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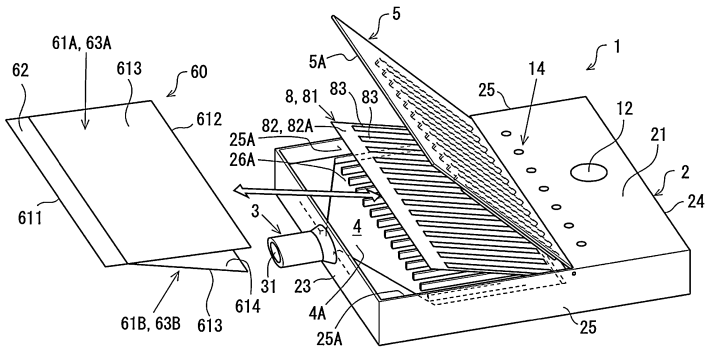
# (54) HEATING UNIT FOR NON-COMBUSTION HEATING-TYPE FLAVOR INHALER, AND NON-COMBUSTION HEATING-TYPE FLAVOR INHALER

(57) Provided is an electric heating-type heating unit disposed inside a heating chamber of a non-combustion heating-type flavor inhaler, the heating unit comprising one or more planar heaters, both the front and rear surfaces of which are formed as heater surfaces, and which can be disposed on each of the front and rear heater surfaces along a sheet-like or planar heated region unit that constitutes a portion or the entirety of a flavor generating source. The planar heaters have a plurality of heating region units that are formed on each of the front and rear heater surfaces and which individually heat a specific section that is a portion of the heated region unit. The plurality of heating region units on each of the front and rear heater surfaces extend in a flowing direction of air that flows through the heating chamber accompanying inhalation through a mouthpiece, and the heating region units on each of the heater surfaces are aligned at intervals therebetween in the direction that crosses the extending direction thereof.

FIG. 1




EP 4 295 711 A1

## Description

### Technical Field

**[0001]** The present invention relates to a heating unit for a non-combustion-heating-type flavor inhaler, and the non-combustion-heating-type flavor inhaler.

### Background Art

**[0002]** There has been proposed a non-combustion-heating-type flavor inhaler including an electric-heating-type heating unit, a controller that controls the heating unit, a power supply (battery) that supplies electric power to the heating unit, and the like, and allowing a user to inhale an aerosol including a flavor component generated by heating a flavor generation source without accompanying combustion in the heating unit (see, for example, PTL 1 to PTL 3).

**[0003]** Here, in order to implement downsizing of the non-combustion-heating-type flavor inhaler (making a device compact), it is important to downsize the power supply that supplies electric power to the heating unit, and for this purpose, it is important to reduce the electric power consumed for heating the flavor generation source. As a method of reducing the power consumption of the power supply, there is a method of performing a rapid heating operation every time a user's inhalation (puff) action is detected.

### Citation List

### Patent Literature

**[0004]**

PTL 1: Japanese Unexamined Patent Application Publication (Translation of PCT Application) No. 2019-501634
PTL 2: International Publication No. 2018/235956
PTL 3: Japanese Patent No. 5808490

### Summary of Invention

### Technical Problem

**[0005]** However, in the non-combustion-heating-type flavor inhaler of related art, it cannot be said that the device is sufficiently downsized (made compact).

**[0006]** In addition, when a specific section of the flavor generation source is individually heated by a plurality of heating region portions included in the heating unit in the rapid heating operation, there is a concern that the length of a flow path until a generated aerosol is inhaled through a mouthpiece is likely to vary for each section, and the delivery amount of the aerosol is unlikely to be stable.

**[0007]** The present invention is made in view of the above circumstances, and an object of the present invention is to provide a heating unit capable of stabilizing the delivery amount of an aerosol while implementing downsizing of a device in a non-combustion-heating-type flavor inhaler that discharges an aerosol including a flavor from a flavor generation source by non-combustion heating the flavor generation source.

### Solution to Problem

**[0008]** A technique according to the present invention is an electric-heating-type heating unit, the heating unit being disposed in a heating chamber formed in a middle of a ventilation flow path of air flowing through an inside of a housing of a non-combustion-heating-type flavor inhaler from an air intake port provided in the housing toward a mouthpiece provided in the housing, the heating unit being configured to cause a flavor generation source to discharge an aerosol including a flavor component by non-combustion heating the flavor generation source when activated.

**[0009]** The heating unit includes one or more planar heaters whose both front and back surfaces are formed as heater surfaces and that allow a sheet-shaped or planar heated region portion constituting a portion or a whole of the flavor generation source to be disposed along each of the front and back heater surfaces.

**[0010]** The planar heater includes a plurality of heating region portions formed on each of the front and back heater surfaces and configured to individually heat a specific section that is a portion of the heated region portion.

**[0011]** The plurality of heating region portions on each of the front and back heater surfaces extend in a flowing direction of air flowing through the heating chamber along with inhalation using the mouthpiece, and the heating region portions are arrayed on each of the heater surfaces at intervals in a direction orthogonal to an extending direction of the heating region portions.

**[0012]** In the heating unit for the non-combustion-heating-type flavor inhaler, the plurality of heating region portions may be disposed in a same plane on each of the front and back heater surfaces.

**[0013]** The heating unit for the non-combustion-heating-type flavor inhaler may further include a thermal conductive sheet disposed on the heater surface.

**[0014]** In the heating unit for the non-combustion-heating-type flavor inhaler, the planar heater may be configured as a cartridge mountable to and removable from a heater mount provided in the heating chamber.

**[0015]** Also, a technique according to the present invention can be specified as a non-combustion-heating-type flavor inhaler. That is, the non-combustion-heating-type flavor inhaler includes a housing provided with a mouthpiece and an air intake port; a heating chamber formed in a middle of a ventilation flow path of air flowing through an inside of the housing from the air intake port toward the mouthpiece and being capable of accommodating a flavor generation source; and any one of the above-described heating units, the heating unit being dis-

posed in the heating chamber.

**[0016]** The non-combustion-heating-type flavor inhaler may further include sandwiching portions provided on an upper surface and a bottom surface of the heating chamber, the sandwiching portions being configured to sandwich a set of heated region portions disposed in an uppermost stage and a lowermost stage among a plurality of the heated region portions disposed in the heating chamber from above and below. Also, the sandwiching portions may at least partially include a high resilient portion formed of a high resilient material.

**[0017]** The solutions to the problem in the present invention can be employed in combination as much as possible. Advantageous Effects of Invention

**[0018]** According to the present invention, it is possible to provide the heating unit capable of stabilizing the delivery amount of the aerosol while implementing the downsizing of the device in the non-combustion-heating-type flavor inhaler that discharges the aerosol including the flavor from the flavor generation source by non-combustion heating the flavor generation source.

Brief Description of Drawings

**[0019]**

[Fig. 1] Fig. 1 is a diagram illustrating a flavor inhaler according to Embodiment 1.

[Fig. 2] Fig. 2 is a diagram illustrating an internal structure of a housing of the flavor inhaler 1.

[Fig. 3] Fig. 3 is a schematic plan view of a planar heater according to Embodiment 1.

[Fig. 4] Fig. 4 is a schematic front view of the planar heater according to Embodiment 1.

[Fig. 5] Fig. 5 is a perspective view illustrating a relationship between a heater mount and the planar heater according to Embodiment 1.

[Fig. 6] Fig. 6 is a schematic side view of a heating unit to which a flavor generation source is attached according to Embodiment 1.

[Fig. 7] Fig. 7 is a diagram illustrating a situation in which the flavor generation source is attached to or detached from the planar heater according to Embodiment 1.

[Fig. 8] Fig. 8 is a diagram illustrating a situation in which side sandwiching portions and lower sandwiching portions sandwich each flavor generation sheet of the flavor generation source according to Embodiment 1.

[Fig. 9] Fig. 9 is a flowchart for explaining an operation of the flavor inhaler according to Embodiment 1.

[Fig. 10] Fig. 10 is a diagram presenting a table in which the cumulative number of puffs after activation of the flavor inhaler and an energization target heating region portion are stored in association with each other.

[Fig. 11] Fig. 11 is a diagram illustrating a flavor generation source according to Modification 1 of Embodiment 1.

[Fig. 12] Fig. 12 is a diagram illustrating a flavor generation source according to Modification 2 of Embodiment 1.

[Fig. 13] Fig. 13 is a diagram illustrating a flavor generation source according to Modification 3 of Embodiment 1.

[Fig. 14] Fig. 14 is a view illustrating a modification of the heating chamber of the flavor inhaler.

[Fig. 15] Fig. 15 is a view illustrating another modification of the planar heater of the flavor inhaler.

[Fig. 16] Fig. 16 is a view illustrating still another modification of the planar heater of the flavor inhaler.

[Fig. 17] Fig. 17 is a diagram illustrating a configuration example of a planar heater of a cartridge system.

[Fig. 18] Fig. 18 is a diagram illustrating a flavor inhaler according to Embodiment 2.

[Fig. 19] Fig. 19 is a perspective view illustrating a flavor generation source cartridge according to Embodiment 2.

[Fig. 20] Fig. 20 is a top view of a bottom frame portion of a holding member according to Embodiment 2.

[Fig. 21] Fig. 21 is a top view of a first intermediate spacer of the holding member according to Embodiment 2.

[Fig. 22] Fig. 22 is a top view of an intermediate frame portion of the holding member according to Embodiment 2.

[Fig. 23] Fig. 23 is a diagram illustrating a situation in which the flavor generation source cartridge is attached to a set of planar heaters according to Embodiment 2.

Description of Embodiments

**[0020]** Here, embodiments of a heating unit for a non-combustion-heating-type flavor inhaler and the non-combustion-heating-type flavor inhaler including the heating unit according to the present invention will be described with reference to the drawings. Note that the dimensions, materials, shapes, relative arrangements, and the like, of structural elements described in the embodiments are examples.

<Embodiment 1>

**[0021]** Fig. 1 is a diagram illustrating a non-combustion-heating-type flavor inhaler (hereinafter, simply referred to as a "flavor inhaler") 1 according to Embodiment 1. The flavor inhaler 1 is an electric-heating-type device for allowing a user to inhale an aerosol including a flavor component by heating a flavor generation source 60 illustrated in Fig. 1 without accompanying combustion. The flavor inhaler 1 constitutes a non-combustion-heating-type tobacco product by being combined with the flavor generation source 60. The flavor generation source 60 is a so-called refill item that is attached to the flavor

inhaler 1 by the user when the flavor inhaler 1 is used, and discharges an aerosol including a flavor component by being heated along with activation of the flavor inhaler 1. Details of the flavor generation source 60 will be described later.

**[0022]** The flavor inhaler 1 includes a housing 2 that is a case for accommodating various components constituting the flavor inhaler 1. Fig. 2 is a diagram illustrating an internal structure of the housing 2 of the flavor inhaler 1.

**[0023]** Describing the housing 2 and its internal structure with reference to Figs. 1 and 2, the housing 2 is provided with a mouthpiece 3. The mouthpiece 3 is a member to be held in the mouth when the user inhales an aerosol with a flavor imparted during the activation of the flavor inhaler 1, and is formed of a member having a flat elliptical cylindrical shape according to the present embodiment. Of course, the mouthpiece 3 may have any of other shapes. A distal end of the mouthpiece 3 is provided with an inhalation port 31 that is an opening for the user to inhale the aerosol with the flavor imparted, the flavor being generated upon the activation of the flavor inhaler 1. An internal flow path is formed inside the mouthpiece 3 in an axial direction in which the mouthpiece 3 extends. The internal flow path is connected to the inhalation port 31. In addition, the flavor inhaler 1 can accommodate the flavor generation source 60 in a heating chamber 4 formed in the housing 2. The housing 2 is provided with an openable/closable cover body 5 for opening or closing the heating chamber 4. Note that a posture when the cover body 5 is open as illustrated in Fig. 1 is referred to as an "open lid posture", and a posture when the cover body 5 is closed as illustrated in Fig. 2 is referred to as "closed lid posture". As is apparent from Figs. 1 and 2, the heating chamber 4 is open to the outside when the cover body 5 is in the open lid posture, and the heating chamber 4 is shut off from the outside when the cover body 5 is in the closed lid posture.

**[0024]** The housing 2 illustrated in Fig. 1 has a flat, substantially rectangular-parallelepiped shape. Of course, the shape of the housing 2 is not particularly limited. In the present description, a surface of the housing 2 of the flavor inhaler 1 provided with the mouthpiece 3 is referred to as a front surface, and a surface of the housing 2 provided with the cover body 5 is referred to as an upper surface. Figs. 1 and 2 indicate respective directions of the housing 2 of the flavor inhaler 1. However, the respective directions of the flavor inhaler 1 illustrated in Figs. 1 and 2 indicate a relative positional relationship of respective elements constituting the flavor inhaler 1, and do not indicate absolute positions of the respective elements. The housing 2 has an upper surface wall 21, a bottom surface wall 22, a front surface wall 23, a rear surface wall 24, and a pair of side surface walls 25, and an external shape of the housing 2 is defined by these surface walls.

**[0025]** The upper surface wall 21 of the housing 2 is provided with an operation unit 12 that can be operated by the user and a notifier 14 for notifying the user of the state of the flavor inhaler 1. The operation unit 12 may be constituted by, for example, a button-type switch or a touch panel. The notifier 14 is, for example, an indicator such as an LED, and notifies the user of the state of the flavor inhaler 1 in accordance with a mode, such as a color of light or a pattern of light. Of course, in the housing 2, the positions where the operation unit 12 and the notifier 14 are disposed are not particularly limited. Reference sign 51 indicated in Fig. 2 denotes a rotation shaft of the cover body 5. The rotation shaft 51 of the cover body 5 is rotatably supported by boss holes or the like formed in the upper surface wall 21 of the housing 2, and the cover body 5 can be opened or closed by rotating around the rotation shaft 51.

**[0026]** An air intake port 6 is provided in the rear surface wall 24 of the housing 2 so as to extend through the rear surface wall 24. As illustrated in Fig. 2, in the flavor inhaler 1 according to the present embodiment, the mouthpiece 3 and the air intake port 6 are provided on opposite sides. Inside the housing 2, a hollow ventilation flow path 7 extending from the air intake port 6 to the inhalation port 31 of the mouthpiece 3 is provided, and the hollow heating chamber 4 is formed in the middle of the ventilation flow path 7. Here, a ventilation flow path extending from the inhalation port 31 to the heating chamber 4 is referred to as a first ventilation flow path 71, and a ventilation flow path extending from the heating chamber 4 to the inhalation port 31 of the mouthpiece 3 is referred to as a second ventilation flow path 72. The second ventilation flow path 72 is mainly formed of a passage formed inside the mouthpiece 3. In the heating chamber 4, a heating unit 8 is installed for electrically heating the flavor generation source 60 detachably accommodated in the heating chamber 4. The flavor generation source 60 can be attached to the heating unit 8, and the flavor generation source 60 accommodated in the heating chamber 4 in a state of being attached to the heating unit 8 is heated by the heating unit 8 in the heating chamber 4.

**[0027]** In the example illustrated in Fig. 2, the interior of the housing 2 has a two-layer structure that is vertically separated by a division wall 26. For example, the heating chamber 4 in which the heating unit 8 is installed, the ventilation flow path 7, and the like, are formed above the division wall 26. In contrast, a power supply 9, a controller 10, and the like, are accommodated below the division wall 26 in the housing 2. The space of the heating chamber 4 is defined by inner wall surfaces of the housing 2. As an example, a bottom surface, an upper surface, and side surfaces of the heating chamber 4 are defined by an inner wall surface 26A of the division wall 26, an inner wall surface 5A of the cover body 5, inner wall surfaces 25A of the pair of side surface walls 25, and the like (see Figs. 1 and 2 and other drawings). In addition, in the heating chamber 4, a narrow flow path portion 4A in which the cross section of the flow path is gradually narrowed toward the second ventilation flow path 72 is formed on a side of a connection end to the second ven-

tilation flow path 72 (see Fig. 1).

**[0028]** Reference sign 27 illustrated in Figs. 1 and 2 and other drawings denotes a rib-shaped upper sandwiching portion provided on an upper surface of the heating chamber 4. In the present embodiment, a plurality of upper sandwiching portions 27 hang down from the inner wall surface 5A of the cover body 5. The plurality of upper sandwiching portions 27 extend in a front-rear direction of the heating chamber 4, and are disposed at intervals in a width direction of the heating chamber 4. Reference sign 28 indicated in Figs. 1 and 2 and other drawings denotes a rib-shaped lower sandwiching portion provided on a bottom surface of the heating chamber 4. In the present embodiment, a plurality of lower sandwiching portions 28 stand on the inner wall surface 26A of the division wall 26. Also in the lower sandwiching portions 28, the upper sandwiching portions 27 extend in the front-rear direction of the heating chamber 4, and are disposed at intervals in the width direction of the heating chamber 4. As will be described in detail later, the upper sandwiching portions 27 and the lower sandwiching portions 28 are members for pressing the flavor generation source 60 attached to the heating unit 8 by sandwiching the flavor generation source 60 from above and below to enhance adhesion of the flavor generation source 60 to the heating unit 8. The upper sandwiching portions 27 and the lower sandwiching portions 28 are made of, for example, resin, but the material thereof is not particularly limited.

**[0029]** The power supply 9 is, for example, a rechargeable secondary battery, an electric double layer capacitor, or the like, and is preferably a lithium ion secondary battery. The electrolyte of the power supply 9 may be constituted by one of a gel electrolyte, an electrolytic solution, a solid electrolyte, and an ionic liquid, or a combination thereof. A charging terminal (not illustrated) that can be electrically connected to an external power supply (not illustrated) is provided at an appropriate position of the housing 2. For example, a Universal Serial Bus (USB) terminal, a micro USB terminal, or a Lightning (registered trademark) terminal may be connectable to the charging terminal. The charging terminal may be capable of receiving electric power transmitted from the external power supply in a non-contact manner.

**[0030]** Furthermore, the flavor inhaler 1 includes an inhalation sensor 13. The inhalation sensor 13 is configured to output, for example, a value of a change in pressure (internal pressure) in the ventilation flow path 7 caused by user's inhalation through the mouthpiece 3. The inhalation sensor 13 is, for example, a pressure sensor that outputs an output value (for example, a voltage value or a current value) corresponding to the internal pressure that changes in accordance with the flow rate of air inhaled from the air intake port 6 toward the inhalation port 31. The inhalation sensor 13 may output an analog value or may output a digital value converted from the analog value.

**[0031]** The controller 10 includes, for example, a micro controller unit (MCU). The MCU of the controller 10 is mainly constituted by, for example, a processor, and further includes a memory constituted by a storage medium, such as a random access memory (RAM) necessary for an operation of the processor and a read only memory (ROM) storing various items of information. In this description, specifically, the processor may be an electric circuit in which circuit elements such as semiconductor elements are combined. The controller 10 is connected to the heating unit 8, the power supply 9, the operation unit 12, the inhalation sensor 13, the notifier 14, and the like, and performs various types of control of the flavor inhaler 1.

**[0032]** Next, the heating unit 8 will be described. The heating unit 8 is a heater module including one or more planar heaters 81 and a heater mount 86 to which the planar heater 81 is mounted. In the present embodiment, as illustrated in Fig. 2, the heating unit 8 includes a planar heater 81.

