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

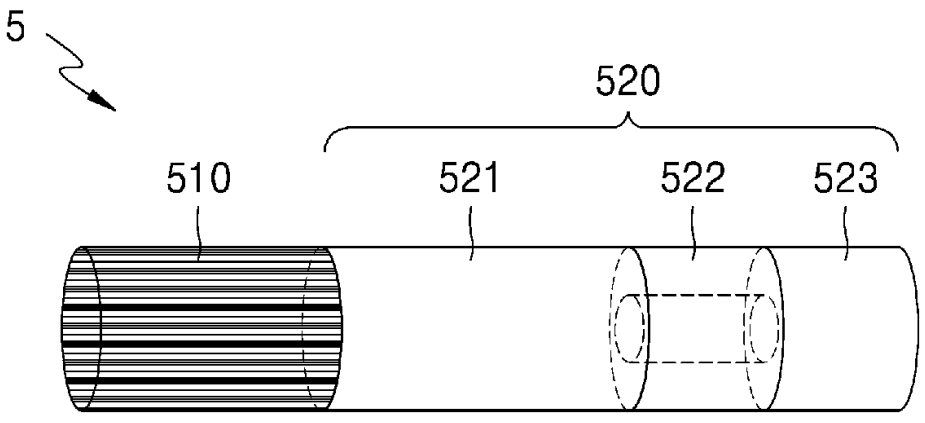
(72) Inventors:
- **JEOUNG, Eun Mi**
Daejeon 34308 (KR)
- **KO, Dong Kyun**
Sejong 30098 (KR)
- **CHOI, Sang Won**
Daejeon 34116 (KR)
- **JEONG, Sun Hwan**
Daejeon 34337 (KR)
- **PARK, In Su**
Seoul 07529 (KR)

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

(54) **CIGARETTE**

(57) A cigarette includes a tobacco rod and a filter rod connected to a downstream end portion of the tobacco rod. A portion of the filter rod includes a cooling portion, and the cooling portion includes sucrose as a cooling material.

FIG. 5



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Description

TECHNICAL FIELD

[0001] The present disclosure provides a cigarette including a tobacco rod and a filter rod.

BACKGROUND ART

[0002] Recently, the demand for alternative methods to overcome the shortcomings of general cigarettes has increased. For example, there is an increasing demand for a method of generating aerosol by heating an aerosol generating material in cigarettes, rather than by burning cigarettes.

[0003] A cigarette includes a filter, and the filter is configured to filter a certain component included in an aerosol or cool the aerosol. When the filtering performance of the filter is too high, the amount of aerosol transfer decreases, and when the filtering performance of the filter is too low, certain components included in the aerosol are not filtered.

[0004] Accordingly, research is being conducted on a filter having appropriate performance by changing components constituting the filter or by changing the structure of the filter.

DESCRIPTION OF EMBODIMENTS/TECHNICAL PROBLEM

[0005] Provided is a cigarette using sucrose as a cooling material configuring a cooling portion. The technical problems of the present disclosure are not limited to the above-described description, and other technical problems may be derived from the embodiments to be described hereinafter.

TECHNICAL SOLUTION TO PROBLEM

[0006] According to an aspect of the present disclosure, a cigarette includes a tobacco rod and a filter rod connected to a downstream end portion of the tobacco rod.

[0007] A portion of the filter rod according to the present embodiment includes a cooling portion, and the cooling portion includes sucrose as a cooling material.

ADVANTAGEOUS EFFECTS OF DISCLOSURE

[0008] According to the present disclosure, a heated aerosol may be effectively cooled by using sucrose as a cooling material configuring a cooling portion of a cigarette. As the heated aerosol passes through the cooling portion, the temperature of the sucrose reaches the melting point thereof or higher, and phase change of sucrose occurs. In this operation, sucrose may absorb the surrounding heat, thereby cooling the heated aerosol.

[0009] In addition, since sucrose has the characteristic of absorbing the surrounding moisture, an amount of aerosol may be increased by adding moisture absorbed by the sucrose to the aerosol passing through the cooling portion.

BRIEF DESCRIPTION OF DRAWINGS

[0010] FIGS. 1 through 3 are diagrams showing examples in which a cigarette is inserted into an aerosol generating device;

FIG. 4 illustrates an example of a cigarette;
FIG. 5 illustrates an example of a cigarette including a cooling portion of an embodiment;
FIG. 6 is an example diagram illustrating a bead-form cooling material of an embodiment;
FIGS.7A, 7B are example diagrams illustrating a sheet-form cooling material of an embodiment;
FIGS.8A, 8B are example diagrams for a block-form cooling material of an embodiment; and
FIG.9 diagram explaining a cooling effect of using sucrose as a cooling material of an embodiment.

BEST MODE

[0011] According to a first aspect of the present disclosure, provided is a cigarette including a tobacco rod and a filter rod connected to a downstream end portion of the tobacco rod, wherein a portion of the filter rod includes a cooling portion, and the cooling portion includes sucrose as a cooling material.

MODE OF DISCLOSURE

[0012] With respect to the terms used to describe the various embodiments, general terms which are currently and widely used are selected in consideration of functions of structural elements in the various embodiments of the present disclosure. However, meanings of the terms can be changed according to intention, a judicial precedence, the appearance of new technology, and the like. In addition, in certain cases, a term which is not commonly used can be selected. In such a case, the meaning of the term will be described in detail at the corresponding portion in the description of the present disclosure. Therefore, the terms used in the various embodiments of the present disclosure should be defined based on the meanings of the terms and the descriptions provided herein.

[0013] In addition, unless explicitly described to the contrary, the word "comprise" and variations such as "comprises" or "comprising" will be understood to imply the inclusion of stated elements but not the exclusion of any other elements. In addition, the terms "-er", "-or", and "module" described in the specification mean units for processing at least one function and operation and can be implemented by hardware components or software components and combinations thereof.

[0014] Hereinafter, the present disclosure will now be described more fully with reference to the accompanying drawings, in which exemplary embodiments of the present disclosure are shown such that one of ordinary skill in the art may easily work the present disclosure. The disclosure may, however, be embodied in many different forms and should not be construed as being limited to the embodiments set forth herein.

[0015] In the following embodiments, the terms "upstream" and "downstream" are terms used to indicate the relative position between segments configuring a cigarette. When a user inhales air by using a cigarette, the portion from which air from the outside flows to the inside of the cigarette is "upstream", and the portion from which air from the inside of the cigarette flows to the outside is "downstream". The user may bite the downstream end portion of the cigarette when using the cigarette. The term "end portion" may also be described as "end".

[0016] Hereinafter, embodiments of the present disclosure will be described in detail with reference to the drawings.

[0017] FIGS. 1 through 3 are diagrams showing examples in which a cigarette is inserted into an aerosol generating device.

[0018] Referring to FIG. 1, the aerosol generating device 10000 may include a battery 11000, a controller 12000, and a heater 13000. Referring to FIGS. 2 and 3, the aerosol generating device 10000 may further include a vaporizer 14000. Also, a cigarette 20000 may be inserted into an inner space of the aerosol generating device 10000.

[0019] FIGS. 1 through 3 illustrate components of the aerosol generating device 10000, which are related to the present embodiment. Therefore, it will be understood by one of ordinary skill in the art related to the present embodiment that other general-purpose components may be further included in the aerosol generating device 10000, in addition to the components illustrated in FIGS. 1 through 3.

[0020] Also, FIGS. 2 and 3 illustrate that the aerosol generating device 10000 includes the heater 13000. However, according to necessity, the heater 13000 may be omitted.

[0021] FIG. 1 illustrates that the battery 11000, the controller 12000, and the heater 130000 are arranged in series. Also, FIG. 2 illustrates that the battery 11000, the controller 12000, the vaporizer 14000, and the heater 13000 are arranged in series. Also, FIG. 3 illustrates that the vaporizer 14000 and the heater 13000 are arranged in parallel. However, the internal structure of the aerosol generating device 10000 is not limited to the structures illustrated in FIGS. 1 through 3. In other words, according to the design of the aerosol generating device 10000, the battery 11000, the controller 12000, the heater 13000, and the vaporizer 14000 may be differently arranged.

