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(71) Applicant: **KT&G Corporation**
Daedeok-gu
Daejeon 34337 (KR)

(72) Inventors:
• **LEE, Tae Kyung**
Daejeon 34128 (KR)

• **KWON, Chan Min**
Daejeon 34128 (KR)

• **KIM, Tae Kyun**
Daejeon 34128 (KR)

• **PARK, Insu**
Daejeon 34128 (KR)

• **LEE, Mi Jeong**
Daejeon 34128 (KR)

• **LEE, John Tae**
Daejeon 34128 (KR)

(74) Representative: **Ter Meer Steinmeister & Partner**
Patentanwälte mbB
Nymphenburger Straße 4
80335 München (DE)

(54) **AEROSOL-GENERATING ARTICLE AND AEROSOL-GENERATING SYSTEM**

(57) An aerosol generating system includes an aerosol generating article including a medium segment, and an aerosol generating device, wherein the aerosol generating article may further include a first filter segment disposed upstream of the medium segment, and a sec-

ond filter segment disposed downstream of the medium segment, wherein nicotine may be adsorbed into at least one of the first filter segment and the second filter segment.

EP 4 324 346 A1

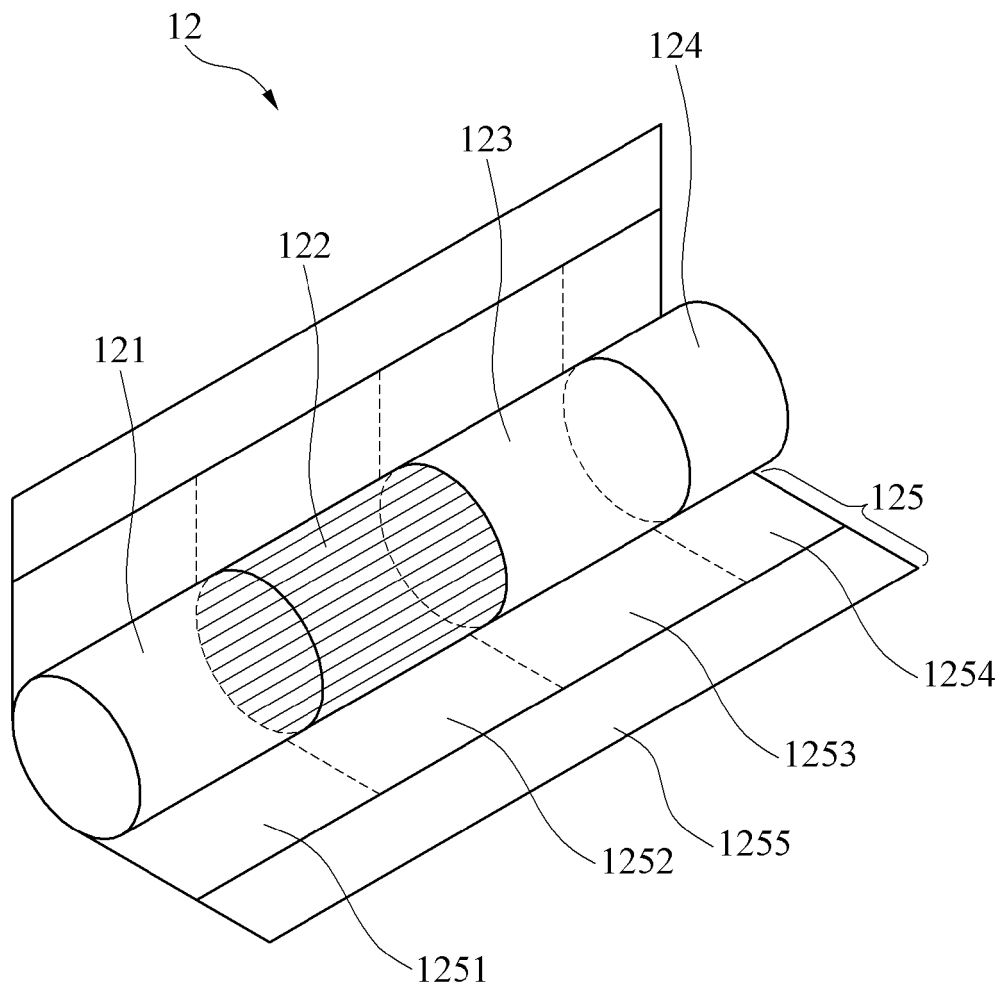


FIG. 4

Description

Technical Field

5 **[0001]** The following embodiments relate to an aerosol generating article and an aerosol generating system.

Background Art

10 **[0002]** Recently, the demand for alternative articles to overcome the disadvantages of traditional cigarettes has increased. For example, there is an increasing demand for a device (e.g., a cigarette-type electronic cigarette) that generates an aerosol by electrically heating a cigarette stick. Accordingly, research on an electrically heated aerosol generating device and a cigarette stick (or an aerosol generating article) applied thereto is being actively conducted. For example, KR Patent Application Publication No. 10-2017-0132823 discloses a non-combustion-type flavor inhaler, a flavor inhalation component source unit, and an atomizing unit.

Disclosure of the Invention

Technical Goals

20 **[0003]** An embodiment is to provide an aerosol generating article that may selectively provide various intensities of smoking taste as a single aerosol generating article and an aerosol generating system including the same.

[0004] An embodiment is to provide an aerosol generating article that may promote sufficient nicotine transfer under low-temperature heating conditions by using a pH-treated medium segment and an aerosol generating system including the same.

Technical Solutions

30 **[0005]** According to various embodiments, an aerosol generating system includes an aerosol generating article including a medium segment; and an aerosol generating device including a controller including at least one processor; an elongated cavity configured to receive the aerosol generating article; and a vaporizer configured to generate an aerosol by heating a liquid composition and emit the generated aerosol toward the aerosol generating article, wherein the controller may control a temperature at which the heater heats the medium segment.

35 **[0006]** The controller may control the heater between a non-heating mode in which the heater does not heat the medium segment and a low-temperature heating mode in which the heater heats the medium segment at a low temperature.

[0007] In the low-temperature heating mode, the controller may control the heater to heat the medium segment to 0°C or more and 150°C or less.

[0008] The medium segment may be pH-treated.

40 **[0009]** The aerosol generating article may further include a first filter segment disposed upstream of the medium segment, and a second filter segment disposed downstream of the medium segment.

[0010] Nicotine may be adsorbed into at least one of the first filter segment and the second filter segment.

[0011] The nicotine adsorbed into at least one of the first filter segment and the second filter segment may be transferred from the medium segment.

[0012] The medium segment may be pH-treated such that the pH thereof is in the range of 8.0 to 9.5.

45 **[0013]** A medium used to fill the medium segment may include at least one component of reconstituted tobacco sheets and tobacco granules.

[0014] The aerosol generating device may further include a heater configured to heat the medium segment, and the aerosol generating article may further include a cooling segment between the medium segment and the second filter segment.

50 **[0015]** The aerosol generating system may further include a thermally conductive wrapper configured to wrap the medium segment.

[0016] The thermally conductive wrapper may include an aluminum component.

55 **[0017]** According to various embodiments, an aerosol generating article includes a medium segment that is pH-treated; a first filter segment disposed upstream of the medium segment; and a second filter segment disposed downstream of the medium segment, wherein nicotine may be adsorbed into at least any one of the first filter segment and the second filter segment.

[0018] The nicotine adsorbed into the first filter segment and the second filter segment may be transferred from the medium segment.

[0019] The medium segment may be pH-treated such that the pH thereof is in the range of 8.0 to 9.5.

Effects

[0020] An aerosol generating system according to an embodiment may adjust an intensity of smoking taste.

[0021] An aerosol generating system according to an embodiment may promote nicotine transfer even under low-temperature heating conditions by using a pH-treated medium segment.

[0022] The effects of the aerosol generating system according to an embodiment are not limited to the above-mentioned effects, and other unmentioned effects can be clearly understood from the following description by one of ordinary skill in the art.

