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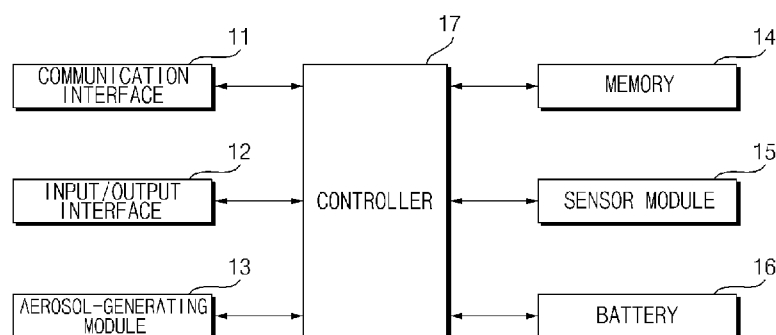
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(54) Title: AEROSOL GENERATING DEVICE AND SYSTEM INCLUDING THE SAME

10



(57) Abstract: An aerosol-generating device and a system including the same are disclosed. The aerosol-generating device of the disclosure includes an insertion space, a heater for heating a stick, a stick detection sensor, a display, and a controller. The stick detection sensor includes a first inductance channel and a second inductance channel disposed so as to respectively correspond to a first region and a second region of the insertion space. The controller determines the type of stick based on at least one of a signal corresponding to the first inductance channel or a signal corresponding to the second inductance channel. When the determined type of stick is the same as a predetermined type, the controller supplies power to the heater, and when the determined type of stick is different from the predetermined type, the controller outputs a screen corresponding to the determined type of stick on the display.



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Description

Title of Invention: AEROSOL GENERATING DEVICE AND SYSTEM INCLUDING THE SAME

Technical Field

- [1] The present disclosure relates to an aerosol-generating device and a system including the same.

Background Art

- [2] An aerosol-generating device is a device that extracts certain components from a medium or a substance by forming an aerosol. The medium may contain a multi-component substance. The substance contained in the medium may be a multi-component flavoring substance. For example, the substance contained in the medium may include a nicotine component, an herbal component, and/or a coffee component. Recently, various research on aerosol-generating devices has been conducted.

Disclosure of Invention

Technical Problem

- [3] It is an object of the present disclosure to solve the above and other problems.
- [4] It is another object of the present disclosure to provide an aerosol-generating device and a system including the same capable of distinguishing the type of stick inserted into an insertion space.
- [5] It is still another object of the present disclosure to provide an aerosol-generating device and a system including the same capable of providing information about the type of stick inserted into an insertion space to a user.
- [6] It is still another object of the present disclosure to provide an aerosol-generating device and a system including the same capable of notifying a user that a stick that is of a different type than a previously used stick is inserted.
- [7] It is still another object of the present disclosure to provide an aerosol-generating device and a system including the same capable of determining whether to heat a heater depending on the type of stick inserted into an insertion space.

Solution to Problem

- [8] An aerosol-generating device according to an aspect of the present disclosure for accomplishing the above and other objects may include a housing having an insertion space defined therein, a heater configured to heat a stick inserted into the insertion space, a stick detection sensor configured to output a signal corresponding to the insertion space, a display, and a controller. The sensor may include a first inductance channel disposed so as to correspond to a first region of the insertion space and a second inductance channel disposed so as to correspond to a second region of the

insertion space. The controller may determine the type of stick inserted into the insertion space based on at least one of a signal corresponding to the first inductance channel or a signal corresponding to the second inductance channel. When the determined type of stick is the same as a predetermined type, the controller may supply power to the heater, and when the determined type of stick is different from the predetermined type, the controller may output a screen corresponding to the determined type of stick on the display.

- [9] A system according to an aspect of the present disclosure for accomplishing the above and other objects may include an aerosol-generating device and a stick. The aerosol-generating device may include a housing having an insertion space defined therein, a heater configured to heat the stick inserted into the insertion space, a stick detection sensor configured to output a signal corresponding to the insertion space, a display, and a controller. The stick detection sensor may include a first inductance channel disposed so as to correspond to a first region of the insertion space and a second inductance channel disposed so as to correspond to a second region of the insertion space. The controller may determine the type of stick inserted into the insertion space based on at least one of a signal corresponding to the first inductance channel or a signal corresponding to the second inductance channel. When the determined type of stick is the same as a predetermined type, the controller may supply power to the heater, and when the determined type of stick is different from the predetermined type, the controller may output a screen corresponding to the determined type of stick on the display. The stick may include a wrapper configured to wrap an aerosol-generating substance, and the wrapper may include a first partial wrapper formed to have a first thickness so as to correspond to the first region and a second partial wrapper formed to have a second thickness so as to correspond to the second region.

Advantageous Effects of Invention

- [10] According to at least one of embodiments of the present disclosure, it may be possible to distinguish the type of stick inserted into an insertion space.
- [11] According to at least one of embodiments of the present disclosure, it may be possible to provide information about the type of stick inserted into an insertion space to a user.
- [12] According to at least one of embodiments of the present disclosure, it may be possible to notify a user that a stick that is of a different type than a previously used stick is inserted.
- [13] According to at least one of embodiments of the present disclosure, it may be possible to determine whether to heat a heater depending on the type of stick inserted into an insertion space.

- [14] Additional applications of the present disclosure will become apparent from the following detailed description. However, because various changes and modifications will be clearly understood by those skilled in the art within the spirit and scope of the present disclosure, it should be understood that the detailed description and specific embodiments, such as preferred embodiments of the present disclosure, are merely given by way of example.

Brief Description of Drawings

- [15] The above and other objects, features and other advantages of the present disclosure will be more clearly understood from the following detailed description taken in conjunction with the accompanying drawings, in which:
- [16] FIG. 1 is a block diagram of an aerosol-generating device according to an embodiment of the present disclosure;
- [17] FIGS. 2 to 4 are views for explaining an aerosol-generating device according to embodiments of the present disclosure;
- [18] FIGS. 5 and 6 are views for explaining a stick according to embodiments of the present disclosure;
- [19] FIGS. 7 to 10 are diagrams for explaining the configuration of the aerosol-generating device according to an embodiment of the present disclosure;
- [20] FIG. 10 is a view for explaining disposition of a plurality of inductance channels according to an embodiment of the present disclosure.
- [21] FIG. 11 is a graph indicating change in the frequency of a current corresponding to insertion of a stick according to an embodiment of the present disclosure.
- [22] FIG. 12 is a view for explaining the type of stick according to an embodiment of the present disclosure.
- [23] FIGs. 13 and 14 are flowcharts showing an operation method of an aerosol-generating device according to an embodiment of the present disclosure.
- [24] FIGs. 15 and 16 are views for explaining operation of an aerosol-generating device according to an embodiment of the present disclosure.

Best Mode for Carrying out the Invention

- [25] Hereinafter, the embodiments disclosed in the present specification will be described in detail with reference to the accompanying drawings. The same or similar elements are denoted by the same reference numerals even though they are depicted in different drawings, and redundant descriptions thereof will be omitted.
- [26] In the following description, with respect to constituent elements used in the following description, the suffixes "module" and "unit" are used only in consideration of facilitation of description. The "module" and "unit" are do not have mutually distinguished meanings or functions.

- [27] In addition, in the following description of the embodiments disclosed in the present specification, a detailed description of known functions and configurations incorporated herein will be omitted when the same may make the subject matter of the embodiments disclosed in the present specification rather unclear. In addition, the accompanying drawings are provided only for a better understanding of the embodiments disclosed in the present specification and are not intended to limit the technical ideas disclosed in the present specification. Therefore, it should be understood that the accompanying drawings include all modifications, equivalents, and substitutions within the scope and spirit of the present disclosure.
- [28] It will be understood that the terms "first", "second", etc., may be used herein to describe various components. However, these components should not be limited by these terms. These terms are only used to distinguish one component from another component.
- [29] It will be understood that when a component is referred to as being "connected to" or "coupled to" another component, it may be directly connected to or coupled to another component. However, it will be understood that intervening components may be present. On the other hand, when a component is referred to as being "directly connected to" or "directly coupled to" another component, there are no intervening components present.
- [30] As used herein, the singular form is intended to include the plural forms as well, unless the context clearly indicates otherwise.
- [31] FIG. 1 is a block diagram of an aerosol-generating device according to an embodiment of the present disclosure.
- [32] Referring to FIG. 1, an aerosol-generating device 10 may include a communication interface 11, an input/output interface 12, an aerosol-generating module 13, a memory 14, a sensor module 15, a battery 16, and/or a controller 17.
- [33] In one embodiment, the aerosol-generating device 10 may be composed only of a main body. In this case, components included in the aerosol-generating device 10 may be located in the main body. In another embodiment, the aerosol-generating device 10 may be composed of a cartridge, which contains an aerosol-generating substance, and a main body. In this case, the components included in the aerosol-generating device 10 may be located in at least one of the main body or the cartridge.
- [34] The communication interface 11 may include at least one communication module for communication with an external device and/or a network. For example, the communication interface 11 may include a communication module for wired communication, such as a Universal Serial Bus (USB). For example, the communication interface 11 may include a communication module for wireless communication, such as Wireless Fidelity (Wi-Fi), Bluetooth, Bluetooth Low Energy (BLE), ZigBee, or nearfield com-

munication (NFC).

- [35] The input/output interface 12 may include an input interface (not shown) for receiving a command from a user and/or an output interface (not shown) for outputting information to the user. For example, the input interface may include a touch panel, a physical button, a microphone, or the like. For example, the output interface may include a display device for outputting visual information, such as a display or a light-emitting diode (LED), an audio device for outputting auditory information, such as a speaker or a buzzer, a motor for outputting tactile information such as haptic effect, or the like.
- [36] The input/output interface 12 may transmit data corresponding to a command input by the user through the input interface to another component (or other components) of the aerosol-generating device 100. The input/output interface 12 may output information corresponding to data received from another component (or other components) of the aerosol-generating device 10 through the output interface.
- [37] The aerosol-generating module 13 may generate an aerosol from an aerosol-generating substance. Here, the aerosol-generating substance may be a substance in a liquid state, a solid state, or a gel state, which is capable of generating an aerosol, or a combination of two or more aerosol-generating substances.
- [38] According to an embodiment, the liquid aerosol-generating substance may be a liquid including a tobacco-containing material having a volatile tobacco flavor component. According to another embodiment, the liquid aerosol-generating substance may be a liquid including a non-tobacco material. For example, the liquid aerosol-generating substance may include water, solvents, nicotine, plant extracts, flavorings, flavoring agents, vitamin mixtures, etc.
- [39] The solid aerosol-generating substance may include a solid material based on a tobacco raw material such as a reconstituted tobacco sheet, shredded tobacco, or granulated tobacco. In addition, the solid aerosol-generating substance may include a solid material having a taste control agent and a flavoring material. For example, the taste control agent may include calcium carbonate, sodium bicarbonate, calcium oxide, etc. For example, the flavoring material may include a natural material such as herbal granules, or may include a material such as silica, zeolite, or dextrin, which includes an aroma ingredient.
- [40] In addition, the aerosol-generating substance may further include an aerosol-forming agent such as glycerin or propylene glycol.
- [41] The aerosol-generating module 13 may include at least one heater (not shown).
- [42] The aerosol-generating module 13 may include an electro-resistive heater. For example, the electro-resistive heater may include at least one electrically conductive track. The electro-resistive heater may be heated as current flows through the elec-

trically conductive track. At this time, the aerosol-generating substance may be heated by the heated electro-resistive heater.

[43] The electrically conductive track may include an electro-resistive material. In one example, the electrically conductive track may be formed of a metal material. In another example, the electrically conductive track may be formed of a ceramic material, carbon, a metal alloy, or a composite of a ceramic material and metal.

[44] The electro-resistive heater may include an electrically conductive track that is formed in any of various shapes. For example, the electrically conductive track may be formed in any one of a tubular shape, a plate shape, a needle shape, a rod shape, and a coil shape.

[45] The aerosol-generating module 13 may include a heater that uses an induction-heating method. For example, the induction heater may include an electrically conductive coil. The induction heater may generate an alternating magnetic field, which periodically changes in direction, by adjusting the current flowing through the electrically conductive coil. At this time, when the alternating magnetic field is applied to a magnetic body, energy loss may occur in the magnetic body due to eddy current loss and hysteresis loss. In addition, the lost energy may be released as thermal energy. Accordingly, the aerosol-generating substance located adjacent to the magnetic body may be heated. Here, an object that generates heat due to the magnetic field may be referred to as a susceptor.

[46] Meanwhile, the aerosol-generating module 13 may generate ultrasonic vibrations to thereby generate an aerosol from the aerosol-generating substance.

[47] The aerosol-generating device 10 may be referred to as a cartomizer, an atomizer, or a vaporizer.

[48] The memory 14 may store programs for processing and controlling each signal in the controller 17. The memory 14 may store processed data and data to be processed.

[49] For example, the memory 14 may store applications designed for the purpose of performing various tasks that can be processed by the controller 17. The memory 14 may selectively provide some of the stored applications in response to the request from the controller 17.

[50] For example, the memory 14 may store data on the operation time of the aerosol-generating device 100, the maximum number of puffs, the current number of puffs, the number of uses of battery 16, at least one temperature profile, the user's inhalation pattern, and data about charging/discharging. Here, "puff" means inhalation by the user. "inhalation" means the user's act of taking air or other substances into the user's oral cavity, nasal cavity, or lungs through the user's mouth or nose.

[51] The memory 14 may include at least one of volatile memory (e.g. dynamic random access memory (DRAM), static random access memory (SRAM), or synchronous

dynamic random access memory (SDRAM)), nonvolatile memory (e.g. flash memory), a hard disk drive (HDD), or a solid-state drive (SSD).

[52] The sensor module 15 may include at least one sensor.

[53] For example, the sensor module 15 may include a sensor for sensing a puff (hereinafter referred to as a "puff sensor"). In this case, the puff sensor may be implemented as a proximity sensor such as an IR sensor, a pressure sensor, a gyro sensor, an acceleration sensor, a magnetic field sensor, or the like.

[54] For example, the sensor module 15 may include a sensor for sensing a puff (hereinafter referred to as a "puff sensor"). In this case, the puff sensor may be implemented by a pressure sensor, a gyro sensor, an acceleration sensor, a magnetic field sensor, or the like.

[55] For example, the sensor module 15 may include a sensor for sensing the temperature of the heater included in the aerosol-generating module 13 and the temperature of the aerosol-generating substance (hereinafter referred to as a "temperature sensor"). In this case, the heater included in the aerosol-generating module 13 may also serve as the temperature sensor. For example, the electro-resistive material of the heater may be a material having a predetermined temperature coefficient of resistance. The sensor module 15 may measure the resistance of the heater, which varies according to the temperature, to thereby sense the temperature of the heater.

[56] For example, in the case in which the main body of the aerosol-generating device 10 is formed to allow a stick to be inserted thereto, the sensor module 15 may include a sensor for sensing insertion of the stick (hereinafter referred to as a "stick detection sensor").

[57] For example, in the case in which the aerosol-generating device 10 includes a cartridge, the sensor module 15 may include a sensor for sensing mounting/demounting of the cartridge and the position of the cartridge (hereinafter referred to as a "cartridge detection sensor").

[58] In this case, the stick detection sensor and/or the cartridge detection sensor may be implemented as an inductance-based sensor, a capacitive sensor, a resistance sensor, or a Hall sensor (or Hall IC) using a Hall effect.

[59] For example, the sensor module 15 may include a voltage sensor for sensing a voltage applied to a component (e.g. the battery 16) provided in the aerosol-generating device 10 and/or a current sensor for sensing a current.

[60] The battery 16 may supply electric power used for the operation of the aerosol-generating device 10 under the control of the controller 17. The battery 16 may supply electric power to other components provided in the aerosol-generating device 100. For example, the battery 16 may supply electric power to the communication module included in the communication interface 11, the output device included in the input/

output interface 12, and the heater included in the aerosol-generating module 13.

