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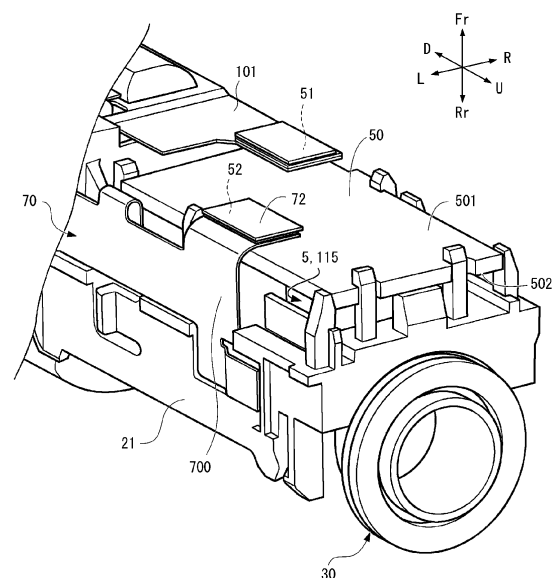
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(54) **POWER SUPPLY UNIT FOR AEROSOL GENERATING DEVICE**

(57) A power supply unit (110) of an inhalation device (100) for heating an aerosol source to generate an aerosol, comprising: a power source unit (111) for supplying power to a heating unit (121) for heating the aerosol source; a main board (50) on which a control unit (1) that controls the heating unit (121) is mounted; a communication unit (115) having an antenna (5) provided on the main board (50), that is capable of wireless communication with an external device; a main FPC (70) connected to the main board (50); and a housing (10) that accommodates these. The antenna (5) is electrically connected to ground patterns (55, 700) formed on the main board (50) and the main FPC (70), and the main FPC (70) is arranged in a position so that the main board (50) is not arranged between the main FPC and the antenna (5), and extends in the longitudinal direction of the housing (10).

[FIG. 11]

FIG. 11



Description

TECHNICAL FIELD

[0001] The present disclosure relates to a power supply unit for an aerosol-generating device for generating an aerosol by heating an aerosol source.

BACKGROUND ART

[0002] Aerosol-generating devices that generate an aerosol to which a flavor component has been added and enable a user to inhale the generated aerosol, for example, are conventionally known. Such aerosol-generating devices comprise a heater for heating an aerosol source, a battery, a control unit for controlling the heating, a communication unit for communicating with an external device such as a smartphone, etc., all accommodated in a housing of a size allowing said aerosol-generating device to be carried.

[0003] For example, PTL 1 describes an aerosol delivery device, comprising a control component for controlling the operation of at least one functional element of the aerosol delivery device based on a detected air-flow through at least a portion of at least one accommodating portion, and a communication interface coupled to the control component and configured to enable wireless communication,

CITATION LIST

PATENT LITERATURE

[0004] PTL 1: JP 2018-514188 A

SUMMARY OF INVENTION

TECHNICAL PROBLEM

[0005] There is a demand for such aerosol-generating devices to maintain or improve the performance of the various functions while reducing the size in view of the convenience of being carried by the user, and there is still room for improvement.

[0006] The present disclosure provides a power supply unit for an aerosol-generating device that is able to maintain or improve the performance of various functions while aiming to reduce size.

SOLUTION TO PROBLEM

[0007] The present disclosure relates to a power supply unit for an aerosol-generating device for generating an aerosol by heating an aerosol source, the power supply unit comprising:

a power source for supplying power to a heating unit that heats the aerosol source;

a rigid board on which a control unit that controls the heating unit is mounted;

a communication unit having an antenna provided on the rigid board, and that is capable of wireless communication with an external device;

a flexible board connected to the rigid board; and a housing that accommodates the power source, the rigid board, the communication unit, and the flexible board, wherein

the antenna is electrically connected to a ground formed on the rigid board and the flexible board, and

the flexible board is arranged in a position so that the rigid board is not arranged between the flexible board and the antenna, and extends in a longitudinal direction of the housing.

ADVANTAGEOUS EFFECTS OF INVENTION

[0008] According to the present disclosure, the use of the flexible board connected to the rigid board as an antenna can improve the antenna efficiency of the antenna while reducing the size.

BRIEF DESCRIPTION OF DRAWINGS

[0009]

Fig. 1 is a schematic diagram schematically showing a first configuration example of an inhalation device (inhalation device 100A);

Fig. 2 is a schematic diagram schematically showing a second configuration example of an inhalation device (inhalation device 100B);

Fig. 3 is an external front view of an inhalation device 100;

Fig. 4 is an exploded oblique view of an internal unit 20 of the inhalation device 100;

Fig. 5 is a schematic view of a front surface 501 of a main board 50;

Fig. 6 is a schematic view of a rear surface 502 of the main board 50;

Fig. 7 is a front view of an L1 layer of a main FPC 70;

Fig. 8 is a front view of an L2 layer of the main FPC 70;

Fig. 9 is an oblique view of the area around a heater temperature sensor connection 75 and a vibrating device connection 76 of the main FPC 70 with the main board 50 removed;

Fig. 10 is an oblique view of the main board 50 attached to a chassis 21; and

Fig. 11 is an oblique view showing an arrangement relationship between the antenna 5 and the main FPC 70.

DESCRIPTION OF EMBODIMENTS

[0010] An embodiment of the power supply unit for an aerosol-generating device according to the present disclosure will be described in detail below with reference to the drawings. The embodiment described below is an exemplary case in which the aerosol-generating device according to the present disclosure is applied to an inhalation device. Note that the drawings are to be viewed in the orientation of the reference signs. Furthermore, hereinafter, identical or similar elements may be assigned identical or similar reference signs, and descriptions thereof may be omitted or simplified as appropriate.

1. Configuration Example of an Inhalation Device

[0011] An inhalation device is a device for generating a substance to be inhaled by a user. Hereinafter, the substance generated by the inhalation device will be described as being an aerosol. Alternatively, the substance generated by the inhalation device may be a gas.

1-1 First Configuration Example

[0012] Fig. 1 is a schematic diagram schematically showing a first configuration example of an inhalation device. As shown in Fig. 1, an inhalation device 100A according to this configuration example includes a power supply unit 110, a cartridge 120, and a flavoring cartridge 130. The power supply unit 110 comprises a power source unit 111A, a sensor unit 112A, a notification unit 113A, a memory unit 114A, a communication unit 115A, and a control unit 116A. The cartridge 120 includes a heating unit 121A, a liquid guiding portion 122, and a liquid storage portion 123. The flavoring cartridge 130 includes a flavor source 131, and a mouthpiece 124. An air flow path 180 is formed in the cartridge 120 and the flavoring cartridge 130.

[0013] The power source unit 111A stores electrical power. The power source unit 111A then supplies the electrical power to each component of the inhalation device 100A in accordance with control performed by the control unit 116A. The power source unit 111A may be configured, for example, by a rechargeable battery such as a lithium ion secondary battery.

[0014] The sensor unit 112A acquires various types of information relating to the inhalation device 100A. As an example, the sensor unit 112A is configured with a pressure sensor such as a condenser microphone, a flow rate sensor or a temperature sensor, or the like, and acquires values associated with inhalation by a user. As another example, the sensor unit 112A is configured by an input device, such as a button or switch, for accepting input of information from the user.

[0015] The notification unit 113A notifies the user of information. The information notified to the user by the

notification unit 113A includes, for example, a state of charge (SOC) indicating the state of charge of the power source unit 111A, the preheating time at the time of inhalation, and times when inhalation is possible period, and so on. The notification unit 113A is configured from a light-emitting device which emits light, a display device which displays images, a sound output device which outputs sound, or a vibration device which vibrates, etc., for example.

[0016] The memory unit 114A stores various types of information for operation of the inhalation device 100A. The memory unit 114A is configured by a non-volatile storage medium such as a flash memory, for example.

[0017] The communication unit 115A is a communication interface capable of performing communication conforming to any wired or wireless communication standard. Examples of communication standards that may be used include standards that employ Wi-Fi (registered trademark), Bluetooth (registered trademark), BLE (Bluetooth Low Energy) (registered trademark), NFC (Near-Field Communication), or LPWA (Low Power Wide Area), for example.

[0018] The control unit 116A functions as an arithmetic processing device and a control device, and controls overall operation within the inhalation device 100A in accordance with various programs. The control unit 116A is realized by a Central Processing Unit (CPU) or an electronic circuit such as a microprocessor, for example.

[0019] The liquid storage portion 123 stores an aerosol source. The aerosol source is atomized to generate an aerosol. The aerosol source is a polyhydric alcohol such as glycerol or propylene glycol, or a liquid such as water, for example. The aerosol source may include a tobacco-derived or non-tobacco-derived flavor component. If the inhalation device 100A is a medical inhaler such as a nebulizer, the aerosol source may include a drug.

[0020] The liquid guiding portion 122 guides the aerosol source, which is a liquid stored in the liquid storage portion 123, from the liquid storage portion 123, and holds the aerosol source. The liquid guiding portion 122 is, for example, a wick formed by twisting either a fibrous material such as glass fibers or a porous material such as a porous ceramic. In this case, the aerosol source stored in the liquid storage portion 123 is guided by the capillary effect of the wick.

[0021] The heating unit 121A heats the aerosol source to atomize the aerosol source, thereby generating the aerosol. In the example shown in Fig. 1, the heating unit 121A is configured as a coil wrapped around the liquid guiding portion 122. When the heating unit 121A generates heat, the aerosol source held in the liquid guiding portion 122 is heated and atomized, generating the aerosol. The heating unit 121A generates heat when supplied with electricity from the power source unit 111A. As an example, electricity may be supplied to the heating unit 121A when the sensor unit

112A has detected that the user has started inhaling and/or that predetermined information has been input. The supply of electricity to the heating unit 121A may then be stopped when the sensor unit 112A has detected that the user has finished inhaling and/or that predetermined information has been input. Note that the user's inhalation operation on the inhalation device 100A can be detected, for example, based on the pressure (internal pressure) within the inhalation device 100A exceeding a predetermined threshold, detected by a puff sensor.

[0022] The flavor source 131 is a component for imparting a flavor component to the aerosol. The flavor source 131 may include tobacco-derived or non-tobacco-derived flavor components.

[0023] The air flow path 180 is a flow path for air to be inhaled by the user. The air flow path 180 has a tubular structure with an air inflow hole 181, which is an inlet for air into the air flow path 180, and an air outflow hole 182, which is an outlet for air from the air flow path 180, at either end thereof. Part way along the air flow path 180, the liquid guiding portion 122 is disposed on the upstream side (the side closer to the air inflow hole 181), and the flavor source 131 is disposed on the downstream side (the side closer to the air outflow hole 182). Air that flows in through the air inflow hole 181 as the user inhales is mixed with the aerosol generated by the heating unit 121A and is transported through the flavor source 131 to the air outflow hole 182, as shown by the arrow 190. When the mixed fluid of aerosol and air passes through the flavor source 131, the flavor component contained in the flavor source 131 is added to the aerosol.

[0024] The mouthpiece 124 is a member that is held in the user's mouth during inhalation. The air outflow hole 182 is disposed in the mouthpiece 124. The user holds the mouthpiece 124 in their mouth and inhales, making it possible to draw the mixed fluid of aerosol and air into the oral cavity.

[0025] A configuration example of the inhalation device 100A has been described above. The inhalation device 100A is, of course, not limited to the configuration described above, and various configurations, such as those illustrated below by way of example, may be adopted.

[0026] As an example, the inhalation device 100A need not include the flavoring cartridge 130. In this case, the cartridge 120 is provided with the mouthpiece 124.

[0027] As another example, the inhalation device 100A may include a plurality of types of aerosol sources. A plurality of types of aerosol generated from the plurality of types of aerosol sources may be mixed within the air flow path 180 to cause a chemical reaction, thereby generating yet more other types of aerosol.