[0022] When the cigarette 20000 is inserted into the aerosol generating device 10000, the aerosol generating device 10000 may operate the heater 13000 and/or the vaporizer 14000 to generate an aerosol from the cigarette 20000 and/or the vaporizer 14000. The aerosol generated by the heater 13000 and/or the vaporizer 14000 is delivered to a user by passing through the cigarette 20000.

[0023] According to necessity, even when the cigarette 20000 is not inserted into the aerosol generating device 10000, the aerosol generating device 10000 may heat the heater 13000.

[0024] The battery 11000 supplies electric power to be used for the aerosol generating device 10000 to operate. For example, the battery 11000 may supply power to heat the heater 13000 or the vaporizer 14000, and may supply power for operating the controller 12000. Also, the battery 11000 may supply power for operations of a display, a sensor, a motor, etc. mounted in the aerosol generating device 10000.

[0025] The controller 12000 may generally control operations of the aerosol generating device 10000. In detail, the controller 12000 may control not only operations of the battery 11000, the heater 13000, and the vaporizer 14000, but also operations of other components included in the aerosol generating device 10000. Also, the controller 12000 may check a state of each of the components of the aerosol generating device 10000 to determine whether or not the aerosol generating device 10000 is able to operate.

[0026] The controller 12000 may include at least one processor. A 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 in the microprocessor is stored. It will be understood by one of ordinary skill in the art that the processor can be implemented in other forms of hardware.

[0027] The heater 13000 may be heated by the power supplied from the battery 11000. For example, when the cigarette 20000 is inserted into the aerosol generating device 10000, the heater 13000 may be located inside the cigarette 20000. Thus, the heated heater 13000 may increase a temperature of an aerosol generating material in the cigarette 20000.

[0028] The heater 13000 may include an electro-resistive heater. For example, the heater 13000 may include an electrically conductive track, and the heater 13000 may be heated when currents flow through the electrically conductive track. However, the heater 13000 is not limited to the example described above and may include all heaters which may be heated to a desired temperature. Here, the desired temperature may be pre-set in the aerosol generating device 10000 or may be set as a temperature desired by a user.

[0029] As another example, the heater 13000 may include an induction heater. In detail, the heater 13000 may include an electrically conductive coil configured to heat a cigarette in an induction heating method, and the cigarette may include a susceptor which may be heated by the induction heater.

[0030] For example, the heater 13000 may include a tube-type heating element, a plate-type heating element, a needle-type heating element, or a rod-type heating element, and may heat the inside or the outside of the cigarette 20000, according to the shape of the heating element.

[0031] Also, the aerosol generating device 10000 may include a plurality of heaters 13000. Here, the plurality of heaters 13000 may be inserted into the cigarette 20000 or may be arranged outside the cigarette 20000. In addition, some of the plurality of heaters 13000 may be inserted into the cigarette 20000, and the others may be arranged outside the cigarette 20000. In addition, the shape of the heater 13000 is not limited to the shapes illustrated in FIGS. 1 through 3 and may include various shapes.

[0032] The vaporizer 14000 may generate an aerosol by heating a liquid composition and the generated aerosol may pass through the cigarette 20000 to be delivered to a user. In other words, the aerosol generated via the vaporizer 14000 may move along an air flow passage of the aerosol generating device 10000 and the air flow passage may be configured such that the aerosol generated via the vaporizer 14000 passes through the cigarette 20000 to be delivered to the user.

[0033] For example, the vaporizer 14000 may include a liquid storage, a liquid delivery element, and a heating element, but it is not limited thereto. For example, the liquid storage, the liquid delivery element, and the heating element may be included in the aerosol generating device 10000 as independent modules.

[0034] The liquid storage may store a liquid composition. For example, the liquid composition may be a liquid including a tobacco-containing material having a volatile tobacco flavor component, or a liquid including a non-tobacco material. The liquid storage may be formed to be attached/detached to/from the vaporizer 14000 or may be formed integrally with the vaporizer 14000.

[0035] For example, the liquid composition may include water, a solvent, ethanol, plant extract, spices, flavorings, or a vitamin mixture. The spices may include menthol, peppermint, spearmint oil, and various fruit-flavored ingredients, but are not limited thereto. The flavorings may include ingredients capable of providing various flavors or tastes to a user. Vitamin mixtures may be a mixture of at least one of vitamin A, vitamin B, vitamin C, and vitamin E, but are not limited thereto. Also, the liquid composition may include an aerosol forming substance, such as glycerin and propylene glycol.

[0036] The liquid delivery element may deliver the liquid composition of the liquid storage to the heating element. For example, the liquid delivery element may be a wick such as cotton fiber, ceramic fiber, glass fiber, or porous ceramic, but is not limited thereto.

[0037] The heating element is an element configured to heat the liquid composition delivered by the liquid delivery element. For example, the heating element may be a metal heating wire, a metal hot plate, a ceramic heater, or the like, but is not limited thereto. In addition, the heating element may include a conductive filament such as nichrome wire and may be positioned as being wound around the liquid delivery element. The heating element may be heated by a current supply and may transfer heat to the liquid composition in contact with the heating element, thereby heating the liquid composition. As a result, aerosol may be generated.

[0038] For example, the vaporizer 14000 may be referred to as a cartomizer or an atomizer, but it is not limited thereto.

[0039] The aerosol generating device 10000 may further include general-purpose components in addition to the battery 11000, the controller 12000, the heater 13000, and the vaporizer 14000. For example, the aerosol generating device 10000 may include a display capable of outputting visual information and/or a motor configured to output haptic information. Also, the aerosol generating device 10000 may include at least one sensor (a puff detecting sensor, a temperature detecting sensor, a cigarette insertion detecting sensor, etc.). Also, the aerosol generating device 10000 may be formed as a structure where, even when the cigarette 20000 is inserted into the aerosol generating device 10000, external air may be introduced or internal air may be discharged.

[0040] Although not illustrated in FIGS. 1 through 3, the aerosol generating device 10000 and an additional cradle may form together a system. For example, the cradle may be used to charge the battery 11000 of the aerosol generating device 10000. Alternatively, the heater 13000 may be heated when the cradle and the aerosol generating device 10000 are coupled to each other.

[0041] The cigarette 20000 may be similar as a general combustive cigarette. For example, the cigarette 20000 may be divided into a first portion including an aerosol generating material and a second portion including a filter, etc. Alternatively, the second portion of the cigarette 20000 may also include an aerosol generating material. For example, an aerosol generating material made in the form of granules or capsules may be inserted into the second portion.

[0042] The entire first portion may be inserted into the aerosol generating device 10000, and the second portion may be exposed to the outside. Alternatively, only a portion of the first portion may be inserted into the aerosol generating device 10000, or the entire first portion and a portion of the second portion may be inserted into the aerosol generating device 10000. The user may puff aerosol while holding the second portion by the mouth of the user. In this case, the aerosol is generated by the external air passing through the first portion, and the generated aerosol passes through the second portion and is delivered to the user's mouth.

[0043] For example, the external air may flow into at least one air passage formed in the aerosol generating device 10000. For example, the opening and closing and/or a size of the air passage formed in the aerosol generating device 10000 may be adjusted by the user. Accordingly, the amount of smoke and a smoking impression may be adjusted by the user. As another example, the external air may flow into the cigarette 20000 through at least one hole formed in a surface of the cigarette 20000.

[0044] Hereinafter, an example of the cigarette 20000 will be described with reference to FIG. 4.

[0045] FIG. 4 illustrates an example of a cigarette.

[0046] Referring to FIG. 4, the cigarette 20000 may include a tobacco rod 21000 and a filter rod 22000. The first portion described above with reference to FIGS. 1 through 3 may include the tobacco rod 21000, and the second portion 32000 may include the filter rod 22000.

[0047] FIG. 4 illustrates that the filter rod 22000 includes a single segment. However, the filter rod 22000 is not limited thereto. In other words, the filter rod 22000 may include a plurality of segments. For example, the filter rod 22000 may include a first segment configured to cool an aerosol and a second segment configured to filter a certain component included in the aerosol. Also, according to necessity, the filter rod 22000 may further include at least one segment configured to perform other functions.

