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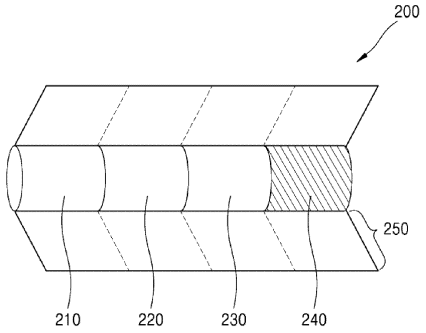
(54) SMOKING ARTICLE INCLUDING LYOCELL TOW

(57) A smoking article is provided. The smoking article includes a first portion including an aerosol-generating substrate impregnated with an aerosol-generating element, a second portion including lyocell tow including a plurality of lyocell fibers and a medium substrate, a third portion including a cooling element, and a fourth portion including a filtering element, wherein the first portion, the second portion, the third portion, and the fourth portion are sequentially arranged along the longitudinal direction of the smoking article.

FIG.5



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Description

[Technical Field]

[0001] The present invention relates to a smoking article which includes lyocell tow in a second portion including a tobacco element (hereinafter, referred to as a "medium substrate"), so that the smoking article has an improved settling rate of the tobacco element, prevents or minimizes deformation of the medium portion due to the heat applied for heating the smoking article, and thus is capable of providing a more improved smoking experience to a user.

[Background Art]

[0002] Modern alternative smoking devices and related technologies adopt structures that use various medium portions to effectively transfer tobacco components. Generally, the devices utilize the principle in which a stick is heated to a high temperature of about 150 to 300 °C, the applied heat is transferred to a medium portion to increase the temperature of the medium portion, and thus tobacco components such as nicotine and the like smoothly move.

[0003] In particular, components such as glycerin play an important role in providing a satisfactory smoking experience to smokers by producing vapor (aerosol). However, when the heating temperature of the device is set to a temperature equal to or less than the boiling point of glycerin, vapor is not smoothly produced, and thus a smoking experience becomes poor.

[0004] In order to solve the above problem, conventionally, a technique in which a humectant is contained in a medium portion or reconstituted tobacco leaves are used as a medium portion was developed. Particularly, a method in which reconstituted tobacco leaves including a humectant are cut lengthwise to form a medium portion or reconstituted tobacco leaves prepared in the form of a sheet are inserted was used. This method provided a certain level of performance improvement, but the following problems were still present.

[0005] First, during the process of cutting reconstituted tobacco leaves and inserting the cut reconstituted tobacco leaves into a medium portion, some of the cut reconstituted tobacco leaves moved to the internal structure of a device, such as a paper tube or front tube, thereby causing contamination. This became a factor that contaminated the internal structure of a device or interfered with the adhesion of a tobacco stick.

[0006] Second, when only the single material of reconstituted tobacco leaves was used, it was difficult to include additional components such as activated carbon and nicotine liquid during the manufacturing process. Although the additional components are useful in increasing the transfer efficiency of tobacco components, their application in the reconstituted tobacco leaf-based medium portion has been limited.

[0007] In order to solve the above problems, a method utilizing folding paper was proposed. A method in which components such as activated carbon, nicotine salts, and granules are included in folding paper to form a medium portion provided flexibility so that various components can be included. However, this method also had some limitations. The folding structure did not structurally combine components tightly, so the loss rate of components during the manufacturing process was high, and the odor from the paper and external odor degraded a user's smoking experience.

[0008] In addition, conventionally, there have been attempts to stably fix materials such as activated carbon, nicotine salts, and granules by applying a double composite filter (e.g., an activated carbon acetate filter (i.e., an activated carbon cellulose acetate filter) and an acetate filter (i.e., a cellulose acetate filter)) or a single filter to a medium portion. Although the activated carbon acetate filter was suitable for effectively fixing components structurally, it was difficult to use it in a high-temperature environment because cellulose acetate tow constituting the filter melts at high temperature.

[Disclosure]

[Technical Problem]

[0009] One object of the present invention is to provide a smoking article which includes lyocell tow in a second portion including a tobacco element (a medium substrate), so that the smoking article has an improved settling rate of the tobacco element, prevents or minimizes deformation of the second portion due to the heat applied for heating the smoking article, and thus is capable of providing a more improved smoking experience to a user.

[0010] The objects of the present invention are not limited to those mentioned above, and other unmentioned objects can be clearly understood by those skilled in the art to which the present invention pertains from the description below.

[Technical Solution]

[0011] According to one aspect of the present application for achieving the one object, there is provided a smoking article, which includes a first portion including an aerosol-generating substrate impregnated with an aerosol-generating

element, a second portion including lyocell tow including a plurality of lyocell fibers and a medium substrate, a third portion including a cooling element, and a fourth portion including a filtering element, wherein the first portion, the second portion, the third portion, and the fourth portion are sequentially arranged along the longitudinal direction of the smoking article.

[0012] In some embodiments, the medium substrate may be filled in a dispersed form in the lyocell tow. This means that the lyocell tow may include the medium substrate in a dispersed form.

[0013] In some embodiments, the medium substrate may be located in a space between the plurality of lyocell fibers.

[0014] In some embodiments, the medium substrate may include a tobacco material, and the tobacco material may be in the form of at least one of tobacco particles, tobacco sheets, tobacco beads, tobacco granules, and tobacco powder.

[0015] The medium substrate may include a plurality of tobacco granules including the tobacco material.

[0016] The aerosol-generating element may include at least one of glycerin, propylene glycol, ethylene glycol, dipropylene glycol, diethylene glycol, triethylene glycol, tetraethylene glycol, and oleyl alcohol.

[0017] According to another aspect of the present application, there is provided a system including the above-described smoking article and an aerosol-generating device using the same.

[Advantageous Effects]

[0018] Since the smoking article according to an embodiment includes lyocell tow in a second portion including a tobacco element (a medium substrate), a settling rate of the tobacco element is improved, deformation of the second portion due to the heat applied for heating the smoking article is prevented or minimized, and thus a more improved smoking experience can be provided to a user.

[0019] Advantageous effects according to the technical spirit of the present disclosure are not limited to those mentioned above, and other unmentioned advantageous effects can be clearly understood by those of ordinary skill in the art from the description below.

[Description of Drawings]

[0020]

FIGS. 1 to 4 are diagrams showing examples in which an aerosol-generating article is inserted into an aerosol-generating device.

FIG. 5 is a diagram showing a smoking article according to an embodiment.

FIG. 6 shows images obtained by photographing filters of Example 1 and Comparative Example 1 before and after heating in order to compare the heat resistance of the filters of Example 1 and Comparative Example 1.

FIG. 7 shows images obtained by photographing a second portion of Example 2 and a second portion of Comparative Example 2, wherein FIG. 7A shows images obtained by photographing second portions of Comparative Example 2 and Example 2 before an experiment (before smoking), and FIG. 7B shows images obtained by photographing second portions of Comparative Example 2 and Example 2 after an experiment (after smoking).

[Modes of the Invention]

[0021] Hereinafter, exemplary embodiments of the present disclosure will be described in detail with reference to the accompanying drawings. Advantages and features of the present disclosure and methods of achieving the same should become clear with embodiments described in detail below with reference to the accompanying drawings. However, the technical spirit of the present disclosure is not limited to the following embodiments and may be implemented in various different forms. The following embodiments are only provided to make the technical spirit of the present disclosure complete and completely inform those of ordinary skill in the art to which the present disclosure pertains of the scope of the present disclosure. The technical spirit of the present disclosure is defined only by the scope of the claims.

[0022] In assigning reference numerals to components of each drawing, it should be noted that the same reference numerals are assigned to the same components wherever possible even when the components are illustrated in different drawings. Also, in describing the present disclosure, when it is determined that the detailed description of a known related configuration or function may obscure the gist of the present disclosure, the detailed description thereof will be omitted.

[0023] Unless otherwise defined, all terms including technical or scientific terms used herein have the same meaning as commonly understood by those of ordinary skill in the art to which the present disclosure pertains. Terms defined in commonly used dictionaries should not be interpreted in an idealized or overly formal sense unless expressly so defined herein. Terms used herein are for describing the embodiments and are not intended to limit the present disclosure. In the present specification, a singular expression includes a plural expression unless the context clearly indicates otherwise.

