a structural element for imparting a flavor component to the aerosol. The flavor source 131 may include a flavor component that is either derived from tobacco or not derived from tobacco.

[0044] The airflow path 180 is a flow path of air to be inhaled by the user. The airflow path 180 has a tubular structure having an air inlet hole 181 and an air outlet hole 182 at both ends. The air inlet hole 181 is an inlet of air into the airflow path 180, and the air outlet hole 182 is an outlet of the air from the airflow path 180. The liquid guide 122 is on the airflow path 180 at an upstream position (close to the air inlet hole 181), and the flavor source 131 is on the airflow path 180 at a downstream position (close to the air outlet hole 182). Air flowing in through the air inlet hole 181 when the user inhales mixes with the aerosol generated by the heater 121. Subsequently, as indicated by an arrow 190, the mixture fluid of the aerosol and the air passes through the flavor source 131 and is conveyed to the air outlet hole 182. When the mixture fluid of the aerosol and the air passes through the flavor source 131, the flavor component included in the flavor source 131 is imparted to the aerosol.

[0045] The mouthpiece 132 is to be held in a mouth of the user during inhalation. The mouthpiece 132 has the air outlet hole 182. When the user inhales with the mouthpiece 132 in his/her mouth, the mixture fluid of the aerosol and the air enters the oral cavity of the user.

[0046] The configuration example of the inhaler device 100 has been described above. The inhaler device 100 is not limited to the above configuration, and may be configured in various ways as exemplified below.

[0047] The inhaler device 100 may include multiple types of aerosol sources. Still another type of aerosol may be generated by mixing a plurality of types of aerosols generated from the plurality of types of aerosol sources in the airflow path 180 and causing a chemical reaction.

[0048] The heater 121 is an example of a generator that generates an aerosol using an aerosol-source item. Means of the generator for atomizing the aerosol source is not limited to heating by the heater 121. For example, the means for atomizing the aerosol source may be vibration atomization or induction heating.

[0049] The inhaler device 100, the cartridge 120, and the flavor imparting cartridge 130 cooperate to generate an aerosol to be inhaled by the user. Thus, the inhaler device 100, the cartridge 120, and the flavor imparting cartridge 130 may be considered to constitute one aerosol generation system.

2. Physical Configuration Example of Inhaler Device

[0050] FIG. 2 and FIG. 3 are overall perspective views of the inhaler device 100 according to the present embodiment. FIG. 4 is an end view illustrating the entirety of an internal configuration of the inhaler device 100 according to the present embodiment. FIG. 5 and FIG. 6 are end views illustrating a portion of the internal configuration of the inhaler device 100 according to the present embodiment. FIG. 4 and FIG. 5 illustrate an end surface taken along line A-A of the inhaler device 100 illustrated in FIG. 2. In contrast, FIG. 6 illustrates an end surface taken along line A-A of the inhaler device 100 illustrated in FIG. 3.

[0051] As illustrated in FIG. 2 and FIG. 3, the inhaler device 100 includes a top housing 11A, a bottom housing 11B, a cover 12, a switch 13, a lid 14, a display 15, a slider 16, and a guide rail 17. The top housing 11A and the bottom housing 11B are connected to each other to define an outermost outer housing 11 of the inhaler device 100. The outer housing 11 has a size to fit in a hand of the user. When the user uses the inhaler device 100, the user can hold the inhaler device 100 with his/her hand and inhale a flavor.

[0052] As illustrated in FIG. 4 to FIG. 6, the inhaler device 100 includes an insertion portion 20, a first support 21, a second support 22, a third support 23, a detector 24, a compression coil spring 25, a rack 26, a pinion 27,

circuit boards 30A to 30C, a battery 31, and a communication interface 32. The circuit boards 30A to 30C correspond to the controller 116 described above. The battery 31 corresponds to the power supply 111 described above. The communication interface 32 corresponds to the communicator 115 described above.

[0053] The top housing 11A has an opening (not illustrated). The cover 12 is coupled to the top housing 11A to close the opening. The cover 12 has an opening 18 through which the insertion portion 20 can pass.

[0054] The longitudinal direction of the inhaler device 100 is also referred to as an up-down direction. In particular, in the longitudinal direction of the inhaler device 100, a direction toward the opening 18 is also referred to as an upward direction, and a direction toward the side opposite to the opening 18 is also referred to as a downward direction. In contrast, the transverse direction of the inhaler device 100 is also referred to as a left-right direction. In particular, a direction toward the insertion portion 20 when viewed from the second support 22 is also referred to as a leftward direction, and the opposite direction is also referred to as a rightward direction.

[0055] A portion of the flavor imparting cartridge 130 is inserted into the insertion portion 20. The flavor imparting cartridge 130 is inserted into the insertion portion 20 in a state in which a portion thereof is inserted into the insertion portion 20 and the other portion thereof protrudes from the insertion portion 20. The mouthpiece 132 of the flavor imparting cartridge 130 protrudes from the insertion portion 20, and the other portion thereof is inserted into the insertion portion 20. For example, the insertion portion 20 is formed in a cylindrical shape, and the flavor imparting cartridge 130 is formed in a columnar shape. The mouthpiece 132 of the flavor imparting cartridge 130 may have a diameter larger than the inside diameter of the insertion portion 20 and the other portion thereof may have a diameter equal to the inside diameter of the insertion portion 20. In this case, when the flavor imparting cartridge 130 is inserted into the insertion portion 20, the flavor imparting cartridge 130 is fixed in a state in which the mouthpiece 132 is caught on the upper end of the insertion portion 20.

[0056] As illustrated in FIG. 2 to FIG. 6, the insertion portion 20 is accommodated inside the inhaler device 100 or pulled out to the outside of the inhaler device 100. The user accommodates the insertion portion 20 inside the inhaler device 100 while not using the inhaler device 100. In contrast, the user holds the mouthpiece 132 protruding from the insertion portion 20 in his/her mouth and inhales the aerosol in a state in which the insertion portion 20 is pulled out from the inhaler device 100.

[0057] The flavor imparting cartridge 130 has an identifier 134 to which identification information is given at a portion protruding from the insertion portion 20 in the state inserted into the insertion portion 20. As an example, the identifier 134 provided on the outer circumference of the tip end of the mouthpiece 132 is given with a color as identification information. The identification information is, for example, information indicating the type of the flavor imparting cartridge 130. That is, a different color is given to the identifier 134 for each type of the flavor imparting cartridge 130.

[0058] The lid 14 can open or close the opening 18. For example, the lid 14 covers the opening 18 or exposes the opening 18. Accordingly, the lid 14 can restrict or permit access to the inside of the inhaler device 100. For example, when the opening 18 is closed by the lid 14, the mouthpiece 132 is prevented from being contaminated or dust is prevented from entering the outer housing 11. In contrast, when the lid 14 is open, it is possible to pull out the insertion portion 20 from the opening 18 to inhale the aerosol or to insert the flavor imparting cartridge 130 into the insertion portion 20.

[0059] The lid 14 is disposed to be slidable outside the outer housing 11. Specifically, the lid 14 is disposed to be slidable along the surface of the cover 12. Thus, the user can easily open or close the opening 18 by sliding the lid 14.

[0060] The lid 14 is transparent or semitransparent. With such a configuration, even in a state in which the lid 14 closes the opening 18, the identifier 134 of the flavor imparting cartridge 130 inserted into the insertion portion 20 can be visually recognized from the outside. Thus, the user can visually recognize the identifier 134 and identify the type of the flavor imparting cartridge 130 in the state in which the lid 14 closes the opening 18.