Brief Description of Drawings

[0023] The accompanying drawings illustrate preferred embodiments of the present disclosure, and are provided together with the detailed description for better understanding of the technical idea of the present disclosure. Therefore, the present disclosure should not be construed as being limited to the embodiments set forth in the drawings.

FIG. 1 is a block diagram of an aerosol generating system according to an embodiment.

FIGS. 2a, 2b and 3 are views schematically illustrating an aerosol generating system in which an aerosol generating article is coupled to an aerosol generating device according to an embodiment.

FIG. 4 is a view schematically illustrating the structure of an aerosol generating article according to an embodiment.

FIG. 5 is a view schematically illustrating an aerosol generating system in which an aerosol generating article is coupled to an aerosol generating device according to an embodiment.

Best Mode for Carrying Out the Invention

[0024] Hereinafter, embodiments will be described in detail with reference to the accompanying drawings. However, various alterations and modifications may be made to the embodiments and thus, the scope of the disclosure is not limited or restricted to the embodiments. The embodiments should be understood to include all changes, equivalents, and replacements within the idea and the technical scope of the disclosure.

[0025] The terminology used herein is for the purpose of describing particular embodiments only and is not intended to be limiting. The singular forms "a," "an," and "the" are intended to include the plural forms as well, unless the context clearly indicates otherwise. It will be further understood that the terms "comprises/comprising" and/or "includes/including" when used herein, specify the presence of stated features, integers, steps, operations, elements, and/or components, but do not preclude the presence or addition of one or more other features, integers, steps, operations, elements, components and/or groups thereof.

[0026] Unless otherwise defined, all terms including technical and scientific terms used herein have the same meaning as commonly understood by one of ordinary skill in the art to which embodiments belong. It will be further understood that terms, such as those defined in commonly-used dictionaries, should be interpreted as having a meaning that is consistent with their meaning in the context of the relevant art and will not be interpreted in an idealized or overly formal sense unless expressly so defined herein.

[0027] When describing the embodiments with reference to the accompanying drawings, like reference numerals refer to like constituent elements and a repeated description related thereto will be omitted. In the description of embodiments, detailed description of well-known related structures or functions will be omitted when it is deemed that such description will cause ambiguous interpretation of the present disclosure.

[0028] Also, in the description of the components, terms such as first, second, A, B, (a), (b) or the like may be used herein when describing components of the present disclosure. These terms are used only for the purpose of discriminating one constituent element from another constituent element, and the nature, the sequences, or the orders of the constituent elements are not limited by the terms. When one constituent element is described as being "connected", "coupled", or "attached" to another constituent element, it should be understood that one constituent element can be connected or attached directly to another constituent element, and an intervening constituent element can also be "connected", "coupled", or "attached" to the constituent elements.

[0029] The same name may be used to describe an element included in the embodiments described above and an element having a common function. Unless otherwise mentioned, the descriptions of the examples may be applicable to the following examples and thus, duplicated descriptions will be omitted for conciseness.

[0030] In the following embodiments, the "moisturizing agent" may refer to a substance capable of facilitating the formation of visible smoke and/or an aerosol. The moisturizing agent may include, for example, glycerin (GLY), propylene glycol (PG), ethylene glycol, dipropylene glycol, diethylene glycol, triethylene glycol, tetraethylene glycol, and oleyl

alcohol, but is not limited thereto. In the art, a moisturizing agent may be used interchangeably with a term such as an aerosol former, a humectant, or the like.

[0031] In the following embodiments, an "aerosol forming material" may refer to a material that forms an aerosol. The aerosol may include a volatile compound. The aerosol forming material may be solid or liquid. For example, a solid aerosol forming material may include solid materials based on tobacco raw materials such as reconstituted tobacco sheets, cut tobacco leaves, and reconstituted tobacco, and a liquid aerosol forming material may include a liquid composition based on nicotine, a tobacco extract, and/or various fragrances. However, the scope of the disclosure is not limited to these examples.

[0032] In the following embodiments, the term "aerosol generating article" may refer to an article that accommodates a medium, in which an aerosol passes through the article and the medium is transferred. A representative example of the aerosol generating article may be a cigarette. However, the scope of the disclosure is not limited thereto.

[0033] In the following embodiments, the term "aerosol generating device" may refer to a device that generates an aerosol using an aerosol forming material to generate an aerosol that may be inhaled through the mouth of a user directly to the lungs of the user.

[0034] In the following embodiments, the terms "upstream" or "upstream direction" may refer to a direction away from a mouth of a user (smoker), and the terms "downstream" or "downstream direction" may refer to a direction toward the mouth of the user. The terms "upstream" and "downstream" may be used to describe relative positions of components of the aerosol generating article.

[0035] In the following embodiments, the term "puff" refers to inhalation by a user, and inhalation refers to a situation in which a user draws in an aerosol into his or her oral cavity, nasal cavity, or lungs through the mouth or nose.

[0036] FIG. 1 is a block diagram of an aerosol generating system according to an embodiment, FIGS. 2A and 2B are views schematically illustrating the aerosol generating system in which an aerosol generating article is coupled to an aerosol generating device according to an embodiment, FIG. 3 is a view schematically illustrating the structure of a vaporizer according to an embodiment, FIG. 4 is a view schematically illustrating the structure of the aerosol generating article according to an embodiment, and FIG. 5 is a view schematically illustrating the aerosol generating system in which the aerosol generating article is coupled to the aerosol generating device according to an embodiment.

[0037] Referring to FIGS. 1 to 5, an aerosol generating system 1 according to an embodiment may include an aerosol generating device 11 and an aerosol generating article 12.

[0038] Referring to FIGS. 1 to 3, the aerosol generating device 11 according to an embodiment may include a battery 111, a controller 112, a vaporizer 113, a heater 114, and an elongated cavity 115.

[0039] Only components related to the present embodiment are shown in the aerosol generating device 11 shown in FIGS. 2A, 2B, and 3. Therefore, it is to be understood by those having ordinary skill in the art to which the disclosure pertains that the aerosol generating device 11 may further include other general-purpose components in addition to the components shown in FIGS. 2A, 2B, and 3. In addition, the aerosol generating device 11 may be in the form of a stick or a holder.

[0040] In an embodiment, the battery 111 may supply power to be used to operate the aerosol generating device 11. For example, the battery 111 may supply current to the vaporizer 113 so that the vaporizer 113 may heat a liquid composition. In addition, the battery 111 may supply power required to operate the heater 114, a display, a sensor, a motor, or the like installed in the aerosol generating device 11.

[0041] In an embodiment, the battery 111 may be a lithium iron phosphate (LiFePO_4) battery, but is not limited to the above example. For example, the battery 111 may correspond to a lithium cobalt oxide (LiCoO_2) battery, a lithium titanate battery, a lithium ion battery, and the like.

[0042] For example, the battery 111 may have a cylindrical shape with a diameter of 10 mm and a length of 37 mm, but is not limited thereto. For example, the capacity of the battery 111 may have a range of 120 mAh to 250 mAh, but is not limited thereto. Further, the battery 111 may be a rechargeable battery or a disposable battery. For example, when the battery 111 is chargeable, the charge rate (C-rate) of the battery 111 may be 10 C, and the discharge rate (C-rate) thereof may be 10 C to 20 C, but is not limited thereto. In addition, for static use, the battery 111 may be manufactured so that 80% or more of the total capacity may be secured even when charging/discharging is performed 2000 times.

[0043] In an embodiment, the controller 112 may control the overall operation of the aerosol generating device 11. Specifically, the controller 112 may control respective operations of other components included in the aerosol generating device 11, in addition to the battery 111, the vaporizer 113, and the heater 114. In addition, the controller 112 may verify a state of each of the components of the aerosol generating device 11 to determine whether the aerosol generating device 11 is in an operable state.