[0048] The cigarette 2000 may be packaged via at least one wrapper 24000. The wrapper 24000 may have at least one hole through which external air may be introduced or internal air may be discharged. For example, the cigarette 20000 may be packaged via one wrapper 24000. As another example, the cigarette 20000 may be doubly packaged via at least two wrappers 24000. For example, the tobacco rod 21000 may be packaged via a first wrapper, and the filter rod 22000 may be packaged via a second wrapper. Also, the tobacco rod 21000 and the filter rod 22000, which are respectively packaged via separate wrappers, may be coupled to each other, and the entire cigarette 20000 may be packaged via a third wrapper. When each of the tobacco rod 21000 and the filter rod 22000 includes a plurality of segments, each segment may be packaged via a separate wrapper. Also, the entire cigarette 20000 including the plurality of segments, which are respectively packaged via the separate wrappers and which are coupled to each other, may be repackaged via another wrapper.

[0049] The tobacco rod 21000 may include an aerosol generating material. For example, the aerosol generating material may include at least one of glycerin, propylene glycol, ethylene glycol, dipropylene glycol, diethylene glycol, triethylene glycol, tetraethylene glycol, and oleyl alcohol, but it is not limited thereto. Also, the tobacco rod 21000 may include other additives, such as flavors, a wetting agent, and/or organic acid. Also, the tobacco rod 21000 may include a flavored liquid, such as menthol or a moisturizer, which is injected to the tobacco rod 21000.

[0050] The tobacco rod 21000 may be manufactured in various forms. For example, the tobacco rod 21000 may be formed as a sheet or a strand. Also, the tobacco rod 21000 may be formed as a pipe tobacco, which is formed of tiny bits cut from a tobacco sheet. Also, the tobacco rod 21000 may be surrounded by a heat conductive material. For example, the heat-conducting material may be, but is not limited to, a metal foil such as aluminum foil. For example, the heat conductive material surrounding the tobacco rod 21000 may uniformly distribute heat transmitted to the tobacco rod 21000, and thus, the heat conductivity applied to the tobacco rod may be increased and taste of the tobacco may be improved. Also, the heat conductive material surrounding the tobacco rod 21000 may function as a susceptor heated by the induction heater. Here, although not illustrated in the drawings, the tobacco rod 21000 may further include an additional susceptor, in addition to the heat conductive material surrounding the tobacco rod 21000.

[0051] The filter rod 22000 may include a cellulose acetate filter. Shapes of the filter rod 22000 are not limited. For example, the filter rod 22000 may include a cylinder-type rod or a tube-type rod having a hollow inside. Also, the filter rod 22000 may include a recess-type rod. When the filter rod 22000 includes a plurality of segments, at least one of the plurality of segments may have a different shape.

[0052] The filter rod 22000 may be formed to generate flavors. For example, a flavoring liquid may be injected onto the filter rod 22000, or an additional fiber coated with a flavoring liquid may be inserted into the filter rod 22000.

[0053] Also, the filter rod 22000 may include at least one capsule 23000. Here, the capsule 23000 may generate a flavor or an aerosol. For example, the capsule 23000 may have a configuration in which a content containing a flavoring material is wrapped with a film. For example, the capsule 23000 may have a spherical or cylindrical shape, but is not

limited thereto.

[0054] When the filter rod 22000 includes a segment configured to cool the aerosol, the cooling segment may include a polymer material or a biodegradable polymer material. For example, the cooling segment may include pure polylactic acid alone, but the material for forming the cooling segment is not limited thereto. In some embodiments, the cooling segment may include a cellulose acetate filter having a plurality of holes. However, the cooling segment is not limited to the above-described example and is not limited as long as the cooling segment cools the aerosol.

[0055] Although not illustrated in FIG. 4, the cigarette 20000 according to an embodiment may further include a front-end filter. The front-end filter may be located on a side of the tobacco rod 21000, the side facing the filter rod 22000. The front-end filter may prevent the tobacco rod 21000 from being detached outwards and prevent a liquefied aerosol from flowing into the aerosol generating device 10000 (FIGS. 1 through 3) from the tobacco rod 21000, during smoking.

[0056] FIG. 5 illustrates an example of a cigarette including a cooling portion according to an embodiment.

[0057] Referring to FIG. 5, a cigarette 5 includes a tobacco rod 510 and a filter rod 520 connected to a downstream end portion of the tobacco rod 510. The filter rod 520 may include a cooling portion 521, a tube portion 522, and an acetate portion 523.

[0058] As shown in FIG. 5, in an embodiment, the cooling portion 521 may be connected to the downstream end portion of the tobacco rod 510, the tobacco rod 510 may be connected to a downstream end portion of the cooling portion 521, and the acetate portion 523 may be connected to a downstream end portion of the tube portion 522. That is, segments may be located in an order of the tobacco rod 510, the cooling portion 521, the tube portion 522, and the acetate portion 523.

[0059] In another embodiment, the tube portion 522 may be connected to the downstream end portion of the tobacco rod 510, the cooling portion 521 may be connected to the downstream end portion of the tube portion 522, and the acetate portion 523 may be connected to the downstream end portion of the cooling portion 521. In other words, segments may be located in an order of the tobacco rod 510, the tube portion 522, the cooling portion 521, and the acetate portion 523.

[0060] However, types of filter segments included in the filter rod 520 and arrangement order of filter segments configuring the filter rod 520 are not limited thereto.

[0061] The cigarette 5 may be packaged via a plurality of wrappers. The plurality of wrappers may be formed as a general wrapper, and may be a porous wrapper or a non-porous wrapper.

[0062] For example, the tobacco rod 510 may be packaged via a first wrapper, and the tube portion 522 may be packaged via a second wrapper. In addition, the cooling portion 521 may be packaged via a third wrapper, and the acetate portion 523 may be packaged via a fourth wrapper.

[0063] A fifth wrapper may be wrapped around outer sides of the first wrapper, the second wrapper, and the third wrapper. In other words, the tobacco rod 510, the tube portion 522, and the cooling portion 521 of the cigarette 5 may be further packaged via the fifth wrapper. In addition, a sixth wrapper may be wrapped around at least a portion of the fifth wrapper and an outer side of the fourth wrapper. That is, at least a portion of the cooling portion 521 of the cigarette 5 and the acetate portion 523 may be further packaged via the sixth wrapper.

[0064] The diameter of the cigarette 5 may be within a range of 5 mm to 9 mm, and the length of the cigarette 5 may be about 48 mm, but are not limited thereto. For example, the length of the tobacco rod 510 may be about 12 mm, the length of the tube portion 522 may be about 10 mm, the length of the cooling potion 521 may be about 14 mm, and the length of the acetate portion 523 may be about 12 mm, but are not limited thereto.

[0065] The tobacco rod 510 includes an aerosol generating material. For example, the aerosol generating material may include at least one of glycerin, propylene glycol, ethylene glycol, dipropylene glycol, diethylene glycol, triethylene glycol, tetraethylene glycol, and oleyl alcohol.

[0066] In addition, the tobacco rod 510 may include other additives, such as flavors, a wetting agent, and/or organic acid. For example, flavors may include licorice, saccharose, fructose syrup, isosweet, cocoa, lavender, cinnamon, carudamon, celery, fenugreek, cascarilla, white sandalwood, monarda didyma, geranium, honey essence, rose oil, vanilla, lemon oil, orange oil, mint oil, cinnamon, caraway, cognac, jasmine, chamomile, methol, cinnamon, ylang-ylang, salvia, spearmint, ginger, coriander, coffee, or the like. In addition, the wetting agent may include glycerin, propylene glycol, or the like.

[0067] For example, the tobacco rod 510 may be filled with a reconstituent tobacco sheet. As another example, the tobacco rod 510 may be filled with tiny bits. Herein, the tiny bits may be generated by finely cutting the reconstituent tobacco sheet. As another example, the tobacco rod 510 may be filled with a plurality of tobacco strands in which the consistuent tobacco sheet is finely cut. For example, the tobacco rod 510 may be formed by combining the plurality of tobacco strands in the same direction (parallel) or randomly.

[0068] In addition, before an operation in which the tobacco rod 510 is packaged via a wrapper, a flavored liquid, such as menthol or a moisturizer, may be injected to the center of the tobacco rod 510.