[0024] Also, in describing components of the present disclosure, terms such as first, second, A, B, (a), and (b) may be used. Such terms are only used for distinguishing one component from another component, and the essence, order,

sequence, or the like of the corresponding component is not limited by the terms. In a case in which a certain component is described as being "connected," "coupled," or "linked" to another component, it should be understood that, although the component may be directly connected or linked to the other component, still another component may also be "connected," "coupled," or "linked" between the two components.

[0025] The terms "comprise" and/or "comprising" used herein do not preclude the presence or addition of one or more components, steps, operations, and/or devices other than those mentioned.

[0026] First, some terms used herein will be clarified.

[0027] In the present specification, a "smoking article" may refer to any product that can be smoked or any product that can provide a smoking experience, regardless of whether the product is based on tobacco, tobacco derivatives, expanded tobacco, reconstituted tobacco, or tobacco substitutes. For example, the smoking article may include products that can be smoked, such as cigarettes, cigars, and cigarillos.

[0028] In the present specification, a "smoking material" may refer to any type of material that can be used in a smoking article.

[0029] In the present specification, the term "user" may be used interchangeably with the term "consumer."

[0030] In the present specification, "upstream" or "upstream direction" may refer to a direction moving away from an oral region of a smoker, and "downstream" or "downstream direction" may refer to a direction approaching the oral region of the smoker.

[0031] In the present specification, a "longitudinal direction" may refer to a direction corresponding to a longitudinal axis of a smoking article. The "longitudinal axis" of a smoking article may refer to an imaginary line extending along the main longitudinal direction of a smoking article. This axis generally runs from one end (e.g., the mouthpiece or filter end) to the opposite end (e.g., the combustion or heat source end) of a smoking article.

[0032] In the present specification, a "lyocell filter" refers to a filter including or composed of lyocell tow.

[0033] In the present specification, "lyocell tow" includes or is composed of a plurality of lyocell fibers. In some embodiments, the lyocell tow may refer to a bundle formed by cross-connecting adjacent lyocell fibers.

[0034] In the present specification, "lyocell fibers" may refer to fibers made of lyocell cellulose. Particularly, lyocell fibers may be fibers made of cellulose derived or primarily derived from wood pulp, especially, semi-synthetic fibers.

[0035] In the present specification, a "shaped cross-section" is defined as a cross-section having a shape including a plurality of protrusions instead of having a circular shape. For example, a cross-section having a shape in which a plurality of protrusions branch and/or extend from the center and/or the center of the cross-section may be referred to as a shaped cross-section. Here, the "protrusion" may refer to a distinct, extended segment or arm extending outward from the central core or joining point of the cross-section of a lyocell fiber.

[0036] In some embodiments, the lyocell fibers may have a Y-shaped cross-section with three protrusions branching and/or extending from the center and/or the center of the cross-section, a cross-shaped cross-section with four protrusions, and/or a star-shaped cross-section with five protrusions, or an O-shaped cross-section, but the present invention is not limited thereto.

[0037] In some embodiments, the lyocell fibers may include three or more protrusions branching and/or extending from the center and/or the center of the cross-section.

[0038] In some embodiments, the lyocell fibers included in the lyocell tow may have a Y-shaped cross-section for application in cigarette filters.

[0039] In the present specification, a "hollow" may refer to a channel extending along the longitudinal direction.

[0040] In the present specification, "being composed of" an element may refer to including or consisting of the element.

[0041] In the present specification, a "tubular rod" as a filter rod may refer to a filter rod with a hollow formed therein, and a filter rod without a hollow formed therein may be referred to as a "cylindrical rod."

[0042] In the present specification, a "recess-type rod" as a filter rod may refer to a filter rod with one or more pores.

[0043] In the present specification, a wrapper (e.g., wrapping paper) may cover at least a portion of the surface around the longitudinal axis of each part (portion) and/or structure of a smoking article.

[0044] In the present specification, basis weight refers to mass per unit area of wrapping paper and/or a wrapper. The basis weight of wrapping paper and/or a wrapper may be determined by measuring the mass and area of wrapping paper and/or a wrapper and dividing the mass of the wrapping paper and/or wrapper by the area. The unit of basis weight may be gram per square meter (gsm), that is, g/m^2.

[0045] In the present specification, the "single fineness" of lyocell tow or cellulose acetate tow refers to the fineness of a monofilament strand separated from a multifilament of lyocell fibers or cellulose acetate fibers constituting lyocell tow or cellulose acetate tow.

[0046] In the present specification, the "total fineness" of lyocell tow or cellulose acetate tow refers to the fineness of a multifilament of lyocell fibers or cellulose acetate fibers constituting lyocell tow or cellulose acetate tow.

[0047] A filter of a smoking article according to one aspect of the present invention may collect at least a portion of smoke generated during smoking of the smoking article. In some embodiments, the filter of the smoking article may collect total particulate matter (hereinafter, abbreviated as "TPM") including at least a portion of at least one of nicotine (hereinafter,

abbreviated as "Nic"), tar, propylene glycol (hereinafter, abbreviated as "PG"), and glycerin (hereinafter, abbreviated as "Gly") included in smoke generated during smoking of the smoking article.

[0048] In the present specification, "draw resistance" refers to the static pressure difference between two ends of a sample when an airflow passes through the sample. In the present specification, "PDC" refers to a draw resistance value measured in a state in which a medium portion is open, the perforations of the filtering portion are blocked, and the inflow of external air is blocked, and "PDO" refers to a draw resistance value measured in a state in which a medium portion is open, the perforations of the filtering portion are not blocked, and the inflow of external air is allowed. For example, draw resistance may be measured according to the ISO standard 6565:2015 method. According to the ISO standard 6565:2015 method, draw resistance may refer to the static pressure difference between two ends of a sample when an airflow passes through the sample under normal conditions (22±2 °C, 60±5% relative humidity) with a volume flow rate of 17.5 mm/s at the discharge end.

[0049] In the present specification, organic acid is a general term for organic compounds that are acidic.

[0050] In some embodiments, room temperature may refer to 20 °C to 25 °C.

[0051] In the present specification, when no separate physical quantity is indicated, component percent (%) and component proportion refer to the weigh percent (wt%) and weight proportion of a component, respectively.

[0052] In the present specification, "puff" refers to an action of inhaling or drawing air through a smoking article for generating and inhaling smoke or vapor. The "Puff count" may refer to the total number of inhaling or drawing actions during use of a smoking article. Alternatively or additionally, the puff count may be the maximum number of inhaling or drawing actions that a smoking article can provide before it is completely consumed or ceases to function.

[0053] In the present specification, Health Canada (HC) conditions may include a puff volume of 55 ml, a puff frequency of 30 seconds, and a puff duration of 2 seconds. Particularly, the HC conditions may be based on a state in which the perforations of a filter are blocked. In measurement under the HC conditions, the puff count may be 9.

[0054] In the present specification, the "ventilation rate (hereinafter, abbreviated as "Vent")" of a smoking article may be defined as a percentage value of a ratio of the total volume flow rate (e.g., ml/s) of air entering the smoking article without burning or heating through the front region, that is, the longitudinal upstream end, of the smoking article to the total volume flow rate (e.g., ml/s) of air at the outlet, that is, the longitudinal downstream end, of the smoking article. For example, the ventilation rate may be measured according to ISO 9512:2019. For example, the total volume flow rate of air entering the smoking article without burning or heating through the front region may be the total volume flow rate of air entering in a direction perpendicular to the longitudinal direction of the smoking article. For example, the total volume flow rate of air entering the smoking article without burning or heating through the front region may be the total volume flow rate of air entering the smoking article through wrapping paper.

[0055] The contents of components included in total particulate matter (TPM) in the collected smoke may be analyzed through gas chromatography-mass spectrometry (GC/MS). For example, the contents of components included in TPM in the collected smoke may be measured using a GC/MS device after a Cambridge filter (a Cambridge filter pad (CFP)) collecting smoke is immersed in isopropyl alcohol (IPA) for a predetermined time (e.g., 20 minutes to 16 hours) in the case of tar or nicotine and in methanol for a predetermined time (e.g., 2 hours to 16 hours) in the case of PG and Gly, then treated using a shaking device, and passed through a polytetrafluoroethylene (PTFE) syringe filter to remove impurities. The immersion time may be 20 minutes or more in the case of tar or nicotine and 2 hours or more in the case of PG and Gly.

