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AEROSOL-GENERATING ARTICLE AND MANUFACTURING METHOD THEREFOR

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A non-combustion-type aerosol generating article according to an embodiment includes a first filter segment, a medium segment disposed downstream of the first filter segment, and a second filter segment disposed
- downstream of the medium segment, in which the medium segment has a longitudinal hollow and is manufactured by being solidified after medium slurry is molded into a cylindrical shape.

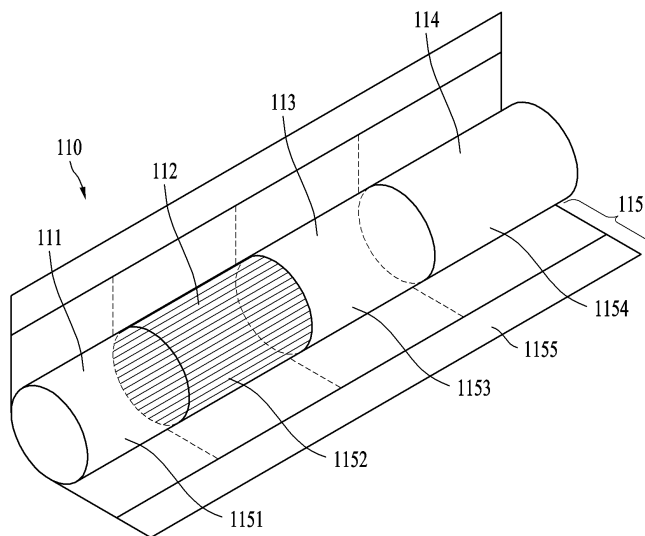


FIG. 1

Description**Technical Field**

5 **[0001]** The following various embodiments relate to an aerosol generating article and a method of manufacturing the same.

Background Art

10 **[0002]** Research on non-combusted cigarettes is being carried out. For example, Korean 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

15 **Technical Goals**

[0003] An aerosol generating article according to an embodiment and a method of manufacturing the same may shorten the preheating time of a medium by increasing the heat transfer efficiency to the medium.

20 **[0004]** An aerosol generating article according to an embodiment and a method of manufacturing the same may prevent a decrease in an amount of atomization.

Technical Solutions

25 **[0005]** An aerosol generating article according to an embodiment includes a first filter segment, a medium segment disposed downstream of the first filter segment, and a second filter segment disposed downstream of the medium segment, and the medium segment has a longitudinal hollow and the medium segment is configured by being solidified after medium slurry including a medium is molded into a tube shape. A cooling segment between the medium segment and the second filter segment is further included.

30 **[0006]** According to an embodiment, the medium may include at least one of reconstituted tobacco sheet, cut leaves, caffeine, taurine, pharmacological materials, flavor materials, or sweeteners.

[0007] According to an embodiment, the medium slurry may have moisture content greater than or equal to 30 percent. The medium slurry may have moisture content less than 60 percent.

35 **[0008]** According to an embodiment, the medium slurry may be molded into a tube shape with an inner diameter greater than or equal to 1/2 of an outer diameter.

[0009] According to an embodiment, the medium slurry may be molded into a tube shape with a hollow by extrusion.

40 **[0010]** A method of manufacturing the aerosol generating article according to an embodiment includes providing medium slurry including a medium, molding the medium slurry into a tube shape, forming a medium segment by drying the medium slurry, and coupling a first filter segment to upstream of the medium segment and coupling a second filter segment to downstream of the medium segment, and the medium slurry has moisture content greater than or equal to 30 percent and less than 60 percent.

[0011] According to an embodiment, the medium slurry may be molded into a tube shape by extrusion in the molding of the medium slurry into the tube shape.

45 **[0012]** According to an embodiment, in the molding of the medium slurry into the tube shape, a second jig with a through hole corresponding to an outer shape of the medium segment may be coupled to a first jig including a rod member with an outer shape corresponding to a hollow of the medium segment, the medium slurry may be filled between the through hole of the second jig and the rod member, and the medium slurry molded into the tube shape may be separated from the first jig and the second jig.

Effects

50 **[0013]** According to an embodiment, the preheating time of a medium may be shortened through an increase in heat transfer efficiency.

[0014] According to an embodiment, a decrease in an amount of atomization may be prevented.

55 **[0015]** The effects of the aerosol generating article and method of manufacturing the same according to an embodiment may not be limited to the above-mentioned effects, and other unmentioned effects may be clearly understood from the following description by one of ordinary skill in the art.

Brief Description of Drawings**[0016]**

FIG. 1 illustrates an aerosol generating article according to an embodiment.
 FIG. 2 illustrates a structure of an aerosol generating article according to an embodiment.
 FIGS. 3A and 3B illustrate jigs manufacturing an aerosol generating article according to an embodiment.
 FIGS. 4A and 4B illustrate a system in which an aerosol generating article is used according to an embodiment.
 FIG. 5 is a block diagram of an aerosol generating device in which an aerosol generating article is used according to an embodiment.
 FIG. 6 illustrates experimental examples according to the moisture content of medium slurry.
 FIG. 7 illustrates a medium segment molded according to some of the experimental examples in FIG. 6.
 FIGS. 8A and 8B illustrate medium segments with different inner diameters.

Best Mode for Carrying Out the Invention

[0017] The terms used in the embodiments are selected from among common terms that are currently widely used, in consideration of their function in the embodiments. 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.

[0018] 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.

[0019] As used herein, an expression such as "at least one of" that precedes listed components modifies not each of the listed components but all the components. For example, the expression "at least one of a, b, or c" should be construed as including a, b, c, a and b, a and c, b and c, or a, b, and c.

[0020] FIG. 1 illustrates a non-combustion-type aerosol generating article 110 according to an embodiment. FIG. 2 illustrates a cross-section of the non-combustion-type aerosol generating article 110 with a smaller hollow diameter of a cooling segment 113 than a hollow diameter of a medium segment 112, and FIGS. 3A and 3B illustrate a cross-section of the non-combustion-type aerosol generating article 110 with a larger hollow diameter of the cooling segment 113 than the hollow diameter of the medium segment 112.

[0021] Referring to FIGS. 1 and 2, the aerosol generating article 110 according to an embodiment may include a first filter segment 111, the medium segment 112 disposed downstream of the first filter segment 111, the cooling segment 113 disposed downstream of the medium segment 112, and a second filter segment 114 disposed downstream of the cooling segment 113. The medium segment 112 may have a longitudinal hollow, and the cooling segment 113 may have a longitudinal hollow communicating with the hollow of the medium segment 112. Here, the longitudinal direction may be defined in a direction parallel to the flow direction of an aerosol from the first filter segment 111 through the medium segment 112 and the cooling segment 113 to the second filter segment 114.

[0022] In an embodiment, the first filter segment 111 may be a cellulose acetate filter. In addition, the first filter segment 111 may include a paper filter and a porous molding. For example, the length of the first filter segment 111 may be about 4 to 15 millimeters (mm) but is not limited thereto. In addition, the first filter segment 111 may be colored and flavored.

