



(51) International Patent Classification:

A24D 3/02 (2006.01) A24B 15/12 (2006.01)

A24D 1/00 (2006.01) A24D 3/06 (2006.01)

A24B 15/28 (2006.01) A24D 1/02 (2006.01)

A24B 13/02 (2006.01) A24D 1/20 (2020.01)

(21) International Application Number:

PCT/KR2023/000489

(22) International Filing Date:

11 January 2023 (11.01.2023)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

10-2022-0015412 07 February 2022 (07.02.2022) KR

(71) Applicant: KT & G CORPORATION [KR/KR]; 71

Beotkkot-gil, Daedeok-gu, Daejeon 34337 (KR).

(72) Inventors: KIM, Hyeon Tae; 605dong 403ho, 93

Bongmyeong-ro, Yuseong-gu, Daejeon 34190 (KR).

CHOI, Sang Won; 14dong 105ho, 71 Beotkkot-gil,

Daedeok-gu, Daejeon 34337 (KR).

(74) Agent: MUHANN PATENT & LAW FIRM; 8th FL., 560,

Eonju-ro, Gangnam-Gu, Seoul 06144 (KR).

(81) Designated States (unless otherwise indicated, for every

kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CV, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IQ, IR, IS, IT, JM, JO, JP, KE, KG, KH, KN, KP, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW.

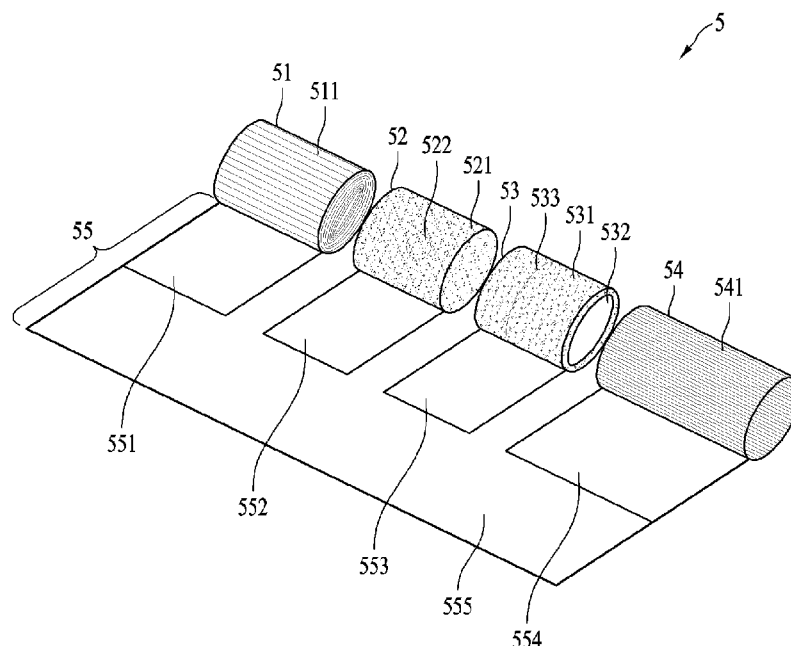
(84) Designated States (unless otherwise indicated, for every

kind of regional protection available): ARIPO (BW, CV, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, ME, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

— with international search report (Art. 21(3))

(54) Title: AEROSOL GENERATING ARTICLE



(57) Abstract: An aerosol generating article includes a segment, wherein the segment includes a capsule and a medium surrounding the capsule, and the capsule includes a core including a basic substance, and a shell surrounding the core.



Description

Title of Invention: AEROSOL GENERATING ARTICLE

Technical Field

- [1] The disclosure relates to an aerosol generating article.

Background Art

- [2] Nicotine contained in organisms may generally exist in the form of nicotine salt. The form of nicotine may change to a form that provides a feeling of satisfaction to a user as the chemical bond in the nicotine salt is broken under predetermined conditions (e.g., high temperature).

Disclosure of Invention

Technical Problem

- [3] Nicotine salt may react with a basic substance and change to a form called "free nicotine". Nicotine salt in the form of free nicotine may have volatility sufficient for a user to inhale at a relatively low temperature. One aspect of the disclosure may provide an aerosol generating article that gives a sufficient feeling of satisfaction to a user in a relatively favorable environment (e.g., low-temperature conditions).

Solution to Problem

- [4] According to an embodiment, an aerosol generating article includes a segment, wherein the segment may include a capsule and a medium surrounding the capsule, and the capsule may include a core including a basic substance, and a shell surrounding the core.
- [5] In an embodiment, the basic substance may include at least one substance having a pH of 12 or less at about 25°C.
- [6] In an embodiment, the basic substance may include at least one water-soluble substance.
- [7] In an embodiment, the basic substance may be in an amount of 12 % by weight (wt%) or less when the medium is in an amount of 100 wt%.
- [8] In an embodiment, the basic substance may include a combination of any one of an alkaline metal and an alkaline earth metal, and any one of carbonate, hydrogen-carbonate, and phosphate.
- [9] In an embodiment, the shell may include at least one material having a melting point between 40°C and 130°C at 1 bar.
- [10] In an embodiment, the at least one material included in the shell may have a melting point of 80°C or less.
- [11] In an embodiment, the capsule may have a crushing strength of 1.0 kilogram-force (kgf) to 2.5 kgf.

- [12] In an embodiment, the medium may include at least one of cut filler tobacco, sheet tobacco, or reconstituted tobacco.
- [13] In an embodiment, the aerosol generating article may further include a wrapper surrounding the segment.
- [14] According to an embodiment, a capsule includes a core including a basic substance, and a shell surrounding the core.
- [15] In an embodiment, the basic substance may include at least one substance having a pH of 12 or less at about 25°C.
- [16] In an embodiment, the basic substance may include at least one water-soluble substance.
- [17] In an embodiment, the basic substance may be in an amount of 12 wt% or less when a medium is in an amount of 100 wt%.
- [18] In an embodiment, the basic substance may include a combination of any one of an alkaline metal and an alkaline earth metal, and any one of carbonate, hydrogen-carbonate, and phosphate.

Advantageous Effects of Invention

- [19] According to an embodiment, it is possible to increase the amount of transition of an aerosol when an aerosol generating article is heated in a relatively favorable environment (e.g., low-temperature conditions), thereby providing a sufficient feeling of satisfaction to a user. According to an embodiment, it is possible to reduce the size of a device to which an aerosol generating article is to be applied. According to an embodiment, it is possible to reduce the initial preheat temperature and/or operating temperature of an aerosol generating article. The effects of the aerosol generating article 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

- [20] The foregoing and other aspects, features, and advantages of embodiments in the disclosure will become apparent from the following detailed description with reference to the accompanying drawings.
- [21] FIGS. 1 to 3 are diagrams illustrating examples of an aerosol generating article (e.g., a cigarette) inserted into an aerosol generating device according to an embodiment.
- [22] FIGS. 4 and 5 are diagrams illustrating examples of an aerosol generating article (e.g., a cigarette) according to an embodiment.
- [23] FIG. 6 is a block diagram of an aerosol generating device according to an embodiment.
- [24] FIG. 7 is a view of an aerosol generating article according to an embodiment.

[25] FIG. 8 is a schematic cross-sectional view of a capsule according to an embodiment.

[26] FIG. 9 illustrates a change in the form of nicotine salt.

Best Mode for Carrying out the Invention

[27] The terms used in the embodiments are selected from among common terms that are currently widely used, in consideration of their function in the disclosure. However, the terms may become different according to an intention of one of ordinary skill in the art, a precedent, or the advent of new technology. Also, in particular cases, the terms are discretionally selected by the applicant of the disclosure, and the meaning of those terms will be described in detail in the corresponding part of the detailed description. Therefore, the terms used in the disclosure are not merely designations of the terms, but the terms are defined based on the meaning of the terms and content throughout the disclosure.

[28] It will be understood that when a certain part "includes" a certain component, the part does not exclude another component but may further include another component, unless the context clearly dictates otherwise. Also, terms such as "unit," "module," etc., as used in the specification may refer to a part for processing at least one function or operation and may be implemented as hardware, software, or a combination of hardware and software.

[29] Hereinbelow, embodiments of the disclosure will be described in detail with reference to the accompanying drawings so that the embodiments may be readily implemented by one of ordinary skill in the technical field to which the disclosure pertains. However, the present invention may be implemented in many different forms and is not limited to the embodiments described herein.

[30] Hereinafter, embodiments of the disclosure will be described in detail with reference to the drawings.

[31] FIGS. 1 to 3 are diagrams illustrating examples of a cigarette being inserted into an aerosol generating device.

[32] Referring to FIG. 1, an aerosol generating device 1 may include a battery 11, a controller 12, and a heater 13. Referring to FIGS. 2 and 3, the aerosol generating device 1 may further include a vaporizer 14. A cigarette 2 may be inserted into an inner space of the aerosol generating device 1.

[33] The aerosol generating device 1 shown in FIGS. 1 to 3 may include components related to an embodiment described herein. Therefore, it is to be understood by one of ordinary skill in the art to which the disclosure pertains that the aerosol generating device 1 may further include other general-purpose components in addition to the ones shown in FIGS. 1 to 3.

[34] In addition, although it is shown that the heater 13 is included in the aerosol

generating device 1 in FIGS. 2 and 3, the heater 13 may be omitted as needed.

[35] FIG. 1 illustrates a linear alignment of the battery 11, the controller 12, and the heater 13. FIG. 2 illustrates a linear alignment of the battery 11, the controller 12, the vaporizer 14, and the heater 13. FIG. 3 illustrates a parallel alignment of the vaporizer 14 and the heater 13. However, the internal structure of the aerosol generating device 1 is not limited to what is shown in FIGS. 1 to 3. That is, the alignments of the battery 11, the controller 12, the heater 13, and the vaporizer 14 may be changed depending on the design of the aerosol generating device 1.

[36] When the cigarette 2 is inserted into the aerosol generating device 1, the aerosol generating device 1 may operate the heater 13 and/or the vaporizer 14 to generate an aerosol. The aerosol generated by the heater 13 and/or the vaporizer 14 may pass through the cigarette 2 into the user.