[0056] The GC/MS may be, for example, a measuring device commercially available from Agilent Technologies, Inc.

[0057] Hereinafter, various embodiments of the present disclosure will be described in detail with reference to the accompanying drawings.

[0058] Throughout the present specification, a "tobacco element" refers to an element including a tobacco material.

[0059] Throughout the present specification, a "tobacco material" refers to any form of material including components derived from tobacco leaves.

[0060] Throughout the present specification, a "cooling element" refers to an element that cools any material. For example, the cooling element may cool an aerosol generated from an aerosol-generating element or a tobacco element.

[0061] Throughout the present specification, a "filtering element" refers to an element including a filtering material. For example, the filtering element may include a plurality of fiber strands.

[0062] FIGS. 1 to 4 are diagrams showing examples in which an aerosol-generating article is inserted into an aerosol-generating device.

[0063] First, an aerosol-generating device will be described with reference to FIGS. 1 to 3.

[0064] Referring to FIG. 1, an aerosol-generating device 100 includes a battery 110, a control unit 120, and a heater 130. Referring to FIGS. 2 and 3, the aerosol-generating device 100 may further include a vaporizer 140. Particularly, a smoking article 200 may be inserted into the internal space of the aerosol-generating device 100.

[0065] In the aerosol-generating device 100 shown in FIGS. 1 to 3, components related to the present embodiment are illustrated. Therefore, it will be understood by those skilled in the art related to the present embodiment that other general-purpose components may be further included in the aerosol-generating device 100 in addition to the components shown in FIGS. 1 to 3.

[0066] In addition, although it is illustrated in FIGS. 2 and 3 that the aerosol-generating device 100 includes the heater 130, if necessary, the heater 130 may be omitted. In some embodiments, the aerosol-generating device 100 may not include a heater. In some embodiments, the battery 110, the control unit 120, and the vaporizer 140 are sequentially disposed, that is, disposed in a row along the longitudinal direction of the smoking article 200.

[0067] In FIG. 1, it is illustrated that the battery 110, the control unit 120, and the heater 130 are disposed in a row. In some embodiments, the battery 110, the control unit 120, and the heater 130 are sequentially disposed along the longitudinal direction of the smoking article 200. Also, it is illustrated in FIG. 2 that the battery 110, the control unit 120, the vaporizer 140, and the heater 130 are disposed in a row along the longitudinal direction of the smoking article 200. Also, it is illustrated in FIG. 3 that the vaporizer 140 and the heater 130 are disposed in parallel. However, the internal structure of the aerosol-generating device 100 is not limited to those shown in FIGS. 1 to 3. In other words, the disposition of the battery 110, the control unit 120, the heater 130, and the vaporizer 140 may vary depending on the design of the aerosol-generating device 100.

[0068] When the smoking article 200 is inserted into the aerosol-generating device 100, the aerosol-generating device 100 may operate the heater 130 and/or the vaporizer 140 to generate an aerosol from the smoking article 200 and/or the vaporizer 140. The aerosol generated by the heater 130 and/or the vaporizer 140 is delivered to a user by passing through the smoking article 200.

[0069] If necessary, even when the smoking article 200 is not inserted into the aerosol-generating device 100, the aerosol-generating device 100 may operate the heater 130.

[0070] The battery 110 supplies power used to operate the aerosol-generating device 100. For example, the battery 110 may supply power so that the heater 130 and/or the vaporizer 140 can operate, and may supply power required to operate the control unit 120. Particularly, the battery 110 may supply power required to operate a display, a sensor, a motor, and the like installed in the aerosol-generating device 100.

[0071] The control unit 120 controls the overall operation of the aerosol-generating device 100. In particular, the control unit 120 controls the operation of not only the battery 110, the heater 130, and the vaporizer 140 but also other components included in the aerosol-generating device 100. Particularly, the control unit 120 may also determine whether the operation of the aerosol-generating device 100 is possible by checking the state of each component of the aerosol-generating device 100.

[0072] The control unit 120 includes at least one processor. The processor may be implemented as an array of multiple logic gates and implemented as a combination of a general-purpose microprocessor and a memory storing a program that can be executed on the microprocessor. Also, it will be understood by those skilled in the art to which the present embodiment pertains that the processor may be implemented as other types of hardware.

[0073] The heater 130 may be heated by the power supplied from the battery 110. For example, when the smoking article 200 is inserted into the aerosol-generating device 100, the heater 130 may be located outside the smoking article 200. Therefore, the heated heater 130 may increase the temperature of an aerosol-generating material in the smoking article 200.

[0074] The heater 130 may be an electrically resistant heater. For example, the heater 130 includes an electrically conductive track, and as current flows through the electrically conductive track, the heater 130 may be heated. However, the heater 130 is not limited to the above-described example, and any heater may be used without limitation as long as it can be heated to a desired temperature. Here, the desired temperature may be preset in the aerosol-generating device 100 or may be set by a user.

[0075] In another example, the heater 130 may be an induction heating-type heater. Particularly, the heater 130 may include an electrically conductive coil for heating an aerosol-generating article by an induction heating method, and the aerosol-generating article may include a susceptor that can be heated by the induction heating-type heater.

[0076] For example, the heater 130 may include a tubular heating element, a plate-shaped heating element, a needle-shaped heating element, and/or a rod-shaped heating element, and the inside and/or outside of the smoking article 200 may be heated according to the shape of a heating element.

[0077] Particularly, a plurality of heaters 130 may be disposed in the aerosol-generating device 100. In this case, a plurality of heaters 130 may be disposed so as to be inserted into the inside of the smoking article 200 or may be disposed outside the smoking article 200. Particularly, some of the plurality of heaters 130 may be disposed so as to be inserted into the inside of the smoking article 200, and the remainder may be disposed outside the smoking article 200. In some embodiments, the heater 130 may heat the inside and outside of the smoking article 200. Also, the shape of the heater 130 is not limited to the shapes shown in FIGS. 1 to 3, and the heater may be manufactured in various shapes. In some embodiments, the heater 130 may include an electrically resistant heater and an induction heating-type heater.

[0078] The vaporizer 140 may heat a liquid composition to generate an aerosol, and the generated aerosol may be delivered to a user by passing through the smoking article 200. In other words, the aerosol generated by the vaporizer 140 may move along the airflow path of the aerosol-generating device 100, and the airflow path may be configured so that the aerosol generated by the vaporizer 140 can be delivered to a user by passing through the smoking article 200.

[0079] For example, the vaporizer 140 may include a liquid reservoir, a liquid delivery means, and a heating element, but

the present invention is not limited thereto. For example, the liquid reservoir, the liquid delivery means, and the heating element may be included as independent modules in the aerosol-generating device 100.

[0080] The liquid reservoir may store a liquid composition. For example, the liquid composition may be a liquid including a tobacco-containing material including a volatile tobacco flavor component. Alternatively or additionally, the liquid composition may be a liquid including a non-tobacco material. The liquid reservoir may be manufactured to be detachable from/attachable to the vaporizer 140 or manufactured integrally with the vaporizer 140.

[0081] For example, the liquid composition may include water, a solvent, ethanol, a plant extract, a flavoring, a flavoring agent, and/or a vitamin mixture. The flavoring may include menthol, peppermint, spearmint oil, and/or various types of fruit flavoring components, but the present invention is not limited thereto. The flavoring agent may include a component that can provide various types of flavor to a user. The vitamin mixture may be a mixture of at least one of vitamin A, vitamin B, vitamin C, and vitamin E, but the present invention is not limited thereto. Particularly, the liquid composition may include an aerosol-forming agent such as glycerin and/or propylene glycol.

[0082] The liquid delivery means may deliver the liquid composition in the liquid reservoir to the heating element. For example, the liquid delivery means may be a wick such as cotton fiber, ceramic fiber, glass fiber, and/or a porous ceramic, but the present invention is not limited thereto.

[0083] The heating element is an element for heating the liquid composition delivered by the liquid delivery means. For example, the heating element may include a metal heating wire, a metal heating plate, and/or a ceramic heater, but the present invention is not limited thereto. Particularly, the heating element may be composed of a conductive filament such as a nichrome wire, and may be disposed in a structure that is wound around the liquid delivery means. The heating element may be heated by current supply and may heat the liquid composition by transferring heat to the liquid composition in contact with the heating element. As a result, an aerosol may be generated.

