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(54) AIRFLOW HEATING ASSEMBLY AND AEROSOL GENERATING DEVICE

(57) This application relates to the technical field of aerosol generating devices (1000), and provides an airflow heating assembly (100) and an airflow heating device. The airflow heating assembly (100) includes an air guiding element (10) and a heating body (20), a first mounting cavity (12) is arranged in the air guiding element (10), the air guiding element (10) is provided with a plurality of through-going air guiding channels (11), and the air guiding channels (11) are configured for gas to circulate. The heating body (20) is arranged in the first mounting cavity (12), and the heating body (20) is configured to be electrically connected to an external power supply, to heat the air guiding element (10), so that the air guiding element (10) heats gas flowing through the air guiding channel (11). The heating body (20) is arranged inside the air guiding element (10). This can effectively overcome a problem that a conventional heating body (20) dissipates a part of heat outward caused by the fact that the heating body (20) is sleeved outside the air guiding element (10), and can improve heating efficiency of the heating body (20).

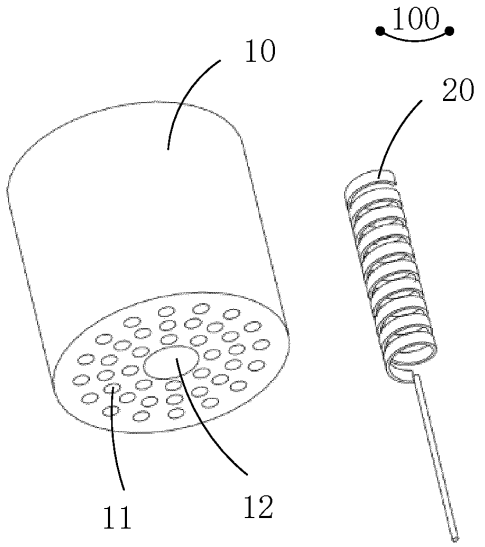

FIG. 1

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Description

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to Chinese Patent Application No. 202210802011.6, entitled "AIRFLOW HEATING ASSEMBLY AND AEROSOL GENERATING DEVICE" filed with the China National Intellectual Property Administration on July 8, 2022, which is incorporated herein by reference in its entirety.

TECHNICAL FIELD

[0002] Embodiments of this application relate to the field of aerosol generating device technologies, and in particular, to an airflow heating assembly and an aerosol generating device.

BACKGROUND

[0003] With the development and promotion of a heat-not-burn technology, aerosol generating devices are increasingly widely applied. The most important component in an aerosol generating device is a heating device. The heating device heats an aerosol generating article, so that the aerosol generating article can generate smoke. Currently, there is also a solution for heating the aerosol generating article by heating an airflow, but a volume is large and power consumption is large.

SUMMARY

[0004] Embodiments of this application provide an airflow heating assembly and an aerosol generating device, to reduce power consumption.

[0005] A technical solution adopted in the embodiments of this application is as follows: An airflow heating assembly is provided, configured to heat an aerosol generating article to generate an aerosol. The airflow heating assembly includes: an air guiding element, where a first mounting cavity is provided inside the air guiding element, the air guiding element is provided with a plurality of through-going air guiding channels, and the air guiding channels are configured for gas to circulate; and a heating body, arranged in the first mounting cavity, where the heating body is configured to be electrically connected to an external power supply to heat the air guiding element, so that the air guiding element heats gas flowing through the air guiding channels.

[0006] Another technical solution adopted in the embodiments of this application is as follows: An airflow heating assembly is provided, configured to heat an aerosol generating article to generate an aerosol. The airflow heating assembly includes: an air guiding element, where a first mounting cavity is provided inside the air guiding element, the air guiding element is provided with a plurality of through-going air guiding channels, and the air guiding channels are configured for gas to circulate; and a resistor heating body, arranged in the first mounting cavity, where the heating body is configured to be electrically connected to an external power supply to heat the air guiding element, so that the air guiding element heats gas flowing through the air guiding channels. The air guiding element is made of graphite or graphite alloy.

[0007] Still another technical solution adopted in the embodiments of this application is as follows: An aerosol generating device is provided, configured to heat an aerosol generating article to generate an aerosol. The aerosol generating device includes: a housing, provided with an accommodating cavity in the housing, where the accommodating cavity is configured for removably arranging the aerosol generating article; and the airflow heating assembly described above, where the airflow heating assembly is arranged in the accommodating cavity, and the airflow heating assembly is arranged at an upstream airflow position of the aerosol generating article, so that air passing through the airflow heating assembly enters the aerosol generating article after being heated.

[0008] The airflow heating assembly in the embodiments of this application includes an air guiding element and a heating body. A first mounting cavity is provided inside the air guiding element, the air guiding element is provided with a plurality of through-going air guiding channels, and the air guiding channels are configured for gas to circulate; and the heating body is arranged in the first mounting cavity, where the heating body is configured to be electrically connected to an external power supply to heat the air guiding element, so that the air guiding element heats gas flowing through the air guiding channels. The heating body is arranged inside the air guiding element, so that heating efficiency of the heating body can be improved, and power consumption of the airflow heating assembly can be reduced.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] To describe the technical solutions of the specific embodiments of this application more clearly, the following briefly introduces the accompanying drawings required for the specific embodiments. In all the accompanying drawings, similar elements or parts are generally identified by using similar reference numerals. In the accompanying drawings, the elements or parts are not necessarily drawn to an actual scale.