[0069] The tube portion 522 may include a cellulose acetate filter. For example, the tube portion 522 may include a tube-type structure including a hollow inside. The length of the tube portion 522 may be an appropriate length within a range of about 4 mm to about 30 mm, but is not limited thereto. Preferably, the length of the tube portion 522 may be

10 mm, but is not limited thereto. The diameter of the hollow included in the tube portion 522 may be an appropriate diameter within a range of about 2 mm to 4.5 mm, but is not limited thereto.

[0070] The hardness of the tube portion 522 may be controlled by adjusting the content of plasticizer when manufacturing the tube portion 522. In addition, the tube portion 522 may be manufactured by inserting a structure such as a film, tube, or the like of the same or different materials into the inside of the tube portion 522 (for example, the hollow).

[0071] The tube portion 522 may be manufactured by using a cellulose acetate filter. Accordingly, an internal material of the tobacco rod 510 may be prevented from being pushed back, and a cooling effect of an aerosol may be generated.

[0072] Sucrose (or saccharose) may be included in the cooling portion 521 as a cooling material. The melting point of sucrose is about 160 °C to about 180 °C. When the temperature of the sucrose reaches the melting point or higher, caramelization performs, and in this operation, surrounding heat is absorbed.

[0073] The cooling portion 521 cools an aerosol generated by the heater heating the tobacco rod 510. Accordingly, a user may puff the aerosol which is cooled to a suitable temperature.

[0074] In detail, when the cigarette 5 is inserted into an aerosol generating device, the aerosol generating device operates a heater to heat the tobacco rod 510 of the cigarette 5. When a user bites the acetate portion 523 of the cigarette 5 inserted into an aerosol generating device and inhales air, air from the outside flows to the inside of the cigarette 5, and an aerosol is generated in an operation in which the introduced air passes through the tobacco rod 510 heated by a heater.

[0075] As the aerosol generated in the tobacco rod 510 passes through the cooling portion 521, the temperature of sucrose, which is a cooling material included in the cooling portion 521, rises. When the temperature of the sucrose reaches the melting point or higher, caramelization may perform, and in this operation, surrounding heat may be absorbed to cool the heated aerosol. Accordingly, a user may puff the aerosol which is cooled to a suitable temperature.

[0076] In addition, the sucrose included in the cooling portion 521 has a characteristic of absorbing and not releasing surrounding moisture. Therefore, moisture absorbed by the sucrose may be added to the aerosol passing through the cooling portion 521 to increase an amount of aerosol, and the amount of aerosol may be maintained until the latter half of smoking.

[0077] In addition, when the sucrose is a sugar concentrate with high concentration, the sucrose has high preservative properties due to high osmotic pressure, and thus storage stability may be ensured.

[0078] In an embodiment, the sucrose included in the cooling portion 521 may have a bead type, a sheet type, or a block type.

[0079] The bead-form sucrose may have a spherical shape or a fillet shape. The sheet-form sucrose may include any one material of a porous paper or an edible film. The block-form sucrose may have a cylindrical shape, a tube shape, or a nine-holed briquette shape.

[0080] The length or diameter of the cooling portion 521 may be variously determined according to the shape of the cigarette 5. For example, the length of the cooling portion 521 may be suitably used within a range of about 7 mm to about 20 mm. Preferably, the length of the cooling portion 521 may be 14 mm, but is not limited thereto.

[0081] As shown in FIG. 5, as the cooling portion 521 is located in the upstream portion of the cigarette 5 than the tube portion 522 and the acetate portion 523, thereby preventing the tube portion 522 and the acetate portion 523 from being melted or contracted by heat.

[0082] FIG. 6 is an example diagram illustrating a bead-form cooling material according to an embodiment.

[0083] Referring to FIG. 6, a cooling portion 600 may include a first filter element 610, a second filter element 620, and a cooling material 630.

[0084] The first filter element 610 may be located at one side end portion of the cooling portion 600, and the second filter element 620 may be located at the other side end portion. In addition, the first filter element 610 and the second filter element 620 may be spaced apart by a certain distance to form a cavity between the first filter element 610 and the second filter element 620. The cooling material 630 including sucrose may be located in the cavity.

[0085] In an embodiment, the first filter element 610 and the second filter element 620 may include a tube-type structure including a hollow inside, but the shape of the first filter element 610 and the second filter element 620 are not limited thereto.

[0086] The cooling material 630 located in the cavity between the first filter element 610 and the second filter element 620 may be a bead-form. The bead-form cooling material 630 may have a spherical shape or a fillet shape.

[0087] In an embodiment, the bead-form cooling material 630 may be manufactured by stacking a sucrose layer on a sucrose seed by using a tangential spray method or a top spray method. The bead-form cooling material 630 manufactured in this method may have a spherical shape or a fillet shape.

[0088] Also, the surface of the bead-form cooling material 630 may be coated. A film-forming polymer, gum, or starch may be used as a coating material coating the surface of the cooling material 630. For example, as the coating material coating the surface of the cooling material 630, shellac, hyroxypropyl methylcellulose (HPMC), corn starch, or a combination thereof may be used. Preferably, the coating material coating the surface of the cooling material 630 may be shellac. Inserting the cooling material 630 into the cooling portion 600 may become easier and storage property of the

cooling material 630 may be improved by coating the surface of the cooling material 630.

[0089] In addition, fine protrusions may be formed on at least a portion of the surface of the cooling material 630. By forming fine protrusions on the surface of the cooling material 630, an area in which the cooling material 630 contacts an aerosol passing through the cooling material 630 may increase. As a result, a cooling effect of the cooling material 630 may be improved.

[0090] In an embodiment, based on the total volume of the cooling portion 600, a ratio of the volume occupied by the bead-form cooling material 630 may be about 30% to about 35%. Also, the diameter of the bead-form cooling material 630 may be about 3 mm to about 5 mm, and the weight of the bead-form cooling material 630 may be about 0.3 g to about 1.0 g.

[0091] The first filter element 610, the second filter element 620, and the cooling material 630 included in the cooling portion 600 may be packaged via at least one wrapper 640.

[0092] FIGS. 7A and 7B are example diagrams illustrating a sheet-form cooling material according to an embodiment.

[0093] A cooling material 710 including sucrose may have a sheet form.

[0094] In an embodiment, the cooling material 710 may be a porous paper sheet. The porous paper sheet may be a material having elasticity and flexibility, and for example, may include a cellulosic material used in wrappers such as birch and bamboo.

[0095] When the cooling material 710 includes a porous paper sheet, a coating material including sucrose (for example, sucrose powder), distilled water, and starch syrup may be coated on the porous paper sheet. Starch syrup included in the coating material may control the viscosity of the coating material and suppress the precipitation of sugar/glucose crystals.

[0096] Materials included in the coating material are not limited to the above-described examples, and additional materials may be further added to increase the efficiency of coating operation and drying operation of the cooling material 710.

[0097] In an embodiment, the concentration of sucrose (for example, sucrose powder) may be 30 %wt to 70 %wt relative to the total concentration of the coating material coated on a porous paper, and the total weight of starch syrup may be 40 % or less relative to the total weight of the coating material, but are not limited thereto.

[0098] In another embodiment, the cooling material 710 may be an edible film.

[0099] The edible film may include a biodegradable film material. For example, starch or cellulose and derivatives thereof, such as pectin, alginate, carrageenan, chitosan, or the like, may be used as the biodegradable film material. Also, pullulan having excellent coating and film forming ability may be further added.

[0100] The cooling material 710 in an edible form may be formed by mixing the above-stated biodegradable film material with sucrose.

[0101] In another embodiment, the cooling material 710 in a sheet form may have a viscosity such as wax. The cooling material 710 may include sucrose, an acid-based solution, and distilled water to have a viscosity such as wax. The acid-based solution may be lemon juice, vinegar, or the like.

[0102] Referring to FIG. 7A, the cooling material 710 in a sheet form may be wound. When a wound cooling material 720 is located inside a cooling portion 700, the wound cooling material 720 may be located inside the cooling portion 700 in a longitudinal direction of the cooling portion 700 such that an airflow (for example, an aerosol) may pass through. In other words, the wound cooling material 720 may be located inside the cooling portion 700 such that the longitudinal direction of the wound cooling material 720 is parallel to the longitudinal direction of the cooling portion 700.