[37] Even when the cigarette 2 is not inserted in the aerosol generating device 1, the aerosol generating device 1 may heat the heater 13, as needed.

[38] The battery 11 may supply power to be used to operate the aerosol generating device 1. For example, the battery 11 may supply power to heat the heater 13 or the vaporizer 14, and may supply power required for the controller 12 to operate. In addition, the battery 11 may supply power required to operate a display, a sensor, a motor, or the like installed in the aerosol generating device 1.

[39] The controller 12 may control the overall operation of the aerosol generating device 1. Specifically, the controller 12 may control respective operations of other components included in the aerosol generating device 1, in addition to the battery 11, the heater 13, and the vaporizer 14. In addition, the controller 12 may verify a state of each of the components of the aerosol generating device 1 to determine whether the aerosol generating device 1 is in an operable state.

[40] The controller 12 may include at least one processor. The at least one 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 at least one processor may be implemented in other types of hardware.

[41] The heater 13 may be heated by power supplied by the battery 11. For example, when a cigarette is inserted in the aerosol generating device 1, the heater 13 may be disposed outside the cigarette. The heated heater 13 may thus raise the temperature of an aerosol generating material in the cigarette.

[42] The heater 13 may be an electrically resistive heater. For example, the heater 13 may include an electrically conductive track, and the heater 13 may be heated as a current flows through the electrically conductive track. However, the heater 13 is not limited

to the foregoing example, and any example of heating the heater 13 up to a desired temperature may be applicable without limitation. Here, the desired temperature may be preset in the aerosol generating device 1 or may be set by the user.

[43] As another example, the heater 13 may be an induction heater. Specifically, the heater 13 may include an electrically conductive coil for heating the cigarette in an induction heating manner, and the cigarette may include a susceptor to be heated by the induction heater.

[44] For example, the heater 13 may include a tubular heating element, a plate-shaped heating element, a needle-shaped heating element, or a rod-shaped heating element, and may heat the inside or outside of the cigarette 2 according to the shape of a heating element.

[45] In addition, the heater 13 may be provided as a plurality of heaters in the aerosol generating device 1. In this case, the plurality of heaters 13 may be disposed to be inserted into the cigarette 2, or may be disposed outside the cigarette 2. In addition, some of the heaters 13 may be disposed to be inserted into the cigarette 2, and the rest may be disposed outside the cigarette 2. However, the shape of the heater 13 is not limited to what is shown in FIGS. 1 through 3 but may be provided in various shapes.

[46] The vaporizer 14 may heat a liquid composition to generate an aerosol, and the generated aerosol may pass through the cigarette 2 into the user. That is, the aerosol generated by the vaporizer 14 may travel along an airflow path of the aerosol generating device 1, and the airflow path may be configured such that the aerosol generated by the vaporizer 14 may pass through the cigarette into the user.

[47] For example, the vaporizer 14 may include a liquid storage, a liquid transfer means, and a heating element. However, embodiments are not limited thereto. For example, the liquid storage, the liquid transfer means, and the heating element may be included as independent modules in the aerosol generating device 1.

[48] The liquid storage may store the liquid composition. For example, the liquid composition may be a liquid including a tobacco-containing material having a volatile tobacco flavor ingredient, or a liquid including a non-tobacco material. The liquid storage may be manufactured to be detachable and attachable from and to the vaporizer 14, or may be manufactured in an integral form with the vaporizer 14.

[49] 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 flavor ingredients, and the like. However, embodiments are 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. However, embodiments are not limited thereto. The liquid com-

position may also include an aerosol former such as glycerin and propylene glycol.

[50] The liquid transfer means may transfer the liquid composition in the liquid storage to the heating element. The liquid transfer means may be, for example, a wick such as cotton fiber, ceramic fiber, glass fiber, or porous ceramic. However, embodiments are not limited thereto.

[51] The heating element may be an element configured to heat the liquid composition transferred by the liquid transfer means. The heating element may be, for example, a metal heating wire, a metal heating plate, a ceramic heater, or the like. However, embodiments are not limited thereto. 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.

[52] For example, the vaporizer 14 may also be referred to as a cartomizer or an atomizer. However, embodiments are not limited thereto.

[53] Meanwhile, the aerosol generating device 1 may further include general-purpose components in addition to the battery 11, the controller 12, the heater 13, and the vaporizer 14. For example, the aerosol generating device 1 may include a display that outputs visual information and/or a motor that outputs tactile information. In addition, the aerosol generating device 1 may include at least one sensor (e.g., a puff sensor, a temperature sensor, a cigarette insertion detection sensor, etc.). In addition, the aerosol generating device 1 may be manufactured to have a structure in which external air may be introduced or internal gas may flow out even with the cigarette 2 being inserted.

[54] Although not shown in FIGS. 1 to 3, the aerosol generating device 1 may constitute a system along with a separate cradle. For example, the cradle may be used to charge the battery 11 of the aerosol generating device 1. Alternatively, the cradle may be used to heat the heater 13, with the cradle and the aerosol generating device 1 coupled.

[55] The cigarette 2 may be of a similar type to a general burning type. For example, the cigarette 2 may be divided into a first portion including an aerosol generating material and a second portion including a filter or the like. Alternatively, the second portion of the cigarette 2 may also include the aerosol generating material. For example, the aerosol generating material provided in the form of granules or capsules may be inserted into the second portion.

[56] The first portion may be entirely inserted into the aerosol generating device 1, and the second portion may be exposed outside. Alternatively, only the first portion may be partially inserted into the aerosol generating device 1, or the first portion may be entirely inserted into the aerosol generating device 1 and the second portion may be partially

inserted into the aerosol generating device 1. The user may inhale the aerosol with the second portion in their mouth. In this case, the aerosol may be generated as external air passes through the first portion, and the generated aerosol may pass through the second portion into the mouth of the user.

[57] For example, the external air may be introduced through at least one air path formed in the aerosol generating device 1. In this example, the opening or closing and/or the size of the air path formed in the aerosol generating device 1 may be adjusted by the user. Accordingly, an amount of atomization, a sense of smoking, or the like may be adjusted by the user. For another example, the external air may be introduced into the inside of the cigarette 2 through at least one hole formed on a surface of the cigarette 2.

[58] Hereinafter, examples of the cigarette 2 will be described with reference to FIGS. 4 and 5.

[59] FIGS. 4 and 5 are perspective views of examples of a cigarette according to an embodiment.

[60] Referring to FIG. 4, the cigarette 2 may include a tobacco rod 21 and a filter rod 22. The first portion and the second portion described above with reference to FIGS. 1 to 3 may include the tobacco rod 21 and the filter rod 22, respectively.

[61] Although the filter rod 22 is illustrated as having a single segment in FIG. 4, examples of which are not limited thereto. That is, alternatively, the filter rod 22 may include a plurality of segments. For example, the filter rod 22 may include a segment that cools an aerosol and a segment that filters a predetermined ingredient contained in an aerosol. In addition, the filter rod 22 may further include at least one segment that performs another function, as needed.

[62] The diameter of the cigarette 2 may be in a range of about 5 millimeters (mm) to about 9 mm, and the length thereof may be about 48 mm. However, embodiments are not limited thereto. For example, the length of the tobacco rod 21 may be about 12 mm, the length of a first segment of the filter rod 22 may be about 10 mm, the length of a second segment of the filter rod 22 may be about 14 mm, and the length of a third segment of the filter rod 22 may be about 12 mm. However, embodiments are not limited thereto.

[63] The cigarette 2 may be wrapped with at least one wrapper 24. The wrapper 24 may have at least one hole through which external air is introduced or internal gas is discharged outside. For example, the cigarette 2 may be wrapped with one wrapper 24. For another example, the cigarette 2 may be wrapped with two or more wrappers 24 in an overlapping manner. For example, the tobacco rod 21 may be wrapped with a first wrapper 241, and the filter rod 22 may be wrapped with wrappers 242, 243, and 244. In addition, the cigarette 2 may be entirely wrapped again with a single wrapper 245. For example, when the filter rod 22 includes a plurality of segments, the plurality of

segments may be wrapped with the wrappers 242, 243, and 244, respectively.

- [64] 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. In addition, the first wrapper 241 and the second wrapper 242 may be formed of oilproof paper and/or an aluminum laminated wrapping material.
- [65] The third wrapper 243 may be formed of hard wrapping paper. For example, the basis weight of the third wrapper 243 may be in a range of about 88 g/m² to about 96 g/m², and may be desirably in a range of about 90 g/m² to about 94 g/m². In addition, the thickness of the third wrapper 243 may be in a range of about 120 μm to about 130 μm, and may be desirably about 125 μm.
- [66] The fourth wrapper 244 may be formed of oilproof hard wrapping paper. For example, the basis weight of the fourth wrapper 244 may be in a range of about 88 g/m² to about 96 g/m², and may be desirably in a range of about 90 g/m² to about 94 g/m². In addition, the thickness of the fourth wrapper 244 may be in a range of about 120 μm to about 130 μm, and may be desirably about 125 μm.
- [67] The fifth wrapper 245 may be formed of sterile paper (e.g., MFW). Here, the sterile paper (MFW) may refer to paper specially prepared such that it has enhanced tensile strength, water resistance, smoothness, or the like, compared to general paper. For example, the basis weight of the fifth wrapper 245 may be in a range of about 57 g/m² to about 63 g/m², and may be desirably about 60 g/m². In addition, the thickness of the fifth wrapper 245 may be in a range of about 64 μm to about 70 μm, and may be desirably about 67 μm.
- [68] The fifth wrapper 245 may have a predetermined material internally added thereto. The material may be, for example, silicon. However, embodiments are not limited thereto. Silicon may have properties, such as, for example, heat resistance which is characterized by less change by temperature, oxidation resistance which refers to resistance to oxidation, resistance to various chemicals, water repellency against water, or electrical insulation. However, silicon may not be necessarily used, but any material having such properties described above may be applied to (or used to coat) the fifth wrapper 245 without limitation.
- [69] The fifth wrapper 245 may prevent the cigarette 2 from burning. For example, there may be a probability that the cigarette 2 burns when the tobacco rod 21 is heated by the heater 13. For example, when the temperature rises above an ignition point of any one of materials included in the tobacco rod 21, the cigarette 2 may burn. Even in this case, it may still be possible to prevent the cigarette 2 from burning because the fifth wrapper 245 includes a non-combustible material.
- [70] In addition, the fifth wrapper 245 may prevent an aerosol generating device from

being contaminated by substances produced in the cigarette 2. For example, liquid substances may be produced in the cigarette 2 by puffs from the user. For example, as an aerosol generated in the cigarette 2 is cooled by external air, liquid substances (e.g., water, etc.) may be produced. Thus, wrapping the cigarette 2 with the fifth wrapper 245 may prevent the liquid substances produced in the cigarette 2 from leaking out of the cigarette 2.