FIG. 1 is an exploded view of an airflow heating assembly from a perspective according to an embodiment of this application;

FIG. 2 is a schematic diagram of an air guiding element in an airflow heating assembly from a perspective according to an embodiment of this application;

FIG. 3 is a schematic diagram of an airflow heating assembly from a perspective according to another embodiment of this application;

FIG. 4 is a schematic diagram of an airflow heating assembly from a perspective according to still another embodiment of this application;

FIG. 5 is a schematic diagram of a heating body in an airflow heating assembly from a perspective according to an embodiment of this application;

FIG. 6 is a cross-sectional view of an airflow heating assembly from a perspective according to an embodiment of this application;

FIG. 7 is a cross-sectional view of an air guiding element and a piercing heating element in an airflow heating assembly from a perspective according to an embodiment of this application;

FIG. 8 is a cross-sectional view of an aerosol generating device from a perspective according to an embodiment of this application; and

FIG. 9 is a cross-sectional view of an aerosol generating device from a perspective according to another embodiment of this application.

DETAILED DESCRIPTION

[0010] For ease of understanding of this application, this application is described in further detail below with reference to the accompanying drawings and specific embodiments. It should be noted that, when an element is expressed as "being fixed to" another element, the element may be directly on the another element, or one or more intermediate elements may exist between the element and the another element. When an element is expressed as "being connected to" another element, the element may be directly connected to the another element, or one or more intermediate elements may exist between the element and the another element. In the descriptions of this specification, orientation or position relationships indicated by the terms such as "up", "down", "inside", "outside", "vertical" and "horizontal" are based on orientation or position relationships shown in the accompanying drawings, and are used only for ease and brevity of illustration and description of this application, rather than indicating or implying that the mentioned apparatus or component must have a particular orientation or must be constructed and operated in a particular orientation. Therefore, such terms should not be construed as limiting of this application. In addition, terms such as "first" and "second" are only used to describe the objective and cannot be understood as indicating or implying relative importance.

[0011] Unless otherwise defined, meanings of all technical and scientific terms used in this specification are the same as that usually understood by a person skilled in the technical field to which this application belongs. Terms used in the specification of this application are merely intended to describe objectives of the specific embodiments, but are not intended to limit this application. The term "and/or" used in this specification includes any or all combinations of one or more associated related listed items.

[0012] In addition, technical features involved in different embodiments of this application described below may be combined together if there is no conflict.

[0013] Referring to FIG. 1, the airflow heating assembly 100 includes an air guiding element 10 and a heating body 20. The heating body 20 is connected to the air guiding element 10, the heating body 20 is configured to be electrically connected to an external power supply, and the heating body 20 is configured to heat the air guiding element 10. The air guiding element 10 is configured to allow gas to flow through and heat the gas flowing through, to increase thermal energy of the gas.

[0014] In an embodiment of this application, the air guiding element 10 is made of graphite or graphite alloy. The air guiding element 10 made of graphite or graphite alloy has good heat conductivity. The heating body 20 directly heats the air guiding element 10, so that the air guiding element 10 can be heated to a preset temperature within short time, for example, the air guiding element 10 can be heated to above 300°C in 25s.

[0015] For the foregoing air guiding element 10, refer to FIG. 1 and FIG. 2. The air guiding element 10 is provided with at least one first mounting cavity 12 and a plurality of air guiding channels 11. The first mounting cavity 12 is arranged inside the air guiding element 10, and the first mounting cavity 12 is configured to mount the heating body 20. The air guiding channel 11 goes through the air guiding element 10 in an axial direction of the air guiding element 10, and the air guiding channel 11 is configured for gas to circulate. When the heating body 20 is in an operating state, and is heating the air guiding element 10, the gas passing through the air guiding channel 11 is heated by the air guiding element 10 to form a hot airflow, and the hot airflow flows to an interior of the aerosol generating article for heating, where a temperature of the hot airflow ranges from 200°C to 400°C.

[0016] In some embodiments, the plurality of air guiding channels 11 are in a cylindrical shape. Specifically, a diameter D1 of the air guiding channel 11 satisfies: $0 < D1 \leq 0.5$ mm. According to the solution of the air guiding channel 11 with the small diameter, a quantity of the air guiding channels 11 can be increased in limited space of the air guiding element 10, and heating efficiency of the gas flowing through the air guiding channel 11 can be improved, to avoid a poor heating effect of the gas caused by a large flow rate of the gas because the air guiding channel 11 is excessively large.

[0017] In some embodiments, a ratio of a sum of areas of cross-sections of the plurality of air guiding channels 11 to an area of a cross-section of the air guiding element 10 is greater than or equal to 1/5. The cross-sections of the air guiding channels 11 are within the cross-section of the air guiding element 10, and the cross-sections of the air guiding channels 11 and the cross-section of the air guiding element 10 are all perpendicular to a central line of the air guiding element 10. On a premise of ensuring a structural stability of the air guiding element 10, a ratio of an area of the cross-sections of the air guiding channels

11 to the area of the cross-section of the air guiding element 10 being closer to 1 indicates that an effective area of the air guiding channel 11 is larger, and a flow area available for gas is larger; and that when an area of a cross-section of a single air guiding channel 11 is determined, a larger quantity of air guiding channels 11 can be arranged on the air guiding element 10.