- [61] The battery 16 may be a rechargeable battery or a disposable battery. For example, the battery 16 may be a lithium-ion (Li-ion) battery or a lithium polymer (Li-polymer) battery. However, the present disclosure is not limited thereto. For example, when the battery 16 is rechargeable, the charging rate (C-rate) of the battery 16 may be 10C, and the discharging rate (C-rate) thereof may be 10C to 20C. However, the present disclosure is not limited thereto. Also, for stable use, the battery 16 may be manufactured such that 80% or more of the total capacity may be ensured even when charging/discharging is performed 2000 times.
- [62] The aerosol-generating device 10 may further include a protection circuit module (PCM) (not shown), which is a circuit for protecting the battery 16. The protection circuit module (PCM) may be disposed adjacent to the upper surface of the battery 16. For example, in order to prevent overcharging and overdischarging of the battery 16, the protection circuit module (PCM) may cut off the electrical path to the battery 16 when a short circuit occurs in a circuit connected to the battery 16, when an overvoltage is applied to the battery 16, or when an overcurrent flows through the battery 16.
- [63] The aerosol-generating device 10 may further include a charging terminal to which electric power supplied from the outside is input. For example, the charging terminal may be formed at one side of the main body of the aerosol-generating device 100. The aerosol-generating device 10 may charge the battery 16 using electric power supplied through the charging terminal. In this case, the charging terminal may be configured as a wired terminal for USB communication, a pogo pin, or the like.
- [64] The aerosol-generating device 10 may further include a power terminal (not shown) to which electric power supplied from the outside is input. For example, a power line may be connected to the power terminal, which is disposed at one side of the main body of the aerosol-generating device 100. The aerosol-generating device 10 may use the electric power supplied through the power line connected to the power terminal to charge the battery 16. In this case, the power terminal may be a wired terminal for USB communication.
- [65] The aerosol-generating device 10 may wirelessly receive electric power supplied from the outside through the communication interface 11. For example, the aerosol-generating device 10 may wirelessly receive electric power using an antenna included in the communication module for wireless communication. The aerosol-generating device 10 may charge the battery 16 using the wirelessly supplied electric power.
- [66] The controller 17 may control the overall operation of the aerosol-generating device 100. The controller 17 may be connected to each of the components provided in the aerosol-generating device 100. The controller 17 may transmit and/or receive a signal

to and/or from each of the components, thereby controlling the overall operation of each of the components.

- [67] The controller 17 may include at least one processor. The controller 17 may control the overall operation of the aerosol-generating device 10 using the processor included therein. Here, the processor may be a general processor such as a central processing unit (CPU). Of course, the processor may be a dedicated device such as an application-specific integrated circuit (ASIC), or may be any of other hardware-based processors.
- [68] The controller 17 may perform any one of a plurality of functions of the aerosol-generating device 100. For example, the controller 17 may perform any one of a plurality of functions of the aerosol-generating device 10 (e.g. a preheating function, a heating function, a charging function, and a cleaning function) according to the state of each of the components provided in the aerosol-generating device 10 and the user's command received through the input/output interface 12.
- [69] The controller 17 may control the operation of each of the components provided in the aerosol-generating device 10 based on data stored in the memory 14. For example, the controller 17 may control the supply of a predetermined amount of electric power from the battery 16 to the aerosol-generating module 13 for a predetermined time based on the data on the temperature profile, the user's inhalation pattern, which is stored in the memory 14.
- [70] The controller 17 may determine the occurrence or non-occurrence of a puff using the puff sensor included in the sensor module 15. For example, the controller 17 may check a temperature change, a flow change, a pressure change, and a voltage change in the aerosol-generating device 10 based on the values sensed by the puff sensor. The controller 17 may determine the occurrence or non-occurrence of a puff based on the value sensed by the puff sensor.
- [71] The controller 17 may control the operation of each of the components provided in the aerosol-generating device 10 according to the occurrence or non-occurrence of a puff and/or the number of puffs. For example, the controller 17 may perform control such that the temperature of the heater is changed or maintained based on the temperature profile stored in the memory 14.
- [72] The controller 17 may perform control such that the supply of electric power to the heater is interrupted according to a predetermined condition. For example, the controller 17 may perform control such that the supply of electric power to the heater is interrupted when the stick is removed, when the cartridge is demounted, when the number of puffs reaches the predetermined maximum number of puffs, when a puff is not sensed during a predetermined period of time or longer, or when the remaining capacity of the battery 16 is less than a predetermined value.
- [73] The controller 17 may calculate the remaining capacity with respect to the full charge

capacity of the battery 16. For example, the controller 17 may calculate the remaining capacity of the battery 16 based on the values sensed by the voltage sensor and/or the current sensor included in the sensor module 15.

[74] The controller 17 may perform control such that electric power is supplied to the heater using at least one of a pulse width modulation (PWM) method or a proportional-integral-differential (PID) method.

[75] For example, the controller 17 may perform control such that a current pulse having a predetermined frequency and a predetermined duty ratio is supplied to the heater using the PWM method. In this case, the controller 17 may control the amount of electric power supplied to the heater by adjusting the frequency and the duty ratio of the current pulse.

[76] For example, the controller 17 may determine a target temperature to be controlled based on the temperature profile. In this case, the controller 17 may control the amount of electric power supplied to the heater using the PID method, which is a feedback control method using a difference value between the temperature of the heater and the target temperature, a value obtained by integrating the difference value with respect to time, and a value obtained by differentiating the difference value with respect to time.

[77] Although the PWM method and the PID method are described as examples of methods of controlling the supply of electric power to the heater, the present disclosure is not limited thereto, and may employ any of various control methods, such as a proportional-integral (PI) method or a proportional-differential (PD) method.

[78] Meanwhile, the controller 17 may perform control such that electric power is supplied to the heater according to a predetermined condition. For example, when a cleaning function for cleaning the space into which the stick is inserted is selected in response to a command input by the user through the input/output interface 12, the controller 17 may perform control such that a predetermined amount of electric power is supplied to the heater.

[79] FIGS. 2 to 4 are views for explaining an aerosol-generating device according to embodiments of the present disclosure.

[80] According to various embodiments of the present disclosure, the aerosol-generating device 10 may include a main body 100 and/or a cartridge 200.

[81] Referring to FIG. 2, the aerosol-generating device 10 according to an embodiment may include a main body 100, which is formed such that a stick 20 can be inserted into the inner space formed by a housing 101.

[82] The stick 20 may be similar to a general combustible cigarette. For example, the stick 20 may be divided into a first portion including an aerosol generating material and a second portion including a filter and the like. Alternatively, an aerosol generating material may be included in the second portion of the stick 20. For example, a

flavoring substance made in the form of granules or capsules may be inserted into the second portion.

[83] The entire first portion is inserted into the insertion space of the aerosol-generating device 10, and the second portion may be exposed to the outside. Alternatively, only a portion of the first portion may be inserted into the insertion space of the aerosol-generating device 10, or a portion of the first portion and the second portion may be inserted. In this case, the aerosol may be generated by passing external air through the first portion, and the generated aerosol may be delivered to the user's mouth through the second portion.

[84] The main body 100 may be structured such that external air is introduced into the main body 100 in the state in which the stick 20 is inserted therinto. In this case, the external air introduced into the main body 100 may flow into the mouth of the user via the stick 20.

[85] The heater may be disposed in the main body 100 at a position corresponding to the position at which the stick 20 is inserted into the main body 100. Although it is illustrated in the drawings that the heater is an electrically conductive heater 110 including a needle-shaped electrically conductive track, the present disclosure is not limited thereto.

[86] The heater may heat the interior and/or exterior of the stick 20 using the electric power supplied from the battery 16. An aerosol may be generated from the heated stick 20. At this time, the user may hold one end of the stick 20 in the mouth to inhale the aerosol containing a tobacco material.

[87] Meanwhile, the controller 17 may perform control such that electric power is supplied to the heater in the state in which the stick 20 is not inserted into the main body according to a predetermined condition. For example, when a cleaning function for cleaning the space into which the stick 20 is inserted is selected in response to a command input by the user through the input/output interface 12, the controller 17 may perform control such that a predetermined amount of electric power is supplied to the heater.

[88] The controller 17 may monitor the number of puffs based on the value sensed by the puff sensor from the point in time at which the stick 20 was inserted into the main body.

[89] When the stick 20 is removed from the main body, the controller 17 may initialize the current number of puffs stored in the memory 14.

[90] Referring to FIG. 3, the aerosol-generating device 10 according to an embodiment may include a main body 100 and a cartridge 200. The main body 100 may support the cartridge 200, and the cartridge 200 may contain an aerosol-generating substance.

[91] According to one embodiment, the cartridge 200 may be configured so as to be de-

tachably mounted to the main body 100. According to another embodiment, the cartridge 200 may be integrally configured with the main body 100. For example, the cartridge 200 may be mounted to the main body 100 in a manner such that at least a portion of the cartridge 200 is inserted into the insertion space formed by a housing 101 of the main body 100.

- [92] The main body 100 may be formed to have a structure in which external air can be introduced into the main body 100 in the state in which the cartridge 200 is inserted thereinto. Here, the external air introduced into the main body 100 may flow into the user's mouth via the cartridge 200.
- [93] The controller 17 may determine whether the cartridge 200 is in a mounted state or a detached state using a cartridge detection sensor included in the sensor module 15. For example, the cartridge detection sensor may transmit a pulse current through a first terminal connected with the cartridge 200. In this case, the controller 17 may determine whether the cartridge 200 is in a connected state, based on whether the pulse current is received through a second terminal.
- [94] The cartridge 200 may include a heater 210 configured to heat the aerosol-generating substance and/or a reservoir 220 configured to contain the aerosol-generating substance. For example, a liquid delivery element impregnated with (containing) the aerosol-generating substance may be disposed inside the reservoir 220. The electrically conductive track of the heater 210 may be formed in a structure that is wound around the liquid delivery element. In this case, when the liquid delivery element is heated by the heater 210, an aerosol may be generated. Here, the liquid delivery element may include a wick made of, for example, cotton fiber, ceramic fiber, glass fiber, or porous ceramic.
- [95] The cartridge 200 may include an insertion space 230 configured to allow the stick 20 to be inserted. For example, the cartridge 200 may include the insertion space formed by an inner wall extending in a circumferential direction along a direction in which the stick 20 is inserted. In this case, the insertion space may be formed by opening the inner side of the inner wall up and down. The stick 20 may be inserted into the insertion space formed by the inner wall.
- [96] The insertion space into which the stick 20 is inserted may be formed in a shape corresponding to the shape of a portion of the stick 20 inserted into the insertion space. For example, when the stick 20 is formed in a cylindrical shape, the insertion space may be formed in a cylindrical shape.
- [97] When the stick 20 is inserted into the insertion space, the outer surface of the stick 20 may be surrounded by the inner wall and contact the inner wall.
- [98] A portion of the stick 20 may be inserted into the insertion space, the remaining portion of the stick 20 may be exposed to the outside.

- [99] The user may inhale the aerosol while biting one end of the stick 20 with the mouth. The aerosol generated by the heater 210 may pass through the stick 20 and be delivered to the user's mouth. At this time, while the aerosol passes through the stick 20, the material contained in the stick 20 may be added to the aerosol. The material-infused aerosol may be inhaled into the user's oral cavity through the one end of the stick 20.
- [100] Referring to FIG. 4, the aerosol-generating device 10 according to an embodiment may include a main body 100 supporting the cartridge 200 and a cartridge 200 containing an aerosol-generating substance. The main body 100 may be formed so as to allow the stick 20 to be inserted into an insertion space 1300 therein.
- [101] The aerosol-generating device 10 may include a first heater for heating the aerosol-generating substance stored in the cartridge 200. For example, when the user holds one end of the stick 20 in the mouth to inhale the aerosol, the aerosol generated by the first heater may pass through the stick 20. At this time, while the aerosol passes through the stick 20, a flavor may be added to the aerosol. The aerosol containing the flavor may be drawn into the user's oral cavity through one end of the stick 20.
- [102] Alternatively, according to another embodiment, the aerosol-generating device 10 may include a first heater for heating the aerosol-generating substance stored in the cartridge 200 and a second heater for heating the stick 20 inserted into the main body 100. For example, the aerosol-generating device 10 may generate an aerosol by heating the aerosol-generating substance stored in the cartridge 200 and the stick 20 using the first heater and the second heater, respectively.
- [103] FIGS. 5 and 6 are views for explaining a stick according to embodiments of the present disclosure.
- [104] Referring to FIG. 5, the stick 20 may include a tobacco rod 21 and a filter rod 22. The first portion described above with reference to FIG. 2 may include the tobacco rod. The second portion described above with reference to FIG. 2 may include the filter rod 22.
- [105] FIG. 5 illustrates that the filter rod 22 includes a single segment. However, the filter rod 22 is not limited thereto. In other words, the filter rod 22 may include a plurality of segments. For example, the filter rod 22 may include a first segment configured to cool an aerosol and a second segment configured to filter a certain component included in the aerosol. Also, as necessary, the filter rod 22 may further include at least one segment configured to perform other functions.
- [106] A diameter of the stick 20 may be within a range of 5 mm to 9 mm, and a length of the stick 20 may be about 48 mm, but embodiments are not limited thereto. For example, a length of the tobacco rod 21 may be about 12 mm, a length of a first segment of the filter rod 22 may be about 10 mm, a length of a second segment of the

filter rod 22 may be about 14 mm, and a length of a third segment of the filter rod 22 may be about 12 mm, but embodiments are not limited thereto.

- [107] The stick 20 may be wrapped using at least one wrapper 24. The wrapper 24 may have at least one hole through which external air may be introduced or internal air may be discharged. For example, the stick 20 may be wrapped using one wrapper 24. As another example, the stick 20 may be double-wrapped using at least two wrappers 24. For example, the tobacco rod 21 may be wrapped using a first wrapper 241. For example, the filter rod 22 may be wrapped using wrappers 242, 243, 244. The tobacco rod 21 and the filter rod 22 wrapped by wrappers may be combined. The stick 20 may be re-wrapped by a single wrapper 245. When each of the tobacco rod 21 and the filter rod 22 includes a plurality of segments, each segment may be wrapped using wrappers 242, 243, 244. The entirety of stick 20 composed of a plurality of segments wrapped by wrappers may be re-wrapped by another wrapper
- [108] The first wrapper 241 and the second wrapper 242 may be formed of general filter wrapping paper. For example, the first wrapper 241 and the second wrapper 242 may be porous wrapping paper or non-porous wrapping paper. Also, the first wrapper 241 and the second wrapper 242 may be made of an oil-resistant paper sheet and an aluminum laminate packaging material.
- [109] The third wrapper 243 may be made of a hard wrapping paper. For example, a basis weight of the third wrapper 243 may be within a range of 88 g/m² to 96 g/m². For example, the basis weight of the third wrapper 243 may be within a range of 90 g/m² to 94 g/m². Also, a total thickness of the third wrapper 243 may be within a range of 1200 μ m to 1300 μ m. For example, the total thickness of the third wrapper 243 may be 125 μ m.
- [110] The fourth wrapper 244 may be made of an oil-resistant hard wrapping paper. For example, a basis weight of the fourth wrapper 244 may be within a range of about 88 g/m² to about 96 g/m². For example, the basis weight of the fourth wrapper 244 may be within a range of 90 g/m² to 94 g/m². Also, a total thickness of the fourth wrapper 244 may be within a range of 1200 μ m to 1300 μ m. For example, the total thickness of the fourth wrapper 244 may be 125 μ m.
- [111] The fifth wrapper 245 may be made of a sterilized paper (MFW). Here, the MFW refers to a paper specially manufactured to have enhanced tensile strength, water resistance, smoothness, and the like, compared to ordinary paper. For example, a basis weight of the fifth wrapper 245 may be within a range of 57 g/m² to 63 g/m². For example, a basis weight of the fifth wrapper 245 may be about 60 g/m². Also, the total thickness of the fifth wrapper 245 may be within a range of 64 μ m to 70 μ m. For example, the total thickness of the fifth wrapper 245 may be 67 μ m.
- [112] A predetermined material may be included in the fifth wrapper 245. Here, an

example of the predetermined material may be, but is not limited to, silicon. For example, silicon exhibits characteristics like heat resistance with little change due to the temperature, oxidation resistance, resistances to various chemicals, water repellency, electrical insulation, etc. However, any material other than silicon may be applied to (or coated on) the fifth wrapper 245 without limitation as long as the material has the above-mentioned characteristics.

