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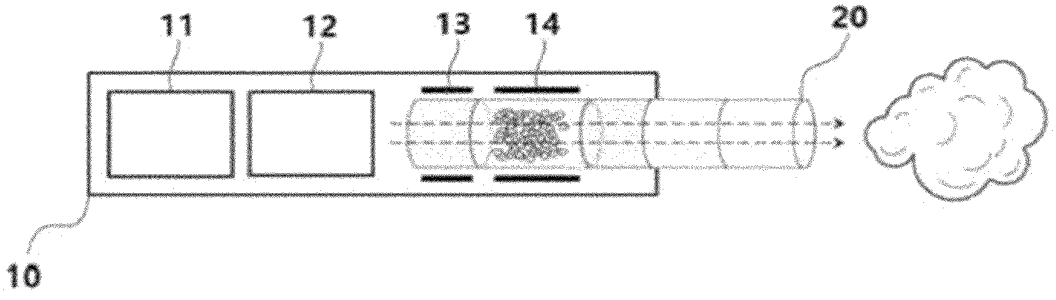
(54) **AEROSOL GENERATING DEVICE COMPRISING A PLURALITY OF HEATERS AND AEROSOL GENERATING ARTICLE USED THEREWITH**

(57) Provided is an aerosol generating apparatus including a housing that forms an accommodation space in which an aerosol generating article is accommodated, a heater unit that heats an aerosol generating article accommodated in the accommodating space, and a control unit that adjusts a temperature of the heater unit. The heater unit includes a first heater unit and a second heater unit disposed to heat different positions of the aerosol generating article, respectively, and the control unit controls to separately adjust the temperature of the first heater unit and the second heater unit. The aerosol generating apparatus according to an embodiment of the present invention may generate various components or amounts of aerosol according to consumer's preference even for one aerosol generating article.

【Figure 1】



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Description

[Technical Field]

[0001] The present invention relates to an aerosol generating apparatus having a plurality of heaters and an aerosol generating article used together therewith. More particularly, the present invention relates to an aerosol generating apparatus including a plurality of heaters that are arranged to heat different positions of an aerosol generating article and can individually control temperature, and an aerosol generating article used together therewith.

[0002] This application claims the benefit of priority based on Korean Patent Application No. 10-2021-0145553 filed on October 28, 2021, the entire contents of which are incorporated as a part of the present specification by reference.

[Background Art]

[0003] In recent years, demand for alternative products that overcome the disadvantages of traditional cigarettes is increasing. For example, there is an increasing demand for apparatuses (e.g., cigarette type electronic cigarette) that generate aerosols by electrically heating a cigarette stick. Accordingly, research Aon an electrically heated aerosol generating apparatus and a cigarette stick (or aerosol generating article) applied thereto is being actively conducted.

[0004] Specifically, the electrically heated aerosol generating apparatus and the cigarette stick applied thereto are being developed in various forms to meet consumer's tastes by using granules including the corresponding components instead of sheet leaf and leaf tobacco cut grass as tobacco materials of the cigarette stick, introducing a separate atomizing unit in the form of a cartridge into the electrically heated aerosol generating apparatus, and the like. Nevertheless, there is a limit to satisfying various consumers, such as being able to satisfy only consumers with specific preferences through the single cigarette stick and the electrically heated aerosol generating apparatus.

[0005] Accordingly, the present inventor completed the present invention after studying an electrically heated aerosol generating apparatus capable of generating aerosol of various components or amounts according to the consumer's preference even for one cigarette stick.

[Prior Art Document]

[Patent Document]

[0006] (Patent Document 1) Korean Patent Laid-Open Publication No. 10-2014-7021388

[Technical Problem]

[0007] The present invention provides an aerosol generating apparatus capable of generating aerosols of various components or amounts according to consumer's preference for one aerosol generating article.

[Technical Solution]

[0008] According to a first aspect of the present invention, an aerosol generating apparatus includes: a housing that forms an accommodation space in which an aerosol generating article is accommodated; a heater unit that heats an aerosol generating article accommodated in the accommodating space; and a control unit that adjusts a temperature of the heater unit, in which the heater unit may include a first heater unit and a second heater unit disposed to heat different positions of the aerosol generating article, respectively, and the control unit may control to separately adjust the temperature of the first heater unit and the second heater unit.

[0009] In an embodiment of the present invention, the aerosol generating article may include a first filter segment, a second filter segment, and a cavity segment, the cavity segment may be formed by the first filter segment and the second filter segment, the cavity segment may be filled with a tobacco granule, and the first filter segment may be located upstream of the cavity segment and include an aerosol forming agent.

[0010] In an embodiment of the present invention, the first filter segment and the cavity segment of the aerosol generating article may be accommodated in the accommodation space of the aerosol generating apparatus, the first heater unit may be located to heat the first filter segment, and the second heater unit may be located to heat the cavity segment.

[0011] In an embodiment of the present invention, the first heater unit may be driven in a smoky mode or a smokeless mode, in the smoky mode, the first heater unit may be heated to maintain a temperature range of 180°C to 240°C, and in the smokeless mode, the first heater unit may not be heated.

[0012] In an embodiment of the present invention, the second heater unit may be driven in one of a strong mode, a medium mode, and a weak mode, in the strong mode, the second heater unit may be heated to maintain a temperature range of 200°C to 260°C, in the medium mode, the second heater unit may be heated to maintain a temperature range of 160°C to 200°C, and in the weak mode, the second heater unit may be heated to maintain a temperature range of 150°C to 180°C.

[0013] In an embodiment of the present invention, when the temperature of the first heater unit is less than 100°C, the second heater unit may be driven in the strong mode.

[0014] In an embodiment of the present invention, the first heater unit and the second heater unit may be driven in a form of being reheated when they are out of a set

range after being initially preheated.