**[0033]** Fig. 3 is a schematic plan view of the planar heater 81 according to Embodiment 1. Fig. 4 is a schematic front view of the planar heater 81 according to Embodiment 1. Fig. 5 is a perspective view illustrating a relationship between a heater mount 82 and the planar heater 81 according to Embodiment 1. Fig. 6 is a schematic side view of the heating unit 8 to which the flavor generation source 60 is attached according to Embodiment 1. Fig. 5 illustrates a state before the planar heater 81 is mounted to the heater mount 82. Fig. 6 illustrates a state after the planar heater 81 is mounted to the heater mount 82.

**[0034]** The planar heater 81 illustrated in Figs. 3 and 4 includes a substrate 82 having a rectangular flat plate shape, and a plurality of heating region portions 83 formed on a first heater surface 82A and a second heater surface 82B on front and back sides of the substrate 82, and is a heater module having a flat plate shape as a whole. The first heater surface 82A is a heater surface formed on an upper surface (front surface) of the planar heater 81 (substrate 82). The second heater surface 82B is a heater surface formed on a lower surface (back surface) of the planar heater 81 (substrate 82). Reference signs 82C to 82F denote a front surface, a rear surface, a first side surface, and a second side surface of the planar heater 81 (substrate 82), respectively. The plurality of heating region portions 83 each having a substantially strip planar shape extending in one direction are arrayed and disposed at intervals on each of the first heater surface 82A and the second heater surface 82B. In the example illustrated in Fig. 3, fourteen heating region portions 83 extend in a front-rear direction of the planar heater 81 (substrate 82) on each of the first heater surface 82A and the second heater surface 82B of the planar heater 81 (substrate 82). The heating region portions 83 on each of the first heater surface 82A and the second heater surface 82B are arrayed at regular intervals.

**[0035]** The front-rear direction of the planar heater 81 (substrate 82) is a direction parallel to the first side sur-

face 82E and the second side surface 82F. A width direction of the planar heater 81 (substrate 82) is parallel to the front surface 82C and the rear surface 82D. The heating region portions 83 on each of the first heater surface 82A and the second heater surface 82B of the planar heater 81 (substrate 82) may not be disposed at the regular intervals in the width direction of the planar heater 81 (substrate 82). The number of heating region portions 83 provided on each of the first heater surface 82A and the second heater surface 82B is not particularly limited. The number of heating region portions 83 on the first heater surface 82A may be different from the number of heating region portions 83 on the second heater surface 82B. In the planar heater 81, the plurality of heating region portions 83 are disposed in the same plane on the first heater surface 82A of the substrate 82. Also, the plurality of heating region portions 83 are disposed in the same plane on the second heater surface 82B of the planar heater 81. The expression "in the same plane" as used herein represents that the plurality of heating region portions 83 are disposed in a flush state, and the heights of surfaces of the heating region portions 83 are equal to each other.

**[0036]** The substrate 82 of the planar heater 81 is formed as a holding body for holding the plurality of heating region portions 83, and is formed of, for example, a resin material such as polyimide resin having excellent electrical insulation and excellent thermal insulation. Each of the heating region portions 83 formed on the substrate 82 of the planar heater 81 is formed of a resistor (described later), and produces heat upon energization. By forming the substrate 82 of the planar heater 81 using a heat insulating material, thermal resistance between the heating region portions 83 on each of the first heater surface 82A and the second heater surface 82B can be increased, and diffusion of heat to the surroundings can be reduced. In addition, as in Modification 1 illustrated in Fig. 4, a recessed slit groove 821 may be formed between the heating region portions 83 formed on each of the heater surfaces 82A and 82B of the substrate 82 of the planar heater 81. Each slit groove 821 is an elongated groove extending in parallel to an extending direction of each heating region portion 83. By forming the slit groove 821 in each of the heater surfaces 82A and 82B, when heat production control is performed on a specific heating region portion 83, dissipation of heat to an adjacent region can be reduced. Here, each slit groove 821 preferably has a length dimension equal to or larger than that of the heating region portions 83. That is, it is preferable that each slit groove 821 is disposed so as to separate the adjacent heating region portions 83 over the entire section of the heating region portions 83, thereby enhancing the effect of suppressing dissipation of heat during the heat production control.

**[0037]** As in Modification 2 illustrated in Fig. 4, a slit hole 822 extending through the substrate 82 in a thickness direction may be formed between the heating region portions 83 formed on each of the heater surfaces 82A and 82B of the planar heater 81. Each slit hole 822 is an elongated through hole extending in parallel to the extending direction of each heating region portion 83. By forming the slit hole 822 in the substrate 82 of the planar heater 81, when the heat production control is performed on a specific heating region portion 83, dissipation of heat to an adjacent region can be reduced. Each slit hole 822 preferably has a length dimension equal to or larger than that of the heating region portions 83. That is, it is preferable that each slit hole 822 is disposed so as to separate the adjacent heating region portions 83 over the entire section of the heating region portions 83, thereby enhancing the effect of reducing diffusion of heat during the heat production control.

**[0038]** In the present embodiment, the planar positions of the heating region portions 83 formed on the first heater surface 82A of the planar heater 81 do not have to be aligned with the planar positions of the heating region portions 83 formed on the second heater surface 82B of the planar heater 81. When the planar positions of the heating region portions 83 on the first heater surface 82A side are not aligned with the planar positions of the heating region portions 83 on the second heater surface 82B side and it is difficult to form the slit holes 822 extending through the substrate 82 due to this situation, it is preferable to form the recessed slit groove 821 between the heating region portions 83 on each of the heater surfaces 82A and 82B as described in Modification 1 of Fig. 4. In the present embodiment, the substrate 82 of the planar heater 81 may be a metal substrate. When the substrate 82 of the planar heater 81 is a metal substrate, a heat insulating layer is preferably disposed at an appropriate position so that heat from each heating region portion 83 formed on each of the first heater surface 82A and the second heater surface 82B does not diffuse through the substrate 82. In addition, when the substrate 82 is a metal substrate, an electrical insulating layer is disposed between the metal substrate and each of the heating region portions 83, and between the metal substrate and various wiring layers (wire LU, wire LD, positive-electrode-side pads 84A to 84N, negative-electrode-side pad 85, and the like) (described later).

**[0039]** The heating region portions 83 disposed on the first heater surface 82A and the second heater surface 82B may be, for example, planar heaters formed by applying (coating) a heat producing coating material to the first heater surface 82A and the second heater surface 82B by printing or the like. Various materials can be used as the heat producing coating material. The heat producing coating material may be formed by, for example, dispersing a metal filler having excellent conductivity as a heat producing coating material in a binder. Examples of such a heat producing coating material include a mixed paste including silver powder and ink. The material included in such a mixed paste is not limited to silver powder, and may include, for example, noble metal powder of such as gold, platinum, or palladium. A material whose change in resistance with temperature is easily detected

because of a large temperature coefficient of resistance even though the specific conductor resistance of the material is not so high may be used. Alternatively, the heat producing coating material may use carbon black or carbon nanotube (CNT) as the heat producing material. As another form, the planar heater 81 may be a planar electric heating wire. Such an electric heating wire can be formed of a metal-based material such as iron-chromium.

**[0040]** Hereinafter, the heating region portions 83 formed on each of the first heater surface 82A and the second heater surface 82B of the planar heater 81 (substrate 82) are referred to as a first heating region portion 83A to a fourteenth heating region portion 83N in order from one disposed at a position close to the first side surface 82E for the convenience. Reference signs 84A to 84N indicated in Fig. 3 denote positive-electrode-side pads. Reference sign 85 denotes a negative-electrode-side pad. The positive-electrode-side pads 84A to 84N are connected to rear end sides of the first heating region portion 83A to the fourteenth heating region portion 83N via wires LU. The negative-electrode-side pad 85 is connected to front end sides of the first heating region portion 83A to the fourteenth heating region portion 83N via a wire LD. Although not illustrated in Fig. 3, positive-electrode-side pads 84A to 84N, a negative-electrode-side pad 85, and wires LU and LD are disposed on the second heater surface 82B of the planar heater 81 (substrate 82) similarly to the first heater surface 82A. The connection relationship between the first heating region portion 83A to the fourteenth heating region portion 83N, the positive-electrode-side pads 84A to 84N, the negative-electrode-side pad 85, and the wires LU and LD on the second heater surface 82B side is similar to that on the first heater surface 82A side described above. When the positive-electrode-side pads 84A to 84N are collectively referred to, they may be simply referred to as "positive-electrode-side pads 84". The wires LU and LD on the substrate 82 are not exposed and may be covered with an electrical insulating layer. The planar heater 81 may employ a configuration in which a heat producing element such as a resistor that produces heat when energized is disposed on only one of the first heater surface 82A (front surface) and the second heater surface 82B (back surface). For example, the planar heater 81 may increase the temperature of the second heater surface 82B (or the first heater surface 82A) by disposing a heat producing element such as a resistor only on the first heater surface 82A (or the second heater surface 82B) and transferring heat of the heat producing element on the first heater surface 82A (or the second heater surface 82B) to the second heater surface 82B (or the first heater surface 82A) side during the activation of the planar heater 81. In this case, it is preferable to reduce the thickness of the substrate 82 of the planar heater 81 to sufficiently reduce the heat capacity of the substrate 82. Accordingly, even in the mode in which the heat producing element such as the resistor is disposed only on the first heater surface 82A (or the second heater surface 82B) of the planar heater 81, the temperature of the second heater surface 82B (or the first heater surface 82A) can be sufficiently increased during the activation of the planar heater 81. The thickness of the substrate 82 in such a mode is, for example, about 0.05 mm to 0.3 mm. In such a mode, the substrate 82 is preferably formed of a material having excellent thermal conductivity.

**[0041]** As illustrated in Figs. 5 and 6, the heater mount 86 has a recessed portion 861 for receiving the rear end side of the planar heater 81. A first connection surface 861A and a second connection surface 861B facing the first connection surface 861A are formed in the recessed portion 861 of the heater mount 86. The first connection surface 861A of the recessed portion 861 is provided with electrodes (not illustrated) connected to the positive-electrode-side pads 84A to 84A and the negative-electrode-side pad 85 on the first heater surface 82A of the planar heater 81 mounted to the recessed portion 861. Similarly, the second connection surface 861B of the recessed portion 861 is provided with electrodes (not illustrated) connected to the positive-electrode-side pads 84A to 84N and the negative-electrode-side pad 85 on the second heater surface 82B of the planar heater 81 mounted to the recessed portion 861.

**[0042]** The electrodes of the heater mount 86 are connected to terminals of the power supply 9 via lead wires or the like, and the heating region portions 83 formed on each of the first heater surface 82A and the second heater surface 82B of the planar heater 81 are energized with electric power supplied from the power supply 9 via the heater mount 86. Each heating region portion 83 is formed of a resistor and produces heat when energized. In addition, a switch is provided in the heater mount 86, and it is possible to freely switch between disconnection and connection of a wiring path connecting each heating region portion 83 formed on each of the first heater surface 82A and the second heater surface 82B and the power supply 9. Accordingly, when electric power is supplied from the power supply 9 to the planar heater 81, it is possible to freely switch which heating region portion 83 on the first heater surface 82A and the second heater surface 82B of the planar heater 81 is energized.

**[0043]** As illustrated in Figs. 5 and 6, a pair of side surfaces 862 of the heater mount 86 are each provided with a rotation shaft 863. The pair of rotation shafts 863 of the heater mount 86 are coaxially formed and supported rotatably with respect to, for example, boss holes or the like formed in inner wall surfaces of the housing 2 that define side surfaces of the heating chamber 4. A heater rotation axis defined by a central axis of each rotation shaft 863 is parallel to a cover rotation axis defined by a central axis of the rotation shaft 51 of the cover body 5, and is set in a direction orthogonal to a flowing direction (hereinafter referred to as a "chamber ventilation direction") AF (see Fig. 2) of air flowing through the heating chamber 4 during the user's inhalation using the mouthpiece 3. In the example illustrated in Fig. 2, the chamber ventilation direction AF is set as a direction in the front-

rear direction of the heating chamber 4 (a direction orthogonal to the width direction).

**[0044]** Next, the flavor generation source 60 will be described. As illustrated in Figs. 1, 3, and 6 and other drawings, the flavor generation source 60 is formed by joining joint edges 611 of two flavor generation sheets 61A and 61B to each other. Reference sign 62 denotes a joint region portion where the flavor generation sheets 61A and 61B are joined to each other. Reference signs 63A and 63B denote a sheet-shaped first to-be-heated region portion (hereinafter, referred to as a "first heated region portion") and a sheet-shaped second to-be-heated region portion (hereinafter, referred to as a "second heated region portion"), respectively. In the flavor generation source 60, the first heated region portion 63A and the second heated region portion 63B that are a pair of sheet pieces are bifurcated from the joint region portion 62.

**[0045]** A raw material constituting the flavor generation source 60 (flavor generation sheets 61A and 61B) are not particularly limited as long as the raw material includes a flavor generation source and an aerosol generation source for discharging an aerosol including a flavor component by being heated during the activation of the planar heater 81 of the heating unit 8. For example, the flavor generation source 60 may include shredded tobacco as the flavor generation source. Alternatively, the flavor generation source may be a plant other than tobacco (for example, mint, Chinese herbal medicine, herb, or the like). Examples of the aerosol generation source include polyols, such as glycerine, propylene glycol, and 1,3-butanediol. For example, the flavor generation source 60 (flavor generation sheets 61A and 61B) may be produced by grinding dried tobacco leaves to obtain ground tobacco, uniformizing the ground tobacco, processing the uniformized ground tobacco into a sheet shape, and adding the aerosol generation source. The raw material of the flavor generation source 60 may include a flavoring agent such as menthol.

**[0046]** In the flavor generation source 60, at least the first heated region portion 63A and the second heated region portion 63B are formed of a raw material including a flavor generation source and an aerosol generation source. Thus, the joint region portion 62 of the flavor generation source 60 can be constituted by a raw material not including a flavor generation source and an aerosol generation source. For example, a low thermal conductive material such as paper or nonwoven fabric can be suitably used as the raw material of the joint region portion 62 of the flavor generation source 60.

**[0047]** In the present embodiment, the flavor generation sheets 61A and 61B in which the joint edges 611 are joined to each other are formed as rectangular sheets having congruent shapes, but the flavor generation sheets 61A and 61B may have any of other shapes. Reference sign 612 denotes a distal edge portion located on the side opposite to the joint edge 611 in each of the flavor generation sheets 61A and 61B. Reference sign 613 denotes an outer surface of each of the flavor generation sheets 61A and 61B (each of heated region portions 63A and 63B), and reference sign 614 denotes an inner surface of each of the flavor sheet pieces 61A and 61B (each of heated region portions 63A and 63B).

**[0048]** The flavor generation source 60 constituted as described above can be attached to the planar heater 81 so that the planar heater 81 is sandwiched between the inner sides of the heated region portions 63A and 63B that are bifurcated from the joint region portion 62 as a base point (see Figs. 2 and 6 and other drawings). When the flavor generation source 60 is attached to the planar heater 81, as illustrated in Fig. 3, the distal edge portion 613 of each of the flavor generation sheets 61A and 61B (each of heated region portions 63A and 63B) of the flavor generation source 60 is brought close to the front surface 82C of the planar heater 81 in a facing state, and the planar heater 81 is inserted between the flavor generation sheets 61A and 61B (heated region portions 63A and 63B). When the planar heater 81 is inserted until the joint region portion 62 of the flavor generation source 60 is located in the vicinity of the front surface 82C of the planar heater 81, the attachment of the flavor generation source 60 to the planar heater 81 is completed (hereinafter, this state is referred to as a "flavor sheet attachment completed state"). In the flavor sheet attachment completed state, as illustrated in Figs. 2 and 6 and other drawings, the heated region portions 63A and 63B are disposed along the first heater surface 82A and the second heater surface 82B, respectively.

**[0049]** Fig. 7 is a diagram illustrating a situation in which the flavor generation source 60 is attached to or detached from the planar heater 81 according to Embodiment 1. When attaching or detaching the flavor generation source 60 to or from the planar heater 81, the user opens the cover body 5 of the flavor inhaler 1. Accordingly, the heating chamber 4 is exposed to the outside of the housing 2, and the user can access the heating unit 8 installed in the heating chamber 4. Then, for example, the user pinches the front surface 82C of the planar heater 81 supported by the heater mount 86 with his/her fingers and lightly lifts the front surface 82C. Accordingly, the heater mount 86 rotates about the rotation shaft 863 supported rotatably with respect to the housing 2, and the posture of the planar heater 81 can be changed from a first posture illustrated in Fig. 2 to a second posture illustrated in Fig. 7. The first posture of the planar heater 81 is a posture in which the planar heater 81 is substantially parallel to the inner wall surface 26A forming the bottom surface of the heating chamber 4, and in this state, the planar heater 81 is accommodated in the heating chamber 4. In contrast, the second posture of the planar heater 81 is a posture in which the planar heater 81 rises obliquely with respect to the inner wall surface 26A, and is a posture in which the flavor generation source 60 is easily attached to or detached from the planar heater 81. Of course, the flavor generation source 60 may be attached to or detached from the planar heater 81 in a state in which the planar heater 81 is held in the first posture.

The planar heater 81 of the heating unit 8 may be installed in the heating chamber 4 in a state of being fixed in the first posture illustrated in Fig. 2.

**[0050]** When the flavor generation source 60 is inhaled using the flavor inhaler 1, the planar heater 81 is switched from the second posture to the first posture in the state in which the flavor generation source 60 is attached to the planar heater 81 (flavor sheet attachment completed state), and the cover body 5 is closed (see Fig. 2). As described above, in the flavor inhaler 1, the plurality of upper sandwiching portions 27 hang down from the inner wall surface 5A of the cover body 5, and the plurality of lower sandwiching portions 28 stand on the inner wall surface 26A of the division wall 26. Thus, when the cover body 5 is closed, the outer surfaces 613 of the flavor generation sheets 61A and 61B (heated region portions 63A and 63B) of the flavor generation source 60 attached to the planar heater 81 are sandwiched and pressed from above and below by the upper sandwiching portions 27 and the lower sandwiching portions 28. Accordingly, each heating region portion 83 formed on the first heater surface 82A of the planar heater 81 can be brought into close contact with the inner surface 614 of the first heated region portion 63A of the flavor generation source 60. In addition, each heating region portion 83 formed on the second heater surface 82B can be brought into close contact with the inner surface 614 of the second heated region portion 63B.

**[0051]** The upper sandwiching portions 27 and the lower sandwiching portions 28 are configured to sandwich, from above and below, a set of heated region portions disposed in the uppermost stage and the lowermost stage among a plurality of heated region portions disposed in the heating chamber 4. Since the set of heated region portions 63A and 63B are disposed in the heating chamber 4 according to the present embodiment, the heated region portion 63A corresponds to the heated region portion disposed in the uppermost stage, and the heated region portion 63B corresponds to the heated region portion disposed in the lowermost stage.

**[0052]** Fig. 8 is a diagram illustrating a situation in which the side sandwiching portions 27 and the lower sandwiching portions 28 sandwich the flavor generation sheets 61A and 61B (heated region portions 63A and 63B) of the flavor generation source 60 from above and below according to Embodiment 1. Fig. 8 schematically illustrates a cross section in the width direction of the heating chamber 4 (that is, the direction orthogonal to the chamber ventilation direction AF). The heating unit 8 of the flavor inhaler 1 is constituted so that, when the planar heater 81 is in the first posture, the heating region portions 83 (83A to 83N) on each of the first heater surface 82A and the second heater surface 82B extend in the chamber ventilation direction AF that is the flowing direction of air flowing through the heating chamber 4 along with the inhalation using the mouthpiece 3, and the heating region portions 83 (83A to 83N) are arrayed at intervals in a direction orthogonal to the extending direction of the heating region portions 83 (that is, the direction orthogonal to the chamber ventilation direction AF).