- [113] The fifth wrapper 245 may prevent the stick 20 from being burned. For example, when the tobacco rod 21 is heated by the heater 110, there is a possibility that the stick 20 is burned. In detail, when the temperature is raised to a temperature above the ignition point of any one of materials included in the tobacco rod 21, the stick 20 may be burned. Even in this case, since the fifth wrapper 245 include a non-combustible material, the burning of the stick 20 may be prevented.
- [114] Furthermore, the fifth wrapper 245 may prevent the aerosol generating device 100 from being contaminated by substances formed by the stick 20. Through puffs of a user, liquid substances may be formed in the stick 20. For example, as the aerosol formed by the stick 20 is cooled by the outside air, liquid materials (e.g., moisture, etc.) may be formed. As the fifth wrapper 245 wraps the stick 20, the liquid materials formed in the stick 20 may be prevented from being leaked out of the stick 20.
- [115] The tobacco rod 21 may include an aerosol generating material. For example, the aerosol generating material may include at least one of glycerin, propylene glycol, ethylene glycol, dipropylene glycol, diethylene glycol, triethylene glycol, tetraethylene glycol, and oleyl alcohol, but it is not limited thereto. Also, the tobacco rod 21 may include other additives, such as flavors, a wetting agent, and/or organic acid. Also, the tobacco rod 21 may include a flavored liquid, such as menthol or a moisturizer, which is injected to the tobacco rod 21.
- [116] The tobacco rod 21 may be manufactured in various forms. For example, the tobacco rod 21 may be formed as a sheet or a strand. Also, the tobacco rod 21 may be formed as a pipe tobacco, which is formed of tiny bits cut from a tobacco sheet. Also, the tobacco rod 21 may be surrounded by a heat conductive material. For example, the heat-conducting material may be, but is not limited to, a metal foil such as aluminum foil. For example, the heat conductive material surrounding the tobacco rod 21 may uniformly distribute heat transmitted to the tobacco rod 21, and thus, the heat conductivity applied to the tobacco rod may be increased and taste of the tobacco may be improved. Also, the heat conductive material surrounding the tobacco rod 21 may function as a susceptor heated by the induction heater. Here, although not illustrated in the drawings, the tobacco rod 21 may further include an additional susceptor, in addition to the heat conductive material surrounding the tobacco rod 21.
- [117] The filter rod 22 may include a cellulose acetate filter. Shapes of the filter rod 22 are

not limited. For example, the filter rod 22 may include a cylinder-type rod or a tube-type rod having a hollow inside. Also, the filter rod 22 may include a recess-type rod. When the filter rod 22 includes a plurality of segments, at least one of the plurality of segments may have a different shape.

- [118] The first segment of the filter rod 22 may be a cellulosic acetate filter. For example, the first segment may be a tube-type structure having a hollow inside. The first segment may prevent an internal material of the tobacco rod 21 from being pushed back when the heater 110 is inserted into the tobacco rod 21 and may also provide a cooling effect to aerosol. A diameter of the hollow included in the first segment may be an appropriate diameter within a range of 2 mm to 4.5 mm but is not limited thereto.
- [119] The length of the first segment may be an appropriate length within a range of 4 mm to 30 mm but is not limited thereto. For example, the length of the first segment may be 10 mm but is not limited thereto.
- [120] The second segment of the filter rod 22 cools the aerosol which is generated when the heater 110 heats the tobacco rod 21. Therefore, the user may puff the aerosol which is cooled at an appropriate temperature.
- [121] The length or diameter of the second segment may be variously determined according to the shape of the stick 20. For example, the length of the second segment may be an appropriate length within a range of 7 mm to 20 mm. Preferably, the length of the second segment may be about 14 mm but is not limited thereto.
- [122] The second segment may be manufactured by weaving a polymer fiber. In this case, a flavoring liquid may also be applied to the fiber formed of the polymer. Alternatively, the second segment may be manufactured by weaving together an additional fiber coated with a flavoring liquid and a fiber formed of a polymer. Alternatively, the second segment may be formed by a crimped polymer sheet.
- [123] For example, a polymer may be formed of a material selected from the group consisting of polyethylene (PE), polypropylene (PP), polyvinyl chloride (PVC), polyethylene terephthalate (PET), polylactic acid (PLA), cellulosic acetate (CA), and aluminum coil.
- [124] As the second segment is formed by the woven polymer fiber or the crimped polymer sheet, the second segment may include a single channel or a plurality of channels extending in a longitudinal direction. Here, a channel refers to a passage through which a gas (e.g., air or aerosol) passes.
- [125] For example, the second segment formed of the crimped polymer sheet may be formed from a material having a thickness between about 5 μm and about 300 μm , for example, between about 10 μm and about 250 μm . Also, a total surface area of the second segment may be between about 300 mm^2/mm and about 1000 mm^2/mm . In addition, an aerosol cooling element may be formed from a material having a specific

surface area between about 10 mm²/mg and about 100 mm²/mg.

- [126] The second segment may include a thread including a volatile flavor component. Here, the volatile flavor component may be menthol but is not limited thereto. For example, the thread may be filled with a sufficient amount of menthol to provide the second segment with menthol of 1.5 mg or more.
- [127] The third segment of the filter rod 22 may be a cellulosic acetate filter. The length of the third segment may be an appropriate length within a range of 4 mm to 20 mm. For example, the length of the third segment may be about 12 mm but is not limited thereto.
- [128] The filter rod 22 may be manufactured to generate flavors. For example, a flavoring liquid may be injected onto the filter rod 22. For example, an additional fiber coated with a flavoring liquid may be inserted into the filter rod 22.
- [129] Also, the filter rod 22 may include at least one capsule 23. Here, the capsule 23 may generate a flavor. The capsule 23 may generate an aerosol. For example, the capsule 23 may have a configuration in which a liquid including a flavoring material is wrapped with a film. The capsule 23 may have a spherical or cylindrical shape but is not limited thereto.
- [130] Referring to FIG. 6, a stick 30 may further include a front-end plug 33. The front-end plug 33 may be located on a side of a tobacco rod 31, the side not facing a filter rod 32. The front-end plug 33 may prevent the tobacco rod 31 from being detached and prevent liquefied aerosol from flowing into the aerosol generating device 10 from the tobacco rod 31, during smoking.
- [131] The filter rod 32 may include a first segment 321 and a second segment 322. The first segment 321 may correspond to the first segment of the filter rod 22 of FIG. 4. The segment 322 may correspond to the third segment of the filter rod 22 of FIG. 4.
- [132] A diameter and a total length of the stick 30 may correspond to the diameter and a total length of the stick 20 of FIG. 4. For example, a length of the front-end plug 33 may be about 7 mm, a length of the tobacco rod 31 may be about 15 mm, a length of the first segment 321 may be about 12 mm, and a length of the second segment 322 may be about 14 mm, but embodiments are not limited thereto.
- [133] The stick 30 may be wrapped using at least one wrapper 35. The wrapper 35 may have at least one hole through which external air may be introduced or internal air may be discharged. For example, the front-end plug 33 may be wrapped using a first wrapper 351, the tobacco rod 31 may be wrapped using a second wrapper 352, the first segment 321 may be wrapped using a third wrapper 353, and the second segment 322 may be wrapped using a fourth wrapper 354. Also, the entire stick 30 may be re-wrapped using a fifth wrapper 355.
- [134] In addition, the fifth wrapper 355 may have at least one perforation 36 formed

therein. For example, the perforation 36 may be formed in an area of the fifth wrapper 355 surrounding the tobacco rod 31 but is not limited thereto. For example, the perforation 36 may transfer heat formed by the heater 210 illustrated in FIG. 3 into the tobacco rod 31.

- [135] Also, the second segment 322 may include at least one capsule 34. Here, the capsule 34 may generate a flavor. The capsule 34 may generate an aerosol. For example, the capsule 34 may have a configuration in which a liquid including a flavoring material is wrapped with a film. The capsule 34 may have a spherical or cylindrical shape but is not limited thereto.
- [136] The first wrapper 351 may be formed by combining general filter wrapping paper with a metal foil such as an aluminum coil. For example, a total thickness of the first wrapper 351 may be within a range of 45 μm to 55 μm . For example, the total thickness of the first wrapper 351 may be 50.3 μm . Also, a thickness of the metal coil of the first wrapper 351 may be within a range 6 μm to 7 μm . For example, the thickness of the metal coil of the first wrapper 351 may be 6.3 μm . In addition, a basis weight of the first wrapper 351 may be within a range of 50 g/m² to 55 g/m². For example, the basis weight of the first wrapper 351 may be 53 g/m².
- [137] The second wrapper 352 and the third wrapper 353 may be formed of general filter wrapping paper. For example, the second wrapper 352 and the third wrapper 353 may be porous wrapping paper or non-porous wrapping paper.
- [138] For example, porosity of the second wrapper 352 may be 35000 CU but is not limited thereto. Also, a thickness of the second wrapper 352 may be within a range of 70 μm to 80 μm . For example, the thickness of the second wrapper 352 may be 78 μm . A basis weight of the second wrapper 352 may be within a range of 20 g/m² to 25 g/m². For example, the basis weight of the second wrapper 352 may be 23.5 g/m².
- [139] For example, porosity of the third wrapper 353 may be 24000 CU but is not limited thereto. Also, a thickness of the third wrapper 353 may be in a range of about 60 μm to about 70 μm . For example, the thickness of the third wrapper 353 may be 68 μm . A basis weight of the third wrapper 353 may be in a range of about 20 g/m² to about 25 g/m². For example, the basis weight of the third wrapper 353 may be 21 g/m².
- [140] The fourth wrapper 354 may be formed of PLA laminated paper. Here, the PLA laminated paper refers to three-layer paper including a paper layer, a PLA layer, and a paper layer. For example, a thickness of the fourth wrapper 353 may be in a range of 100 μm to 1200 μm . For example, the thickness of the fourth wrapper 353 may be 110 μm . Also, a basis weight of the fourth wrapper 354 may be in a range of 80 g/m² to 100 g/m². For example, the basis weight of the fourth wrapper 354 may be 88 g/m².
- [141] The fifth wrapper 355 may be formed of sterilized paper (MFW). Here, the sterilized paper (MFW) refers to paper which is particularly manufactured to improve tensile

strength, water resistance, smoothness, and the like more than ordinary paper. For example, a basis weight of the fifth wrapper 355 may be in a range of 57 g/m² to 63 g/m². For example, the basis weight of the fifth wrapper 355 may be 60 g/m². Also, a thickness of the fifth wrapper 355 may be in a range of 64 μ m to 70 μ m. For example, the thickness of the fifth wrapper 355 may be 67 μ m.

[142] The fifth wrapper 355 may include a preset material added thereto. An example of the material may include silicon, but it is not limited thereto. Silicon has characteristics such as heat resistance robust to temperature conditions, oxidation resistance, resistance to various chemicals, water repellency to water, and electrical insulation, etc. Besides silicon, any other materials having characteristics as described above may be applied to (or coated on) the fifth wrapper 355 without limitation.

[143] The front-end plug 33 may be formed of cellulosic acetate. For example, the front-end plug 33 may be formed by adding a plasticizer (e.g., triacetin) to cellulosic acetate tow. Mono-denier of filaments constituting the cellulosic acetate tow may be in a range of 1.0 to 10.0. For example, the mono-denier of filaments constituting the cellulosic acetate tow may be within a range of 4.0 to 6.0. For example, the mono-denier of the filaments of the front-end plug 33 may be 5.0. Also, a cross-section of the filaments constituting the front-end plug 33 may be a Y shape. Total denier of the front-end plug 33 may be in a range of 20000 to 30000. For example, the total denier of the front-end plug 33 may be within a range of 25000 to 30000. For example, the total denier of the front-end plug 33 may be 28000.

[144] Also, as needed, the front-end plug 33 may include at least one channel. A cross-sectional shape of the channel may be manufactured in various shapes.

[145] The tobacco rod 31 may correspond to the tobacco rod 21 described above with reference to FIG. 4. Therefore, hereinafter, the detailed description of the tobacco rod 31 will be omitted.

[146] The first segment 321 may be formed of cellulosic acetate. For example, the first segment 321 may be a tube-type structure having a hollow inside. The first segment 321 may be manufactured by adding a plasticizer (e.g., triacetin) to cellulosic acetate tow. For example, mono-denier and total denier of the first segment 321 may be the same as the mono-denier and total denier of the front-end plug 33.

[147] The second segment 322 may be formed of cellulosic acetate. Mono denier of filaments constituting the second segment 322 may be in a range of 1.0 to 10.0. For example, the mono denier of the filaments of the second segment 322 may be within a range of about 8.0 to about 10.0. For example, the mono denier of the filaments of the second segment 322 may be 9.0. Also, a cross-section of the filaments of the second segment 322 may be a Y shape. Total denier of the second segment 322 may be in a range of 20000 to 30000. For example, the total denier of the second segment 322 may

be 25000.

- [148] FIGS. 7 to 10 are diagrams for explaining the configuration of the aerosol-generating device according to an embodiment of the present disclosure.
- [149] Referring to FIG. 7, according to an embodiment of the present disclosure, the insertion space, into which the stick 20 is inserted, may be defined in the upper end of the housing 101 of the aerosol-generating device 10.
- [150] The insertion space may be formed so as to be depressed to a predetermined depth toward the interior of the housing 101 so that the stick 20 is inserted at least partway thereinto. The depth of the insertion space may correspond to the length of the portion of the stick 20 that contains an aerosol-generating substance. For example, in the case in which the stick 20 shown in FIG. 5 is capable of being used in the aerosol-generating device 10, the depth of the insertion space may correspond to the length of a tobacco rod 21 of the stick 20.
- [151] The battery 16, the printed circuit board 710, and the heater may be disposed in the housing 101 of the aerosol-generating device 10.
- [152] The components of the aerosol-generating device 10 may be mounted on one surface and/or the opposite surface of the printed circuit board 710. The components mounted on the printed circuit board 710 may transmit or receive signals therebetween through a wiring layer of the printed circuit board 710. For example, at least one communication module included in the communication interface 11, at least one sensor included in the sensor module 15 and the controller 17 may be mounted on the printed circuit board 710.
- [153] The printed circuit board 710 may be disposed adjacent to the battery 16. For example, the printed circuit board 710 may be disposed such that one surface thereof faces the battery 16.
- [154] A temperature sensor may be mounted on one surface of the printed circuit board 710. The temperature sensor may be implemented by a thermistor, which is an element using a property of changing resistance according to temperature. For example, the temperature sensor may include a negative temperature coefficient thermistor (NTC thermistor) having a property of decreasing resistance when the temperature rises.
- [155] The controller 17 may determine the temperature of the battery 16 based on an output of the temperature sensor. For example, the controller 17 may determine the output of the temperature sensor as the temperature of the battery 16. For example, the controller 17 may determine a result of compensating the output of the temperature sensor according to a preset standard as the temperature of the battery 16.
- [156] A display 720 may be disposed on one side of the housing 101. The display 720 may display a screen in response to a signal transmitted from the controller 17.
- [157] The display 720 may include a cover glass 821, a display panel 823, and/or a touch

panel 825.