[0015] In an embodiment of the present invention, the aerosol generating apparatus may further include: a switch that is disposed on an outer wall surface of the housing, in which the switch may set the smoky mode or the smokeless mode for the first heater unit and set the strong mode, the medium mode, or the weak mode for the second heater unit.

[Advantageous Effects]

[0016] An aerosol generating apparatus according to an embodiment of the present invention separately adjusts a first heater unit that may heat a first filter segment capable of generating an aerosol and a second heater unit that may heat a cavity segment capable of supplying tobacco components to the aerosol, so for one aerosol generating article, a large amount of nicotine may be transferred to give a high satisfaction to consumers who prefer a strong tobacco taste and a small amount of nicotine may be transferred to give a high satisfaction to consumers who prefer a soft tobacco taste.

[Description of Drawings]

[0017]

FIG. 1 is a diagram schematically illustrating an aerosol generating apparatus to which an aerosol generating article according to an embodiment of the present invention is applied, and illustrates that the aerosol generating apparatus operates in a smoky mode.

FIG. 2 is a diagram schematically illustrating the aerosol generating apparatus to which the aerosol generating article according to the embodiment of the present invention is applied, and illustrates that the aerosol generating apparatus operates in a smokeless mode.

FIG. 3 is a diagram schematically illustrating the aerosol generating article according to the embodiment of the present invention.

[Best Mode]

[0018] Hereinafter, specific embodiments will be described in detail with reference to the accompanying drawings. It is to be noted that in giving reference numerals to components of the respective drawings, the same components will be denoted by the same reference numerals even though they are illustrated in different drawings. Further, in describing specific embodiments, well-known constructions or functions will not be described in detail in the case in which it is determined that they may unnecessarily obscure the understanding of specific embodiments of the present disclosure.

[0019] In addition, the terms first, second, A, B, (a), (b), and the like may be used in describing components of specific embodiments. These terms are only for distinguishing the components from other components, and the nature, sequence, order, or the like of the components are not limited by the terms. When it is described that any component is "connected" or "coupled" to another component, it is to be understood that any component is directly connected or coupled to another component or is connected or coupled to another component with the other component interposed therebetween.

[0020] Components included in any one specific embodiment and components including common functions will be described using the same names in other specific embodiments. Unless described to the contrary, the description described in any one specific embodiment may be applied to other embodiments, and specific descriptions will be omitted to the extent of overlapping.

[0021] In this specification, the term "aerosol generating apparatus" refers to an apparatus capable of generating an aerosol by applying an aerosol generating article to generate an aerosol that may be directly inhaled into a user's lung through a user's mouth. An exemplary structure of the aerosol generating apparatus will be described with reference to FIGS. 1 and 2.

[0022] In this specification, the term "aerosol generating article" refers to an article capable of generating an aerosol, such as a cigarette or cigar. The aerosol generating article may include at least one of an aerosol forming agent and an aerosol forming substrate. The aerosol generating article may include several segments each having functionality. In general, the aerosol generating article includes a combustion-type an aerosol generating article that is used by direct fire, a heating-type an aerosol generating article that is used along with an aerosol generating apparatus, and the like. In the present invention, the heating-type an aerosol generating article used along with the aerosol generating apparatus may be preferably applied.

[0023] As used herein, the term "aerosol forming agent" means a substance capable of facilitating the formation of visible smoke and/or aerosol. Examples of the aerosol generating material include, but are not limited to, glycerin (GLY), propylene glycol (PG), ethylene glycol, dipropylene glycol, diethylene glycol, triethylene glycol, tetraethylene glycol, and oleyl alcohol. In the art, the aerosol forming agent may be used interchangeably with the terms such as a moisturizer and a humectant.

[0024] As used herein, the term "aerosol forming substrate" means a material capable of forming an aerosol. The aerosol may include volatile compounds. The aerosol forming substrate may be solid or liquid.

[0025] For example, the solid aerosol forming substrate may include a solid material based on tobacco raw materials such as planar leaf tobacco, cut filler, and reconstituted tobacco, and the liquid aerosol forming substrate may include liquid compositions based on nicotine, tobacco extracts, and/or various flavoring agents. However, it is not necessarily limited thereto. The aerosol forming substrate may further include an aerosol forming

agent in order to stably form visible smoke and/or aerosol.

[0026] In this specification, the terms "upstream" and "downstream" are terms used to represent relative positions of segments constituting the aerosol generating article based on a direction in which a user inhales air using the aerosol generating article. The aerosol generating article includes an upstream end portion (i.e., a portion through which air enters) and a downstream end portion (i.e., a portion through which air exits) opposite thereto. When using the aerosol generating article, a user may bite the downstream end portion of the aerosol generating article. The downstream end portion is located downstream of the upstream end portion, while the term "end portion" may also be described as "distal end."

[0027] In this specification, the term "puff" refers to user's inhalation, and the inhalation refers to a situation in which air is drawn through a user's mouth or nose into a user's oral cavity, nasal cavity, or lung.

[0028] In this specification, the term "longitudinal direction" refers to a direction corresponding to a longitudinal axis of the aerosol generating article.

[0029] The present invention relates to an aerosol generating apparatus, and is intended to provide an aerosol generating apparatus capable of generating various components or amounts of aerosol according to consumer's preference even when one aerosol generating article is applied. In the present specification, in order to help understand the aerosol generating apparatus, FIGS. 1 and 2 schematically illustrate an exemplary an aerosol generating apparatus. According to an embodiment of the present invention, the aerosol generating apparatus 10 includes a housing, heater units 13 and 14, and a control unit 12. The aerosol generating apparatus 10 may further include a battery 11, and may further include general-purpose components for those skilled in the art in addition to the above components. For example, the aerosol generating apparatus 10 may further include an input module (e.g., a button, a touchable display, etc.) for receiving a command from a user, or the like, and an output module (e.g., an LED, a display, a vibration motor, etc.) for outputting information such as an apparatus state and smoking information Hereinafter, each component of the aerosol generating apparatus 10 will be described in detail.