**[0053]** The planar heater 81 is configured to individually heat a specific section forming a portion of each of the heated region portions 63A and 63B of the flavor generation source 60. Here, in the heated region portions 63A and 63B, portions serving as a heating target when the first heating region portion 83A to the fourteenth heating region portion 83N on each of the heater surfaces 82A and 82B of the planar heater 81 are caused to produce heat are referred to as a first section RA to a fourteenth section RN. Fig. 8 schematically illustrates boundary positions of the sections RA to RN. However, heat transferred from the heating region portions 83A to 83N to the heated region portions 63A and 63B is transferred in a width direction of the heated region portions 63A and 63B. Thus, chain-line positions illustrated in Fig. 8 do not necessarily coincide with the boundary positions of the sections RA to RN.

**[0054]** When the controller 10 controls the heating unit 8, the heat producing temperature of the heating region portions 83 on the planar heater 81 is controlled so that the heated region portions 63A and 63B of the flavor generation source 60 are not accompanied by combustion. When the heated region portions 63A and 63B of the flavor generation source 60 are heated, vapors of the flavor generation source and the aerosol generation source included therein are mixed with the air flowing through ventilation paths (for example, indicated by reference signs 41 and 42 and the like in Fig. 8) formed in the heating chamber 4 through the first ventilation flow path 71, and an aerosol including a flavor component is generated. The aerosol including the flavor component flows down along the ventilation paths 41 and 42 and the like in the chamber ventilation direction AF, then flows into the second ventilation flow path 72 in the mouthpiece 3 from the narrow flow path portion 4A, and is finally inhaled into the user's oral cavity from the inhalation port 31.

**[0055]** The ventilation path 41 illustrated in Fig. 8 is a ventilation path formed between the plurality of upper sandwiching portions 27, and between the upper sandwiching portions 27 and the inner wall surfaces 25A at both ends. The ventilation path 42 is a ventilation path formed between the plurality of lower sandwiching portions 28, and between the lower sandwiching portions 28 and the inner wall surfaces 25A at both ends. The ventilation paths 41 and 42 extend in the front-rear direction of the heating chamber 4. In other words, the ventilation paths 41 and 42 extend in the extending direction of the heating region portions 83 of the planar heater 81.

**[0056]** As illustrated in Fig. 8, the upper sandwiching portions 27 provided on the inner wall surface 5A of the cover body 5 and the lower sandwiching portions 28 provided on the inner wall surface 26A of the division wall 26 are disposed so as not to overlap the heating region portions 83 formed on each of the heater surfaces 82A and 82B of the planar heater 81 in an up-down direction.

In other words, the upper sandwiching portions 27 and the lower sandwiching portions 28 are disposed at positions deviated in the width direction of the heating chamber 4 with respect to the heating region portions 83 formed on each of the heater surfaces 82A and 82B. Accordingly, when the outer surfaces 613 of the flavor generation sheets 61A and 61B (heated region portions 63A and 63B) of the flavor generation source 60 attached to the planar heater 81 are sandwiched from above and below by the upper sandwiching portions 27 and the lower sandwiching portions 28, the heated region portions 63A and 63B can be prevented from being excessively strongly pressed against the heating region portions 83 formed on each of the heater surfaces 82A and 82B, and can be adjusted to have an appropriate close contact relationship. Consequently, when the heating region portions 83 disposed on each of the heater surfaces 82A and 82B produce heat, the first heated region portion 63A and the second heated region portion 63B can be suitably heated while the first heated region portion 63A and the second heated region portion 63B are prevented from being scorched.

**[0057]** Since the upper sandwiching portions 27 and the lower sandwiching portions 28 are disposed so as not to vertically overlap the heating region portions 83 formed on each of the heater surfaces 82A and 82B of the planar heater 81, dissipation of heat produced by the heating region portions 83 to the housing 2 side through the upper sandwiching portions 27 and the lower sandwiching portions 28 can be suppressed. Accordingly, heat production loss in the heating region portions 83 of the planar heater 81 can be reduced.

**[0058]** Next, an operation of the flavor inhaler 1 will be described. Fig. 9 is a flowchart for explaining an operation of the flavor inhaler 1 according to Embodiment 1. Processing related to each step of the flowchart presented in Fig. 9 is implemented by, for example, the processor executing a program stored in the memory in the MCU of the controller 10.

**[0059]** When the flavor inhaler 1 is activated by an operation of the operation unit 12 or the like (step S01: YES), the controller 10 turns on the power supply 9 (step S02). The flavor inhaler 1 according to the present embodiment causes not all but a portion of the heating region portions 83A to 83N disposed on each of the heater surfaces 82A and 82B of the planar heater 81 to be energized to rapidly produce heat every time a user's action (puff action) of the inhalation using the mouthpiece 3 is detected. Consequently, a specific section of each of the heated region portions 63A and 63B of the flavor generation source 60 can be heated, and power consumption of the power supply 9 that supplies electric power to the heating unit 8 can be reduced.

**[0060]** When the cumulative number of puff actions by the user after the flavor inhaler 1 is activated reaches a prescribed number of times, the controller 10 performs heating control corresponding to the last one of the prescribed number of puff actions and then turns off the power supply 9. Here, the prescribed number of times related to the cumulative number of puffs after the activation of the flavor inhaler 1 is described as fourteen times corresponding to the number of heating region portions 83 on each of the heater surfaces 82A and 82B of the planar heater 81, but the prescribed number of times is not particularly limited.

**[0061]** After the power supply 9 is turned on in step S02, the controller 10 determines the presence of a puff action by the user (step S03). The presence of the puff action can be detected based on an output value of the inhalation sensor 13. When the controller 10 detects a puff action (step S03: YES), the controller 10 causes the power supply 9 to supply electric power to the planar heater 81 of the heating unit 8, and performs processing of energizing a heating region portion associated with the cumulative number of puffs (hereinafter, also referred to as an "energization target heating region portion") among the plurality of heating region portions 83A to 83N disposed on each of the heater surfaces 82A and 82B (step S04). That is, when the cumulative number of puffs is N (N is a natural number and $1 < N \leq 14$), heat is produced by energizing the Nth heating region portion on each of the first heater surface 82A and the second heater surface 82B. When the puff action is not detected in step S03 (step S03: NO), the processing returns to step S03 after a certain period of time has elapsed, and the presence of the puff action is determined again.

**[0062]** A target temperature when the heating region portions 83 are energized for heat production may be set in advance, and the supply with electric power from the power supply 9 may be controlled so that the temperatures of the heating region portions 83 converge to the target temperature. For example, the flavor inhaler 1 may further include a voltage sensor that measures and outputs a voltage value of a voltage applied to the heating region portions 83 when the heating region portions 83 are energized and/or a current sensor that measures and outputs a current value of a current flowing through the heating region portions 83, and may acquire the temperature of the heating region portions 83 based on the output values of the sensors. In this case, the outputs of the voltage sensor and the current sensor are input to the controller 10. The processor of the controller 10 can acquire a resistance value of the heating region portions 83 on the planar heater 81 based on the output of the voltage sensor and the output of the current sensor, and acquire the temperature of the heating region portions 83 corresponding to the resistance value. When the resistance value of the heating region portions 83 is acquired, the current sensor is not necessary as long as a constant current is supplied to the heating region portions 83. Similarly, when the resistance value of the heating region portions 83 is acquired, the voltage sensor is not necessary as long as a constant voltage is applied to the heating region portions 83. A temperature measurement sensor such as a thermistor may be disposed in the heating chamber 4, and energization control for causing the

heating region portions 83 to produce heat may be performed based on an output of the temperature measurement sensor. Alternatively, the heating region portions 83 may be caused to produce heat by performing energization control on the heating region portions 83 for a certain period of time set in advance.

**[0063]** When the heating region portions 83 disposed on each of the heater surfaces 82A and 82B of the planar heater 81 are caused to produce heat with detection of a puff action as a trigger, a specific section of each of the heated region portions 63A and 63B of the flavor generation source 60 corresponding to the heating region portions 83 that have produced heat is heated, and an aerosol including a flavor component is discharged from the section. The aerosol including the flavor component passes through the ventilation paths 41 to 44 extending in the front-rear direction of the heating chamber 4, sequentially passes through the narrow flow path portion 4A and the second ventilation flow path 72, and is finally inhaled from the inhalation port 31.

**[0064]** The controller 10 stores in the memory a prescribed number of times related to the cumulative number of puffs and information related to the cumulative number of puffs after activation. After performing the energization processing for causing the heating region portions 83 associated with the cumulative number of puffs to produce heat in step S04, the controller 10 increments the cumulative number of puffs stored in the memory to update the information related to the cumulative number of puffs (step S05). Next, the controller 10 determines whether the cumulative number of puffs stored in the memory has reached the prescribed number of times (step S06). If it is determined in step S06 that the cumulative number of puffs has not reached the prescribed number of times (step S06: NO), the processing returns to step S03 after a certain period of time has elapsed, and the presence of a puff action is determined again. In contrast, when it is determined in step S06 that the cumulative number of puffs has reached the prescribed number of times (step S06: YES), the power supply 9 is turned off (step S07).

**[0065]** In the above-described operation example, until the cumulative number of puffs after the activation of the flavor inhaler 1 reaches the prescribed number of times, the processing of causing a specific heating region portion associated with the cumulative number of puffs to produce heat among the plurality of heating region portions 83A to 83N disposed on each of the heater surfaces 82A and 82B of the planar heater 81 is repeatedly performed every time a puff action by the user is detected.

**[0066]** Fig. 10 is a diagram presenting a table in which the cumulative number of puffs after the activation of the flavor inhaler 1 and the energization target heating region portions on each of the heater surfaces 82A and 82B of the planar heater 81 are stored in association with each other. The table presented in Fig. 10 is stored in the memory of the controller 10. In the example of the table presented in Fig. 10, when the cumulative number of puffs is 1, the first heating region portion 83A on each of the heater surfaces 82A and 82B is associated as the energization target heating region portion. Thus, when the first puff action is detected after the activation of the flavor inhaler 1, the first heating region portion 83A on the first heater surface 82A and the first heating region portion 83A on the second heater surface 82B of the planar heater 81 are selected as the energization target heating region portions and energized. Consequently, the first section RA of the first heated region portion 63A and the first section RA of the second heated region portion 63B of the flavor generation source 60 are individually heated, and an aerosol including a flavor component is discharged mainly from the sections RA.

**[0067]** In the example of the table presented in Fig. 10, when the cumulative number of puffs is 2, the second heating region portion 83B on each of the heater surfaces 82A and 82B is associated as the energization target heating region portion. Thus, when the second puff action is detected after the activation of the flavor inhaler 1, the second heating region portion 83B on the first heater surface 82A and the second heating region portion 83B on the second heater surface 82B of the planar heater 81 are selected as the energization target heating region portions and energized. Consequently, the second section RB of the first heated region portion 63A and the second section RB of the second heated region portion 63B of the flavor generation source 60 are individually heated, and an aerosol including a flavor component is discharged mainly from the sections RB.

**[0068]** Of course, the table presented in Fig. 10 is merely an example, and it is possible to freely change the correspondence relation between the cumulative number of puffs and the energization target heating region portions after the activation of the flavor inhaler 1. Alternatively, the energization target heating region portion of the first heater surface 82A and the energization target heating region portion of the second heater surface 82B associated with the cumulative number of puffs may be different from each other. Still alternatively, a plurality of (for example, two or three) heating region portions 83 on the first heater surface 82A may be associated with the cumulative number of puffs as the energization target heating region portion. In this case, the plurality of heating region portions 83 on the first heater surface 82A associated with the cumulative number of puffs are simultaneously energized. Similarly, a plurality of (for example, two or three) heating region portions 83 on the second heater surface 82B may be associated with the cumulative number of puffs as the energization target heating region portion. In this case, the plurality of heating region portions 83 on the second heater surface 82A associated with the cumulative number of puffs are simultaneously energized. The flavor inhaler 1 may be configured to be capable of communicating with a user external terminal, such as a mobile terminal or a personal computer. In this case, the user may be allowed to desirably set the order of energization, the heating temperature, the heating pe-

riod of time, and the like, of the heating region portions 83 provided on each of the heater surfaces 82A and 82B of the heating unit 8 of the flavor inhaler 1 using, for example, an application of the user external device. By storing the user setting in the memory of the controller 10 through communication using any of various input terminals such as a USB terminal, short-range wireless communication such as near field communication (NFC), wireless fidelity (Wi-Fi), or the like, the user can desirably set a preferred inhalation (heater heating) condition .

**[0069]** As described above, the flavor inhaler 1 according to the present embodiment can reduce power consumption when heating the flavor generation source 60 by performing the energization control described with reference to Fig. 10 with detection of a puff action by the user as a trigger. Accordingly, downsizing of the power supply 9 can be implemented, thereby contributing to downsizing of the flavor inhaler 1 (housing 2).

**[0070]** In addition, with the heating unit 8 according to the present embodiment, the planar heater 81 with both front and back surfaces formed as the heater surfaces 82A and 82B is provided. The heater surfaces 82A and 82B of the planar heater 81 allow the sheet-shaped or planar heated region portions 63A and 63B constituting a portion or a whole of the flavor generation source 60 to be disposed along the heater surfaces 82A and 82B, respectively, and the plurality of heating region portions 83 for individually heating a specific section that is a portion of the heated region portions 63A and 63B are formed on each of the heater surfaces 82A and 82B. As described above, since the planar heater 81 has the heater surfaces 82A and 82B that allow the sheet-shaped or planar heated region portions 63A and 63B to be disposed along the heater surfaces 82A and 82B, respectively, on both surfaces of the planar heater 81, the height (thickness) of the housing 2 can be low and compact.

**[0071]** Furthermore, in the heating unit 8, the plurality of heating region portions 83 on each of the front and back heater surfaces 82A and 82B of the planar heater 81 extend in the chamber ventilation direction AF of the air flowing through the heating chamber 4 along with the inhalation using the mouthpiece 3, and the heating region portions 83 on each of the heater surfaces 82A and 82B are arrayed at intervals in the direction orthogonal to the extending direction (chamber ventilation direction AF) of the heating region portions 83. Accordingly, even when any of the heating region portions 83 on each of the heater surfaces 82A and 82B is determined as the energization target heating region portion and is caused to produce heat, the length of the flow path from the position of the section individually heated by the energization target heating region portion to the inhalation port 31 is substantially constant. That is, even when any of the heating region portions 83 is caused to produce heat, it is possible to avoid a large variation in a cooling distance (flow path length) until the aerosol discharged from the section where each of the heated region portions 63A and 63B is heated by the heating region portion 83 is guided to the inhalation port 31. Consequently, whichever heating region portion 83 is caused to produce heat, a condensation state of a flavor component vaporized by heating using the heating region portion 83 can be stabilized, and the delivery amount of the aerosol can be stabilized.

**[0072]** In addition, by extending the plurality of heating region portions 83 on each of the front and back heater surfaces 82A and 82B of the planar heater 81 in the chamber ventilation direction AF and arraying them at intervals in the direction orthogonal to the extending direction (chamber ventilation direction AF) of the heating region portions 83, the ventilation paths 41 to 44 can be formed in the extending direction of the heating region portions 83. Consequently, the air taken in from the air intake port 6 and the aerosol generated in the heating chamber 4 can smoothly flow toward the mouthpiece 3.

**[0073]** In the planar heater 81 of the heating unit 8, the plurality of heating region portions 83 are disposed in the same plane on each of the front and back heater surfaces 82A and 82B. That is, in each of the heater surfaces 82A and 82B of the planar heater 81, the heights of the heating region portions 83 are flush with each other. Accordingly, when the heated region portions 63A and 63B of the flavor generation source 60 are disposed respectively along the heater surfaces 82A and 82B of the planar heater 81, the correspondence relation (for example, contact relation) between the heater surfaces 82A and 82B and the inner surfaces 614 of the heated region portions 63A and 63B can be easily made uniform. Thus, in each of the heater surfaces 82A and 82B of the planar heater 81, a heating condition when each section of the heated region portions 63A and 63B is individually heated by the heating region portion 83 is less likely to vary, thereby contributing to stabilization of the delivery amount of the aerosol.

**[0074]** In the operation of the flavor inhaler 1 described with reference to the flowchart of Fig. 9, the controller 10 notifies the user of the state of the flavor inhaler 1 by controlling the light emission mode (for example, color of light or pattern of light) of the notifier 14. The controller 10 may notify the user of the remaining number of available puffs through the light emission mode of the notifier 14. Alternatively, when the energization control on the planar heater 81 is performed, the notifier 14 at a position corresponding to the energization target heating region portion may be caused to emit light in a predetermined mode to notify the user of the energization target heating region portion that is currently in operation. The flavor inhaler 1 may include a vibrator including a vibration element (for example, a piezoelectric element) for notifying the user of the state of the flavor inhaler 1, and the state of the flavor inhaler 1 may be notified to the user instead of the notifier 14 or in combination with the notifier 14. Alternatively, the flavor inhaler 1 may include a speaker for outputting sound, and the user may be notified of the state of the flavor inhaler 1 through the sound output by the speaker.

**[0075]** In the description of the above embodiment, the planar heater 81 of the heating unit 8 has been described

as a flat plate heater, but the shape (cross-sectional shape, planar shape, or the like) of the planar heater 81 is not particularly limited. That is, as long as the planar heater 81 of the heating unit 8 has, on the front and back sides thereof, the first heater surface 82A and the second heater surface 82B that allow the heated region portions 63A and 63B of the flavor generation source to be disposed, and the plurality of heating region portions 83 formed on each of the heater surfaces 82A and 82B extend in the chamber ventilation direction AF and are arrayed at intervals in the direction orthogonal to the extending direction of the heating region portions 83, the mode is not particularly limited. For example, the first heater surface 82A and/or the second heater surface 82B may have a curved surface shape (convex shape, concave shape). However, it is preferable to form the planar heater 81 using a planar-shaped heater in which the first heater surface 82A and the second heater surface 82B each have a planar shape from the viewpoint of ease of manufacture of the planar heater 81 and uniformity of thermal distribution during the heating control.

<Modifications>

**[0076]** Hereinafter, modifications of the flavor inhaler 1 according to the present embodiment will be described. The same components as those of the above-described embodiment are denoted by the same reference signs and will not be described in detail.

**[0077]** Fig. 11 is a diagram illustrating a flavor generation source 60A according to Modification 1. The flavor generation source 60A includes a plurality of flavor generation sheets separated from each other. In the example illustrated in Fig. 11, two sheet-shaped flavor generation sources 60A are illustrated. In Modification 1, the entirety of one flavor generation source 60A is constituted as a first heated region portion 63A, and the entirety of the other flavor generation source 60A is constituted as a second heated region portion 63B. One flavor generation source 60A (first heated region portion 63A) can be disposed along the first heater surface 82A of the planar heater 81, and the other flavor generation source 60A (second heated region portion 63B) can be disposed along the second heater surface 82B of the planar heater 81. The flavor generation source 60A illustrated in Fig. 11 can be also applied to the heating unit 8 of the flavor inhaler 1.