[0018] In some embodiments, the plurality of air guiding channels 11 are arranged around a center of the air guiding element 10 in a plurality of circles, and a ratio of a quantity of air guiding channels 11 located on an inner circle to a quantity of air guiding channels 11 located on an outer circle is equal to a ratio of a radius of the inner circle to a radius of the outer circle. In a direction from the center of the cross-section of the air guiding element 10 to an edge of the cross-section of the air guiding element 10, a quantity of air guiding channels 11 that can be arranged increases, so that flowing channels of the gas can be increased. In some embodiments, the plurality of air guiding channels 11 are arranged in a circumferential array, to be specific, distances between two adjacent air guiding channels 11 located on a same circle are the same.

[0019] In some embodiments, referring to FIG. 2 and FIG. 8, the air guiding element 10 meets at least one of the following conditions:

(1) a diameter D3 of the air guiding element 10 is: 4 mm $\leq$ D3 $\leq$ 8 mm;
(2) the diameter D3 of the air guiding element 10 is: 6 mm $\leq$ D3 $\leq$ 7 mm;
(3) a cross-sectional area S1 of the air guiding element 10 is 10 $mm^2 \leq S1 \leq 50\ mm^2$;
(4) the cross-sectional area S1 of the air guiding element 10 is 25 $mm^2 \leq S1 \leq 35\ mm^2$;
(5) an axial length L1 of the air guiding element 10 is: 5 mm $\leq$ L1 $\leq$ 10 mm; and
(6) the axial length L1 of the air guiding element 10 is: 7 mm $\leq$ L1 $\leq$ 9 mm.

[0020] In some other embodiments, the air guiding channel 11 may be in an irregular shape, and the air guiding channel 11 may be in a linear array, a ray array, or randomly distributed on the air guiding element 10.

[0021] It should be noted that, that the first mounting cavity 12 is arranged inside the air guiding element 10 may be understood as that the first mounting cavity 12 is formed by being recessed from an outer surface of the air guiding element 10 to an inside of the air guiding element 10, or the air guiding element 10 is formed by splicing two or more split members, and a chamber or a gap for mounting the heating body 20 is formed between the two adjacent split members. For details, refer to the following embodiments.

[0022] In some embodiments, referring to FIG. 3, the air guiding element 10 includes a first air guiding block 13 and a second air guiding block 14. The first air guiding block 13 and the second air guiding block 14 are sequentially arranged in an extending direction of the central line of the air guiding element 10, in other words, an end surface of the first air guiding block 13 is arranged opposite to an end surface of the second air guiding block 14. A first mounting cavity 12 is formed between the first air guiding block 13 and the second air guiding block 14, and the heating body 20 is arranged in the first mounting cavity 12. Specifically, the heating body 20 located between the first air guiding block 13 and the second air guiding block 14 is in a shape of a sheet, and may be a Mesh heating mesh, a metal sheet, a flexible heating film, or the like.

[0023] In some embodiments, referring to FIG. 4, the air guiding block includes a first air guiding block 13 and a second air guiding block 14. The first air guiding block 13 and the second air guiding block 14 are sequentially arranged perpendicular to the extending direction of the central line of the air guiding element 10, in other words, a side surface of the first air guiding block 13 and a side surface of the second air guiding block 14 are arranged opposite to each other. A first mounting cavity 12 is formed between the first air guiding block 13 and the second air guiding block 14, and the heating body 20 is arranged in the first mounting cavity 12. Specifically, the heating body 20 is in a shape of a sheet, or the heating body 20 may be wound into a rod shape, and may be specifically a Mesh heating mesh, a metal sheet, or a flexible heating film.

[0024] In some other embodiments, the air guiding block includes a first air guiding block 13 and a second air guiding block 14. The first air guiding block 13 is provided with a through groove, the second air guiding block 14 is arranged in the through groove, a gap formed between the first air guiding block 13 and the second air guiding block 14 is a first mounting cavity 12, and the heating body 20 is arranged in the first mounting cavity 12. In some embodiments, the heating body 20 is in a shape of a cylinder or a ring, the heating body 20 is sleeved on an outer surface of the second air guiding block 14, and then the heating body 20 and the second air guiding block 14 are mounted in the through groove. In some other embodiments, the heating body 20 is a resistor heating wire, the resistor heating wire is wound around the outer surface of the second air guiding block 14, and then the resistor heating wire and the second air guiding block 14 are mounted in the through groove. In some other embodiments, the heating body 20 may alternatively be a MESH metal mesh, a heating film, or the like.

[0025] Certainly, in some other embodiments, the air guiding element 10 may include a plurality of air guiding blocks. The plurality of air guiding blocks are stacked up and down in the extending direction of the central line of the air guiding element 10, or the plurality of air guiding blocks are stacked left and right perpendicular to the extending direction of the central line of the air guiding element 10. The heating body 20 is arranged at a gap between the two adjacent air guiding blocks, and the

heating body 20 respectively heats the two adjacent air guiding blocks.