[0030] The housing forms an appearance of the aerosol generating apparatus 10. When forming the appearance of the aerosol generating apparatus 10, an accommodation space capable of accommodating the aerosol generating article 20 is formed. The housing may be preferably formed of a material capable of protecting internal components.

[0031] The heater units 13 and 14 heat the aerosol generating article 20 accommodated in the accommodation space. Specifically, when the aerosol generating article 20 is accommodated in the accommodation space of the aerosol generating apparatus 10, the heater unit 13 may heat the aerosol generating article 20 by power supplied from a battery 11.

[0032] The heater units 13 and 14 may be configured in various forms and/or manners.

[0033] The heater units 13 and 14 may be configured to include, for example, an electrical resistive heating element. For example, the heater unit 13 may include an electrically insulating substrate (for example, a substrate made of polyimide) and an electrically conductive track, and include a heating element that generates heat as current flows through the electrically conductive track. However, the heater unit 13 is not limited thereto, and the heating element may be applicable without limitation as long as it may be heated to a desired temperature. Here, the desired temperature may be preset (for example, when a temperature profile is pre-stored) in the aerosol generating apparatus 10 or may be set to a desired temperature by a user.

[0034] As another example, the heater units 13 and 14 may be configured to include a heating element operating in an induction heating method. Specifically, the heater 13 may include an inductor (e.g., an induction coil) for heating the aerosol generating article 20 by the induction heating method and a susceptor for induction heating by the inductor. The susceptor may be located inside or outside the aerosol generating article 20.

[0035] As another example, the heater units 13 and 14 may be configured to include a heating element (hereinafter referred to as an "internal heating element") for internally heating the aerosol generating article 20 and a heating element (hereinafter referred to as "external heating element") for externally heating the aerosol generating article 20, or a combination thereof. The internal heating element may have, for example, a tubular shape, a needle shape, a rod shape, or the like, and may be disposed to penetrate through at least a portion of an aerosol generating article 20. The external heating element may be formed in a shape such as a plate shape or a cylinder shape and may be disposed in a shape that encloses at least a portion of the aerosol generating article 20. However, the scope of the present disclosure is not limited thereto, and the shape, number, and arrangement of heating elements may be designed in various manners.

[0036] According to an embodiment of the present invention, the heater units 13 and 14 include a first heater unit 13 and a second heater unit 14 disposed to heat different positions of the aerosol generating article 20, respectively. Since the first heater unit 13 and the second heater unit 14 are located separately, they may come into contact with the aerosol generating article 10 at different positions. The shapes of the first heater unit 13 and the second heater unit 13 is not particularly limited as long as they are located separately. As described above, an internal heating element in the form of a tubular, needle, rod, etc. and an external heating element in the form of a plate, cylinder, etc., may be possible, and in the aerosol generating apparatus 10 according to FIGS. 1 and 2, as one specific example, a cylindrical external heating element is used.

[0037] The battery 11 supplies power used to operate the aerosol generating apparatus 10. For example, the battery 11 may supply power to allow the heater units 13 and 14 to heat the aerosol generating article 20, and may supply power required for the control unit 12 to operate. In addition, the battery 11 may supply power required for electrical components such as a display (not illustrated), a sensor (not illustrated), and a motor (not illustrated) installed in the aerosol generating apparatus 10 to operate.

[0038] The control unit 12 may control the overall operation of the aerosol generating apparatus 10. For example, the control unit 12 may control operations of the heater units 13 and 14 and the battery 11, and may also control operations of other components included in the aerosol generating apparatus 10. The control unit 12 may control the power supplied by the battery 11, and control a heating temperature or the like of the heater units 13 and 14. As described above, when the heater unit 13 includes the first heater unit 13 and the second heater unit 14, the control unit 12 may control to separately adjust the temperature of the first heater unit and the second heater unit. In addition, the control unit 12 may determine whether or not the aerosol generating apparatus 10 is in an operable state by confirming a state of each of the components of the aerosol generating apparatus 10.

[0039] The control unit 12 may be implemented by at least one processor. The control unit may be implemented as an array of a plurality of logic gates or may be implemented as a combination of a general-purpose microcontroller and a memory in which a program executable in the microcontroller is stored. In addition, those skilled in the art may clearly understand that the control unit 12 may be implemented with other types of hardware.

[0040] The aerosol generating article 20 applied to the aerosol generating apparatus 10 may have a structure similar to that of a general combustion type cigarette. The aerosol generating article 20 may be divided into, for example, a first part (e.g., a tobacco rod) including a tobacco material (or an aerosol forming substrate) and a second part (e.g., a filter rod) including a filter and the like. The entire first part may be inserted into the aerosol generating apparatus 10, and the second part may be exposed to the outside. Alternatively, only a portion of the first portion may be inserted into the aerosol generating apparatus 10, or the entire first portion and a portion of the second portion may be inserted. A user may smoke while holding the second part with his or her mouth.

[0041] In the present specification, in order to help understanding of the aerosol generating article applied to the aerosol generating apparatus described above, FIG. 3 schematically illustrates an exemplary aerosol generating article. According to an embodiment of the present invention, the aerosol generating article 20 includes a first filter segment 21, a second filter segment 23, and a cavity segment 22. The cavity segment 22 is formed by the first filter segment 21 and the second filter segment 23. The first filter segment 21, the second filter segment 23, and the cavity segment 22 are components included in the above-described first part (or tobacco rod), and supply tobacco components (or smoking flavor components) such as nicotine as the first portion is heated. Regarding the tobacco component in the first part, the cavity segment 22 may be filled with tobacco granules 22A, which are tobacco substances in the form of granules. The tobacco material included in the aerosol generating article according to the present invention is not limited to tobacco granules, but may be preferably applied in the aerosol generating apparatus according to the present invention. The first filter segment 21 and the second filter segment 23 basically have functionality as a filter, but also have a function of designating a compartment in which the tobacco granules 22A may be retained without leaking when the tobacco granules 22A are filled in the cavity segment 22. The first part including the first filter segment 21, the second filter segment 23, and the cavity segment 22 may be wrapped with a wrapper.