[0023] Alternatively, the first filter segment 111 may include an atomization segment. A moisturizing agent used to fill the atomization segment may include at least one of glycerin, propylene glycol, ethylene glycol, dipropylene glycol, diethylene glycol, triethylene glycol, tetraethylene glycol, and oleyl alcohol but is not limited thereto. Furthermore, the atomization segment may include other additives such as a flavoring agent, a humectant, and/or organic acid. In addition, the atomization segment may contain flavoring liquid such as menthol or a moisturizing agent. The atomization segment may allow an aerosol to be generated even when a separate vaporizer is not provided in an aerosol generating device. For example, in this case, a vaporizer (e.g., a vaporizer 230 in FIGS. 4A and 4B) may be omitted from an aerosol generating device (e.g., an aerosol generating device 200 in FIGS. 4A and 4B), and a heater (e.g., a heater 250 in FIGS. 4A and 4B) may generate an aerosol by heating the atomization segment. The aerosol generated from the atomization segment may have relatively high temperature but cooled in the cooling segment 113 after passing through the medium segment 112. A user may thus inhale the aerosol cooled down to a suitable temperature.

[0024] In an embodiment, the medium segment 112 may have a tube shape having a hollow and may include a medium. For example, a desirable length of the medium segment 112 may be adopted from a range of 6 mm to 18 mm but is not limited thereto.

[0025] The medium segment 112 may be processed such that a slurried tobacco material is molded into a cylindrical shape (a tube shape) and then solidified and cut into segments.

[0026] For example, the tobacco material may include at least one component of reconstituted tobacco sheet, granular tobacco (tobacco granules), reconstituted tobacco, slurry tobacco, and cut leaves. Alternatively, the medium segment 112 may include functional materials (e.g., taurine, caffeine, red ginseng components, medicinal materials, etc.) as a medium instead of the tobacco material.

[0027] The medium segment 112 may include an aerosol generating material such as glycerin or the like. Furthermore, the medium segment 112 may include other additives such as a flavoring agent, a humectant, and/or organic acid. In addition, the medium segment 112 may include flavoring liquid (a flavor material) such as menthol or a moisturizing agent that is added by being sprayed onto the medium segment 112.

[0028] In an embodiment, a pH-treated medium may be included in the medium segment 112. 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 112. 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, the basic pH-treated medium may achieve sufficient nicotine transfer yield even when the medium segment 112 is heated at low temperature or not heated.

[0029] In an embodiment, the cooling segment 113 may cool an aerosol that passes through the medium segment 112. For example, the cooling segment 113 may be made of cellulose acetate and may have a tubular structure including a hollow therein. For example, the cooling segment 113 may be manufactured by adding a plasticizer (e.g., triacetin) to cellulose acetate tow. For example, the cooling segment 113 may be made of paper and may have a tubular structure including a hollow therein. A desirable diameter of the hollow included in the cooling segment 113 may be adopted from a range of 4 mm to 8 mm but is not limited thereto. A desirable length of the cooling segment 113 may be adopted from a range of 4 mm to 30 mm but is not limited thereto. The cooling segment 113 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.

[0030] In an embodiment, the second filter segment 114 may be a cellulose acetate filter. The second filter segment 114 may be configured with a filter including at least one flavor capsule. For example, the second filter segment 114 may be a cellulose acetate filter into which at least one flavor capsule is inserted. In addition, the second filter segment 114 may be configured with a filter in which flavoring materials are mixed.

[0031] In an embodiment, the aerosol generating article 110 may be wrapped with at least one wrapper 115. The wrapper 115 may have at least one hole through which external air is introduced or internal gas flows out. The wrapper 115 may include a material with high thermal conductivity.

[0032] For example, the first filter segment 111 may be wrapped with a first wrapper 1151, the medium segment 112 may be wrapped with a second wrapper 1152, the cooling segment 113 may be wrapped with a third wrapper 1153, and the second filter segment 114 may be wrapped with a fourth wrapper 1154. In addition, the non-combustion-type aerosol generating article 110 may be entirely wrapped again with a fifth wrapper 1155.

[0033] In an embodiment, the first wrapper 1151 may include an aluminum component. The first wrapper 1151 may be a combination of general filter wrapping paper and metal foil such as aluminum foil. For example, the total thickness of the first wrapper 1151 may be in a range of 40 micrometers (μm) to 80 μm . In addition, the thickness of the metal foil of the first wrapper 1151 may be in a range of 6 μm to 20 μm .

[0034] In an embodiment, the second wrapper 1152 and the third wrapper 1153 may be formed with porous wrapping paper. For example, the porosity of the second wrapper 1152 may be about 35000 CU but is not limited thereto. Also, the thickness of the second wrapper 1152 may be in a range of 70 μm to 80 μm . In addition, the basis weight of the second wrapper 1152 may be in a range of 20 g/m² to 25 g/m².

[0035] For example, the second wrapper 1152 may include an aluminum component. For example, the second wrapper 1152 may be a combination of general filter wrapping paper and metal foil such as aluminum foil. Furthermore, the second wrapper 1152 may be formed of sterile paper (e.g., MFW).

[0036] In an embodiment, the porosity of the third wrapper 1153 may be about 35000 CU but is not limited thereto. Also, the thickness of the third wrapper 1153 may be in a range of 70 μm to 80 μm . In addition, the basis weight of the third wrapper 1153 may be in a range of 20 g/m² to 25 g/m².

[0037] In an embodiment, the fourth wrapper 1154 may be formed with polylactic acid (PLA) laminated paper. 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 1154 may be in a range of 100 μm to 120 μm . In addition, the basis weight of the fourth wrapper 1154 may be in a range of 80 g/m² to 100 g/m².

[0038] In an embodiment, the fifth wrapper 1155 may be formed of sterile paper (e.g., MFW). For example, the basis weight of the fifth wrapper 1155 may be in a range of 57 g/m² to 63 g/m². Also, the thickness of the fifth wrapper 1155

may be in a range of 64 μm to 70 μm .

[0039] In an embodiment, when an aerosol passes through the first filter segment 111 of the aerosol generating article 110 that is inserted into an aerosol generating device (e.g., the aerosol generating device 200 in FIGS. 4A and 4B) and is transferred to the medium segment 112, the aerosol may smoothly pass through the hollow of the medium segment 112. Here, the aerosol may be transferred with ingredients (e.g., nicotine) from the medium in the medium segment 112 and may be inhaled by a user, and homogeneous ingredients may be inhaled by the user due to the hollow structure of the medium segment 112.

[0040] FIG. 3A illustrates jigs 121, 122, and 123 to manufacture the medium segment 112 of the aerosol generating article 110, and FIG. 3B illustrates the medium segment 112 manufactured by the jigs 121, 122, and 123.