- [71] The tobacco rod 21 may include an aerosol generating material. The aerosol generating material may include, for example, at least one of glycerin, propylene glycol, ethylene glycol, dipropylene glycol, diethylene glycol, triethylene glycol, tetraethylene glycol, or oleyl alcohol. However, embodiments are not limited thereto. The tobacco rod 21 may also include other additives such as, for example, a flavoring agent, a wetting agent, and/or an organic acid. In addition, the tobacco rod 21 may include a flavoring liquid such as menthol or a moisturizing agent that is added as being sprayed onto the tobacco rod 21.
- [72] 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. Alternatively, the tobacco rod 21 may be formed of tobacco leaves finely cut from a tobacco sheet. In addition, the tobacco rod 21 may be enveloped by a thermally conductive material. The thermally conductive material may be, for example, a metal foil such as aluminum foil. However, embodiments are not limited thereto. For example, the thermally conductive material enveloping the tobacco rod 21 may evenly distribute the heat transferred to the tobacco rod 21 to improve the conductivity of the heat to be applied to the tobacco rod 21, thereby improving the taste of tobacco. In addition, the thermally conductive material enveloping the tobacco rod 21 may function as a susceptor heated by an induction heater. In this case, although not shown, the tobacco rod 21 may further include an additional susceptor in addition to the thermally conductive material enveloping the outside thereof.
- [73] The filter rod 22 may be a cellulose acetate filter. However, there is no limit to the shape of the filter rod 22. For example, the filter rod 22 may be a cylindrical rod, or a tubular rod including a hollow therein. The filter rod 22 may also be a recess-type rod. For example, when the filter rod 22 includes a plurality of segments, at least one of the segments may be manufactured in a different shape.
- [74] A first segment of the filter rod 22 may be a cellulose acetate filter. For example, the first segment may be a tubular structure including a hollow therein. The first segment may prevent internal materials of the tobacco rod 21 from being pushed back when the heater 13 is inserted into the tobacco rod 21 and may cool the aerosol. A desirable diameter of the hollow included in the first segment may be adopted from a range of about 2 mm to about 4.5 mm. However, embodiments are not limited thereto.

- [75] A desirable length of the first segment may be adopted from a range of about 4 mm to about 30 mm. However, embodiments are not limited thereto. Desirably, the length of the first segment may be 10 mm. However, embodiments are not limited thereto.
- [76] The first segment may have a hardness that is adjustable through an adjustment of the content of a plasticizer in the process of manufacturing the first segment. In addition, the first segment may be manufactured by inserting a structure such as a film or a tube of the same or different materials therein (e.g., in the hollow).
- [77] A second segment of the filter rod 22 may cool an aerosol generated as the heater 13 heats the tobacco rod 21. The user may thus inhale the aerosol cooled down to a suitable temperature.
- [78] The length or diameter of the second segment may be determined in various ways according to the shape of the cigarette 2. For example, a desirable length of the second segment may be adopted from a range of about 7 mm to about 20 mm. Desirably, the length of the second segment may be about 14 mm. However, embodiments are not limited thereto.
- [79] The second segment may be manufactured by weaving a polymer fiber. In this case, a flavoring liquid may be applied to a fiber formed of a polymer. As another example, the second segment may be manufactured by weaving a separate fiber to which a flavoring liquid is applied and the fiber formed of the polymer together. As still another example, the second segment may be formed with a crimped polymer sheet.
- [80] For example, the polymer may be prepared with a material selected from the group consisting of polyethylene (PE), polypropylene (PP), polyvinyl chloride (PVC), polyethylene terephthalate (PET), polylactic acid (PLA), cellulose acetate (CA,) and aluminum foil.
- [81] As the second segment is formed with 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. A channel used herein may refer to a path through which a gas (e.g., air or aerosol) passes.
- [82] For example, the second segment formed with the crimped polymer sheet may be formed of a material having a thickness between about 5 μm and about 300 μm , for example, between about 10 μm and about 250 μm . In addition, the total surface area of the second segment may be between about 300 mm^2/mm and about 1000 mm^2/mm . Further, an aerosol cooling element may be formed from a material having a specific surface area between about 10 mm^2/mg and about 100 mm^2/mg .
- [83] Meanwhile, the second segment may include a thread containing a volatile flavor ingredient. The volatile flavor ingredient may be menthol. However, embodiments are not limited thereto. For example, the thread may be filled with a sufficient amount of menthol to provide at least 1.5 mg of menthol to the second segment.

- [84] A third segment of the filter rod 22 may be a cellulose acetate filter. A desirable length of the third segment may be adopted from a range of about 4 mm to about 20 mm. For example, the length of the third segment may be about 12 mm. However, embodiments are not limited thereto.
- [85] The third segment may be manufactured such that a flavor is generated by spraying a flavoring liquid onto the third segment in the process of manufacturing the third segment. Alternatively, a separate fiber to which the flavoring liquid is applied may be inserted into the third segment. An aerosol generated in the tobacco rod 21 may be cooled as it passes through the second segment of the filter rod 22, and the cooled aerosol may pass through the third segment into the user. Accordingly, when a flavoring element is added to the third segment, the flavor carried to the user may last much longer.
- [86] In addition, the filter rod 22 may include at least one capsule 23. Here, the capsule 23 may perform a function of generating a flavor or a function of generating an aerosol. For example, the capsule 23 may have a structure in which a liquid containing a fragrance is wrapped with a film. The capsule 23 may have a spherical or cylindrical shape. However, embodiments are not limited thereto.
- [87] Referring to FIG. 5, a cigarette 3 may further include a front end plug 33. The front end plug 33 may be disposed on one side of a tobacco rod 31 opposite to a filter rod 32. The front end plug 33 may prevent the tobacco rod 31 from escaping to the outside, and may also prevent an aerosol liquefied in the tobacco rod 31 during smoking from flowing into an aerosol generating device (e.g., the aerosol generating device 1 of FIGS. 1 to 3).
- [88] The filter rod 32 may include a first segment 321 and a second segment 322. Here, the first segment 321 may correspond to the first segment of the filter rod 22 of FIG. 4, and the second segment 322 may correspond to the third segment of the filter rod 22 of FIG. 4.
- [89] A diameter and a total length of the cigarette 3 may correspond to the diameter and the total length of the cigarette 2 of FIG. 4. For example, the length of the front end plug 33 may be about 7 mm, the length of the tobacco rod 31 may be about 15 mm, the length of the first segment 321 may be about 12 mm, and the length of the second segment 322 may be about 14 mm. However, embodiments are not limited thereto.
- [90] The cigarette 3 may be wrapped with at least one wrapper 35. The wrapper 35 may have at least one hole through which external air is introduced or internal gas flows out. For example, the front end plug 33 may be wrapped with a first wrapper 351, the tobacco rod 31 may be wrapped with a second wrapper 352, the first segment 321 may be wrapped with a third wrapper 353, and the second segment 322 may be wrapped with a fourth wrapper 354. In addition, the cigarette 3 may be entirely wrapped again

with a fifth wrapper 355.

- [91] In addition, at least one perforation 356 may be formed in the fifth wrapper 355. For example, the perforation 356 may be formed in an area surrounding the tobacco rod 31. However, embodiments are not limited thereto. The perforation 356 may perform a function of transferring heat generated by the heater 13 shown in FIGS. 2 and 3 to the inside of the tobacco rod 31.
- [92] In addition, the second segment 322 may include at least one capsule 34. Here, the capsule 34 may perform a function of generating a flavor or a function of generating an aerosol. For example, the capsule 34 may have a structure in which a liquid containing a fragrance is wrapped with a film. The capsule 34 may have a spherical or cylindrical shape. However, embodiments are not limited thereto.
- [93] The first wrapper 351 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 351 may be in a range of about 45 μm to about 55 μm , and may be desirably about 50.3 μm . Further, the thickness of the metal foil of the first wrapper 351 may be in a range of about 6 μm to about 7 μm , and may be desirably about 6.3 μm . In addition, the basis weight of the first wrapper 351 may be in a range of about 50 g/m^2 to about 55 g/m^2 , and may be desirably about 53 g/m^2 .
- [94] The second wrapper 352 and the third wrapper 353 may be formed with 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.
- [95] For example, the porosity of the second wrapper 352 may be 35000 CU. However, embodiments are not limited thereto. Further, the thickness of the second wrapper 352 may be in a range of about 70 μm to about 80 μm , and may be desirably about 78 μm . In addition, the basis weight of the second wrapper 352 may be in a range of about 20 g/m^2 to about 25 g/m^2 , and may be desirably about 23.5 g/m^2 .
- [96] For example, the porosity of the third wrapper 353 may be 24000 CU. However, embodiments are not limited thereto. Further, the thickness of the third wrapper 353 may be in a range of about 60 μm to about 70 μm , and may be desirably about 68 μm . In addition, the basis weight of the third wrapper 353 may be in a range of about 20 g/m^2 to about 25 g/m^2 , and may be desirably about 21 g/m^2 .
- [97] The fourth wrapper 354 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 354 may be in a range of about 100 μm to about 120 μm , and may be desirably about 110 μm . In addition, the basis weight of the fourth wrapper 354 may be in a range of about 80 g/m^2 to about 100 g/m^2 , and may be desirably about 88 g/m^2 .
- [98] The fifth wrapper 355 may be formed of sterile paper (e.g., MFW). Here, the sterile

paper (MFW) may refer to paper specially prepared such that it has enhanced tensile strength, water resistance, smoothness, or the like, compared to general paper. For example, the basis weight of the fifth wrapper 355 may be in a range of about 57 g/m² to about 63 g/m², and may be desirably about 60 g/m². Further, the thickness of the fifth wrapper 355 may be in a range of about 64 μ m to about 70 μ m, and may be desirably about 67 μ m.