[0026] For the foregoing first mounting cavity 12, referring to FIG. 1 and FIG. 2, the first mounting cavity 12 is arranged at the center of the air guiding element 10, and the heating body 20 is arranged in the first mounting cavity 12. The heating body 20 is arranged at the center of the air guiding element 10, so that a feature that the heating body 20 generates heat in a spot-shaped manner is effectively used, and heating is performed outward from the center of the air guiding element 10 in a radial direction, so that heat dissipation of the heating body 20 can be greatly reduced, and thermal efficiency of the airflow heating assembly 100 can be improved.

[0027] In some embodiments, the first mounting cavity 12 may be tubular, and a diameter D2 of the first mounting cavity 12 satisfies: 0 mm < D2 ≤ 2.5 mm. On a premise that the heating body 20 can be mounted in the first mounting cavity 12, a smaller diameter of the first mounting cavity 12 can release more space for the air guiding element 10, to increase the quantity of the air guiding channels 11. To achieve a better effect of releasing space, the diameter D2 of the first mounting cavity 12 may further satisfy 0 mm < D2 ≤ 1.7 mm.

[0028] In some embodiments, the first mounting cavity 12 may alternatively be a flat groove, and the flat groove may be arranged transversely on the air guiding element 10, or may be arranged vertically on the air guiding element 10. The flat groove may allow the sheet-shaped heating body 20 to be inserted. Specifically, the sheet-shaped heating body 20 may be a resistor heating sheet including a metal material. In this way, space of the air guiding element 10 occupied by the first mounting cavity 12 can be reduced, and the heating body 20 and the air guiding element 10 can also be attached as much as possible to maintain better contact, which is beneficial to improving the heating efficiency.

[0029] In some embodiments, there are a plurality of first mounting cavities 12 and a plurality of heating bodies 20, and the plurality of heating bodies 20 are arranged in the plurality of first mounting cavities 12. The plurality of first mounting cavities 12 may be arranged around the center of the air guiding element 10, may be linearly arranged, or may be randomly arranged. The plurality of heating bodies 20 are arranged in the air guiding element 10, so that duration required for heating the air guiding element 10 can be effectively reduced, and the thermal efficiency of the airflow heating assembly 100 is improved.

[0030] In some embodiments, an inner surface of the first mounting cavity 12 and an outer surface of the heating body 20 are at least partially attached to each other, to reduce a gap between the outer surface of the heating body 20 and the inner surface of the first mounting cavity 12, and enhance an effect of direct heating of the air guiding element 10 by the heating body 20. Specifically, a flat heating wire may be used as the heating body, so that an outer surface of the heating wire after spiraling can be in a flat state. When the spiral heating wire is mounted in the first mounting cavity 12, the outer surface of the heating wire can be attached to the inner surface of the first mounting cavity 12, so that heat generated by the heating wire can be directly transferred to the air guiding element 10, to reduce heat loss.

[0031] In some embodiments, the first mounting cavity 12 goes through the air guiding element 10, the first mounting cavity 12 is configured to mount the heating body 20, and the first mounting cavity 12 may further allow airflow to circulate, thereby increasing a channel of the airflow in the air guiding element 10. In some embodiments, the first mounting cavity 12 may alternatively be provided as a blind hole, to facilitate fixing the heating body 20 in the first mounting cavity 12, and prevent gas located in the first mounting cavity 12 from directly entering the aerosol generating article after being heated by the heating body 20, causing a user to feel burning in the mouth when inhaling smoke generated by the aerosol generating article.

[0032] In some embodiments, the heating body 20 and the first mounting cavity 12 may only partially overlap, and the first mounting cavity 12 may alternatively be arranged in only a partial area of the air guiding element 10. For example, an axial length of the heating body 20 inserted into the first mounting cavity 12 is at least 1/3 of the axial length of the air guiding element.

[0033] In some embodiments, referring to FIG. 6, an inner wall of the first mounting cavity 12 is provided with an abutting portion 122. The abutting portion 122 is configured to abut against an end of the heating body 20, to facilitate mounting of the heating body 20, and the abutting portion 122 cooperates with other components to fix the heating body 20 in the first mounting cavity 12. In some embodiments, the abutting portion 122 may be a step surface. In some embodiments, the inner wall of the first mounting cavity 12 is provided with a clamping slot, and the clamping slot is configured to be clamped with the heating body 20, so that the heating body 20 can be fixed in the first mounting cavity 12.

[0034] In some embodiments, referring to FIG. 5 and FIG. 6, the heating body 20 is provided with a ventilation air gap 21. The ventilation air gap 21 increases a path for gas in the first mounting cavity 12, increases a path for gas directly or indirectly heated by the heating body 20, and improves utilization of hot gas. The ventilation air gap 21 of the heating body 20 is formed in a plurality of manners, and for some manners, refer to the following embodiments.

[0035] For example, a first hollow groove is arranged inside the heating body 20, and at least a top of the first hollow groove is in communication with the air guiding element 10, and/or at least the top of the first hollow groove is in communication with a bottom of the aerosol generating article. The first hollow groove forms the ventilation air gap 21 of the heating body 20, and the first hollow groove is configured for the gas in the first mounting cavity 12 to circulate, to increase a path for the

gas, so that the gas directly heated by the heating body 20 flows to the inside of the aerosol generating article. Further, several protrusions may be provided on the inner wall surface of the first hollow groove. The several protrusions are configured to change a direction of airflow in the first hollow groove, so that gas flowing in the first hollow groove flows in an "S" shape, to increase heat absorbed by the gas, to prevent the airflow from entering the aerosol generating article excessively fast when the airflow is much lower than a preset heating temperature.