[0061] The switch 13 receives a user's operation. For example, by pressing the switch 13, the operation mode of the inhaler device 100 can be switched to a power-on mode or a power-off mode. The power-on mode is an operation mode in which the aerosol is generated in response to detection of a puff action performed by the user. The power-off mode is an operation mode in which the aerosol is not generated even when the user performs a puff action. The switch 13 corresponds to the sensor 112 described above.

[0062] The display 15 displays various items of information. For example, the display 15 displays information indicating the operation mode of the inhaler device 100, displays the remaining amount of the battery 31, and displays the remaining number of available puffs. The display 15 corresponds to the notifier 113 described above.

[0063] The first support 21 supports the insertion portion 20. For example, the first support 21 supports the insertion portion 20 in a state in which the insertion portion 20 is fitted to an upper portion of the first support 21. The first support 21 may have an internal space for accommodating the cartridge 120 therein. In this case, the cartridge 120 accommodated inside the first support 21 and the flavor imparting cartridge 130 are connected to each other with the insertion portion 20 sandwiched therebetween. A vent is provided in the bottom surface of the insertion portion 20. The aerosol generated from the cartridge 120 passes through the flavor imparting cartridge 130 via the vent and reaches the inside of the mouth of the user.

[0064] As illustrated in FIG. 2, FIG. 4, and FIG. 5, the first support 21 can support the insertion portion 20 in a first state in which the entirety of the insertion portion 20 is accommodated inside the outer housing 11. Further, as illustrated in FIG. 3 and FIG. 6, the first support 21 can support the insertion portion 20 in a second state in which at least a portion of the insertion portion 20 protrudes outside the outer housing 11 from the opening 18. The first support 21 is disposed to be movable inside the outer housing 11 so as to support the insertion portion 20 in the first state or the second state. With such a configuration, by moving the first support 21, the insertion portion 20 can be accommodated in the outer housing 11 or pulled out from the outer housing 11.

[0065] The first support 21 is slidable inside the outer housing 11. For example, the first support 21 is disposed to be slidable along a slide rail (not illustrated) provided inside the outer housing 11. As illustrated in FIG. 5, the first state is a state in which the first support 21 has slid to an end portion farthest from the opening 18 in a slidable range X of the first support 21. As illustrated in FIG. 6, the second state is a state in which the first support 21 has slid to an end portion closest to the opening 18 in the slidable range X of the first support 21. In FIG. 5 and FIG. 6, as the slidable range X of the first support 21, a movable range of the upper end of the first support 21 is illustrated.

[0066] The slider 16 is an example of an operation portion that is able to receive a user's operation for changing the position of the first support 21. The slider 16 is slidable along the guide rail 17. The position of the first support 21 changes in accordance with the user's operation on the slider 16. When the slider 16 is moved to an end portion of the guide rail 17 in an X2 direction, the position of the first support 21 moves to an end portion in an X1 direction. In contrast, when the slider 16 is moved to an end portion of the guide rail 17 in the X1 direction, the position of the first support 21 moves to an end portion in the X2 direction.

[0067] The position of the first support 21 is changed by a rack-and-pinion mechanism that converts movement between rotational movement and linear movement. The pinion is a rotatable gear. The rack is a flat plate-shaped member provided with teeth meshing with the pinion. When the slider 16 is slid, the rack 26 fixed to the slider 16 meshes with the pinion 27 to rotate the pinion 27. The pinion 27 meshes with a rack (not illustrated) fixed to the first support 21 to move the first support 21 upward or downward. In this way, the rack 26 fixed to the slider 16 and the rack (not illustrated) fixed to the first support 21 move in directions opposite to each other via the pinion 27 in accordance with the user's operation on the slider 16.

[0068] The detector 24 detects information on the flavor imparting cartridge 130. Specifically, the detector 24 detects identification information given to the identifier 134 of the flavor imparting cartridge 130. Subsequently, the controller 116 identifies the type of the flavor imparting cartridge 130 inserted into the insertion portion 20 based on the identification information detected by the detector 24.

[0069] The detector 24 may be a photoelectric sensor. The photoelectric sensor is a sensor including a light emitter that emits light such as visible light or infrared light and a light receiver that receives light reflected by an object within a detection range. For example, the detector 24 emits white light and detects the color as the identification information given to the identifier 134 based on the light reflected by the identifier 134 located within the detection range.

[0070] In the first state, the detector 24 is disposed such that the detection range is located closer to the opening 18 than the insertion portion 20. More specifically, in the first state, the detector 24 is disposed such that the portion of the flavor imparting cartridge 130 inserted using the insertion portion 20 and protruding from the insertion portion 20 is positioned within the detection range. Accordingly, in the first state, the identifier 134 can be included within the detection range. Thus, the type of the flavor imparting cartridge 130 can be identified based on the color of the identifier 134.

[0071] The detector 24 is supported by the second support 22. For example, the detector 24 is disposed at the left end of the second support 22. The second support 22 is disposed to be movable in accordance with movement of the first support 21. The detector 24 is fixed to the second support 22 and moves together with movement of the second support 22. Thus, the detector 24 can move to a position at which the identifier 134 can be appropriately included within the detection range in accordance with the movement of the first support 21. That is, identification accuracy for the flavor imparting cartridge 130 can be improved.

[0072] The second support 22 is slidable inside the outer housing 11. Specifically, the second support 22 is supported by the third support 23. The third support 23 has a shape covering a portion of the second support 22, and functions as a guide rail for the second support 22. The second support 22 is slidable along an inner wall of the third support 23.

[0073] A slidable direction of the first support 21 is different from a slidable direction of the second support 22. Specifically, the first support 21 is slidable in the up-down direction and the second support 22 is slidable in the left-right direction, and these directions are orthogonal to each other.

[0074] As illustrated in FIG. 5, in the first state, the second support 22 is in a state slid to an end portion close to the opening 18 in a slidable range Y of the second support 22. In contrast, as illustrated in FIG. 6, in the second state, the second support 22 is in a state slid to an end portion far from the opening 18 in the slidable range Y of the second support 22. In FIG. 5 and FIG. 6, as the slidable range Y of the second support 22, a movable range of the left end of the second support 22 is illustrated. With such a configuration, the second support

22 moves in the leftward direction with a change in the state from the second state to the first state, and the detector 24 moves in the leftward direction with the movement of the second support 22. Accordingly, the detector 24 disposed at the left end of the second support 22 can be brought as close as possible to the identifier 134. Thus, identification accuracy for the flavor imparting cartridge 130 can be improved.

[0075] The first support 21 has a first inclined surface 21a inclined in a direction toward the second support 22 from a side close to the opening 18 to a side far from the opening 18. That is, the first inclined surface 21a is inclined in the rightward direction as the first inclined surface 21a extends in the downward direction. The second support 22 has a second inclined surface 24a inclined in a direction toward the first support 21 from a side far from the opening 18 to a side close to the opening 18. That is, the second inclined surface 24a is inclined in the leftward direction as the second inclined surface 24a extends in the upward direction. The first inclined surface 21a and the second inclined surface 24a are slidably in contact with each other. For example, the inclination angle of the first inclined surface 21a and the inclination angle of the second inclined surface 24a are 90 degrees in total. The compression coil spring 25 urges the second support 22 in a direction toward the opening 18 in the slidable direction of the second support 22. Accordingly, as will be described in detail below, when the first support 21 moves upward or downward, the first inclined surface 21a and the second inclined surface 24a slide while being in contact with each other, and the second support 22 moves leftward or rightward.