[0028] Furthermore, the means for atomizing the aerosol source is not limited to heating by the heating

unit 121A. For example, the means for atomizing the aerosol source may be vibration atomization or induction heating.

1-2. Second Configuration Example

[0029] Fig. 2 is a schematic diagram schematically showing a second configuration example of an inhalation device. As shown in Fig. 2, an inhalation device 100B according to this configuration example comprises a power source unit 111B, a sensor unit 112B, a notification unit 113B, a memory unit 114B, a communication unit 115B, a control unit 116B, a heating unit 121B, an accommodating portion 140, and a heat insulating portion 144. The power supply unit 110 accommodates the power source unit 111A, and the heating unit 121A were separate elements in the inhalation device 100A of the first configuration example, but the power source unit 111B and the heating unit 121B constitute a single piece in the inhalation device 100B of the second configuration example. That is, the inhalation device 100B of the second configuration example can also be said to have a power supply unit 110B with a built-in heating unit.

[0030] The power source unit 111B, sensor unit 112B, notification unit 113B, memory unit 114B, communication unit 115B, and control unit 116B are each substantially the same as the corresponding component included in the inhalation device 100A of the first configuration example.

[0031] The accommodating portion 140 has an internal space 141, and holds a stick-type substrate 150 while accommodating a portion of the stick-type substrate 150 in the internal space 141. The accommodating portion 140 has an opening 142 allowing the internal space 141 to communicate with the outside, and accommodates the stick-type substrate 150 which has been inserted into the internal space 141 from the opening 142. For example, the accommodating portion 140 is a cylindrical body comprising the opening 142 and a bottom portion 143 serving as a bottom surface, and defines a columnar internal space 141. An air flow path for supplying air to the internal space 141 is connected to the accommodating portion 140. An air inflow hole, which is an inlet for air into the air flow path, is disposed in a side surface of the inhalation device 100, for example. An air outflow hole, which is an outlet for air from the air flow path to the internal space 141, is disposed in the bottom portion 143, for example.

[0032] The stick-type substrate 150 comprises a substrate portion 151 and a mouthpiece portion 152. The substrate portion 151 contains an aerosol source. The aerosol source includes a tobacco-derived or non-tobacco-derived flavor component. If the inhalation device 100B is a medical inhaler such as a nebulizer, the aerosol source may include a drug. The aerosol source may, for example, be a liquid such as water or a polyhydric alcohol, for example glycerol or propylene glycol,

containing the tobacco-derived or non-tobacco-derived flavor component, or may be a solid including the tobacco-derived or non-tobacco-derived flavor component. In a state in which the stick-type substrate 150 is held in the accommodating portion 140, at least part of the substrate portion 151 is accommodated in the internal space 141, and at least part of the mouthpiece portion 152 protrudes from the opening 142. Then, when the user holds the mouthpiece portion 152 protruding from the opening 142 in their mouth and inhales, air flows into the internal space 141 via an air flow path that is not illustrated on the drawings, and reaches the inside of the user's mouth together with the aerosol generated from the substrate portion 151.

[0033] In the example shown in Fig. 2, the heating unit 121B has a film-like form and is arranged so as to cover the outer circumference of the accommodating portion 140. Then, when the heating unit 121B generates heat, the substrate portion 151 of the stick-type substrate 150 is heated from the outer circumference, generating the aerosol.

[0034] The heat insulating portion 144 prevents heat transfer from the heating unit 121B to other components. For example, the heat insulating portion 144 is configured from a vacuum heat insulating material or an aerogel heat insulating material, or the like.

[0035] A configuration example of the inhalation device 100B has been described above. The inhalation device 100B is, of course, not limited to the configuration described above, and various configurations, such as those illustrated below by way of example, may be adopted.

[0036] As one example, the heating unit 121B may be configured with a blade-like form and may be arranged so as to protrude into the internal space 141 from the bottom portion 143 of the accommodating portion 140. In that case, the blade-like heating unit 121B is inserted into the substrate portion 151 of the stick-type substrate 150 and heats the substrate portion 151 of the stick-type substrate 150 from the inside. As another example, the heating unit 121B may be arranged so as to cover the bottom portion 143 of the accommodating portion 140. Furthermore, the heating unit 121B may be configured from a combination of two or more from among a first heating unit covering the outer circumference of the accommodating portion 140, a blade-like second heating unit, and a third heating unit covering the bottom portion 143 of the accommodating portion 140.

[0037] As another example, the accommodating portion 140 may include an opening and closing mechanism such as a hinge for opening and closing part of an outer casing that forms the internal space 141. Then, by opening and closing the outer casing, the accommodating portion 140 may accommodate and grip the stick-type substrate 150 that has been inserted into the internal space 141. In this case, the heating unit 121B may be provided on the gripping part of the accommo-

dating portion 140, and may heat the stick-shaped substrate 150 while pressing the same.

[0038] Furthermore, the means for atomizing the aerosol source is not limited to heating by the heating unit 121B. For example, the means for atomizing the aerosol source may be induction heating. In that case, the inhalation device 100B comprises at least an electromagnetic induction source such as a coil for generating a magnetic field, instead of the heating unit 121B. A susceptor, which generates heat by means of induction heating, may be provided in the inhalation device 100B, or may be contained in the stick-type substrate 150.

[0039] Furthermore, the inhalation device 100B may additionally include the heating unit 121A, the liquid guiding portion 122, the liquid storage portion 123, and the air flow path 180 according to the first configuration example, and the air flow path 180 may supply air to the internal space 141. In this case, the mixed fluid of the aerosol generated by the heating unit 121A and air flows into the internal space 141 and is further mixed with the aerosol generated by the heating unit 121B, and reaches the oral cavity of the user.

[0040] Note that, hereinafter, the inhalation device 100A and the inhalation device 100B described above will also be referred to, without distinction, as the "inhalation device 100", and the power supply unit 110A and the power supply unit 110B will also be referred to, without distinction, as the "power supply unit 110". Similarly, the power source unit 111A, 111B may be referred to as the "power source unit 111", the sensor unit 112A, 112B may be referred to as the "sensor unit 112", the notification unit 113A, 113B may be referred to as the "notification unit 113", the memory unit 114A, 114B may be referred to as the "memory unit 114", the communication unit 115A, 115B may be referred to as the "communication unit 115", the control unit 116A, 116B may be referred to as the "control unit 116", and the heating unit 121A, 121B may be referred to as the "heating unit 121".

2. Structural Configuration Example of an Inhalation Device

[0041] Next, a structural configuration example of the inhalation device 100 (power supply unit 110) is described. In the following, for convenience of explanation, the insertion and removal direction of the stick-type substrate 150 relative to the inhalation device 100 is defined as the vertical direction, the sliding movement direction of a shutter 12 described below is defined as the front-rear direction, and the direction perpendicular to the vertical direction and the front-rear direction is defined as the left-right direction. Also, as shown in the figures, Fr is the front, Rr is the rear, L is the left side, R is the right side, U is up, and D is down.

[0042] Fig. 3 is an external front view of the inhalation device 100. The inhalation device 100 has an overall

rounded cuboid shape and is configured longer in the vertical direction. For example, the user holds the inhalation device 100 in one hand, with fingertips in contact with the surfaces of the inhalation device 100. Note that the shape of the inhalation device 100 is not limited to a cuboid shape, but can be any shape.

[0043] The inhalation device 100 comprises a housing 10 constituting the exterior of the inhalation device 100, and an internal unit 20 accommodated in the housing 10.

[0044] The upper face of the housing 10 is provided with an opening 11 for inserting and removing a stick-type substrate 150 (see Fig. 2), and a shutter 12 that can slide in the front-rear direction. The opening 11 communicates with the accommodating portion 140 for accommodating the stick-type substrate 150. The shutter 12 selectively takes an open state that allows insertion and removal of the stick-type substrate 150 by opening the opening 11, and a closed state by closing the opening 11.

[0045] A universal serial bus (USB) connector 13 is provided on the bottom face side of the housing 10. The USB connector 13 includes a terminal (for example, a VBUS terminal) that accepts power from an external power source. The USB connector 13 is a receptacle into which a partnering plug can be inserted, for example a USB type-C shaped receptacle.

[0046] The front face of the housing 10 is provided with an operation unit 14 and a light-emitting unit 15, each connected to a main board 50 described below. The operation unit 14 is arranged below the light-emitting unit 15.

[0047] The operation unit 14 is a button-type switch that can be operated by a user, and is an input device for receiving input of information from a user. The user pressing the operation unit 14, for example, activates a Micro Controller Unit (MCU) 1, which is described later, or the heating unit 121.

[0048] The light-emitting unit 15 includes a light-emitting device such as a light-emitting diode (LED), for example. A plurality of light emitting elements is provided and configured to be able to emit light in a plurality of light colors. The light-emitting unit 15 is an example of the notification unit 113, and emits light in a predetermined light-emitting mode in response to a command from the MCU 1 to notify the user of predetermined information. The specific light emission mode may be, for example, a mode in which light is emitted in different colors according to predetermined information, but is not limited to this, and may also be, for example, a mode such as varying the intensity of the light emission or light emission pattern (for example, flashing at predetermined time intervals). Also, the predetermined information is, for example, operating information indicating whether the inhalation device 100 is powered on or not.

[0049] The internal unit 20 will now be described with reference to Figs. 4 to 11.

[0050] As shown in Fig. 4, the internal unit 20 comprises a chassis 21, the main board 50, a power source unit 111, a power source flexible printed circuit (FPC) 101, a heater assembly 30, a vibration device 60, a main FPC 70, and a plurality of temperature sensors 66 to 68.

[0051] The chassis 21 comprises a power supply arrangement unit 22 in which the power source unit 111 is arranged, a board arrangement part 23 in which the main board 50 is arranged, a heater arrangement part 24 in which the heater assembly 30 is arranged, a USB connector arrangement part 25 in which the USB connector 13 is arranged.

[0052] The power supply arrangement unit 22 has a cylindrical shape with a portion of the side cut out, in other words a substantially semi-cylindrical shape. The power supply arrangement unit 22 has a bottom wall portion 21a, a side wall portion 21b having a circular arc shape and standing upright from the bottom wall portion 21a, and an upper wall portion 21c provided at the upper end of the side wall portion 21b. The power source unit 111 is arranged in a space surrounded by the bottom wall portion 21a, the side wall portion 21b, and a lower face of the upper wall portion 21c.

[0053] The board arrangement part 23 is provided on a vertical wall portion 21d standing upright from the upper wall portion 21c of the power supply arrangement unit 22. The board arrangement part 23 is provided on one side of the vertical wall portion 21d in the front-rear direction, and the main board 50 is fixed to the board arrangement part 23 by a bracket 27.

[0054] The heater arrangement part 24 is provided on the side of the vertical wall portion 21d opposite to the board arrangement part 23 in the front-rear direction. The heater arrangement part 24 has a space surrounded by the vertical wall portion 21d, a pair of left and right wall portions 21e extending from the vertical wall portion 21d in a front-rear direction, and an upper face of the upper wall portion 21c, and the heater assembly 30 is arranged in this space.

[0055] The USB connector arrangement part 25 is extended downwards from the bottom wall portion 21a of the power supply arrangement unit 22.

[0056] The main board 50 is a rigid circuit board with a plurality of electronic components (elements) mounted on both sides. The rigid circuit board is not flexible, and is generally set with a thickness of 300 μm to 1600 μm . The main board 50 includes, for example, the MCU 1, the communication unit 115, a charging IC (integrated circuit) 81, a heating element 82, light-emitting elements that are not illustrated on the drawings, and so on. In the following description, the surface of the main board 50 that is opposite to the vertical wall portion 21d is the rear surface 502 and the surface that is opposite to the rear surface 502 is the front surface 501.