**[0078]** Fig. 12 is a diagram illustrating a flavor generation source 60B according to Modification 2. The flavor generation source 60B illustrated in Fig. 12 has a flat tube form as a whole by joining side edge portions of a pair of flavor generation sheets 61A and 61B to each other. Reference sign 615 denotes a side joint portion formed by joining the side edge portions of the flavor generation sheets 61A and 61B to each other. Reference sign 616 denotes a heater insertion port formed as an opening into which the planar heater 81 can be inserted from the front surface 82C side. In the flavor generation source 60B, regions sandwiched between a pair of side joint portions 615 are formed as a planar first heated region portion 63A and a planar second heated region portion 63B. That is, the first heated region portion 63A and the second heated region portion 63B of the flavor generation source 60B are portions of the flavor generation source 60B.

**[0079]** A hollow portion 64 capable of accommodating the planar heater 81 is formed between the first heated region portion 63A and the second heated region portion 63B. In the flavor generation source 60B illustrated in Fig. 12, by inserting (slipping) the planar heater 81 into the hollow portion 64 from the front surface 82C side through the heater insertion port 616, the planar heater 81 can be sandwiched between the first heated region portion 63A and the second heated region portion 63B. Accordingly, the first heated region portion 63A can be disposed along the first heater surface 82A of the planar heater 81, and the second heated region portion 63B can be disposed along the second heater surface 82B of the planar heater 81.

**[0080]** Fig. 13 is a diagram illustrating a flavor generation source 60C according to Modification 3. The flavor generation source 60C is similar to the flavor generation source 60B illustrated in Fig. 12 except that rear edge portions of the pair of flavor generation sheets 61A and 61B are also joined to each other. Reference sign 617 denotes a rear joint portion formed by joining the rear edge portions of the flavor generation sheets 61A and 61B to each other, and the flavor generation source 60C has a flat bag shape as a whole. In the flavor generation source 60C, by inserting (slipping) the planar heater 81 into the hollow portion 64 from the front surface 82C side through the heater insertion port 616, the planar heater 81 can be sandwiched between the first heated region portion 63A and the second heated region portion 63B. Accordingly, the first heated region portion 63A can be disposed along the first heater surface 82A of the planar heater 81, and the second heated region portion 63B can be disposed along the second heater surface 82B of the planar heater 81.

**[0081]** In the flavor inhaler 1, the upper sandwiching portions 27 and the lower sandwiching portions 28 provided on the upper surface and the bottom surface of the heating chamber 4 can also employ any of various forms. For example, in the example illustrated in Fig. 8, the plurality of rib-shaped (plate-shaped) upper sandwiching portions 27 hang down from the inner wall surface 5A of the cover body 5, and the plurality of rib-shaped (plate-shaped) lower sandwiching portions 28 stand on the inner wall surface 26A of the division wall 26, but these may be omitted. That is, the inner wall surface 5A of the cover body 5 and the inner wall surface 26A of the division wall 26 may sandwich the first heated region portion 63A and the second heated region portion 63B attached to the planar heater 81 from above and below so as to enhance the adhesion of the first heated region portion 63A and the second heated region portion 63B to the planar

heater 81. In such a mode, the inner wall surface 5A of the cover body 5 and the inner wall surface 26A of the division wall 26 also function as the upper sandwiching portions 27 and the lower sandwiching portions 28 described above, respectively.

**[0082]** Fig. 14 is a view for explaining another modification of the cross-sectional structure of the heating chamber 4 of the flavor inhaler 1, and specifically illustrates a state when the heating chamber 4 is cut at a cross section orthogonal to the front-rear direction. Reference signs 87A and 87B indicated in Fig. 14 denote thermal conductive sheets disposed on the heater surfaces 82A and 82B, respectively. The thermal conductive sheets 87A and 87B cover surfaces of a plurality of heating region portions 83 disposed in each of the heater surfaces 82A and 82B. The thermal conductive sheets 87A and 87B may be formed of, for example, an aluminum foil. The thermal conductive sheet 87A interposed between the first heated region portion 63A and the first heater surface 82A transfers heat of the heating region portions 83 to the first heated region portion 63A when the heating region portions 83 in the first heater surface 82A produce heat while suppressing direct contact of the first heated region portion 63A with the heating region portions 83 in the first heater surface 82A. The thermal conductive sheet 87B interposed between the second heated region portion 63B and the second heater surface 82B transfers heat of the heating region portions 83 to the second heated region portion 63B when the heating region portions 83 in the second heater surface 82A produce heat while suppressing direct contact of the second heated region portion 63B with the heating region portions 83 in the second heater surface 82B. With such a configuration, when the heating region portions 83 disposed in each of the heater surfaces 82A and 82B produce heat, the first heated region portion 63A and the second heated region portion 63B can be suitably heated while the first heated region portion 63A and the second heated region portion 63B are prevented from being scorched.

**[0083]** Furthermore, in the modification illustrated in Fig. 14, the inner wall surface 5A of the cover body 5 and the inner wall surface 26A of the division wall 26 have protruding and recessed shapes. Reference signs 251 and 252 indicated in Fig. 14 denote a protruding portion and a recessed portion alternately disposed in a width direction of the inner wall surface 5A of the cover body 5. Reference signs 261 and 262 denote a protruding portion and a recessed portion alternately disposed in a width direction of the inner wall surface 26A of the division wall 26. In the flavor generation source 60 according to the present modification, a recessed portion 613A that can receive the protruding portion 251 of the inner wall surface 5A and a protruding portion 613B that can be fitted into the recessed portion 252 are formed in an outer surface of the first heated region portion 63A. Similarly, a recessed portion 613A that can receive the protruding portion 261 of the inner wall surface 26A and a protruding portion 613B that can be fitted into the recessed portion 262 are formed in an outer surface of the second heated region portion 63B. In the present modification, the protruding portions 251 and 261 formed in the inner wall surface 5A of the cover body 5 and the inner wall surface 26A of the division wall 26 correspond to sandwiching portions that sandwich the set of heated region portions 63A and 63B disposed in the uppermost stage and the lowermost stage disposed in the heating chamber 4 from above and below.

**[0084]** Reference signs 251A and 261A indicated in Fig. 14 denote high resilient portions formed and provided on distal end sides of the protruding portions 251 and 261 (sandwiching portions). The high resilient portions 251A and 261A are formed of a high resilient material. Examples of such a high resilient material include silicone rubber. Furthermore, since silicone rubber has heat resistance, it is suitable as a material used for the high resilient portions 251A and 261A. As described above, by providing the high resilient portions 251A and 261A on the protruding portions 251 and 261 that sandwich the heated region portions 63A and 63B disposed in the heating chamber 4 from above and below, adhesion of the heated region portions 63A and 63B to the planar heater 81 can be suitably enhanced.

**[0085]** As illustrated in Fig. 14, the depth dimension of the recessed portion 252 of the cover body 5 is larger than the height dimension of the protruding portion 613B formed in the outer surface of the first heated region portion 63A. Thus, a clearance is formed between a top surface of the protruding portion 613B and a groove bottom of the recessed portion 252, and a ventilation path 46 is formed by the clearance. Similarly, the depth dimension of the recessed portion 262 of the division wall 26 is larger than the height dimension of the protruding portion 613B formed in the outer surface of the second heated region portion 63B. Thus, a clearance is formed between a top surface of the protruding portion 613B and a groove bottom of the recessed portion 262, and the ventilation path 46 is formed by the clearance. The ventilation path 46 is provided in the extending direction of the heating region portions 83, and air or an aerosol can smoothly flow to the mouthpiece 3 side through the ventilation path 46.

**[0086]** Reference sign 47 indicated in Fig. 14 denotes groove portions (cutout portions) formed in the inner surfaces 614 of the first heated region portion 63A and the second heated region portion 63B. The groove portions 47 extend in a front-rear direction of the first heated region portion 63A and the second heated region portion 63B. Thus, in the state in which the first heated region portion 63A and the second heated region portion 63B are attached to the planar heater 81, the heating region portions 83 of the planar heater 81 and the groove portions 47 extend in parallel to each other. The groove portions 47 may be disposed at regular intervals in the width direction of each of the heated region portions 63A and 63B so that the groove portions 47 are located between the adjacent heating region portions 83 in each of the

heater surfaces 82A and 82B in the state in which the heated region portions 63A and 63B are attached to the planar heater 81. By disposing the groove portions 47 in this manner, when a desired section of each of the heated region portions 63A and 63B is heated by the heating region portions 83, dissipation of heat to a section adjacent to the section can be suppressed. Consequently, a specific section serving as a heating target by the heating region portions 83 can be efficiently heated. In addition, the groove portions 47 formed in each of the heated region portions 63A and 63B can be suitably used as a ventilation path through which air or an aerosol flows.

**[0087]** Fig. 15 is a view illustrating still another modification of the planar heater 81 of the flavor inhaler 1. Fig. 15 schematically illustrates a portion of a cross section of the planar heater 81. In the configuration example illustrated in Fig. 15, a plurality of heat producing elements 830 formed of a resistor are disposed only on the first heater surface 82A of the substrate 82 of the planar heater 81 to extend in elongated strip shapes in the front-rear direction of the substrate 82 parallel to the chamber ventilation direction AF. The heat producing elements 830 are arrayed in parallel at intervals in a direction orthogonal to an extending direction of the heat producing elements 830. The heat producing elements 830 each are a resistor that generates heat when energized, and can be formed using an appropriate material similarly to the resistor for forming the heating region portions 83 described in the above embodiment. Here, reference sign 823 denotes a heat conducting portion of the substrate 82. The heat conducting portion 823 may be formed of, for example, resin having high thermal conductivity and electrical insulation. In the substrate 82, a region located below each heat producing element 830 is formed of the heat conducting portion 823, and the remaining region is formed of a heat insulating region portion 824. The heat insulating region portion 824 may be formed of a resin material such as polyimide resin having excellent electrical insulation and excellent thermal insulation.

**[0088]** In the planar heater 81 with the above-described configuration, heat of the heat producing elements 830 produced upon energization is conducted to the second heater surface 82B side through the heat conducting portions 823 located below the heat producing elements 830. Accordingly, regions of the second heater surface 82B of the planar heater 81 corresponding to the back sides of the heat producing elements 830 are also in a high temperature state, and can heat the heated region portions of the flavor generation source. As described above, when the heat of the heat producing elements 830 is transferred to the heater surface on which the heat producing elements 830 are not disposed through the heat conducting portions 823 of the substrate 82, it is preferable to reduce the thickness of the heat conducting portions 823 in order to ensure heat transfer efficiency. For example, the thickness of the heat conducting portions 823 may be about 0.05 mm to 0.3 mm. As described above, in the planar heater 81, the first heater surface 82A and the second heater surface 82B can be formed even when the heat producing elements 830 are disposed on only one of the front and back sides of the substrate 82. In the example illustrated in Fig. 15, the heating region portions 83 can be formed on both the first heater surface 82A and the second heater surface 82B by a combination of the heat producing elements 830 formed on the first heater surface 82A of the planar heater 81 and the heat conducting portions 823 provided to correspond to the heat producing elements 830. Of course, the heat producing elements 830 may be disposed on the second heater surface 82B side instead of the first heater surface 82A of the planar heater 81.

**[0089]** In the planar heater 81 according to the embodiment and modifications described above, the substrate 82 is not essential, and for example, as illustrated in Fig. 16, a heat producing element 831 such as an electric heating wire may be provided at the heater mount 86 to form a planar heater as a whole. Fig. 16 illustrates a state in which the planar heater 81 is viewed from above, and for example, a plurality of elongated flat-plate-shaped heat producing elements 831 are disposed in a comb shape to extend from the heater mount 86. The heat producing elements 831 extend in the chamber ventilation direction AF of the heating chamber 4, and are arrayed and disposed at intervals in a direction orthogonal to an extending direction of the heat producing elements 831. For example, the heated region portion 63A can be disposed so as to extend over upper surfaces of the heat producing elements 831, and the heated region portion 63B can be disposed so as to extend over lower surfaces of the heat producing elements 831. The cross-sectional shape of each of the heat producing elements 831 is not limited to a flat plate shape and can be changed as appropriate.

**[0090]** In the description of the heating unit 8 according to the embodiment and modifications described above, an example of a heater module in which the planar heater 81 is integrally mounted to the heater mount 86 has been described. However, the planar heater 81 may be in a cartridge form that is mountable to and removable from the heater mount 86 provided in the heating chamber 4. In this case, for example, the recessed portion 861 (see Fig. 5) of the heater mount 86 can be formed as a slot into and from which the planar heater 81 can be inserted and removed, from the rear surface 82D side, and hence the planar heater 81 can be formed as a removably mountable cartridge.

**[0091]** The planar heater 81 may be configured as a cartridge system in a form as illustrated in Fig. 17. Fig. 17 is a diagram illustrating a configuration example of a planar heater 81 of a cartridge system. In the example illustrated in Fig. 17, the planar heater 81 is provided with a plurality of pin electrodes 88 protruding from the rear surface 82D of the substrate 82. The plurality of pin electrodes 88 are arranged side by side in a comb shape in a width direction of the rear surface 82D of the substrate 82. A heater mount 86 illustrated in Fig. 17 is configured

as a socket (connector) having a plurality of receiving ports 89 into which and from which the plurality of pin electrodes 88 provided on the planar heater 81 can be inserted and removed. The plurality of pin electrodes 88 of the planar heater 81 are electrically connected to the wires LU and LD and the like of the planar heater 81 described with reference to Figs. 3, 5, and 6 and other drawings, and by inserting the plurality of pin electrodes 88 into the corresponding receiving ports 89, terminals on the power supply 9 side and circuit wiring provided on the planar heater 8 side can be electrically connected.

<Embodiment 2>

**[0092]** Next, Embodiment 2 will be described. In the embodiment and modifications described above, the mode has been exemplarily described in which the heating unit 8 includes the one planar heater 81. However, the heating unit 8 may include a plurality of planar heaters 81.

**[0093]** Fig. 18 is a diagram illustrating a flavor inhaler 1A according to Embodiment 2. In Fig. 18, the same components as those of the above-described embodiment are denoted by the same reference signs. A cover body 50 of the flavor inhaler 1A has a substantially L-shape in side view, and is provided so as to extend over the upper surface and the front surface of the housing 2. Also in the present embodiment, a rotation shaft 51 of the cover body 50 is supported rotatably with respect to the upper surface wall 21 of the housing 2. In Fig. 18, the cover body 50 in the closed lid posture is indicated by a solid line, and the cover body 50 in the open lid posture is indicated by a chain line. As illustrated in Fig. 18, in the flavor inhaler 1A according to the present embodiment, a mouthpiece 3 is provided integrally with the cover body 50. In the cover body 50 constituted as described above, not only the upper surface but also the front surface of the heating chamber 4 formed in the housing 2 are largely opened to the outside by being switched from the closed lid posture to the open lid posture.

**[0094]** Reference sign 8A denotes a heating unit. The heating unit 8A according to the present embodiment includes a plurality of planar heaters 81 and a heater mount 86A that holds the plurality of planar heaters 81. In the example illustrated in Fig. 18, the heating unit 8A includes a set of planar heaters 81 disposed in upper and lower two stages. Rear surfaces 82D of the set of planar heaters 81 are supported by the heater mount 86A. In addition, the set of planar heaters 81 are disposed to face each other with an interval therebetween in an up-down direction of the heating chamber 4. Furthermore, the set of planar heaters 81 are held by the heater mount 86A in mutually parallel postures along the inner wall surface 26A of the division wall 26 forming the bottom surface of the heating chamber 4.

**[0095]** Even when the planar heaters 81 are installed in a plurality of stages in the up-down direction of the heating chamber 4 as in the above-described configuration, the flavor generation source 60 (see Fig. 1), the flavor generation source 60A (see Fig. 11), the flavor generation source 60B (see Fig. 12), the flavor generation source 60C (see Fig. 13), or the like, can be applied, and the first heated region portion 63A and the second heated region portion 63B can be disposed along the heater surfaces 82A and 82B on the front and back sides of each of the planar heaters 81. In addition, the flavor generation source accommodated in the heating chamber 4 by the user can be constituted in a plurality of stages in accordance with the form of the heating unit 8A.

**[0096]** Next, a flavor generation source cartridge FC suitable for the flavor inhaler 1A according to Embodiment 2 will be described. Fig. 19 is a perspective view illustrating the flavor generation source cartridge FC according to Embodiment 2.

**[0097]** The flavor generation source cartridge FC is a cartridge in which a plurality of flavor generation sheets and a holding member 90 that holds the flavor generation sheets are integrally assembled.

**[0098]** The holding member 90 is a frame body that holds a predetermined number of flavor generation sheets, and is constituted by combining a plurality of frame bodies. In the flavor inhaler 1A described with reference to Fig. 18, the heating unit 8A includes the two planar heaters 81, and the flavor generation sheets 60A are disposed on the front and back sides of each of the planar heaters 81. Thus, the holding member 90 of the flavor generation source cartridge FC illustrated in Fig. 19 holds four flavor generation sheets. Reference signs FS1 to FS4 denote flavor generation sheets. The flavor generation sheets FS1 to FS4 are substantially similar to the flavor generation source 60A described in Fig. 11.

**[0099]** The holding member 90 includes a bottom frame portion 91, a first intermediate spacer 92, an intermediate frame portion 93, a second intermediate spacer 94, and an upper frame portion 95. Fig. 20 is a top view of the bottom frame portion 91 of the holding member 90 according to Embodiment 2. The bottom frame portion 91 is a frame member constituted to include a bottom plate WL1, a pair of side walls WS1, and a plurality of partition walls WP1. The bottom plate WL1 has a rectangular plane, and the pair of side walls WS1 and the plurality of partition walls WP1 vertically stand upward from the bottom plate WL1. The pair of side walls WS1 and the plurality of partition walls WP1 extend from a front end to a rear end of the bottom plate WL1. In addition, a ventilation flow path CH1 extends from a front end to a rear end of the bottom frame portion 91 between the side wall WS1 and the partition wall WP1 and between the adjacent partition walls WP1.

**[0100]** The upper frame portion 95 of the holding member 90 is a frame member having substantially the same structure as the bottom frame portion 91, and a pair of side walls WS1 and a plurality of partition walls WP1 hang from a rectangular top plate WU. A ventilation flow path CH1 extends from a front end to a rear end of the upper frame portion 95 between the side wall WS1 and the par-

tition wall WP1 and between the adjacent partition walls WP1.

**[0101]** Fig. 21 is a top view of the first intermediate spacer 92 of the holding member 90 according to Embodiment 2. The first intermediate spacer 92 is a frame member including a rear wall WB2 and a pair of side walls WS2 and having a substantially U-shaped plane in plan view. Rear ends of the pair of side walls WS2 are connected to both side ends of the rear wall WB2. The second intermediate spacer 94 has the same structure as the first intermediate spacer 92.

**[0102]** Fig. 22 is a top view of the intermediate frame portion 93 of the holding member 90 according to Embodiment 2. The intermediate frame portion 93 is constituted to include a rear wall WB1, a pair of side walls WS1, and a plurality of partition walls WP1. Rear ends of the pair of side walls WS1 are connected to both side ends of the rear wall WB1. The plurality of partition walls WP1 are disposed in parallel to the pair of side walls WS1, and a rear end of each of the partition walls WP1 is connected to the rear wall WB1. In the rear wall WB1, vent holes 96 are formed between the side wall WS1 and the partition wall WP1 and between the adjacent partition walls WP1. Accordingly, a ventilation flow path CH2 extends from a front end to a rear end of the intermediate frame portion 93 between the side wall WS1 and the partition wall WP1 and between the adjacent partition walls WP1.