[0084] For example, the vaporizer 140 may be referred to as a cartomizer or an atomizer, but the present invention is not limited thereto.

[0085] Meanwhile, the aerosol-generating device 100 may further include general-purpose components in addition to the battery 110, the control unit 120, the heater 130, and the vaporizer 140. For example, the aerosol-generating device 100 may include a display capable of outputting visual information and/or a motor for outputting tactile information. Particularly, the aerosol-generating device 100 may include at least one sensor (a puff sensor, a temperature sensor, and/or an aerosol-generating article insertion sensor). Particularly, the aerosol-generating device 100 may be manufactured so that external air can be introduced or internal gas can be discharged even when the smoking article 200 is inserted.

[0086] Although not shown in FIGS. 1 to 3, the aerosol-generating device 100 may constitute a system together with a separate cradle. For example, the cradle may be used to charge the battery 110 of the aerosol-generating device 100. Alternatively or additionally, the heater 130 may be heated while the cradle and the aerosol-generating device 100 are combined.

[0087] The smoking article 200 may be similar to a general combustion-type cigarette. For example, the smoking article 200 may be divided into a first portion including an aerosol-generating material and a second portion including a filter and the like. Optionally, an aerosol-generating material may also be included in the second portion of the smoking article 200. For example, a granular and/or capsule-type aerosol-generating material may be included in the first portion and optionally in the second portion.

[0088] The entire first portion may be inserted into the inside of the aerosol-generating device 100, and the second portion may be exposed to the outside. Alternatively, only a portion of the first portion may be inserted into the inside of the aerosol-generating device 100, or the entire first portion and a portion of the second portion may be inserted. A user may inhale an aerosol while holding the second portion in his/her mouth. In this case, an aerosol is generated by passing external air through the first portion, and the generated aerosol is delivered to the user's mouth by passing through the second portion.

[0089] In some embodiments, external air may be introduced through at least one air path formed in the aerosol-generating device 100. For example, the opening and closing and/or size of the air path formed in the aerosol-generating device 100 may be adjusted by a user. Accordingly, a vapor amount, a feeling of smoking, and the like may be adjusted by a user. In another example, external air may be introduced into the inside of the smoking article 200 through at least one hole formed in the surface of the smoking article 200.

[0090] Next, referring to FIG. 4, FIG. 4 shows an example of an aerosol-generating device using an induction heating method.

[0091] Referring to FIG. 4, an aerosol-generating device 100 includes a battery 110, a control unit 120, a coil C, and a susceptor S. Particularly, at least a portion of a smoking article 200 may be accommodated in a void V of the aerosol-generating device 100. The smoking article 200, the battery 110, and the control unit 120 of FIG. 4 may correspond to the smoking article 200, the battery 110, and the control unit 120 of FIGS. 1 to 3. Particularly, the coil C and the susceptor S may be included in the heater 130. Therefore, duplicate descriptions are omitted.

[0092] In the aerosol-generating device 100 shown in FIG. 4, components related to the present embodiment are

shown. Therefore, it can be understood by those skilled in the art related to the present embodiment that other general-purpose components may be further included in the aerosol-generating device 100 in addition to the components shown in FIG. 4.

[0093] The coil C may be located around the void V. It is illustrated in FIG. 4 that the coil C is disposed to surround the void V, but the present invention is not limited thereto.

[0094] When the smoking article 200 is accommodated in the void V of the aerosol-generating device 100, the aerosol-generating device 100 may supply power to the coil C so that the coil C generates a magnetic field. As the magnetic field generated by the coil C passes through the susceptor S, the susceptor S may be heated.

[0095] This induction heating phenomenon is a well-known phenomenon explained by Faraday's law of induction. Particularly, when the magnetic induction in the susceptor S changes, an electric field is generated in the susceptor S, and thus eddy currents flow within the susceptor S. Eddy currents generate heat proportional to the current density and conductor resistance within the susceptor S.

[0096] As the susceptor S is heated by eddy currents and an aerosol-generating material in the smoking article 200 is heated by the heated susceptor S, an aerosol may be generated. The aerosol generated from the aerosol-generating material is delivered to a user by passing through the smoking article 200.

[0097] The battery 110 may supply power so that the coil C can generate a magnetic field. The control unit 120 may be electrically connected to the coil C.

[0098] The coil C may be an electrically conductive coil that generates a magnetic field by power supplied from the battery 110. The coil C may be disposed to surround at least a portion of the void V. The magnetic field generated by the coil C may be applied to the susceptor S disposed at the inner end of the void V.

[0099] The susceptor S may be heated as the magnetic field generated from the coil C passes therethrough, and may include a metal and/or carbon. For example, the susceptor S may include at least one of ferrite, ferromagnetic alloys, stainless steel, and aluminum.

[0100] The susceptor S may include at least one of graphite, molybdenum, silicon carbide, niobium, nickel alloys, metal films, ceramics such as zirconia, transition metals such as nickel (Ni) and cobalt (Co), and metalloids such as boron (B) or phosphorus (P). However, the susceptor S is not limited to the above-described examples, and any susceptor may be used without limitation as long as it can be heated to a desired temperature by applying a magnetic field. Here, the desired temperature may be preset in the aerosol-generating device 100 or may be set by a user.

[0101] When the smoking article 200 is accommodated in the void V of the aerosol-generating device 100, the susceptor S may be disposed to surround at least a portion of the smoking article 200. Therefore, the heated susceptor S may increase the temperature of an aerosol-generating material in the smoking article 200.

[0102] It is illustrated in FIG. 4 that the susceptor S is disposed to surround at least a portion of the aerosol-generating article, but the present invention is not limited thereto. For example, the susceptor S may include a tubular heating element, a plate-shaped heating element, a needle-shaped heating element, and/or a rod-shaped heating element, and the inside and/or outside of the smoking article 200 may be heated according to the shape of a heating element.

[0103] Particularly, a plurality of susceptors S may be disposed in the aerosol-generating device 100. In this case, a plurality of susceptors S may be disposed outside the smoking article 200 and may be disposed so as to be inserted into the inside. Particularly, some of the plurality of susceptors S may be disposed so as to be inserted into the inside of the smoking article 200, and the remainder may be disposed outside the smoking article 200. Also, the shape of the susceptor S is not limited to the shape shown in FIG. 4, and the susceptor may be manufactured in various shapes.

[0104] FIG. 5 is a diagram showing a smoking article according to an embodiment.

[0105] Referring to FIG. 5, a smoking article 200 may include a first portion 210, a second portion 220, a third portion 230, and a fourth portion 240. Particularly, the first portion 210, the second portion 220, the third portion 230, and the fourth portion 240 may include an aerosol-generating element, a medium substrate (a tobacco element), a cooling element, and a filtering element, respectively. In some embodiments, the first portion 210 may include an aerosol-generating material, the second portion 220 may include a tobacco material and optionally one or more humectants, the third portion 230 may cool the airflow passing through the first portion 210 and the second portion 220, and the fourth portion 240 may include a filtering material. Meanwhile, to emphasize the function of the third portion 230 and the fourth portion 240 as filters, the third portion 230 may be referred to as a cooling structure 230, and the fourth portion 240 may be referred to as a mouthpiece 240.

[0106] Referring to FIG. 5, the first portion 210, the second portion 220, the third portion 230, and the fourth portion 240 may be sequentially arranged based on a longitudinal direction of the smoking article 200. Here, the longitudinal direction of the smoking article 200 may be a direction in which the length of the smoking article 200 extends. For example, the longitudinal direction of the smoking article 200 may be a direction from the first portion 210 toward the fourth portion 240. Accordingly, an aerosol generated in at least one of the first portion 210 and the second portion 220 forms an airflow by sequentially passing through the first portion 210, the second portion 220, the third portion 230, and the fourth portion 240, and thus a smoker may inhale the aerosol from the fourth portion 240.