[0103] In FIG. 7A, a plurality of wound cooling materials 720 may be located in the cooling portion 700, such that a honeycomb-shaped airflow path may be formed inside the cooling portion 700.

[0104] In addition, referring to FIG. 7B, the cooling material 710 in a sheet form may form various patterns and be located in the cooling portion 700 such that an airflow may pass along the longitudinal direction of the cooling portion 700. For example, a cooling material 731 wound in an irregular pattern, a swirling cooling material 732, or a concentric circle-form cooling material 733 may be located inside the cooling portion 700.

[0105] FIGS. 8A and 8B are example diagrams illustrating a block-form cooling material according to an embodiment.

[0106] A cooling material including sucrose may have a block form. In an embodiment, a block-form cooling material may be manufactured in a method in which syrup or powdered-form sucrose is poured into a mold to harden.

[0107] Referring to FIG. 8A, the block-form cooling material may have a circular shape, a tube shape including a hollow inside, or a nine-holed briquette shape in which a plurality of holes penetrating the inside are formed. However, the block-form cooling material is not limited thereto.

[0108] Referring to FIG. 8B, at least one channel may be formed on an outer circumferential surface of the block-form cooling material. The at least one channel formed on the outer circumferential surface of the cooling material may be formed in the longitudinal direction of the cooling portion such that an airflow may pass along the longitudinal direction of the cooling material.

[0109] In an embodiment, the at least one channel formed on the outer circumferential surface of the cooling material may form a regular or irregular pattern of a straight line, a curved line, spiral or zigzag. Also, convex protrusions or

concave grooves may be formed on the outer circumferential surface of the cooling material to perform a channel function allowing the airflow passing through.

[0110] FIG. 9 is a diagram explaining a cooling effect of using sucrose as a cooling material according to an embodiment.

[0111] Referring to FIG. 9, each of cigarettes 910 to 970 may include a tobacco rod, a tube portion, a cooling portion, and an acetate portion.

[0112] While the tobacco rods of the cigarettes 910 to 970 are being heated, air is introduced from the outside to the inside of the cigarettes 910 to 970 whenever a user bites the acetate portions of the cigarettes 910 to 970 and puffs. An aerosol is produced in an operation in which the introduced air passes through the heated tobacco rod.

[0113] Table 1 below is a result of measuring the temperature of aerosols reaching an upstream end portion of the acetate portions after the aerosols generated from the tobacco rods have passed through the cooling portions, by using the cigarettes 910 to 970 according to first to seventh embodiments. In other words, through Table 1 below, how much the aerosols have cooled by passing through the cooling portions in each of the first to seventh embodiments may be confirmed.

[0114] For the measurement of Table 1, the puff volume was set to 55 ml, the puff time was set to 2 seconds, the puff cycle was set to 20 seconds, and the number of puffs was set to 12. In Table 1, the maximum temperature refers to an average value of maximum temperatures during the puff period for each puff, and the average temperature refers to an average value of average temperatures during the puff period for each puff.

[0115] [Table 1]

Division	First Embodiment	Second Embodiment	Third Embodiment	Fourth Embodiment	Fifth Embodiment	Sixth Embodiment	Seventh Embodiment
Maximum temperature	79.2	68.8	86.8	69.5	77.3	85.7	47.3
Average temperature	65.8	57.7	69.0	55.7	61.8	72.7	42.6

[0116] Hereinafter, the tube portions and the cooling portions of the first to seventh embodiments are tube-type structures including a hollow inside.

[0117] In the first embodiment, the tube portion of the cigarette 910 is cellulose acetate (CA), and the cooling portion is poly lactic acid (PLA) woven fabric. As a result measuring the temperatures of aerosols at a measurement position by using the cigarette 910 of the first embodiment, the maximum temperature was 79.2 °C and the average temperature was 65.8 °C.

[0118] In the second embodiment, the tube portion of the cigarette 920 is CA, and the cooling portion is also CA. As a result measuring the temperatures of aerosols at a measurement position by using the cigarette 920 of the second embodiment, the maximum temperature was 68.8 °C and the average temperature was 57.7 °C.

[0119] In the third embodiment, the tube portion of the cigarette 930 is a reconsistuent tobacco sheet, and the cooling portion is CA. As a result measuring the temperatures of aerosols at a measurement position by using the cigarette 930 of the third embodiment, the maximum temperature was 86.8 °C and the average temperature was 69.0 °C.

[0120] In the fourth embodiment, the tube portion of the cigarette 940 is a paper, and the cooling portion is CA. As a result measuring the temperatures of aerosols at a measurement position by using the cigarette 940 of the fourth embodiment, the maximum temperature was 69.5 °C and the average temperature was 55.7 °C.

[0121] In the fifth embodiment, the tube portion of the cigarette 950 is a CA, and the cooling portion is a reconstituent tobacco sheet. As a result measuring the temperatures of aerosols at a measurement position by using the cigarette 950 of the fifth embodiment, the maximum temperature was 77.3 °C and the average temperature was 61.8 °C.

[0122] In the sixth embodiment, the tube portion of the cigarette 960 is a CA, and the cooling portion is a paper. As a result measuring the temperatures of aerosols at a measurement position by using the cigarette 960 of the sixth embodiment, the maximum temperature was 85.7 °C and the average temperature was 72.7 °C.

[0123] In the seventh embodiment, the tube portion of the cigarette 970 is a CA, and the cooling portion is sucrose. As a result measuring the temperatures of aerosols at a measurement position by using the cigarette 970 of the seventh embodiment, the maximum temperature was 47.3 °C and the average temperature was 42.6 °C.

[0124] In other words, as a result measuring temperatures of aerosols at a measurement position by using the cigarettes 910 to 970 according to the first to seventh embodiments, the maximum temperature and the average temperature of the seventh embodiment in which the cooling material is sucrose were measured to be the lowest.

[0125] When the temperature of sucrose included in the cooling portion reaches the melting point or higher, caramelization may perform, and in this operation, surrounding heat may be absorbed to effectively cool the heated aerosol. Accordingly, a user may puff the aerosol cooled to a suitable temperature.

[0126] Those of ordinary skill in the art related to the present embodiments may understand that various changes in form and details can be made therein without departing from the scope of the characteristics described above. The disclosed methods should be considered in a descriptive sense only and not for purposes of limitation. The scope of the present disclosure is defined by the appended claims rather than by the foregoing description, and all differences within the scope of equivalents thereof should be construed as being included in the present disclosure.

Claims

1. A cigarette comprising:

a tobacco rod; and
a filter rod connected to a downstream end portion of the tobacco rod;
wherein a portion of the filter rod comprises a cooling portion, and the cooling portion comprises sucrose as a cooling material.

2. The cigarette of claim 1, wherein the cooling portion comprises
a first filter element at one side end portion of the cooling portion and a second filter element at the other side end portion of the cooling portion,
and the first filter element and the second filter element are spaced apart by a certain distance to form a cavity between the first filter element and the second filter element, and the cooling material is in the cavity.

3. The cigarette of claim 1, wherein the cooling material has a bead form.

4. The cigarette of claim 3, wherein a surface of the bead-form cooling material is coated.

5. The cigarette of claim 4, wherein fine protrusions are formed on at least a portion of the surface of the cooling material.

6. The cigarette of claim 1, wherein the cooling material has a sheet form.

7. The cigarette of claim 6, wherein the sheet-form cooling material is located in the cooling portion and wound such that an airflow passes through in a longitudinal direction of the cooling portion.

8. The cigarette of claim 6, wherein the sheet-form cooling material comprises any one material of porous paper or edible film.

9. The cigarette of claim 1, wherein the cooling material is a block form.

10. The cigarette of claim 9, wherein the block-form cooling material has any one shape of a cylindrical shape, a tube shape, or a nine-holed briquette shape.