[0044] In an embodiment, the controller 112 may include at least one processor. The processor may be implemented as an array of a plurality of logic gates, or may be implemented as a combination of a general-purpose microprocessor and a memory in which a program executable by the microprocessor is stored. In addition, it is to be understood by one of ordinary skill in the art to which the disclosure pertains that the processor may be implemented in other types of hardware.

[0045] In an embodiment, the vaporizer 113 may generate an aerosol by heating the liquid composition and emit the generated aerosol toward the aerosol generating article 12 inserted into the elongated cavity 115 such that the generated aerosol may pass through the inserted aerosol generating article 12. Therefore, a tobacco flavor may be added to the aerosol that has passed through the aerosol generating article 12, and a user may suck one end of the aerosol generating article 12 through the mouth to inhale the aerosol with the tobacco flavor added. According to an embodiment, the vaporizer 113 may be referred to as a cartomizer or an atomizer. According to an embodiment, the vaporizer 113 may be coupled to the aerosol generating device 11 in a replaceable manner.

[0046] In an embodiment, the heater 114 may be heated by the power supplied by the battery 111. For example, when the aerosol generating article 12 is inserted in the aerosol generating device 11, the heater 114 may be disposed outside the aerosol generating article 12. The heated heater 114 may thus raise the temperature of an aerosol generating material in the aerosol generating article 12.

[0047] For example, the heater 114 may be an electrically resistive heater. In this example, the heater 114 may include an electrically conductive track, and the heater 114 may be heated as a current flows through the electrically conductive track. However, the heater 114 is not limited to the foregoing example, and any example of heating the heater 114 up to a desired temperature may be applicable without limitation. Here, the desired temperature may be preset in the aerosol generating device 11 or may be set by the user.

[0048] Meanwhile, as another example, the heater 114 may be an induction heater. Specifically, the heater 114 may include an electrically conductive coil for heating the aerosol generating article 12 in an induction heating manner, and the aerosol generating article 12 may include a susceptor to be heated by the induction heater.

[0049] For example, the heater 114 may include a tubular heat transfer element, a plate-shaped heat transfer element, a needle-shaped heat transfer element, or a rod-shaped heat transfer element, and may heat the inside or outside of the aerosol generating article 12 according to the shape of a heat transfer element.

[0050] In addition, the heater 114 may be provided as a plurality of heaters in the aerosol generating device 11. In this case, the plurality of heaters 114 may be disposed to be inserted into the aerosol generating article 12 or may be disposed outside the aerosol generating article 12. In addition, some of the plurality of heaters 114 may be disposed to be inserted into the aerosol generating article 12, and the rest may be disposed outside the aerosol generating article 12.

[0051] In an embodiment, the aerosol generating article 12 may be received in the elongated cavity 115. In an embodiment, the heater 114 may be disposed to surround the outer surface of the elongated cavity 115, thereby heating the aerosol generating article received in the elongated cavity 115. The heater 114 according to an embodiment may be disposed to surround at least a portion of the outer surface of the elongated cavity 115.

[0052] Meanwhile, the aerosol generating device 11 may further include general-purpose components in addition to the battery 111, the controller 112, the vaporizer 113, the heater 114, and the elongated cavity 115. For example, the aerosol generating device 11 may include a sensing unit 116, an output unit 117, a user input unit 118, a memory 119, and a communication unit 120.

[0053] Meanwhile, the aerosol generating device 11 may further include general-purpose components in addition to the battery 111, the controller 112, the vaporizer 113, the heater 114, and the elongated cavity 115. For example, the aerosol generating device 11 may further include a sensing unit 116, an output unit 117, a user input unit 118, a memory 119, and a communication unit 120.

[0054] The sensing unit 116 may sense a state of the aerosol generating device 11 or a state of an environment around the aerosol generating device 11, and transmit sensed information to the controller 112. Based on the sensed information, the controller 112 may control the aerosol generating device 11 to perform various functions, such as controlling the operation of the heater 114, restricting smoking, determining whether the aerosol generating article 12 (e.g., a cigarette, a cartridge, etc.) is inserted, displaying a notification, and the like.

[0055] The sensing unit 116 may include at least one of a temperature sensor 1161, an insertion detection sensor 1162, or a puff sensor 1163, but is not limited thereto.

[0056] The temperature sensor 1161 may sense a temperature at which the heater 114 (or an aerosol generating material) is heated. The aerosol generating device 11 may include a separate temperature sensor for sensing the temperature of the heater 114, or the heater 114 itself may perform a function as a temperature sensor. Alternatively, the temperature sensor 1161 may be arranged around the battery 111 to monitor the temperature of the battery 111.

[0057] The insertion detection sensor 1162 may sense an insertion and/or removal of the aerosol generating article 12. The insertion detection sensor 1162 may include, for example, at least one of a film sensor, a pressure sensor, a light sensor, a resistive sensor, a capacitive sensor, an inductive sensor, and an infrared sensor, and may sense a signal change caused when the aerosol generating article 12 is inserted and/or removed.

[0058] The puff sensor 1163 may sense a puff from the user based on various physical changes in an airflow path or airflow channel. For example, the puff sensor 1163 may sense the puff from the user based on any one of a temperature change, a flow change, a voltage change, and a pressure change.

[0059] The sensing unit 116 may further include at least one of a temperature/humidity sensor, an atmospheric pressure sensor, a magnetic sensor, an acceleration sensor, a gyroscope sensor, a position sensor (e.g., a global positioning

system (GPS)), a proximity sensor, and a red, green, blue (RGB) sensor (e.g., an illuminance sensor), in addition to the sensors 1161 to 1163 described above. A function of each sensor may be intuitively inferable from its name by one of ordinary skill in the art, and thus, a more detailed description thereof will be omitted here.

[0060] The output unit 117 may output information about the state of the aerosol generating device 11 and provide the information to the user. The output unit 117 may include at least one of a display 1171, a haptic portion 1172, and a sound outputter 1173, but is not limited thereto. When the display 1171 and a touchpad are provided in a layered structure to form a touchscreen, the display 1171 may be used as an input device in addition to an output device.

[0061] The display 1171 may visually provide information about the aerosol generating device 11 to the user. The information about the aerosol generating device 11 may include, for example, a charging/discharging state of the battery 111 of the aerosol generating device 11, a preheating state of the heater 114, an insertion/removal state of the aerosol generating article 12, a limited usage state (e.g., an abnormal article detected) of the aerosol generating device 11, or the like, and the display 1171 may externally output the information. The display 1171 may be, for example, a liquid-crystal display (LCD) panel, an organic light-emitting diode (OLED) panel, or the like. The display 1171 may also be in the form of a light-emitting diode (LED) device.

[0062] The haptic portion 1172 may provide information about the aerosol generating device 11 to the user in a haptic way by converting an electrical signal into a mechanical stimulus or an electrical stimulus. The haptic portion 1172 may include, for example, a motor, a piezoelectric element, or an electrical stimulation device.

[0063] The sound outputter 1173 may provide information about the aerosol generating device 11 to the user in an auditory way. For example, the sound outputter 1173 may convert an electrical signal into a sound signal and externally output the sound signal.

[0064] The user input unit 118 may receive information input from the user or may output information to the user. For example, the user input unit 118 may include a keypad, a dome switch, a touchpad (e.g., a contact capacitive type, a pressure resistive film type, an infrared sensing type, a surface ultrasonic conduction type, an integral tension measurement type, a piezo effect type, etc.), a jog wheel, a jog switch, or the like, but is not limited thereto. In addition, although not shown in FIG. 1, the aerosol generating device 11 may further include a connection interface such as a universal serial bus (USB) interface, and may be connected to another external device through the connection interface such as a USB interface to transmit and receive information or to charge the battery 111.

[0065] The memory 119, which is hardware for storing various pieces of data processed in the aerosol generating device 11, may store data processed by the controller 112 and data to be processed thereby. The memory 119 may include at least one type of storage medium of a flash memory type memory, a hard disk type memory, a multimedia card micro type memory, a card type memory (e.g., an SD or XE memory), a random-access memory (RAM), a static random-access memory (SRAM), a read-only memory (ROM), an electrically erasable programmable read-only memory (EEPROM), a programmable read-only memory (PROM), a magnetic memory, a magnetic disk, or an optical disk. The memory 119 may store an operating time of the aerosol generating device 11, a maximum number of puffs, a current number of puffs, at least one temperature profile, data associated with a smoking pattern of the user, and the like.