- [158] The cover glass 821 may form the external appearance of the aerosol-generating device 10 together with the housing 101. The cover glass 821 may come into contact with a part of the user's body. The cover glass 821 may protect the display panel 823 and/or the touch panel 825 from external impact.
- [159] The display panel 823 may be disposed in a direction from the cover glass 821 toward the inside of the housing 101. For example, the display panel 823 may be disposed parallel to the cover glass 821.
- [160] The display panel 823 may output an image. The display panel 823 may output an image in response to a signal transmitted from the controller 17. For example, the display panel 823 may be implemented as a liquid crystal display (LCD) panel, an organic light-emitting diode (OLED) panel, or the like, but the present disclosure is not limited thereto.
- [161] The touch panel 825 may be disposed in a direction from the cover glass 821 toward the inside of the housing 101. For example, the touch panel 825 may be disposed parallel to the cover glass 821 and the display panel 823.
- [162] The touch panel 825 may detect a touch corresponding to contact with an object. For example, the touch panel 825 may detect a touch corresponding to contact with a part of the user's body.
- [163] The touch panel 825 may include at least one touch sensor configured to detect touch. For example, the touch sensor may include a capacitive touch sensor, a resistive touch sensor, a surface acoustic wave touch sensor, and an infrared touch sensor, but the present disclosure is not limited thereto.
- [164] A plurality of touch sensors included in the touch panel 825 may receive a driving signal according to a preset period. In this case, each touch sensor may output an electrical signal corresponding to a state (e.g., pressure, magnetic field, capacitance, quantity of light) according to the driving signal.
- [165] At least one motor 730, which generates vibration for a haptic effect, may be disposed in the housing 101. The motor 730 may be mounted on the other surface of the printed circuit board 710. For example, the motor 730 may be implemented as a linear actuator, but the present disclosure is not limited thereto.
- [166] The structure of the aerosol-generating device 10 is not limited to that shown in FIG. 7. In some embodiments, disposition of the battery 16, the printed circuit board 710, the display 720, and the motor 730 may vary.
- [167] Referring to FIG. 8, the aerosol-generating device 10 may include a housing 101, a heater 110, an insertion space 130, a sensor module 15, a battery 16, a controller 17, a printed circuit board 710, and/or a stick detection sensor 800.
- [168] At least one sensor included in the sensor module 15 and the controller 17 may be

mounted on the printed circuit board 710. The printed circuit board 710 may be electrically connected to the battery 16. The components mounted on the printed circuit board 710 may be operated by the power supplied from the battery 16.

- [169] The inner wall 103 of the housing 101 may extend vertically. The inner wall 103 of the housing 101 may extend along the inner circumference of the housing 101. The inner wall 103 of the housing 101 may extend in the circumferential direction to have a cylindrical shape.
- [170] The inner wall 103 of the housing 101 may define the insertion space 130, into which a stick 20 is inserted. The insertion space 130 in the housing 101 may be a space formed so as to be depressed to a predetermined depth toward the inside of the aerosol-generating device 100 so that the stick 20 is inserted at least partway thereinto. The predetermined depth may correspond to the length of the portion of the stick 20 that contains an aerosol-generating substance (e.g. a tobacco rod 21).
- [171] The insertion space 130 may be formed in a shape corresponding to the shape of a portion of the stick 20. For example, when the stick 20 is formed in a cylindrical shape, the insertion space 130 may be formed in a cylindrical shape.
- [172] The heater 110 may be disposed adjacent to the insertion space 130. The heater 110 may heat the stick 20 inserted into the insertion space 130. The heater 110 may be disposed at a position corresponding to the position of the tobacco rod 21 of the stick 20 inserted into the insertion space 130. In the present disclosure, although the heater 110 is illustrated in the drawings as being an induction heater, which generates an alternating magnetic field, which periodically changes in direction, by adjusting the current flowing through an electrically conductive coil, the present disclosure is not limited thereto.
- [173] The stick detection sensor 800 may be disposed adjacent to the insertion space 130, into which the stick 20 is inserted. The stick detection sensor 800 may be elongated in the vertical direction along the insertion space 130.
- [174] The stick detection sensor 800 may be an inductive sensor including at least one coil. The coil of the stick detection sensor 800 may be disposed adjacent to the insertion space 130. For example, when a magnetic field changes around the coil, through which current flows, the characteristics of the current flowing through the coil may change according to Faraday's law of electromagnetic induction. Here, the characteristics of the current flowing through the coil may include a frequency of alternating current, a current value, a voltage value, an inductance value, an impedance value, and the like.
- [175] The stick detection sensor 800 may output a signal corresponding to the characteristics of the current flowing through the coil. For example, the stick detection sensor 800 may output a signal corresponding to the inductance value of the coil.
- [176] The controller 17 may determine whether the stick 20 is inserted into the insertion

space 130 using the inductive sensor 151. For example, when the inductance value corresponding to the signal from the inductive sensor 151 is equal to or greater than a predetermined value, the controller 17 may determine that the stick 20 has been inserted into the insertion space 130. For example, when variation in the frequency of the current corresponding to the signal from the inductive sensor 151 is equal to or greater than a predetermined reference, the controller 17 may determine that the stick 20 has been inserted into the insertion space 130.

[177] Referring to FIGs. 9 and 10, the insertion space 130 may have a cylindrical shape so as to correspond to the shape of the stick 20.

[178] The heater 110 may be disposed so as to surround at least a portion of the insertion space 130. For example, the heater 110 may be disposed in the housing 101 along the inner wall 103 of the housing 101, which defines the insertion space 130. In this case, it can be understood that the heater 110 surrounds the outer circumferential surface of the insertion space 130. The heater 110 may be of a tube type having a cavity defined therein so that the stick 20 inserted into the insertion space 130 is uniformly heated.

[179] The heater 110 may be disposed so as to correspond to a first region and a second region of the insertion space 130. Here, the first region of the insertion space 130 may correspond to a first region 1010 of the tobacco rod 21 of the stick 20. The second region of the insertion space 130 may correspond to a second region 1020 of the tobacco rod 21 of the stick 20. The heater 110 may be disposed so as to correspond to the first region 1010 and the second region 1020 of the tobacco rod 21 of the stick 20.

[180] The stick detection sensor 800 may include a plurality of inductance channels 910 and 920. The plurality of inductance channels 910 and 920 may be disposed so as to surround at least a portion of the heater 110. The plurality of inductance channels 910 and 920 may be formed in the shape of a tube having a cavity defined therein so as to correspond to the shape of the heater 110.

[181] The plurality of inductance channels 910 and 920 may be disposed parallel to each other in the vertical direction. For example, the first inductance channel 910 may be disposed adjacent to the lower end of the insertion space 130. For example, the second inductance channel 920 may be disposed adjacent to the upper end of the insertion space 130. The first inductance channel 910 may be disposed so as to correspond to the first region of the insertion space 130. The second inductance channel 920 may be disposed so as to correspond to the second region of the insertion space 130.

[182] Each of the plurality of inductance channels 910 and 920 may include at least one coil. Alternating current having a predetermined frequency may flow through each of the plurality of inductance channels 910 and 920.

[183] The first wrapper 241, which surrounds the tobacco rod 21 of the stick 20, may be formed as a metal foil in order to increase the thermal conductivity for an aerosol-

generating substance. When the stick 20 is inserted into the insertion space 130, the characteristics of the current flowing through each of the plurality of inductance channels 910 and 920 may change. For example, the frequency of the current flowing through each of the plurality of inductance channels 910 and 920 may change in response to insertion of the stick 20.

[184] The stick detection sensor 800 may transmit a signal corresponding to each of the plurality of inductance channels 910 and 920 to the controller 17. The controller 17 may determine change in the characteristics of the current flowing through each of the plurality of inductance channels 910 and 920 based on a signal received from the stick detection sensor 800. For example, the controller 17 may calculate variation in the frequency of the current flowing through the first inductance channel 910 (hereinafter referred to as first frequency variation) and variation in the frequency of the current flowing through the second inductance channel 920 (hereinafter referred to as second frequency variation).

[185] The controller 17 may determine whether the stick 20 is inserted into the insertion space 130 based on a signal received from the stick detection sensor 800. For example, when variation in the frequency of the current flowing through any one of the plurality of inductance channels 910 and 920 is equal to or greater than predetermined frequency variation, the controller 17 may determine that the stick 20 has been inserted into the insertion space 130.

[186] FIG. 11 is a graph indicating the current flowing through the first inductance channel 910 according to an embodiment of the present disclosure.

[187] Referring to FIG. 11, current having a first frequency may flow through the first inductance channel 910 until a time point t1. When the stick 20 is inserted at the time point t1, the frequency of the current flowing through the first inductance channel 910 may be changed to a second frequency. Meanwhile, the current having the first frequency may again flow through the first inductance channel 910 at a time point t2 when a predetermined time period has elapsed from the time point t1.

[188] The controller 17 may calculate variation in the frequency of the current flowing through the first inductance channel 910 based on the first frequency and the second frequency. For example, the stick detection sensor 800 may include an inductance-digital converter (LDC). Here, the inductance-digital converter (LDC) may output a signal corresponding to the frequency of the current flowing through the first inductance channel 910. In this case, the controller 17 may determine variation in the frequency of the current flowing through the first inductance channel 910 based on a signal received from the inductance-digital converter (LDC). The inductance-digital converter (LDC) may be mounted on the printed circuit board 710. Meanwhile, the inductance-digital converter (LDC) may be included in the controller 17.

- [189] The controller 17 may determine the type of stick 20 inserted into the insertion space 130 based on a signal received from the stick detection sensor 800.
- [190] Referring to FIG. 12, the first wrapper 241, which surrounds the tobacco rod 21 of the stick 20, may include a first partial wrapper 1210 and a second partial wrapper 1220. The first partial wrapper 1210 may be the region of the first wrapper 241 that surrounds the first region 1010 of the tobacco rod 21 of the stick 20. The second partial wrapper 1220 may be the region of the first wrapper 241 that surrounds the second region 1020 of the tobacco rod 21 of the stick 20.
- [191] The first frequency variation may correspond to the thickness of the first partial wrapper 1210. The second frequency variation may correspond to the thickness of the second partial wrapper 1220. When the thickness of the first partial wrapper 1210 and the thickness of the second partial wrapper 1220 are different from each other, the first frequency variation and the second frequency variation may be different from each other.
- [192] The controller 17 may determine the type of stick 20 inserted into the insertion space 130 based on at least one of the first frequency variation or the second frequency variation. For example, the controller 17 may determine the type of stick 20 based on whether the first frequency variation is equal to or greater than a predetermined first threshold. For example, the controller 17 may determine the type of stick 20 based on whether the second frequency variation is equal to or greater than a predetermined second threshold. For example, the controller 17 may determine the type of stick 20 based on whether the sum of the first frequency variation and the second frequency variation is equal to or greater than a predetermined third threshold. For example, the controller 17 may determine the type of stick 20 based on whether the difference between the square of the first frequency variation and the square of the second frequency variation is equal to or greater than a predetermined fourth threshold.
- [193] FIGs. 13 and 14 are flowcharts showing an operation method of an aerosol-generating device according to an embodiment of the present disclosure.
- [194] Referring to FIG. 13, the aerosol-generating device 10 may monitor a signal corresponding to the first inductance channel 910 and/or a signal corresponding to the second inductance channel 920 in operation S1310. For example, the aerosol-generating device 10 may monitor at least one of the first frequency variation corresponding to the first inductance channel 910 or the second frequency variation corresponding to the second inductance channel 920 based on a signal corresponding to the first inductance channel 910.
- [195] The aerosol-generating device 10 may determine whether the stick 20 is inserted into the insertion space 130 based on a signal corresponding to the first inductance channel 910 and/or a signal corresponding to the second inductance channel 920 in operation

S1320. For example, when at least one of the first frequency variation or the second frequency variation is equal to or greater than predetermined minimum variation, the aerosol-generating device 10 may determine that the stick 20 has been inserted into the insertion space 130.

- [196] According to an embodiment, upon determining that the stick 20 has been inserted into the insertion space 130 based on a signal corresponding to any one of the first inductance channel 910 and the second inductance channel 920, the aerosol-generating device 10 may check a signal corresponding to the other of the first inductance channel 910 and the second inductance channel 920.
- [197] The aerosol-generating device 10 may determine the type of stick 20 inserted into the insertion space 130 in response to insertion of the stick 20 in operation S1330. For example, the aerosol-generating device 10 may determine the type of stick 20 inserted into the insertion space 130 based on a signal corresponding to the first inductance channel 910 and/or a signal corresponding to the second inductance channel 920. This will be described below with reference to FIG. 14.
- [198] Referring to FIG. 14, the aerosol-generating device 10 may determine whether the first frequency variation is equal to or greater than a predetermined first threshold in operations S1410 and S1420.
- [199] Upon determining that the first frequency variation is equal to or greater than the predetermined first threshold, the aerosol-generating device 10 may determine the type of stick 20 to be a first type in operation S1430. Here, the first threshold may correspond to the thickness of the first partial wrapper 1210 included in the stick 20, which is of the first type.
- [200] Upon determining that the first frequency variation is less than the predetermined first threshold, the aerosol-generating device 10 may check the second frequency variation in operation S1440.
- [201] The aerosol-generating device 10 may determine whether the second frequency variation is equal to or greater than a predetermined second threshold in operation S1450.
- [202] Upon determining that the second frequency variation is equal to or greater than the predetermined second threshold, the aerosol-generating device 10 may determine the type of stick 20 to be a second type in operation S1460. Here, the second threshold may correspond to the thickness of the second partial wrapper 1220 included in the stick 20, which is of the second type.
- [203] Upon determining that the second frequency variation is less than the predetermined second threshold, the aerosol-generating device 10 may determine the type of stick 20 to be a third type in operation S1470.
- [204] According to an embodiment, the aerosol-generating device 10 may determine the

type of stick 20 based on whether the sum of the first frequency variation and the second frequency variation is equal to or greater than a predetermined third threshold. According to an embodiment, the aerosol-generating device 10 may determine the type of stick 20 based on whether the difference between the square of the first frequency variation and the square of the second frequency variation is equal to or greater than a predetermined fourth threshold. Accordingly, the aerosol-generating device 10 may accurately determine the type of stick 20 even when the first frequency variation and/or the second frequency variation are small or the difference between the two frequency variations is small.

[205] Referring back to FIG. 13, the aerosol-generating device 10 may determine whether the type of stick 20 inserted into the insertion space 130 is the same as a predetermined type in operation S1340. For example, the predetermined type may be the type of stick 20 used by the user just before the stick 20 is inserted into the insertion space 130. For example, the predetermined type may be a type set by the user through the input/output interface 12.

[206] Upon determining that the type of stick 20 inserted into the insertion space 130 is different from the predetermined type, the aerosol-generating device 10 may output a screen corresponding to the type of stick 20 on the display 720 in operation S1350. Here, the screen corresponding to the type of stick 20 may include at least one object indicating the type of stick 20 that can be used in the aerosol-generating device 10.

[207] Referring to FIG. 15, upon determining that the type of stick 20 inserted into the insertion space 130 is different from the predetermined type, the aerosol-generating device 10 may output a screen 1500 corresponding to the type of stick 20 on the display 720. Here, the screen corresponding to the type of stick 20 may be a screen for setting the use mode of the aerosol-generating device 10. The use mode of the aerosol-generating device 10 may correspond to the type of stick 20. For example, when the number of modes that can be set to the use mode of the aerosol-generating device 10 is three, the number of types of sticks that can be used in the aerosol-generating device 10 may be three.

[208] The screen 1500 corresponding to the type of stick 20 may include objects 1510, 1520, and 1530 corresponding, respectively, to a plurality of types. In this case, when the type of stick 20 inserted into the insertion space 130 is different from the predetermined type, an indicator 1540 indicating the type of stick 20 currently inserted into the insertion space may be displayed. Accordingly, when a stick 20 that is of a different type than the stick previously used by the user is inserted into the insertion space 130, the user may intuitively identify the type of stick 20 selected in response to user input.

[209] The user may select any one of the objects included in the screen 1500 corresponding

to the type of stick 20. For example, the aerosol-generating device 10 may receive touch input for selecting any one of the objects 1510, 1520, and 1530 output on the display 720. According to an embodiment, when the type of stick 20 is selected, the aerosol-generating device 10 may change the predetermined type to the selected type of stick 20.