- [99] The fifth wrapper 355 may have a predetermined material internally added thereto. The material may be, for example, silicon. However, embodiments are not limited thereto. Silicon may have properties, such as, for example, heat resistance which is characterized by less change by temperature, oxidation resistance which refers to resistance to oxidation, resistance to various chemicals, water repellency against water, or electrical insulation. However, silicon may not be necessarily used, but any material having such properties described above may be applied to (or used to coat) the fifth wrapper 355 without limitation.
- [100] The front end plug 33 may be formed of cellulose acetate. For example, the front end plug 33 may be manufactured by adding a plasticizer (e.g., triacetin) to cellulose acetate tow. The mono denier of a filament of the cellulose acetate tow may be in a range of about 1.0 to about 10.0, and may be desirably in a range of about 4.0 to about 6.0. The mono denier of the filament of the front end plug 33 may be more desirably about 5.0. In addition, a cross section of the filament of the front end plug 33 may be Y-shaped. The total denier of the front end plug 33 may be in a range of about 20000 to about 30000, and may be desirably in a range of about 25000 to about 30000. The total denier of the front end plug 33 may be more desirably 28000.
- [101] In addition, as needed, the front end plug 33 may include at least one channel, and a cross-sectional shape of the channel may be provided in various ways.
- [102] The tobacco rod 31 may correspond to the tobacco rod 21 described above with reference to FIG. 4. Thus, a detailed description of the tobacco rod 31 will be omitted here.
- [103] The first segment 321 may be formed of cellulose acetate. For example, the first segment may be a tubular structure including a hollow therein. The first segment 321 may be manufactured by adding a plasticizer (e.g., triacetin) to cellulose acetate tow. For example, the mono denier and the total denier of the first segment 321 may be the same as the mono denier and the total denier of the front end plug 33.
- [104] The second segment 322 may be formed of cellulose acetate. The mono denier of a filament of the second segment 322 may be in a range of about 1.0 to about 10.0, and may be desirably in a range of about 8.0 to about 10.0. The mono denier of the filament of the second segment 322 may be more desirably 9.0. In addition, a cross section of the filament of the second segment 322 may be Y-shaped. The total denier

of the second segment 322 may be in a range of about 20000 to about 30000, and may be desirably 25000.

[105] FIG. 6 is a block diagram of an aerosol generating device 400 according to an embodiment.

[106] The aerosol generating device 400 may include a controller 410, a sensing unit 420, an output unit 430, a battery 440, a heater 450, a user input unit 460, a memory 470, and a communication unit 480. However, the internal structure of the aerosol generating device 400 is not limited to what is shown in FIG. 6. It is to be understood by one of ordinary skill in the art to which the disclosure pertains that some of the components shown in FIG. 6 may be omitted or new components may be added according to the design of the aerosol generating device 400.

[107] The sensing unit 420 may sense a state of the aerosol generating device 400 or a state of an environment around the aerosol generating device 400, and transmit sensing information obtained through the sensing unit to the controller 410. Based on the sensing information, the controller 410 may control the aerosol generating device 400 to control operations of the heater 450, restrict smoking, determine whether an aerosol generating article (e.g., a cigarette, a cartridge, etc.) is inserted, display a notification, and perform other functions.

[108] The sensing unit 420 may include at least one of a temperature sensor 422, an insertion detection sensor 424, or a puff sensor 426. However, embodiments are not limited thereto.

[109] The temperature sensor 422 may sense a temperature at which the heater 450 (or an aerosol generating material) is heated. The aerosol generating device 400 may include a separate temperature sensor for sensing the temperature of the heater 450, or the heater 450 itself may perform a function as a temperature sensor. Alternatively, the temperature sensor 422 may be arranged around the battery 440 to monitor the temperature of the battery 440.

[110] The insertion detection sensor 424 may sense whether the aerosol generating article is inserted or removed. The insertion detection sensor 424 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, or an infrared sensor, which may sense a signal change by the insertion or removal of the aerosol generating article.

[111] The puff sensor 426 may sense a puff from a user based on various physical changes in an airflow path or airflow channel. For example, the puff sensor 426 may sense the puff of the user based on any one of a temperature change, a flow change, a voltage change, and a pressure change.

[112] The sensing unit 420 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, or a red, green, blue (RGB) sensor (e.g., an illuminance sensor), in addition to the sensors 422 through 426 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.

- [113] The output unit 430 may output information about the state of the aerosol generating device 400 and provide the information to the user. The output unit 430 may include at least one of a display 432, a haptic portion 434, or a sound outputter 436. However, embodiments are not limited thereto. When the display 432 and a touchpad are provided in a layered structure to form a touchscreen, the display 432 may be used as an input device in addition to an output device.
- [114] The display 432 may visually provide information about the aerosol generating device 400 to the user. The information about the aerosol generating device 400 may include, for example, a charging/discharging state of the battery 440 of the aerosol generating device 400, a preheating state of the heater 450, an insertion/removal state of the aerosol generating article, a limited usage state (e.g., an abnormal article detected) of the aerosol generating device 400, or the like, and the display 432 may externally output the information. The display 432 may be, for example, a liquid-crystal display panel (LCD), an organic light-emitting display panel (OLED), or the like. The display 432 may also be in the form of a light-emitting diode (LED) device.
- [115] The haptic portion 434 may provide information about the aerosol generating device 400 to the user in a haptic way by converting an electrical signal into a mechanical stimulus or an electrical stimulus. The haptic portion 434 may include, for example, a motor, a piezoelectric element, or an electrical stimulation device.
- [116] The sound outputter 436 may provide information about the aerosol generating device 400 to the user in an auditory way. For example, the sound outputter 436 may convert an electrical signal into a sound signal and externally output the sound signal.
- [117] The battery 440 may supply power to be used to operate the aerosol generating device 400. The battery 440 may supply power to heat the heater 450. In addition, the battery 440 may supply power required for operations of the other components (e.g., the sensing unit 420, the output unit 430, the user input unit 460, the memory 470, and the communication unit 480) included in the aerosol generating device 400. The battery 440 may be a rechargeable battery or a disposable battery. The battery 440 may be, for example, a lithium polymer (LiPoly) battery. However, embodiments are not limited thereto.
- [118] The heater 450 may receive power from the battery 440 to heat the aerosol generating material. Although not shown in FIG. 6, the aerosol generating device 400 may further include a power conversion circuit (e.g., a direct current (DC)-to-DC

(DC/DC) converter) that converts power of the battery 440 and supplies the power to the heater 450. In addition, when the aerosol generating device 400 generates an aerosol in an induction heating manner, the aerosol generating device 400 may further include a DC-to-alternating current (AC) (DC/AC) converter that converts DC power of the battery 440 into AC power.

[119] The controller 410, the sensing unit 420, the output unit 430, the user input unit 460, the memory 470, and the communication unit 480 may receive power from the battery 440 to perform functions. Although not shown in FIG. 6, the aerosol generating device 400 may further include a power conversion circuit, for example, a low dropout (LDO) circuit or a voltage regulator circuit, that converts power of the battery 440 and supplies the power to respective components.

[120] In an embodiment, the heater 450 may be formed of a predetermined electrically resistive material that is suitable. The electrically resistive material may be a metal or a metal alloy including, for example, titanium, zirconium, tantalum, platinum, nickel, cobalt, chromium, hafnium, niobium, molybdenum, tungsten, tin, gallium, manganese, iron, copper, stainless steel, nichrome, or the like. However, embodiments are not limited thereto. In addition, the heater 450 may be implemented as a metal heating wire, a metal heating plate on which an electrically conductive track is arranged, a ceramic heating element, or the like. However, embodiments are not limited thereto.

[121] In an embodiment, the heater 450 may be an induction heater. For example, the heater 450 may include a susceptor that heats the aerosol generating material by generating heat through a magnetic field applied by a coil.

[122] In an embodiment, the heater 450 may include a plurality of heaters. For example, the heater 450 may include a first heater for heating a cigarette and a second heater for heating a liquid.

[123] The user input unit 460 may receive information input from the user or may output information to the user. For example, the user input unit 460 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 method, etc.), a jog wheel, a jog switch, or the like. However, embodiments are not limited thereto. In addition, although not shown in FIG. 6, the aerosol generating device 400 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 440.

[124] The memory 470, which is hardware for storing various pieces of data processed in the aerosol generating device 400, may store data processed by the controller 410 and data to be processed thereby. The memory 470 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 470 may store an operating time of the aerosol generating device 400, a maximum number of puffs, a current number of puffs, at least one temperature profile, data associated with a smoking pattern of the user, or the like.

[125] The communication unit 480 may include at least one component for communicating with another electronic device. For example, the communication unit 480 may include a short-range wireless communication unit 482 and a wireless communication unit 484.

[126] The short-range wireless communication unit 482 may include a Bluetooth communication unit, a 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. However, embodiments are not limited thereto.

[127] The wireless communication unit 484 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, or the like. However, embodiments are not limited thereto. The wireless communication unit 484 may use subscriber information (e.g., international mobile subscriber identity (IMSI)) to identify and authenticate the aerosol generating device 400 in a communication network.

[128] The controller 410 may control the overall operation of the aerosol generating device 400. In an embodiment, the controller 410 may include at least one processor. The at least one 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 it may be implemented in other types of hardware.