[0041] Referring to FIG. 3A, the first jig 121 may include a support and a plurality of rod members protruding above the support. The rod member may have an outer shape corresponding to the hollow of the medium segment 112 (e.g., the inner diameter of the medium segment 112). The second jig 122 may include a plurality of through holes (hollows), and the through holes may have a shape corresponding to the outer shape of the medium segment 112. The third jig 123 may include a cylindrical push member that fills between the rod member of the first jig 121 and the through hole of the second jig 122 while the rod member of the first jig 121 and the through hole of the second jig 122 are coupled to each other. When the first jig 121, the second jig 122, and the third jig 123 are coupled, the through hole of the second jig 122 may be completely filled by the push member of the third jig 123 and the rod member of the first jig 121.

[0042] A molding method of the medium segment 112 is described with reference to FIGS. 3A and 3B. First, the first jig 121 and the second jig 122 may be coupled such that the through hole of the second jig 122 enters the rod member while the inner diameter of the cylinder of the third jig 123 is coupled to the rod member of the first jig 121. In this state, the second jig 122 may be disposed on the upper portion of the third jig 123. Then, after medium slurry including a medium is filled between the rod member of the first jig 121 and the through hole of the second jig 122, and then the first jig 121 and the second jig 122 are separated from the medium slurry, the medium segment 112 may be manufactured in a tube shape. For example, after the medium slurry is filled between the rod member of the first jig 121 and the through hole of the second jig 122, and then the second jig 122 is lowered towards the third jig 123, the medium segment 112 may be molded. In addition to the extrusion method using the jigs in FIGS. 3A and 3B, the medium segment 112 may also be manufactured by other extrusion methods and may be cut to a desirable length and used after extrusion.

[0043] FIGS. 4A and 4B illustrate an aerosol generating system 10 according to an embodiment.

[0044] Referring to FIGS. 4A and 4B, the aerosol generating system 10 according to an embodiment may include the aerosol generating article 110 according to an embodiment and the aerosol generating device 200 into which at least a portion of the aerosol generating article 110 is inserted and capable of transferring an aerosol to the aerosol generating article 110.

[0045] In an embodiment, the aerosol generating device 200 may include a housing 210, a battery 220 disposed in the housing 210 and capable of supplying power, the vaporizer 230 receiving power from the battery 230 and including a liquid storage cartridge and an aerosolizing element that aerosolizes liquid, a controller 240 controlling the battery 220 or the vaporizer 230, and an aerosol generating article insertion portion (e.g., an elongated cavity) communicating with the vaporizer 230 and into which at least a portion of the aerosol generating article 110 is inserted.

[0046] FIG. 4A illustrates that the battery 220, the controller 240, the vaporizer 230, and the aerosol generating article insertion portion are arranged in a row. FIG. 4B is different from FIG. 4A in that the vaporizer 230 and the aerosol generating article insertion portion are illustrated as being arranged in parallel. However, the internal arrangement structure of the aerosol generating device 200 according to an embodiment is not limited to FIGS. 4A and 4B, and depending on the design of the aerosol generating device 200, the arrangement of the battery 220, the vaporizer 230, the controller 240, and the aerosol generating article insertion portion may be changed.

[0047] In an embodiment, the battery 220 may supply power to be used to operate the aerosol generating device 200. For example, the battery 220 may supply power to heat the vaporizer 230 and may supply power required to operate the controller 240. In addition, the battery 220 may supply power required to operate a display, a sensor, a motor, or the like installed in the aerosol generating device 200.

[0048] In an embodiment, the controller 240 may control the overall operation of the aerosol generating device 200. Specifically, the controller 240 may control respective operations of other components included in the aerosol generating device 200, in addition to the battery 220 and the vaporizer 230. In addition, the controller 240 may verify a state of each of the components of the aerosol generating device 200 to determine whether the aerosol generating device 200 is in an operable state. The controller 200 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.

[0049] In an embodiment, the vaporizer 230 may heat a liquid composition to generate an aerosol, and the generated aerosol may pass through the non-combustion-type aerosol generating article 110 according to an embodiment and be transferred to a user. That is, the aerosol generated by the vaporizer 230 may travel along an airflow path of the aerosol generating device 200, and the airflow path may be configured such that the aerosol generated by the vaporizer 230

may pass through the non-combustion-type aerosol generating article 110 according to an embodiment and be transferred to the user.

[0050] For example, the vaporizer 230 may include a liquid storage cartridge and an aerosolizing element (e.g., a liquid transfer means and a heating element, or an ultrasonic element) that aerosolizes liquid but is not limited thereto. For example, the liquid storage cartridge, the liquid transfer means, and the heating element may be included in the aerosol generating device 200 as independent modules. For example, the vaporizer 230 may be referred to as a cartomizer or an atomizer but is not limited thereto.

[0051] The liquid storage cartridge may store a liquid composition. For example, the liquid composition may include an aerosol former such as glycerin and propylene glycol.

[0052] When the aerosolizing element includes a liquid transfer means and a heating element (e.g., a cartridge heater), the liquid transfer means may transfer the liquid composition of the liquid storage cartridge 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 but is not limited thereto. The heating element may be an element for heating 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 but is not limited thereto. Furthermore, 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 up as a current is supplied and may transfer heat to the liquid composition in contact with the heating element, thereby heating the liquid composition. As a result, an aerosol may be generated.

[0053] Alternatively, the aerosolizing element may include a vibrator (e.g., an ultrasonic element) instead of the heating element. As voltage (e.g., alternating voltage) is applied to the vibrator, the vibrator may generate heat and/or ultrasonic vibration, and the heat and/or ultrasonic vibration generated by the vibrator may generate an aerosol. For example, the viscosity of the liquid composition may be lowered and the liquid composition may turn into fine particles due to the heat and vibration generated by the vibrator, thereby generating an aerosol. Such an ultrasonic aerosolization may have an advantage of reducing power usage compared to the heating method, and miniaturization of batteries and devices may be achieved through this.

[0054] In addition, the aerosol generating device 200 may further include general-purpose components in addition to the battery 220, the controller 240, and the vaporizer 230. For example, the aerosol generating device 200 may include a display that outputs visual information and/or a motor that outputs tactile information. In addition, the aerosol generating device 200 may include at least one sensor (e.g., a puff detection sensor, a temperature detection sensor, a cigarette insertion detection sensor, etc.). In addition, the aerosol generating device 200 may be manufactured to have a structure allowing external air to be introduced or internal gas to flow out even while the aerosol generating article 110 according to an embodiment is inserted.

[0055] In an embodiment, the heater 250 may be heated up by power supplied from the battery 220. For example, when the aerosol generating article 110 is inserted into the aerosol generating device 200, the heater 250 may be disposed outside the aerosol generating article 110. The heater 250 once heated up may thus raise the temperature of an aerosol generating material in the aerosol generating article 110.