[0057] As shown in Fig. 5, a power connection 51 to which the power source FPC 101 is connected, and a

main FPC connection 52 to which the main FPC 70 is connected, for example, are provided on the front surface 501 of the main board 50.

[0058] The power connection 51 is provided at the right end in the lower region of the main board 50, and has a positive electrode connection 51a and a negative electrode connection 51b. The power connection 51 is electrically connected to the power source unit 111 via the power source FPC 101.

[0059] The main FPC connection 52 is provided at the left end in substantially the central region in the vertical direction of the main board 50. The main FPC connection 52 is connected from the front to the main FPC 70.

[0060] As shown in Fig. 6, the MCU 1, the charging IC 81, and the heating element 82, for example, are mounted on the rear surface 502 of the main board 50. The MCU 1 functions as the previously-described control unit 116, and controls the heating of the heating unit 121. The charging IC 81 performs charging control to supply power from an external power source that is not illustrated on the drawings, that is input via the USB connector 13 to the power source unit 111, and to supply the power from the power source unit 111 to the electronic components, and so on, of the main board 50, etc. The heating element 82 includes a step up DC/DC converter or switching element or the like, and generates power to be supplied to the heating unit 121 by boosting the voltage of the power supplied from the power source unit 111. The MCU 1 is provided in an upper region of the main board 50. The charging IC 81 and heating element 82 are provided in substantially the central region in the vertical direction of the main board 50.

[0061] Also, the communication unit 115, which is a communication interface capable of wirelessly communicating with an external device such as a smartphone, is mounted on the rear surface 502 of the main board 50. The communication unit 115 is configured so that some components, such as, for example, the antenna 5, are incorporated inside the MCU 1, but it is not limited to this configuration and may be provided independently of the MCU 1. The antenna 5 and the structure in the vicinity of the antenna 5 will be described later.

[0062] Furthermore, a heater connection portion 57 to which the heating unit 121 of the heater assembly 30 is connected, is provided on the rear surface 502 of the main board 50. The heater connection portion 57 is provided on a lower region of the main board 50.

[0063] Returning to Fig. 4, the power source unit 111 is a lithium ion secondary battery, for example, and has a cylindrical shape. The power source unit 111 is electrically connected to the power connection 51 of the main board 50 via the power source FPC 101. The power source unit 111 is provided with a positive electrode tab 111a and a negative electrode tab 111b. The power source FPC 101 is connected to the positive electrode tab 111a and the negative electrode tab 111b

of the power source unit 111, and, is also connected to the power connection 51 of the main board 50. The power supplied from the power source unit 111 is transmitted to the main board 50 through a conductive pattern formed on the power source FPC 101 and supplied to each component.

[0064] The heater assembly 30 comprises a heating unit 121, an accommodating portion 140 and a heat insulating portion 140. The heating unit 121 is, for example, a film heater, and is wound around the outer circumference of the accommodating portion 140. The heating unit 121 is provided with a connection 32 extending from the bottom and connected to the heater connection portion 57 of the main board 50. As shown in Figure 10, the connection 32 is connected to the heater connection portion 57 through a through-hole 26 provided in the lower part of the vertical wall portion 21d.

[0065] As shown in Fig. 4, the heater assembly 30 is also provided with a stick guide 31. The stick guide 31 is provided on an upper portion of the heater assembly 30 and guides the stick-type substrate 150 into the accommodating portion 140. The stick guide 31 is a cylindrical member, and constitutes part of the accommodating portion 140.

[0066] Furthermore, the heater assembly 30 is provided with the heater temperature sensor 66 capable of measuring the temperature of the heating unit 121. The heater temperature sensor 66 is, for example, a thermistor and the output therefrom, which depends on the electrical resistance value, is input to the MCU 1.

[0067] The vibrating device 60 includes a vibrating element such as a vibrating motor, for example. The vibrating device 60 is arranged between the top surface of the power source unit 111 and the upper wall portion 21c, and the lead wires 61 of the vibrating device 60 extend upwards and are connected to the main FPC 70 (see Figure 9). The vibrating device 60 is an example of the notification unit 113, and vibrates in a predetermined vibration mode in response to a command from the MCU 1 to notify the user of predetermined information. For example, at the start or end of heating of the stick-type substrate 150, the vibrating device 60 vibrates in a predetermined vibration mode to notify the user of the start or end of heating.

[0068] The main FPC 70 is a flexible circuit board having flexibility. The main FPC 70 is formed elongated in the vertical direction and connects the various parts of the power supply unit 110 to the main board 50. Compared with a rigid circuit board, the main FPC 70 has more flexibility in arrangement within the housing 10, so the power supply unit 110 can be reduced in size.

[0069] In this embodiment, the main FPC 70 extends from the position where the main board 50 and the heater assembly 30 are arranged to the position where the power source unit 111 and the USB connector 13 are arranged in the vertical direction which is the long-

itudinal direction of the housing 10. With such an arrangement, the main FPC 70 is formed long in the longitudinal direction of the housing 10.

[0070] The main FPC 70 includes: a main body portion 71 provided on the left side of the chassis 21 and extending long in the vertical direction; a board connection portion 72 connected to the main board 50; a USB connector connection 73 to which the USB connector 13 is connected; a housing temperature sensor connection 74 to which a housing temperature sensor 67 for measuring the temperature of the housing 10 is connected; a heater temperature sensor connection 75 to which the heater temperature sensor 66 is connected; a vibrating device connection 76 to which the vibrating device 60 is connected; and a power source temperature sensor connection 77 to which the power source temperature sensor 68 is connected. It should be noted that each connection 72 to 77 may be directly connected to the component in question or may be indirectly connected, for example via a lead wire or the like.

[0071] As shown in Figs. 7 and 8, the main FPC 70 consists of two layers, the layer exposed to the front surface (the layer close to the housing 10) is the first electrically conductive layer L1 (also referred to as the L1 layer), and the layer exposed to the back surface is referred to as the second electrically conductive layer L2 (also referred to as the L2 layer).

[0072] The main FPC 70 is formed with a plurality of electrically conductive patterns 703 to 707, and the USB connector connection 73, the housing temperature sensor connection 74, the heater temperature sensor connection 75, the vibrating device connection 76, and the power source temperature sensor connection 77 are electrically connected to the board connection portion 72 via the plurality of electrically conductive patterns 703 to 707. The electrically conductive patterns 703 to 707 are formed, for example, by etching an electrically conductive foil (e.g. copper foil) of the main FPC 70 leaving the required points, or by applying the required electrically conductive foil.

[0073] The main FPC 70 also forms a ground pattern 700 (also denoted as "GND" in the figures) connected to a ground provided in the power supply unit 110 and having the same potential as the reference potential (ground potential) of the power supply unit 110. The ground pattern 700 is formed extensively across the whole of the main FPC 70 in the vertical direction which is the longitudinal direction of the housing 10.

[0074] The board connection portion 72 is provided at the upper end of the main FPC 70 and is connected to the main FPC connection 52 of the main board 50. Specifically, the board connection portion 72 is a portion extending forward from the upper end of the main body portion 71, and configured to be folded along the left side and front surface 501 of the main board 50 (see Figs. 4 and 10).

[0075] The USB connector connection 73 is provided at the lower end of the main FPC 70 and the USB

connector 13 is mounted thereon. Specifically, the USB connector connection 73 is formed at the lower end portion of the main body portion 71, and is configured to be folded along the bottom wall portion 21a of the chassis 21 and the USB connector arrangement part 25.

[0076] The USB connector connection 73 is connected to the board connection portion 72 via the electrically conductive pattern 703 formed on the L1 and L2 layers of the main FPC 70. The electrically conductive pattern 703 comprises power wiring 703a for transmitting power from an external power source to the main board 50 when the external power source is connected to the USB connector 13, and a signal line 703b for transmitting a signal when the external power source is connected. The power wiring 703a is formed from the widest of the plurality of electrically conductive patterns 703 to 707 and the signal line 703b, reducing the amount of heat generated by the current flowing from the USB connector connection 73 by reducing the resistance value.

[0077] The housing temperature sensor connection 74 is provided at the upper end of the main FPC 70, and the housing temperature sensor 67 is mounted thereon. The housing temperature sensor 67 is, for example, a thermistor, and the output thereof is input to the MCU 1 depending on the electrical resistance value. The housing temperature sensor 67 is provided in close proximity to the inner surface of the housing 10, and measures the temperature of the housing 10. The housing temperature sensor connection 74 is provided on the opposite side of the board connection portion 72 to the main body portion 71.

[0078] The housing temperature sensor connection 74 is connected to the board connection portion 72 via the electrically conductive pattern 704 formed in the L2 layer of the main FPC 70.

[0079] The heater temperature sensor connection 75 is provided at a branch 78 branching from the main body portion 71 at a position below the board connection portion 72. As shown in Figs. 4 and 9, the branch 78 is configured folded from the main body portion 71 along the vertical wall portion 21d from the left side of the chassis 21, and is arranged between the vertical wall portion 21d and the main board 50 with the main board 50 installed on the chassis 21 (see Fig. 10). The branch 78 is provided at a position in which the heater assembly 30 and the main board 50 are arranged in the vertical direction, that is, at a position that overlaps with the heater assembly 30 and the main board 50 when viewed from the front of the power supply unit 110.

[0080] A lead wire 66a of the heater temperature sensor 66 is connected to the heater temperature sensor connection 75. The lead wire 66a of the heater temperature sensor 66 extends from the heater assembly 30 and is connected to the heater temperature sensor connection 75 via the through-hole 26 provided in the vertical wall portion 21d. The heater temperature

sensor connection 75 is provided at a position in the vertical direction where the heater assembly 30 is arranged, so that the lead wire 66a extending from the heater assembly 30 can be shortened.

[0081] The heater temperature sensor connection 75 is connected to the board connection portion 72 via the electrically conductive pattern 705 formed in the L1 layer of the main FPC 70.

[0082] The vibrating device connection 76 is provided at the branch 78, similarly to the heater temperature sensor connection 75, and a lead wire 61 of the vibrating device 60 is connected to the vibrating device connection. The vibrating device connection 76 is located at the branch 78 above the heater temperature sensor connection 75.

[0083] The vibrating device connection 76 is connected to the board connection portion 72 via the electrically conductive pattern 706 formed on the L1 and L2 layers of the main FPC 70.

[0084] The power source temperature sensor connection 77 is provided at a position in the vertical direction where the power source unit 111 is arranged, and the power source temperature sensor 68 is mounted. The power source temperature sensor 68 is, for example, a thermistor, and the output therefrom is input to the MCU 1 depending on the electrical resistance value.

[0085] The power source temperature sensor connection 77 is connected to the board connection portion 72 via the electrically conductive pattern 707 formed in the L2 layer of the main FPC 70.

[0086] The power source temperature sensor 68 is provided at the power source temperature sensor connection 77 so that its longitudinal direction is along the axial direction (vertical direction) of the cylindrically-shaped power source unit 111. Specifically, the power source temperature sensor 68 is provided at the power source temperature sensor connection 77 so that the positive and negative terminals, which are not illustrated on the drawings, are along the axial direction of the power source unit 111. This allows the power source temperature sensor 68 and the power source unit 111 to be arranged in close proximity regardless of the curvature of the power source unit 111, improving the temperature measurement accuracy of the power source unit 111.

[0087] In this way, the USB connector connection 73, the housing temperature sensor connection 74, the heater temperature sensor connection 75, the vibrating device connection 76, and the power source temperature sensor connection 77 are provided in the main FPC 70, and the connection points between these and the main board 50 are aggregated in one place (i.e. the board connection portion 72). By providing the main FPC 70, the power supply unit 110 can be reduced in size compared with connecting each temperature sensor 66 to 68 and the vibrating device 60 to the main board 50 individually.