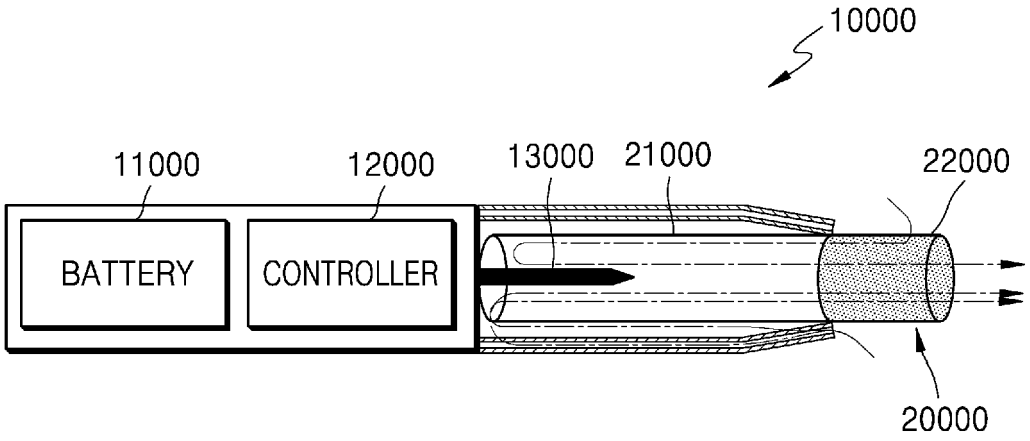
11. The cigarette of claim 9, wherein at least one channel through which an airflow passes through in a longitudinal direction of the cooling portion is formed in an outer circumferential surface of the block-form cooling material.

12. The cigarette of claim 11, wherein the at least one channel forms a regular pattern or an irregular pattern of a straight line, a curved line, a spiral, or a zigzag, and is formed on the outer circumferential surface of the cooling material.

13. The cigarette of claim 1, wherein
the filter rod comprises a tube portion, a cooling portion, and an acetate portion,
the tube portion is connected to a downstream end portion of the tobacco rod, the cooling portion is connected to a downstream end portion of the tube portion, and
the acetate portion is connected to a downstream end portion of the cooling portion.

14. The cigarette of claim 1, wherein
the filter rod comprises a cooling portion, a tube portion, and an acetate portion,
the cooling portion is connected to a downstream end portion of the tobacco rod, the tube portion is connected to a downstream end portion of the cooling portion, and
the acetate portion is connected to a downstream end portion of the tube portion.

FIG. 1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CONTROLLER
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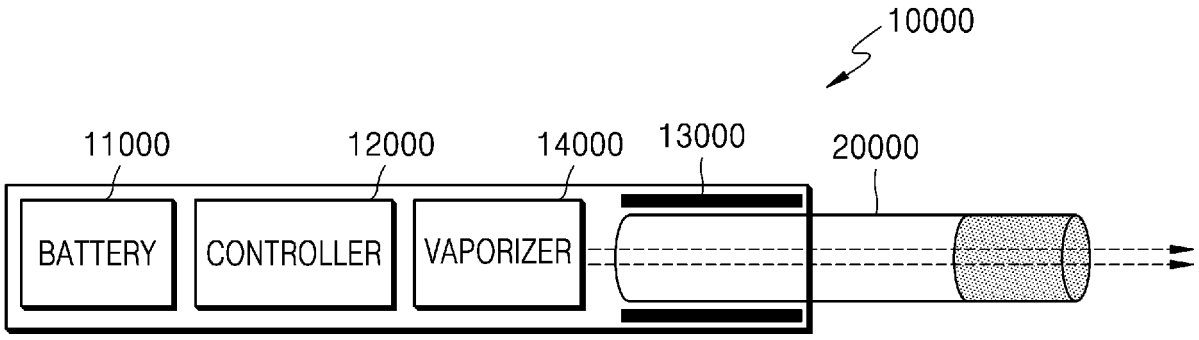
FIG. 2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VAPORIZER

FIG. 3

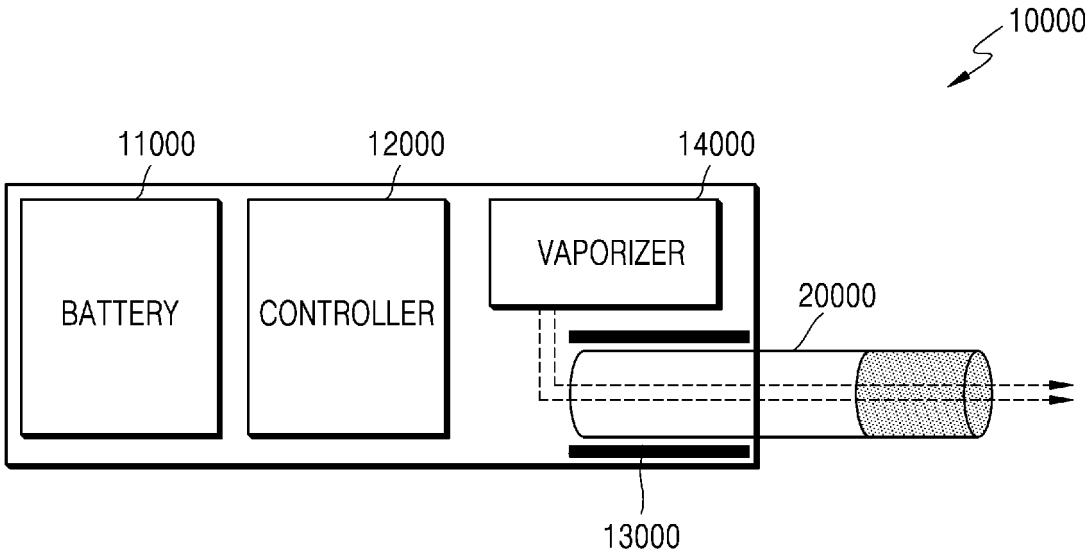
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FIG. 4