[0076] The compression coil spring 25 exerts a stress in a direction in which the compression coil spring 25 spreads leftward and rightward. One end of the compression coil spring 25 is fixed to the second support 22, and the other end thereof is fixed to the third support 23. Thus, the compression coil spring 25 urges the second support 22 in a direction away from the third support 23 and toward the opening 18, that is, in the leftward direction. The second support 22 urged by the compression coil spring 25 moves leftward or rightward in accordance with the first support 21 that moves upward or downward in accordance with the user's operation on the slider 16. For example, when the state of the first support 21 changes from the first state to the second state, as illustrated in FIG. 6, the second support 22 moves in the rightward direction and the compression coil spring 25 is compressed. In contrast, when the state of the first support 21 changes from the second state to the first state, as illustrated in FIG. 5, the second support 22 receives the stress of the compression coil spring 25 and is pushed out in the leftward direction.

[0077] In this way, by moving the second support 22 leftward or rightward in accordance with the upward or downward movement of the first support 21, it is possible to move the detector 24 leftward or rightward. That is, when the type of the flavor imparting cartridge 130 is to be identified, the detector 24 is brought close to the flavor imparting cartridge 130 to improve identification accuracy. In contrast, when the insertion portion 20 is to be pulled out from the outer housing 11, the detector 24 is brought away from the flavor imparting cartridge 130 so as not to obstruct the movement of the first support 21.

3. Information Processing

[0078] The controller 116 functions as a detection controller that controls operation of the detector 24. As an example, the circuit board 30A may function as the detection controller.

[0079] The circuit board 30A controls the operation of the detector 24 in accordance with a change in the state of the first support 21. For example, the circuit board 30A causes the detector 24 to detect the information on the flavor imparting cartridge 130 with a change from the second state to the first state as a trigger. With such a configuration, it is possible to operate the detector 24 only at a timing at which the identifier 134 is included within the detection range and the detector 24 comes closest to the identifier 134. Thus, identification accuracy for the type of the flavor imparting cartridge 130 can be improved.

[0080] Further, the circuit board 30A may cause the detector 24 to detect the information on the flavor imparting cartridge 130 with a change in the state of the first support 21 to the first state for the first time after the flavor imparting cartridge 130 is inserted into the insertion portion 20 as a trigger. The fact that the state of the first support 21 has changed to the first state for the first time after the flavor imparting cartridge 130 is inserted into the insertion portion 20 may be detected based on, for example, a user's operation. For example, when the user inserts (that is, replaces) the flavor imparting cartridge 130 into the insertion portion 20, the user presses the switch 13 to reset the remaining number of available puffs displayed on the display 15. The circuit board 30A causes the detector 24 to detect the information on the flavor imparting cartridge 130 when the state of the first support 21 has changed to the first state for the first time after the reset operation is performed. Regarding that the number of available puffs may vary depending on the type of the flavor imparting cartridge 130, such a configuration can cause the display 15 to display an appropriate remaining number of available puffs.

[0081] The controller 116 functions as a communication controller that controls operation of the communication interface 32. As an example, the circuit board 30B may function as the communication controller.

[0082] The circuit board 30B controls the communication interface 32 so as to transmit or receive information on the inhaler device 100 to or from another device. For example, the circuit board 30B controls the communication interface 32 so as to transmit information indicating the identified type of the flavor imparting cartridge 130 or transmit information indicating the puff history.

[0083] The controller 116 functions as a generation controller that controls operation of the heater 121. As an example, the circuit board 30C may function as the generation controller.

[0084] The circuit board 30C controls the operation of the heater 121 to generate the aerosol in response to detection of a puff action. The occurrence of a puff action is detected by the pressure sensor, the flow sensor, the temperature sensor, or the like, included in the sensor 112. The circuit board 30C supplies electric power from the battery 31 to the heater 121 to generate the aerosol only at the timing at which a puff action is performed. Thus, it is possible to suppress wasteful electric power consumption and to suppress wasteful consumption of the aerosol source and the flavor source.

[0085] FIG. 7 is a flowchart presenting an example of a flow of processing executed in the inhaler device 100 according to the present embodiment.

[0086] As presented in FIG. 7, first, the controller 116 determines whether the state of the first support 21 is the first state (step S102).

[0087] When it is determined that the state of the first support 21 is the first state (step S102), the controller 116 determines whether the current timing is the timing at which the state becomes the first state for the first time after the flavor imparting cartridge 130 is inserted into the insertion portion 20 (step S104).

[0088] When it is determined that the current timing is the timing at which the state becomes the first state for the first time after the flavor imparting cartridge 130 is inserted into the insertion portion 20 (step S104: YES), the controller 116 identifies the type of the flavor imparting cartridge 130 (step S106). Specifically, the controller 116 operates the detector 24 to read the color of the identifier 134. Subsequently, the controller 116 identifies the type of the flavor imparting cartridge 130 based on the read color of the identifier 134.

[0089] The display 15 displays the remaining number of available puffs corresponding to the identified type of the flavor imparting cartridge 130 (step S108). Then, the processing ends.

[0090] When it is determined that the current timing is not the timing at which the state becomes the first state for the first time after the flavor imparting cartridge 130 is inserted into the insertion portion 20 (step S104: NO), the processing ends.

[0091] If it is determined that the state of the first support 21 is not the first state (step S102: NO), the controller 116 determines whether the state of the first support 21 is the second state (step S110).

[0092] If it is determined that the state of the first support 21 is the second state (step S110: YES), the controller 116 determines whether a puff action has been detected (step S112).

[0093] If it is determined that a puff action has been detected (step S112: YES), the controller 116 supplies electric power from the battery 31 to the heater 121 to generate the aerosol (step S114).

[0094] Next, the controller 116 updates the remaining number of available puffs and causes the display 15 to display the updated remaining number of available puffs (step S116). Then, the processing returns to step S110 again.

[0095] When it is determined that the puff action has not been detected (step S112: NO), the processing returns to step S110 again.

[0096] When it is determined that the state of the first support 21 is not the second state (step S110: NO), the processing ends.

4. Supplement

[0097] Although the preferred embodiments of the present invention have been described in detail with reference to the accompanying drawings, the present invention is not limited to these examples. It will be apparent to those who have ordinary knowledge in the technical field to which the present invention pertains that various changes and modifications can be made within the scope of the technical idea as defined in the appended claims. It is to be understood that the changes and modifications also obviously pertain to the technical scope of the present invention.

[0098] For example, in the above-described embodiment, the slider 16 has been described as the example of the operation portion that is able to receive the user's operation for changing the position of the first support 21, but the present invention is not limited to this example. As an example, the position of the first support 21 may be changed in accordance with an operation of rotating a rotary switch that rotates the pinion 27. As another example, the pinion 27 may be electrically rotated in response to pressing of the switch 13, and the position of the first support 21 may be changed accordingly.

[0099] For example, although the example in which the detector 24 is the photoelectric sensor has been described in the above embodiment, the present invention is not limited to this example. The detector 24 may be a magnetic sensor. In this case, the identification information given to the identifier 134 may be a magnetic body.

[0100] For example, although the example in which the compression coil spring 25 urges the second support 22 has been described in the above embodiment, the present invention is not limited to this example. Instead of the compression coil spring 25, any elastic body such as a plate spring may be used.

[0101] Note that the series of processing performed by each device described in the present description may be implemented using any of software, hardware, and a combination of software and hardware. A program constituting the software is stored in advance in, for example, a recording medium (non-transitory media) provided inside or outside each device. For example, each program is read into a RAM and executed by a processor such as a CPU at the time of execution by a computer that controls each device described in the present description. The

recording medium is, for example, a magnetic disk, an optical disk, a magnetooptical disk, a flash memory, or the like. The computer program may be distributed via a network, for example, without using a recording medium.

[0102] Also, the processing described using the flowchart and the sequence diagram in the present description do not have to be executed in the illustrated order. Some of the processing steps may be performed in parallel. Also, an additional processing step may be employed, or the processing steps may be partially omitted.

[0103] The following configurations also pertain to the technical scope of the present invention.