[0088] Also, as shown in Fig. 7, the USB connector connection 73 of the main FPC 70, the housing temperature sensor connection 74, the heater temperature sensor connection 75, the vibrating device connection 76, and the power source temperature sensor connection 77 are provided with stiffening plates 79a. A stiffening plate 79a is provided on the L1 or L2 layer of the main FPC 70. The stiffening plate 79a is formed from polyimide, for example. By providing the stiffening plates 79a, the strength of each connection 73 to 77 can be increased.

[0089] A stiffening plate 79b is provided at the board connection portion 72 of the main FPC 70. The stiffening plate 79b is provided on the L1 or L2 layer of the main FPC 70. The stiffening plate 79b is formed, for example, from stainless steel, and is stronger than the stiffening plates 79a. This is because the board connection portion 72 requires strength as the board connection portion 72 is pressed against the main FPC connection 52 to connect the main FPC 70 to the main board 50 during assembly of the power supply unit 110.

[0090] Furthermore, the main FPC 70 also contributes to improving the communication function of the communication unit 115. The communication unit 115 is described in detail below with reference to Figs. 6 to 11.

[0091] The communication unit 115 is a communication interface capable of wireless communication with an external device as previously described. As shown in Fig. 6, the communication unit 115 includes the antenna 5. The antenna 5 is, for example, a monopole antenna, and is electrically connected to a ground pattern 55 formed on the main board 50, and a ground pattern 700 formed on the main FPC 70 and connected to the ground pattern 55. Due to the image effect of the ground pattern 55, 700, the antenna 5 can be about one quarter of the length of the resonant wavelength, and the power supply unit 110 can be reduced in size.

[0092] The antenna 5 is a conductor provided on the main board 50 which carries a current supplied from a signal generator that is not illustrated on the drawings, and emits radio waves to the outside. The antenna 5 is, for example, a pattern antenna, a chip antenna, or a wire antenna. The antenna 5 may be provided on the main board 50 integrated into the MCU 1, or may be provided on the main board 50 separately from the MCU 1.

[0093] The antenna 5 is provided on the rear surface 502 of the main board 50, and is provided at the left side end in the horizontal direction, which is close to the main FPC 70. The antenna 5 is also located above the main FPC connection 52 in the vertical direction.

[0094] The ground pattern 55 is the portion of the ground pattern formed over a wide area of the main board 50 provided in the vicinity of the antenna 5. The ground pattern 55 is provided, for example, at a position overlapping the antenna 5. The ground pattern 55 extends from the upper region of the main board 50 to

the main FPC connection 52.

[0095] The ground pattern 700 of the main FPC 70 is connected to the ground pattern 55 of the main board 50 at the main FPC connection portion 52 and the board connection portion 72.

[0096] In the vicinity of the antenna 5 on the main board 50, a non-metallic region 56 (the region enclosed by a dash double dot line in Fig. 6) is provided in which no metal is formed. In the present embodiment, the non-metallic region 56 is provided along the left side end in the upper region of the main board 50. Metal parts such as electronic components are not provided in the non-metallic region 56, and no electrically conductive pattern is formed. By providing the non-metallic region 56, it is possible to reduce interference with radio waves between the antenna 5 and the metal, and reduce performance degradation of the antenna 5.

[0097] As shown in Fig. 11, the main FPC 70 is arranged in a position so that the main board 50 is not disposed between the main FPC and the antenna 5. In more detail, the main FPC 70, with the exception of the board connection portion 72, is arranged on the rear surface 502 side (rear side) of the main board 50, and the antenna 5 is also arranged on the rear surface 502 side of the main board 50. Also, no electronic components, or the like, mounted on the main board 50 are arranged between the main FPC 70 and the antenna 5.

[0098] Since the main board 50 is not arranged between the main FPC 70 and the antenna 5, the main FPC 70 and the antenna 5 are arranged in proximity. Therefore, the ground pattern 700 formed in the main FPC 70 can be used as the ground for the antenna 5.

[0099] Also, as mentioned before, the main FPC 70 extends in the longitudinal direction of the housing 10, so sufficient area can be ensured for the ground pattern 700. Therefore, the antenna efficiency of the antenna 5 can be improved.

[0100] In the present embodiment, the main board 50 is provided with the antenna 5 on the rear surface 502 and the main FPC connection 52 is provided on the front surface 501. In other words, the main FPC connection 52 and the antenna 5 are provided on different sides of the main board 50. However, as the main FPC 70 is configured to be bent from the board connection portion 72, which connects to the main FPC connection 52, toward the rear surface 502 of the main board 50 (here the rear side), the main FPC 70 can be arranged so that the main board 50 is not positioned between the main FPC and the antenna 5. It should be noted that, unlike the present embodiment, the antenna 5 and the main FPC connection 52 may be provided on the same side of the main board 50 (e.g. the rear surface 502), and in this case also the main board 50 must not be arranged between the antenna 5 and the portion of the main FPC 70 proximate to the antenna 5.

[0101] Also, since the antenna 5 and the main FPC connection 52 of the main board 50 are provided at one end in the left-right direction of the main board 50 (here

on the left side), the antenna 5 and the main FPC 70 provided along the left-hand side of the chassis 21 can be arranged closer together, to further improve the antenna efficiency of the antenna 5.

[0102] Also, the antenna 5 and the main FPC connection 52 of the main board 50 are provided offset from each other in the vertical direction, and the antenna 5 is provided on the upper side relative to the main FPC connection part 52, on the opposite side to the main FPC 70, which extends downward from the main FPC connection part 52. In this way sufficient area can be ensured for the ground pattern 700.

[0103] Also inside the housing 10, the heater assembly 30 and the main board 50 are arranged on the upper side in the vertical direction, and the power source unit 111 is arranged on the lower side, so that the housing 10 is formed long in the vertical direction.

[0104] The main FPC 70 extends in the longitudinal direction (vertical direction) of the housing 10 from a position at which the heater assembly 30 is arranged to a position at which the power source unit 111 is arranged. Therefore, the main FPC 70 can be formed longer, and the area of the ground pattern 700 can be larger, which contributes to improved antenna efficiency of the antenna 5.

[0105] An embodiment of the present invention has been described above with reference to the drawings, but it goes without saying that the present invention is not limited to this embodiment. It is obvious that a person skilled in the art will be able to conceive of a number of variant examples or modified examples within the scope disclosed in the claims, and any such variant examples or modified examples are naturally understood to fall within the technical scope of the present disclosure. Furthermore, the components in the embodiments described above may be combined in any way within a scope that does not depart from the essential points of the invention.

[0106] For example, in the embodiment described previously, the main FPC 70 comprises the USB connector connection 73, the housing temperature sensor connection 74, the heater temperature sensor connection 75, the vibrating device connection 76, and the power source temperature sensor connection 77, in addition to the board connection portion 72, but it may not have some of these connections. In particular, the main FPC 70 may be configured with a board connection portion 72 and at least one of the connections 73 to 77. In particular, if the main FPC 70 is used as ground for the antenna 5, it need not have some of the connections 73 to 77, as previously described, if the main FPC 70 is formed extending in the longitudinal direction of the housing 10. As an example, the main FPC 70 may not have a USB connector connection 73.

[0107] Also, for example, the main FPC 70 may include connections to which other electronic components are connected, besides the USB connector connection 73, the housing temperature sensor connection

74, the heater temperature sensor connection 75, the vibrating device connection 76, and the power source temperature sensor connection 77 as described. For example, the main FPC 70 may have a connection to which a light-emitting element such as an LED is connected, or a connection to which a switch as an operation unit 14 is connected, and so on. Also, if a panel that is not illustrated on the drawings is detachably attached to the housing 10 by a magnet, the main FPC 70 may have a connection for connecting to a magnetic sensor for detecting the panel.

[0108] The present specification, and so on, sets forth at least the following features. Constituent components, or the like, that correspond to the embodiments described above are shown by way of example within parentheses, but there is no limitation to such components.

(1) A power supply unit (power supply unit 110) for an aerosol-generating device (inhalation device 100) for generating an aerosol by heating an aerosol source, the power supply unit comprising:

- a power source (power source unit 111) for supplying power to a heating unit (heating unit 121) that heats the aerosol source;
- a rigid board (main board 50) on which a control unit (MCU 1) that controls the heating unit is mounted;
- a communication unit (communication unit 115) having an antenna (antenna 5) provided on the rigid board, and that is capable of wireless communication with an external device;
- a flexible board (main FPC 70) connected to the rigid board; and
- a housing (housing 10) that accommodates the power source, the rigid board, the communication unit, and the flexible board, wherein the antenna is electrically connected to a ground (ground pattern 55, 700) formed on the rigid board and the flexible board, and the flexible board is arranged in a position so that the rigid board is not arranged between the flexible board and the antenna, and extends in a longitudinal direction of the housing.

[0109] According to (1), the flexible board is arranged in a position so that the rigid board is not arranged between the flexible board and the antenna, so that the antenna and the flexible board can be arranged in close proximity. Since the antenna and the flexible board are arranged close to each other and the ground pattern to which the antenna is electrically connected is formed in the flexible board, the flexible board can be used as an antenna and the power supply unit can be reduced in size. Furthermore, as the flexible board extends in the longitudinal direction of the housing, sufficient area can be ensured for the ground pattern and

the antenna efficiency of the antenna can be improved.

[0110] (2) The power supply unit for an aerosol-generating device as disclosed in (1), wherein the antenna is provided on the first side (rear surface 502) of the rigid board, and the board connection (main FPC connection 52) between the flexible board and the rigid board is provided on the second side (front surface 501) opposite to the first side, and the flexible board is configured by bending from the board connection toward the first side.

[0111] According to (2), even if the board connection and the antenna are provided on different sides of the rigid board, the antenna and the flexible board can be arranged in close proximity as the flexible board is configured to bend from the board connection toward the first side.

[0112] (3) The power supply unit for an aerosol generation device as disclosed in (2), wherein the antenna and the board connection are provided at one end of the rigid board in a direction perpendicular to the longitudinal direction of the housing.

[0113] According to (3), the antenna efficiency of the antenna can be further improved as the antenna and the flexible board are arranged closer together.

[0114] (4) The power supply unit for an aerosol generation device as disclosed in (3), wherein the antenna and the board connection are provided offset from each other in the longitudinal direction of the housing, and the antenna is provided on the opposite direction side relative to the board connection to the direction in which the flexible board extends from the board connection.

[0115] According to (4), the antenna is provided on the opposite side to the direction in which the flexible board extends, relative to the board connection, so the area of the ground pattern can be sufficiently ensured.

[0116] (5) The power supply unit for an aerosol-generating device as disclosed in any of (1) to (4), wherein inside the housing, the heating unit and the rigid board are arranged at one end in the longitudinal direction and the power source is arranged at the other end.

[0117] According to (5), the housing can be lengthened in the longitudinal direction because the heating unit and the power source, which occupy volume within the housing, are provided along the longitudinal direction.

[0118] (6) The power supply unit for an aerosol generation device as disclosed in (5), wherein the flexible board extends in the longitudinal direction from a position at which the heating unit is arranged to a position at which the power source is arranged.

[0119] According to (6), the flexible board can be formed longer and the antenna efficiency of the antenna can be further improved.

[0120] (7) The power supply unit for an aerosol generation device as disclosed in (6), further comprising

a first temperature sensor (heater temperature

sensor 66) for measuring the temperature of the heating unit, wherein the flexible board is provided with a first sensor connection (heater temperature sensor connection 75) to which the first temperature sensor is connected at a position where the heating unit is arranged in the longitudinal direction.

[0121] According to (7), the temperature information of the heating unit can be transmitted to the rigid board via the flexible board.