[0107] The first portion 210 may include an aerosol-generating element. Particularly, one or more other additional

materials such as a flavoring agent, a wetting agent, and/or an organic acid may be included, and a flavoring liquid including menthol and/or a humectant may be included. In this case, the aerosol-generating element may include, for example, at least one of glycerin, propylene glycol, ethylene glycol, dipropylene glycol, diethylene glycol, triethylene glycol, tetraethylene glycol, and oleyl alcohol. However, the present disclosure is not limited to the above-described examples, and various types of aerosol-generating elements widely known in the art may be included in the present disclosure.

[0108] The first portion 210 may include an aerosol-generating substrate impregnated with an aerosol-generating element. Examples of the aerosol-generating substrate may include a crimped sheet, and the aerosol-generating element may be included in the first portion 210 while being impregnated into the crimped sheet. Particularly, one or more other additional materials such as a flavoring agent, a wetting agent, and/or an organic acid, and/or a flavoring liquid may be included in the first portion 210 in a state of being absorbed into the crimped sheet.

[0109] The crimped sheet may be a sheet made of a polymer material. For example, the polymer material may include at least one of paper, cellulose acetate (hereinafter, abbreviated as "CA"), and polylactic acid. For example, the crimped sheet may be a paper sheet that does not generate an off-flavor caused by heat even when heated to a high temperature. However, the present invention is not limited thereto.

[0110] The first portion 210 may extend to a point about 7 mm to about 20 mm from the end of the smoking article 200, and the second portion 220 may extend to a point about 7 mm to about 20 mm from the end of the first portion 210. However, the present invention is not necessarily limited to these numerical ranges, and the length by which each of the first portion 210 and the second portion 220 extends may be appropriately adjusted within the range that can be easily changed by those skilled in the art. For example, the first portion 210 may have a length of about 10 mm, and the second portion may have a length of about 12 mm, but the present invention is not limited thereto.

[0111] In an embodiment, the second portion 220 may include lyocell tow including a plurality of lyocell fibers and a plurality of medium substrates (or tobacco elements) filled in the lyocell tow. Particularly, the second portion 220 may include a lyocell filter composed of lyocell tow, and a medium substrate filled so as to be uniformly and/or randomly distributed in the entire or partial area of the lyocell filter. In the present specification, the medium substrate may include a tobacco element.

[0112] In the present invention, the lyocell fibers included in the second portion 220 may be eco-friendly fibers made of cellulose extracted from wood pulp. The lyocell tow may refer to a bundle formed by cross-connecting adjacent lyocell fibers.

[0113] In some embodiments, the lyocell fibers may have a shaped cross-section. A shaped cross-section is defined as a cross-section having a shape including a plurality of protrusions instead of having a circular shape. For example, a cross-section having a shape in which a plurality of protrusions extend from the center may be referred to as a shaped cross-section.

[0114] In some embodiments, the lyocell fibers may have a Y-shaped cross-section with three protrusions branching from the center, a cross-shaped cross-section with four protrusions, and/or a star-shaped cross-section with five protrusions, or an O-shaped cross-section, but the present invention is not limited thereto.

[0115] In the manufacture of the second portion 220 in which the medium substrate is filled in the lyocell tow, the medium substrate may be filled so as to be inserted into the inside of the lyocell tow. The plurality of lyocell fibers constituting the lyocell tow may have a space between the lyocell fibers, and the medium substrate may settle in the space between the lyocell fibers. In other words, the medium substrate may be filled in a dispersed form in the lyocell tow. Accordingly, the medium substrate settles inside the lyocell tow while being located in the space between the plurality of lyocell fibers included in the lyocell tow, and as a result, the medium substrate may be filled in the lyocell filters so that it is not exposed to the outside while being surrounded by the lyocell filters.

[0116] In some embodiments, the medium substrate may be a specific type of tobacco material. For example, the medium substrate may be in the form of shredded tobacco, tobacco particles, tobacco sheets, tobacco beads, tobacco granules, tobacco powder, and/or tobacco extracts. Particularly, the tobacco material may include, for example, one or more of tobacco leaves, tobacco leaf veins, expanded tobacco, shredded tobacco, reconstituted shredded tobacco leaves, and reconstituted tobacco.

[0117] The second portion 220 may be manufactured by spreading tow constituting a filter, introducing a medium substrate inside and/or on the tow, for example, by a method such as free fall or the like, and rolling the tow with the medium substrate introduced to form a predetermined shape such as a cylindrical shape or the like. Accordingly, the medium substrate may be filled so as to be randomly and/or uniformly distributed in the entire or partial area of the lyocell tow. In other words, the medium substrate may be filled in a dispersed form in the lyocell tow while being located in the space between the lyocell fibers constituting the lyocell tow.

[0118] Since the lyocell tow including the plurality of lyocell fibers with a space formed therebetween is used as the tow for loading the medium substrate in the second portion 220 according to the present invention, the settling rate of the medium substrate is improved even without a separate additive for adhesion compared to cellulose acetate plasticized by a plasticizer, and thus the efficiency of the manufacturing process and the retention of the medium substrate can be

improved.

[0119] In particular, since the lyocell tow including the plurality of lyocell fibers with a space formed therebetween is used as the tow for loading the medium substrate in the second portion 220, in the case of paper, a phenomenon in which the medium substrate bounces off the surface of paper due to the grain of paper when the medium substrate is introduced is prevented, and thus the efficiency of a manufacturing process can be improved.

[0120] The second portion 220 may further include, for example, at least one of glycerin, propylene glycol, ethylene glycol, dipropylene glycol, diethylene glycol, triethylene glycol, tetraethylene glycol, and oleyl alcohol, which are aerosol-generating materials, but the present invention is not limited thereto. Particularly, the second portion 220 may further include other additional materials such as a flavoring agent, a wetting agent, and/or an organic acid. In particular, a flavoring liquid including menthol and/or a humectant may be added to the second portion 220. Particularly, a flavoring liquid including menthol and/or a humectant may be added to the second portion 220 by spraying.

[0121] The third portion 230 may cool an airflow passing through the first portion 210 and the second portion 220. The third portion 230 may be manufactured using a polymer material, a biodegradable polymer material, and/or a paper tube filter and may have a cooling function. For example, the third portion 230 may be a tubular filter and/or a paper tube composed of polylactic acid (PLA) fibers, cellulose acetate fibers, and/or lyocell fibers and having a hollow. The hollow may extend along the longitudinal direction of the third portion 230.

[0122] A length and/or diameter of the third portion 230 may vary depending on the shape of the smoking article 200. For example, a length of the third portion 230 may be appropriately adjusted in a range of 7 mm to 20 mm. Preferably, the third portion 230 may have a length of about 12 mm, but the present invention is not limited thereto.

[0123] In some embodiments, the third portion 230 may have an outer diameter of about 5 mm to 10 mm, preferably 6 mm to 8 mm, more preferably 6.2 mm to 7.8 mm, even more preferably 6.4 mm to 7.6 mm, even more preferably 6.6 mm to 7.4 mm, even more preferably 6.8 mm to 7.2 mm, and even more preferably 7 mm. The inner diameter of the third portion 230 (i.e., the diameter of the hollow) may be smaller than the outer diameter and may be appropriately adjusted in a range of about 2 mm to 5.5 mm, preferably 2.1 mm to 5 mm, more preferably 2.2 mm to 4.5 mm, and even more preferably 2.5 mm to 4 mm, but the present invention is not limited thereto. Preferably, the third portion 230 may have an inner diameter of 3.7 mm to 3.9 mm, more preferably 3.8 mm, but the present invention is not limited thereto.

[0124] The fourth portion 240 may include a filtering element. For example, the fourth portion 240 may be a cellulose acetate filter and/or a lyocell filter. Meanwhile, there is no limitation on the shape of the fourth portion 240. For example, the fourth portion 240 may be a cylindrical rod or a tubular rod with a hollow formed therein. Also, the fourth portion 240 may be a recess-type rod. When the fourth portion 240 is composed of a plurality of segments, at least one of the plurality of segments may be manufactured to have a different shape from the other segments. A length of the fourth portion 240 may be appropriately adjusted in the range of 7 mm to 20 mm. Preferably, the fourth portion 240 may have a length of about 14 mm, but the present invention is not limited thereto.

[0125] The fourth portion 240 may be manufactured so as to generate flavor. In some embodiments, a flavoring liquid may be sprayed onto the fourth portion 240, and alternatively or additionally, a separate fiber coated with a flavoring liquid may be inserted into the inside of the fourth portion 240.