[0042] The first filter segment 21 is a filter segment forming the cavity segment 22 and may be located upstream of the cavity segment 22. The first filter segment 21 has a basically similar configuration to the second filter segment 22 to be described later, but additional functionality is required. The first filter segment 21 may perform a function of preventing the tobacco granules 22A from falling off. In addition, when the aerosol generating article 20 is inserted into the aerosol generating apparatus 10, the first filter segment 21 may allow the cavity segment 22 to be disposed at an appropriate position within the aerosol generating apparatus 10. In addition, the first filter segment 21 may prevent the tobacco rod from escaping to the outside and prevent the aerosol liquefied from the tobacco rod from flowing into the aerosol generating apparatus 10 during smoking.

[0043] According to an embodiment of the present invention, the first filter segment 21 may include a paper material. In other words, the first filter segment 21 may be composed of a paper filter. It may be preferable that the paper material is arranged in the longitudinal direction to secure a smooth air flow path. However, it is not limited thereto. However, the present invention is not limited thereto. A tobacco rod suitable for the heating type aerosol generating apparatus 10 according to the embodiment of the present invention may be manufactured. Specifically, the cellulose acetate fibers may be melted or contracted upon contact with the internal heating element, accelerating the falling-off phenomenon of the tobacco granules 22A. However, paper materials that are resistant to heat may greatly mitigate this phenomenon. According to the embodiment of the present invention, the first filter segment 21 may include a water-resistant or oil-resistant paper material.

[0044] The second filter segment 23 is a filter segment forming the cavity segment 22 and may be located downstream of the cavity segment 22. In addition to the cavity forming function, the first filter segment 21 may further perform functions of filtering, cooling, and the like an aer-

osol.

[0045] According to the embodiment of the present invention, the second filter segment 23 may include a paper material. In other words, the second filter segment 23 may be composed of a paper filter. It may be preferable that the paper material is arranged in the longitudinal direction to secure a smooth air flow path. However, it is not limited thereto. However, the present invention is not limited thereto. A tobacco rod suitable for the heating type aerosol generating apparatus 10 according to the embodiment of the present invention may be manufactured. Specifically, since the cellulose acetate fibers melt or shrink when heated above a certain temperature, it is difficult to apply the cellulose acetate fibers to the portion of the tobacco rod heated by the heater units 13 and 14. On the other hand, since the paper material is hardly denatured by heat, the paper material may be easily applied to the tobacco rod portion, so the tobacco rod suitable for the heating type aerosol generating apparatus 10 may be manufactured. However, in another embodiment, the second filter segment 23 may be composed of the cellulose acetate filter. In this case, an improvement effect of removal ability of the second filter segment 23 may be achieved.

[0046] According to the embodiment of the present invention, the second filter segment 23 may include a water-resistant or oil-resistant paper material. In this case, the problem (e.g., the problem of reducing the amount of atomization in a smoky mode) that the smoke component (e.g., moisture, aerosol forming agent component) contained in the aerosol is absorbed while passing through the second filter segment 23 and the amount of visible atomization is reduced may be greatly alleviated. For example, when the first filter segment 23 includes a general paper material, the above-described smoke component may be absorbed due to the hygroscopicity of the paper material, thereby reducing the amount of visible atomization. However, when a water-resistant or oil-resistant paper material is applied, the absorption of the above-described smoke component hardly occurs, and thus the problem of reducing the amount of atomization may be solved.

[0047] According to an embodiment of the present invention, the suction resistance of the first filter segment 21 or the second filter segment 23 may be 50mmH_2O/60mm to 150mmH_2O/60mm, preferably 50mmH_2O/60mm to 130mmH_2O/60mm, 50mmH_2O/60mm to 120mmH_2O/60mm, 50mmH_2O/60mm to 110mmH_2O/60mm, 50mmH_2O/60mm to 100mmH_2O/60mm, 50mmH_2O/60mm to 90mmH_2O/60mm, 50mmH_2O/60mm to 100mmH_2O/80mm, or 50mmH_2O/60mm to 70mmH_2O/60mm. Within such a numerical range, appropriate suckability may be ensured. In addition, the probability of occurrence of a vortex flow in the cavity segment 22 is increased by the appropriate suckability, and accordingly, an effect of uniformly heating a plurality of tobacco granules 22A may be achieved.

[0048] Meanwhile, physical properties of paper materials included in the first filter segment 21 and the second filter segment 23 may vary.

[0049] According to an embodiment of the present invention, the oil resistance of the paper material may be 4 or more (i.e., 4 or more in the range of 1 to 12), preferably 5, 6, 7, or 8 or more when measured by 3M Kit Test. Within this numerical range, the problem (e.g., reducing the amount of visible smoke in the smoky mode) of reducing the visible amount of smoke (i.e., the amount of visible smoke generated) due to the moisture absorption of the paper material may be solved.

[0050] According to an embodiment of the present invention, the thickness of the paper material may be 30 μm to 50 μm, and preferably 33 μm to 47 μm, 35 μm to 45 μm, or 37 μm to 42 μm.

[0051] According to an embodiment of the present invention, the paper material may have a basis weight of 20 g/m^2 to 40 g/m^2, and preferably 23 g/m^2 to 37 g/m^2, 25 g/m^2 to 35 g/m^2, or 27 g/m^2 to 33 g/m^2.

[0052] According to an embodiment of the present invention, the tensile strength of the paper material may be 2.5 kgf/15 mm or more, and preferably 2.8 kgf/15 mm, 3.2 kgf/15 mm, or 3.5 kgf/15 mm or more.

[0053] According to an embodiment of the present invention, the elongation of the paper material may be 0.8% or more, and preferably 1.0%, 1.2% or 1.5% or more.