[0122] (8) The power supply unit for an aerosol-generating device as disclosed in (6) or (7), further comprising

a second temperature sensor (power source temperature sensor 68) for measuring the temperature of the power source, wherein the flexible board is provided with a second sensor connection (power source temperature sensor connection 77) to which the second temperature sensor is connected at a position at which the power source is arranged in the longitudinal direction.

[0123] According to (8), temperature information of the power source can be transmitted to the rigid board via the flexible board.

[0124] (9) The power supply unit for an aerosol-generating device as disclosed in any of (1) to (8), further comprising

a charging connector (USB connector 13) capable of supplying power from an external power source to the power source, wherein the flexible board is provided with a connector connection (USB connector connection 73) that is connected to the charging connector.

[0125] According to (9), power from an external power source can be supplied to the power source via the flexible board.

[0126] (10) The power supply unit for an aerosol-generating device as disclosed in any of (1) to (9), wherein the flexible board is provided with a plurality of sensor connections (housing temperature sensor connection 74, heater temperature sensor connection 75, power source temperature sensor connection 77) to which all temperature sensors provided in the power supply unit are connected.

[0127] According to (10), the temperature information of all temperature sensors provided in the power supply unit can be transmitted to the rigid board by a single flexible board.

[0128] (11) The power supply unit for an aerosol-generating device as disclosed in any of (1) to (10), further comprising

a vibrating device (vibrating device 60) for notifying

the outside of the status of the power supply unit by vibrating, wherein the flexible board is provided with a connection (vibrating device connection 76) for connecting with the vibrating device.

[0129] According to (11), an operation command from the main board can be transmitted to the vibrating device via the flexible board.

[0130] (12) The power supply unit for an aerosol generation device as disclosed in any of (1) to (11), wherein

the flexible board is provided with a first stiffener (stiffening plate 79b) at a position where a connection with the rigid board is provided, and a second stiffener (stiffening plate 79a) at a position where a connection with other parts is provided in the power supply unit, and the first stiffener is stronger than the second stiffener.

[0131] According to (12), the flexible board is provided with a first stiffener having a high strength at the connection with the rigid board, so that the connection between the boards, which are prone to pressure being applied during assembly, can be sufficiently reinforced.

REFERENCE SIGNS LIST

[0132]

1 MCU (control unit)
5 Antenna
10 Housing
13 USB connector (charging connector)
50 Main board (rigid board)
501 Front surface (second face)
502 Rear surface (first face)
52 Main FPC connection (board connection)
60 Vibrating device
66 Heater temperature sensor (first temperature sensor)
68 Power source temperature sensor (second temperature sensor)
70 Main FPC (flexible board)
73 USB connector connection (connector connection)
74 Housing temperature sensor connection (sensor connection)
75 Heater temperature sensor connection (first sensor connection, sensor connection)
76 Vibrating device connection (connection)
77 Power source temperature sensor connection (second sensor connection, sensor connection)
79a Stiffening plate (second stiffener)
79b Stiffening plate (first stiffener)
100 Inhalation device (aerosol-generating device)
110 Power supply unit
111 Power source unit (power source)
115 Communication unit
121 Heating unit

Claims

1. A power supply unit for an aerosol-generating device for generating an aerosol by heating an aerosol source, the power supply unit comprising:
 - a power source for supplying power to a heating unit that heats the aerosol source;
 - a rigid board on which a control unit that controls the heating unit is mounted;
 - a communication unit having an antenna provided on the rigid board, and that is capable of wireless communication with an external device;
 - a flexible board connected to the rigid board; and
 - a housing that accommodates the power source, the rigid board, the communication unit, and the flexible board, wherein
 - the antenna is electrically connected to a ground formed on the rigid board and the flexible board, and
 - the flexible board is arranged in a position so that the rigid board is not arranged between the flexible board and the antenna, and extends in a longitudinal direction of the housing.
2. The power supply unit for an aerosol-generating device as claimed in claim 1, wherein
 - the antenna is provided on a first side of the rigid board, and the board connection between the flexible board and the rigid board is provided on a second side opposite to the first side, and
 - the flexible board is configured by bending from the board connection toward the first side.
3. The power supply unit for an aerosol generation device as claimed in claim 2, wherein
 - the antenna and the board connection are provided at one end of the rigid board in a direction perpendicular to the longitudinal direction of the housing.
4. The power supply unit for an aerosol generation device as claimed in claim 3, wherein
 - the antenna and the board connection are provided offset from each other in the longitudinal direction of the housing, and
 - the antenna is provided on the opposite direction side relative to the board connection to the direction in which the flexible board extends from the board connection.
5. The power supply unit for an aerosol-generating device as claimed in any one of claims 1 to 4, wherein
 - inside the housing, the heating unit and the rigid board are arranged at one end in the longitudinal direction and the power source is arranged at the other end.
6. The power supply unit for an aerosol generation device as claimed in claim 5, wherein
 - the flexible board extends in the longitudinal direction from a position at which the heating unit is arranged to a position at which the power source is arranged.
7. The power supply unit for an aerosol-generating device as claimed in claim 6, further comprising:
 - a first temperature sensor for measuring the temperature of the heating unit, wherein the flexible board is provided with a first sensor connection to which the first temperature sensor is connected at a position where the heating unit is arranged in the longitudinal direction.
8. The power supply unit for an aerosol-generating device as claimed in claim 6 or 7, further comprising
 - a second temperature sensor for measuring the temperature of the power source, wherein the flexible board is provided with a second sensor connection to which the second temperature sensor is connected at a position at which the power source is arranged in the longitudinal direction.
9. The power supply unit for an aerosol-generating device as claimed in any one of claims 1 to 8, further comprising
 - a charging connector capable of supplying power from an external power source to the power source, wherein the flexible board is provided with a connector connection which is connected to the charging connector.
10. The power supply unit for an aerosol-generating device as claimed in any one of claims 1 to 9, wherein
 - the flexible board is provided with a plurality of sensor connections to which all temperature sensors provided in the power supply unit are connected.
11. The power supply unit for an aerosol-generating device as claimed in any one of claims 1 to 10,

further comprising

a vibrating device for notifying the outside of
the status of the power supply unit by vibrating,
wherein
the flexible board is provided with a connection
for connecting with the vibrating device.

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12. The power supply unit for an aerosol-generating
device as claimed in any one of claims 1 to 11,
wherein

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the flexible board is provided with a first stiffen-
er at a position where a connection with the
rigid board is provided, and a second stiffener
at a position where a connection with other
parts provided in the power supply unit is pro-
vided, and
the first stiffener is stronger than the second
stiffener.

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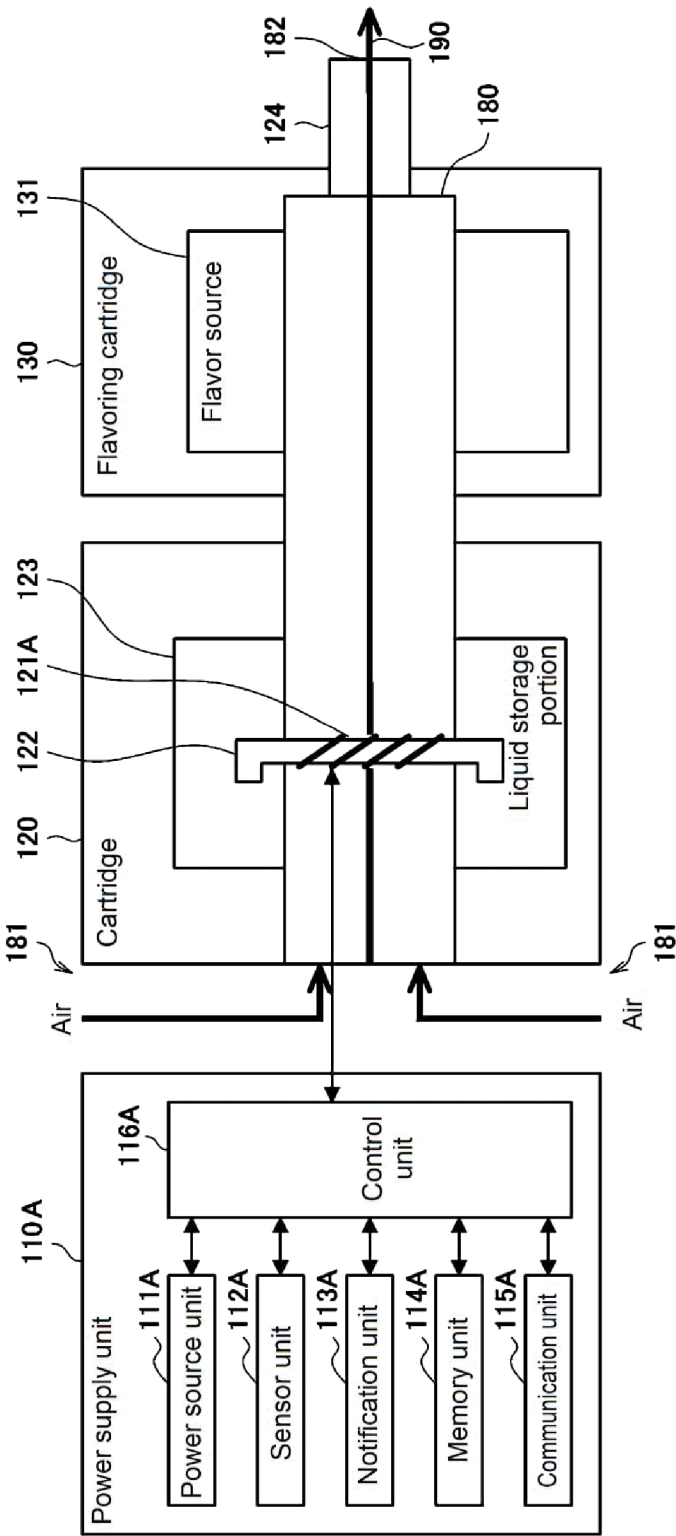
50

55

[FIG. 1]