[129] The controller 410 may control the temperature of the heater 450 by controlling the supply of power from the battery 440 to the heater 450. For example, the controller 410 may control the supply of power by controlling the switching of a switching element between the battery 440 and the heater 450. In another example, a direct heating circuit may control the supply of power to the heater 450 according to a control command from the controller 410.

[130] The controller 410 may analyze a sensing result obtained by the sensing of the

sensing unit 420 and control processes to be performed thereafter. For example, the controller 410 may control power to be supplied to the heater 450 to start or end an operation of the heater 450 based on the sensing result obtained by the sensing unit 420. As another example, the controller 410 may control an amount of power to be supplied to the heater 450 and a time for which the power is to be supplied, such that the heater 450 may be heated up to a predetermined temperature or maintained at a desired temperature, based on the sensing result obtained by the sensing unit 420.

[131] The controller 410 may control the output unit 430 based on the sensing result obtained by the sensing unit 420. For example, when the number of puffs counted through the puff sensor 426 reaches a preset number, the controller 410 may inform the user that the aerosol generating device 400 is to be ended soon, through at least one of the display 432, the haptic portion 434, or the sound outputter 436.

[132] In an embodiment, the controller 410 may control a power supply time and/or a power supply amount for the heater 450 according to a state of the aerosol generating article sensed by the sensing unit 420. For example, when the aerosol generating article is in an over-humidified state, the controller 410 may control the power supply time for an inductive coil to increase a preheating time, compared to a case where the aerosol generating article is in a general state.

[133] One embodiment may also be implemented in the form of a recording medium including instructions executable by a computer, such as a program module executable by the computer. A computer-readable medium may be any available medium that can be accessed by a computer and includes a volatile medium, a non-volatile medium, a removable medium, and a non-removable medium. In addition, the computer-readable medium may include both a computer storage medium and a communication medium. The computer storage medium includes all of a volatile medium, a non-volatile medium, a removable medium, and a non-removable medium implemented by any method or technology for storage of information such as computer-readable instructions, data structures, program modules or other data. The communication medium typically includes computer-readable instructions, data structures, other data in modulated data signals such as program modules, or other transmission mechanisms, and includes any information transfer medium.

[134] The term "aerosol generating material" used herein refers to a material from which an aerosol can be generated. The aerosol may include a volatile compound. The aerosol generating material may be solid or liquid. For example, a solid aerosol generating material may include a solid substance based on tobacco raw materials such as sheet tobacco, cut filler tobacco, or reconstituted tobacco, and a liquid aerosol generating material may include a liquid composition based on nicotine, tobacco extracts, and/or various flavoring agents. The aerosol generating material may include an aerosol

former to stably form visible smoke and/or an aerosol.

[135] The term "aerosol generating device" used herein refers to a device that generates an aerosol using an aerosol generating article such that the aerosol may be inhaled through the mouth of a user directly to the lungs of the user.

[136] The term "upstream" or "upstream direction" used herein refers to a direction away from the mouth of a user, and the term "downstream" or "downstream direction" refers to a direction toward the mouth of a user. The terms "upstream" and "downstream" may be used to describe relative positions of components of an aerosol generating article.

[137] The term "puff" used herein refers to inhalation by a user. Inhalation refers to drawing in through the mouth or nose of a user into the oral cavity, nasal cavity, or lungs of the user.

[138] The "longitudinal direction" used herein refers to a direction corresponding to the longitudinal axis of an aerosol generating article.

[139] FIG. 7 is a view of an aerosol generating article according to an embodiment, and FIG. 8 is a schematic cross-sectional view of a capsule according to an embodiment.

[140] Referring to FIGS. 7 and 8, an aerosol generating article 5 may include, from downstream to upstream, a first segment 51, a second segment 52, a third segment 53, and a fourth segment 54.

[141] The first segment 51 may include a filter 511. For example, the filter 511 may include a cellulose acetate filter. In an embodiment, the first segment 51 may not include a hollow portion.

[142] The second segment 52 may include a medium 521. For example, the medium 521 may include an aerosol generating material, a fragrance material, and/or any other material suitable for generating an aerosol. The aerosol generating material may include, for example, at least one of cut filler tobacco, sheet tobacco, or reconstituted tobacco. In some embodiments, the aerosol generating material may include at least one of glycerin, propylene glycol, ethylene glycol, dipropylene glycol, diethylene glycol, triethylene glycol, tetraethylene glycol, or oleyl alcohol.

[143] In an embodiment, the second segment 52 may include a capsule 522. The capsule 522 may be configured to melt within a determined temperature range. The capsule 522 may be at least partially surrounded by the medium 521. In some embodiments, the capsule 522 may be embedded in the medium 521. The capsule 522 may include a core 5221 and a shell 5222 surrounding the core 5221.

[144] In an embodiment, the core 5221 and the shell 5222 may form a capsule 522 at least partially having a curved surface. In some embodiments, the core 5221 and shell 5222 may form a capsule 522 having a substantially circular or elliptical cross section. In an embodiment, the core 5221 and shell 5222 may form a capsule 522 having any suitable

shape.

- [145] In an embodiment, the core 5221 may include a basic substance. The basic substance may convert one form of aerosol generating material in the medium 521 to any other form of aerosol generating material suitable for inhalation by a user. For example, as shown in FIG. 9, the basic substance may break the chemical bond(s) in a substance in the form of nicotine salt, thereby promoting transition to the user in the form of "free nicotine" having sufficient volatility at a relatively low temperature.
- [146] An aerosol having sufficient volatility at a relatively low temperature may reduce the unpleasant stimulus to the user and increase the feeling of inhalation satisfaction of the user, when transitioned to the user. Considering that an aerosol is generated at a relatively low temperature, the amount of an aerosol transitioned to the user may increase. In addition, since an aerosol may be generated at a relatively low temperature, the initial preheat temperature and/or operating temperature of a device (e.g., the aerosol generating device 1 of FIGS. 1 to 3) to which the aerosol generating article 5 is applied may be reduced. Further, composing the medium 521 in an environment with a relatively high pH may reduce chemical damage to a wrapper (e.g., the second wrapper 552 and/or the fifth wrapper 555) surrounding the medium 521.
- [147] In an embodiment, the basic substance may include at least one of alkaline metal carbonate, alkaline earth metal carbonate, alkaline metal hydrogencarbonate, alkaline earth metal hydrogencarbonate, alkaline metal hydroxide, alkaline earth metal hydroxide, alkaline metal phosphate, alkaline earth metal phosphate, alkaline metal monohydrogen phosphate, or alkaline earth metal monohydrogen phosphate.
- [148] In some embodiments, the basic substance may include at least one of alkaline metal carbonate, alkaline earth metal carbonate, alkaline earth metal hydrogencarbonate, or alkaline metal phosphate.
- [149] In some embodiments, the basic substance may include at least one of sodium carbonate, potassium carbonate, calcium carbonate, sodium hydroxide, potassium hydroxide, calcium hydroxide, or calcium oxide.
- [150] In an embodiment, the basic substance may include a substance having a pH of about 12 or less, a pH of about 11.5 or less, a pH of about 10 or less, a pH of about 9.5 or less, a pH of about 9.0 or less, a pH of about 8.5 or less, a pH of about 8.0 or less, or a pH of about 7.5 or less, at about 25°C.
- [151] In an embodiment, the basic substance may include a substance that is substantially water-soluble at about 25°C.
- [152] In an embodiment, the basic substance may be in an amount of about 12 % by weight (wt%) or less, about 11 wt% or less, about 10 wt% or less, about 9 wt% or less, or about 8 wt% or less, based on 100 wt% of the medium 521.
- [153] In an embodiment, the core 5221 may have a diameter or width of about 2.0 mil-

limeters (mm) or greater, about 2.5 mm or greater, about 3.0 mm or greater, about 3.5 mm or greater, about 4.5 mm or greater, about 5.0 mm or greater, or about 5.5 mm or greater. In an embodiment, the core 5221 may have a diameter or width of about 7.0 millimeters (mm) or less, about 6.5 mm or less, about 6.0 mm or less, about 5.5 mm or less, about 5.0 mm or less, about 4.5 mm or less, about 4.0 mm or less, about 3.5 mm or less, or about 3.0 mm or less.

- [154] In an embodiment, the shell 5222 may include wax. In some embodiments, the shell 5222 may include animal or fat-soluble wax. For example, the shell 5222 may include cocoa butter, shea butter, and/or a combination thereof.
- [155] In some embodiments, the shell 5222 may include vegetable wax. For example, the shell 5222 may include carnauba wax, candelilla wax, castor wax, ouricury wax, and/or a combination thereof.
- [156] In some embodiments, the shell 5222 may include soy wax, beeswax, palm wax, paraffin wax, and/or a combination thereof.
- [157] In an embodiment, the shell 5222 may include a water-soluble polymer. For example, the shell 5222 may include at least one of water-soluble hydrocolloids including gelatin, agar, carrageenan, alginic acid and pectin, gums including gellan gum, starches including potato starch and corn starch, or starch derivatives including dextrin, maltodextrin and cyclodextrin. In some examples, the shell 5222 may include gelatin, agar, and/or a combination thereof. In some instances, the shell 5222 may include at least one of cellulose derivatives such as hydroxy propyl methyl cellulose (HPMC), hydroxy propyl cellulose (HPC), methyl cellulose (MC) and carboxy methyl cellulose (CMC), polyvinyl alcohol, or polyol.
- [158] In an embodiment, the shell 5222 may include a material having a melting point of about 25°C or higher, about 30°C or higher, about 35°C or higher, about 40°C or higher, about 45°C or higher, about 50°C or higher, about 55°C or higher, about 60°C or higher, about 65°C or higher, about 70°C or higher, about 75°C or higher, about 80°C or higher, about 85°C or higher, about 90°C or higher, about 95°C or higher, about 100°C or higher, about 105°C or higher, about 110°C or higher, about 115°C or higher, about 120°C or higher, or about 125°C or higher. In some embodiments, the shell 5222 may include a material having a melting point of about 40°C or higher. The shell 5222 does not substantially melt at room temperature and thus, may protect the material of the core 5221 surrounded by the shell 5222. Substantially maintaining the pre-use shape of the capsule 522 may contribute to the storability of the capsule 522.
- [159] In an embodiment, the shell 5222 may include a material having a melting point of about 180°C or lower, about 175°C or lower, about 170°C or lower, about 165°C or lower, about 160°C or lower, about 155°C or lower, about 150°C or lower, about 145°C or lower, about 140°C or lower, about 135°C or lower, about 130°C or lower,

about 125°C or lower, about 120°C or lower, about 115°C or lower, about 110°C or lower, about 105°C or lower, about 100°C or lower, about 95°C or lower, about 90°C or lower, about 85°C or lower, about 80°C or lower, about 75°C or lower, about 70°C or lower, about 65°C or lower, about 60°C or lower, about 55°C or lower, about 50°C or lower, or about 45°C or lower. In some embodiments, the shell 5222 may include a material having a melting point of about 130°C or less. In some embodiments, the shell 5222 may include a material having a melting point of about 80°C or less. The melting of the shell 5222 at the temperature mentioned above may contribute to the smooth release of the material of the core 5221 in a desired environment (e.g., a relatively low-temperature environment) to which the capsule 522 is to be applied.