**[0103]** As illustrated in Fig. 19, the holding member 90 constituted as described above is assembled in a state in which the bottom frame portion 91, the first intermediate spacer 92, the intermediate frame portion 93, the second intermediate spacer 94, and the upper frame portion 95 are stacked in this order from below. As is apparent from Fig. 19, the height dimensions of the first intermediate spacer 92 and the second intermediate spacer 94 are smaller than the height dimensions of the other members, that is, the bottom frame portion 91, the intermediate frame portion 93, and the upper frame portion 95. The material of the bottom frame portion 91, the first intermediate spacer 92, the intermediate frame portion 93, the second intermediate spacer 94, and the upper frame portion 95 constituting the holding member 90 is not particularly limited, but can be formed of cardboard, heat-resistant resin, or the like.

**[0104]** Here, the flavor generation sheet FS1 is held by being sandwiched between an upper surface of the bottom frame portion 91 and a lower surface of the first intermediate spacer 92. The flavor generation sheet FS2 is held by being sandwiched between an upper surface of the first intermediate spacer 92 and a lower surface of the intermediate frame portion 93. The flavor generation sheet FS3 is held by being sandwiched between an upper surface of the intermediate frame portion 93 and a lower surface of the second intermediate spacer 94. The flavor generation sheet FS4 is held by being sandwiched between an upper surface of the second intermediate spacer 94 and a lower surface of the upper frame portion 95.

**[0105]** In the flavor generation source cartridge FC constituted as described above, heater insertion ports IP1 and IP2 for inserting the planar heaters 81 are formed in front surfaces of the first intermediate spacer 92 and the second intermediate spacer 94. The height dimensions of the first intermediate spacer 92 and the second intermediate spacer 94 that define the vertical dimensions of the heater insertion ports IP1 and IP2 are set to be slightly larger than the thickness dimensions of the planar heaters 81. The width dimensions of the heater insertion ports IP1 and IP2 are also set to be slightly larger than the width dimensions of the planar heaters 81. In addition, in the flavor generation source cartridge FC, a large number of ventilation flow paths CH1 and CH2 extending through the flavor generation source cartridge FC in the front-rear direction are formed.

**[0106]** When the flavor inhaler 1A is used, the cover body 50 is opened. Then, the prepared flavor generation source cartridge FC is attached to the set of planar heaters 81 disposed in the heating chamber 4. Specifically, as illustrated in Fig. 23, the set of planar heaters 81 are inserted into the set of heater insertion ports IP1 and IP2 formed on the front surface side of the flavor generation source cartridge FC. In the flavor generation source cartridge FC, a set of flavor generation sheets FS1 and S2 are disposed above and below the heater insertion port IP1, and a set of flavor generation sheets FS3 and S4 are disposed above and below the heater insertion port IP1. Thus, by attaching the flavor generation source cartridge FC to the set of planar heaters 81 as described above, the flavor generation source cartridge FC can be disposed in a state in which the flavor generation sheets FS1 to FS4 extend along the front and back heater surfaces of the planar heaters 81. In the flavor inhaler 1A according to the present embodiment, when the cover body 50 is in the open lid posture, not only the upper surface but also the front surface of the heating chamber 4 formed in the housing 2 can be largely opened to the outside. Accordingly, as illustrated in Fig. 23, it is possible to perform a work of inserting the planar heaters 81 into the heater insertion ports IP1 and IP2 while maintaining the relationship in which an extending direction of the heater insertion ports IP1 and IP2 of the flavor generation source cartridge FC are substantially parallel to an extending direction of the planar heaters 81. Accordingly, the attachment work of the flavor generation source cartridge FC to the planar heaters 81 installed in the heating chamber 4 becomes simple, and the convenience for the user becomes excellent.

**[0107]** When the flavor generation source cartridge FC is used by the flavor inhaler 1A, the holding member 90 of the flavor generation source cartridge FC is formed with a large number of ventilation flow paths CH1 and CH2 as described above, and the ventilation flow paths CH1 and CH2 extend in parallel to the chamber ventilation direction AF described above. Thus, the air taken in from the air intake port 6 of the housing 2 and the aerosol generated in the heating chamber 4 can smoothly flow toward the mouthpiece 3. The flavor generation source

cartridge FC that has been used by the flavor inhaler 1A can be taken out while the cover body 50 of the housing 2 is brought into the open lid posture, and can be discarded.

Reference Signs List

**[0108]**

| | |
|---|---|
| 1 | flavor inhaler |
| 2 | housing |
| 4 | heating chamber |
| 8 | heating unit |
| 60 | flavor generation source |
| 81 | planar heater |

## Claims

**1.** An electric-heating-type heating unit for a non-combustion-heating-type flavor inhaler, the heating unit being disposed in a heating chamber formed in a middle of a ventilation flow path of air flowing through an inside of a housing of the non-combustion-heating-type flavor inhaler from an air intake port provided in the housing toward a mouthpiece provided in the housing, the heating unit being configured to cause a flavor generation source to discharge an aerosol including a flavor component by non-combustion heating the flavor generation source when activated, the heating unit comprising:

one or more planar heaters whose both front and back surfaces are formed as heater surfaces and that allow a sheet-shaped or planar heated region portion constituting a portion or a whole of the flavor generation source to be disposed along each of the front and back heater surfaces,
wherein the planar heater includes a plurality of heating region portions formed on each of the front and back heater surfaces and configured to individually heat a specific section that is a portion of the heated region portion, and
wherein the plurality of heating region portions on each of the front and back heater surfaces extend in a flowing direction of air flowing through the heating chamber along with inhalation using the mouthpiece, and the heating region portions are arrayed on each of the heater surfaces at intervals in a direction orthogonal to an extending direction of the heating region portions.

**2.** The heating unit for the non-combustion-heating-type flavor inhaler according to claim 1, wherein the plurality of heating region portions are disposed in a same plane on each of the front and back heater surfaces.

**3.** The heating unit for the non-combustion-heating-type flavor inhaler according to claim 1 or 2, further comprising a thermal conductive sheet disposed on the heater surface.

**4.** The heating unit for the non-combustion-heating-type flavor inhaler according to any one of claims 1 to 3, wherein the planar heater is configured as a cartridge mountable to and removable from a heater mount provided in the heating chamber.

**5.** A non-combustion-heating-type flavor inhaler comprising:

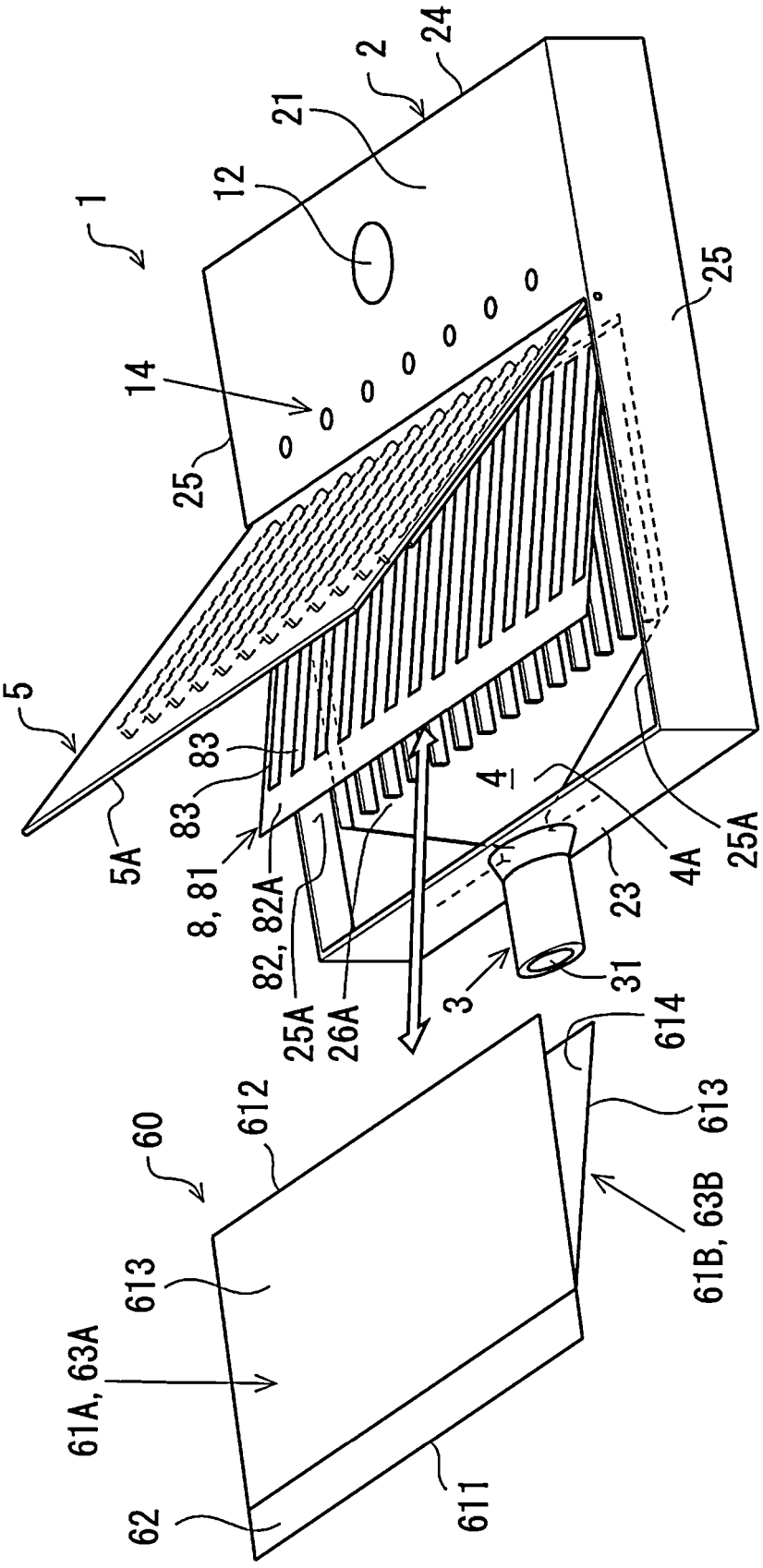
a housing provided with a mouthpiece and an air intake port;
a heating chamber formed in a middle of a ventilation flow path of air flowing through an inside of the housing from the air intake port toward the mouthpiece and being capable of accommodating a flavor generation source; and
the heating unit according to any one of claims 1 to 4, the heating unit being disposed in the heating chamber.

**6.** The non-combustion-heating-type flavor inhaler according to claim 5, further comprising sandwiching portions provided on an upper surface and a bottom surface of the heating chamber, the sandwiching portions being configured to sandwich a set of heated region portions disposed in an uppermost stage and a lowermost stage among a plurality of the heated region portions disposed in the heating chamber from above and below.

**7.** The non-combustion-heating-type flavor inhaler according to claim 6, wherein the sandwiching portions at least partially include a high resilient portion formed of a high resilient material.

**8.** A flavor generation source that is attached to the planar heater of the heating unit according to any one of claims 1 to 4, the flavor generation source comprising:
a sheet-shaped or planar heated region portion that can be disposed along each of the heater surfaces formed on the front and back surfaces of the planar heater.

FIG. 1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612
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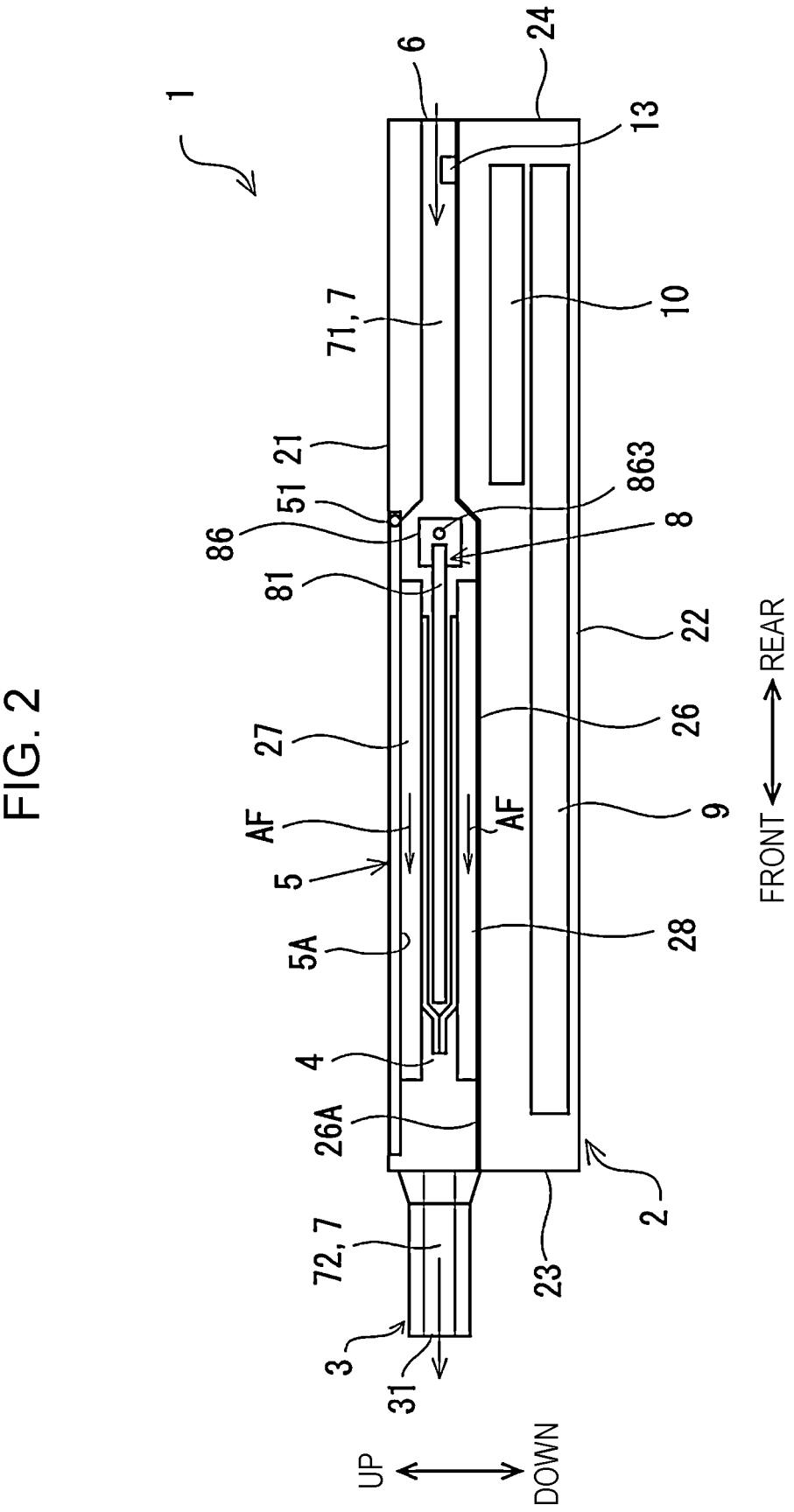
62
611
61B, 63B

FIG. 2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27
26
AF
AF
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5A
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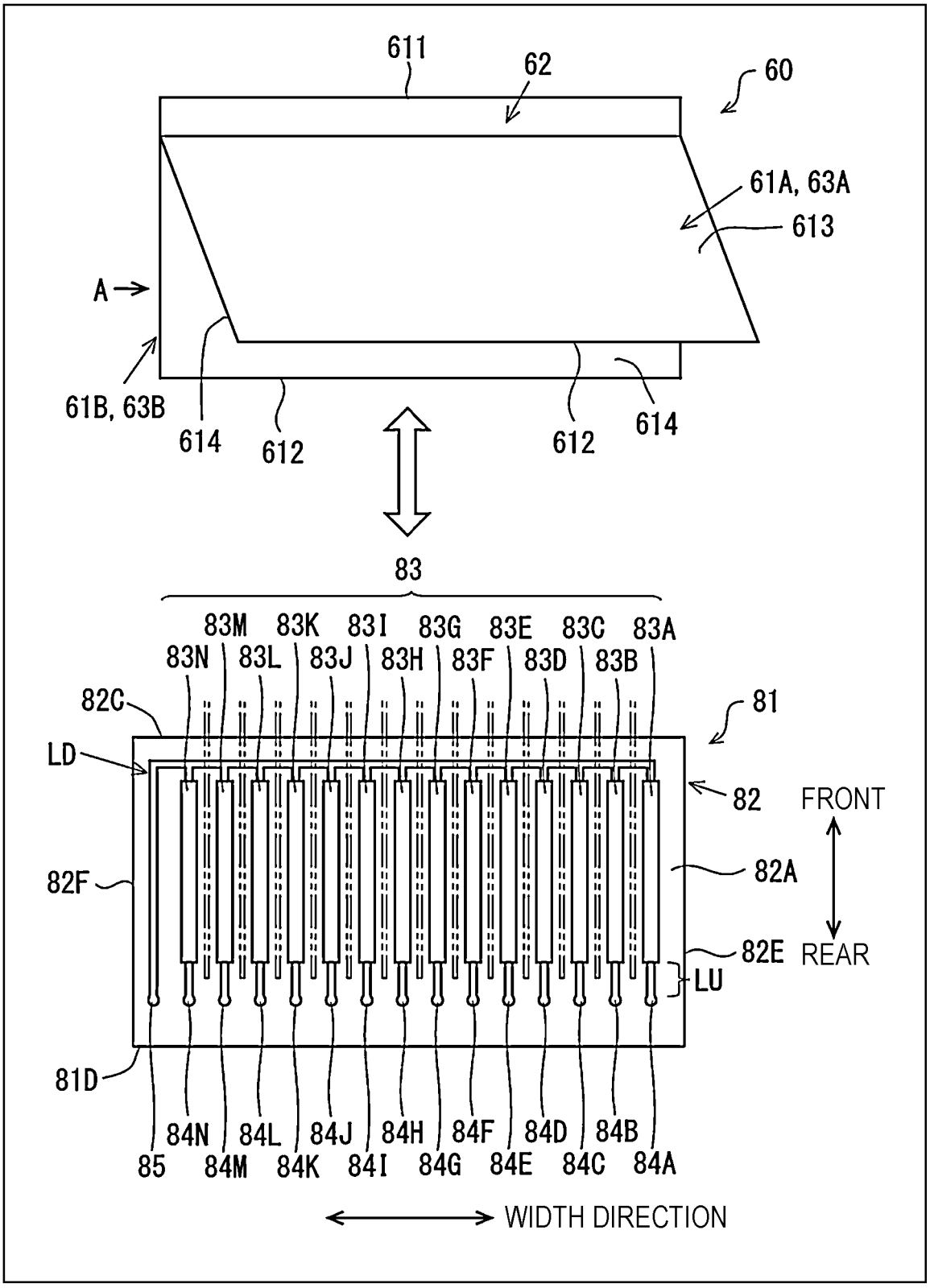
4
26A
72, 7
23
2
3
31
UP
DOWN
FRONT
REAR