(1) An aerosol generation system comprising:

a housing having an opening;
an insertion portion into which a portion of an aerosol-source item is inserted; and
a first support that supports the insertion portion,
wherein the first support is disposed to be movable inside the housing so as to support the insertion portion in a first state in which an entirety of the insertion portion is accommodated inside the housing or a second state in which at least a portion of the insertion portion protrudes outside the housing from the opening.

(2) The aerosol generation system according to said (1), further comprising:
a detector that detects information on the aerosol-source item.

(3) The aerosol generation system according to said (2),
wherein, in the first state, the detector is disposed such that a detection range is located closer to the opening than the insertion portion.

(4) The aerosol generation system according to said (3),
wherein, in the first state, the detector is disposed such that the detection range is located at a portion of the aerosol-source item inserted into the insertion portion, the portion protruding from the insertion portion.

(5) The aerosol generation system according to any one of said (2) to (4), further comprising:

a second support that supports the detector,
wherein the second support is disposed to be movable in accordance with movement of the first support.

(6) The aerosol generation system according to said (5),

wherein the first support and the second support are slidable inside the housing, and
wherein a slidable direction of the first support is different from a slidable direction of the second support.

(7) The aerosol generation system according to said (6),

wherein the first state is a state in which the first support has slid to an end portion far from the opening in a slidable range of the first support, and
wherein the second state is a state in which the first support has slid to an end portion close to the opening in the slidable range of the first support.

(8) The aerosol generation system according to said (6) or (7),

wherein, in the first state, the second support is in a state slid to an end portion close to the opening in a slidable range of the second support, and
wherein, in the second state, the second support is in a state slid to an end portion far from the opening in the slidable range of the second support.

(9) The aerosol generation system according to said (8),

wherein the first support has a first inclined surface inclined in a direction toward the second support from a side close to the opening to a side far from the opening,
wherein the second support has a second inclined surface inclined in a direction toward the first support from a side far from the opening to a side close to the opening,
wherein the first inclined surface and the second inclined surface are slidably in contact with each other, and
wherein the aerosol generation system further comprises an elastic body that urges the second support in a direction toward the opening in the slidable direction of the second support portion.

(10) The aerosol generation system according to any one of said (3) to (9),
wherein the detector is a photoelectric sensor or a magnetic sensor.

(11) The aerosol generation system according to any one of said (3) to (10), comprising:
a detection controller that controls operation of the detector in accordance with a change in a state of the first support.

(12) The aerosol generation system according to said (11),
wherein the detection controller causes the detector to detect the information on the aerosol-source item with a change in the state of the first support to the

first state for a first time after the aerosol-source item is inserted into the insertion portion as a trigger.

(13) The aerosol generation system according to any one of said (1) to (12), further comprising:
a generation controller that controls operation of a generator that generates an aerosol using the aerosol-source item inserted into the insertion portion so as to generate the aerosol in response to detection of a puff action of inhaling the aerosol.

(14) The aerosol generation system according to any one of said (1) to (13), further comprising:

an operation portion that is able to receive a user's operation,
wherein a position of the first support changes in accordance with the user's operation on the operation portion.

(15) The aerosol generation system according to said (14),
wherein the operation portion is a slider.

(16) The aerosol generation system according to any one of said (1) to (15), comprising:
a lid that is able to open or close the opening.

(17) The aerosol generation system according to said (16),
wherein the lid is disposed to be slidable outside the housing.

(18) The aerosol generation system according to said (16) or (17),
wherein the lid is transparent or semitransparent.

(19) The aerosol generation system according to any one of said (1) to (18),
wherein the aerosol-source item has an identifier to which identification information is given, at a portion protruding from the insertion portion in a state inserted into the insertion portion.

(20) The aerosol generation system according to any one of said (1) to (19), comprising:
the aerosol-source item.

Reference Signs List

[0104]

100	inhaler device
111	power supply
112	sensor
113	notifier
114	memory
115	communicator
116	controller
120	cartridge
121	heater
122	liquid guide
123	liquid storage
130	flavor imparting cartridge
131	flavor source
132	mouthpiece
134	identifier
180	airflow path
181	air inlet hole
182	air outlet hole
11	outer housing
12	cover
13	switch
14	lid
15	display
16	slider
17	guide rail
18	opening
20	insertion portion
21	first support
21a	first inclined surface
22	second support
22a	second inclined surface
23	third support
24	detector
25	compression coil spring
26	rack
27	pinion
30	circuit board
31	battery
32	communication interface

Claims

1. An aerosol generation system comprising:

a housing having an opening;
an insertion portion into which a portion of an aerosol-source item is inserted; and
a first support that supports the insertion portion, wherein the first support is disposed to be movable inside the housing so as to support the insertion portion in a first state in which an entirety of the insertion portion is accommodated inside the housing or a second state in which at least a portion of the insertion portion protrudes outside the housing from the opening.

2. The aerosol generation system according to claim 1, further comprising:
a detector that detects information on the aerosol-source item.

3. The aerosol generation system according to claim 2, wherein, in the first state, the detector is disposed such that a detection range is located closer to the opening than the insertion portion.

4. The aerosol generation system according to claim 3, wherein, in the first state, the detector is disposed such that the detection range is located at a portion of the aerosol-source item inserted into the insertion

portion, the portion protruding from the insertion portion.

5. The aerosol generation system according to any one of claims 2 to 4, further comprising:

a second support that supports the detector,
wherein the second support is disposed to be movable in accordance with movement of the first support.

6. The aerosol generation system according to claim 5,

wherein the first support and the second support are slidable inside the housing, and
wherein a slidable direction of the first support is different from a slidable direction of the second support.

7. The aerosol generation system according to claim 6,

wherein the first state is a state in which the first support has slid to an end portion far from the opening in a slidable range of the first support, and
wherein the second state is a state in which the first support has slid to an end portion close to the opening in the slidable range of the first support.

8. The aerosol generation system according to claim 6 or 7,

wherein, in the first state, the second support is in a state slid to an end portion close to the opening in a slidable range of the second support, and
wherein, in the second state, the second support is in a state slid to an end portion far from the opening in the slidable range of the second support.

9. The aerosol generation system according to claim 8,

wherein the first support has a first inclined surface inclined in a direction toward the second support from a side close to the opening to a side far from the opening,
wherein the second support has a second inclined surface inclined in a direction toward the first support from a side far from the opening to a side close to the opening,
wherein the first inclined surface and the second inclined surface are slidably in contact with each other, and
wherein the aerosol generation system further comprises an elastic body that urges the second support in a direction toward the opening in the slidable direction of the second support portion.

10. The aerosol generation system according to any one of claims 3 to 9,
wherein the detector is a photoelectric sensor or a magnetic sensor.

11. The aerosol generation system according to any one of claims 3 to 10, comprising:
a detection controller that controls operation of the detector in accordance with a change in a state of the first support.

12. The aerosol generation system according to claim 11,
wherein the detection controller causes the detector to detect the information on the aerosol-source item with a change in the state of the first support to the first state for a first time after the aerosol-source item is inserted into the insertion portion as a trigger.

13. The aerosol generation system according to any one of claims 1 to 12, further comprising:
a generation controller that controls operation of a generator that generates an aerosol using the aerosol-source item inserted into the insertion portion so as to generate the aerosol in response to detection of a puff action of inhaling the aerosol.

14. The aerosol generation system according to any one of claims 1 to 13, further comprising:

an operation portion that is able to receive a user's operation,
wherein a position of the first support changes in accordance with the user's operation on the operation portion.

15. The aerosol generation system according to claim 14,
wherein the operation portion is a slider.

16. The aerosol generation system according to any one of claims 1 to 15, comprising:
a lid that is able to open or close the opening.