[0056] The heater 250 may be an electrically resistive heater. For example, the heater 250 may include an electrically conductive track, and the heater 250 may be heated up as a current flows through the electrically conductive track. However, the heater 250 is not limited to the above example, and any example of heating up the heater 250 up to the desired temperature may be applicable without limitation. Here, the desired temperature may be preset in the aerosol generating device 200 or may be set by a user.

[0057] In another example, the heater 250 may be an inductive heating-type heater. Specifically, the heater 250 may include an electrically conductive coil for heating the aerosol generating article 110 in an induction heating manner, and the aerosol generating article 110 may include a susceptor to be heated by the inductive heating-type heater. In addition, the heater 250 may be provided as a plurality of heaters in the aerosol generating device 200.

[0058] In an embodiment, the heater 250 may heat the aerosol generating article 110 that is accommodated in the aerosol generating article insertion portion by and being arranged surrounding the outer surface of the aerosol generating article insertion portion (e.g., an elongated cavity). The heater 250 according to an embodiment may be arranged surrounding at least a portion of the outer surface of the aerosol generating article insertion portion.

[0059] FIG. 5 is a block diagram of the aerosol generating device 200 according to an embodiment.

[0060] Referring to FIG. 5, the aerosol generating device 200 may include the battery 220, the controller 240, the heater 250, a sensing unit 260, an output unit 270, a communication unit 280, a user input unit 291, and a memory 292. However, the internal structure of the aerosol generating device 200 is not limited to the illustration in FIG. 5. It is to be understood by one of ordinary skill in the art to which the present disclosure pertains that some of the components shown in FIG. 5 may be omitted or new components may be added according to the design of the aerosol generating device 200.

[0061] The sensing unit 260 may sense a state of the aerosol generating device 200 or a state of an environment around the aerosol generating device 200 and may transmit sensed information to the controller 240. Based on the sensed information, the controller 240 may control the aerosol generating device 200 to perform various functions, such

as determining whether the aerosol generating article 110 according to an embodiment is inserted, displaying a notification, and the like. The sensing unit 260 may include a temperature sensor 261, an insertion detection sensor 262, or a puff sensor 263 but is not limited thereto.

[0062] The output unit 270 may output information about the state of the aerosol generating device 200 and provide the information to a user. The output unit 270 may include at least one of a display 271, a haptic portion 272, or a sound outputter 273 but is not limited thereto.

[0063] The user input unit 291 may receive information input from a user or may output information to the user. For example, the user input unit 291 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 piezoelectric effect type, etc.), a jog wheel, a jog switch, or the like but is not limited thereto. In addition, although not shown in FIGS. 4A and 4B, the aerosol generating device 200 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 220.

[0064] The memory 292, which is hardware for storing various pieces of data processed in the aerosol generating device 200, may store data processed by the controller 240 and data to be processed thereby. The memory 292 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 XD memory), random access memory (RAM), static random access memory (SRAM), read-only memory (ROM), electrically erasable programmable read-only memory (EEPROM), programmable read-only memory (PROM), magnetic memory, a magnetic disk, or an optical disk. The memory 292 may store the operating time of the aerosol generating device 200, the maximum number of puffs, the current number of puffs, at least one temperature profile, data associated with a smoking pattern of a user, and the like.

[0065] The communication unit 280 may include at least one component for communicating with another electronic device. For example, the communication unit 280 may include a short-range wireless communication unit 291 and a wireless communication unit 292.

[0066] FIG. 6 illustrates the degree of molding according to the moisture content of the medium segment 112.

[0067] Referring to FIG. 6, experimental example A shows the degree of molding of the medium slurry dough when the moisture included in the medium slurry is 0 %. When the manufacturing moisture input is 0 %, only glycerin and other liquid fragrances are input to the micronized medium. In this case, the micronized medium may not be condensed.

[0068] Experimental example B is a case in which the medium slurry is manufactured by inputting 10 % of the manufacturing moisture and experimental example C is a case in which the medium slurry is manufactured by inputting 20 % of the manufacturing moisture, and even in this case, the micronized medium may not be sufficiently condensed.

[0069] Experimental example D is a case in which the manufacturing moisture is 30 %, and it may be observed that condensation of the micronized medium begins even though the moisture is slightly insufficient.

[0070] Experimental example E is a case in which the manufacturing moisture is 40 %, and it may be observed that the condensation of the micronized medium is well-progressed and the moisture is sufficient.

[0071] Experimental example F is a case in which the manufacturing moisture is 60 %, and from this point on, it may begin to become difficult to maintain the shape of the medium slurry when the medium slurry is manufactured by putting the medium slurry in a mold.

[0072] Experimental example G is a case in which the manufacturing moisture is 70 %, the viscosity of the medium slurry is even lower than that of experimental example F, and it may have difficulty in maintaining the shape of the medium when the medium slurry is dried.

[0073] FIG. 7 illustrates a state after drying of the medium slurry in experimental examples F and E.

[0074] Referring to FIG. 7, the moisture may evaporate while the medium slurry is dried after being molded, and here, the medium slurry may contract. Experimental example F shows that the shape is slightly changed after being molded due to contraction, while in experimental example E, it may be observed that the shape of the medium is good even after drying.

[0075] In an embodiment, the medium segment 112 may be solidified through drying after being molded into a tube shape including a hollow from the medium slurry, and the medium slurry may include the micronized medium and moisture. In addition, the medium slurry may include glycerin or liquid fragrance.

[0076] To secure the moldability of the medium slurry, the moisture content compared to the mass of the medium slurry may be set to be greater than or equal to 30 percent and to be less than 60 percent. As described above with reference to experimental examples A to G, when the moisture content of the medium slurry is greater than or equal to 30 percent and less than 60 percent, the medium slurry may maintain the shape thereof during the extrusion process and may maintain the shape thereof even after contraction occurs due to evaporation of the moisture during drying. That is, the moldability may be secured when the manufacturing moisture of the medium slurry is set to be greater than or equal to 30 percent, and shape distortion during drying may be prevented when the manufacturing moisture of the medium slurry is set to be less than 60 percent.

[0077] FIG. 8A illustrates the medium slurry drying when the medium slurry is molded into a tube shape with the inner

diameter less than 1/2 of the outer diameter, and FIG. 8B illustrates the medium slurry after drying when the medium slurry is molded into a tube shape with the inner diameter greater than or equal to 1/2 of the outer diameter.

[0078] [Table 1] below shows experimental examples in which the inner diameter of the medium slurry before drying is set to be less than 1/2 and greater than or equal to 1/2 of the outer diameter, and the result according to experimental example H is shown in FIG. 8A and the result according to experimental example I is shown in FIG. 8B.