FIG. 3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83C
83A
83N
83L
83J
83H
83F
83D
83B
82C
81
LD
82
FRONT
82F
82A
82E
REAR
LU
81D
84N
84L
84J
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84M
84K
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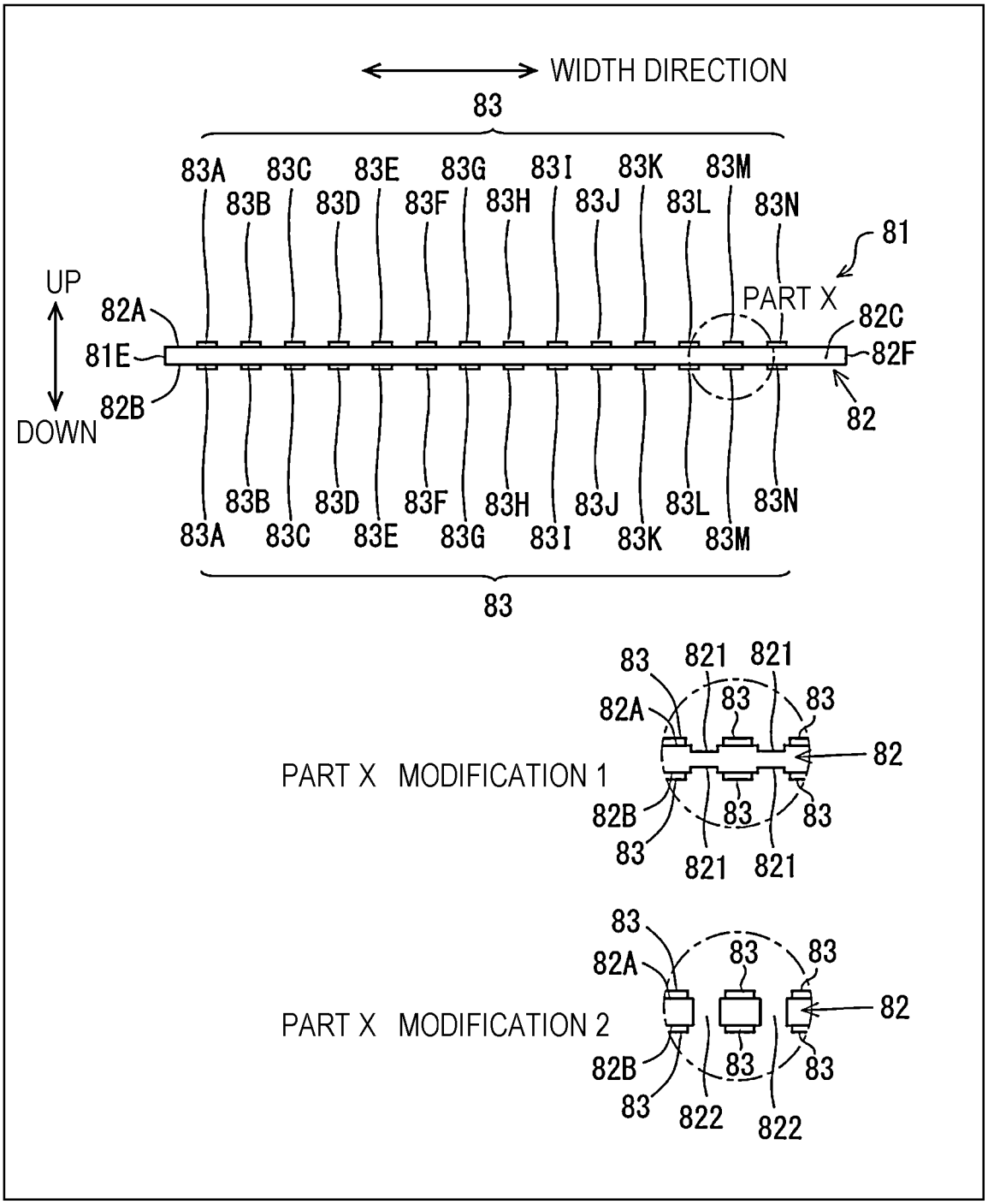
84C
84A
WIDTH DIRECTION

FIG. 4


WIDTH DIRECTION
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83F
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83L
83N
81
PART X
UP
DOWN
82A
81E
82B
82C
82F
82
PART X MODIFICATION 1
821
PART X MODIFICATION 2
822

FIG. 5

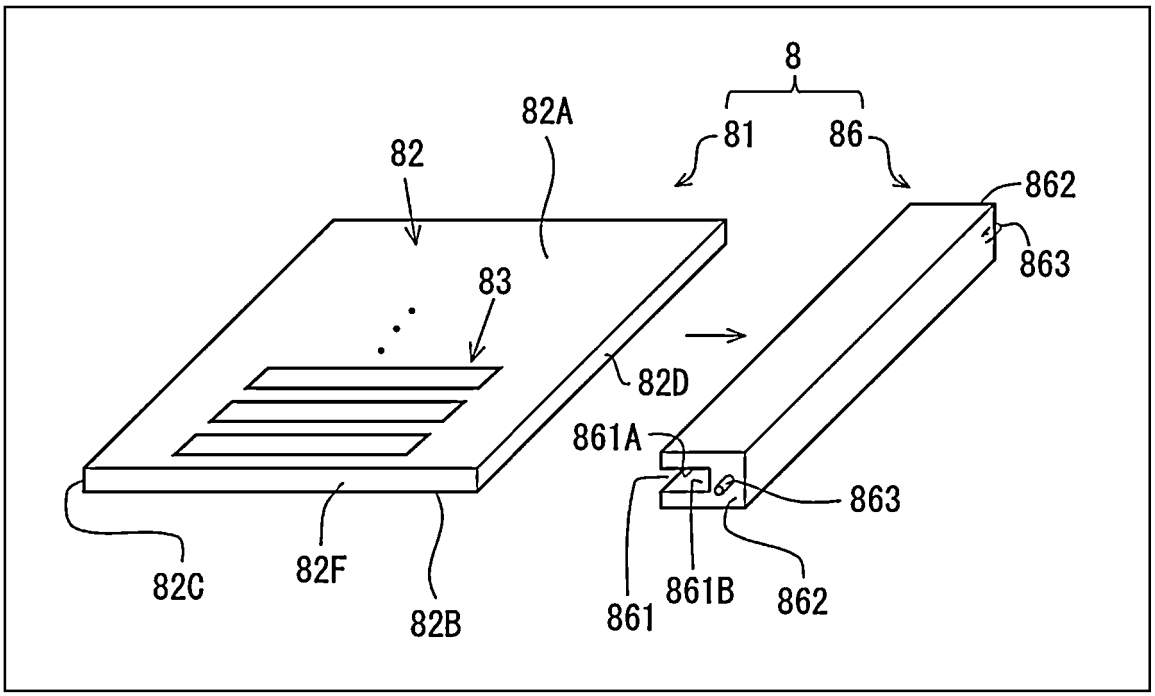

8
82A
81
86
82
862
863
83
82D
861A
863
82C
82F
82B
861
861B
862

FIG. 6

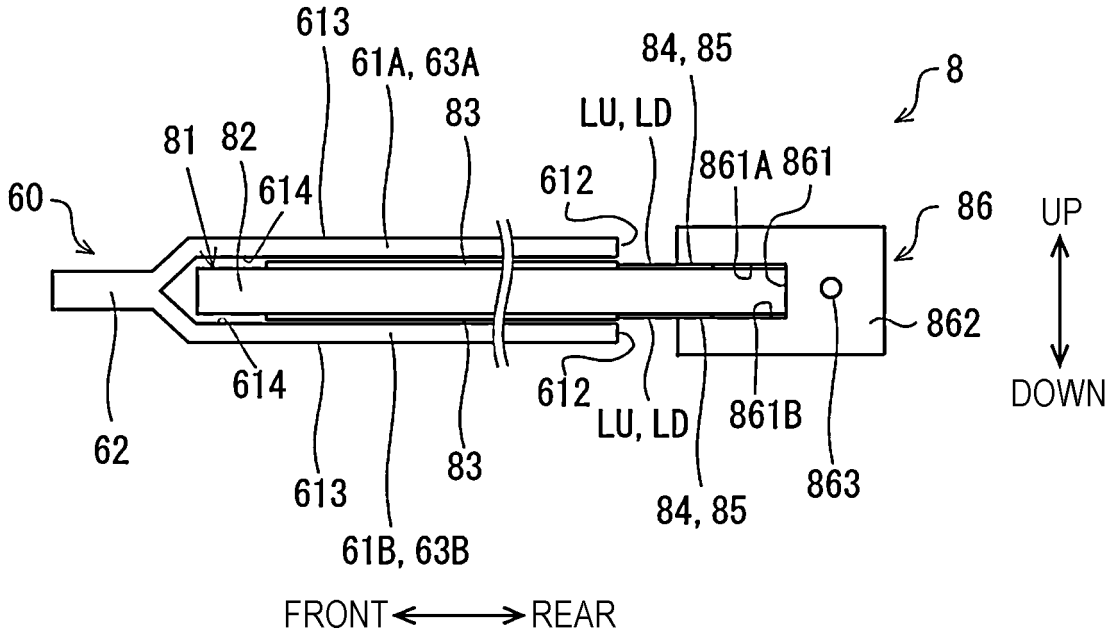

613
61A, 63A
84, 85
8
83
LU, LD
81
82
861A
861
60
614
612
86
UP
862
614
612
LU, LD
861B
62
613
83
863
84, 85
61B, 63B
DOWN
FRONT
REAR

FIG. 7

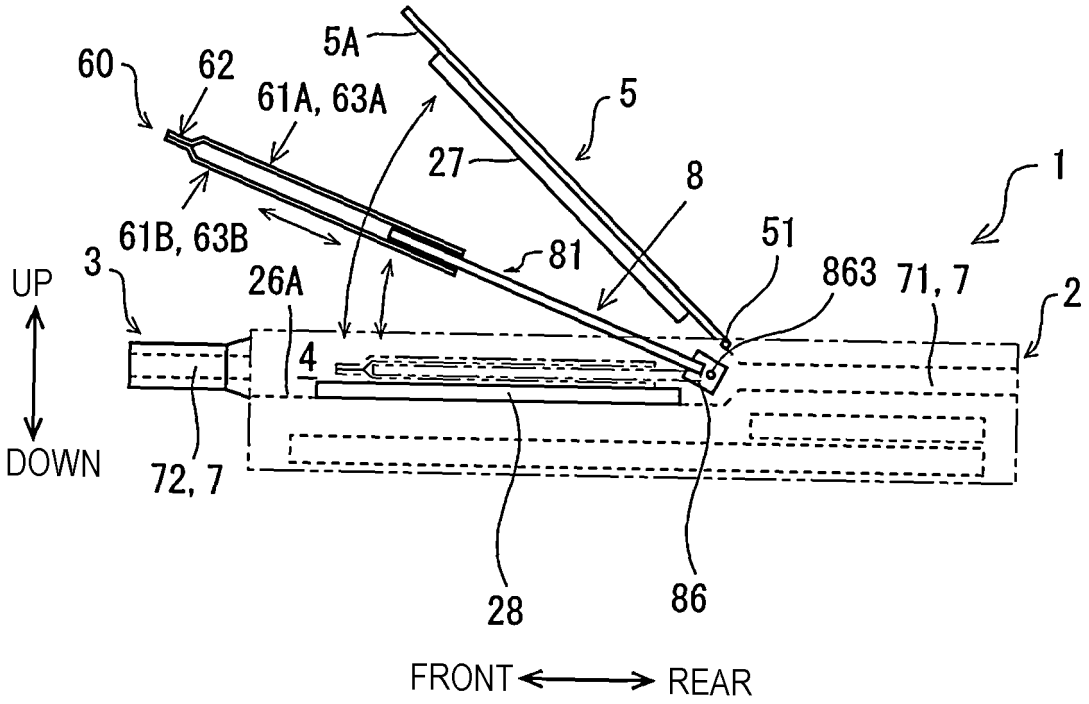

5A
60
62
61A, 63A
5
27
8
1
61B, 63B
81
51
863
71, 7
2
UP
3
26A
4
DOWN
72, 7
28
86
FRONT
REAR

FIG. 8

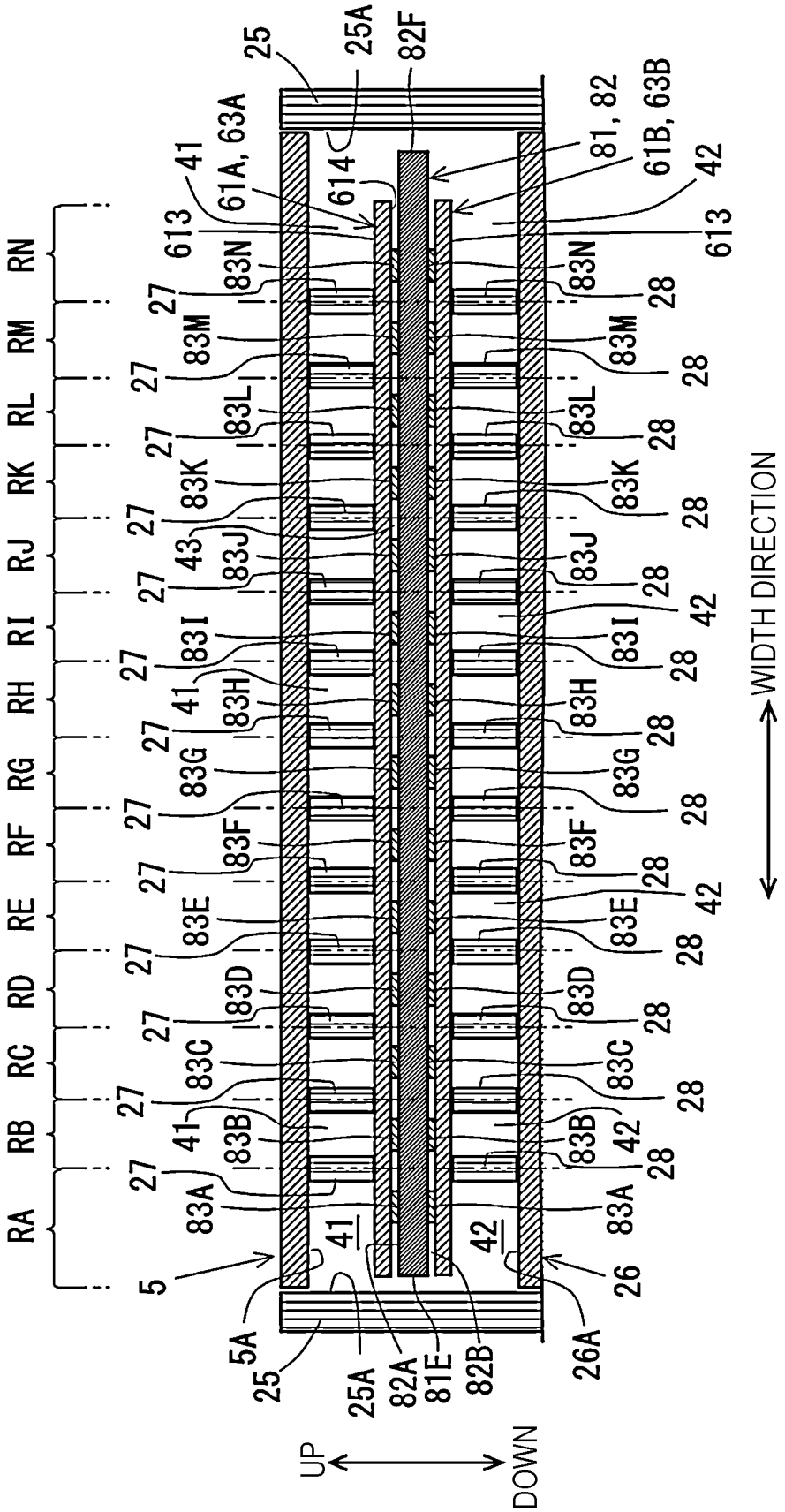

RA
RB
RC
RD
RE
RF
RG
RH
RI
RJ
RK
RL
RM
RN
WIDTH DIRECTION
UP
DOWN
25
25A
82F
61A, 63A
41
614
613
81, 82
61B, 63B
42
83N
83M
83L
83K
83J
83I
83H
83G
83F
83E
83D
83C
83B
83A
27
28
43
5
5A
26
26A
82A
81E
82B

FIG. 9

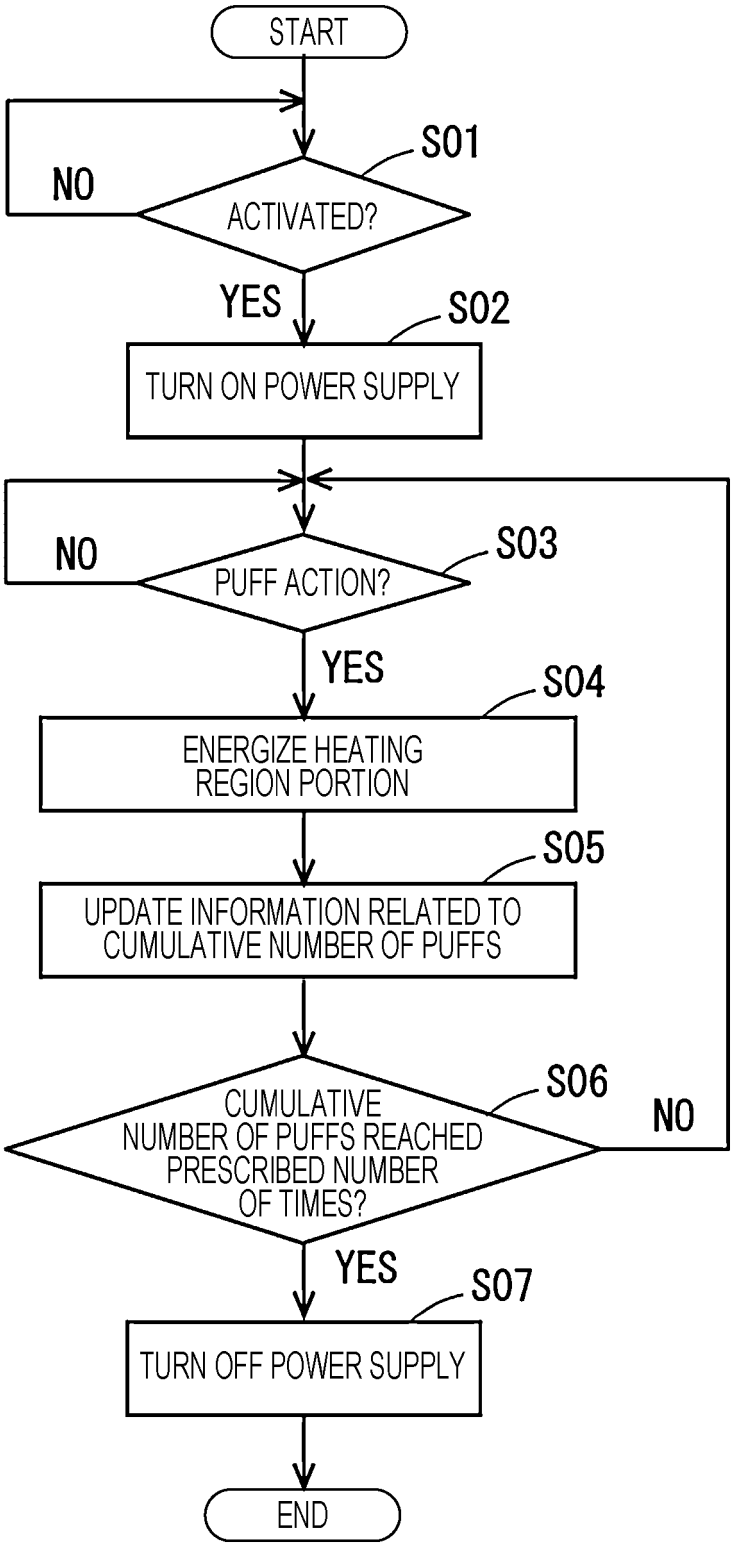

START
S01
NO
ACTIVATED?
YES
S02
TURN ON POWER SUPPLY
NO
S03
PUFF ACTION?
YES
S04
ENERGIZE HEATING REGION PORTION
S05
UPDATE INFORMATION RELATED TO CUMULATIVE NUMBER OF PUFFS
S06
CUMULATIVE NUMBER OF PUFFS REACHED PRESCRIBED NUMBER OF TIMES?
NO
YES
S07
TURN OFF POWER SUPPLY
END