17. The aerosol generation system according to claim 16,
wherein the lid is disposed to be slidable outside the housing.

18. The aerosol generation system according to claim 16 or 17,
wherein the lid is transparent or semitransparent.

19. The aerosol generation system according to any one of claims 1 to 18,
wherein the aerosol-source item has an identifier to which identification information is given, at a portion protruding from the insertion portion in a state insert-

ed into the insertion portion.

20. The aerosol generation system according to any one of claims 1 to 19, comprising:

the aerosol-source item.

FIG. 1

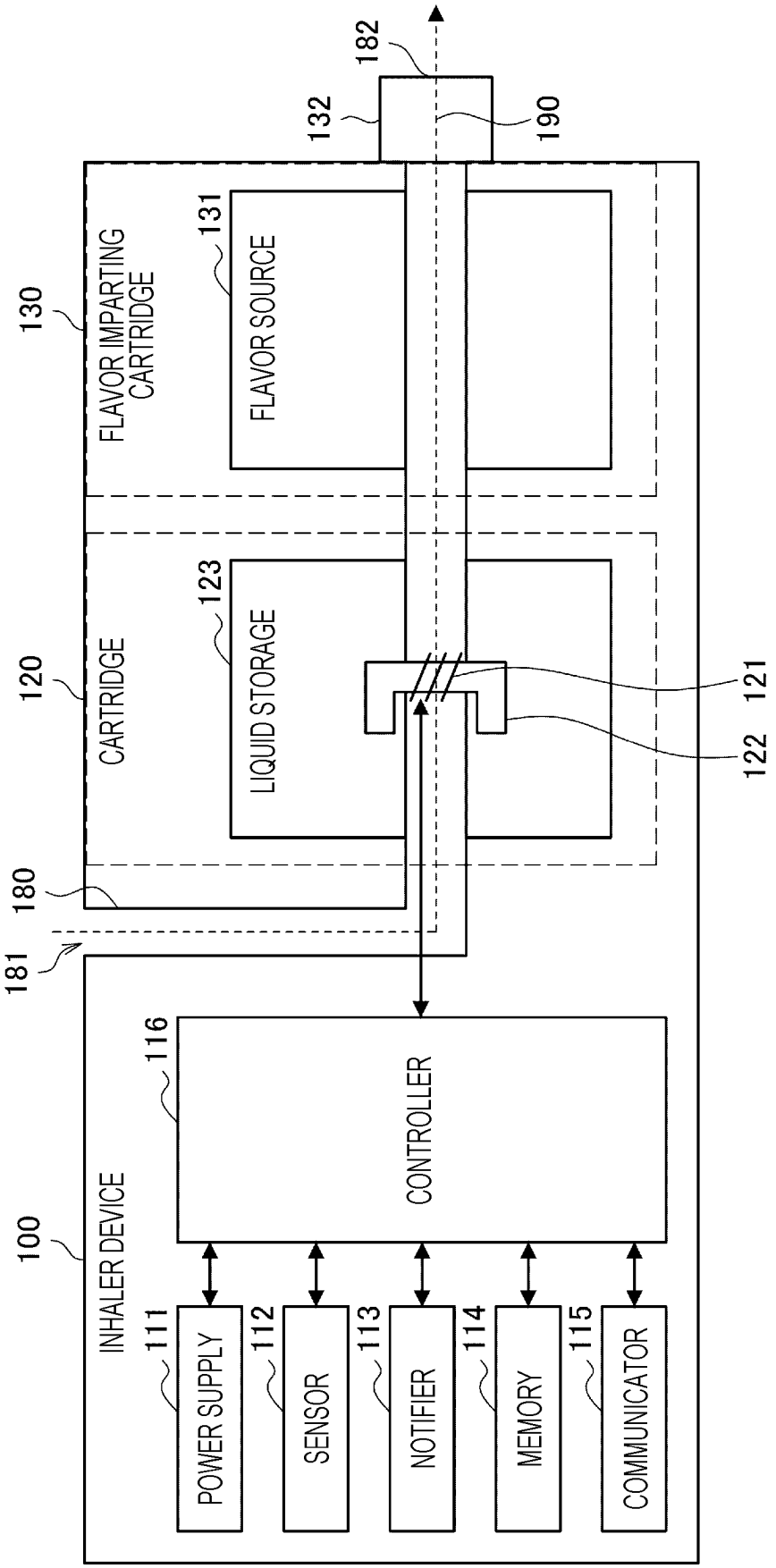

182
132
190
130
FLAVOR IMPARTING CARTRIDGE
131
FLAVOR SOURCE
120
CARTRIDGE
123
LIQUID STORAGE
121
122
180
181
116
CONTROLLER
100
INHALER DEVICE
111
POWER SUPPLY
112
SENSOR
113
NOTIFIER
114
MEMORY
115
COMMUNICATOR