[0066] The communication unit 120 may include at least one component for communicating with another electronic device. For example, the communication unit 120 may include a short-range wireless communication unit 1201 and a wireless communication unit 1202.

[0067] The short-range wireless communication unit 1201 may include a Bluetooth communication unit, a Bluetooth low energy (BLE) communication unit, a near-field communication unit, a WLAN (Wi-Fi) communication unit, a ZigBee communication unit, an infrared data association (IrDA) communication unit, a Wi-Fi direct (WFD) communication unit, an ultra-wideband (UWB) communication unit, and an Ant+ communication unit, but is not limited thereto.

[0068] The wireless communication unit 1202 may include, for example, a cellular network communicator, an Internet communicator, a computer network (e.g., a local area network (LAN) or a wide-area network (WAN)) communicator, and the like, but is not limited thereto. The wireless communication unit 1202 may use subscriber information (e.g., international mobile subscriber identity (IMSI)) to identify and authenticate the aerosol generating device 11 in a communication network.

[0069] In an embodiment, the aerosol generating device 11 may include at least one input device (e.g., a button) through which the user may control functions of the aerosol generating device 11 and/or a terminal to be coupled with a cradle. For example, the user may execute various functions using the input device of the aerosol generating device 11. The user may execute a desired function among the plurality of functions of the aerosol generating device 11 by adjusting the number of times the user presses the input device (e.g., one time, two times, etc.) or the length of time the user presses the input device (e.g., 0.1 seconds, 0.2 seconds, etc.). As the user operates the input device, a function of preheating a heating element or heater module of the vaporizer 113, a function of adjusting the temperature of the heating element or heater module of the vaporizer 113, a function of cleaning the space in which the aerosol generating article is inserted, a function of inspecting whether the aerosol generating device 11 is in an operable state, a function of displaying the remaining level (available power) of the battery 111, a function of resetting the aerosol generating device 11, and the like may be performed. However, the functions of the aerosol generating device 11 are

not limited to the examples described above.

[0070] In an embodiment, the aerosol generating device 11 may include a puff detection sensor, a temperature detection sensor, and/or an aerosol generating article insertion detection sensor. In addition, the aerosol generating device 11 may be manufactured to have a structure allowing external air to flow in/flow out even while the aerosol generating article is inserted.

[0071] According to an embodiment, the aerosol generating device 11 may include a vaporizer 113 and an elongated cavity 115 arranged in series, as shown in FIG. 2A. According to another embodiment, the aerosol generating device 11 may include a vaporizer 113 and an elongated cavity 115 arranged in parallel, as shown in FIG. 2B. In addition, the arrangement of the battery 111, the controller 112, the vaporizer 113, the heater 114, and the elongated cavity 115 of the aerosol generating device 11 is not limited to FIGS. 2A and 2B, and may vary.

[0072] Referring to FIG. 2B, through the airflow path in the aerosol generating device 11, the aerosol generated by the vaporizer 113 may flow into the elongated cavity 115 and pass through the aerosol generating article 12. Therefore, a tobacco flavor may be added to the aerosol that has passed through the aerosol generating article 12, and a user may suck one end of the aerosol generating article 12 through the mouth to inhale the aerosol with the tobacco flavor added.

[0073] The vaporizer 113 according to an embodiment may include a liquid storage, a liquid transfer means, a heating element, and an airflow path. The components of the vaporizer 113 may be formed of a material of polycarbonate, but are not limited thereto.

[0074] In an embodiment, the liquid storage may store a liquid composition from which an aerosol may be generated when heated. According to an embodiment, the liquid composition may be a liquid containing a tobacco-containing material including a volatile tobacco flavor component, and according to another embodiment, the liquid composition may be a liquid containing a non-tobacco material. In addition, the liquid composition may store a liquid in a capacity of 0.1 to 2.0 mL, but is not limited thereto. Further, the liquid storage may be interchangeably coupled within the vaporizer 113.

[0075] The liquid composition may include, for example, water, a solvent, ethanol, a plant extract, a fragrance, a flavoring agent, or a vitamin mixture. The fragrance may include, for example, menthol, peppermint, spearmint oil, various fruit flavors, and the like, but is not limited thereto. The flavoring agent may include ingredients that provide the user with a variety of flavors or scents. The vitamin mixture may be a mixture of at least one of vitamin A, vitamin B, vitamin C, or vitamin E, but is not limited thereto. The liquid composition may also include an aerosol former such as glycerin and propylene glycol.

[0076] In an embodiment, the liquid transfer means may transfer the liquid composition in the liquid storage to the heating element. In an embodiment, the liquid transfer means may be a wick such as cotton fiber, ceramic fiber, glass fiber, or porous ceramic, and may transfer the liquid composition in the liquid storage to the heating element using capillary action.

[0077] In an embodiment, the heating element may be an element for heating the liquid composition transferred by the liquid transfer means, and may be a metal heating wire, a metal heating plate, a ceramic heater, or the like. In addition, the heating element may include a conductive filament such as a nichrome wire, and may be arranged in a structure wound around the liquid transfer means. The heating element may be heated as a current is supplied and may transfer heat to the liquid composition in contact with the heating element, and may thereby heat the liquid composition. As a result, an aerosol may be generated.

[0078] In an embodiment, the airflow path may be arranged such that the generated aerosol may be emitted toward the inserted aerosol generating article 12. That is, the aerosol generated by the heating element may be emitted through the airflow path.

[0079] In an embodiment, the controller 112 may control the temperature of the heating element by controlling the current supplied to the heating element. Accordingly, the controller 112 may control the amount of aerosol generated from the liquid composition by controlling the current supplied to the heating element. In addition, the controller 112 may control the current to be supplied to the heating element for a predetermined time when a puff of the user is sensed. For example, the controller 112 may control the current to be supplied to the heating element for 1 to 5 seconds from when a puff of the user is sensed.

[0080] In an embodiment, the controller 112 may control the amount of aerosol emitted from the vaporizer 113 by controlling the opening and closing state of the airflow path. Specifically, the controller 112 may increase the amount of aerosol emitted from the vaporizer 113 by increasing the size of an opening in the airflow path, and reduce the amount of aerosol emitted from the vaporizer 113 by reducing the size of the opening in the airflow path. For example, the controller 112 may control the opening in the airflow path by using a dial method.

[0081] In an embodiment, when the amount of the liquid composition in the liquid storage is less than a preset amount, the controller 112 may notify the user of information that the liquid composition is insufficient through a vibration motor or a display.

[0082] Referring to FIG. 3, the aerosol generating device 11 according to an embodiment may include a housing, the heater 114, the battery 111, and the controller 112. In this case, the aerosol generating article 12 may be heated by the heater 114 without a vaporizer.

[0083] Referring to FIG. 4, the aerosol generating article 12 according to an embodiment may include a first filter segment 121, a medium segment 122, a cooling segment 123, a second filter segment 124, and a wrapper 125.

[0084] In an embodiment, the first filter segment 121 may be a cellulose acetate filter. In addition, the first filter segment 121 may include a paper filter and a porous molding. For example, the length of the first filter segment 121 may be about 4 to 15 mm, but is not limited thereto. In addition, the first filter segment 121 may be colored and flavored.

[0085] In an embodiment, the medium segment 122 may include a cavity, and the cavity may be filled with a medium. For example, the medium used to fill the medium segment 122 may include at least one component of reconstituted tobacco sheets, granulated tobacco (tobacco granules), reconstituted tobacco, tobacco slurry, and cut tobacco leaves. For example, a desirable length of the medium segment 122 may be adopted from a range of 6 mm to 18 mm, but is not limited thereto.