[Table 1]

	Experimental example H	Experimental example I
Inner diameter/Outer diameter before drying	Inner diameter 3.2 mm/Outer diameter 7.2 mm	Inner diameter 4.0 mm/Outer diameter 7.2 mm
Inner diameter/Outer diameter after drying	Inner diameter 4.2 mm/Outer diameter 6.7 mm	Inner diameter 4.6 mm/Outer diameter 6.9 mm
Sensory (taste evaluation)	Slightly late smoking taste occurrence	Initial smoking taste occurrence

[0079] Referring to [Table 1], in experimental example H, the inner diameter of the medium slurry before drying is set to be less than 1/2 of the outer diameter, and it may be observed that the degree of contraction is high in both the inner diameter and outer diameter of the tube shape after drying. In addition, as a result of the sensory evaluation (taste evaluation), it may be observed that the occurrence of smoking taste is also late.

[0080] In experimental example I, the inner diameter of the medium slurry before drying is set to be greater than or equal to 1/2 of the outer diameter, and it may be observed that relatively little contraction occurs in both the inner diameter and outer diameter of the tube shape after drying. In addition, it may be observed that the initial smoking taste occurs in the sensory evaluation.

[0081] In an embodiment, the medium slurry before drying may be molded into the tube shape with the inner diameter greater than or equal to 1/2 of the outer diameter. The tube-shaped medium slurry may affect the contraction of the outer diameter depending on the size of the inner diameter, and when the inner diameter is greater than or equal to 1/2 of the outer diameter, the degree of contraction may be less and sufficient smoking taste may be achieved during the sensory evaluation.

[0082] Hereinafter, a method of manufacturing the aerosol generating article 110 according to an embodiment is described.

[0083] First, the medium slurry including the medium may be provided. The manufacturing moisture of the medium slurry may be set to be greater than or equal to 30 percent and less than 60 percent.

[0084] Then, the medium slurry may be molded into a tube shape by the extrusion process. The inner diameter of the tube shape before drying may be formed to be greater than or equal to 1/2 of the outer diameter. As described above with reference to FIGS. 3A and 3B, the extrusion process may be performed by the jigs and may also be performed by other extrusion processes.

[0085] The medium slurry may be dried to form the medium segment 122.

[0086] The first filter segment 121 may be coupled to upstream of the medium segment 122, and the second filter segment 124 may be coupled to downstream. In some cases, the cooling segment 123 may be coupled between the medium segment 122 and the second filter segment 124.

[0087] The aerosol generating article 110 according to an embodiment may have the medium segment 122 with the tube shape having a hollow, so efficient heat transfer may be performed when a heater (e.g., the heater 250 in FIGS. 4A and 4B) heats the outside of the medium segment 122. Through this, moisture residue in the medium segment 122 may be prevented, and a phenomenon in which a moisturizing agent released from a vaporizer (e.g., the vaporizer 230 in FIGS. 4A and 4B) is filtered in the medium segment 122 may be prevented, so a sufficient amount of atomization may be secured.

[0088] Accordingly, according to the aerosol generating article 110 and method of manufacturing the same according to an embodiment, the central portion of the medium segment 122 may have a tube shape with a hollow, so heat transfer efficiency from the heater may be maximized and a sufficient amount of atomization may be achieved.

[0089] 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.

Claims

1. An aerosol generating article comprising:

5 a first filter segment;
a medium segment disposed downstream of the first filter segment; and
a second filter segment disposed downstream of the medium segment,
wherein the medium segment has a longitudinal hollow and the medium segment is configured by being solidified
after medium slurry comprising a medium is molded into a tube shape.

10 2. The aerosol generating article of claim 1, further comprising:
a cooling segment between the medium segment and the second filter segment.

15 3. The aerosol generating article of claim 1 or 2, wherein the medium comprises at least one of reconstituted tobacco
sheet, cut leaves, caffeine, taurine, pharmacological materials, flavor materials, or sweeteners.

4. The aerosol generating article of claim 3, wherein the medium slurry has moisture content greater than or equal to
30 percent.

20 5. The aerosol generating article of claim 4, wherein the medium slurry has moisture content less than 60 percent.

6. The aerosol generating article of claim 3, wherein the medium slurry is molded into a tube shape with an inner
diameter greater than or equal to 1/2 of an outer diameter.

25 7. The aerosol generating article of claim 3, wherein the medium slurry is molded into a tube shape with a hollow by
extrusion.

8. A method of manufacturing the aerosol generating article according to claim 1, the method comprising:

30 providing medium slurry comprising a medium;
molding the medium slurry into a tube shape;
forming a medium segment by drying the medium slurry; and
coupling a first filter segment to upstream of the medium segment and coupling a second filter segment to
downstream of the medium segment,
35 wherein the medium slurry has moisture content greater than or equal to 30 percent and less than 60 percent.

9. The method of claim 8, wherein, in the molding of the medium slurry into the tube shape, the medium slurry is molded
into a tube shape by extrusion.

40 10. The method of claim 8, wherein, in the molding of the medium slurry into the tube shape, a second jig with a through
hole corresponding to an outer shape of the medium segment is coupled to a first jig comprising a rod member with
an outer shape corresponding to a hollow of the medium segment, the medium slurry is filled between the through
hole of the second jig and the rod member, and the medium slurry molded into the tube shape is separated from
the first jig and the second jig.