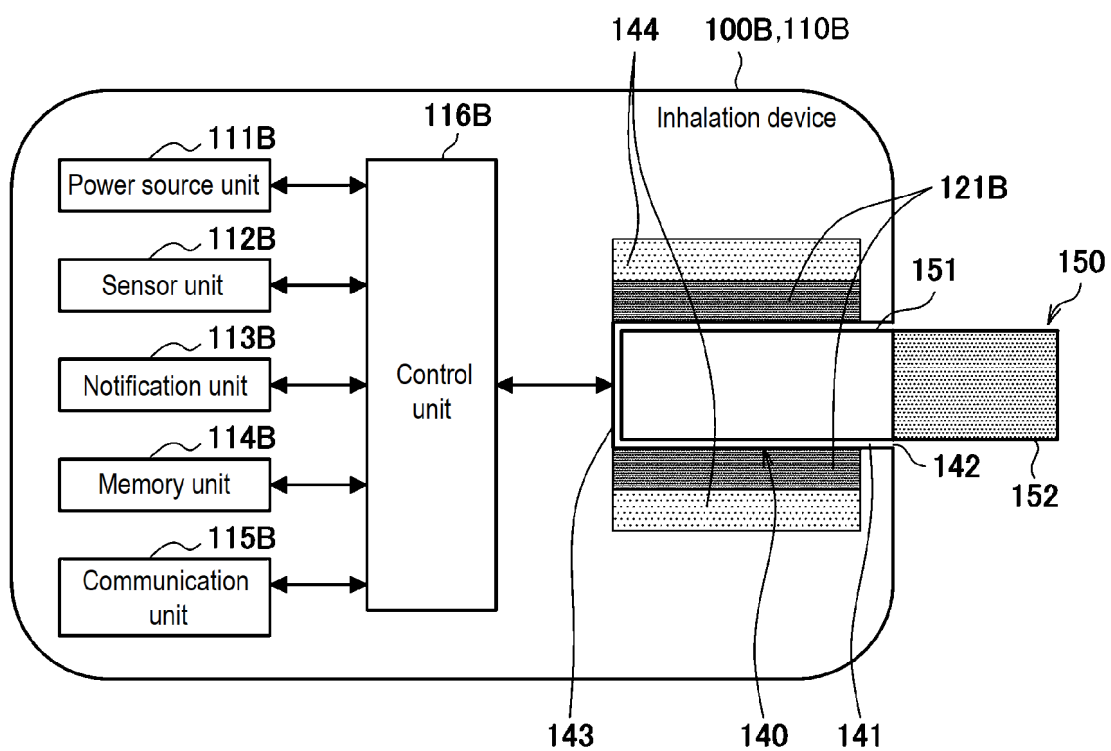
FIG. 1

100A

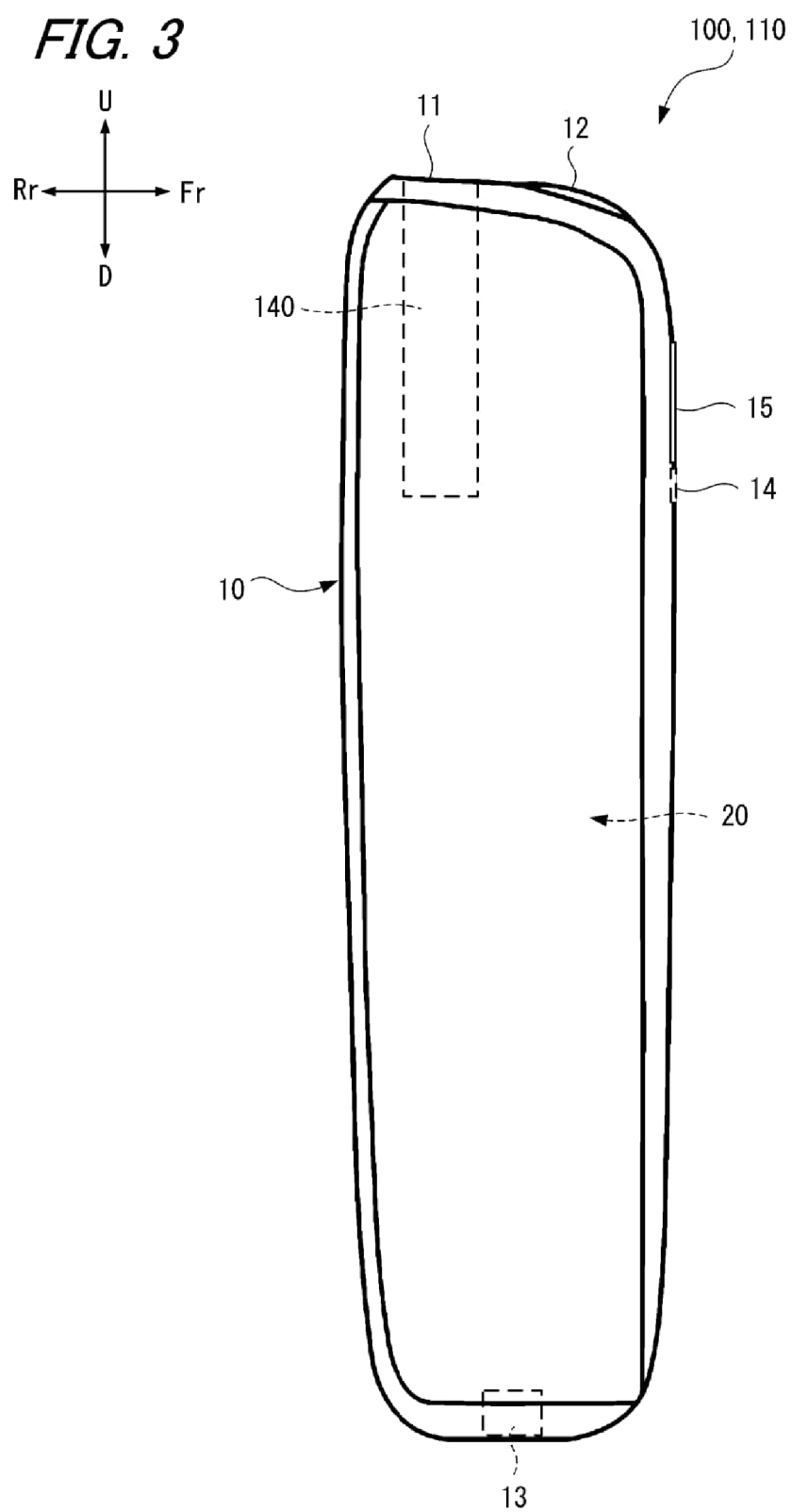


[FIG. 2]

FIG. 2

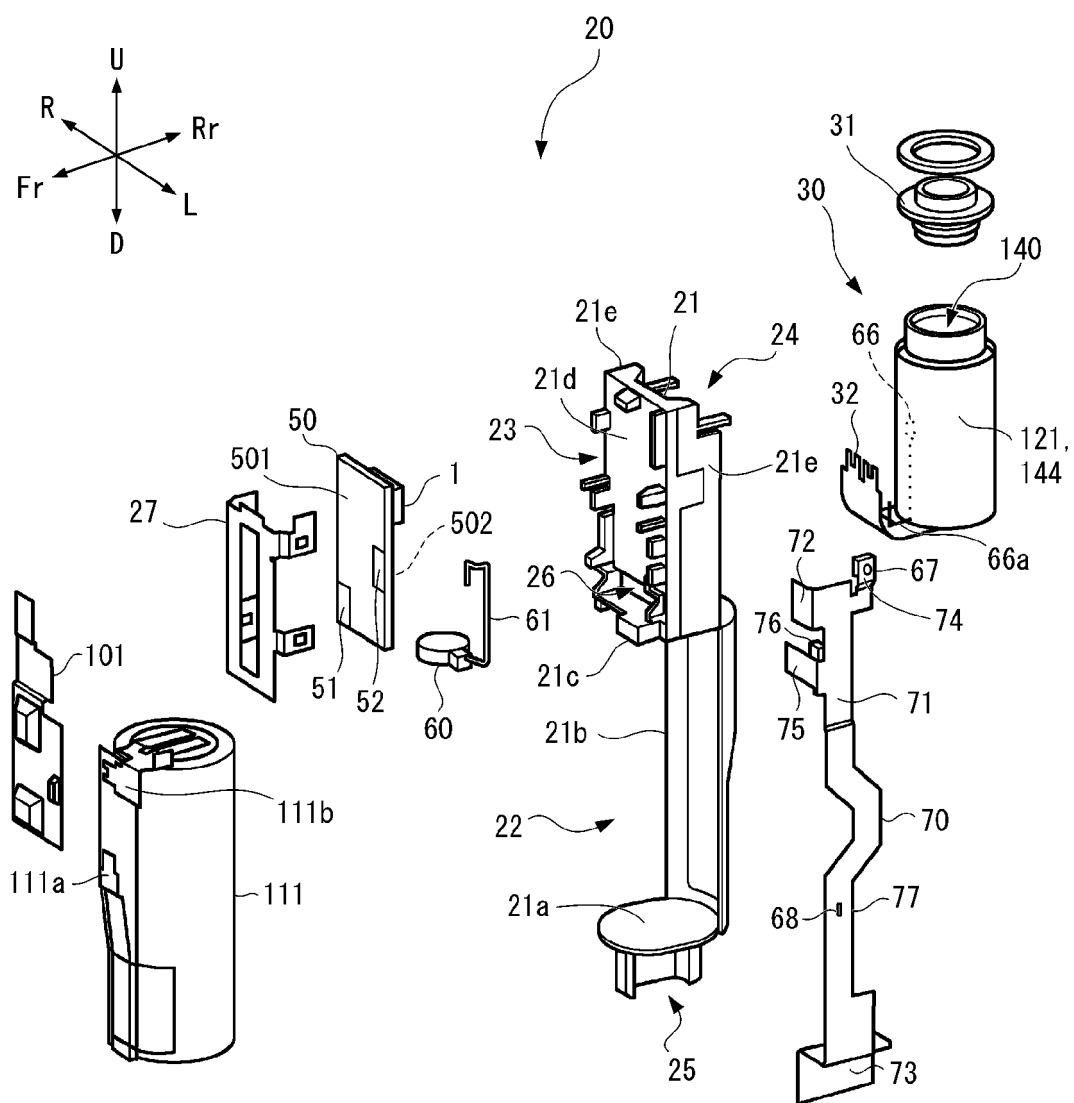


[FIG. 3]

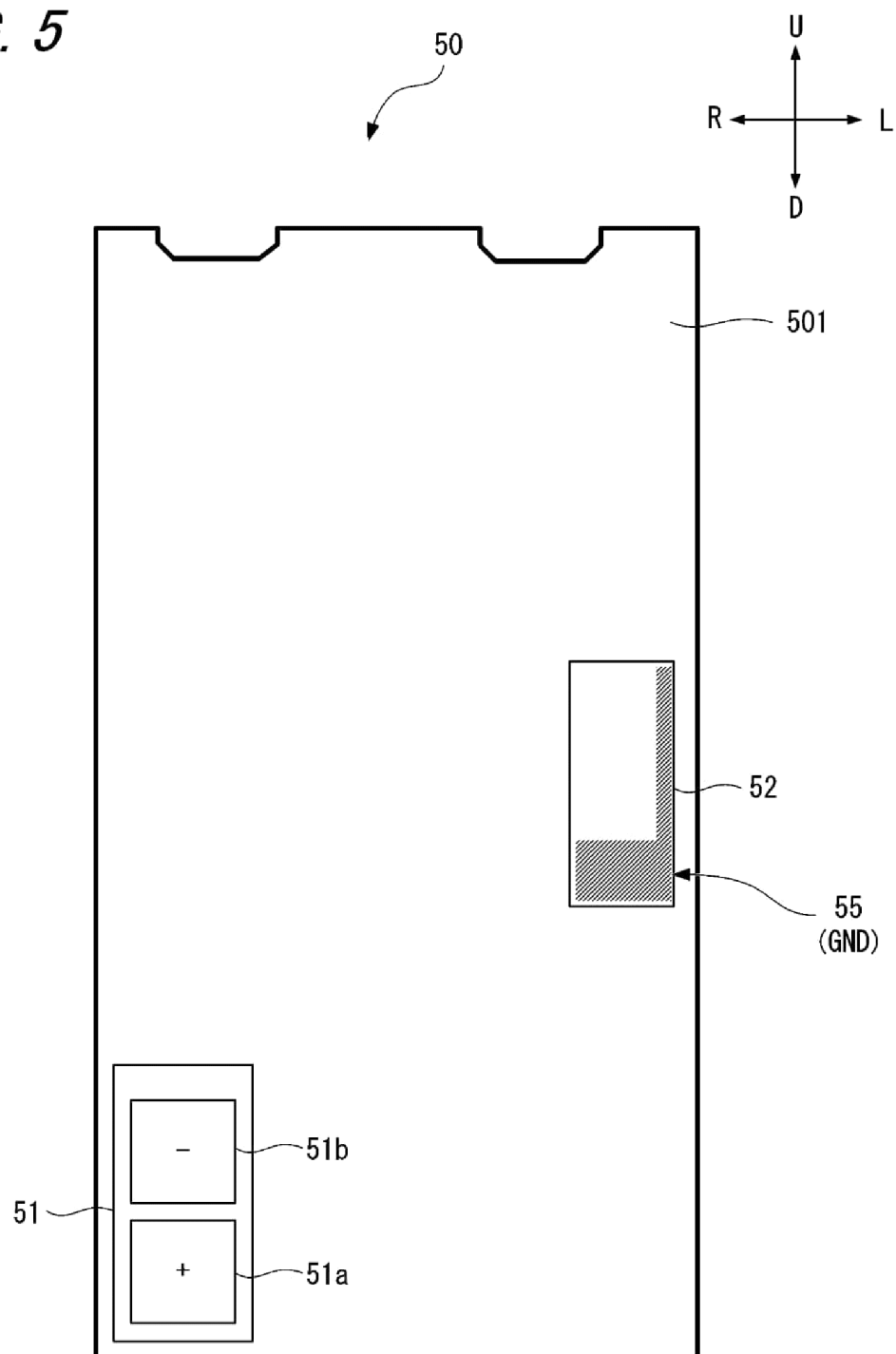


[FIG. 4]