[0036] For example, the first hollow groove and a plurality of first through holes going through a side wall surface of the heating body 20 are arranged in the heating body 20. The first hollow groove and the plurality of first through holes jointly form the ventilation air gap 21 of the heating body 20. The plurality of first through holes are in communication with the air guiding channel 11 of the air guiding element 10, so that the gas inside the heating body 20 flows to the inside of the aerosol generating article through the air guiding channel 11 after being heated.

[0037] For example, an outer peripheral surface of the heating body 20 is provided with several grooves. When the heating body 20 is mounted in the first mounting cavity 12, the grooves and the inner surface of the first mounting cavity 12 jointly form the ventilation air gap 21. The heating body 20 heats the air guiding element 10 and directly heats gas flowing through the grooves, thereby increasing a path for the gas.

[0038] In some embodiments, referring to FIG. 5 and FIG. 6, the heating body 20 is formed through spiraling of a heating wire, and the heating wire forms a plurality of ventilation air gaps 21 during spiraling. It may be understood that the heating body 20 may be partially helical, or may be entirely helical.

[0039] Specifically, the heating body 20 may alternatively be a double helix structure. A first spiral layer 22 and a second spiral layer 23. The second spiral layer 23 is arranged outside the first spiral layer 22, and a pitch of the second spiral layer 23 is greater than a pitch of the first spiral layer 22 along an axial direction of a central line of the spiral heating body 20, so that the heating body 20 is in a screw-shape. A spiral fixing groove 123 is arranged on the inner wall surface of the first mounting cavity 12, and the spiral fixing groove 123 is configured to be helically connected to the second spiral layer 23, so that the heating body 20 can be directly fixed in the first mounting cavity 12. This reduces components for fixing the heating body 20, and helps reduce a volume of the airflow heating assembly 100.

[0040] For example, the heating body 20 is provided with a clamping portion 24. After the heating body 20 is inserted into the first mounting cavity 12, the clamping portion 24 is clamped with the clamping slot of the first mounting cavity 12, to fix the heating body 20 in the first mounting slot. In some embodiments, the clamping slot is arranged at a mouth of the first mounting cavity 12, and the clamping portion 24 is arranged at an end of the heating body 20, so that the heating body 20 is clamped with the first mounting cavity 12 only at the mouth, and the part of the heating body 20 inserted into the first mounting cavity 12 can be directly attached to the inner surface of the first mounting cavity 12, to reduce heat loss of the heating body 20.

[0041] In some embodiments, referring to FIG. 6 and FIG. 8, the heating body 20 meets at least one of the following conditions:

(1) a diameter D4 of the heating body 20 satisfies: 1 mm $\leq$ D4 $\leq$ 2 mm;

(2) the diameter D4 of the heating body 20 satisfies: 1.4 mm $\leq$ D4 $\leq$ 1.7 mm;

(3) an area S2 enclosed by an outer contour of a cross-section of the heating body 20 is: 0.7 $mm^2 \leq S2 \leq 3.5\ mm^2$, where the cross-section of the air guiding element 10 is perpendicular to the central line of the air guiding element 10; and

(4) an axial length L2 of the heating body 20 is: 4 mm $\leq$ L2 $\leq$ 9 mm.

[0042] In some embodiments, the heating body 20 may be made of at least one of a metal material with proper impedance, a metal alloy, graphite, carbon, conductive ceramic, or a composite material of a ceramic material and a metal material. A suitable metal or alloy material includes at least one of nickel, cobalt, zirconium, titanium, nickel alloy, cobalt alloy, zirconium alloy, titanium alloy, nickel-chromium alloy, nickel-iron alloy, iron-chromium alloy, iron-chromium-aluminum alloy, titanium alloy, iron-manganese-aluminum-based alloy, stainless steel, or the like.

[0043] In some embodiments, referring to FIG. 7, the airflow heating assembly 100 further includes a piercing heating element 30. The piercing heating element 30 is arranged at an end of the air guiding element 10, and the piercing heating element 30 is configured to pierce and insert into a tobacco segment of the aerosol generating article, to transfer heat generated by the heating body 20 to the aerosol generating article.

[0044] The piercing heating element 30 includes a piercing portion 31 and a mounting portion 32. An end of the mounting portion 32 is connected to the air guiding element 10, and the other end of the mounting portion 32 is connected to the piercing portion 31. The piercing portion 31 is configured to pierce an air inlet end of the tobacco segment of the aerosol generating article. A second mounting cavity 321 is arranged in the mounting portion 32, and the second mounting cavity 321 is in communication with the first mounting cavity 12. The heating body 20 is arranged in the first mounting cavity 12 and the second mounting cavity 321, and the heating body 20 is configured to simultaneously heat the air guiding element 10, the mounting portion 32, and the piercing portion 31. A through-going ventilation hole 322 is arranged on a side wall surface of the mounting portion 32, and the second mounting cavity 321 is in commu-

nication with the outside through the ventilation hole 322, so that after the piercing heating element 30 is inserted into the interior of the aerosol generating article, heated gas enters the second mounting cavity 321 from the first mounting cavity 12, and then passes through the ventilation hole 322 to enter the interior of the aerosol generating article, thereby completing a process of heating the aerosol generating article.