[0054] According to an embodiment of the present invention, the stiffness of the paper material may be 100 cm^3 or more, and preferably 120 cm^3, 150 cm^3, or 180 cm^3 or more.

[0055] According to an embodiment of the present invention, the ash content of the paper material may be 1.5% or less, and preferably 1.2%, 1.0%, or 0.8% or less.

[0056] According to an embodiment of the present invention, the paper width of the paper material may be 80 mm to 250 mm, preferably 90 mm to 230 mm, 100 mm to 200 mm, 120 mm to 180 mm, or 120 mm to 150 mm. Within this numerical range, it was confirmed that the first filter segment 21 and the second filter segment 23 had an appropriate suction resistance and an appropriate amount of atomization was ensured.

[0057] The aerosol generating article 20 according to the embodiment of the present invention is an article filled with the tobacco granules 22A, and the aerosol generating apparatus 10 may operate to heat the aerosol generating article 20 at a heating temperature of about 270°C or lower. In this case, no visible smoke may be generated or the generation of visible smoke may be minimized during smoking. This is because the tobacco granules 22A have a significantly lower content of moisture and/or aerosol forming agent than the tobacco substances such as cut filler (e.g., leaf tobacco cut filler, sheet leaf cut filler), thereby reducing the generation of the visible smoke. In addition, this is because the tobacco granules 22A may exhibit a sufficient smoking flavor even at a lower heating temperature (e.g., the heating temperature of the cut filler is usually 270°C or higher) than the tobacco substances

such as cut filler and sheet leaf (i.e., nicotine may be sufficiently transferred), so the heating temperature of the heater unit 13 may be lowered, and the generation of the visible smoke may be further reduced as the heating temperature is lowered.

[0058] As described above, when the aerosol generating article 20 includes the tobacco granules 22A as the tobacco material, the generation of aerosol or visible smoke may be reduced, so a configuration capable of supplementing this is required. With this configuration, the cartridge including the aerosol forming agent may be added to the aerosol generating apparatus 10, and in the present invention, this configuration may also be included in the aerosol generating article 20 instead of the aerosol generating apparatus 10.

[0059] According to the embodiment of the present invention, the first filter segment 21 includes the aerosol forming agent. Considering the flow of the aerosol within the aerosol generating article 20, in order for the generated aerosol to pass through the cavity segment 22 including the tobacco granules, the aerosol needs to be generated upstream of the cavity segment 22, and the first filter segment 21 may be preferable as a location for generating the aerosol. The aerosol forming agent may be applied in the form of being impregnated into the paper material constituting the first filter segment 21. Examples of the aerosol forming agent include, but are not limited to, glycerin (GLY), propylene glycol (PG), ethylene glycol, dipropylene glycol, diethylene glycol, triethylene glycol, tetraethylene glycol, and oleyl alcohol.

[0060] Additives commonly used in the art, such as perfumes, flavoring agents, and vitamin mixtures, may be used together with the aerosol forming agent. The perfume may include menthol, peppermint, spearmint oil, various fruit flavor components, and the like, but is not limited thereto. The flavoring agent is a material that may include a component capable of providing various flavors and savors. The vitamin mixture may be a mixture of at least one of vitamin A, vitamin B, vitamin C, and vitamin E, but is not limited thereto.

[0061] The cavity segment 22 is a segment including a cavity, and may be located between the first filter segment 21 and the second filter segment 23. That is, the cavity segment 22 may be formed by the first filter segment 21 and the second filter segment 23.

[0062] The cavity segment 22 may be manufactured in various manners. The cavity segment 22 may be manufactured in a form including, for example, a tubular structure such as a branch pipe. As another example, the cavity segment 22 may be manufactured by wrapping the cavity formed by the first filter segment 21 and the second filter segment 23 with a wrapper of an appropriate material. However, the cavity segment 22 may be manufactured in any way without any limitation as long as the cavity segment 22 may fill the tobacco granules 22. According to an embodiment of the present invention, the length of the cavity segment 22 may be freely selected within the range of 8 mm to 12 mm.

[0063] As illustrated in FIG. 3, the cavity segment 22 may be filled with the tobacco granules 22A. Generally, since the tobacco granules 22Ahave significantly less moisture and/or aerosol forming agent content than other types of tobacco materials (e.g., leaf tobacco cut filler, sheet leaf, etc.), it is possible to greatly reduce the generation of the visible smoke, so a separate configuration capable of supplementing the generation of the aerosol and visible smoke is required. According to the above description, the first filter segment 21 may also have this configuration. A diameter, a density, a filling rate, a composition ratio of constituent materials, a heating temperature, and the like, of the tobacco granules 22 may be various, and may change according to embodiments.

[0064] According to an embodiment of the present invention, the diameter of the tobacco granules 22A may be 0.3mm to 1.2mm. Within such a numerical range, proper hardness and the manufacturing easiness of the tobacco granules 22 may be ensured, and the probability of occurrence of a vortex flow in the cavity segment 212 may be increased.

[0065] According to an embodiment of the present invention, the size of the tobacco granules 22A may be 15 meshes to 50 meshes, and preferably 15 meshes to 45 meshes, 20 meshes to 45 mesh, 25 meshes to 45 meshes, or 25 meshes to 40 meshes. Within such a numerical range, proper hardness and the manufacturing easiness of the tobacco granules 22A may be ensured, the fall-off phenomenon of the tobacco granules 22A may be minimized, and the probability of occurrence of a vortex flow in the cavity segment 22 may be increased.

[0066] According to an embodiment of the present invention, the density of the tobacco granules 22Amay be 0.5g/cm3 to 1.2g/cm3, and preferably 0.6g/cm^3 to 1.0g/cm^3, 0.7g/cm^3 to 0.9g/cm^3, or 0.6 g/cm3 to 0.8 g/cm^3. Within such a numerical range, proper hardness and the manufacturing easiness of the tobacco granules 22A may be ensured, and the probability of occurrence of a vortex flow in the cavity segment 212 may be increased.