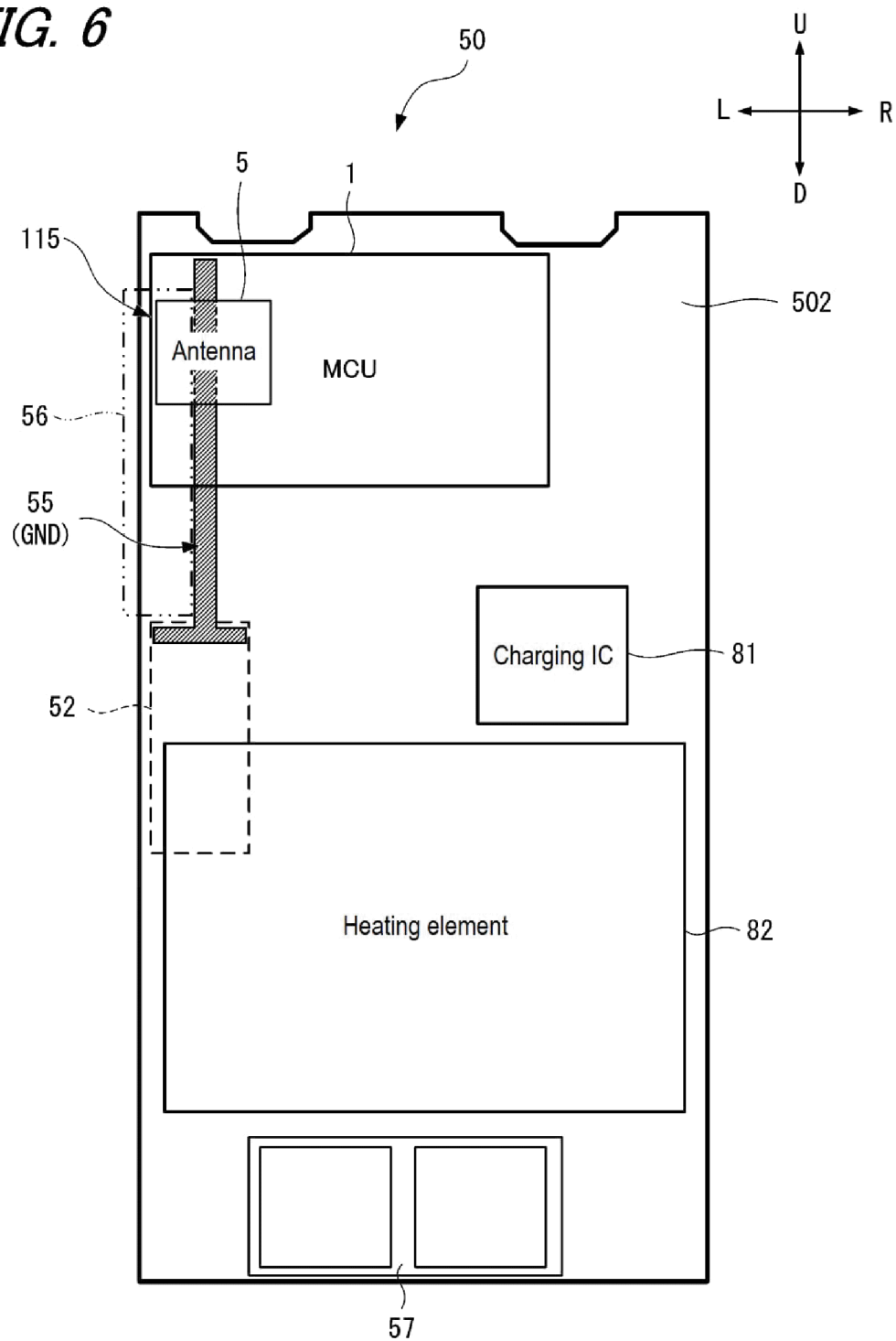
FIG. 4



[FIG. 5]

FIG. 5

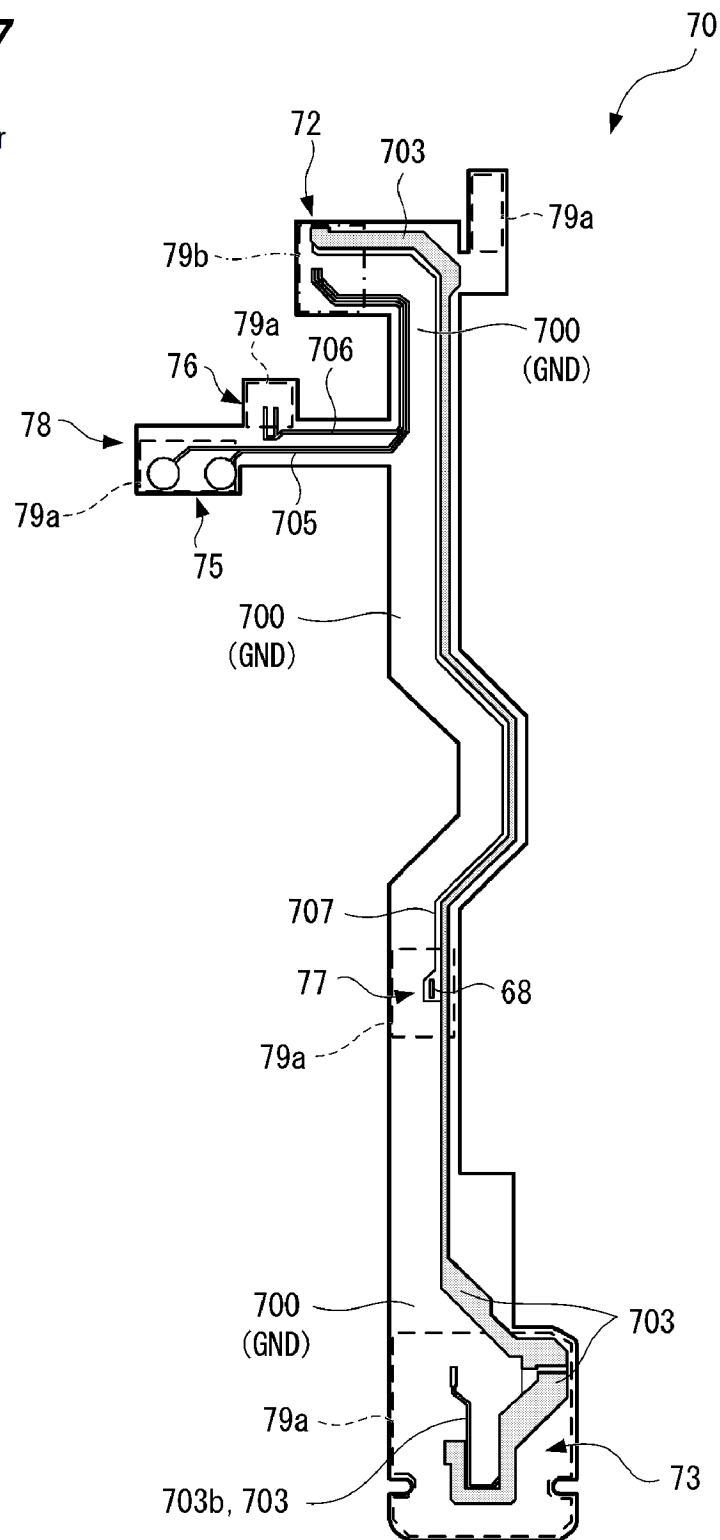
[FIG. 6]

FIG. 6

[FIG. 7]

FIG. 7

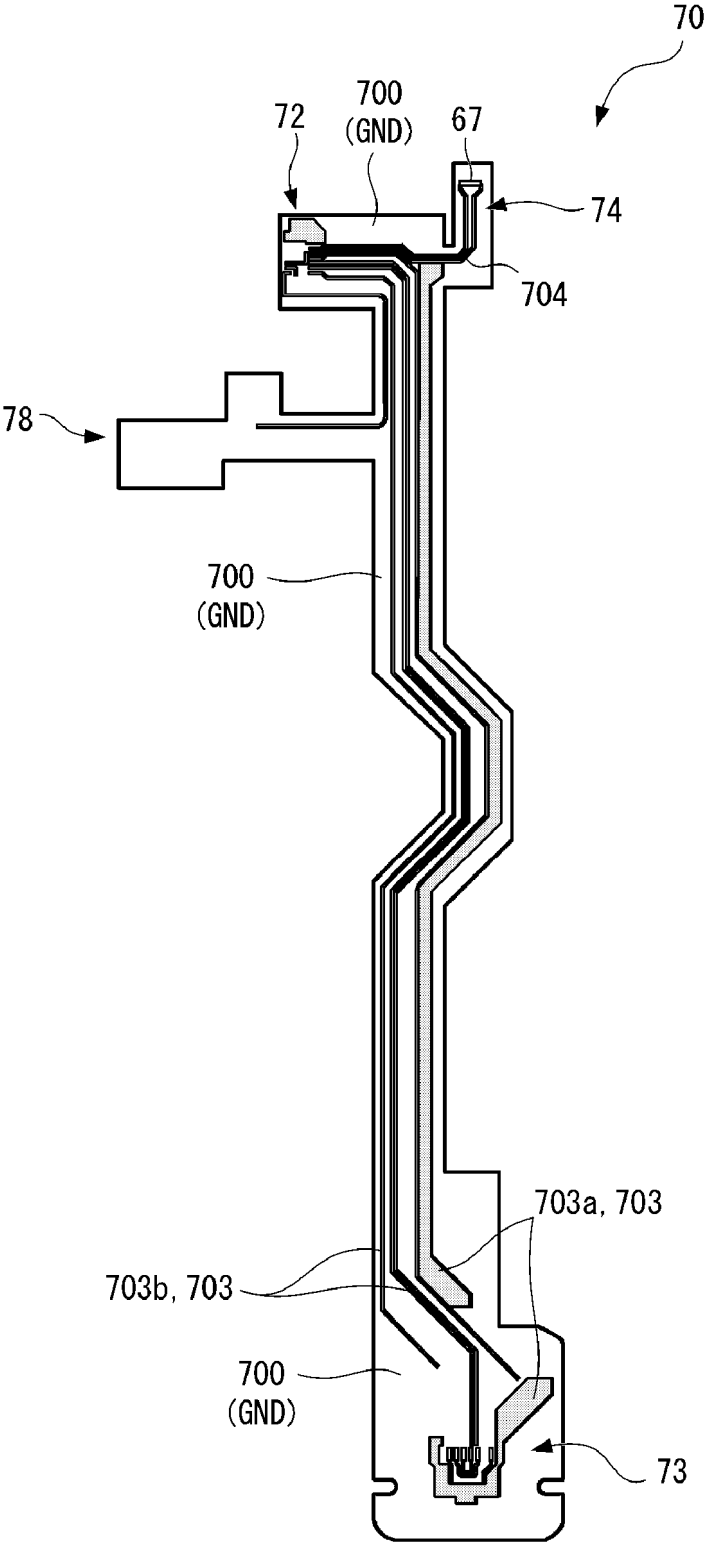
L1 layer



[FIG. 8]