- [210] Referring to FIG. 16, upon receiving touch input for selecting any one of the objects 1510, 1520, and 1530 corresponding, respectively, to the plurality of types, the aerosol-generating device 10 may output a screen corresponding to change of the predetermined type on the display 720. For example, upon receiving user input for selecting an object 1520 corresponding to the type of stick 20 currently inserted into the insertion space, the aerosol-generating device 10 may display the object 1520 corresponding to the type of stick 20 currently inserted into the insertion space more clearly than the other objects 1510 and 1530. Accordingly, the user may intuitively identify the type of stick 20 selected in response to the user input.
- [211] According to an embodiment, upon receiving user input for selecting an object 1520 corresponding to the type of stick 20 currently inserted into the insertion space, the aerosol-generating device 10 may generate vibration corresponding to change of the predetermined type using the motor 730.
- [212] Referring back to FIG. 13, the aerosol-generating device 10 may determine whether the type of stick 20 inserted into the insertion space 130 is selected in operation S1360.
- [213] Upon determining that the type of stick 20 inserted into the insertion space 130 is the same as the predetermined type or that the type of stick 20 inserted into the insertion space 130 is selected, the aerosol-generating device 10 may supply power to the heater 110 in operation S1370.
- [214] According to an embodiment, the memory 14 may store a temperature profile corresponding to the type of stick 20. For example, in the case in which a plurality of types of sticks can be used in the aerosol-generating device 10, the memory 14 may store a plurality of temperature profiles corresponding to the plurality of types. In this case, the aerosol-generating device 10 may supply power to the heater 110 based on the temperature profile corresponding to the type of stick 20 inserted into the insertion space 130 among the plurality of temperature profiles stored in the memory 14.
- [215] Meanwhile, upon determining that the type of stick 20 inserted into the insertion space 130 is different from the predetermined type and that a type different from the type of stick 20 inserted into the insertion space 130 is selected, the aerosol-generating device 10 may interrupt the supply of power to the heater 110.
- [216] As described above, according to at least one of the embodiments of the present disclosure, it may be possible to distinguish the type of stick inserted into the insertion space.

- [217] In addition, according to at least one of the embodiments of the present disclosure, it may be possible to provide information about the type of stick inserted into the insertion space to the user.
- [218] In addition, according to at least one of the embodiments of the present disclosure, it may be possible to notify the user that a stick that is of a different type than a previously used stick is inserted.
- [219] In addition, according to at least one of the embodiments of the present disclosure, it may be possible to determine whether to heat the heater depending on the type of stick inserted into the insertion space.
- [220] Referring to FIGs. 1 to 16, an aerosol-generating device 10 in accordance with one aspect of the present disclosure may include a housing 101 having an insertion space 130 defined therein, a heater 110 configured to heat a stick 20 inserted into the insertion space 130, a stick detection sensor 800 configured to output a signal corresponding to the insertion space 130, a display 720, and a controller 17. The sensor 800 may include a first inductance channel 910 disposed so as to correspond to a first region of the insertion space 130 and a second inductance channel 920 disposed so as to correspond to a second region of the insertion space 130. The controller 17 may determine the type of stick 20 inserted into the insertion space 130 based on at least one of a signal corresponding to the first inductance channel 910 or a signal corresponding to the second inductance channel 920. When the determined type of stick 20 is the same as a predetermined type, the controller 17 may supply power to the heater 110, and when the determined type of stick 20 is different from the predetermined type, the controller 17 may output a screen corresponding to the determined type of stick 20 on the display 720.
- [221] In addition, in accordance with another aspect of the present disclosure, the aerosol-generating device may further include an interface 12 configured to receive user input. Upon receiving user input selecting the determined type of stick 20 through the interface 12, the controller 17 may change the predetermined type to the determined type of stick 20.
- [222] In addition, in accordance with another aspect of the present disclosure, the aerosol-generating device may further include an interface 12 configured to receive user input. Upon receiving user input selecting the determined type of stick 20 through the interface 12, the controller 17 may output a screen corresponding to change of the predetermined type on the display 720.
- [223] In addition, in accordance with another aspect of the present disclosure, the aerosol-generating device may further include an interface 12 configured to receive user input. Upon receiving user input selecting the determined type of stick 20 through the interface 12, the controller 17 may supply power to the heater 110.

- [224] In addition, in accordance with another aspect of the present disclosure, when variation in the frequency of the current flowing through the first inductance channel 910 is equal to or greater than a first threshold, the controller 17 may determine that the type of stick 20 is a first type. When variation in the frequency of the current flowing through the first inductance channel 910 is less than the first threshold, the controller 17 may determine whether the type of stick 20 is a second type based on whether variation in the frequency of the current flowing through the second inductance channel 920 is equal to or greater than a second threshold.
- [225] In addition, in accordance with another aspect of the present disclosure, when variation in the frequency of the current flowing through the first inductance channel 910 is equal to or greater than a first threshold, the controller 17 may determine that the type of stick 20 is a first type. When variation in the frequency of the current flowing through the first inductance channel 910 is less than the first threshold, the controller 17 may determine whether the type of stick 20 is a second type based on whether the sum of variation in the frequency of the current flowing through the first inductance channel 910 and variation in the frequency of the current flowing through the second inductance channel 920 is equal to or greater than a third threshold.
- [226] In addition, in accordance with another aspect of the present disclosure, when variation in the frequency of the current flowing through the first inductance channel 910 is equal to or greater than a first threshold, the controller 17 may determine that the type of stick 20 is a first type. When variation in the frequency of the current flowing through the first inductance channel 910 is less than the first threshold, the controller 17 may determine whether the type of stick 20 is a second type based on whether the difference between the square of variation in the frequency of the current flowing through the first inductance channel 910 and the square of variation in the frequency of the current flowing through the second inductance channel 920 is equal to or greater than a fourth threshold.
- [227] In addition, in accordance with another aspect of the present disclosure, the heater 110 may be disposed so as to surround the insertion space 130, and the first inductance channel 910 and the second inductance channel 920 may be disposed so as to surround the heater 110.
- [228] In addition, in accordance with another aspect of the present disclosure, the heater 110 may be disposed so as to correspond to at least a portion of the first region of the insertion space 130 and at least a portion of the second region of the insertion space 130.
- [229] A system in accordance with one aspect of the present disclosure may include an aerosol-generating device 10 and a stick 20. The aerosol-generating device 10 may include a housing 101 having an insertion space 130 defined therein, a heater 110

configured to heat the stick 20 inserted into the insertion space 130, a stick detection sensor 800 configured to output a signal corresponding to the insertion space 130, a display 720, and a controller 17. The stick detection sensor 800 may include a first inductance channel 910 disposed so as to correspond to a first region of the insertion space 130 and a second inductance channel 920 disposed so as to correspond to a second region of the insertion space 130. The controller 17 may determine the type of stick 20 inserted into the insertion space 130 based on at least one of a signal corresponding to the first inductance channel 910 or a signal corresponding to the second inductance channel 920. When the determined type of stick 20 is the same as a predetermined type, the controller 17 may supply power to the heater 110, and when the determined type of stick 20 is different from the predetermined type, the controller 17 may output a screen corresponding to the determined type of stick 20 on the display 720. The stick 20 may include a wrapper 241 configured to wrap an aerosol-generating substance, and the wrapper 241 may include a first partial wrapper 1210 formed to have a first thickness so as to correspond to the first region and a second partial wrapper 1220 formed to have a second thickness so as to correspond to the second region.

- [230] Certain embodiments or other embodiments of the disclosure described above are not mutually exclusive or distinct from each other. Any or all elements of the embodiments of the disclosure described above may be combined with another or combined with each other in configuration or function.
- [231] For example, a configuration "A" described in one embodiment of the disclosure and the drawings and a configuration "B" described in another embodiment of the disclosure and the drawings may be combined with each other. Namely, although the combination between the configurations is not directly described, the combination is possible except in the case where it is described that the combination is impossible
- [232] Although embodiments have been described with reference to a number of illustrative embodiments thereof, it should be understood that numerous other modifications and embodiments can be devised by those skilled in the art that will fall within the scope of the principles of this disclosure. More particularly, various variations and modifications are possible in the component parts and/or arrangements of the subject combination arrangement within the scope of the disclosure, the drawings and the appended claims. In addition to variations and modifications in the component parts and/or arrangements, alternative uses will also be apparent to those skilled in the art.

Claims

- [Claim 1] An aerosol-generating device comprising:
a housing shaped to define an insertion space that is elongated;
a heater configured to heat a stick upon insertion into the insertion space;
a stick detection sensor configured to output a signal associated with the insertion space;
a display; and
at least one processor,
wherein the stick detection sensor comprises:
a first inductance channel disposed to correspond to a first region of the insertion space; and
a second inductance channel disposed to correspond to a second region of the insertion space, and
wherein the at least one processor is configured to:
determine a type of the stick based on at least one of a first signal corresponding to the first inductance channel or a second signal corresponding to the second inductance channel;
supply power to the heater based on the determined type of the stick being same as a predetermined type; and
control the display to output a screen corresponding to the determined type of the stick based on the determined type of the stick being different from the predetermined type.
- [Claim 2] The aerosol-generating device according to claim 1, further comprising an input interface,
wherein the at least one processor is further configured to change the predetermined type to the determined type of the stick in response to receiving, via the input interface, user input selecting the determined type of the stick.
- [Claim 3] The aerosol-generating device according to claim 1, further comprising an input interface,
wherein the at least one processor is further configured to control the display to output a screen corresponding to a change of the predetermined type in response to receiving, via the input interface, user input selecting the determined type of the stick.
- [Claim 4] The aerosol-generating device according to claim 1, further comprising an input interface,

wherein the at least one processor is further configured to supply the power to the heater in response to receiving, via the input interface, user input selecting the determined type of the stick.

[Claim 5] The aerosol-generating device according to claim 1, wherein the at least one processor is further configured to:

determine that the type of the stick is a first type in response to a variation in frequency of a current flowing through the first inductance channel being equal to or greater than a first threshold; and
in response to the variation in frequency of the current flowing through the first inductance channel being less than the first threshold, determine whether the type of the stick is a second type based on whether a variation in frequency of a current flowing through the second inductance channel is equal to or greater than a second threshold.

[Claim 6] The aerosol-generating device according to claim 1, wherein the at least one processor is further configured to:

determine that the type of the stick is a first type in response to a variation in frequency of a current flowing through the first inductance channel being equal to or greater than a first threshold; and
in response to the variation in frequency of the current flowing through the first inductance channel being less than the first threshold, determine whether the type of the stick is a second type based on whether a sum of the variation in frequency of the current flowing through the first inductance channel and a variation in frequency of a current flowing through the second inductance channel is equal to or greater than a second threshold.

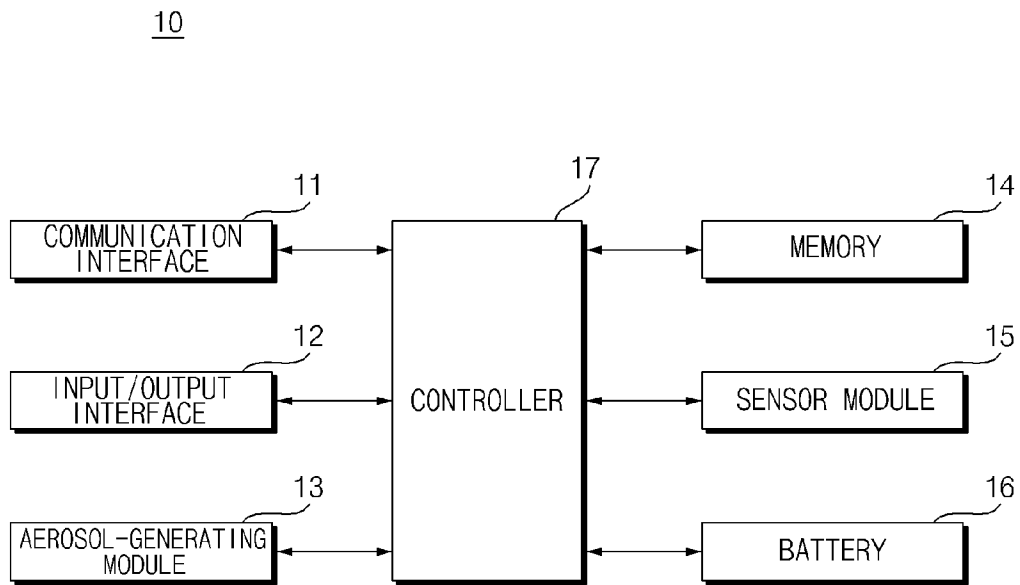
[Claim 7] The aerosol-generating device according to claim 1, wherein the at least one processor is further configured to:

determine that the type of the stick is a first type in response to a variation in frequency of a current flowing through the first inductance channel being equal to or greater than a first threshold; and
in response to the variation in frequency of the current flowing through the first inductance channel being less than the first threshold, determine whether the type of the stick is a second type based on whether a difference between a square of the variation in frequency of the current flowing through the first inductance channel and a square of a variation in frequency of a current flowing through the second inductance channel is equal to or greater than a second threshold.

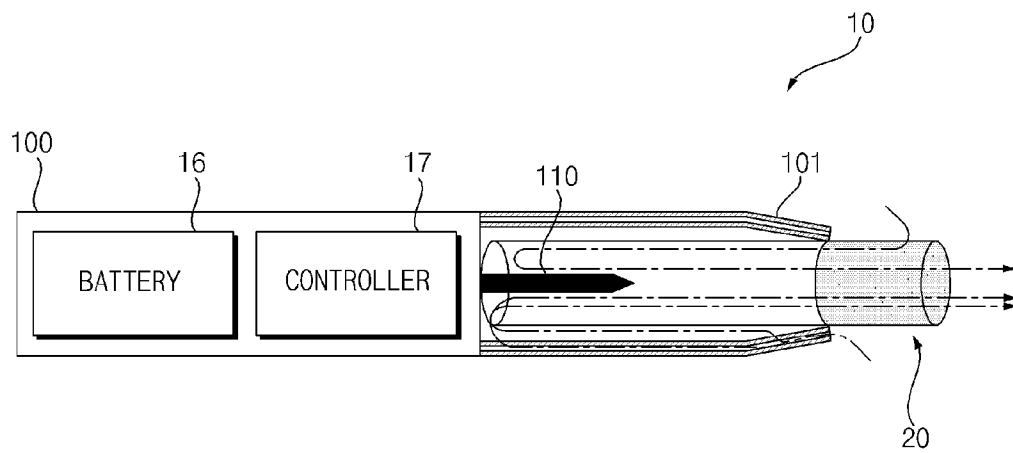
- [Claim 8] The aerosol-generating device according to claim 1, wherein the heater is disposed to surround the insertion space, and wherein the first inductance channel and the second inductance channel are disposed to surround the heater.
- [Claim 9] The aerosol-generating device according to claim 1, wherein the heater is disposed to correspond to at least a portion of the first region of the insertion space and at least a portion of the second region of the insertion space.
- [Claim 10] A system comprising:
an aerosol-generating device; and
a stick,
wherein the aerosol-generating device comprises:
a housing shaped to define an insertion space that is elongated;
a heater configured to heat the stick upon insertion into the insertion space;
a stick detection sensor configured to output a signal associated with the insertion space;
a display; and
at least one processor,
wherein the stick detection sensor comprises:
a first inductance channel disposed to correspond to a first region of the insertion space; and
a second inductance channel disposed to correspond to a second region of the insertion space,
wherein the stick comprises a wrapper configured to wrap an aerosol-generating substance,
wherein the wrapper comprises:
a first partial wrapper having a first thickness to correspond to the first region; and
a second partial wrapper having a second thickness to correspond to the second region, and
wherein the at least one processor is configured to:
determine a type of the stick based on at least one of a first signal corresponding to the first inductance channel or a second signal corresponding to the second inductance channel;
supply power to the heater based on the determined type of the stick being same as a predetermined type; and
control the display to output a screen corresponding to the determined

type of the stick based on the determined type of the stick being different from the predetermined type.