[160] In an embodiment, the shell 5222 may have a thickness of about 0.1 mm or greater, about 0.2 mm or greater, about 0.3 mm or greater, about 0.4 mm or greater, about 0.5 mm or greater, about 0.6 mm or greater, about 0.7 mm or greater, or about 0.8 mm or greater.

[161] In an embodiment, the shell 5222 may have a thickness of about 1.5 mm or less, about 1.4 mm or less, about 1.3 mm or less, about 1.2 mm or less, about 1.1 mm or less, about 1.0 mm or less, or about 0.9 mm or less.

[162] In an embodiment, the capsule 522 may have a crushing strength of about 0.5 kgf or greater, about 0.6 kgf or greater, about 0.7 kgf or greater, about 0.8 kgf or greater, about 0.9 kgf or greater, about 1.0 kgf or greater, about 1.1 kgf or greater, or about 1.2 kgf or greater, about 1.3 kgf or greater, or about 1.4 kgf or greater. In some embodiments, the capsule 522 may have a crushing strength of about 1.0 kgf or greater. When the capsule 522 has a low crushing strength, it may be unfavorable for the storability of the capsule 522, and thus, the melting of the shell 5222 and release of the core 5221 in a desired environment may not be expected.

[163] In an embodiment, the capsule 522 may have a crushing strength of about 3.0 kgf or less, about 2.9 kgf or less, about 2.8 kgf or less, about 2.7 kgf or less, about 2.6 kgf or less, about 2.5 kgf or less, about 2.4 kgf or less, or about 2.3 kgf or less, about 2.2 kgf or less, about 2.1 kgf or less, about 2.0 kgf or less, about 1.9 kgf or less, or about 1.8 kgf or less. In some embodiments, the capsule 522 may have a crushing strength of about 2.5 kgf or less. In some application examples, the user may break the capsule 522 to release the core 5221. However, when the capsule 522 has a high crushing strength, it may be difficult to accomplish such a goal, and the user may show reduced interest in utilizing the capsule 522.

[164] The third segment 53 may include a filter 531. For example, the filter 531 may include a cellulose acetate filter. In an embodiment, the third segment 53 may include a hollow portion 532 in the filter 531. In an embodiment, the third segment 53 may include a plurality of perforations 533 arranged in the circumferential direction of the

filter 531.

[165] The fourth segment 54 may include a filter 541. For example, the filter 541 may include a cellulose acetate filter. In an embodiment, the fourth segment 54 may not include a hollow portion.

[166] The aerosol generating article 5 may include a wrapper 55. For example, the wrapper 55 may include a first wrapper 551 at least partially surrounding the first segment 51, a second wrapper 552 at least partially surrounding the second segment 52, a third wrapper 553 at least partially surrounding the third segment 53, a fourth wrapper 554 at least partially surrounding the fourth segment 54, and a fifth wrapper 555 at least partially surrounding the first wrapper 551, the second wrapper 552, the third wrapper 553, and the fourth wrapper 554. In some embodiments, at least one of the first wrapper 551, the second wrapper 552, the third wrapper 553, or the fourth wrapper 554 may be omitted. In an embodiment, the second wrapper 552 and/or the fifth wrapper 555 may be formed of a material resistant to a basic substance.

[167] 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

- [Claim 1] An aerosol generating article, comprising:
a segment,
wherein the segment comprises a capsule and a medium surrounding the capsule, and
the capsule comprises a core comprising a basic substance, and a shell surrounding the core.
- [Claim 2] The aerosol generating article of claim 1, wherein
the basic substance comprises at least one substance having a pH of 12 or less at about 25°C.
- [Claim 3] The aerosol generating article of claim 1, wherein
the basic substance comprises at least one water-soluble substance.
- [Claim 4] The aerosol generating article of claim 1, wherein
the basic substance is in an amount of 12 % by weight (wt%) or less when the medium is in an amount of 100 wt%.
- [Claim 5] The aerosol generating article of claim 1, wherein
the basic substance comprises a combination of:
any one of an alkaline metal and an alkaline earth metal; and
any one of carbonate, hydrogencarbonate, and phosphate.
- [Claim 6] The aerosol generating article of claim 1, wherein
the shell comprises at least one material having a melting point between 40°C and 130°C at 1 bar.
- [Claim 7] The aerosol generating article of claim 6, wherein
the at least one material included in the shell has a melting point of 80°C or less.
- [Claim 8] The aerosol generating article of claim 1, wherein
the capsule has a crushing strength of 1.0 kilogram-force (kgf) to 2.5 kgf.
- [Claim 9] The aerosol generating article of claim 1, wherein
the medium comprises at least one of cut filler tobacco, sheet tobacco, or reconstituted tobacco.
- [Claim 10] The aerosol generating article of claim 1, further comprising:
a wrapper surrounding the segment.
- [Claim 11] A capsule, comprising:
a core comprising a basic substance; and
a shell surrounding the core.
- [Claim 12] The capsule of claim 11, wherein

the basic substance comprises at least one substance having a pH of 12 or less at about 25°C.

[Claim 13]

The capsule of claim 11, wherein

the basic substance comprises at least one water-soluble substance.

[Claim 14]

The capsule of claim 11, wherein

the basic substance is in an amount of 12 % by weight (wt%) or less when a medium is in an amount of 100 wt%.

[Claim 15]

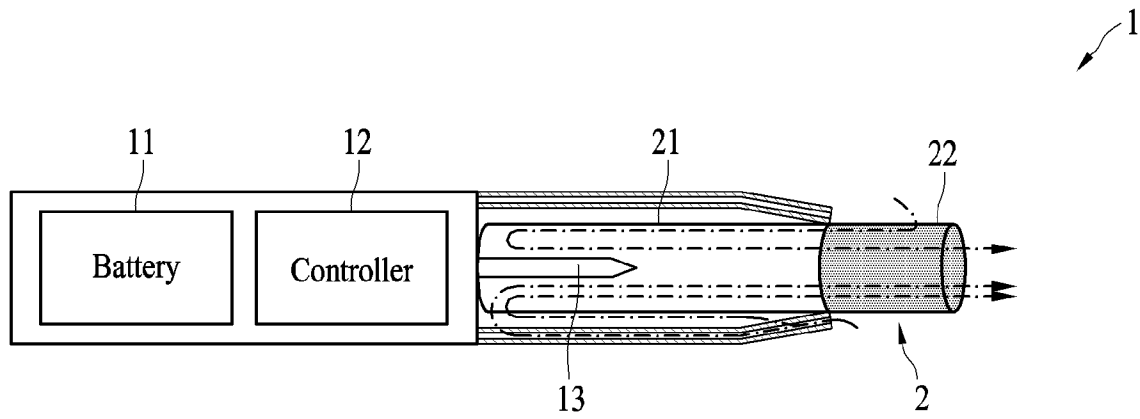
The capsule of claim 11, wherein

the basic substance comprises a combination of:

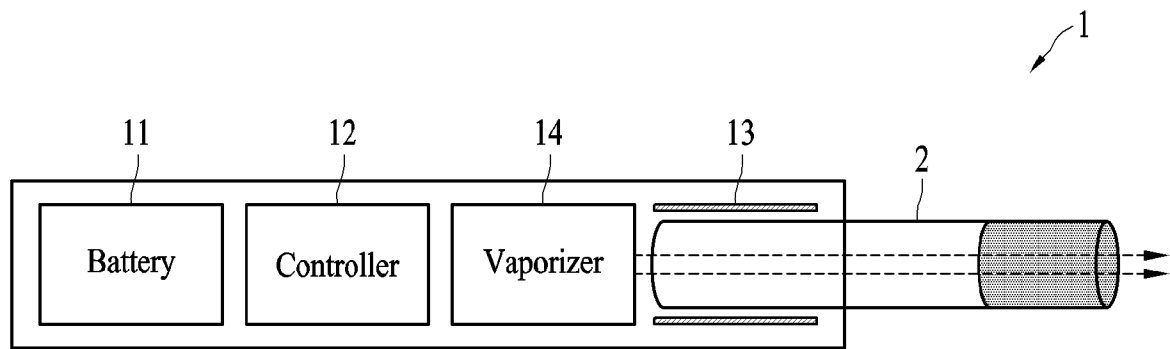
any one of an alkaline metal and an alkaline earth metal; and

any one of carbonate, hydrogencarbonate, and phosphate.