FIG. 10

| CUMULATIVE NUMBER OF PUFFS | 1 | 2 | 3 | ··· | 13 | 14 |
|---|---|---|---|---|---|---|
| ENERGIZATION TARGET (FIRST HEATER SURFACE) | 83A | 83B | 83C | ··· | 83M | 83N |
| ENERGIZATION TARGET (SECOND HEATER SURFACE) | 83A | 83B | 83C | ··· | 83M | 83N |

FIG. 11

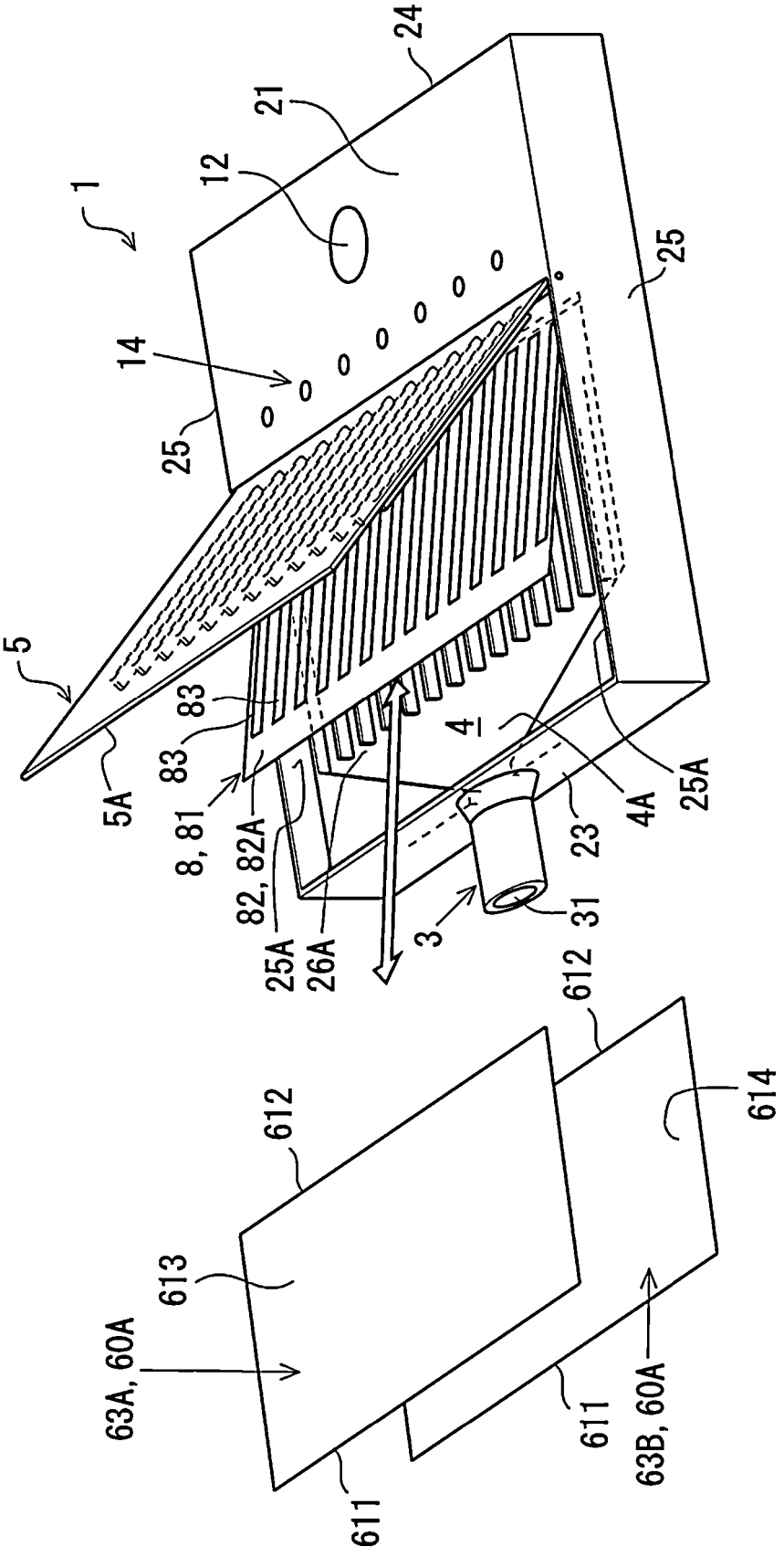

1
5
5A
8, 81
82, 82A
83
83
14
12
21
24
25
25
25A
4
4A
23
31
3
25A
26A
612
612
614
613
63A, 60A
611
611
63B, 60A

FIG. 12

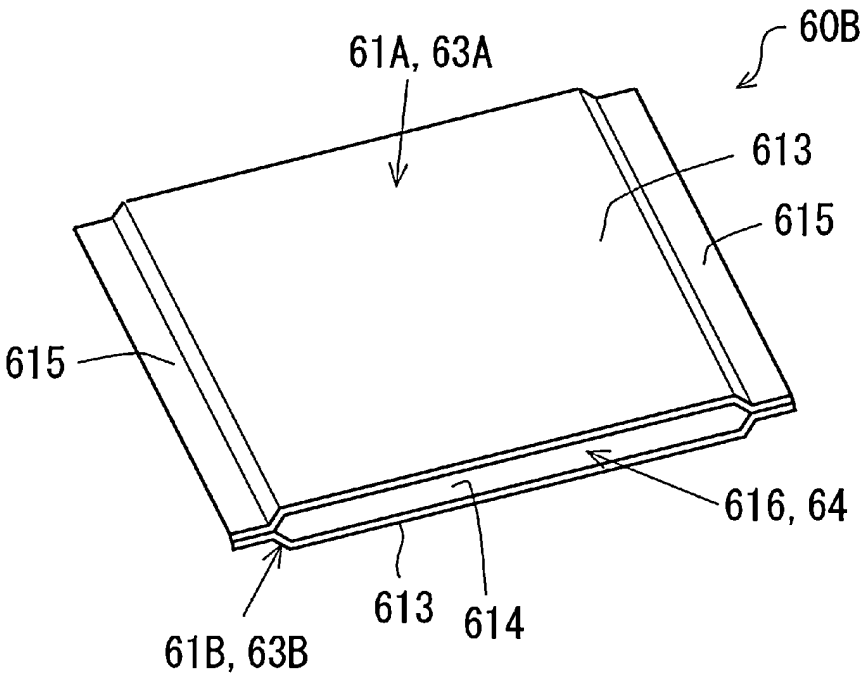

60B
61A, 63A
613
615
615
616, 64
613
614
61B, 63B

FIG. 13

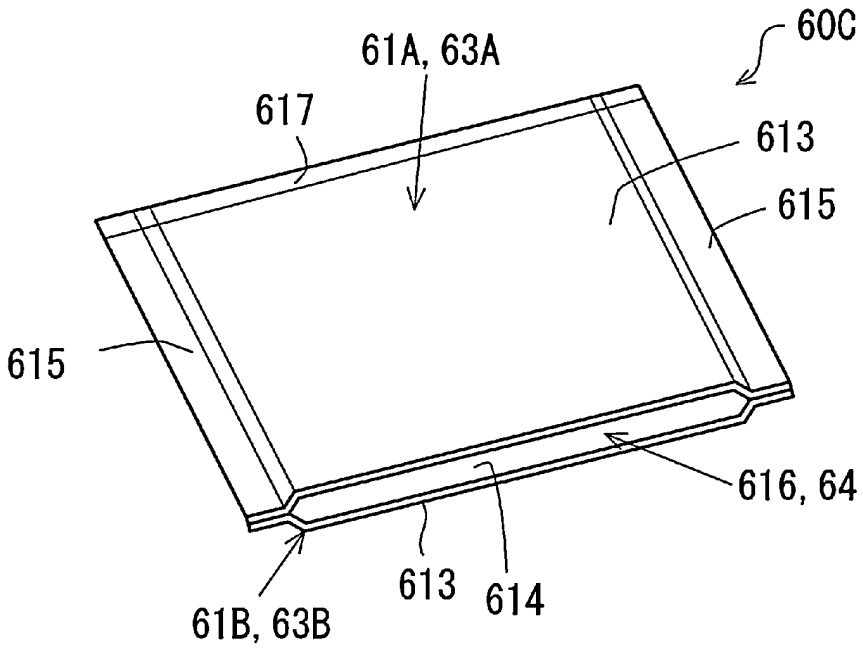

60C
61A, 63A
617
613
615
615
616, 64
613
614
61B, 63B

FIG. 14

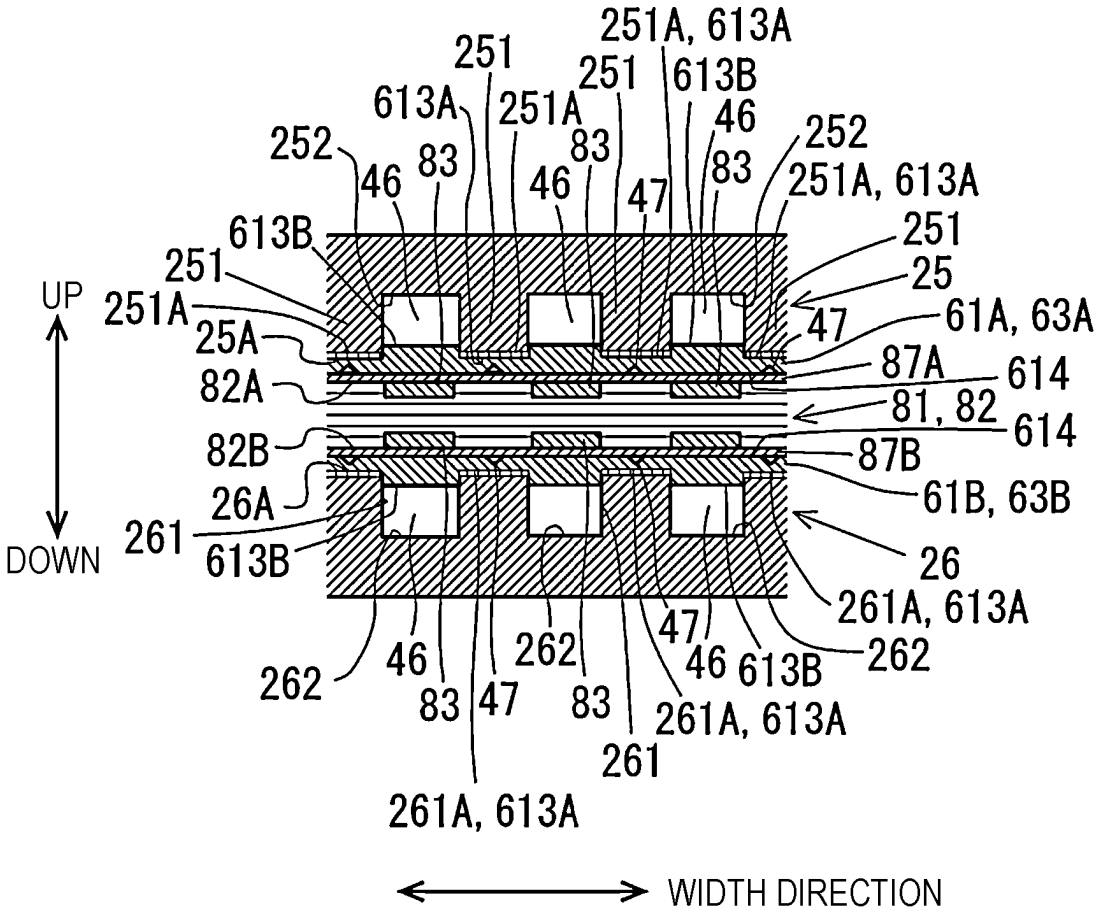

251A, 613A
251
251
613B
613A
251A
46
252
252
46
83
83
46
47
83
251A, 613A
613B
251
251
25
UP
251A
47
61A, 63A
25A
87A
614
82A
81, 82
614
82B
87B
26A
61B, 63B
261
613B
26
DOWN
261A, 613A
47
262
46
262
46
613B
262
83
47
83
261A, 613A
261
261A, 613A
WIDTH DIRECTION

FIG. 15

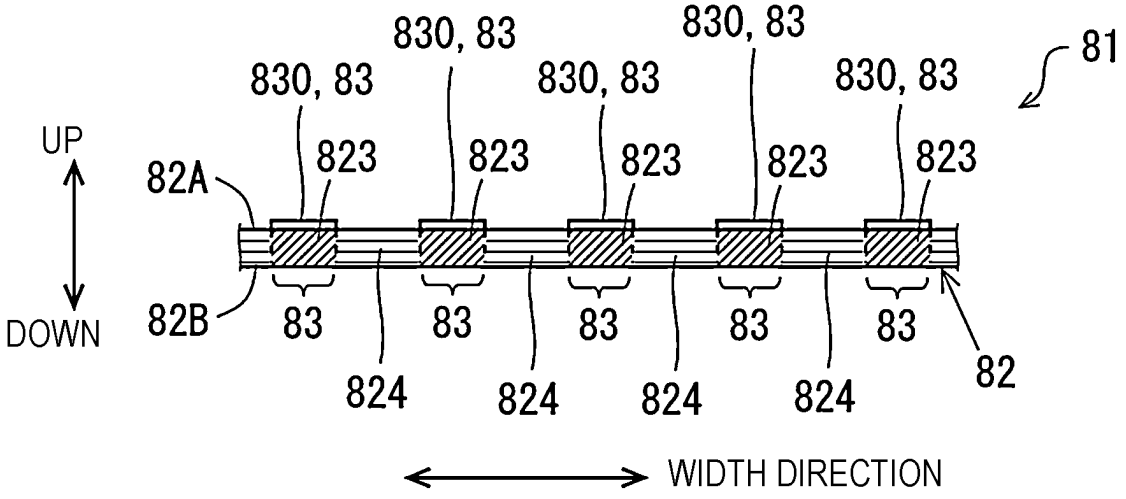

830, 83
830, 83
830, 83
830, 83
81
830, 83
UP
823
823
823
823
823
82A
82B
83
83
83
83
83
824
824
824
824
82
WIDTH DIRECTION