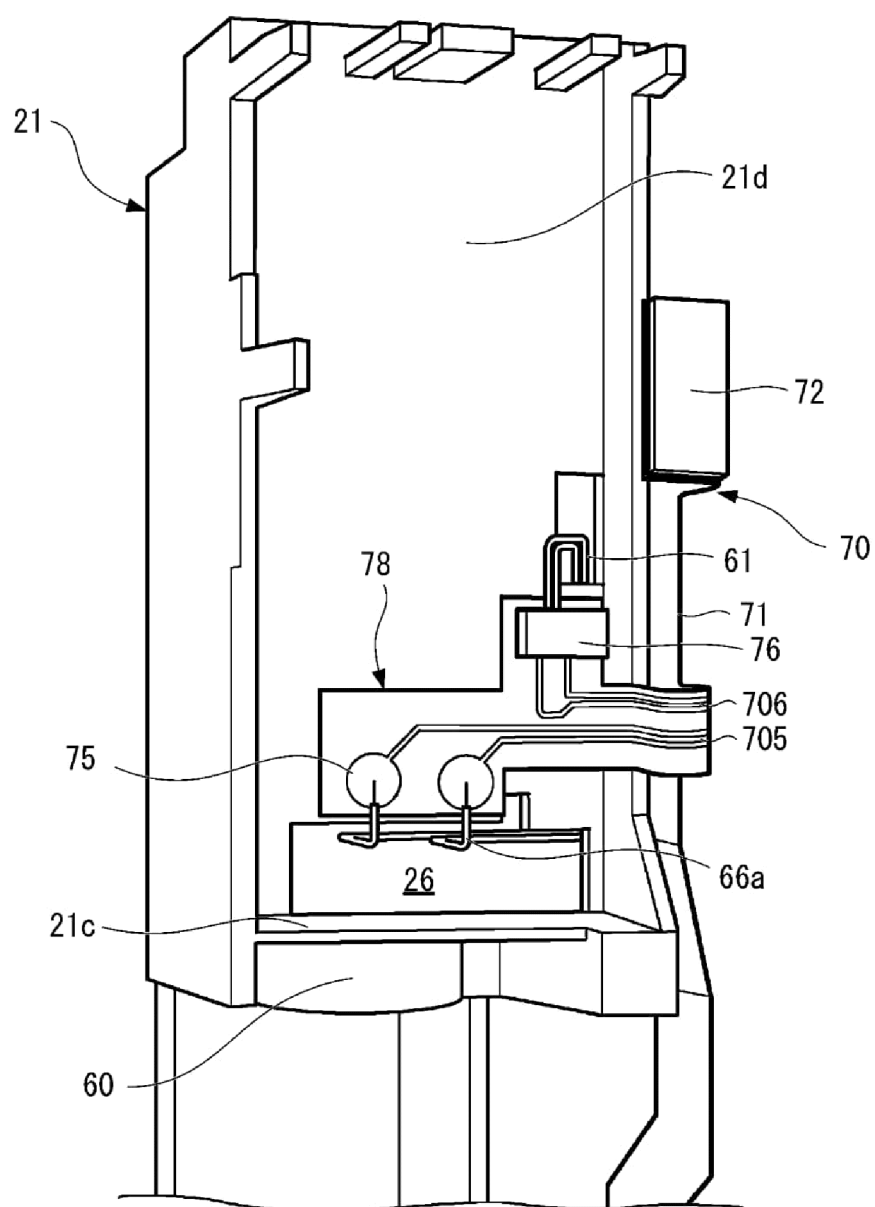
FIG. 8

L2 layer



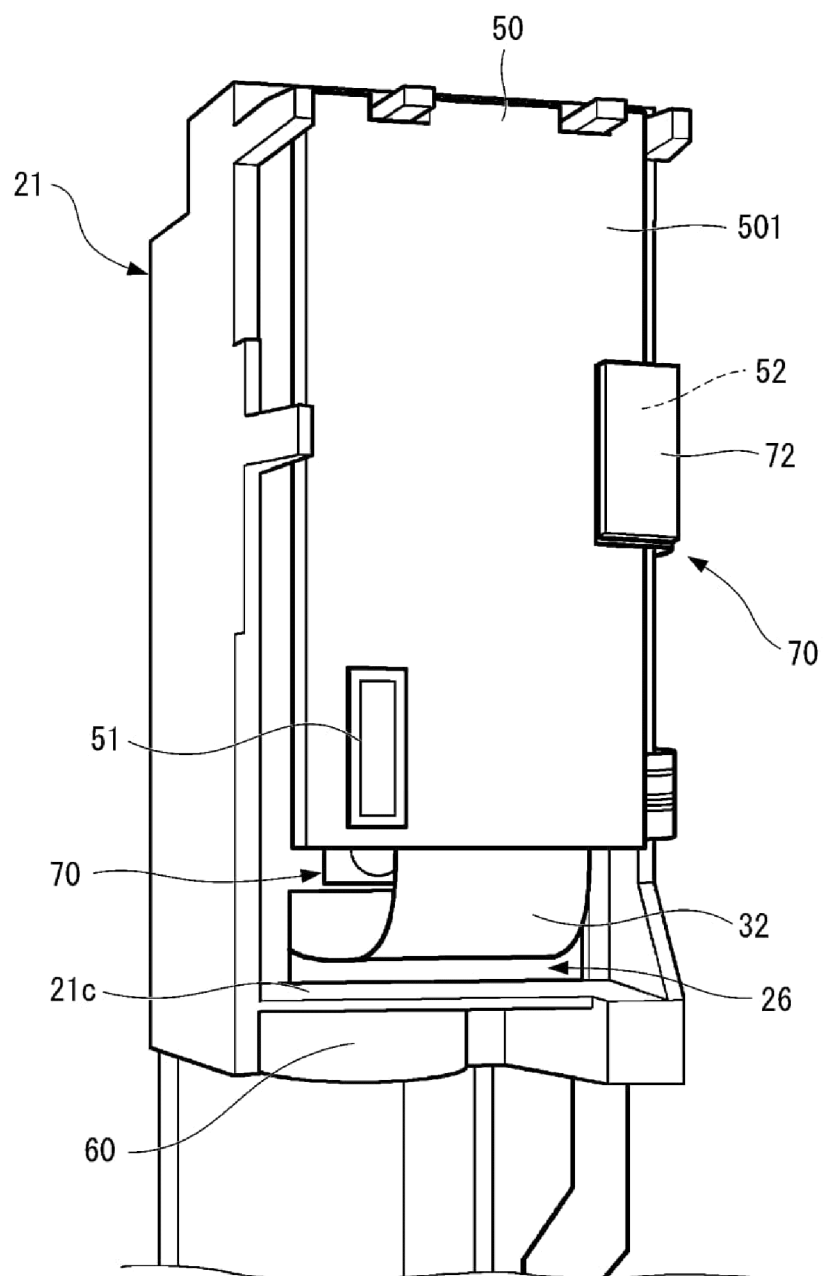
[FIG. 9]

FIG. 9

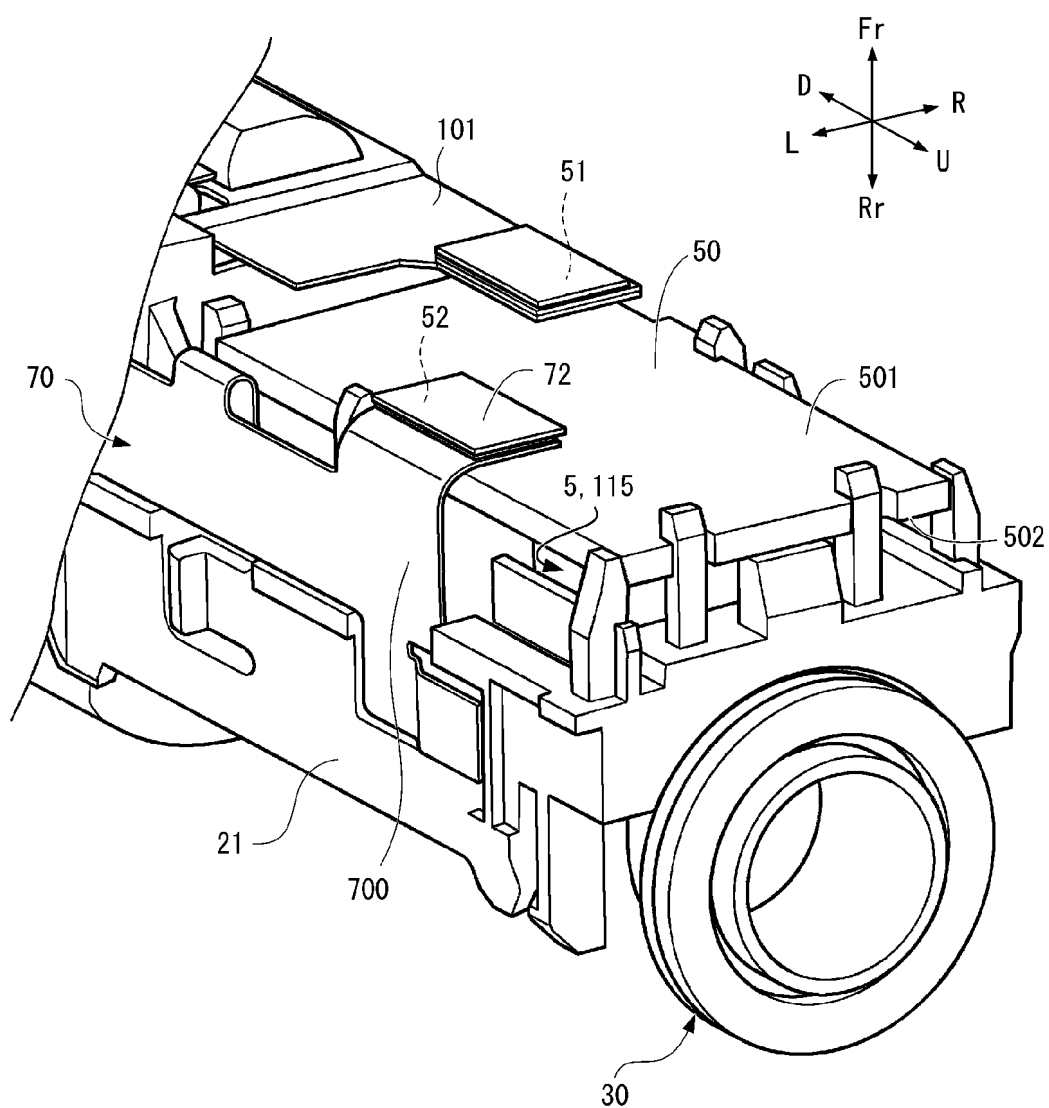


[FIG. 10]

FIG. 10



[FIG. 11]

FIG. 11

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2023/044718

A. CLASSIFICATION OF SUBJECT MATTER**A24F 40/65**(2020.01)i

FI: A24F40/65

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)

A24F40/65

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 1971-2024
 Registered utility model specifications of Japan 1996-2024
 Published registered utility model applications of Japan 1994-2024

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	WO 2022/239276 A1 (JAPAN TOBACCO INC.) 17 November 2022 (2022-11-17) entire text, all drawings	1-12
A	JP 2018-514188 A (RAI STRATEGIC HOLDINGS, INC.) 07 June 2018 (2018-06-07) entire text, all drawings	1-12
A	JP 2020-114200 A (JAPAN TOBACCO INC.) 30 July 2020 (2020-07-30) entire text, all drawings	1-12

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

* Special categories of cited documents:

“A” document defining the general state of the art which is not considered to be of particular relevance

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