[0086] Generally, tobacco granules have a significantly lower content of moisture and/or aerosol former than other types of tobacco materials (e.g., cut tobacco leaves, reconstituted tobacco sheets, and the like) and thus may greatly reduce the generation of visible smoke, which may facilitate the implementation of a smokeless function of the aerosol generating device 11. However, the tobacco granules may vary in diameter, density, filling rate, composition ratio of constituent materials, heating temperature, and the like, etc. depending on the embodiment. The diameter of tobacco granules may be about 0.3 mm to 1.2 mm. Within this numerical range, the proper hardness and ease of manufacture of the tobacco granules may be guaranteed, and the probability of vortex airstream in the cavity may be increased.

[0087] Also, the medium segment 122 may include an aerosol generating material such as glycerin or the like. Further, the medium segment 122 may include other additives such as a flavoring agent, a humectant, and/or organic acid. In addition, the medium segment 122 may include a flavoring liquid such as menthol or a moisturizing agent that is added as being sprayed onto the medium segment 122.

[0088] In an embodiment, a pH-treated medium may be included in the medium segment 122. For example, the medium may be pH-treated by a pH control agent to have basicity, and the pH control agent may be basic and may include, for example, at least one of potassium carbonate (K_2CO_3), sodium bicarbonate ($NaHCO_3$), and calcium oxide (CaO). However, the material included in the pH control agent is not limited to the above examples, and a material that generates less negative odor during smoking may be used. A basic pH control agent may increase the pH of the medium included in the medium segment 122. Compared to a medium not treated with a basic pH control agent, a medium pH-treated with a basic pH control agent may increase the amount of nicotine released therefrom when heated. That is, a medium pH-treated with a basic pH control agent may achieve a sufficient nicotine yield even when the medium segment 122 is heated at a low temperature.

[0089] In an embodiment, the medium segment 122 may include slurry or paper-type reconstituted tobacco sheets having a pH adjusted to a range of 8.0 to 9.5, or may be filled with tobacco granules having a pH adjusted to a range of 8.0 to 9.5. The medium may include nicotine, and when the medium is pH-treated, free nicotine may be transferred from the medium even under non-heating conditions or relatively low temperature conditions. That is, by adjusting the pH of the medium in the medium segment 122 to a range of 8.0 to 9.5, a low amount of volatile free nicotine may be transferred under non-heating conditions, and a low level to moderate level of intensity of smoking taste may be implemented. In addition, by increasing the amount of nicotine transfer by promoting the transfer of nicotine in low-temperature heating, a moderate level to high level of intensity of smoking taste may be implemented. As such, the amount of nicotine transfer may be easily adjusted even through non-heating or low-temperature heating in the aerosol generating article 12 according to an embodiment.

[0090] In an embodiment, the cooling segment 123 may produce an effect of cooling an aerosol. The user may thus inhale the aerosol cooled down to a suitable temperature. For example, the cooling segment 123 may be made of cellulose acetate and may be a tubular structure including a hollow therein. For example, the cooling segment 123 may be manufactured by adding a plasticizer (e.g., triacetin) to cellulose acetate tow. For example, the cooling segment 123 may be made of paper and may be a tubular structure including a hollow therein.

[0091] For example, a desirable diameter of the hollow included in the cooling segment 123 may be adopted from a range of 4 mm to 8 mm, but is not limited thereto. A desirable length of the cooling segment 123 may be adopted from a range of 4 mm to 30 mm, but is not limited thereto. The cooling segment 123 is not limited to the above example, and may be applicable without limitation as long as it may perform a function of cooling an aerosol.

[0092] In an embodiment, the second filter segment 124 may be configured with a filter including at least one flavor capsule. For example, the second filter segment 124 may be a cellulose acetate filter into which at least one flavor capsule is inserted. In addition, the second filter segment 124 may be configured with a filter in which flavoring materials are mixed.

[0093] In an embodiment, nicotine may be adsorbed into at least one of the first filter segment 121 and the second filter segment 124. As the medium segment 122 is pH-treated in the range of 8.0 to 9.5, nicotine in the medium segment 122 may be actively transferred even under non-heating conditions. Accordingly, the nicotine transferred from the medium segment 122 may be adsorbed into at least one of the first filter segment 121 and the second filter segment 124. Since not only the medium segment 122 but also the first filter segment 121 or the second filter segment 124 contain nicotine,

sufficient nicotine transfer may be guaranteed even in non-heating or indirect heating.

[0094] A nicotine transfer treatment process may be performed on the aerosol generating article 12 according to an embodiment. For example, the nicotine transfer treatment process may be performed as follows. First, the medium segment 122 may be pH-treated in the range of 8.0 to 9.5, and the first filter segment 121 and the second filter segment 123 may be combined by the wrapper 125 with the medium segment 122 therebetween. The aerosol generating article 12 may then undergo a nicotine transfer period at room temperature. The nicotine transfer period may be 4 weeks or more.

[0095] Table 1 below shows the amounts of nicotine transfer for the first filter segment 121, a first medium segment (e.g., the medium segment 122), a second medium segment, and the second filter segment 124 over time. The experiment was conducted under a temperature condition of 22°C. The experiment according to Table 1 below was conducted in a state in which the second medium segment was applied instead of the cooling segment 123, and the same/similar experimental results may be obtained even when the cooling segment 123 is applied instead of the second medium segment.

[0096] Referring to Table 1, it may be learned that nicotine is transferred to the first filter segment 121 and the second filter segment 124 after 4 weeks. Further, according to the smoke component analysis values, it may be learned that the amount of nicotine increases while the amount of atomization remains constant.

[0097] In addition, it may be learned that the amount of nicotine transfer is stabilized without a significant change in the amount of nicotine transferred to the first filter segment 121 and the second filter segment 124 even after 4 weeks. Further, in view of the smoke component analysis values, it may be learned that the amount of atomization and the amount of nicotine are also stabilized.

[0098] Consequently, it may be learned that it is ideal to transfer nicotine to the first filter segment 121 and the second filter segment 124 for 4 weeks. In addition, it may be learned that the amount of nicotine transfer, the amount of atomization of smoke components, and the amount of nicotine are continuously stabilized even after 4 weeks. Therefore, it is preferable to set the nicotine transfer treatment period to 4 weeks.

[Table 1]

Classification	Nicotine Transfer Amount (mg/seg)				Smoke Component Analysis Value (mg/stick)	
Time	First filter segment	First medium segment	Second medium segment	Second filter segment	Atomization Amount	Nicotine
0 weeks	-	-	-	-	37.8	0.15
4 weeks	0.33	0.60	1.05	0.27	38.8	0.31
6 weeks	0.35	0.55	0.98	0.31	38.6	0.32
8 weeks	0.37	0.66	0.75	0.30	39.0	0.31

[0099] In an embodiment, the aerosol generating article 12 may be wrapped with at least one wrapper 125. The wrapper 125 may have at least one hole through which external air flows in or internal gas flows out. The wrapper 125 may include a material with high thermal conductivity.

[0100] For example, the first filter segment 121 may be wrapped with a first wrapper 1251, the medium segment 122 may be wrapped with a second wrapper 1252, the cooling segment 123 may be wrapped with a third wrapper 1253, and the second filter segment 124 may be wrapped with a fourth wrapper 1254. In addition, the aerosol generating article 12 may be entirely wrapped again with the fifth wrapper 1255.

[0101] In an embodiment, the first wrapper 1251 may include an aluminum component. The first wrapper 1251 may be a combination of general filter wrapping paper and a metal foil such as aluminum foil. For example, the total thickness of the first wrapper 1251 may be in the range of 40 μm to 80 μm . In addition, the thickness of the metal foil of the first wrapper 1251 may be in the range of 6 μm to 20 μm .

[0102] In an embodiment, the second wrapper 1252 and the third wrapper 1253 may be formed with porous wrapping paper. For example, the porosity of the second wrapper 1252 may be about 35000 CU, but is not limited thereto. Also, the thickness of the second wrapper 1252 may be in the range of 70 μm to 80 μm . In addition, the basis weight of the second wrapper 1252 may be in the range of 20 g/m² to 25 g/m².