FIG. 16

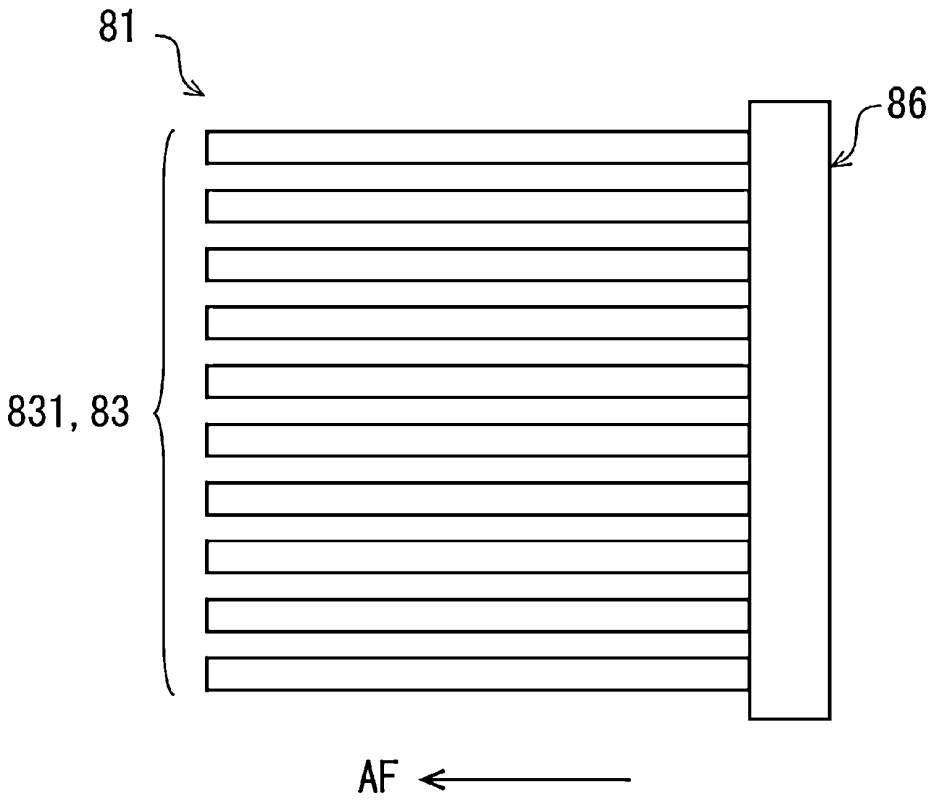



FIG. 17

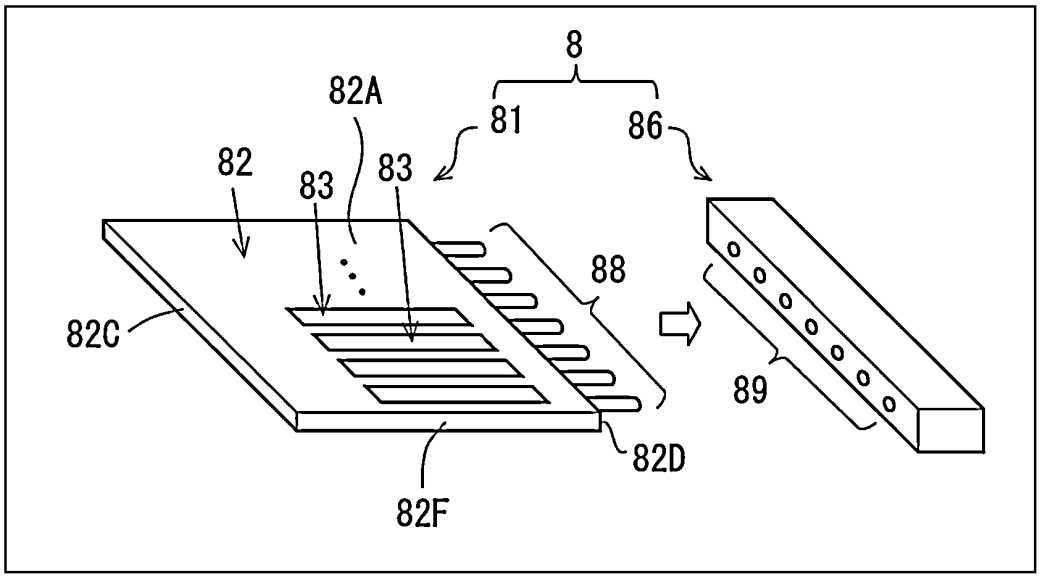


FIG. 18

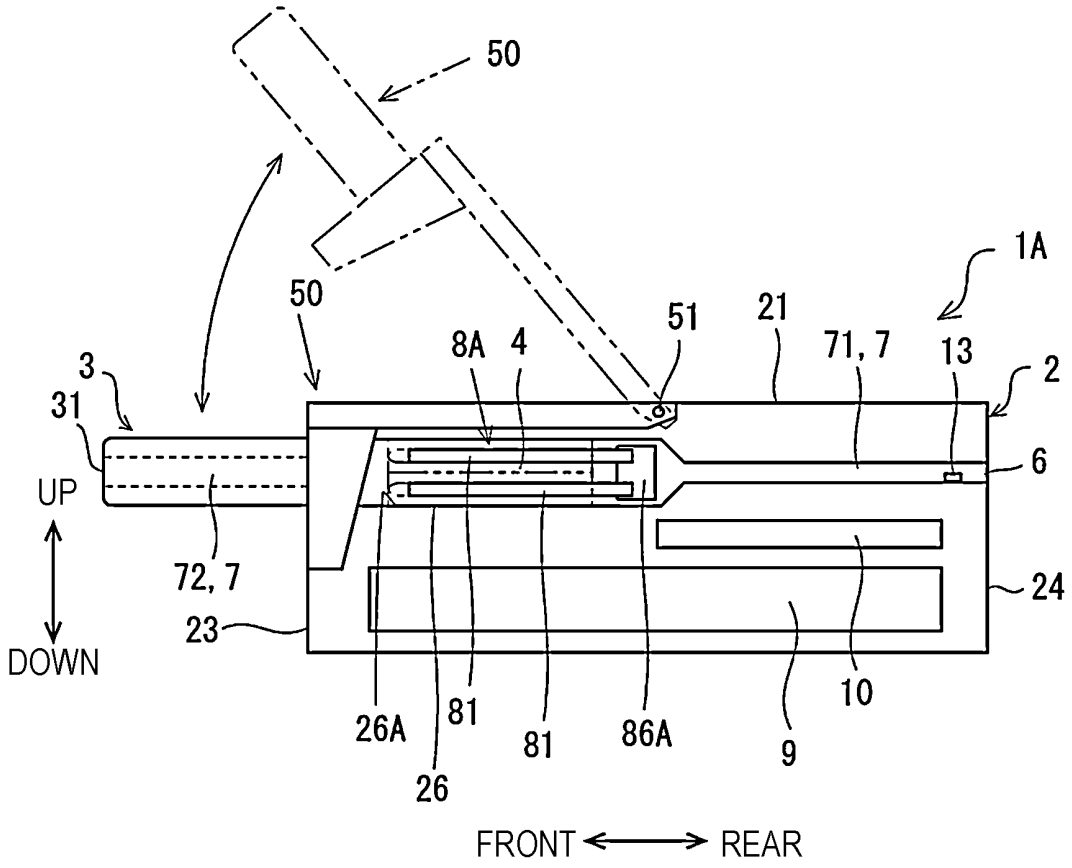

50
50
1A
51
21
8A
4
71, 7
13
2
3
31
6
UP
72, 7
24
23
DOWN
10
26A
81
81
86A
9
26
FRONT
REAR

FIG. 19

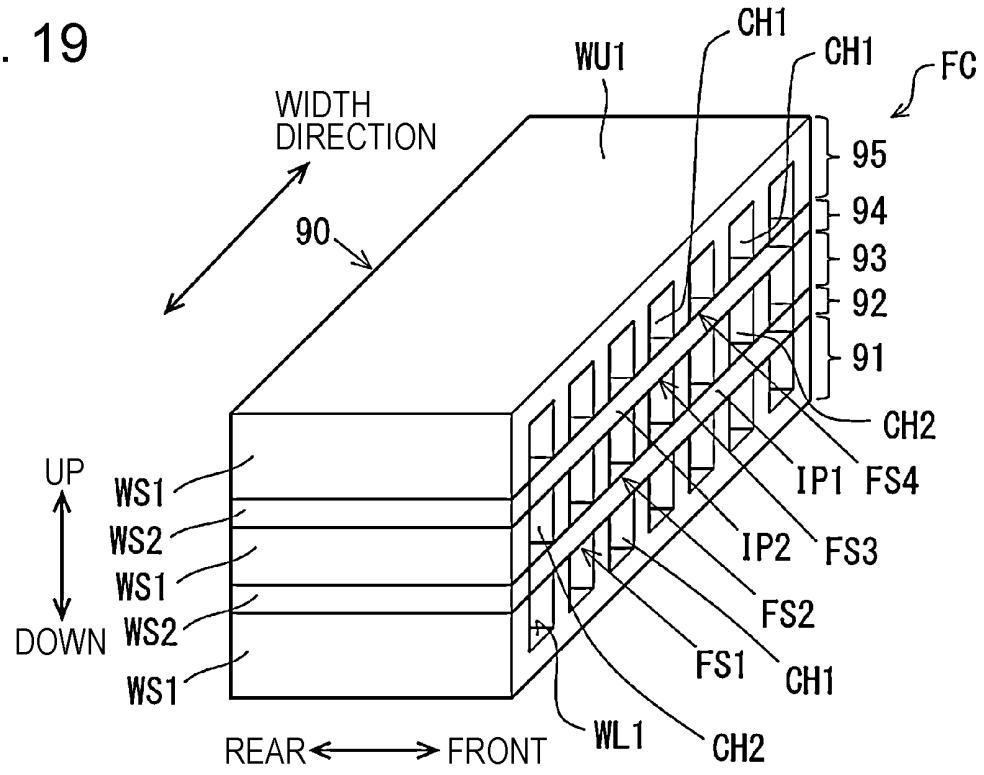

CH1
WU1
CH1
FC
WIDTH DIRECTION
95
90
94
93
92
91
CH2
UP
WS1
IP1
FS4
WS2
IP2
FS3
WS1
FS2
DOWN
WS2
FS1
CH1
WS1
WL1
CH2
REAR
FRONT

FIG. 20

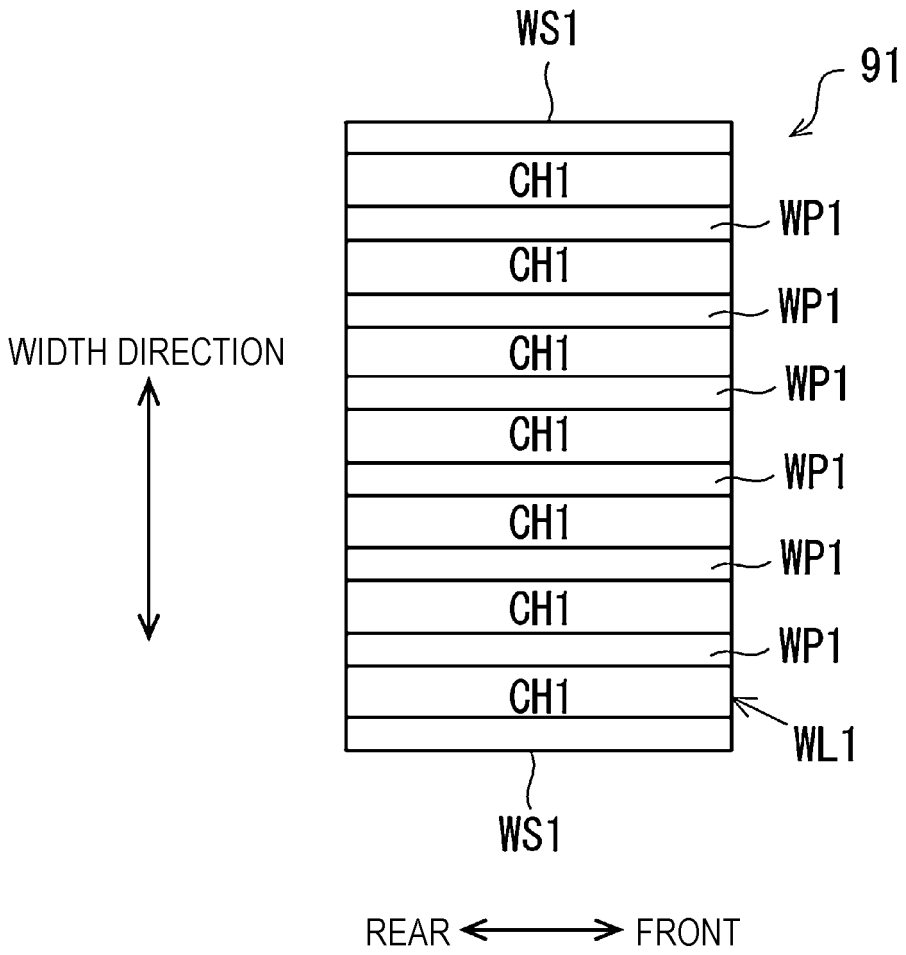

WS1
91
CH1
WP1
CH1
WP1
CH1
WP1
CH1
WP1
CH1
WP1
CH1
WP1
CH1
WL1
WS1
WIDTH DIRECTION
REAR
FRONT

FIG. 21

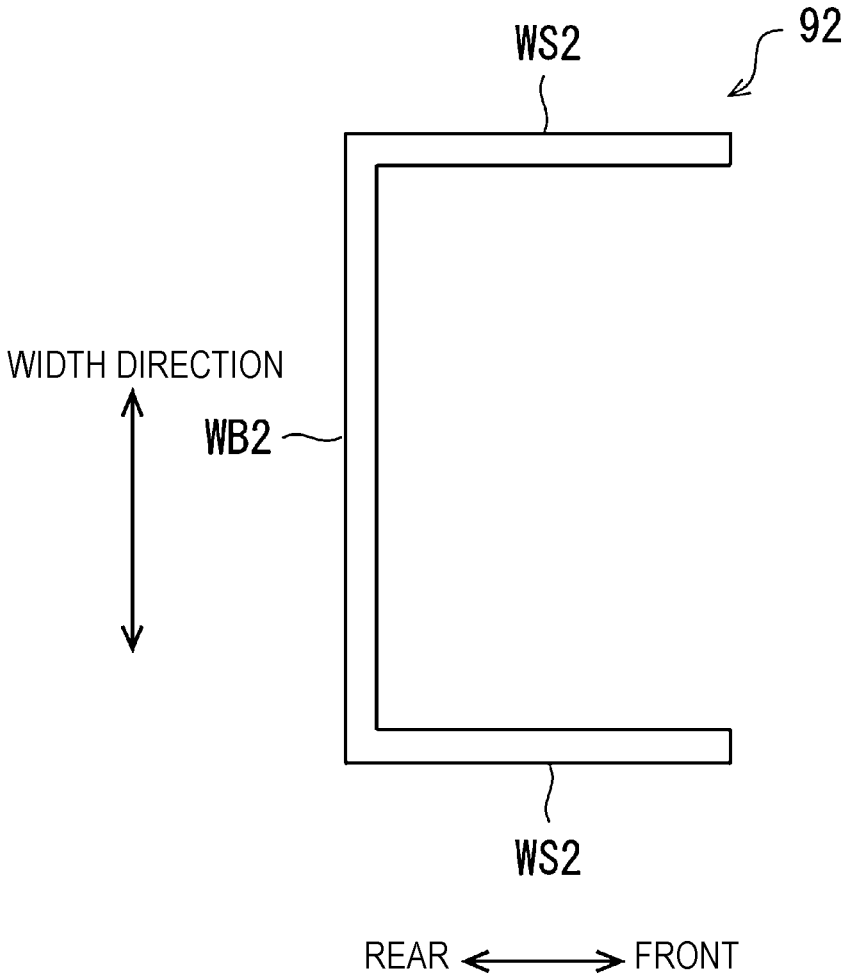


FIG. 22

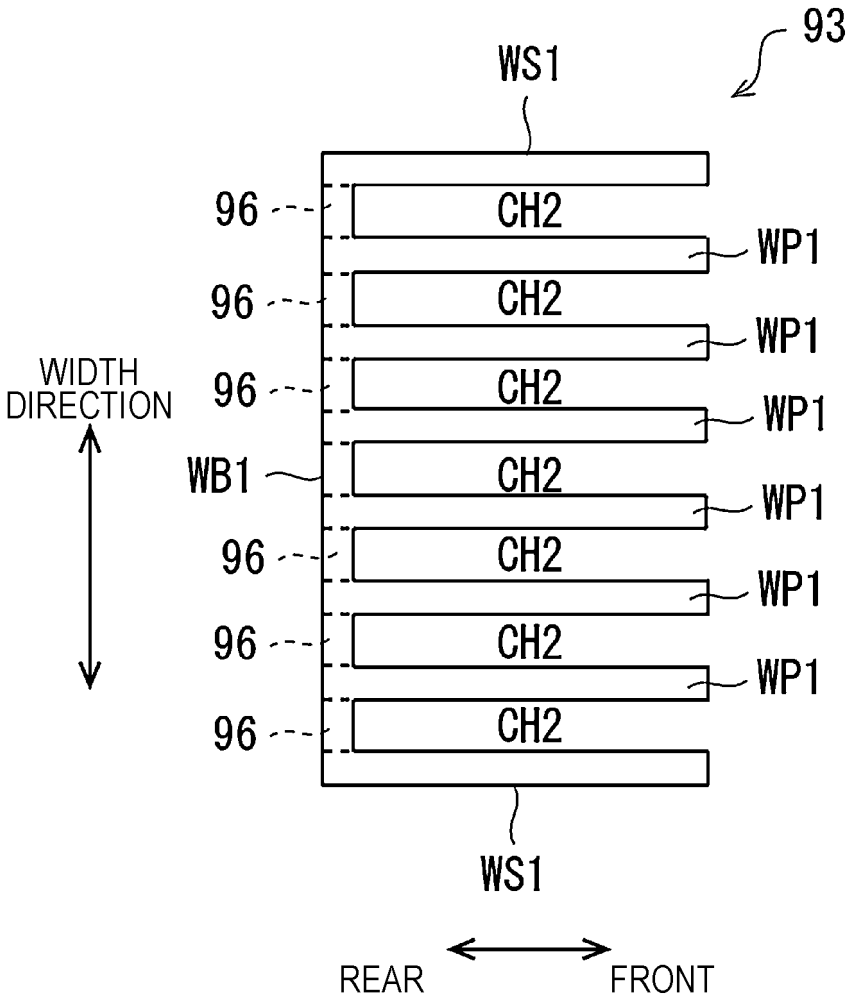
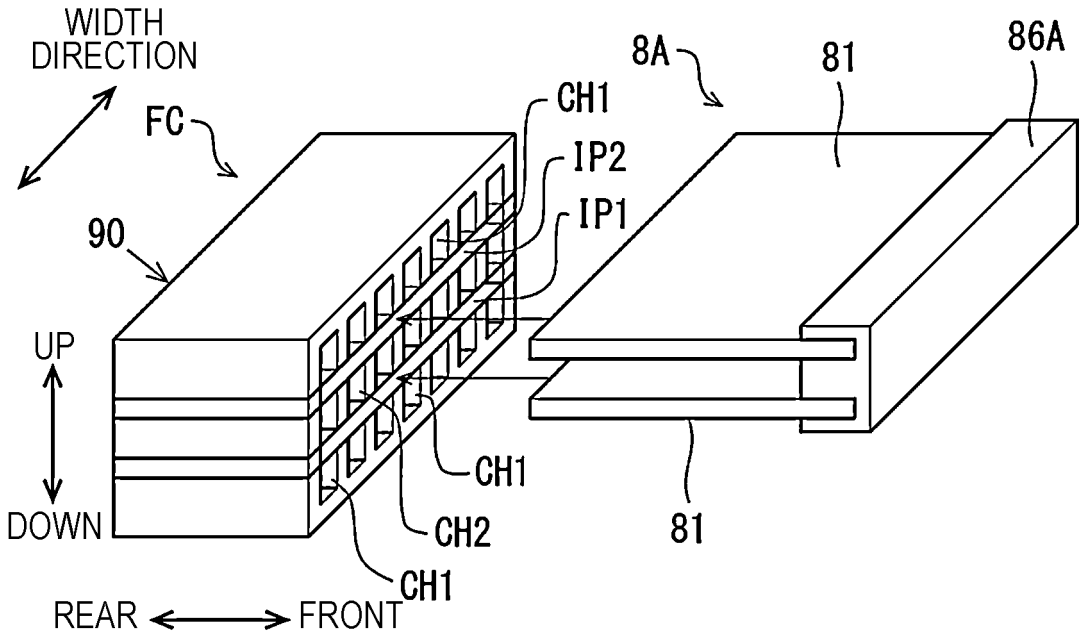


FIG. 23


WIDTH DIRECTION
FC
90
UP
DOWN
REAR
FRONT
CH1
IP2
IP1
CH1
CH2
CH1
8A
81
86A
81

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2021/005933

A. CLASSIFICATION OF SUBJECT MATTER
A24F 40/20(2020.01)i; A24F 40/46(2020.01)i
FI: A24F40/46; A24F40/20
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A24F40/20; A24F40/46

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. |
|---|---|---|
| Y<br>X<br>A | WO 2018/235959 A1 (JAPAN TOBACCO INC) 27 December 2018 (2018-12-27) paragraphs [0009]-[0041], fig. 1-4 | 1-5<br>8<br>6-7 |
| Y | JP 2017-520263 A (PHILIP MORRIS PRODUCTS S.A) 27 July 2017 (2017-07-27) paragraphs [0079]-[0104], fig. 1A-4B | 1-5 |
| Y | JP 8-511176 A (PHILIP MORRIS PRODUCTS INC) 26 November 1996 (1996-11-26) specification, page 37, line 12 to page 38, line 16, fig. 8 | 1-5 |
| A | JP 2015-532828 A (R.J. REYNOLDS TOBACCO COMPANY) 16 November 2015 (2015-11-16) entire text, all drawings | 1-8 |

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

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"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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| | |
|---|---|
| Date of the actual completion of the international search<br>25 March 2021 (25.03.2021) | Date of mailing of the international search report<br>13 April 2021 (13.04.2021) |
| Name and mailing address of the ISA/<br>Japan Patent Office<br>3-4-3, Kasumigaseki, Chiyoda-ku,<br>Tokyo 100-8915, Japan | Authorized officer<br><br>Telephone No. |

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**INTERNATIONAL SEARCH REPORT**
Information on patent family members

International application No.
PCT/JP2021/005933

| Patent Documents referred in the Report | Publication Date | Patent Family | Publication Date |
|---|---|---|---|
| WO 2018/235959 A1 | 27 Dec. 2018 | US 2020/0120981 A1<br>paragraphs [0049]-[0098], fig. 1-4<br>EP 3643190 A1<br>KR 10-2020-0007938 A<br>CN 110799048 A | |
| JP 2017-520263 A | 27 Jul. 2017 | US 2017/0164657 A1<br>paragraphs [0084]-[0109], fig. 1A-4B<br>KR 10-2017-0020782 A<br>CN 106659247 A | |
| JP 8-511176 A | 26 Nov. 1996 | US 5665262 A<br>specification, column 18, line 47 to column 19, line 24 | |
| JP 015-532828 A | 16 Nov. 2015 | US 2014/0060554 A1<br>KR 10-2015-0047616 A<br>CN 104768407 A | |

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## REFERENCES CITED IN THE DESCRIPTION

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### Patent documents cited in the description


- JP 2019501634 W **[0004]**
- WO 2018235956 A **[0004]**
- JP 5808490 B **[0004]**