[0126] The smoking article 200 may include a wrapper 250 that surrounds at least a portion of the first portion 210 to the fourth portion 240. Particularly, the smoking article 200 may include a wrapper 250 that surrounds all of the first portion 210 to the fourth portion 240. The wrapper 250 may be located in the outermost surface of the smoking article 200, and the wrapper 250 may be a single wrapper or a combination of a plurality of wrappers.

[0127] In some embodiments, the first portion 210 of the smoking article 200 may include a crimped sheet containing an aerosol-generating material, the second portion 220 may include lyocell tow including a plurality of lyocell fibers and a medium substrate filled in the lyocell tow, the third portion 230 may include a paper tube, and the fourth portion 240 may include cellulose acetate (CA) fibers, but the present disclosure is not necessarily limited thereto.

[0128] Hereinafter, the configurations of the present invention and the advantageous effects according thereto will be described in more detail using examples and comparative examples. However, the examples are merely for describing the present invention in more detail, and the scope of the present invention is not limited to these examples.

Example 1 and Comparative Example 1

[0129] A lyocell filter was manufactured under the conditions shown in Example 1 of Table 1 using lyocell tow having a single fineness of 3.33 dtex (a monodenier of 3.0) and a total fineness of 3,889 tex (a total denier of 35,000), and a plasticizer was added to cellulose acetate tow having a single fineness of 3.00 dtex (a monodenier of 2.7) and a total fineness of 3,889 tex (a total denier of 35,000) to manufacture a cellulose acetate filter under the conditions shown in Comparative Example 1 of Table 1.

[Table 1]

Classification	Weight (mg)	Circumference (mm)	Draw resistance (mmH_20)
Example 1	570	21.96	350
Comparative Example 1	540	21.94	387

Experimental Example 1. Evaluation of heat resistance according to filter material

[0130] In order to evaluate heat resistance according to a filter material, the filters of Example 1 and Comparative Example 1 were heated to 250 °C or higher under internal conditions including an internal temperature of about 22±2 °C and an internal relative humidity of about 60±5% by an external heating method. An image obtained by photographing the filters before heating is shown in FIG. 6A, and an image obtained by photographing the filters after heating is shown in FIG. 6B.

[0131] The left side in FIG. 6A is the filter of Comparative Example 1 before heating, the right side in FIG. 6A is the filter of Example 1 before heating, the left side in FIG. 6B is the filter of Comparative Example 1 after heating, and the right side in FIG. 6B is the filter of Example 1 after heating.

[0132] Referring to FIG. 6, it can be confirmed that the shapes of the cellulose acetate filter before and after heating were significantly different, and the cellulose acetate filter melted due to heat after heating, and thus any substantial shape did not remain. On the other hand, it can be confirmed that the lyocell filter was only partially blackened after heating, and the shapes before and after heating were substantially similar. From the above results, it can be seen that cellulose acetate is a fiber having an amorphous structure and completely melts due to having low heat resistance, whereas lyocell has high heat resistance.

Example 2 and Comparative Example 2

[0133] Tobacco granules were filled in lyocell tow having a single fineness of 3.33 dtex (a monodenier of 3.0) and a total fineness of 3,889 tex (a total denier of 35,000), and then the resulting tow was covered with wrapping paper to manufacture a tobacco granule-lyocell filter having a length of 84 mm under the conditions shown in Example 2 of Table 2, and a plasticizer was added to cellulose acetate tow having a single fineness of 3.00 dtex (a monodenier of 2.7) and a total fineness of 3,889 tex (a total denier of 35,000), and then the resulting tow was covered with wrapping paper to manufacture a cellulose acetate filter having a length of 84 mm under the conditions shown in Comparative Example 2 of Table 2. As the wrapper used in the manufacture of the filters, wrapping paper having a basis weight of 75 gsm was used.

[Table 2]

Classification	Weight (mg)	Circumference (mm)	Roundness (%)	Draw resistance (mmH_20)
Example 2	900.7	23.86	93.35	518.4
Comparative Example 2	901.5	21.96	91.70	576.4

Experimental Example 2. Evaluation of physical properties according to filter material filled with medium substrate

[0134] Subsequently, the lyocell filter of Example 2 and the cellulose acetate filter of Comparative Example 2 were each cut to a length of 12 mm, thereby manufacturing a smoking article 200 shown in FIG. 5. Particularly, like the smoking article 200 shown in FIG. 5, a heating-type cigarette (a smoking article) including a first portion composed of paper, having a length of 10 mm, and including an aerosol-generating element, the second portion of Example 2 or Comparative Example 2 having a length of 12 mm, a third portion having a length of 12 mm and an inner diameter of 3.8 mm and composed of cellulose acetate, and a fourth portion having a length of 14 mm and composed of cellulose acetate was manufactured, and the physical properties of the smoking article were measured and shown in Table 3 below.

[0135] Unless otherwise specified herein, PDC may refer to a draw resistance value measured in a state in which the second portion is open, the perforations formed in any one of the first, third, and fourth portions are blocked, and the inflow of external air is blocked, and PDO may refer to a draw resistance value measured in a state in which the second portion is open, the perforations formed in any one of the first, third, and fourth portions are not blocked, and the inflow of external air is allowed.

[Table 3]

Classification	Weight (mg)	Circumference (mm)	Vent (%)	PDO (mmH_20)	PDC (mmH_20)
Smoking article of Example 2	590.5	22.734	81.60	55.1	163.1
Smoking article of Comparative Example 2	585.7	22.699	77.61	53.5	140.0

[0136] (In Table 3, Vent refers to a ventilation rate (VR).)

[0137] Referring to Table 3, it can be confirmed that the smoking articles each including lyocell tow and cellulose acetate tow as a filter material constituting the second portion exhibited similar physical properties, and the filter weights in Table 2 and the smoking article weights in Table 3 each exhibited similar values, and thus the degree of heat absorption according to weight was similar in terms of heat resistance.

Experimental Example 3. Evaluation of heat resistance according to filter material filled with medium substrate

[0138] In order to analyze the material deformation caused by the heat generated during heating of the second portion of the smoking article according to a filter material filled with tobacco granules, the second portions of the smoking articles according to Example 2 and Comparative Example 2 were heated to a heating temperature of 190 °C to 280 °C (e.g., 250 °C) in a smoking room with an internal temperature of about 22±2 °C and an internal relative humidity of about 60±5% (specifically, a temperature of about 21.9 °C and a relative humidity of 64.3%) by an external heating method, and images of the second portions disassembled before and after heating are shown in FIG. 7.

[0139] In FIG. 7, FIG. 7A shows images obtained by photographing the second portions according to Comparative Example 2 and Example 2 disassembled before heating, wherein the left side in FIG. 7A is the second portion according to Comparative Example 2 before heating, and the right side in FIG. 7A is the second portion according to Example 2 before heating. Also, in FIG. 7, FIG. 7B shows images obtained by photographing the second portions according to Comparative Example 2 and Example 2 disassembled after heating, wherein the left side in FIG. 7B is the second portion according to Comparative Example 2 after heating, and the right side in FIG. 7B is the second portion according to Example 2 after heating.

[0140] Referring to FIG. 7A, it can be confirmed that the appearances of the cellulose acetate-containing second portion according to Comparative Example 2 and the lyocell-containing second portion according to Example 2 before heating were substantially the same.

[0141] Referring to FIG. 7B, it can be confirmed that the second portion according to Comparative Example 2 after heating (i.e., after heating to a temperature of 190 °C to 280 °C) greatly shrank as the cellulose acetate tow melted and stuck. Therefore, it can be seen that a cellulose acetate material shrinks and melts due to the heat applied to the second portion during heating.

[0142] In addition, referring to FIG. 7B, it can be confirmed that Example 2 after heating (i.e., after heating to a temperature of 190 °C to 280 °C) was blackened due to heat, but the shape was largely similar to the shape before heating. Also, it can be confirmed that the tobacco granules filled in the tow were concentrated inside in the case of Comparative Example 2 (left) composed of cellulose acetate tow, whereas the tobacco granules were dispersed in the entire area of lyocell tow in the case of Example 2 (right).