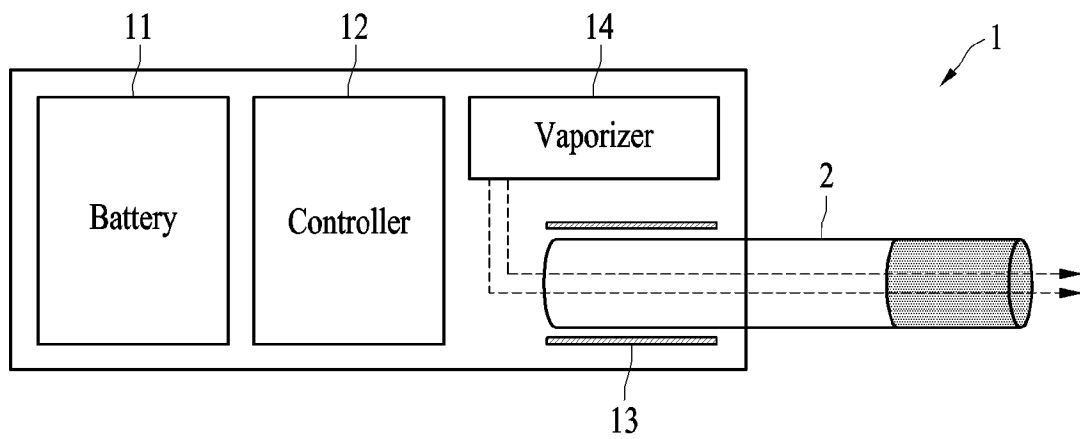
[Fig. 1]



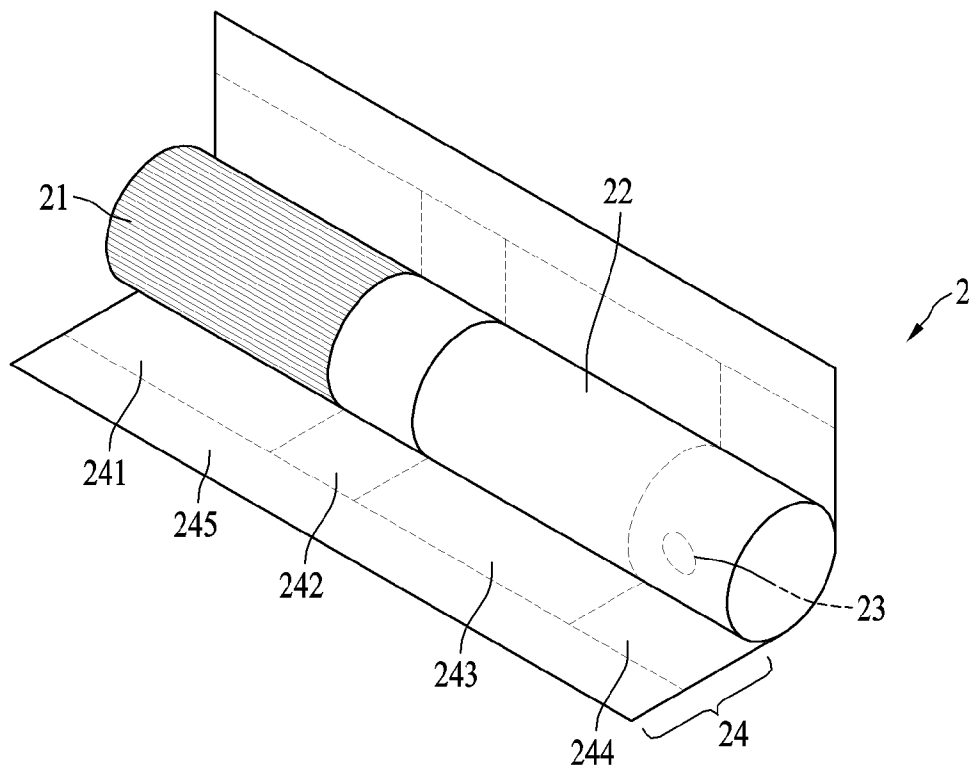
[Fig. 2]



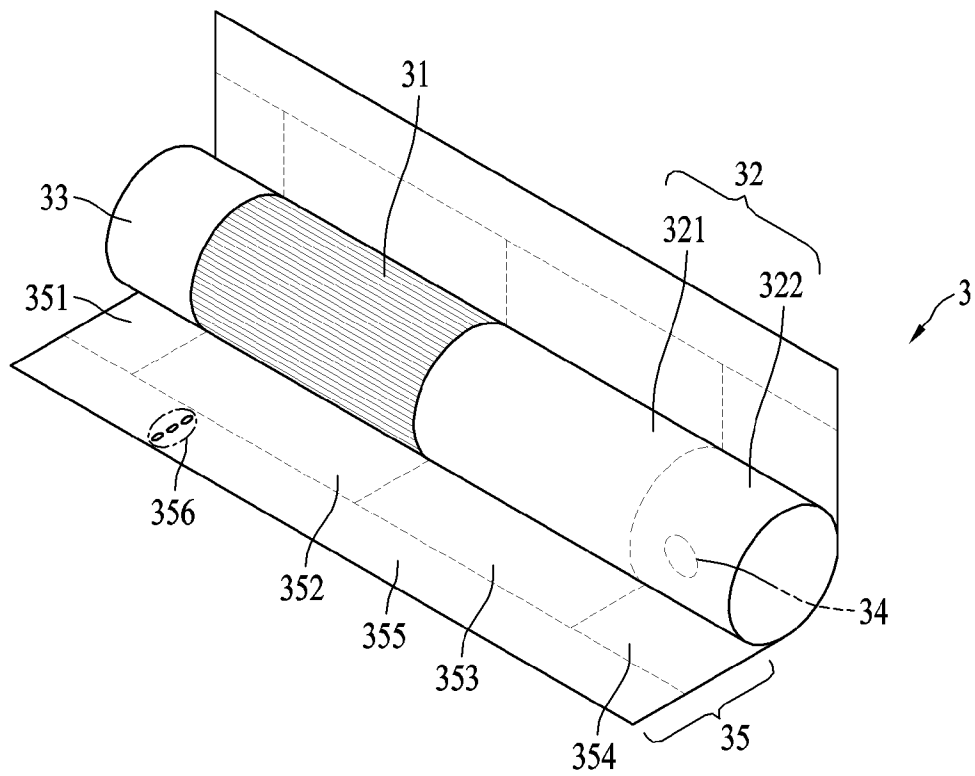
[Fig. 3]



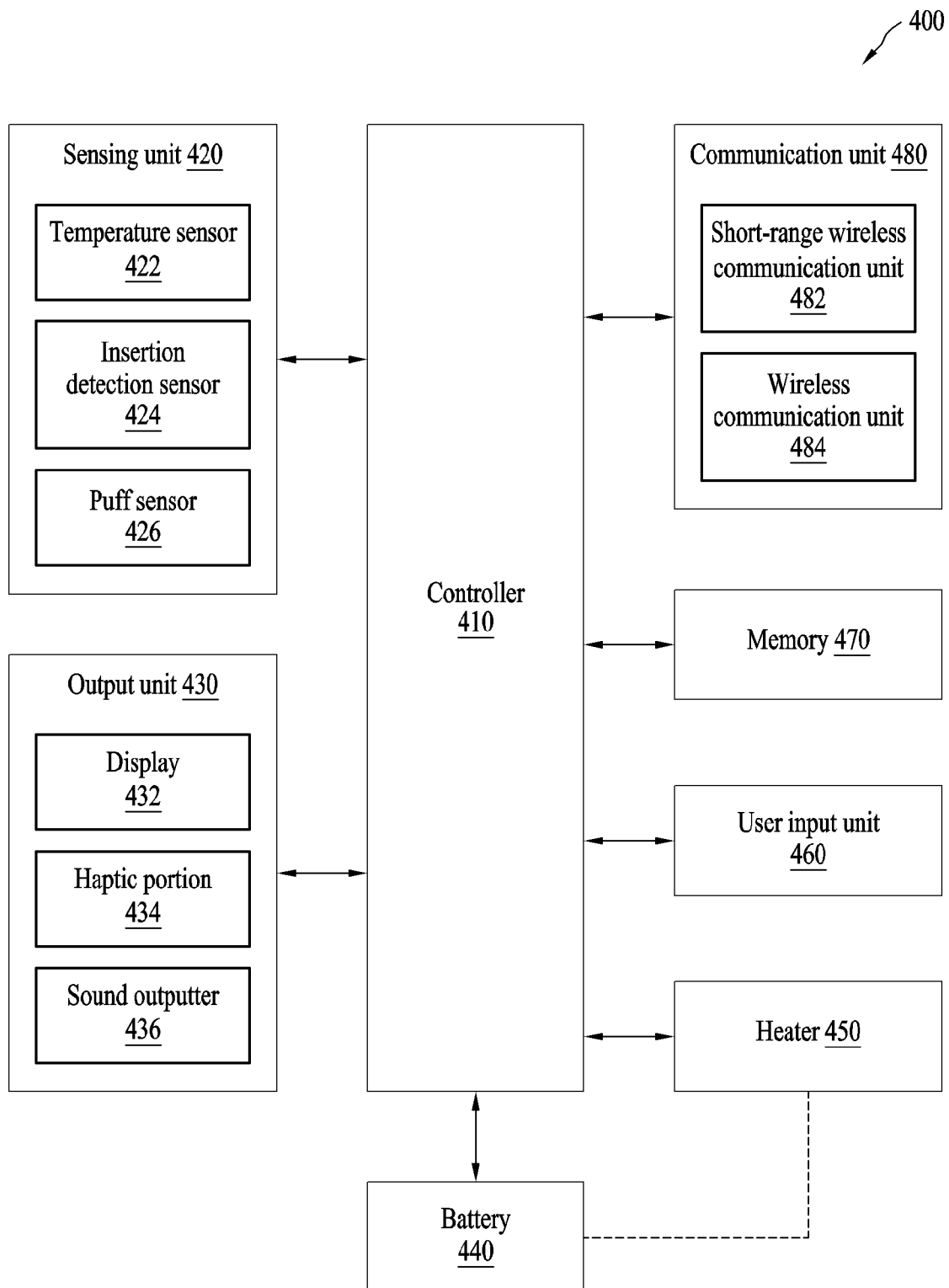
[Fig. 4]