[0045] In some embodiments, referring to FIG. 8, the airflow heating assembly 100 further includes a cover plate 40. The cover plate 40 is arranged at the other end of the air guiding element 10, and the cover plate 40 is configured to cooperate with the abutting portion 122 in the first mounting cavity 12, to fix the heating body 20 in the first mounting cavity 12. At least a part of the cover plate 40 may be made of ceramic, which can effectively insulate heat. Similarly, the abutting portion may alternatively be formed by at least a part of the air guiding element 10, or may be formed by the heating body arranged inside the first mounting cavity 12.

[0046] In some embodiments, referring to FIG. 8, the airflow heating assembly 100 further includes a heat preservation assembly. The heat preservation assembly 200 includes an inner tube portion 202 and an outer tube portion 203. An accommodating cavity 201 is arranged in an inner tube wall. A mounting structure matching the air guiding element 10 may be further arranged in the inner tube wall, so that the air guiding element 10 can be assembled inside the inner tube wall, and an aerosol generating article is inserted into and nearly attached to the accommodating cavity 201. The outer tube portion 203 is sleeved outside the inner tube portion 202. A cavity 204 is enclosed between the inner tube portion 202 and the outer tube portion 203, and the cavity 204 has a specific vacuum inside, or is filled with an inert gas with low heat conductivity, or is filled with a solid medium or a liquid medium with low heat conductivity. It may be understood that, "nearly attached" indicates that a distance between the inner tube portion 202 and the aerosol generating article is expected to be as small as possible. This helps assist in heating the circumferential outer surface of the aerosol generating article by using a remaining temperature of the inner tube portion 202, and can complement baking of the outer surface of the aerosol generating article, so that the baking of the aerosol generating article is more thorough and uniform. Specifically, a minimum distance between the inner tube portion 202 and the outer surface of the aerosol generating article is within 1 mm, preferably 0.5 mm. The cavity 204 of the heat preservation assembly 200 can reduce the amount of heat transferred by the inner tube portion 202 to the outer tube portion 203, so that the heat preservation assembly 200 also has a heat preservation function for the airflow heating assembly, and there is no need to add another heat preservation measure or assembly, which is beneficial to reducing costs and simplifying the structure.

[0047] In some embodiments, referring to FIG. 9, the heat preservation assembly 200 may alternatively be a single-layer tube, such as a metal tube or a ceramic tube, and can absorb a part of heat of the air guiding element 10, and convert the heat into supplementary heating for the aerosol generating article. Therefore, heat can be dissipated quickly, and power consumption can be reduced.

[0048] The airflow heating assembly 100 in the embodiments of this application includes an air guiding element 10 and a heating body 20. A first mounting cavity 12 is provided inside the air guiding element 10, the air guiding element 10 is provided with a plurality of through-going air guiding channels 11, and the air guiding channels 11 are configured for gas to circulate; and the heating body 20 is arranged in the first mounting cavity 12, where the heating body 20 is configured to be electrically connected to an external power supply to heat the air guiding element 10, so that the air guiding element 10 heats gas flowing through the air guiding channels 11. The heating body 20 is arranged inside the air guiding element 10, so that a problem of a conventional heating body 20 emitting some heat outwards due to the fact that the heating body 20 is sleeved outside the air guiding element 10 can be effectively resolved, and heating efficiency of the heating body 20 can be improved.

[0049] This application further provides an embodiment of an aerosol generating device 1000. Referring to FIG. 8, the aerosol generating device 1000 is configured to be inserted with an aerosol generating article and heat the aerosol generating article to generate aerosols. The aerosol generating device 1000 includes a housing 200 and the foregoing airflow heating assembly 100. The housing 200 is provided with an accommodating cavity 201. At least a part of the aerosol generating article is removably arranged in the accommodating cavity 201. The airflow heating assembly 100 is arranged in the accommodating cavity 201, and the airflow heating assembly 100 is arranged at an upstream airflow position of the aerosol generating article, so that air passing through the airflow heating assembly 100 enters the interior of the aerosol generating article for heating after being heated. For a function and a structure of the airflow heating assembly 100, refer to the foregoing embodiments.

[0050] In some embodiments, the housing may be a heat preservation component, or a heat preservation component may be arranged inside the housing. For example, the heat preservation component is in a shape of a hollow cylinder, and may be made of a vacuum tube or a high-temperature-resistant material such as Peek or aerogel. The heat preservation component may be configured to reduce heat generated by the airflow heating assembly to be transferred along a direction of the housing, to prevent the user from being scalded due to an excessively high temperature in an area outside the airflow heating assembly in contact with the user.

[0051] The foregoing descriptions are merely embodiments of this application, and the protection scope of this application is not limited thereto. All equivalent structure

or process changes made according to the content of this specification and accompanying drawings in this application or by directly or indirectly applying this application in other related technical fields shall fall within the protection scope of the present invention.

Claims

1. An airflow heating assembly, configured to heat an aerosol generating article to generate an aerosol, wherein the airflow heating assembly comprises:

   an air guiding element, wherein a first mounting cavity is provided inside the air guiding element, the air guiding element is provided with a plurality of through-going air guiding channels, and the air guiding channels are configured for gas to circulate; and
   a heating body, arranged in the first mounting cavity, wherein the heating body is configured to be electrically connected to an external power supply to heat the air guiding element, so that the air guiding element heats gas flowing through the air guiding channels.