FIG. 2

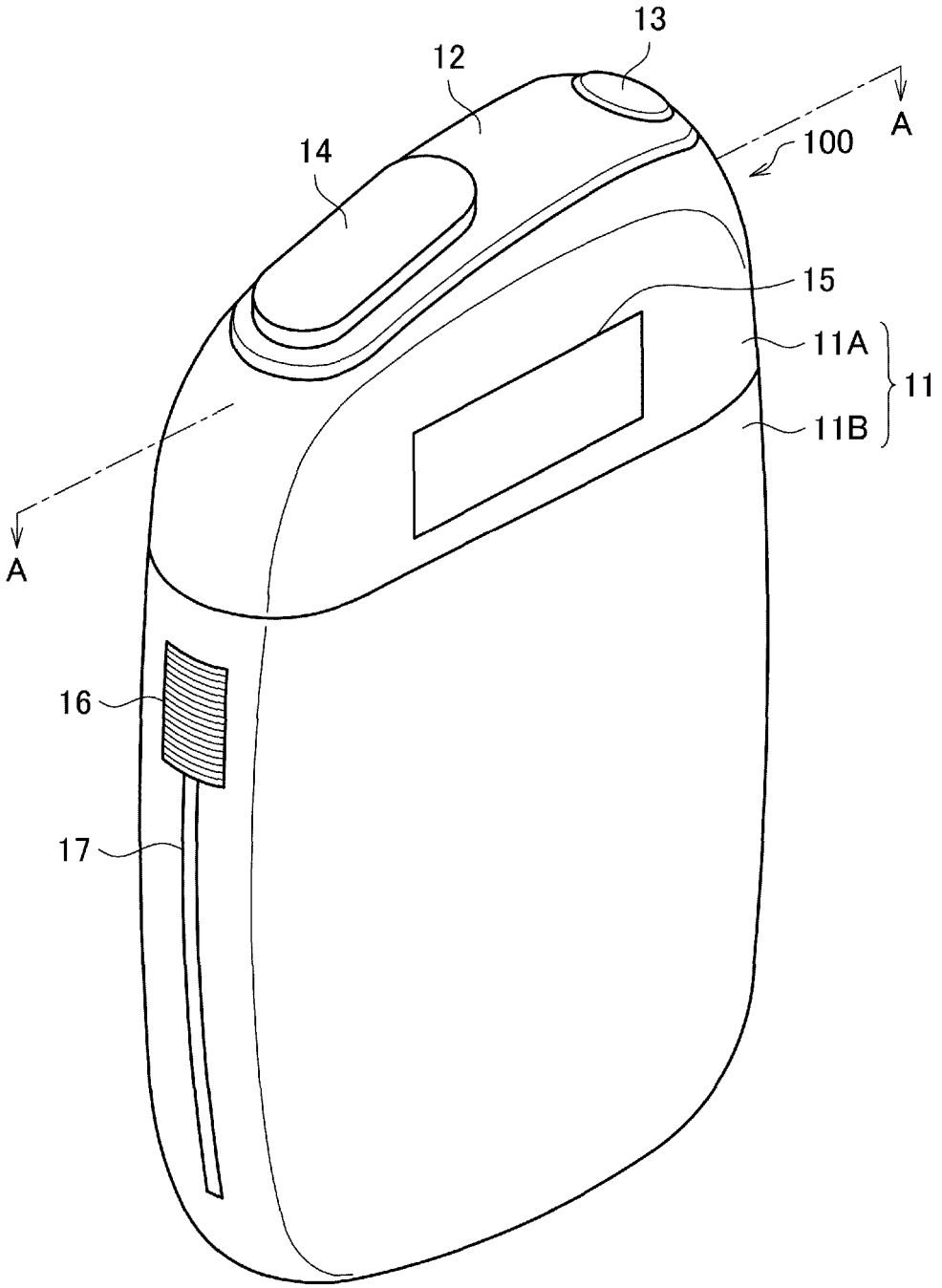


FIG. 3

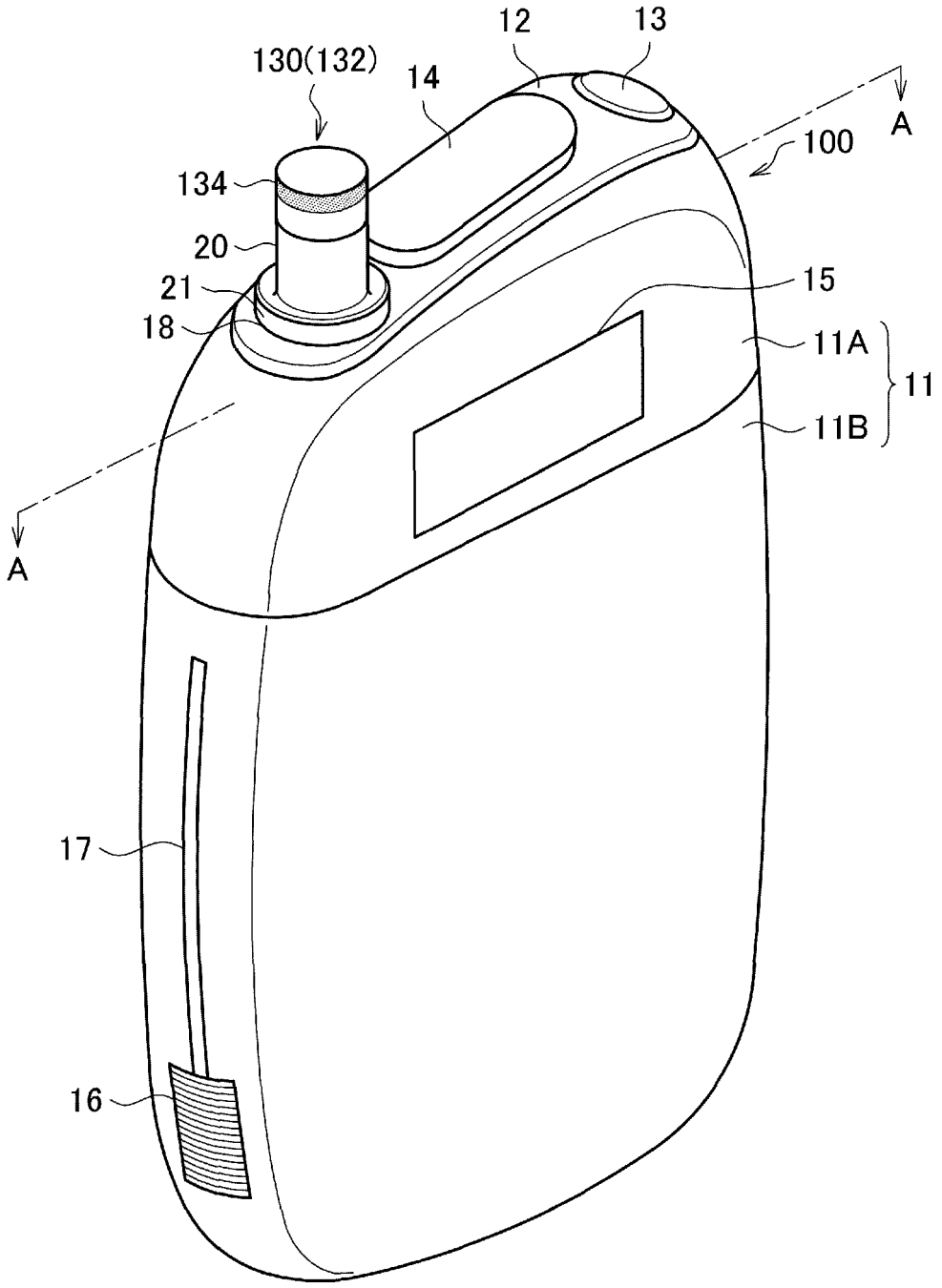


FIG. 4

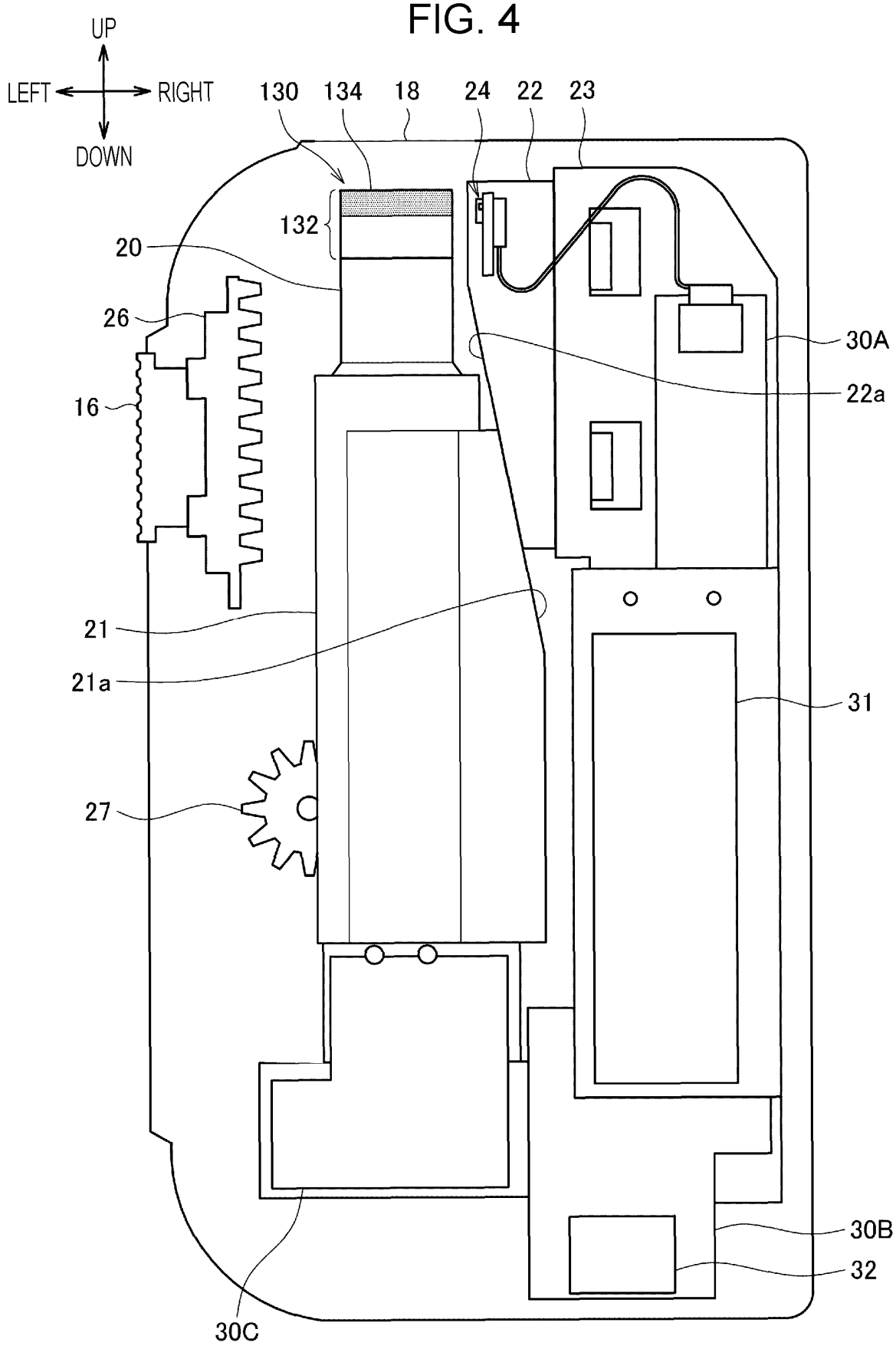

UP
LEFT
RIGHT
DOWN
130
134
18
24
22
23
132
20
26
16
30A
22a
21
21a
31
27
30B
32
30C

FIG. 5

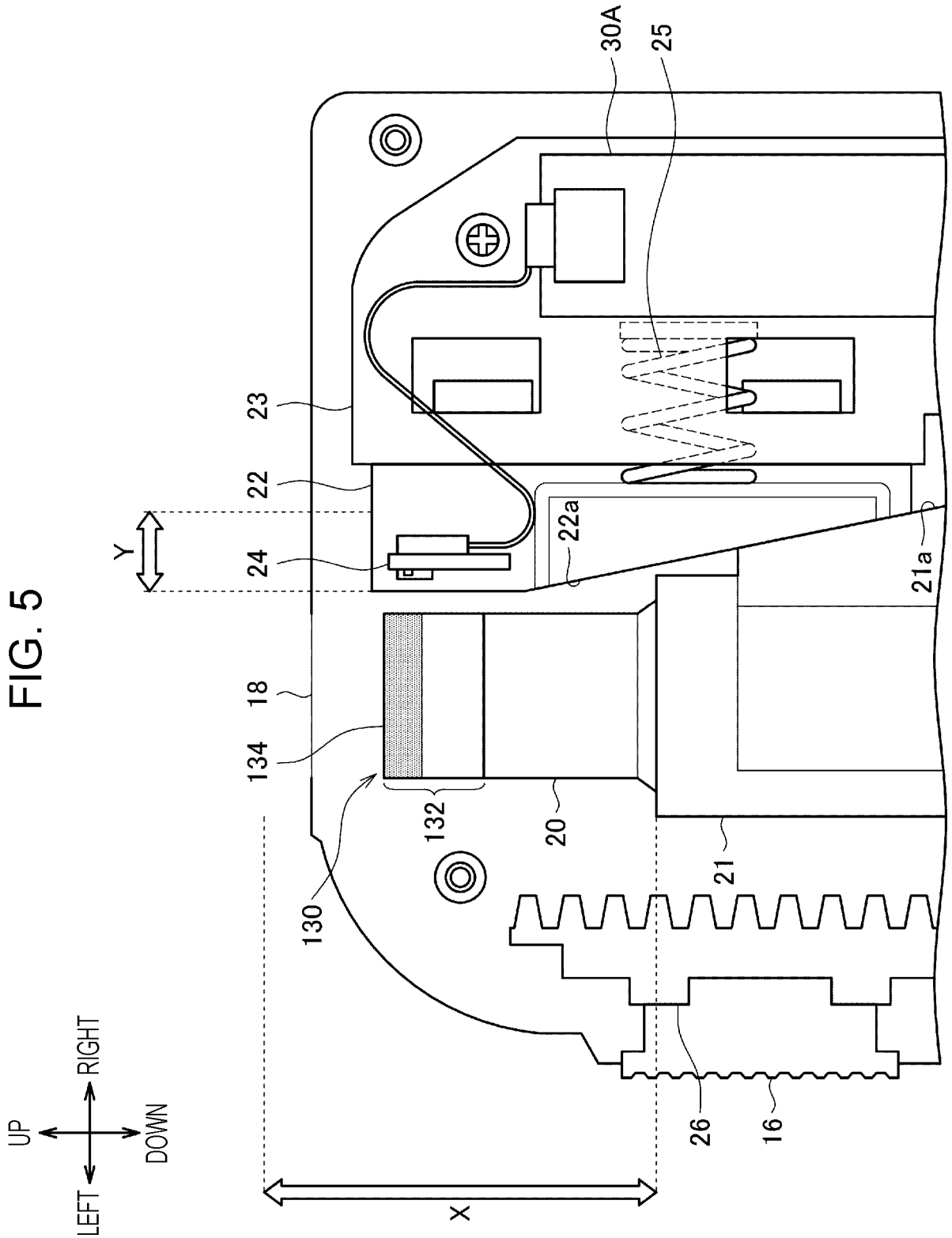

30A
25
23
22
24
Y
22a
21a
18
134
132
20
21
130
26
16
X
UP
RIGHT
LEFT
DOWN

FIG. 6

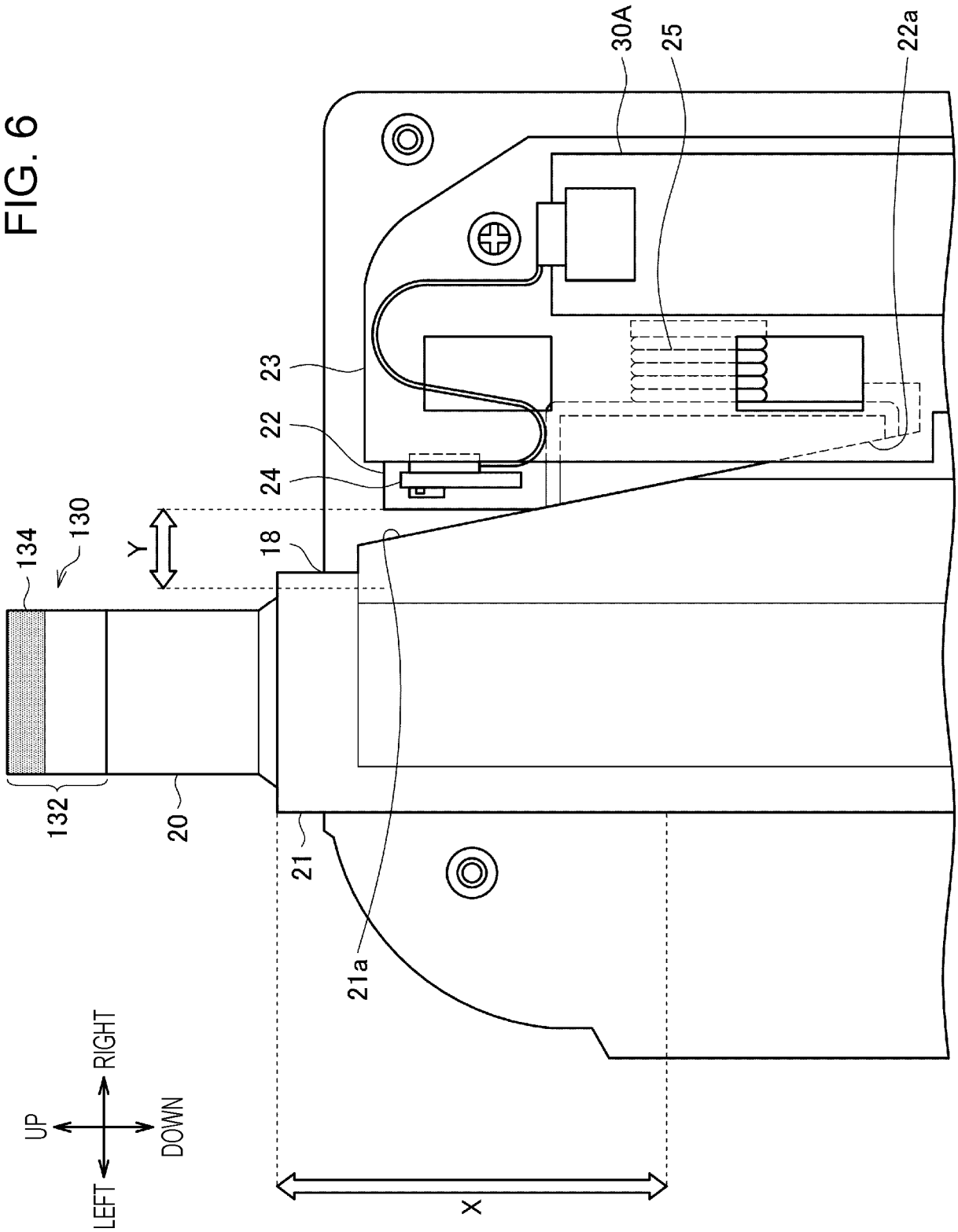
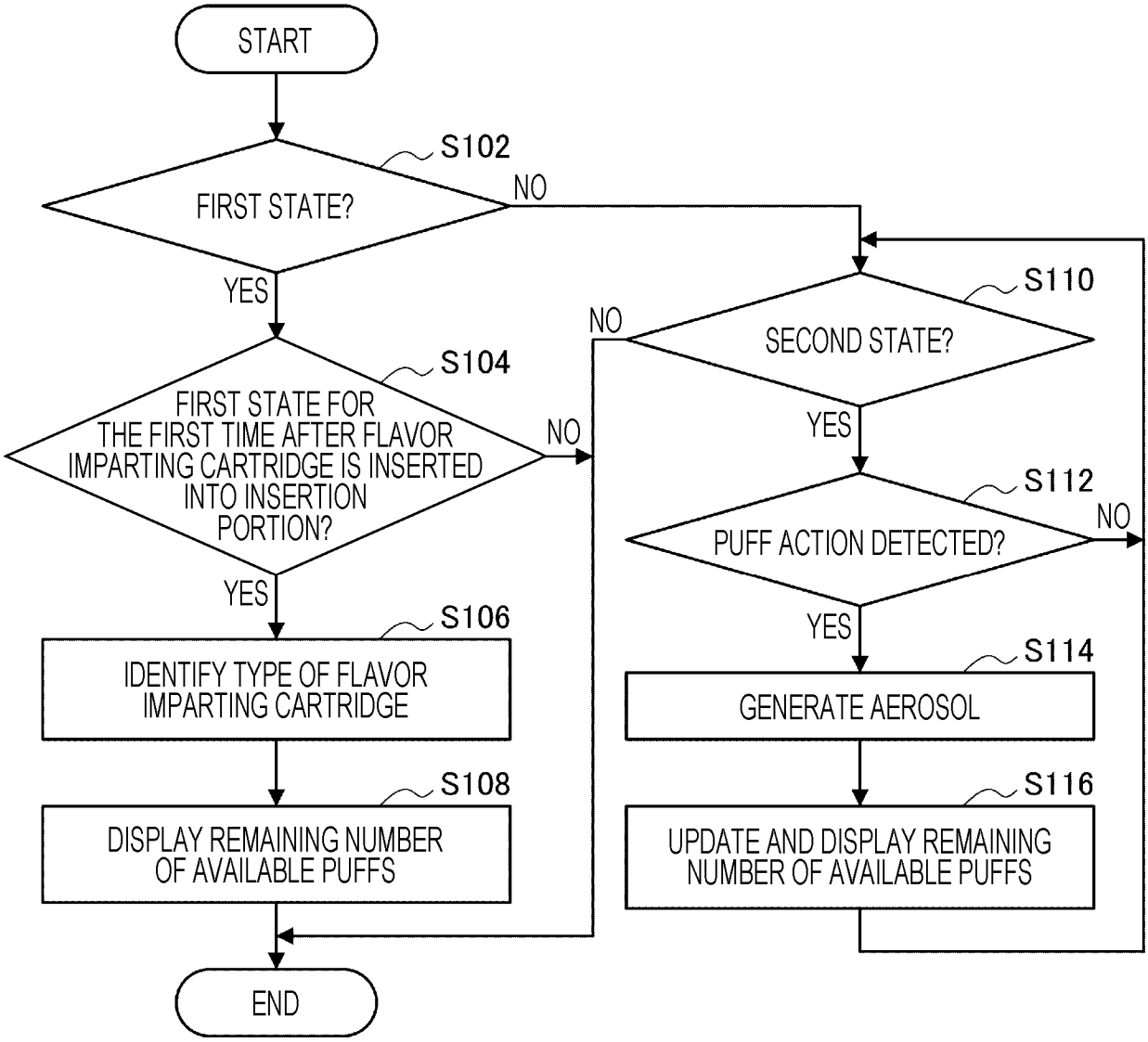


FIG. 7


START
S102
FIRST STATE?
NO
YES
S104
FIRST STATE FOR THE FIRST TIME AFTER FLAVOR IMPARTING CARTRIDGE IS INSERTED INTO INSERTION PORTION?
NO
YES
S106
IDENTIFY TYPE OF FLAVOR IMPARTING CARTRIDGE
S108
DISPLAY REMAINING NUMBER OF AVAILABLE PUFFS
END
S110
SECOND STATE?
NO
YES
S112
PUFF ACTION DETECTED?
NO
YES
S114
GENERATE AEROSOL
S116
UPDATE AND DISPLAY REMAINING NUMBER OF AVAILABLE PUFFS

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2021/016617

A. CLASSIFICATION OF SUBJECT MATTER

A24F 40/40(2020.01)i; ***A24F 40/51***(2020.01)i