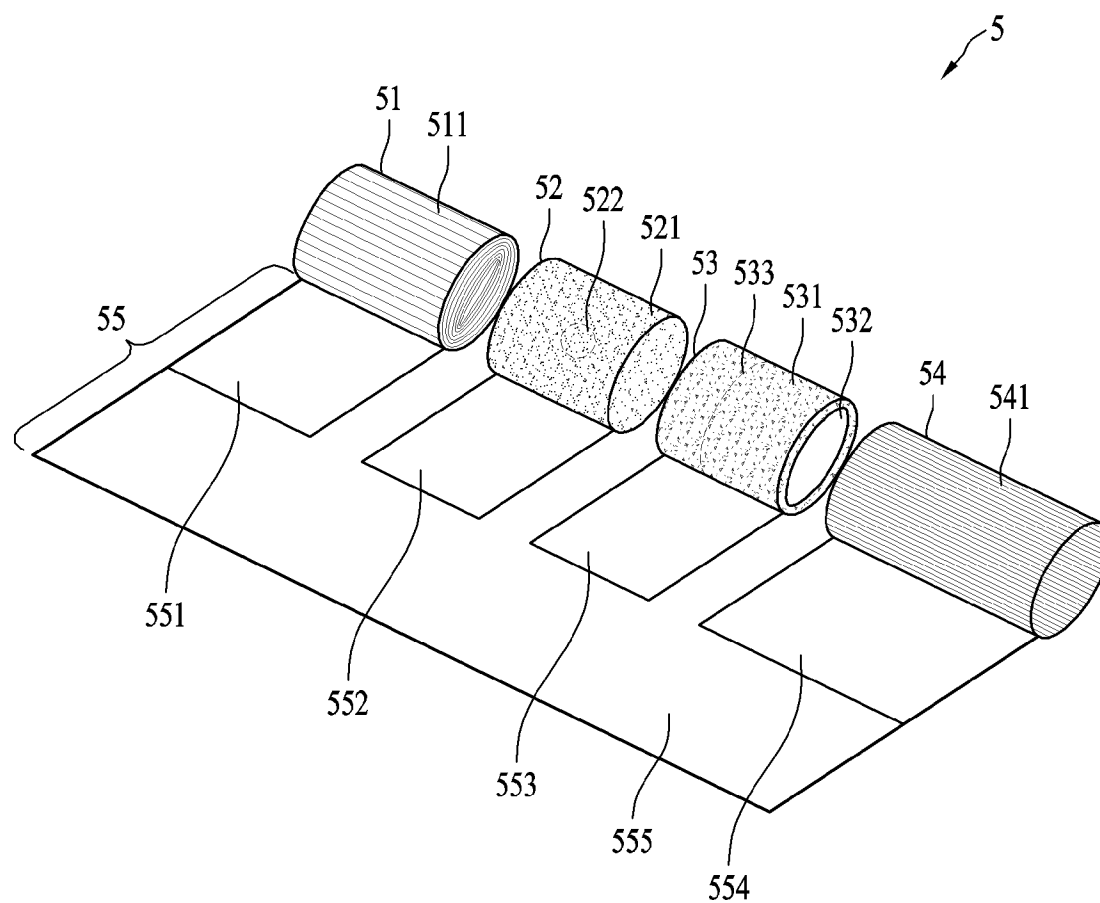
[Fig. 5]



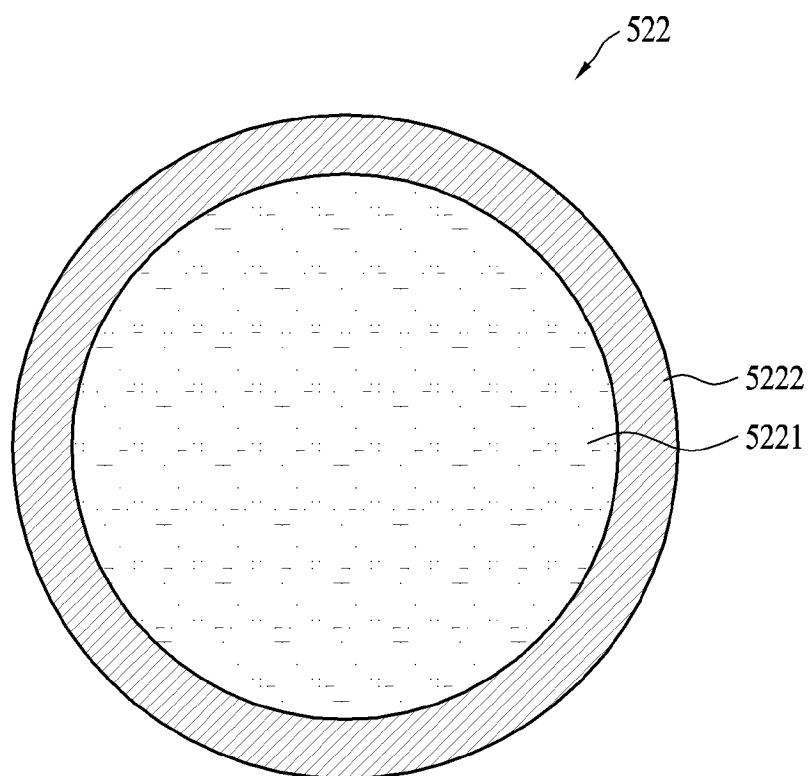
[Fig. 6]



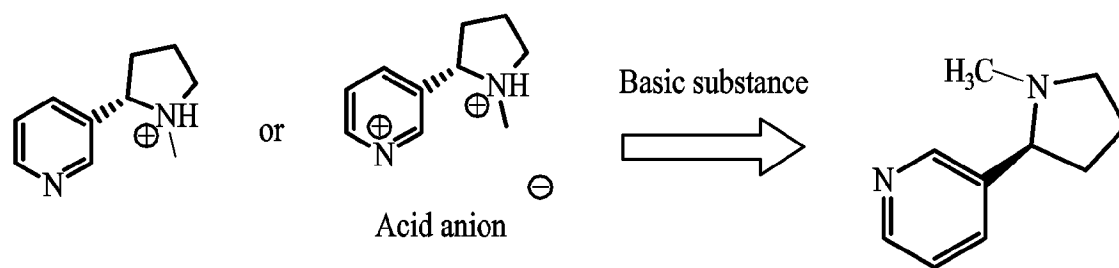
[Fig. 7]



[Fig. 8]



[Fig. 9]



INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR2023/000489

A. CLASSIFICATION OF SUBJECT MATTER

A24D 3/02(2006.01)i; A24D 1/00(2006.01)i; A24B 15/28(2006.01)i; A24B 13/02(2006.01)i; A24B 15/12(2006.01)i;
A24D 3/06(2006.01)i; A24D 1/02(2006.01)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)

A24D 3/02(2006.01); A24B 15/16(2006.01); A24B 15/167(2020.01); A24B 15/28(2006.01); A24D 3/04(2006.01);
A24D 3/06(2006.01); 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
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: capsule, core, shell, wrapping, calcium carbonate, potassium carbonate, sodium carbonate, calcium hydroxide, potassium hydroxide, sodium hydroxide, calcium oxide

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 2014-072735 A1 (BRITISH AMERICAN TOBACCO CO.) 15 May 2014 (2014-05-15) pages 3, 4,16; figure 2	1-10,12,14
X	US 2021-0204595 A1 (CHINA TOBACCO HUNAN INDUSTRIAL CO., LTD.) 08 July 2021 (2021-07-08) paragraphs [0014]-[0017].	11,13,15
Y		1-10,12,14
A	WO 2017-174595 A1 (PHILIP MORRIS PRODUCTS S.A.) 12 October 2017 (2017-10-12) paragraphs [0010]-[0040]	1-15
A	WO 2011-139730 A1 (R.J. REYNOLDS TOBACCO COMPANY) 10 November 2011 (2011-11-10) claims 1-45	1-15



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
“D” document cited by the applicant in the international application
“E” earlier application or patent but published on or after the international filing date
“L” document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
“O” document referring to an oral disclosure, use, exhibition or other means
“P” document published prior to the international filing date but later than the priority date claimed

“T” later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

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

“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

13 April 2023

Date of mailing of the international search report

14 April 2023

Name and mailing address of the ISA/KR

Korean Intellectual Property Office
189 Cheongsa-ro, Seo-gu, Daejeon
35208, Republic of Korea

Facsimile No. +82-42-481-8578

Authorized officer

HEO, Joo Hyung

Telephone No. +82-42-481-5373

INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR2023/000489

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	KR 10-2021-0084014 A (KT & G CORPORATION) 07 July 2021 (2021-07-07) claims 1-12	1-15

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/KR2023/000489

Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)		Publication date (day/month/year)
WO	2014-072735	A1	15 May 2014	CN	104768402 A	08 July 2015
				EP	2916665 A1	16 September 2015
				JP	2015-533512 A	26 November 2015
				KR	10-2015-0082608 A	15 July 2015
				US	2015-0296874 A1	22 October 2015
US	2021-0204595	A1	08 July 2021	EP	3797606 A1	31 March 2021
				JP	2021-523716 A	09 September 2021
				JP	7089066 B2	21 June 2022
				KR	10-2021-0011423 A	01 February 2021
				WO	2019-223412 A1	28 November 2019
WO	2017-174595	A1	12 October 2017	CA	3014147 A1	12 October 2017
				CN	108778007 A	09 November 2018
				EP	3439492 A1	13 February 2019
				JP	2019-513374 A	30 May 2019
				KR	10-2018-0124910 A	21 November 2018
				KR	10-2492952 B1	30 January 2023
WO	2011-139730	A1	10 November 2011	US	2017-0280769 A1	05 October 2017
				CN	102946747 A	27 February 2013
				CN	103929989 A	16 July 2014
				CN	105124761 A	09 December 2015
				EP	2566358 A1	13 March 2013
				EP	2647300 B1	24 April 2019
				EP	2647301 B1	28 August 2019
				EP	2757912 B1	10 August 2022
				EP	3520636 A1	07 August 2019
				JP	2013-524850 A	20 June 2013
				JP	2014-526275 A	06 October 2014
				JP	5976637 B2	23 August 2016
KR	10-2021-0084014	A	07 July 2021	JP	6008971 B2	19 October 2016
				None		