[0067] According to an embodiment of the present invention, the hardness of the tobacco granules 22Amay be 80% or more, preferably 85% or 90% or more, more preferably 91%, 93%, 95%, or 97% or more. Within such a numerical range, the manufacturing easiness of the tobacco granules 22A may be improved, and a crumbling phenomenon of the tobacco granules 22A may be minimized, such that the manufacturing easiness of the aerosol generating article 20 may also be improved. In this specification, the hardness of the tobacco granules 22A may be a numerical value measured in accordance with the national standard test method KSM-1802 ("Activated carbon test method"). For details of a hardness measurement method and the meaning of the measured values, the national standard KSM-1802 is referred to.

[0068] According to the embodiment of the present invention, the filling ratio of the tobacco granules 22 of the cavity segment 22 may be 80 vol% or less, and preferably

70 vol% less, 60 vol%, or 50 vol% or less. Within such a numerical range, the probability of occurrence of a vortex flow in the cavity segment 22 may be increased. In addition, the filling rate of the tobacco granules 22A may be preferably 20 vol%, 30 vol%, or 40 vol% in order to ensure an appropriate smoking flavor.

[0069] According to an embodiment of the present invention, the tobacco granules 22A may include 20 wt% or less of moisture, and preferably 15 wt%, 12 wt%, 10 wt%, 7 wt%, or 5 wt% or less of moisture. Within such a numerical range, the generation of visible smoke may be significantly decreased, and a smokeless function of the aerosol generating apparatus 10 may be easily implemented.

[0070] According to the embodiment of the present invention, the tobacco granules 22A may include about 10 wt% or less of an aerosol forming agent, and preferably about 7 wt%, 5 wt%, 3 wt%, or 1 wt% of an aerosol forming agent. Alternatively, the tobacco granules 22A may not include the aerosol forming agent. Within such a numerical range, the generation of visible smoke may be significantly decreased, and a smokeless function of the aerosol generating apparatus 10 may be easily implemented.

[0071] According to the embodiment of the present invention, a content of nicotine on a wet basis in the tobacco granules may be about 1.0% to 4.0%, and preferably about 1.5% to 3.5%, 1.8% to 3.0%, or 2.0% to 2.5%. Within such a numerical range, an appropriate level of smoking flavor may be ensured.

[0072] According to the embodiment of the present invention, a content of nicotine on a dry basis in the tobacco granules 22Amay be 1.2% to 4.2%, and preferably about 1.7% to 3.7%, 2.0% to 3.2%, or 2.2% to 2.7%. Within such a numerical range, an appropriate level of smoking flavor may be ensured.

[0073] According to an embodiment of the present invention, the aerosol generating article 20 further includes a cooling segment 24 and a mouthpiece segment 25. The cooling segment 24 and the mouthpiece segment 25 are components included in the above-described second part (or filter rod), and are located downstream of the tobacco rod to perform the filtering function for the aerosol. The filter rod may include a filter material such as paper, cellulose acetate fibers, and the like. The filter rod may further include a wrapper wrapping the filter material.

[0074] The filter rod 22 may be manufactured in various shapes. For example, the filter rod may be a cylindrical rod or a tubular rod including a hollow therein. In addition, the filter rod may be a recessed rod. If the filter rod is composed of a plurality of segments, at least one of the plurality of segments may be manufactured in a different shape.

[0075] The filter rod may be manufactured to generate flavor. For example, a flavoring solution may be sprayed into the filter rod 12 or a separate fiber to which a flavoring solution is applied may be inserted into the filter rod. As another example, the filter rod may include at least one capsule (not illustrated) containing a flavoring solution.

[0076] The filter rod 12 may include the cooling segment 24 performing the function of cooling the aerosol and the mouthpiece segment 25 performing the function of filtering the aerosol. Alternatively, in some cases, the filter rod may further include at least one segment performing other functions.

[0077] The cooling segment 24 may be manufactured in various forms. The cooling segment 24 may be manufactured in the form of, for example, a paper pipe, a hollow cellulose acetate filter, a cellulose acetate filter having a plurality of holes, a filter filled with a polymer material or a biodegradable polymer material, and the like. However, the cooling segment 24 may be manufactured in any shape without limitation as long as the cooling segment 24 may perform the function of cooling the aerosol. The polymer material or biodegradable polymer material may be a woven material of polylactic acid (PLA), but is not limited thereto.

[0078] The mouthpiece segment 25 may be, for example, a cellulose acetate filter (i.e., a filter made of a cellulose acetate fiber), but is not limited thereto. The above description of the filter rod may also be applied to the mouthpiece segment 25.

[0079] The aerosol generating article 20 may be wrapped with at least one wrapper (not illustrated). As an example, the aerosol generating article 20 may be wrapped by one wrapper. As another example, the aerosol generating article 20 may be wrapped in an overlapping manner by two or more wrappers. For example, the tobacco rod may be wrapped by a first wrapper and the filter rod may be wrapped by a second wrapper. In addition, the tobacco rod and the filter rod wrapped by individual wrappers may be coupled to each other, and the entire aerosol generating article 20 may be rewrapped by a third wrapper. If each of the tobacco rod 21 or the filter rod 22 is composed of a plurality of segments, each segment may be wrapped by an individual wrapper. In addition, the entire aerosol generating article 20 in which segments wrapped by individual wrappers are coupled to each other may be rewrapped by another wrapper. At least one hole through which external air is introduced or internal gas is discharged may be formed in the wrapper.

[0080] As illustrated in FIGS. 1 and 2, the first filter segment 21 and the cavity segment 22 of the aerosol generating article 20 are accommodated in the accommodation space of the aerosol generating apparatus 10, the heater unit 13 may be located to heat the first filter segment 21, and the second heater unit 14 may be located to heat the cavity segment 23.