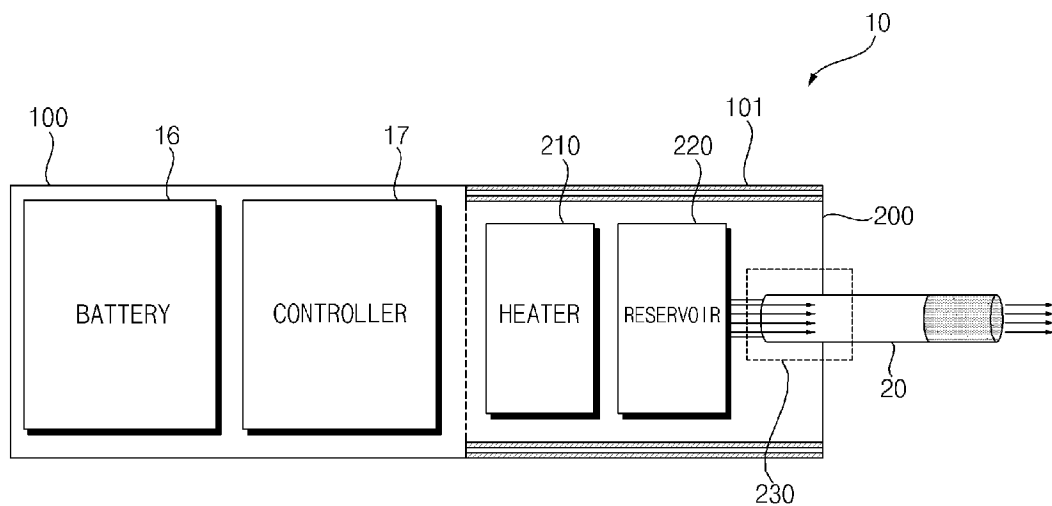
[Fig. 1]



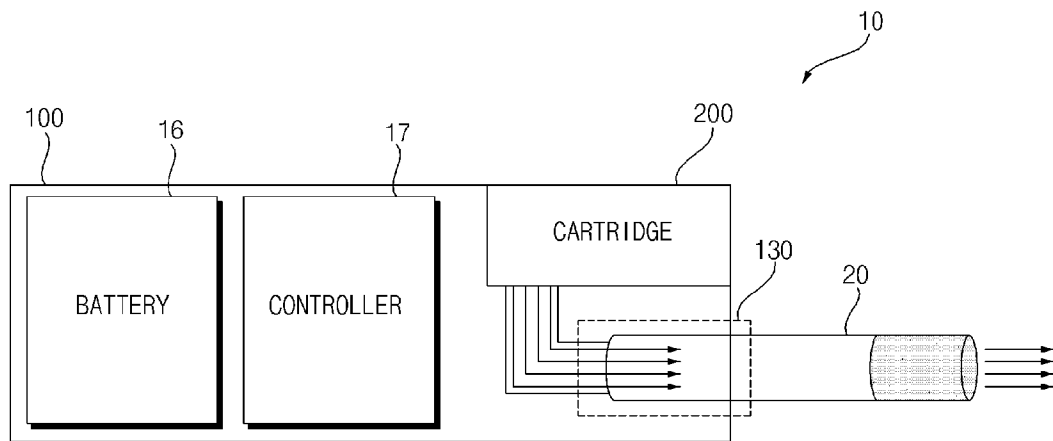
[Fig. 2]



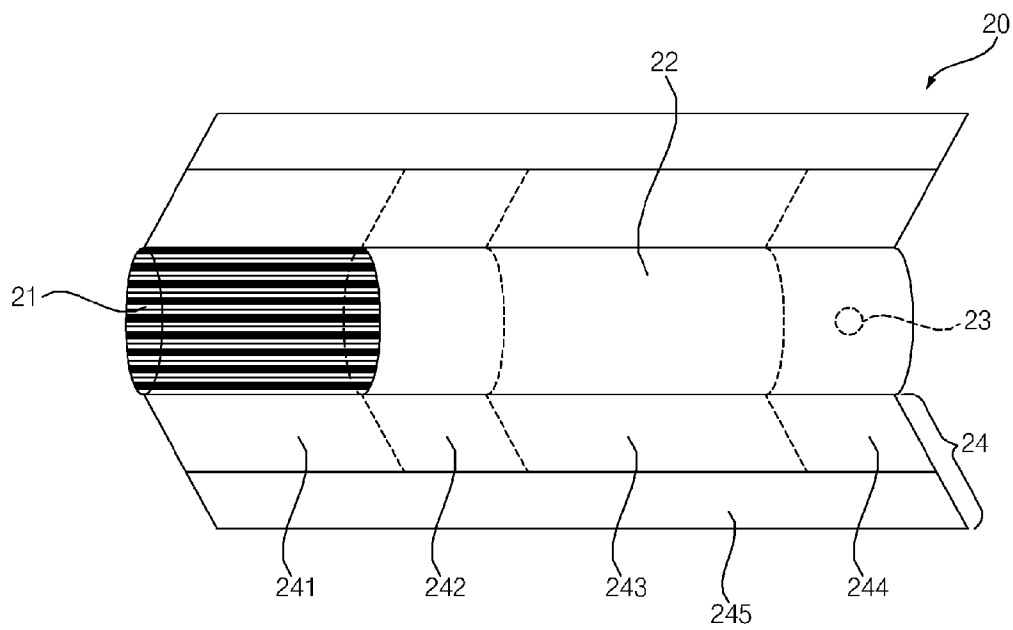
[Fig. 3]



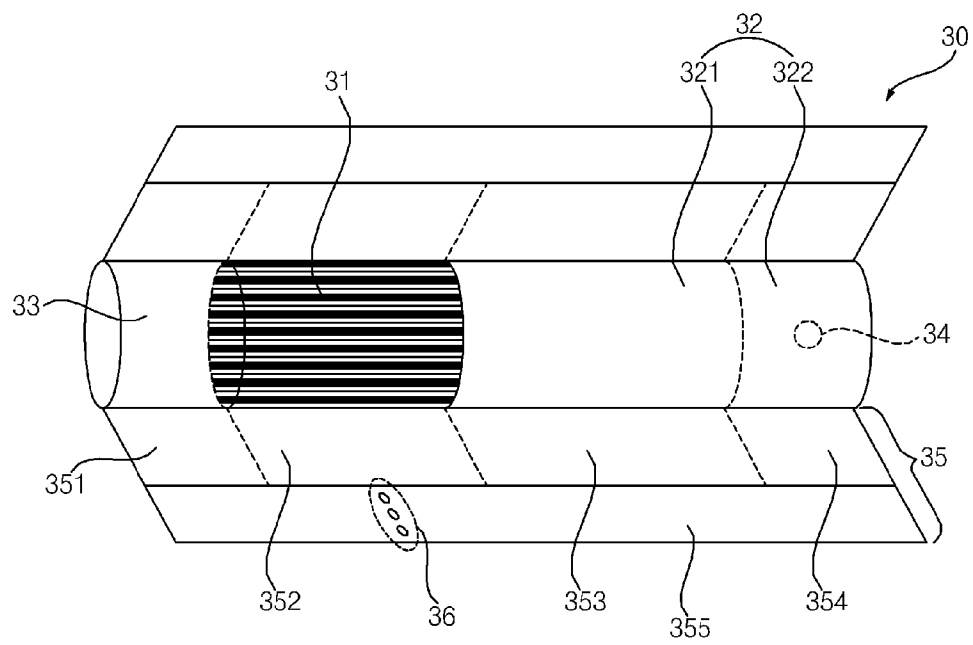
[Fig. 4]



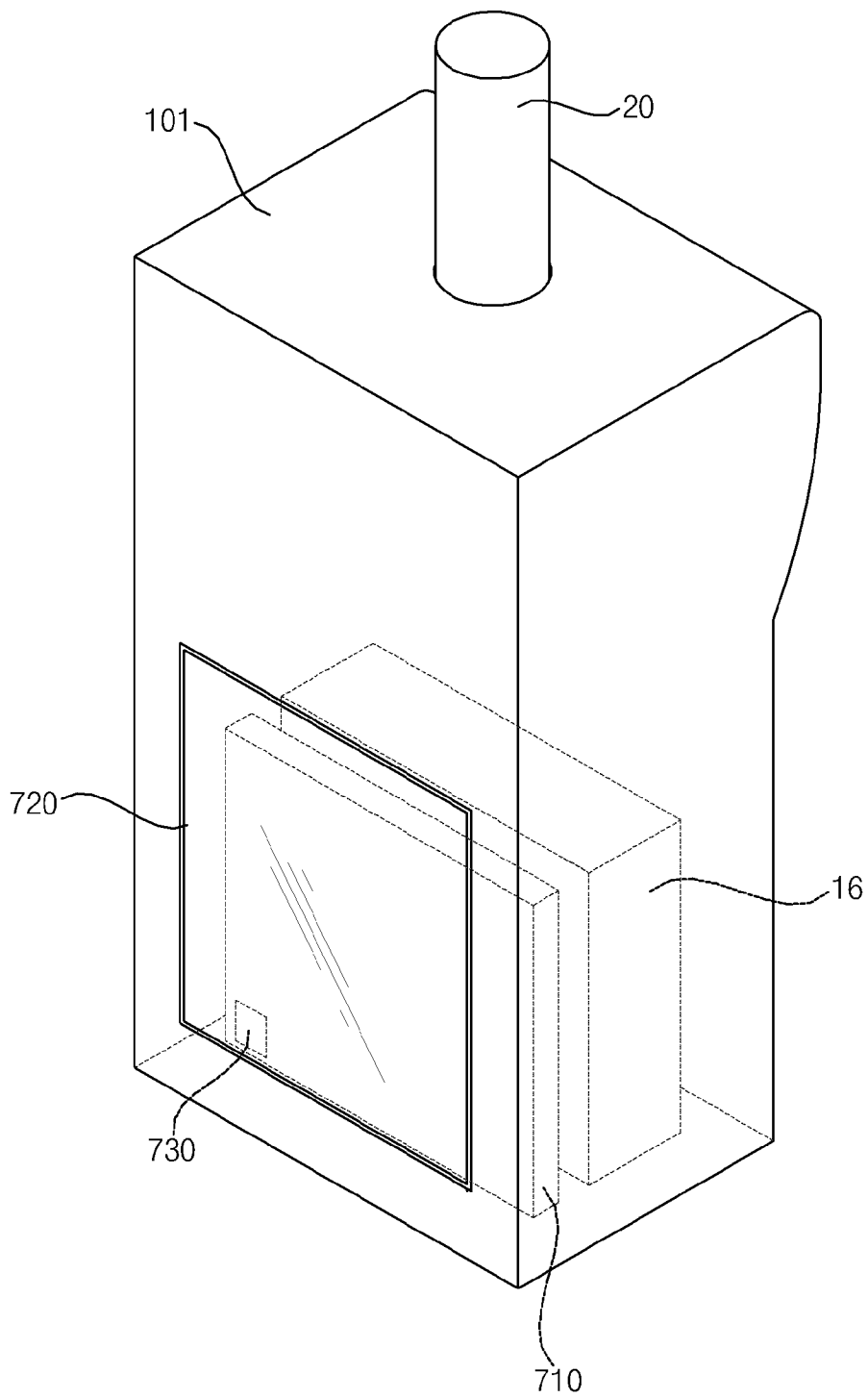
[Fig. 5]



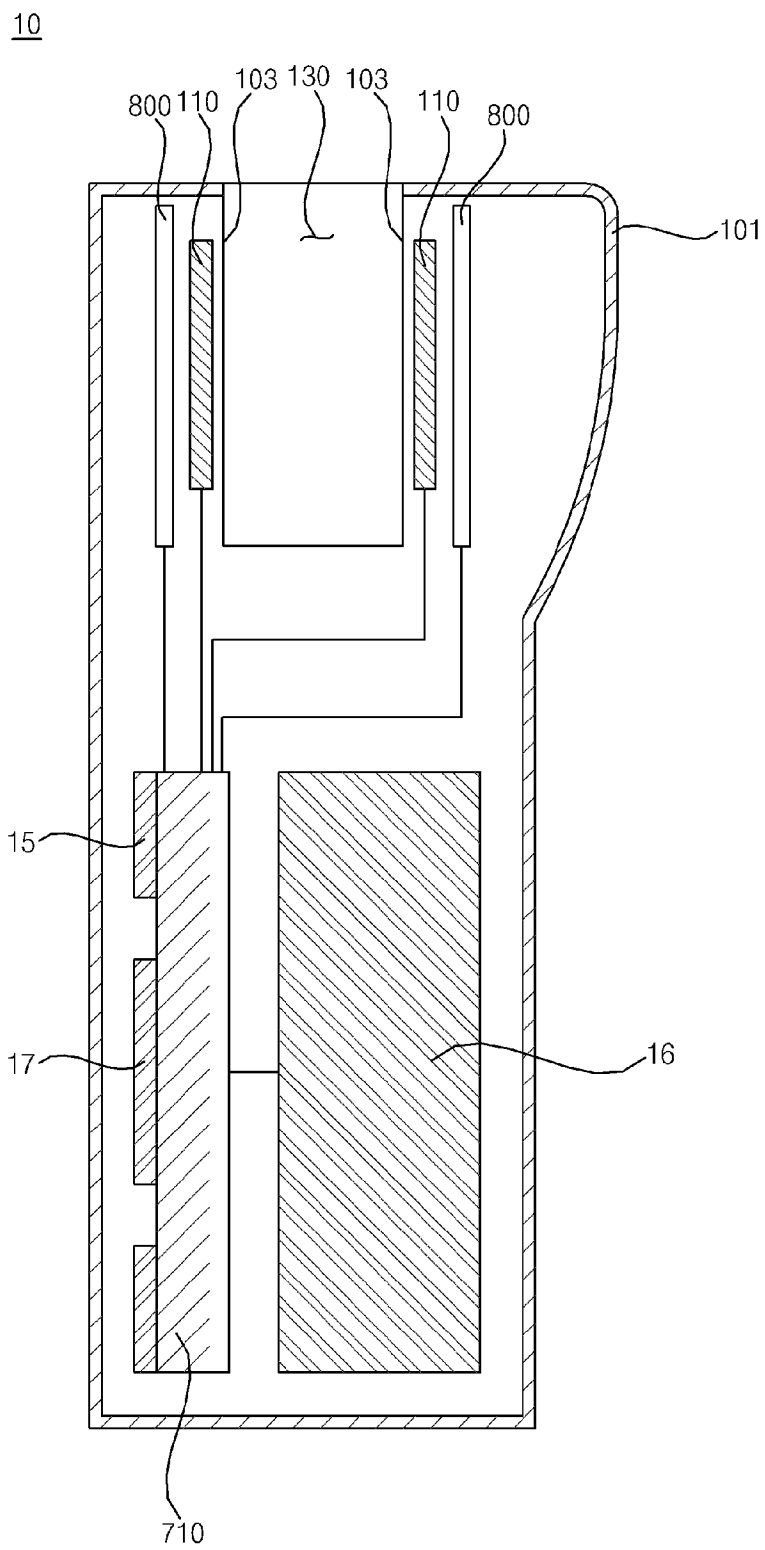
[Fig. 6]