[0103] For example, the second wrapper 1252 may include an aluminum component. For example, the second wrapper 1252 may be a combination of general filter wrapping paper and a metal foil such as aluminum foil. Further, the second wrapper 1252 may be formed of sterile paper (e.g., MFW).

[0104] In an embodiment, the porosity of the third wrapper 1253 may be about 35000 CU, but is not limited thereto. Also, the thickness of the third wrapper 1253 may be in the range of 70 μm to 80 μm . In addition, the basis weight of

the third wrapper 1253 may be in the range of 20 g/m² to 25 g/m².

[0105] In an embodiment, the fourth wrapper 1254 may be formed with polylactic acid (PLA) laminated paper. Here, the PLA laminated paper may refer to three-ply paper including a paper layer, a PLA layer, and a paper layer. For example, the thickness of the fourth wrapper 1254 may be in the range of 100 μm to 120 μm. In addition, the basis weight of the fourth wrapper 1254 may be in the range of 80 g/m² to 100 g/m².

[0106] In an embodiment, the fifth wrapper 1255 may be formed of sterile paper (e.g., MFW). For example, the basis weight of the fifth wrapper 1255 may be in the range of 57 g/m² to 63 g/m². Also, the thickness of the fifth wrapper 1255 may be in the range of 64 μm to 70 μm.

[0107] Referring to FIGS. 1 to 5, in the aerosol generating system 1 according to an embodiment, the controller 112 may control a temperature at which the heater 114 heats the aerosol generating article 12. For example, the controller 112 may adjust the temperature at which the heater 114 heats the medium segment 122.

[0108] In an embodiment, the controller 112 may control the heater 114 between a non-heating mode and a low-temperature heating mode. In the non-heating mode, the heater 114 may not heat the aerosol generating article 12. At this time, the medium segment 122 may not be heated. In the low-temperature heating mode, the heater 114 may heat the aerosol generating article 12 at a low temperature of 0°C or more and 150°C or less. At this time, the medium segment 122 may be heated at a low temperature of 0°C or more and 150°C or less.

[0109] In an embodiment, the intensity of smoking taste may be adjusted as the aerosol generating article 12 is switched between the non-heating mode and the low-temperature heating mode. In the non-heating mode, the intensity of smoking taste may be low as the amount of free nicotine transferred from the medium segment 122 is low. In the low-temperature heating mode, compared to the non-heating mode, the intensity of smoking taste may be high as the amount of free nicotine transferred from the medium segment 122 is high. Therefore, in the low-temperature heating mode, a sufficient intensity of smoking taste may be secured even when the medium segment 122 is not treated to have a high pH. Accordingly, it is possible to reduce the appearance of off-flavors and off-odors that may occur due to the high-pH treatment of the medium segment 122.

[0110] The descriptions of the above-described embodiments are merely examples, and it will be understood by one of ordinary skill in the art that various changes and equivalents may be made thereto. Therefore, the scope of the disclosure should be defined by the appended claims, and all differences within the scope equivalent to those described in the claims will be construed as being included in the scope of protection defined by the claims.

[0111] The features and aspects of any embodiment(s) described above may be combined with features and aspects of any other embodiment(s) without resulting in apparent technical conflicts.

Claims

1. An aerosol generating system comprising:

an aerosol generating article comprising a medium segment; and
an aerosol generating device comprising a controller comprising at least one processor; an elongated cavity configured to receive the aerosol generating article; and a vaporizer configured to generate an aerosol by heating a liquid composition and emit the generated aerosol toward the aerosol generating article,
wherein the aerosol generating article further comprises:

a first filter segment disposed upstream of the medium segment; and
a second filter segment disposed downstream of the medium segment,
wherein nicotine is adsorbed into at least one of the first filter segment and the second filter segment.

2. The aerosol generating system of claim 1, wherein the nicotine adsorbed into at least one of the first filter segment and the second filter segment is transferred from the medium segment.

3. The aerosol generating system of claim 1 or 2, wherein the medium segment is pH-treated.

4. The aerosol generating system of claim 3, wherein the medium segment is pH-treated such that the pH thereof is in the range of 8.0 to 9.5.

5. The aerosol generating system of claim 1, wherein a medium used to fill the medium segment comprises at least one component of reconstituted tobacco sheets and tobacco granules.

6. The aerosol generating system of claim 1, wherein

the aerosol generating device further comprises a heater configured to heat the medium segment, and the aerosol generating article further comprises a cooling segment between the medium segment and the second filter segment.

5 7. The aerosol generating system of claim 6, further comprising a thermally conductive wrapper configured to wrap the medium segment.

8. The aerosol generating system of claim 7, wherein the thermally conductive wrapper comprises an aluminum component.

10 9. The aerosol generating system of claim 6, wherein

the controller controls a temperature at which the heater heats the medium segment, and the controller controls the heater between a non-heating mode in which the heater does not heat the medium segment and a low-temperature heating mode in which the heater heats the medium segment at a low temperature.

15 10. The aerosol generating system of claim 9, wherein in the low-temperature heating mode, the controller controls the heater to heat the medium segment to 0°C or more and 150°C or less.

20 11. An aerosol generating article comprising:

a medium segment that is pH-treated;
a first filter segment disposed upstream of the medium segment; and
25 a second filter segment disposed downstream of the medium segment,
wherein nicotine is adsorbed into at least any one of the first filter segment and the second filter segment.

30 12. The aerosol generating article of claim 11, wherein the nicotine adsorbed into the first filter segment and the second filter segment is transferred from the medium segment.

13. The aerosol generating article of claim 11, wherein the medium segment is pH-treated such that the pH thereof is in the range of 8.0 to 9.5.