[0143] Meanwhile, as a second portion is configured so that a medium substrate is filled in lyocell tow rather than cellulose acetate tow, even when the second portion is heated by a heater, the shape of the second portion can be maintained due to the excellent heat resistance of the lyocell tow, and thus smoke can uniformly move during smoking, and a problem that a smoking article is broken or appearance quality is degraded can be prevented.

Experimental Example 4. Analysis of components in smoke according to filter material filled with medium substrate

[0144] In order to compare the components in smoke according to a filter material filled with a medium substrate and constituting a second portion, the second portions of the smoking articles according to Example 2 and Comparative Example 2 was heated to a heating temperature of 190 °C to 280 °C by an external heating method, and total particulate matter (TPM), nicotine component, and moisture contents were measured and shown in Table 4 below.

[0145] Particularly, an experiment was conducted using the smoking articles according to Example 2 and Comparative Example 2 in a smoking room with an internal temperature of about 22±2 °C and an internal relative humidity of about 60 ±5% (specifically, a temperature of about 21.9 °C and a relative humidity of 64.3%), smoking was performed under Health Canada (HC) conditions (puff volume: 55 ml, puff frequency: 30 s, puff duration: 2 s, and puff count: 9 puffs), and the

generated smoke was collected on a Cambridge filter (i.e., a Cambridge filter pad (CFP)) and analyzed. The total particulate matter (TPM) is a value obtained by measuring the change in weight of the Cambridge filter before and after smoking using a smoking device. For the remaining components, the collected smoke was analyzed by gas chromatography (GC).

[Table 4]

Classification	TPM (mg)	Tar (mg)	Nic (mg)	PG (mg)	Gly (mg)	Moisture (mg)
Example 2	28.73	15.06	0.61	0.05	5.93	13.06
Comparative Example 2	Not analyzed due to melting of cellulose acetate tow					

[0146] Referring to Table 4, when a filter including a medium substrate and constituting a second portion is cellulose acetate tow, the cellulose acetate tow melted, and thus it was not possible to measure the components in smoke. In other words, it can be seen that when conventional cellulose acetate tow is applied, problems regarding a heating temperature and the quality of the smoking article such as deformation of the second portion, and the like, occur.

[0147] Although the embodiments of the present disclosure have been described above with reference to the accompanying drawings, those of ordinary skill in the art to which the present disclosure pertains should understand that the present disclosure may be embodied in other specific forms without changing the technical spirit or essential features thereof. Therefore, the embodiments described above should be understood as being illustrative, instead of limiting, in all aspects. The scope of protection of the present disclosure should be interpreted by the claims below, and all technical ideas within the scope equivalent to the claims should be interpreted as falling within the scope of rights of the technical spirit defined by the present disclosure.

[EXPLANATION OF DRAWING SYMBOLS]

[0148]

200: smoking article
210: first portion
220: second portion
230: third portion
240: fourth portion

Claims

1. A smoking article comprising:

a first portion including an aerosol-generating substrate impregnated with an aerosol-generating element;
a second portion including lyocell tow including a plurality of lyocell fibers and a medium substrate;
a third portion including a cooling element; and
a fourth portion including a filtering element,
wherein the first portion, the second portion, the third portion, and the fourth portion are sequentially arranged along the longitudinal direction of the smoking article.

2. The smoking article of claim 1, wherein the medium substrate is filled in a dispersed form in the lyocell tow.

3. The smoking article of claim 1, wherein the medium substrate is located in a space between the plurality of lyocell fibers.

4. The smoking article of claim 1, wherein the medium substrate includes a tobacco material, and the tobacco material is in the form of at least one of tobacco particles, tobacco sheets, tobacco beads, tobacco granules, and tobacco powder.

5. The smoking article of claim 1, wherein the medium substrate includes a plurality of tobacco granules including the tobacco material.

6. The smoking article of claim 1, wherein the aerosol-generating element includes at least one of glycerin, propylene glycol, ethylene glycol, dipropylene glycol, diethylene glycol, triethylene glycol, tetraethylene glycol, and oleyl alcohol.

7. The smoking article of claim 1, wherein the third portion includes at least one of a tubular filter composed of cellulose acetate fibers or lyocell fibers and a paper tube having a hollow.

8. The smoking article of claim 1, wherein the fourth portion includes at least one of a cellulose acetate filter and a lyocell filter.