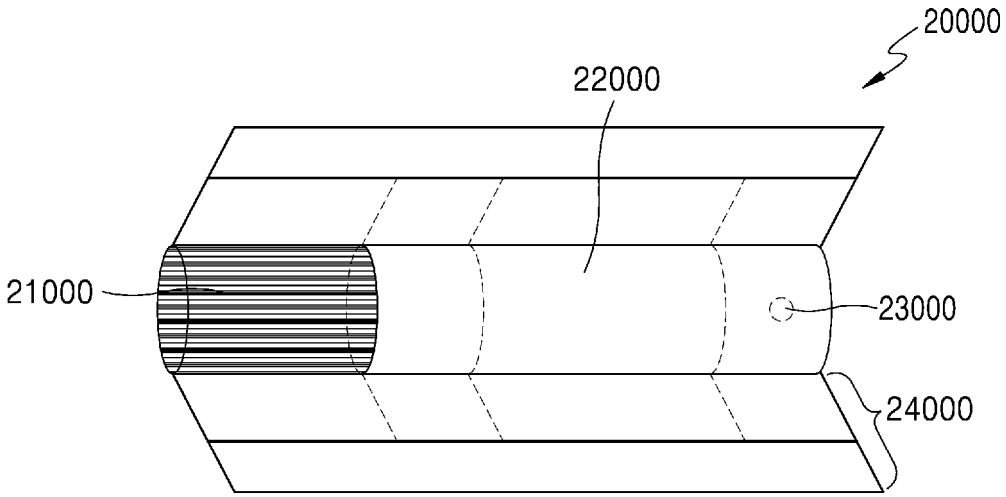


FIG. 5

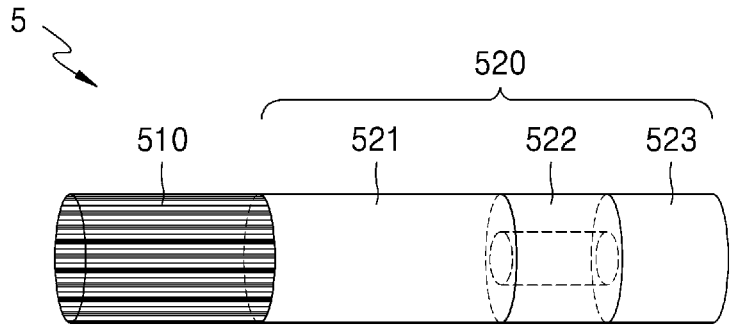


FIG. 6

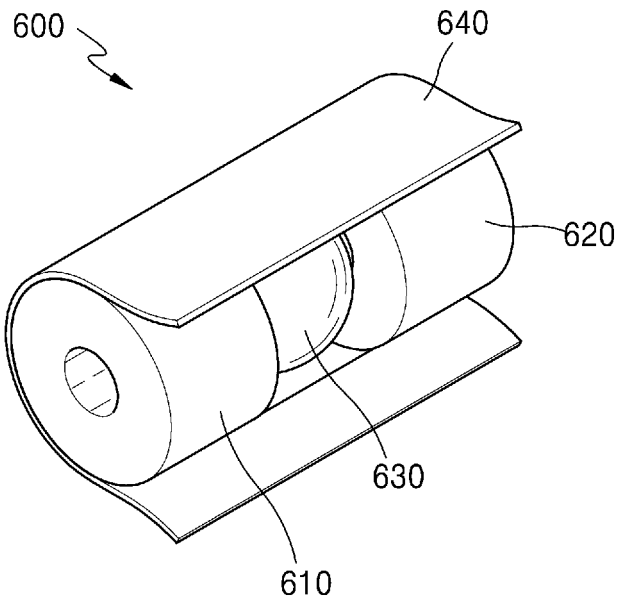


FIG. 7A

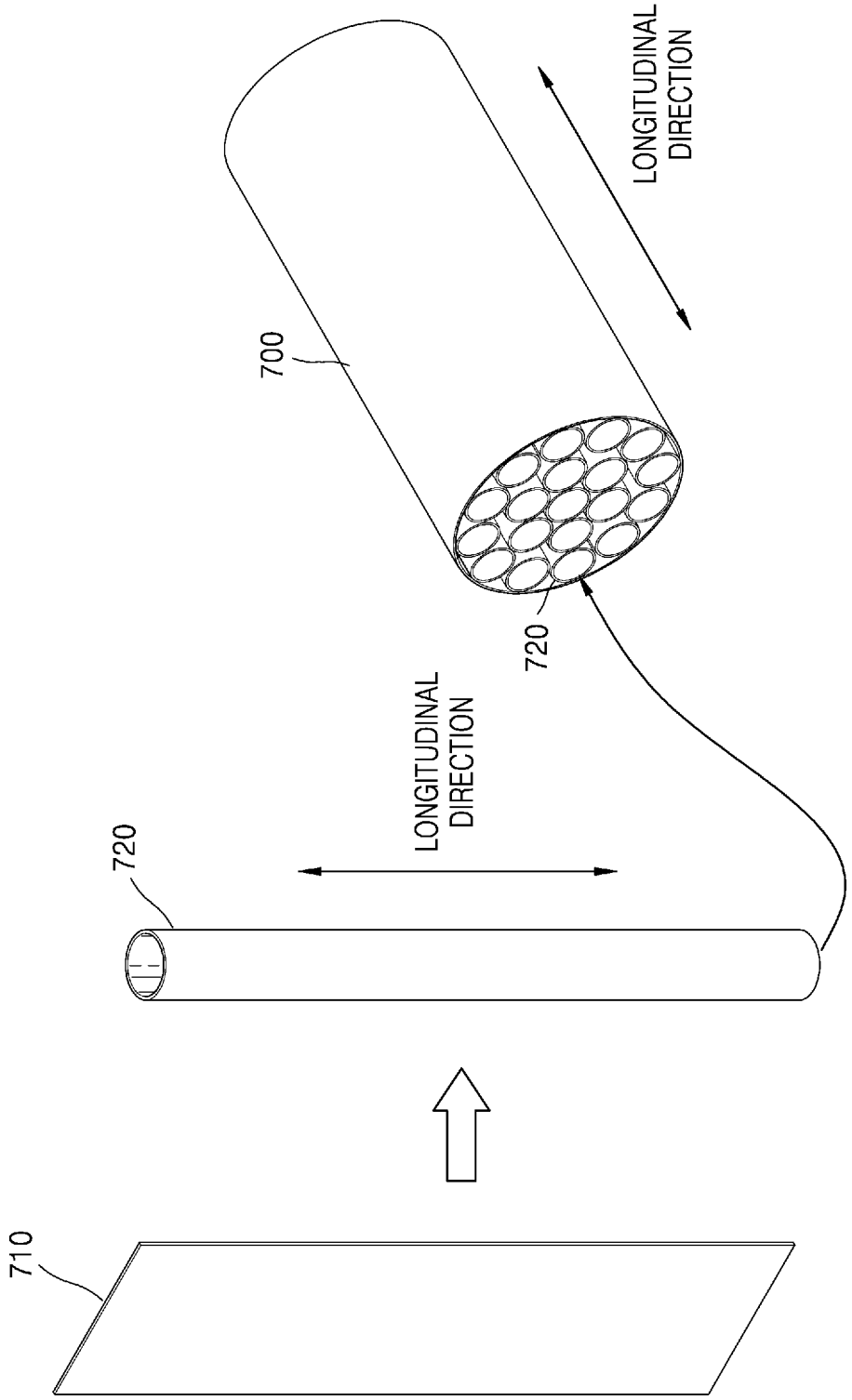

LONGITUDINAL DIRECTION
700
720
LONGITUDINAL DIRECTION
720
710

FIG. 7B

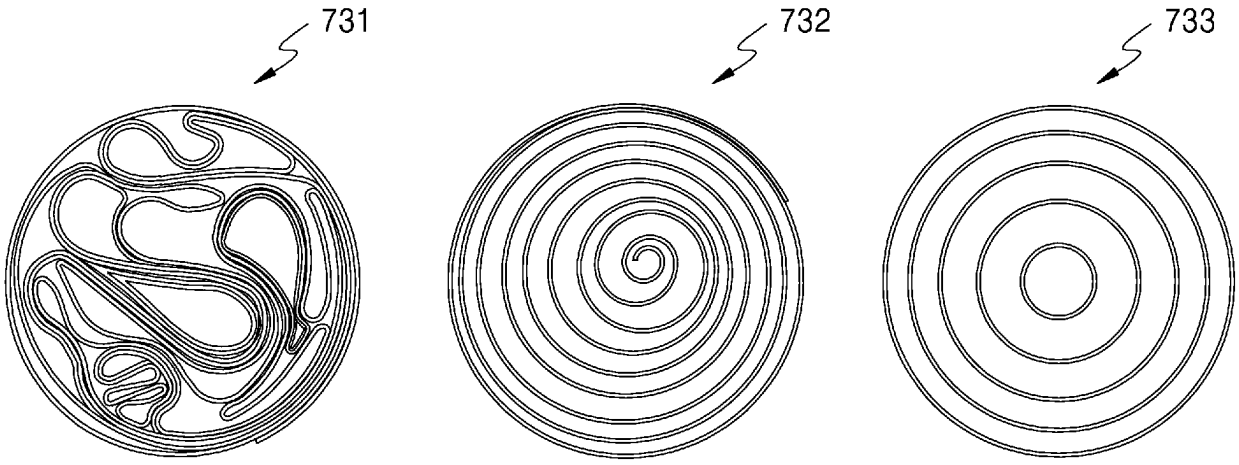


FIG. 8A

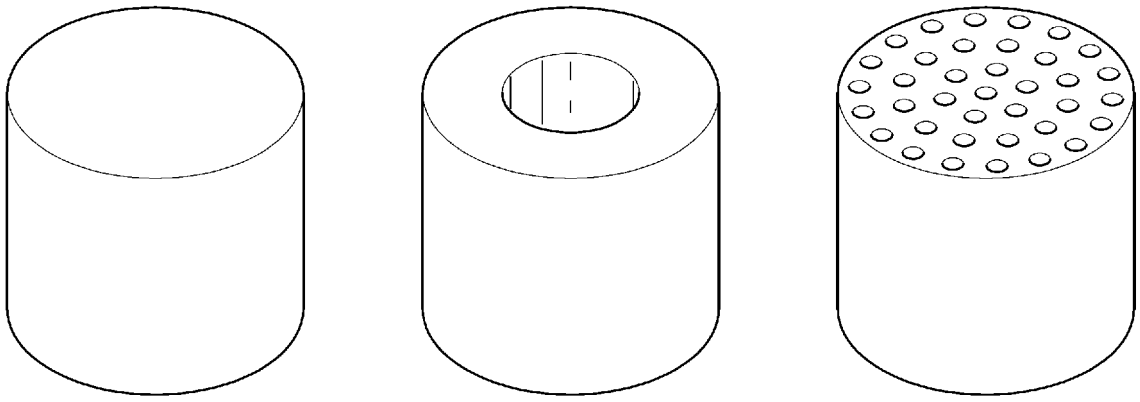


FIG. 8B

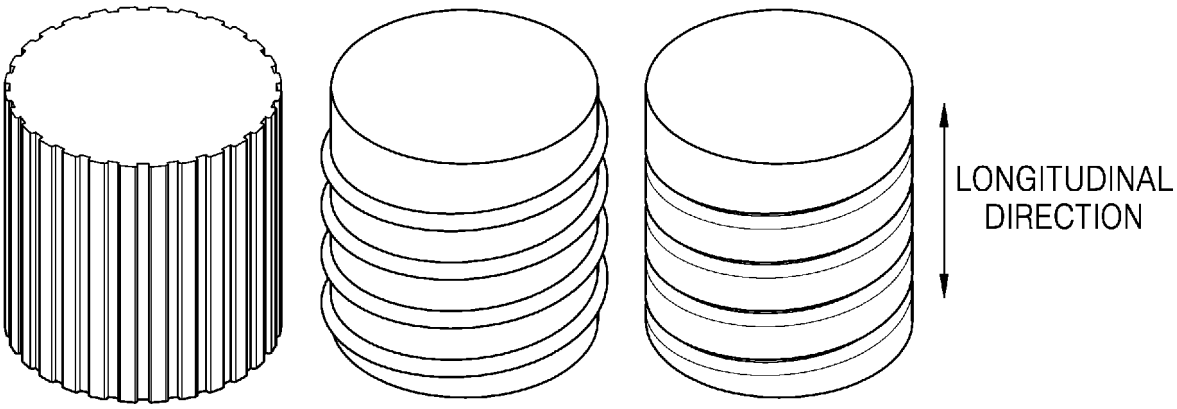
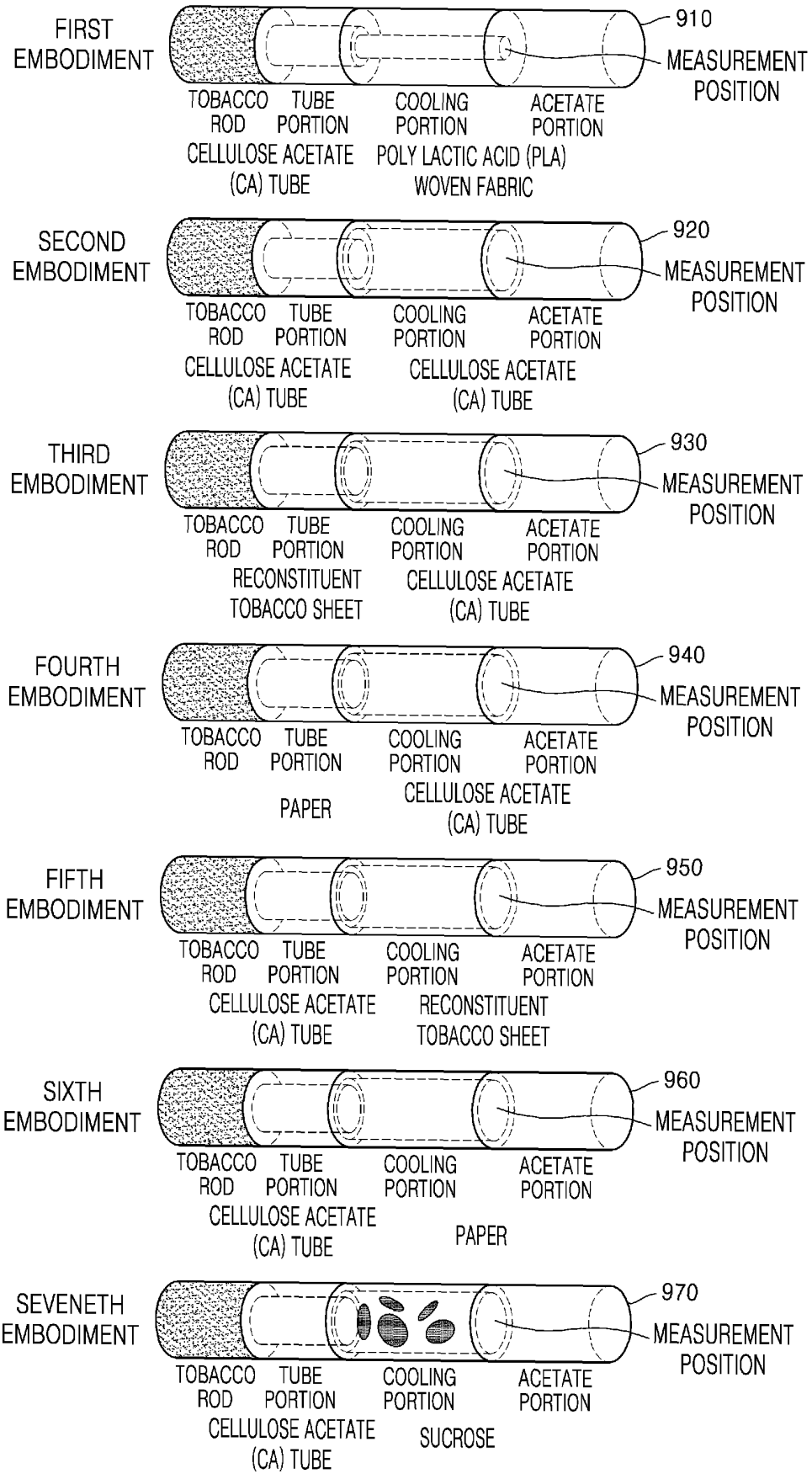


FIG. 9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SECOND EMBODIMENT
920
MEASUREMENT POSITION
TOBACCO ROD
TUBE PORTION
COOLING PORTION
ACETATE PORTION
CELLULOSE ACETATE (CA) TUBE
CELLULOSE ACETATE (CA) TUBE
THIRD EMBODIMENT
930
MEASUREMENT POSITION
TOBACCO ROD
TUBE PORTION
COOLING PORTION
ACETATE PORTION
RECONSTITUENT TOBACCO SHEET
CELLULOSE ACETATE (CA) TUBE
FOURTH EMBODIMENT
940
MEASUREMENT POSITION
TOBACCO ROD
TUBE PORTION
COOLING PORTION
ACETATE PORTION
PAPER
CELLULOSE ACETATE (CA) TUBE
FIFTH EMBODIMENT
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TUBE PORTION
COOLING PORTION
ACETATE PORTION
CELLULOSE ACETATE (CA) TUBE
RECONSTITUENT TOBACCO SHEET
SIXTH EMBODIMENT
960
MEASUREMENT POSITION
TOBACCO ROD
TUBE PORTION
COOLING PORTION
ACETATE PORTION
CELLULOSE ACETATE (CA) TUBE
PAPER
SEVENETH EMBODIMENT
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MEASUREMENT POSITION
TOBACCO ROD
TUBE PORTION
COOLING PORTION
ACETATE PORTION
CELLULOSE ACETATE (CA) TUBE
SUCROSE

INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2019/009951

A. CLASSIFICATION OF SUBJECT MATTER

A24D 1/04(2006.01)i, A24D 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 1/04; A24B 15/30; A24D 3/04; A24D 3/06; A24D 3/14; A24F 47/00

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: cigarette, rod, filter, cooling and sucrose

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
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"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	Date of mailing of the international search report
19 NOVEMBER 2019 (19.11.2019)	**19 NOVEMBER 2019 (19.11.2019)**
Name and mailing address of the ISA/KR Korean Intellectual Property Office Government Complex Daejeon Building 4, 189, Cheongsa-ro, Seo-gu, Daejeon, 35208, Republic of Korea Facsimile No. +82-42-481-8578	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (January 2015)

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Information on patent family members

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