FI: A24F40/40; A24F40/51

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A24F40/40; A24F40/51

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

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

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 2017-532009 A (RAI STRATEGIC HOLDINGS, INC.) 02 November 2017 (2017-11-02) fig. 17-18	1-20
A	WO 2020/119153 A1 (CHINA TOBACCO YUNNAN INDUSTRIAL CO., LTD) 18 June 2020 (2020-06-18) entire text, all drawings	1-20
A	US 2018/0177230 A1 (ALTRIA CLIENT SERVICES LLC) 28 June 2018 (2018-06-28) entire text, all drawings	1-20
A	JP 2012-513750 A (PHILIP MORRIS PRODUCTS SA) 21 June 2012 (2012-06-21) entire text, all drawings	1-20

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

* Special categories of cited documents:
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"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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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

Date of the actual completion of the international search	Date of mailing of the international search report
29 June 2021	**06 July 2021**
Name and mailing address of the ISA/JP **Japan Patent Office (ISA/JP)** **3-4-3 Kasumigaseki, Chiyoda-ku, Tokyo 100-8915** **Japan**	Authorized officer Telephone No.

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

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/JP2021/016617

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
JP 2017-532009 A	02 November 2017	WO 2016/028544 A1 fig. 17-18 US 2016/0050975 A1 EP 3182845 B1 KR 10-2017-0044158 A CN 107105777 A	
WO 2020/119153 A1	18 June 2020	CN 109497621 A	
US 2018/0177230 A1	28 June 2018	WO 2018/122177 A1	
JP 2012-513750 A	21 June 2012	WO 2010/073122 A1 entire text, all drawings US 2010/0163063 A1 EP 2201850 A1 CN 102264251 A KR 10-2011-0096548 A	

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

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 2012513750 A **[0004]**