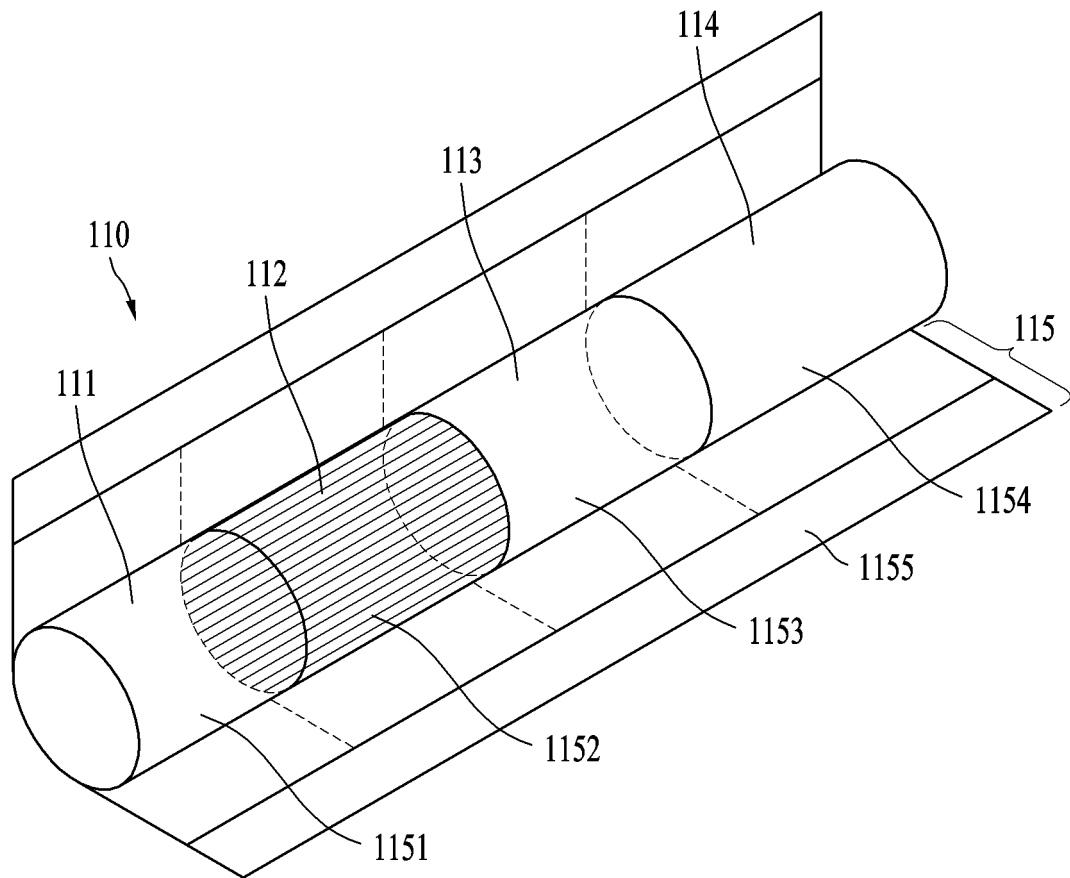


FIG. 1

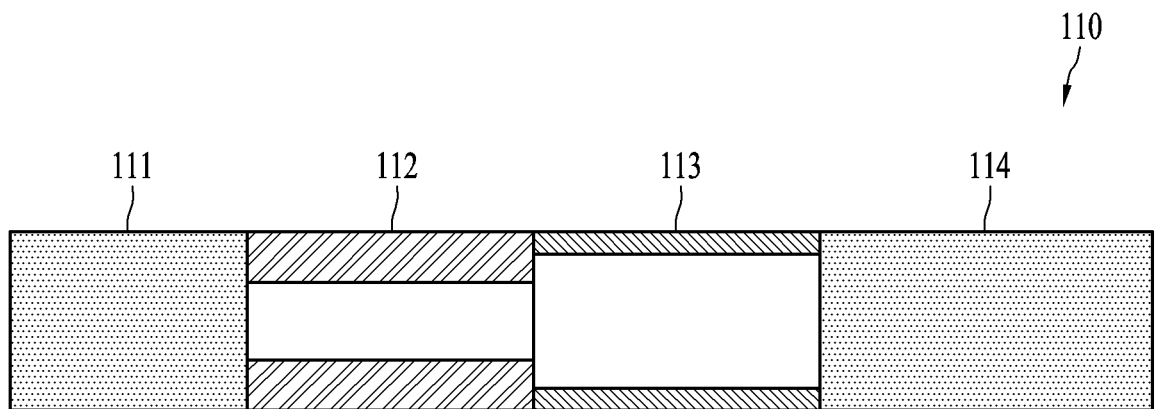


FIG. 2

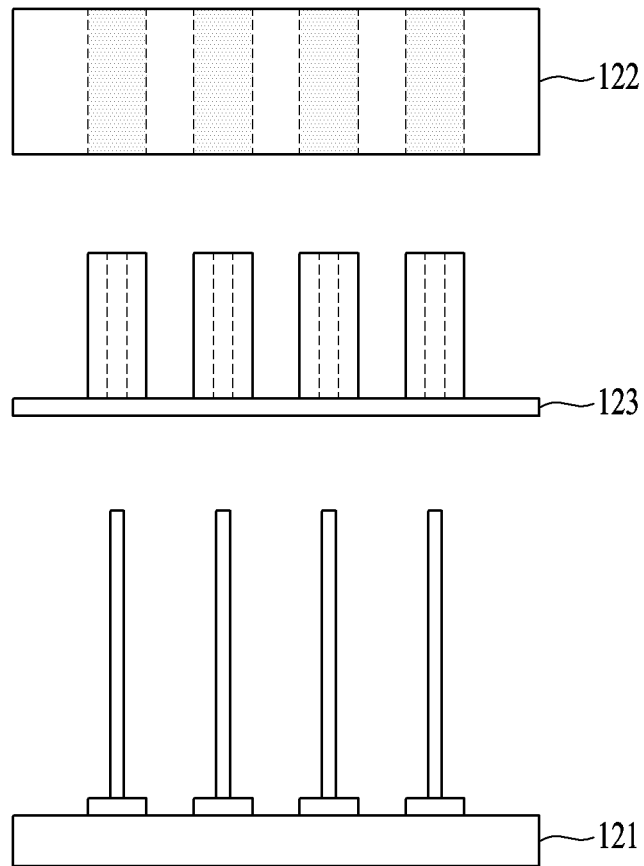


FIG. 3A

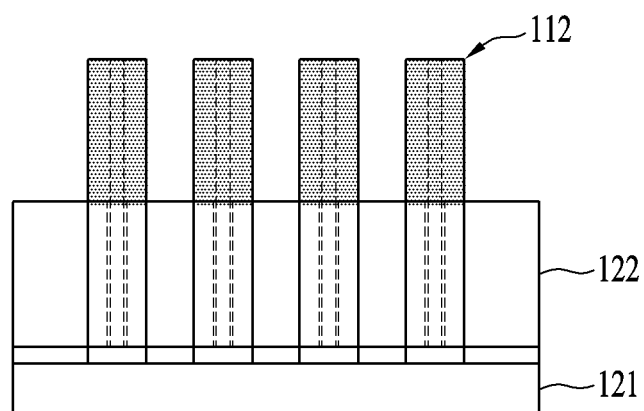


FIG. 3B

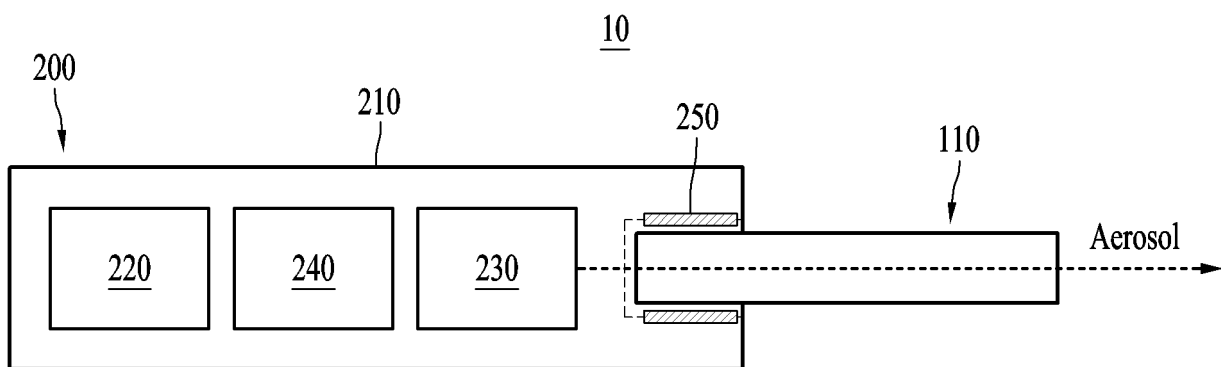


FIG. 4A

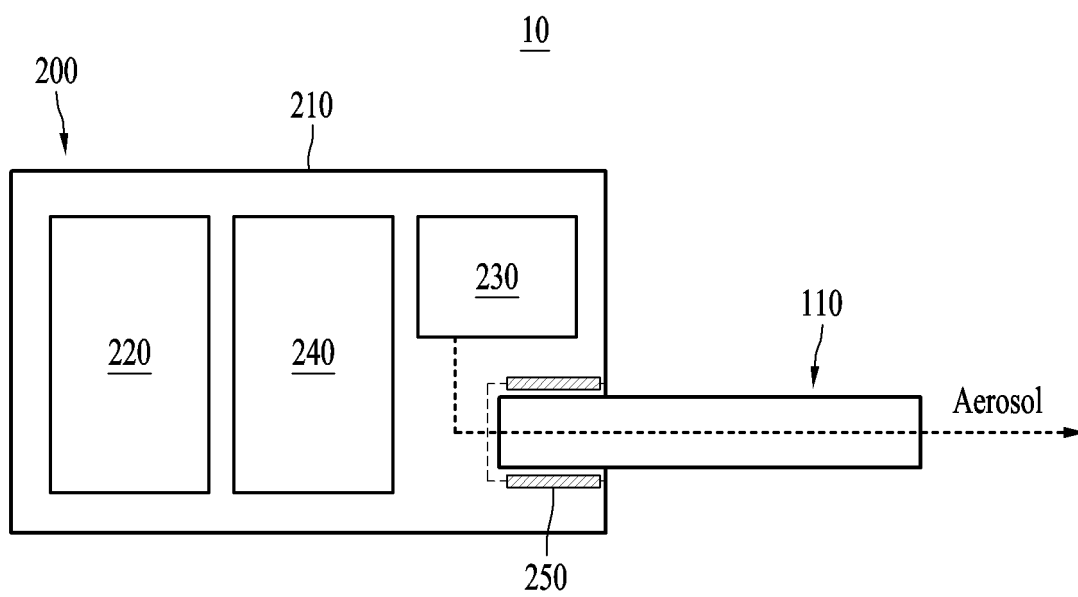


FIG. 4B

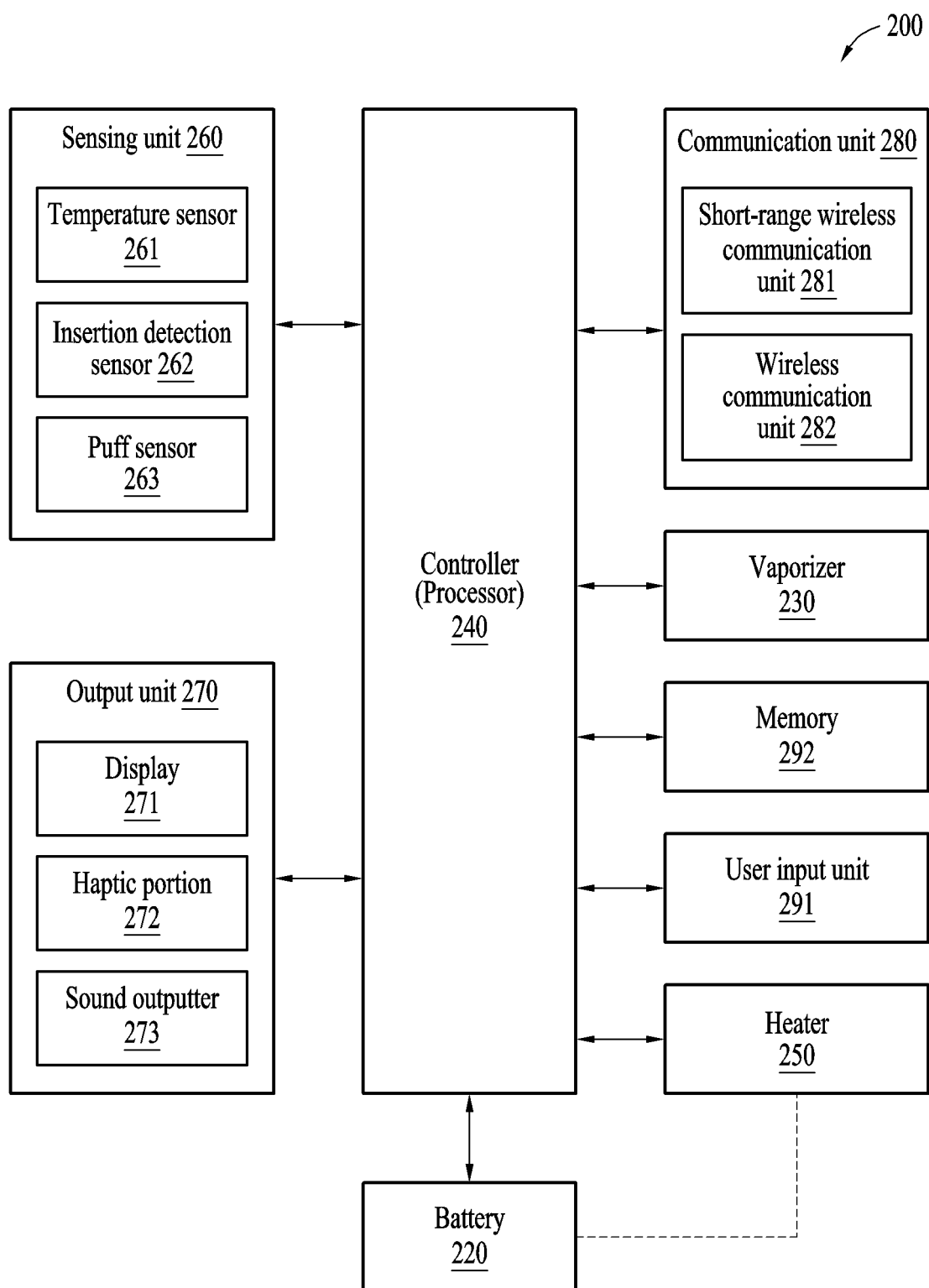


FIG. 5

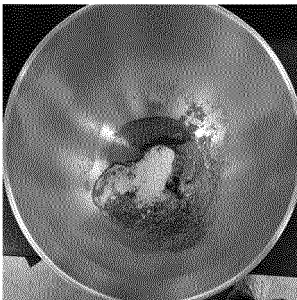
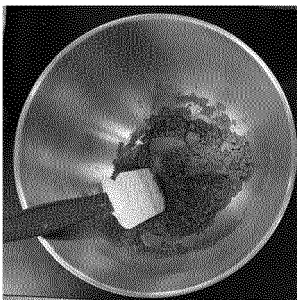
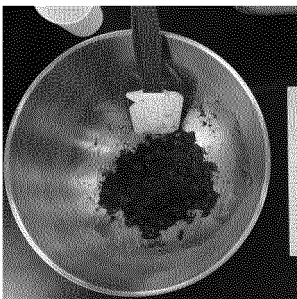
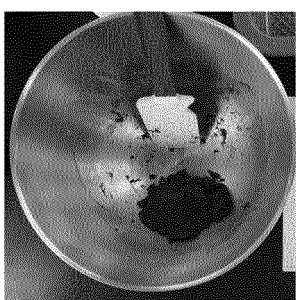
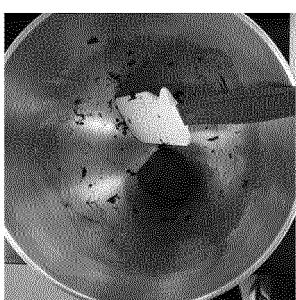
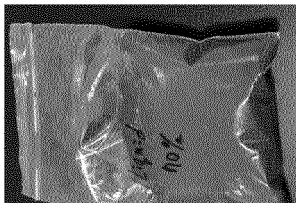
Manufacturing moisture 0%			Experimental example A	Experimental example B	Experimental example C	Manufacturing moisture 20%	
Manufacturing moisture 30%			Manufacturing moisture 40%	Manufacturing moisture 60%	Manufacturing moisture 70%		
Experimental example D		Experimental example E		Experimental example F		Experimental example G	

FIG. 6

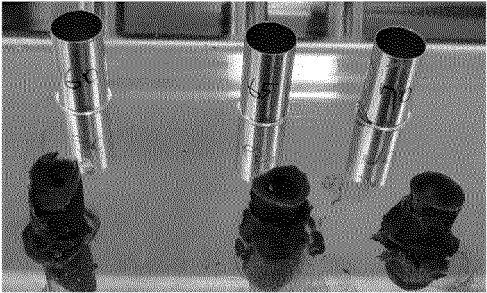
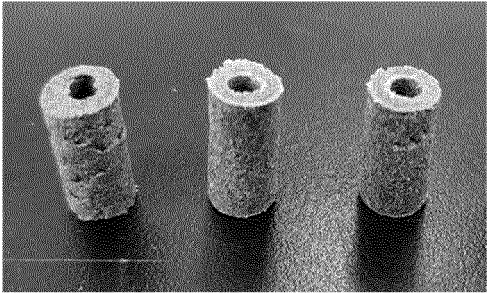
Slurry manufacturing moisture 60%	Slurry manufacturing moisture 40%
	
Experimental example F	Experimental example E