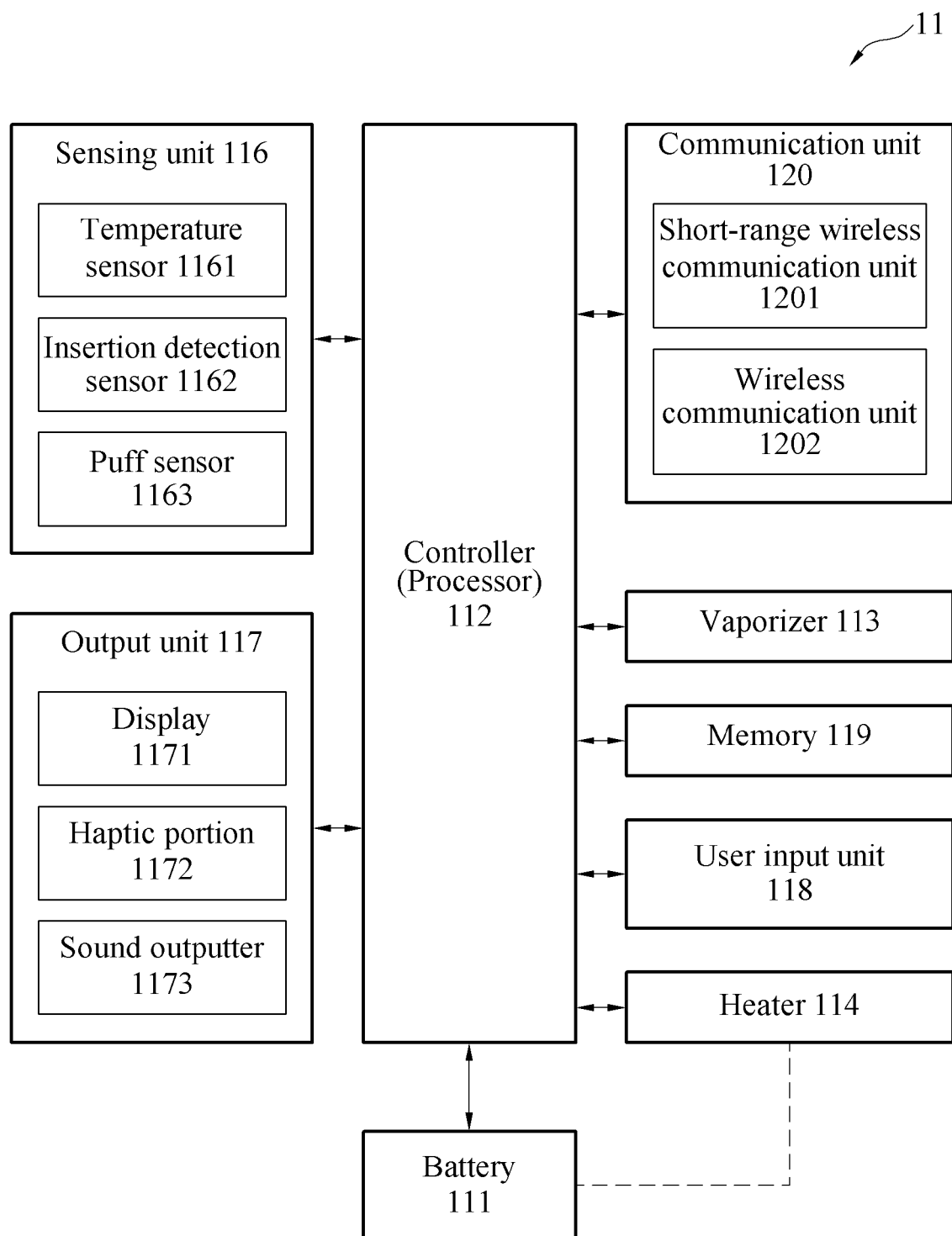


FIG. 1

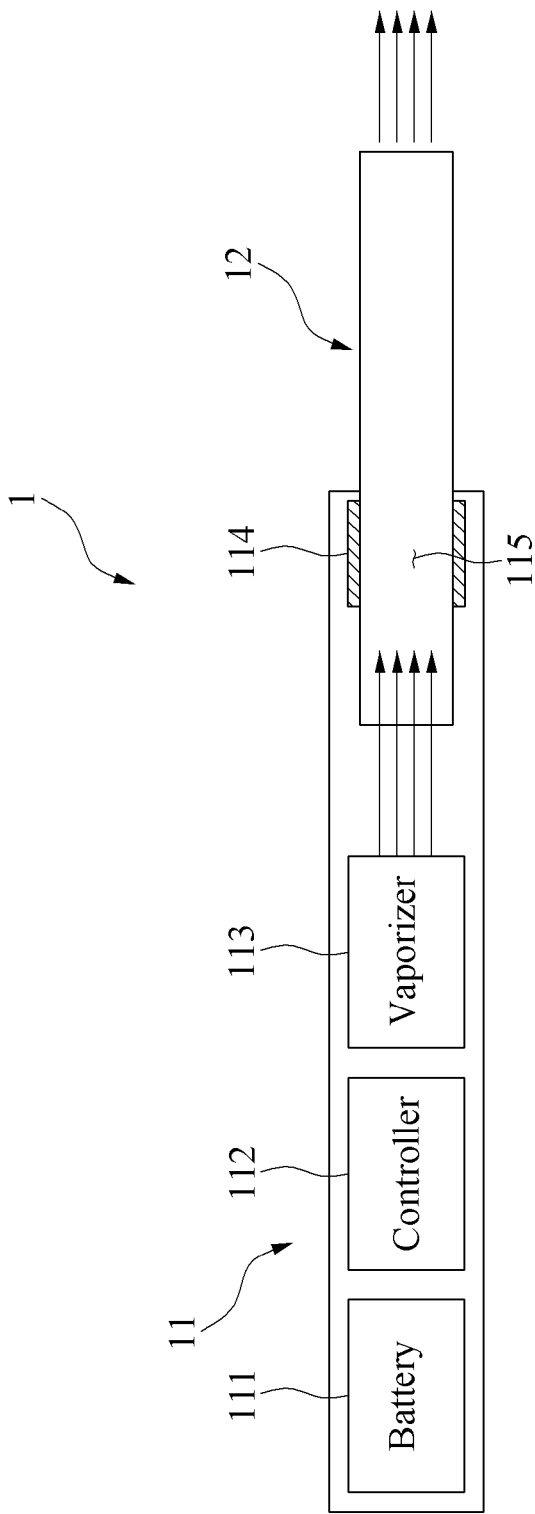


FIG. 2A

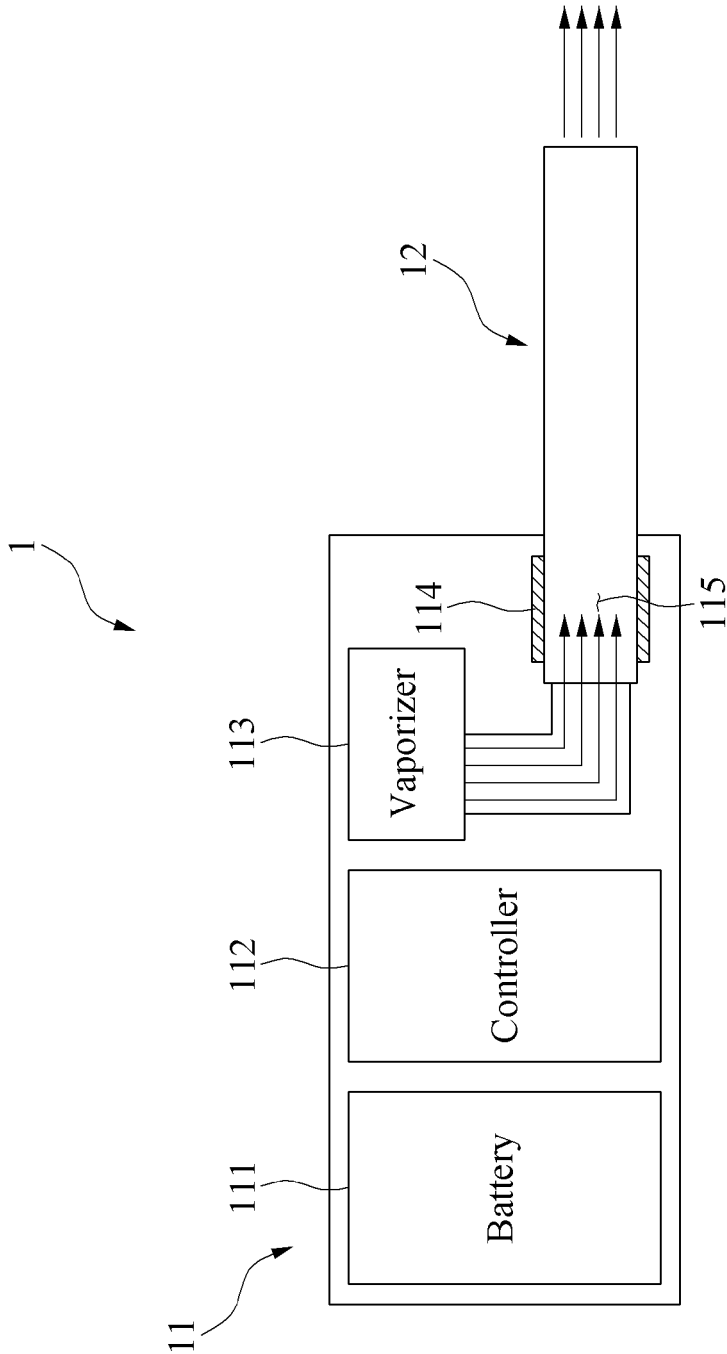


FIG. 2B

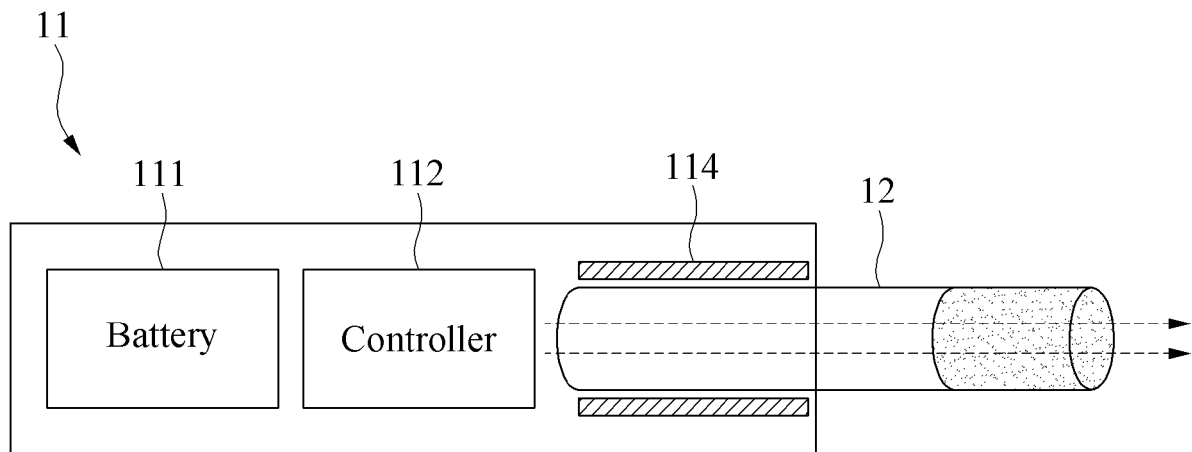


FIG. 3

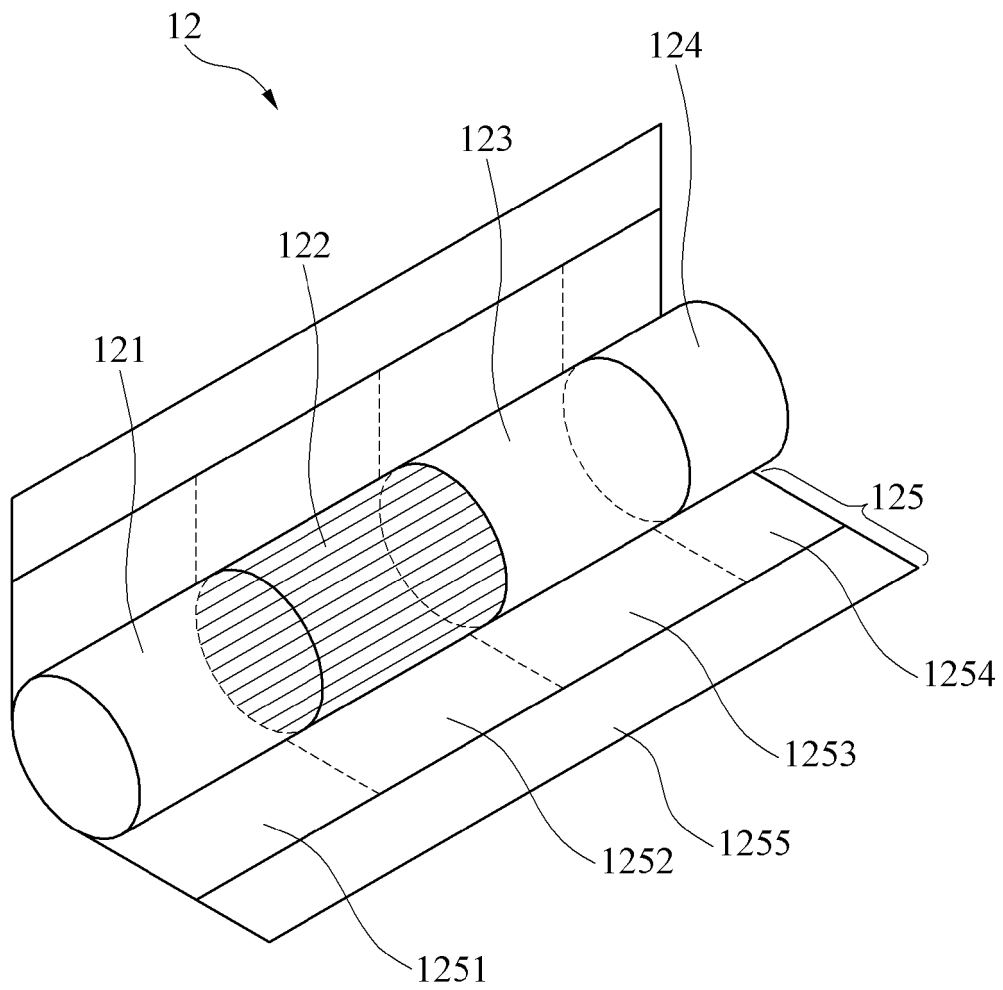


FIG. 4

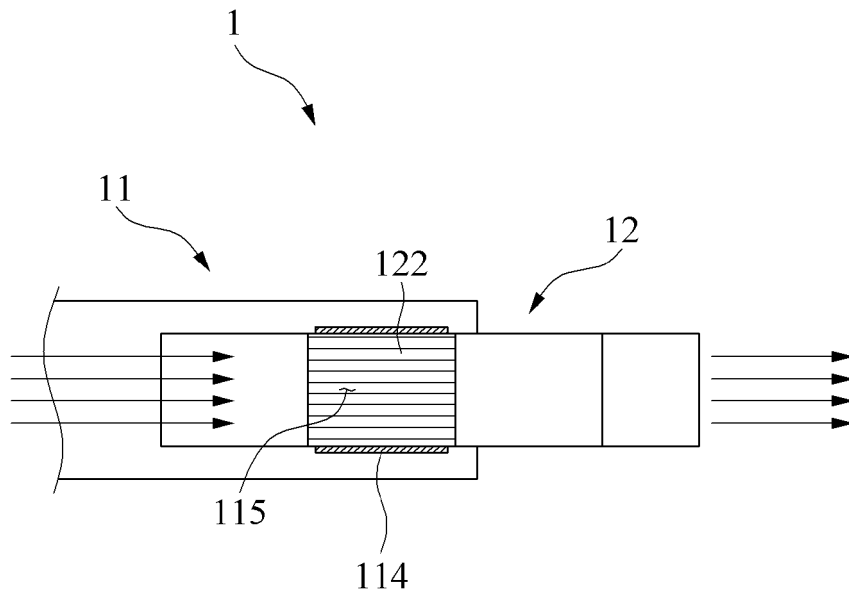


FIG. 5

INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR2023/002860

A. CLASSIFICATION OF SUBJECT MATTER

A24F 40/30(2020.01)i; A24D 1/20(2020.01)i; A24F 40/50(2020.01)i; A24D 1/04(2006.01)i; A24D 3/02(2006.01)i;
A24D 3/04(2006.01)i; A24B 13/02(2006.01)i; A24F 40/46(2020.01)i; A24D 1/02(2006.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A24F 40/30(2020.01); A24B 15/16(2006.01); A24B 15/167(2020.01); A24B 3/14(2006.01); A24D 3/00(2006.01);
A24F 40/10(2020.01); A24F 40/40(2020.01); A24F 47/00(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: IPC as above
Japanese utility models and applications for utility models: IPC as above

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

eKOMPASS (KIPO internal) & keywords: 에어로졸 (aerosol), 제어부 (control), 필터 (filter), 세그먼트 (segment), 히터 (heater), 래퍼 (wrapper)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	US 2014-0345634 A1 (PHILIP MORRIS PRODUCTS S.A.) 27 November 2014 (2014-11-27) See entire document.	1-13

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

☒ See patent family annex.

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“X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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

“&” document member of the same patent family

Date of the actual completion of the international search

24 May 2023

Date of mailing of the international search report

24 May 2023

Name and mailing address of the ISA/KR

**Korean Intellectual Property Office
Government Complex-Daejeon Building 4, 189 Cheongsaro, Seo-gu, Daejeon 35208**

Facsimile No. +82-42-481-8578

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR2023/002860

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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