2. The airflow heating assembly according to claim 1, wherein a diameter D1 of the air guiding channel satisfies: $0 < D1 \leq 0.5$ mm; or
   a diameter D2 of the first mounting cavity satisfies: $0 \text{ mm} < D2 \leq 2.5$ mm.

3. The airflow heating assembly according to claim 1, wherein a ratio of a total area of cross-sections of the plurality air guiding channels to an area of a cross-section of the air guiding element is greater than or equal to 1/5, wherein
   the cross-sections of the air guiding channels overlap with the cross-section of the air guiding element, and the cross-sections of the air guiding channels and the cross-section of the air guiding element are all perpendicular to a central line of the air guiding element.

4. The airflow heating assembly according to claim 1, wherein the plurality of air guiding channels are arranged on a plurality of circles around a center of the air guiding element, and distances between two adjacent air guiding channels located on a same circle are the same.

5. The airflow heating assembly according to claim 4, wherein a ratio of a quantity of air guiding channels located on an inner circle to a quantity of air guiding channels located on an outer circle is equal to a ratio of a radius of the inner circle to a radius of the outer circle.

6. The airflow heating assembly according to claim 1, wherein the air guiding element meets at least one of the following conditions: a cross-sectional area S1 of the air guiding element is: $10 \text{ mm}^2 \leq S1 \leq 50 \text{ mm}^2$, wherein a cross-section of the air guiding element is perpendicular to a central line of the air guiding element; or
   an axial length L1 of the air guiding element is: $5 \text{ mm} \leq L1 \leq 10$ mm.

7. The airflow heating assembly according to claim 1, wherein the heating body meets at least one of the following conditions: an area S2 enclosed by an outer contour of a cross-section of the heating body is: $0.7 \text{ mm}^2 \leq S2 \leq 3.5 \text{ mm}^2$, wherein a cross-section of the air guiding element is perpendicular to a central line of the air guiding element; or
   an axial length L2 of the heating body is: $4 \text{ mm} \leq L2 \leq 9$ mm.

8. The airflow heating assembly according to claim 1, wherein the first mounting cavity meets at least one of the following conditions:

   the first mounting cavity is arranged at a center of the air guiding element;
   the first mounting cavity goes through the air guiding element; and
   the first mounting cavity is a blind hole.

9. The airflow heating assembly according to claim 1, wherein there are a plurality of heating bodies and a plurality of first mounting cavities, and the plurality of heating bodies are arranged in the plurality of first mounting cavities.

10. The airflow heating assembly according to claim 1, wherein an outer surface of the heating body and an inner surface of the first mounting cavity are at least partially attached to each other.

11. The airflow heating assembly according to claim 1, wherein the heating body has a ventilation air gap; and

    the ventilation air gap comprises at least a first hollow groove and/or several grooves, wherein the first hollow groove is arranged inside the heating body, and at least a top of the first hollow groove is in communication with the air guiding element, or at least a top of the first hollow groove is in communication with a bottom of the aerosol generating article, or at least a side surface of the first hollow groove is in communication with the heating body to form a plurality of first through holes; and
    the groove is arranged on an outer peripheral surface of the heating body, and the groove and

an inner surface of the first mounting cavity jointly form the ventilation air gap for gas to circulate.

12. The airflow heating assembly according to claim 11, wherein the heating body is at least partially formed through spiraling of a heating wire, and a plurality of ventilation air gaps are formed during the spiraling of the heating wire.

13. The airflow heating assembly according to claim 1, wherein a shape of a cross-section of the heating wire is a rectangle, wherein the cross-section of the heating wire is perpendicular to an extension direction of an unfolded heating wire; or
a shape of the heating body is a sheet.

14. The airflow heating assembly according to claim 1, wherein the heating body is provided with a clamping portion, an inner surface of the first mounting cavity is provided with a clamping slot, and the heating body is clamped with the clamping slot of the first mounting cavity through the clamping portion, to fix the heating body in the first mounting cavity.

15. The airflow heating assembly according to claim 1, further comprising a cover plate, and at least one of the air guiding element, an inner wall of the first mounting cavity, and/or the heating body is provided with an abutting portion, to fix the heating body in the first mounting cavity.

16. The airflow heating assembly according to claim 1, wherein an axial length of the heating body inserted into the first mounting cavity is at least 1/3 of an axial length of the air guiding element.

17. The airflow heating assembly according to claim 1, wherein the air guiding element comprises a first air guiding block and a second air guiding block, the heating body is arranged between the first air guiding block and the second air guiding block, and arrangement of the first air guiding block and the second air guiding block meets at least one of the following conditions:

the first air guiding block and the second air guiding block are arranged up and down in an extending direction of a central line of the air guiding element;
the first air guiding block and the second air guiding block are arranged left and right perpendicular to the extending direction of the central line of the air guiding element; and
the first air guiding block is provided with a groove, and the second air guiding block is sleeved in the groove.

18. The airflow heating assembly according to claim 1, wherein the airflow heating assembly further comprises a piercing heating element, the piercing heating element is arranged at an end of the air guiding element, the air guiding element is provided with a first mounting cavity, the heating body is arranged in the first mounting cavity, the heating body is configured to heat the piercing heating element and the air guiding element, and the piercing heating element is configured to be inserted into the aerosol generating article to heat the aerosol generating article.