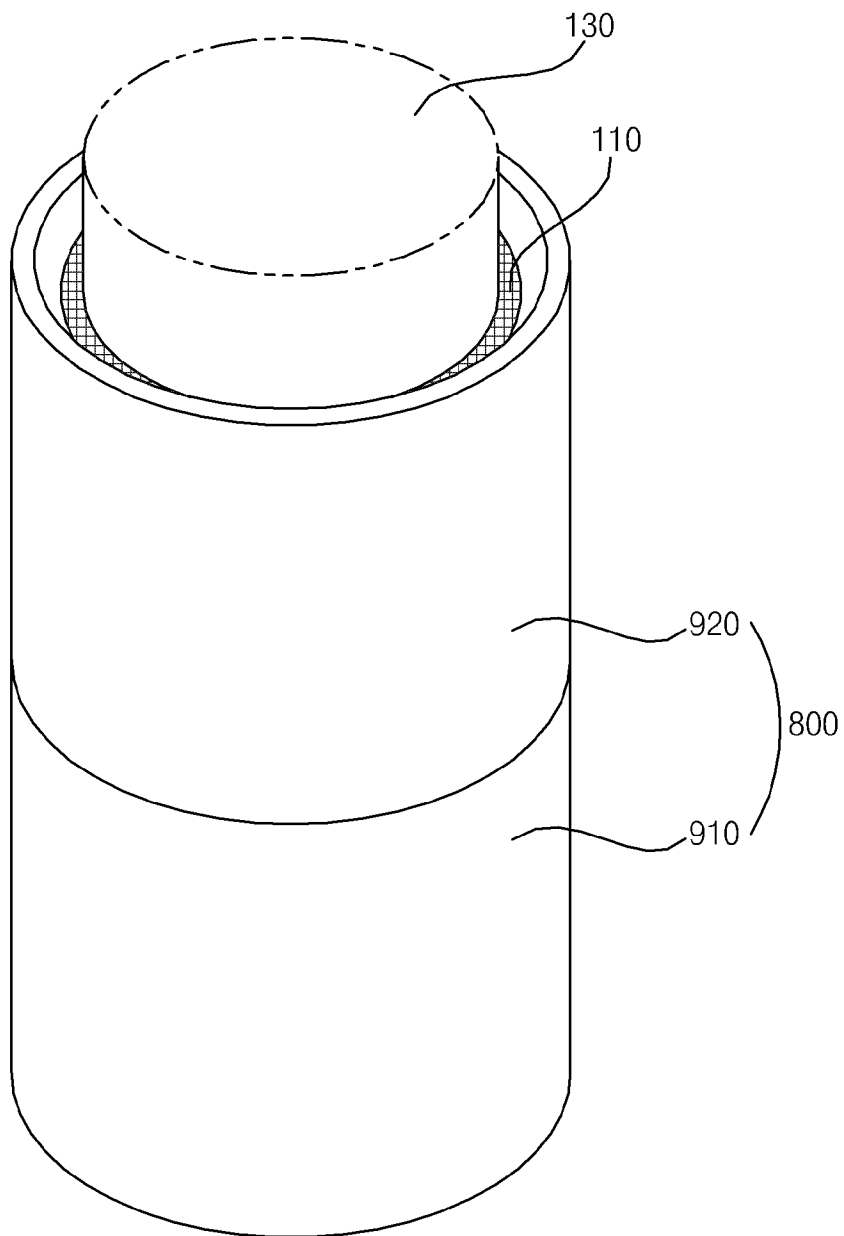
[Fig. 7]



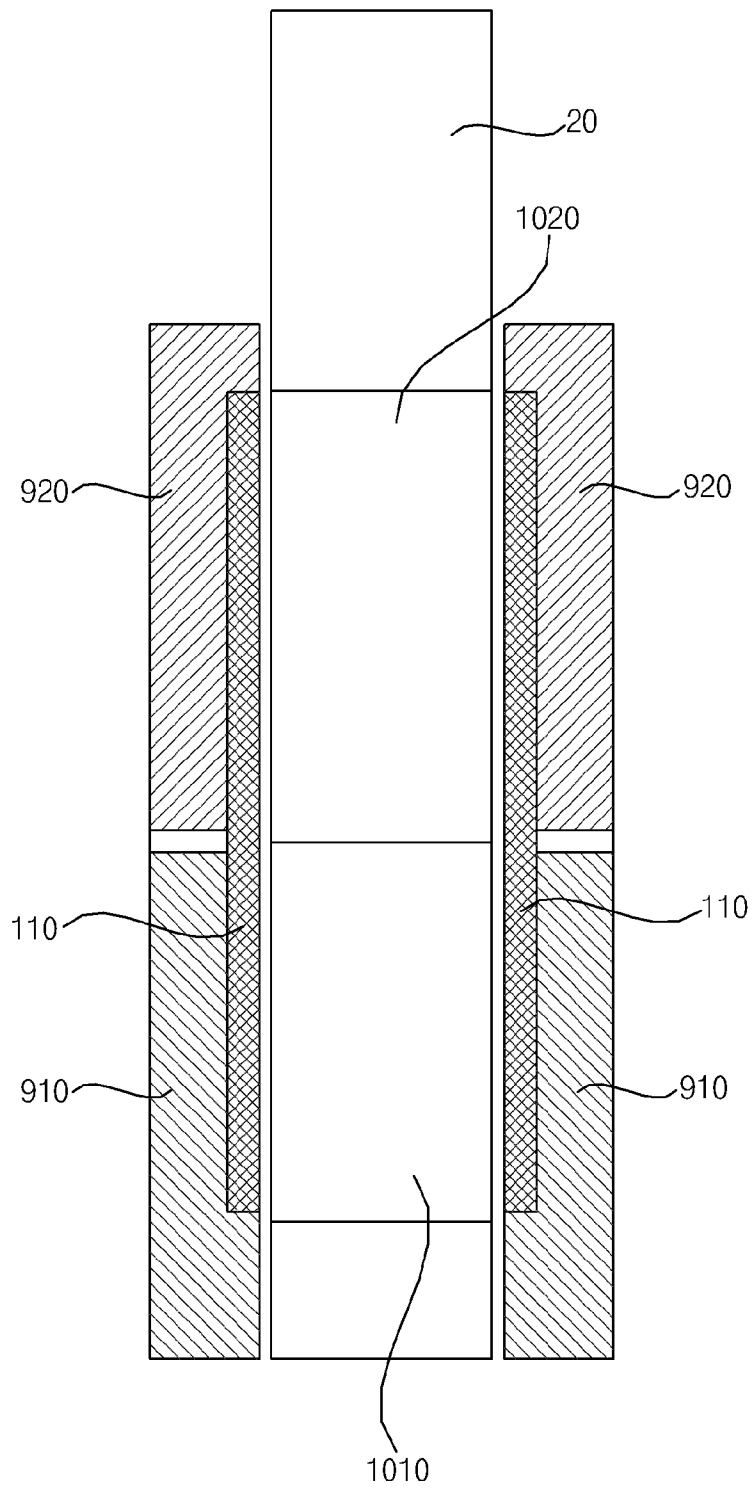
[Fig. 8]



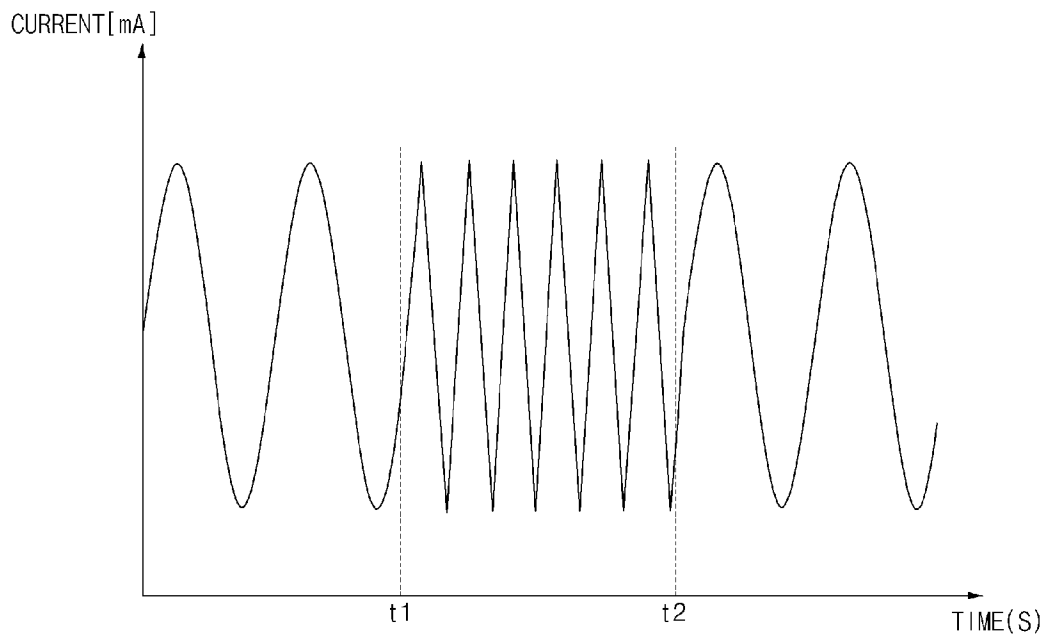
[Fig. 9]



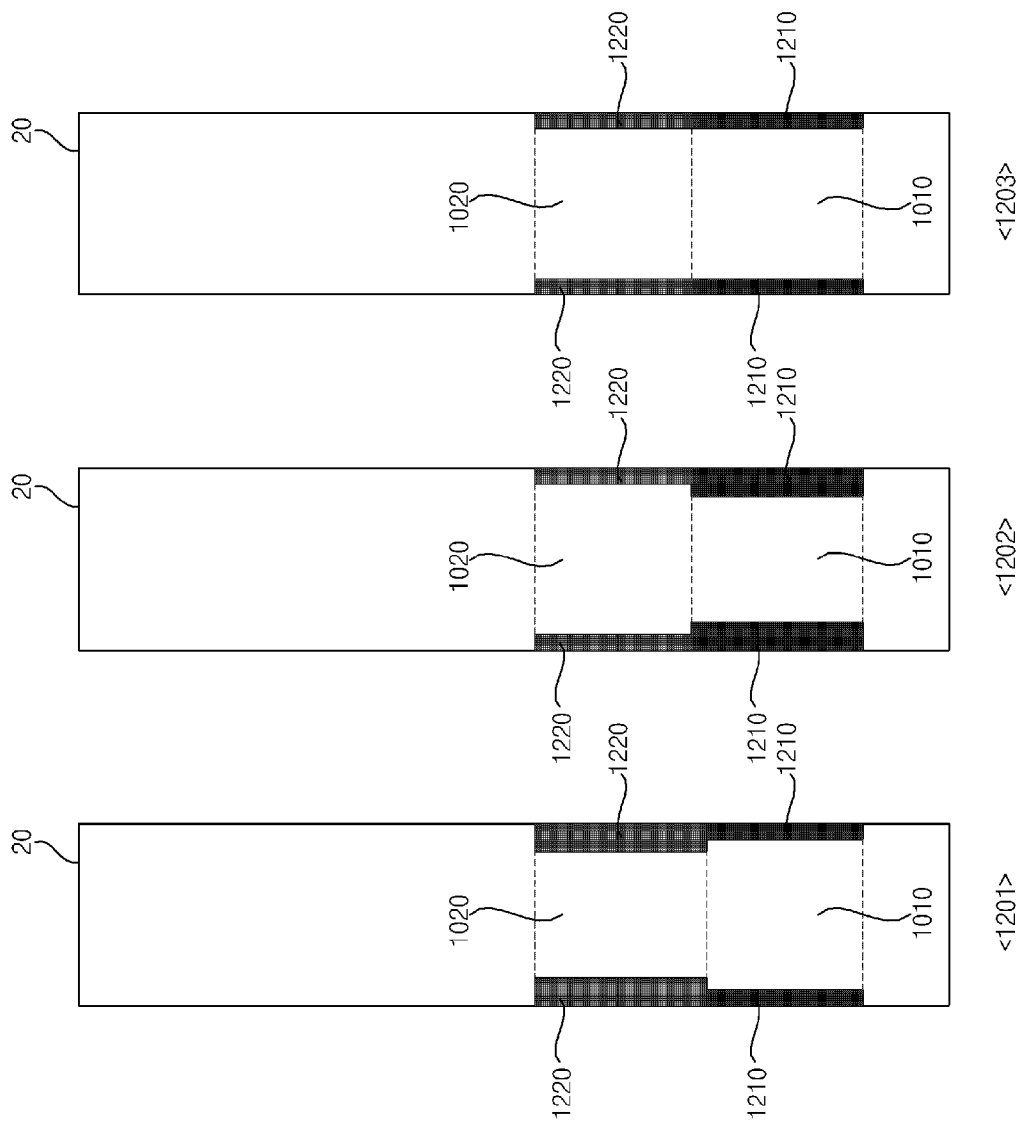
[Fig. 10]



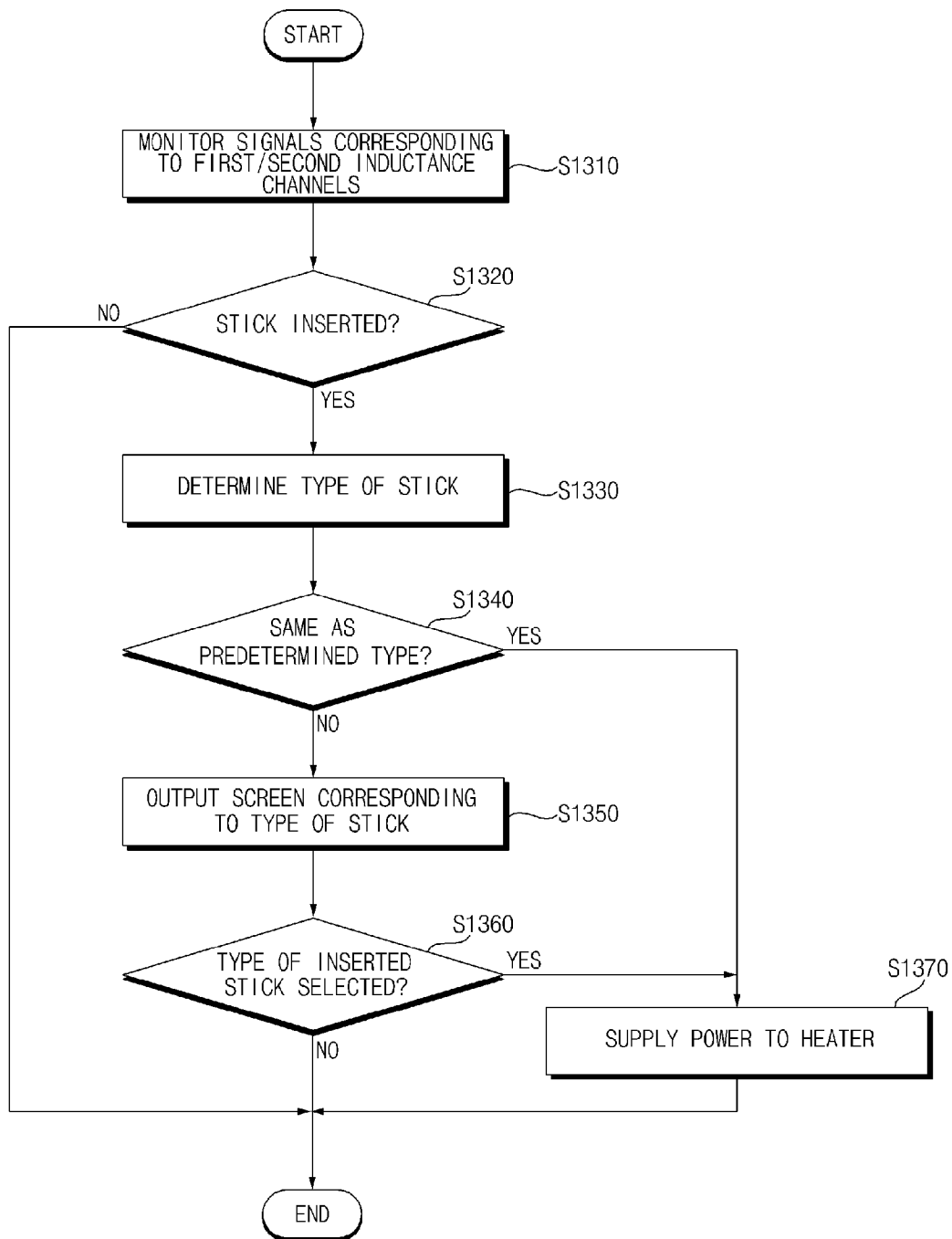
[Fig. 11]