FIG.1

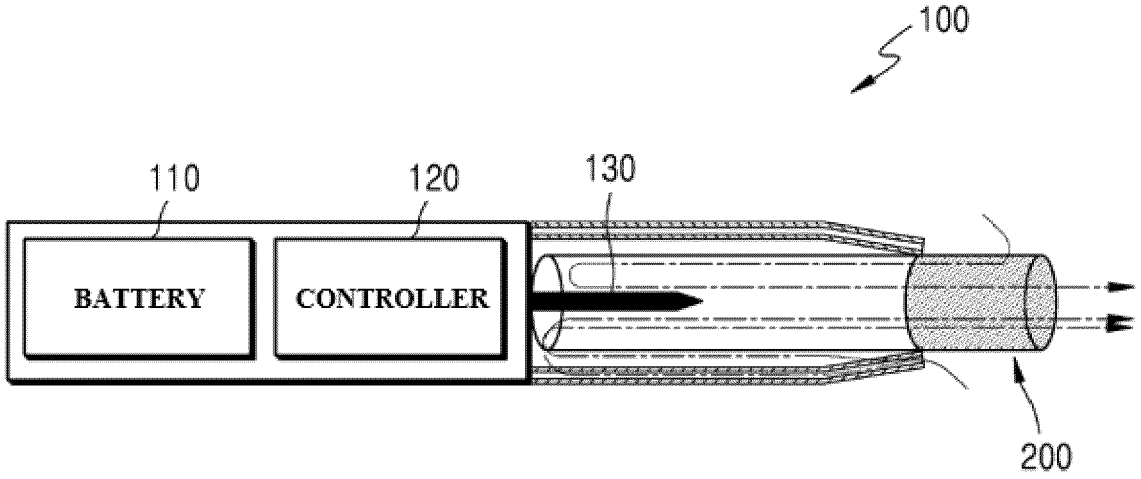


FIG.2

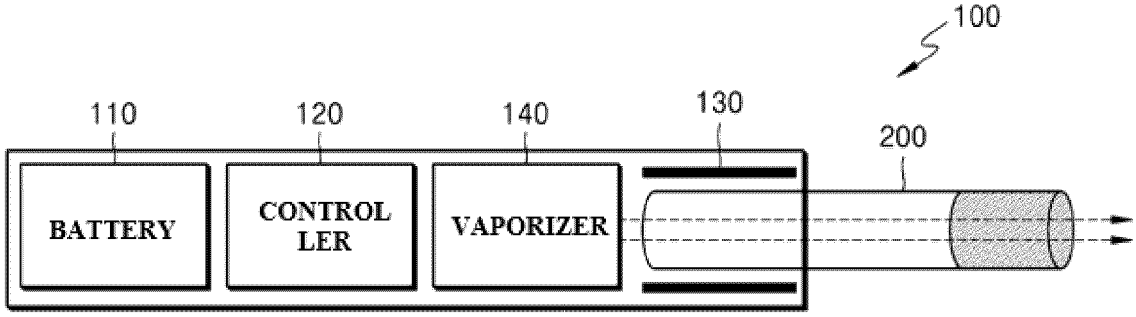


FIG.3

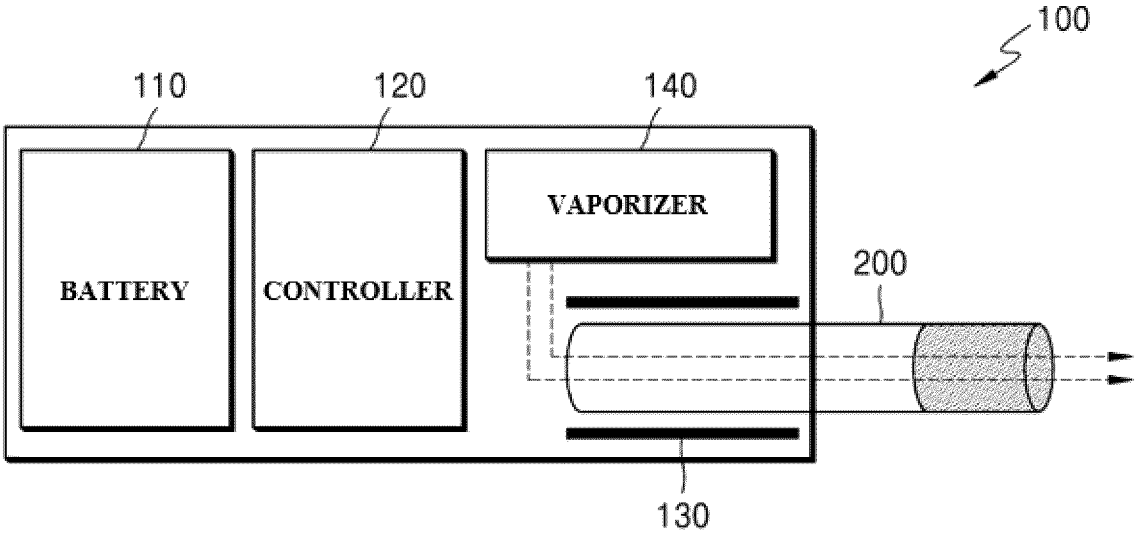


FIG.4

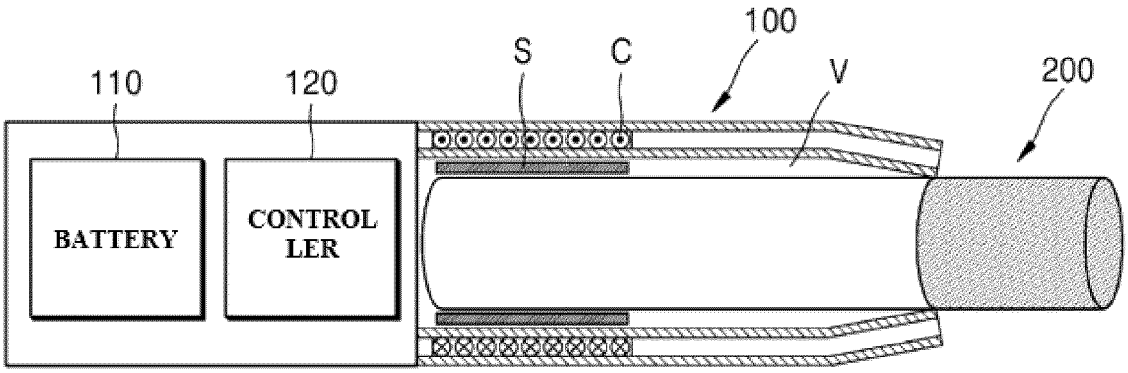


FIG.5

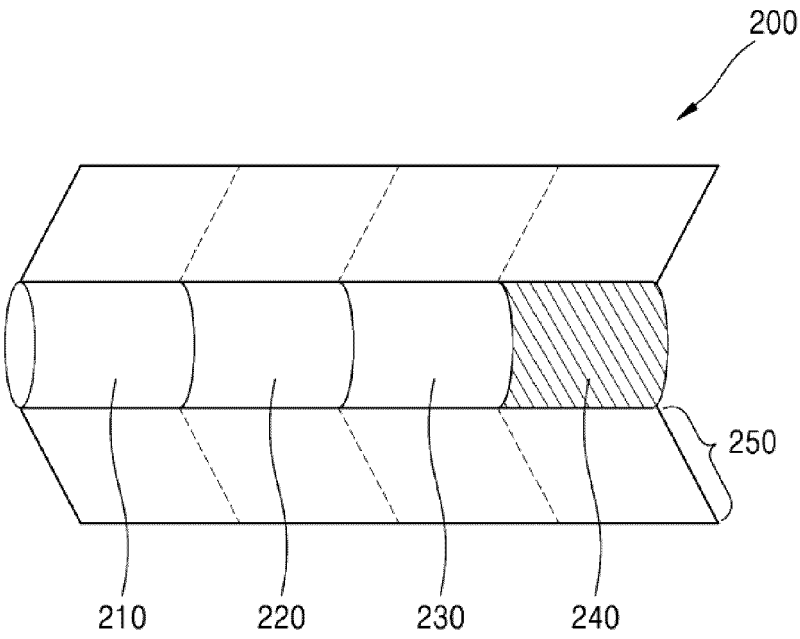
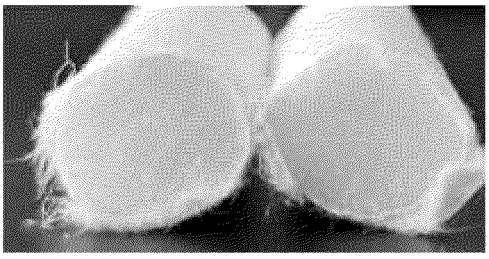


FIG.6

(A)



(B)

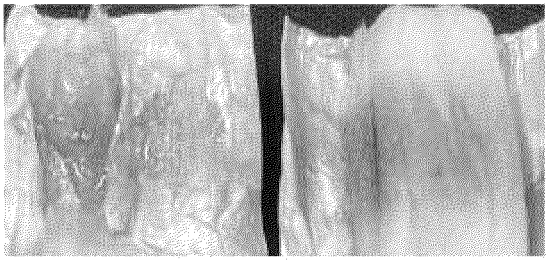
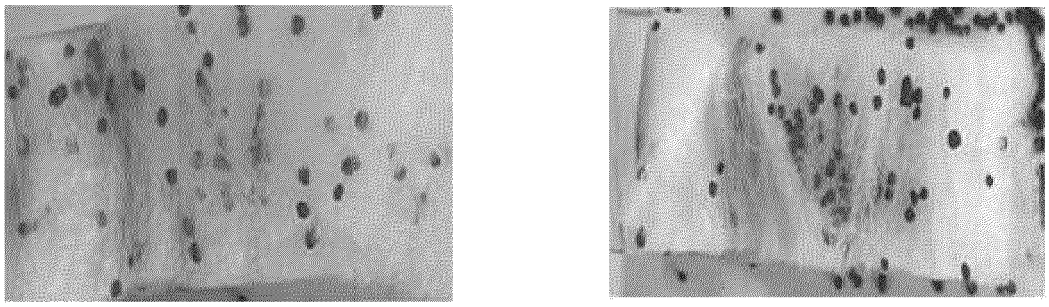
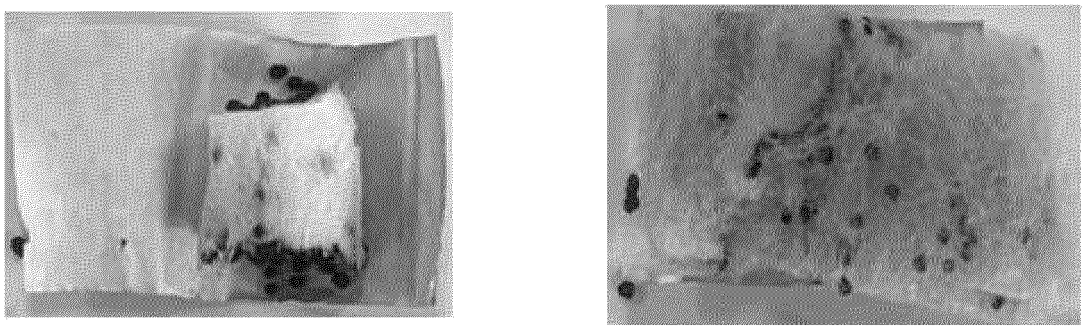


FIG.7

(A)



(B)



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EUROPEAN SEARCH REPORT

Application Number
EP 25 15 1942

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	WO 2023/112267 A1 (JAPAN TOBACCO INC [JP]) 22 June 2023 (2023-06-22) * paragraph [0001] - paragraph [0107]; claims; figures *	1-8	INV. A24B15/12 A24B15/14 A24B15/16 A24B15/30 A24D1/20 A24D3/04 A24D3/06 A24D3/10
Y	WO 2020/256341 A1 (KT & G CORP [KR]) 24 December 2020 (2020-12-24) * paragraph [0001] - paragraph [0072]; figures *	1-8	

TECHNICAL FIELDS SEARCHED (IPC)

A24B
A24F
A24D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	19 May 2025	Alevisopoulos, S

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2023112267 A1	22-06-2023	NONE	
WO 2020256341 A1	24-12-2020	NONE	