FIG. 7

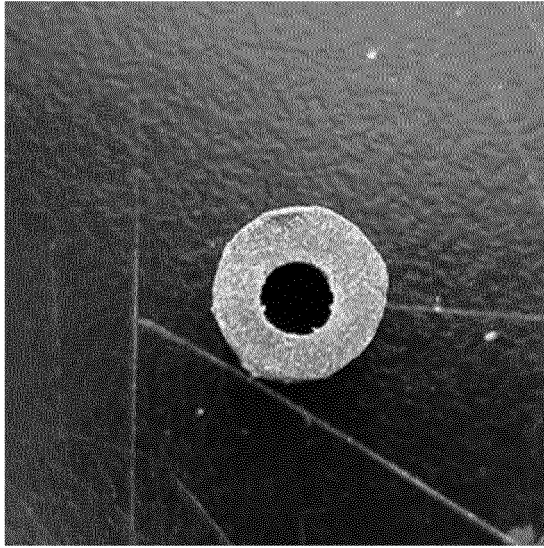


FIG. 8A

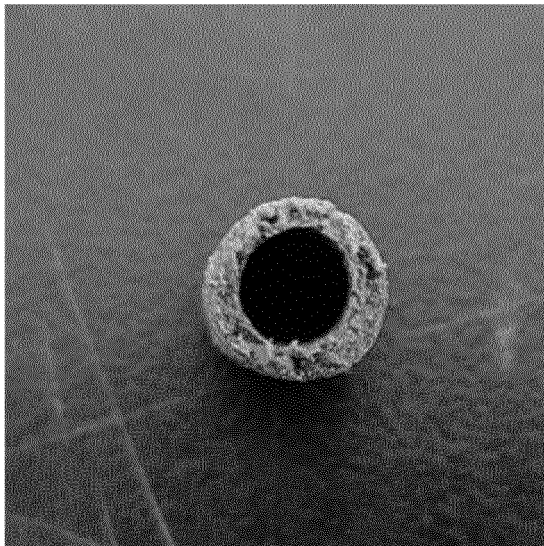


FIG. 8B

INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR2023/017485

A. CLASSIFICATION OF SUBJECT MATTER

A24D 1/20(2020.01)i; A24D 3/02(2006.01)i; A24C 5/18(2006.01)i; A24D 3/04(2006.01)i; A24B 3/04(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)

A24D 1/20(2020.01); A24B 15/16(2006.01); A24B 3/14(2006.01); A24C 5/01(2020.01); A24F 40/10(2020.01);
A24F 40/40(2020.01); A24F 40/46(2020.01)

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 발생 물품(aerosol generating article), 매질 슬러리(medium slurry), 중공(hollow), 고체화(solidification), 압출(extrusion), 지그(jig)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	KR 10-2022-0126615 A (KT & G CORPORATION) 16 September 2022 (2022-09-16) See paragraphs [0002]-[0003], [0046], [0067]-[0076], [0080]-[0083], [0107], [0116] and [0147]; and figures 3 and 6.	1-10
Y	KR 10-2021-0031751 A (NICOVENTURES TRADING LIMITED) 22 March 2021 (2021-03-22) See claims 1 and 9; paragraphs [0053]-[0058], [0087] and [0134]-[0138]; and figure 4.	1-10
A	KR 10-2021-0136474 A (KT & G CORPORATION) 17 November 2021 (2021-11-17) See entire document.	1-10
A	CN 114302654 A (KOREAN TOBACCO GINSENG COMMUNITY) 08 April 2022 (2022-04-08) See entire document.	1-10
A	KR 10-2022-0116453 A (PHILIP MORRIS PRODUCTS S.A.) 23 August 2022 (2022-08-23) See entire document.	1-10

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

* Special categories of cited documents:

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"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

02 February 2024

Date of mailing of the international search report

02 February 2024

Name and mailing address of the ISA/KR

Korean Intellectual Property Office
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Authorized officer

Telephone No.

Form PCT/ISA/210 (second sheet) (July 2022)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/KR2023/017485

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		JP 2023-527129 A	27 June 2023
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		WO 2022-191529 A1	15 September 2022
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		EP 4076015 A1	26 October 2022
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