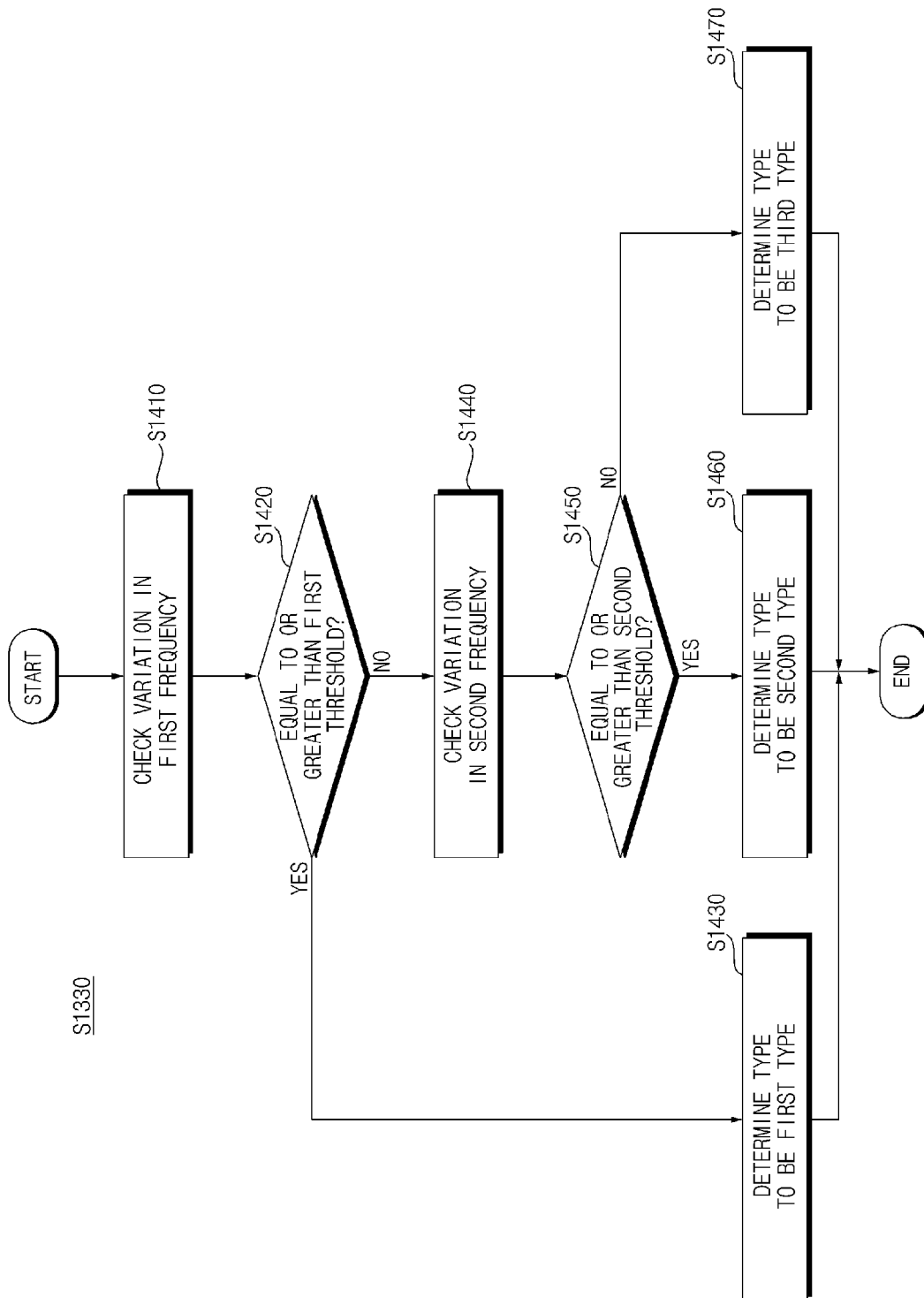
[Fig. 12]



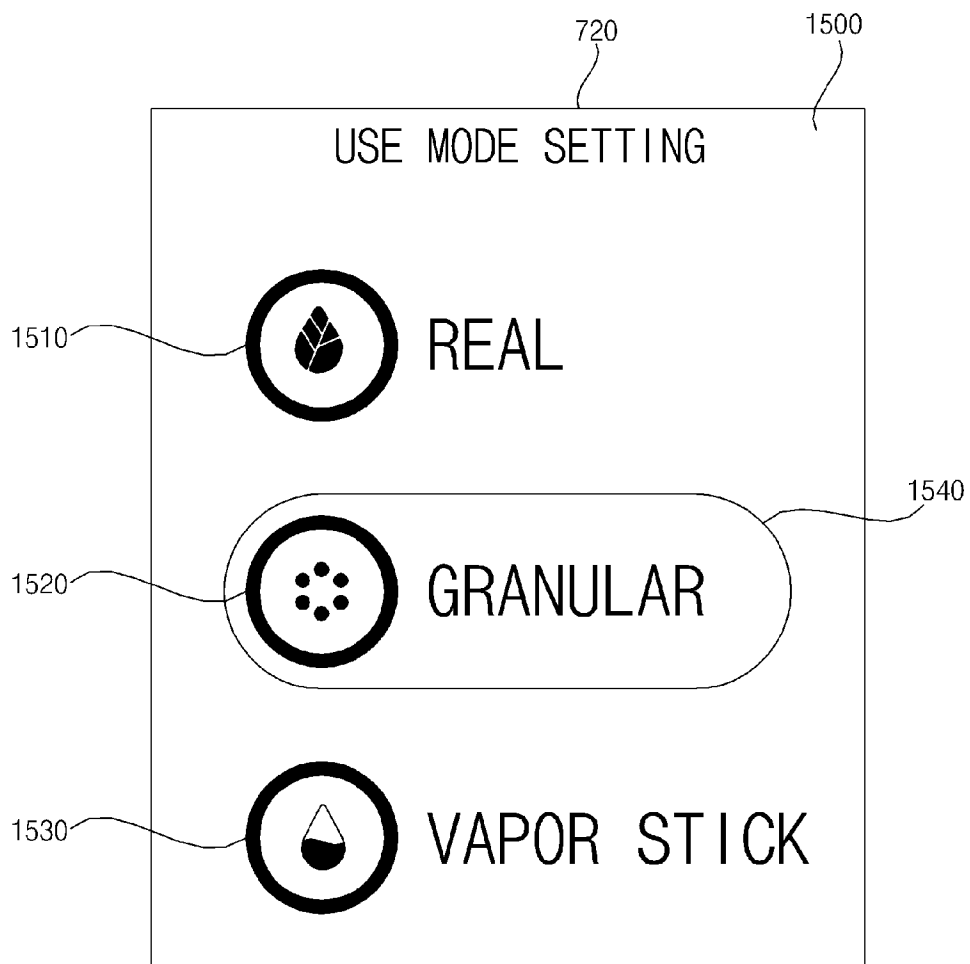
[Fig. 13]



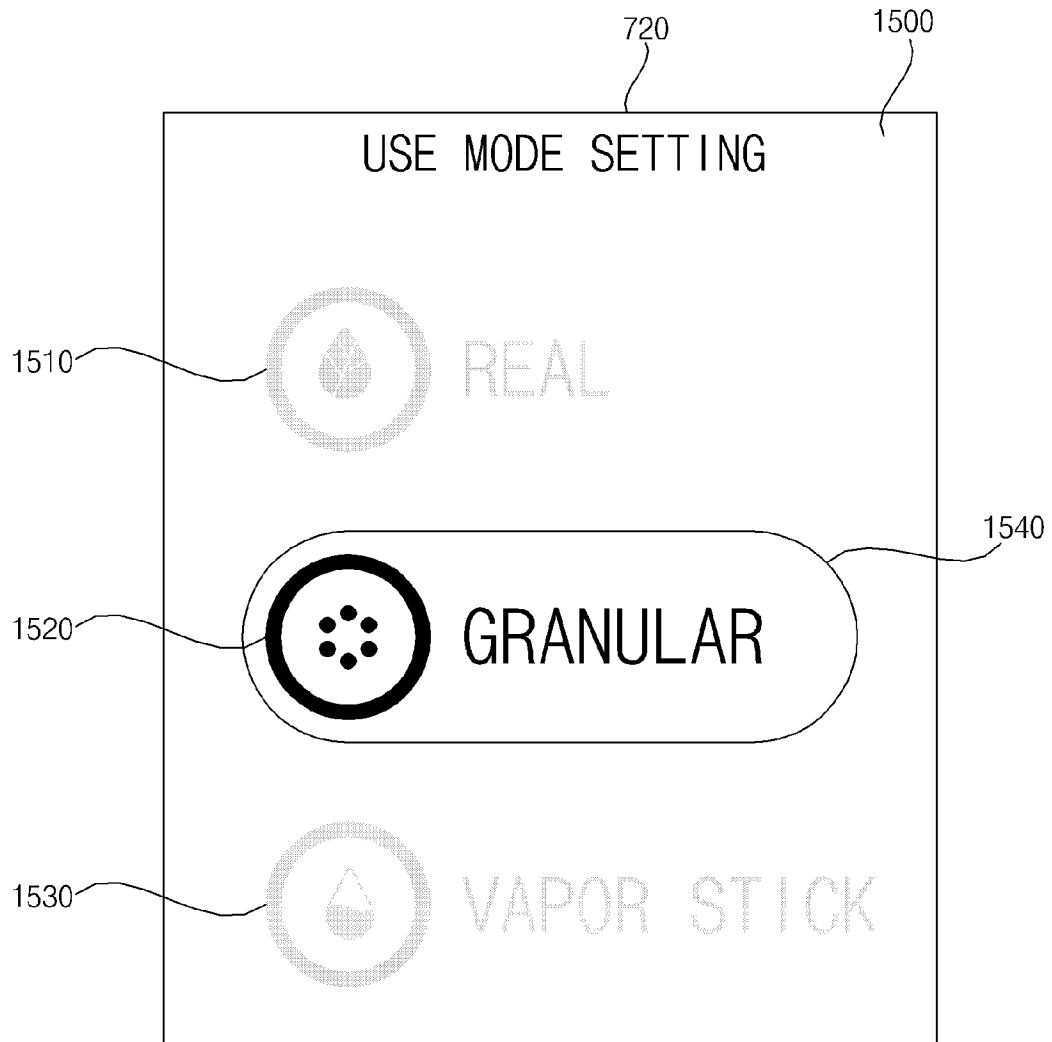
[Fig. 14]



[Fig. 15]



[Fig. 16]



INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR2022/016859

A. CLASSIFICATION OF SUBJECT MATTER

A24F 40/60(2020.01)i; A24F 40/50(2020.01)i; A24F 40/51(2020.01)i; A24F 40/46(2020.01)i; A24D 1/02(2006.01)i; D21H 19/02(2006.01)i; D21H 27/00(2006.01)i; A24F 40/20(2020.01)i; A24D 1/20(2020.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A24F 40/60(2020.01); A24F 40/50(2020.01); A24F 40/51(2020.01); A24F 47/00(2006.01); G01D 5/24(2006.01); H05B 6/06(2006.01)

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

Korean utility models and applications for utility models
Japanese utility models and applications for utility models

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

eKOMPASS(KIPO internal) & Keywords: aerosol generator, determine types of stick, stick detector, display, inductance channel, user input, different thickness wrapper

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2017-0095003 A1 (PHILIP MORRIS PRODUCTS S.A.) 06 April 2017 (2017-04-06) See paragraphs [0018], [0029], [0038]-[0043], [0049]-[0051]; and figure 2.	1-4,8-9
A		5-7,10
Y	US 2018-0049469 A1 (BRITISH AMERICAN TOBACCO (INVESTMENTS) LIMITED) 22 February 2018 (2018-02-22) See paragraphs [0048], [0052]-[0054], [0068], [0073], [0075]; and figure 10.	1-4,8-9
A	WO 2021-157836 A1 (KT&G CORPORATION) 12 August 2021 (2021-08-12) See the whole document.	1-10
A	WO 2016-184824 A1 (JT INTERNATIONAL SA) 24 November 2016 (2016-11-24) See the whole document.	1-10



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

“A” document defining the general state of the art which is not considered to be of particular relevance
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Date of the actual completion of the international search

27 February 2023

Date of mailing of the international search report

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INTERNATIONAL SEARCH REPORT

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PCT/KR2022/016859

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	KR 10-2020-0061233 A (KT&G CORPORATION) 02 June 2020 (2020-06-02) See the whole document.	1-10

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/KR2022/016859

Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)		Publication date (day/month/year)
US	2017-0095003	A1	06 April 2017	CA	2939882 A1	26 November 2015
				CN	106455714 A	22 February 2017
				CN	106455714 B	09 October 2020
				CN	111035072 A	21 April 2020
				CN	111109662 A	08 May 2020
				CN	111449293 A	28 July 2020
				EP	3145340 A1	29 March 2017
				EP	3145340 B1	04 July 2018
				EP	3406148 A1	28 November 2018
				EP	3406148 B1	18 November 2020
				EP	3777572 A1	17 February 2021
				JP	2017-515488 A	15 June 2017
				JP	2020-171310 A	22 October 2020
				JP	2022-058616 A	12 April 2022
				JP	6789119 B2	25 November 2020
				JP	7011684 B2	27 January 2022
				KR	10-2017-0007262 A	18 January 2017
				US	10159283 B2	25 December 2018
				US	10463080 B2	05 November 2019
				US	10959463 B2	30 March 2021
				US	2018-0317561 A1	08 November 2018
				US	2020-0000152 A1	02 January 2020
				US	2021-0120875 A1	29 April 2021
				WO	2015-177247 A1	26 November 2015
US	2018-0049469	A1	22 February 2018	CA	2940693 A1	24 September 2015
				CA	2940693 C	24 July 2018
				CN	106455707 A	22 February 2017
				CN	106455707 B	24 July 2020
				EP	3119224 A1	25 January 2017
				JP	2017-510270 A	13 April 2017
				JP	6348985 B2	27 June 2018
				KR	10-1971169 B1	22 April 2019
				KR	10-2016-0124853 A	28 October 2016
				KR	10-2019-0014596 A	12 February 2019
				KR	10-2123900 B1	17 June 2020
				US	10687553 B2	23 June 2020
				US	2020-0260790 A1	20 August 2020
				WO	2015-140312 A1	24 September 2015
WO	2021-157836	A1	12 August 2021	CA	3117188 A1	07 August 2021
				CN	113507851 A	15 October 2021
				EP	3886616 A1	06 October 2021
				JP	2022-522610 A	20 April 2022
				KR	10-2325373 B1	11 November 2021
				US	2022-0361582 A1	17 November 2022
WO	2016-184824	A1	24 November 2016	EP	3297466 A1	28 March 2018
				EP	3297466 B1	11 November 2020
				ES	2842752 T3	14 July 2021
				JP	2018-516564 A	28 June 2018
				JP	6812624 B2	13 January 2021
				KR	10-2018-0011180 A	31 January 2018

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/KR2022/016859

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
		KR 10-2022-0059559 A	10 May 2022
		KR 10-2022-0059559 A	10 May 2022
		KR 10-2022-0070070 A	27 May 2022
		KR 10-2022-0070070 A	27 May 2022
		KR 10-2392421 B1	02 May 2022
		US 11154094 B2	26 October 2021
		US 2018-0140015 A1	24 May 2018
		US 2022-0039479 A1	10 February 2022
		ZA 201707871 B	29 May 2019
KR 10-2020-0061233 A	02 June 2020	CN 111511233 A	07 August 2020
		EP 3818881 A1	12 May 2021
		JP 2021-509806 A	08 April 2021
		KR 10-2398653 B1	16 May 2022
		US 2021-0007393 A1	14 January 2021
		WO 2020-105896 A1	28 May 2020