[0081] The first heater unit 13 and the second heater unit 14 may be driven in a form of being reheated when they are out of a set range after being initially preheated. Hereinafter, the heating temperature range described above is a range of the temperature profile to which the above-described heating method is applied, and since

the temperature may gradually drop when not heated, the heater unit is not necessarily driven to be maintained at a specific temperature. Nevertheless, a certain level of heat may be applied so that the temperature may be maintained as much as possible within the heating temperature range.

[0082] The first heater unit 13 that heats the first filter segment 21 may be driven in a smoky mode or a smokeless mode. According to an embodiment of the present invention, in the smoky mode, the first heater unit 13 is heated to maintain a temperature range of 180°C to 240°C, and in the smokeless mode, the first heater unit 13 is not heated. Specifically, the temperature range may be adjusted to 180°C or higher, 190°C or higher, or 200°C or higher, or 240°C or lower, 230°C or lower, or 220°C or lower. The temperature range in the smoky mode is a set temperature such that while a user smokes one aerosol generating article 20, the supplemented aerosol or visible smoke may be sufficiently perceived, and the aerosol or visible smoke may be maintained until the smoking ends. When the above temperature range is exceeded, the aerosol or the visible smoke may be exhausted before smoking is finished, and then the paper material without the aerosol forming agent may be directly heated and the smoking taste may be reduced.

[0083] The second heater unit 14 for heating the cavity segment 22 may be driven in one of a strong mode, a medium mode, and a weak mode. According to an embodiment of the present invention, in the strong mode, the second heater unit is heated to maintain a temperature range of 200°C to 260°C, and in the medium mode, the second heater unit is heated to maintain a temperature range of 160°C to 200°C, and in the weak mode, the second heater unit is heated to maintain a temperature range of 150°C to 180°C. Specifically, the temperature range in the strong mode may be adjusted to 200°C or higher, 250°C or higher, or 210°C or higher, or 260°C or lower, 255°C or lower, or 250°C or lower. The temperature range in the medium mode may be adjusted to 160°C or higher, 165°C or higher, or 170°C or higher, or 200°C or lower, 195°C or lower, or 190°C or lower. The temperature range in the weak mode may be adjusted to 150°C or higher, 155°C or higher, or 160°C or higher, or 180°C or lower, 175°C or lower, or 170°C or lower.

[0084] The temperature ranges of the strong mode, medium mode, and weak mode are set to be adjustable according to the user's preference within a range in which tobacco components such as nicotine are transferred to some extent and problems such as burnt taste due to overheating do not occur, and in the strong mode, the medium mode, and the weak mode, the composition of the tobacco components in the aerosol is clearly distinguished, so a user may implement various smoking sensations even with one aerosol generating apparatus 10 and aerosol generating article 20. As described above, since the heating in the aerosol generating apparatus 10 is not continuously performed throughout smoking, even if the temperature ranges in each mode partially overlap, when considering the overall temperature profile, each mode is clearly distinguished.

[0085] FIG. 1 illustrates that the aerosol generating apparatus 10 operates in the smoky mode, and FIG. 2 illustrates that the aerosol generating apparatus 10 operates in the smokeless mode. When the first heater unit is operated in the smoky mode, the second heater unit may be driven in all of the strong mode, the medium mode, and the weak mode, and when the first heater unit is operated in the smokeless mode, the second heater unit may be driven only in the strong mode. In the smokeless mode, the transfer amount of the tobacco component from the tobacco material is very low, and the user may not feel the smoking sensation at all in the medium mode and the weak mode. When the first heater unit is switched from the smoky mode to the smokeless mode, since there is a heating temperature of the first heater unit in the smoky mode, when the first heater unit drops to a temperature of less than 100°C, less than 80°C, or less than 60°C, if the second heater unit is in the other mode, the second heater unit is switched to the strong mode.

[0086] According to an embodiment of the present invention, the aerosol generating apparatus 10 further includes a switch that is disposed on an outer wall surface of the housing. The switch sets the smoky mode or the smokeless mode for the first heater unit and sets the strong mode, the medium mode, or the weak mode for the second heater unit. According to the setting of the switch, the control unit may control the temperature of the first heater unit and the second heater unit.

[0087] As described above, although the embodiments have been described by the limited embodiments and drawings, various modifications and alternations are possible by those of ordinary skill in the art from the above description. For example, even though the described techniques may be performed in a different order than the described method, and/or components of the described systems, structures, devices, circuits, etc. may be combined or combined in a different manner than the described method, or replaced or substituted by other components, appropriate results may be achieved.

[Detailed Description of Main Elements]

[0088]

10: Aerosol generating apparatus
11: Battery
12: Control unit
13: First heater unit
14: Second heater unit
20: Aerosol generating article
21: First filter segment
22: Cavity segment
22A: Tobacco granule
23: Second filter segment
24: Cooling segment

25: Mouthpiece segment

Claims

1. An aerosol generating apparatus, comprising:

   a housing that forms an accommodation space in which an aerosol generating article is accommodated;
   a heater unit that heats an aerosol generating article accommodated in the accommodating space; and
   a control unit that adjusts a temperature of the heater unit,
   wherein the heater unit includes a first heater unit and a second heater unit disposed to heat different positions of the aerosol generating article, respectively, and
   the control unit controls to separately adjust the temperature of the first heater unit and the second heater unit.

2. The aerosol generating apparatus of claim 1, wherein the aerosol generating article includes a first filter segment, a second filter segment, and a cavity segment,

   the cavity segment is formed by the first filter segment and the second filter segment,
   the cavity segment is filled with a tobacco granule, and
   the first filter segment is located upstream of the cavity segment and includes an aerosol forming agent.

3. The aerosol generating apparatus of claim 2, wherein the first filter segment and the cavity segment of the aerosol generating article are accommodated in the accommodation space of the aerosol generating apparatus,

   the first heater unit is located to heat the first filter segment, and
   the second heater unit is located to heat the cavity segment.

4. The aerosol generating apparatus of claim 3, wherein the first heater unit is driven in a smoky mode or a smokeless mode,

   in the smoky mode, the first heater unit is heated to maintain a temperature range of 180°C to 240°C, and
   in the smokeless mode, the first heater unit is not heated.

5. The aerosol generating apparatus of claim 3, wherein the second heater unit is driven in one of a strong mode, a medium mode, and a weak mode,

   in the strong mode, the second heater unit is heated to maintain a temperature range of 200°C to 260°C,
   in the medium mode, the second heater unit is heated to maintain a temperature range of 160°C to 200°C, and
   in the weak mode, the second heater unit is heated to maintain a temperature range of 150°C to 180°C.

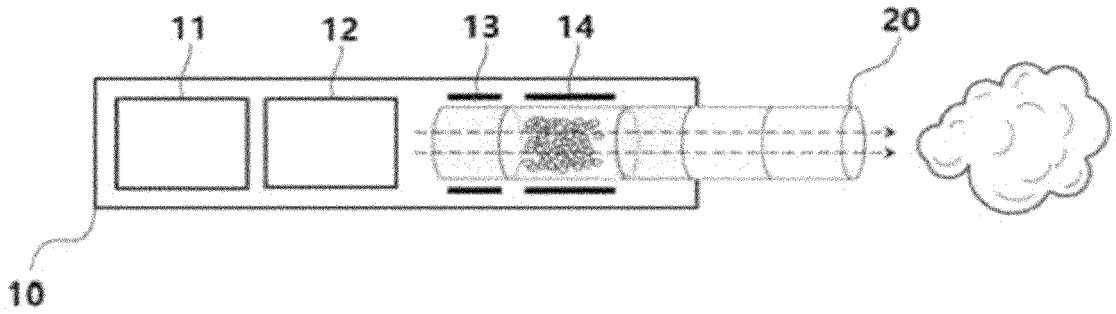
6. The aerosol generating apparatus of claim 5, wherein when the temperature of the first heater unit is less than 100°C, the second heater unit is driven in the strong mode.

7. The aerosol generating apparatus of claim 1, wherein the first heater unit and the second heater unit are driven in a form of being reheated when they are out of a set range after being initially preheated.

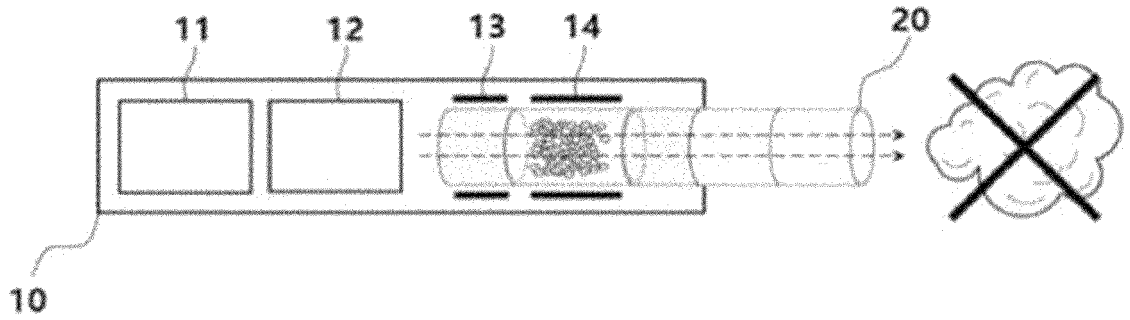
8. The aerosol generating apparatus of claim 4 or 5, further comprising:

   a switch that is disposed on an outer wall surface of the housing,
   wherein the switch sets the smoky mode or the smokeless mode for the first heater unit and sets the strong mode, the medium mode, or the weak mode for the second heater unit.

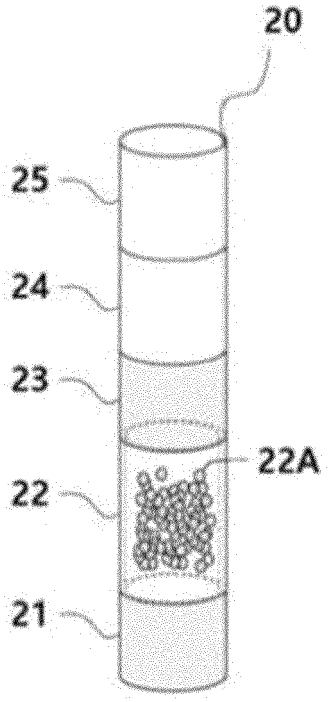
【Figure 1】



【Figure 2】



【Figure 3】



INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2022/015572

A. CLASSIFICATION OF SUBJECT MATTER

A24F 40/46(2020.01)i; **A24D 1/20**(2020.01)i; **A24F 40/57**(2020.01)i; **A24B 13/02**(2006.01)i; **A24D 1/04**(2006.01)i; **A24D 3/17**(2020.01)i; **A24D 3/02**(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)

A24F 40/46(2020.01); A24D 3/04(2006.01); A24F 40/10(2020.01); A24F 40/50(2020.01); A24F 47/00(2006.01)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models: IPC as above
Japanese utility models and applications for utility models: IPC as above

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

eKOMPASS (KIPO internal) & keywords: 에어로졸 발생 장치(aerosol generating device), 복수의 가열부(multiple heating portions), 개별적 온도 제어(individual temperature control), 유연/무연 모드(smoke/smokeless mode)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	KR 10-2015-0129683 A (PHILIP MORRIS PRODUCTS S.A.) 20 November 2015 (2015-11-20) See paragraphs [0180]-[0188]; claim 7; and figure 1.	1,7
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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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"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
25 January 2023	**25 January 2023**
Name and mailing address of the ISA/KR **Korean Intellectual Property Office** **Government Complex-Daejeon Building 4, 189 Cheongsa-ro, Seo-gu, Daejeon 35208** Facsimile No. **+82-42-481-8578**	Authorized officer Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2022/015572

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International application No.
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