19. The airflow heating assembly according to claim 18, wherein the piercing heating element comprises a piercing portion and a mounting portion, an end of the mounting portion is connected to the air guiding element, the piercing portion is arranged at another end of the mounting portion, a second mounting cavity is provided in the mounting portion, the second mounting cavity is in communication with the first mounting cavity, and the heating body is arranged in the first mounting cavity and the second mounting cavity.

20. The airflow heating assembly according to claim 19, wherein a ventilation hole is provided on a side wall of the piercing heating element in contact with the aerosol generating article.

21. The airflow heating assembly according to claim 1, wherein
the air guiding element is made of graphite or graphite alloy.

22. The airflow heating assembly according to claim 1, further comprising a heat preservation assembly connected to the air guiding element, wherein an accommodating cavity is arranged in the heat preservation assembly, and the accommodating cavity is configured to accommodate the aerosol generating article, wherein

the heat preservation assembly comprises an inner tube portion and an outer tube portion, the accommodating cavity is arranged inside the inner tube portion, the outer tube portion is arranged around the inner tube portion, a cavity is enclosed between the outer tube portion and the inner tube portion, and the inner tube portion is nearly attached to the aerosol generating article; or
the heat preservation assembly is a single-layer tube, an interior of the single-layer tube is nearly attached to the aerosol generating article, and the single-layer tube is a metal tube or a ceramic tube.

23. An airflow heating assembly, configured to heat an

aerosol generating article to generate an aerosol, wherein the airflow heating assembly comprises:

an air guiding element, wherein a first mounting cavity is provided in the air guiding element, the air guiding element is provided with a plurality of through-going air guiding channels, and the air guiding channels are configured to allow gas to circulate; and

a resistor heating body, arranged in the first mounting cavity, wherein the heating body is configured to be electrically connected to an external power supply to heat the air guiding element, so that the air guiding element heats gas flowing through the air guiding channels, wherein

the air guiding element is made of graphite or graphite alloy.

24. An aerosol generating device, configured to heat an aerosol generating article to generate an aerosol, wherein the aerosol generating device comprises:

a housing, provided with an accommodating cavity in the housing, wherein the accommodating cavity is configured for removably arranging the aerosol generating article; and

the airflow heating assembly according to any one of claims 1 to 23, wherein the airflow heating assembly is arranged in the accommodating cavity, and the airflow heating assembly is arranged at an upstream airflow position of the aerosol generating article, so that air passing through the airflow heating assembly enters the aerosol generating article after being heated.

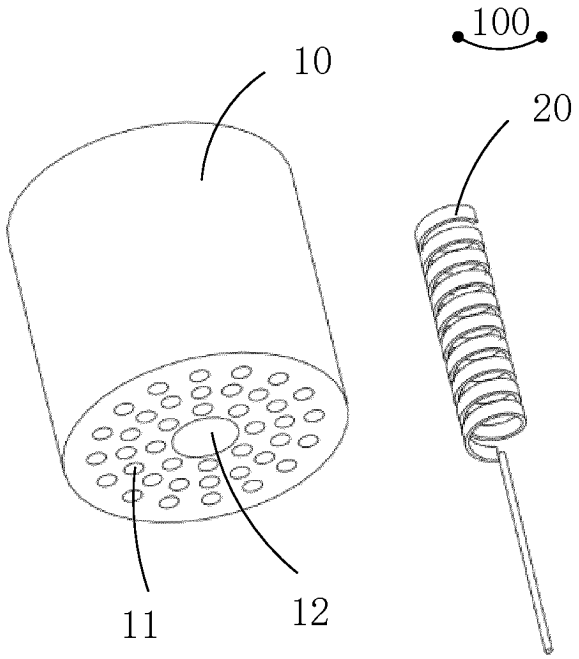

FIG. 1

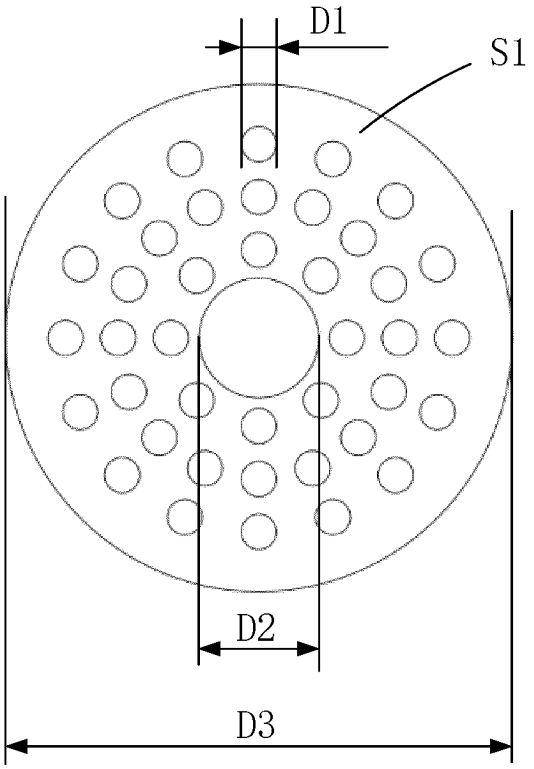

FIG. 2

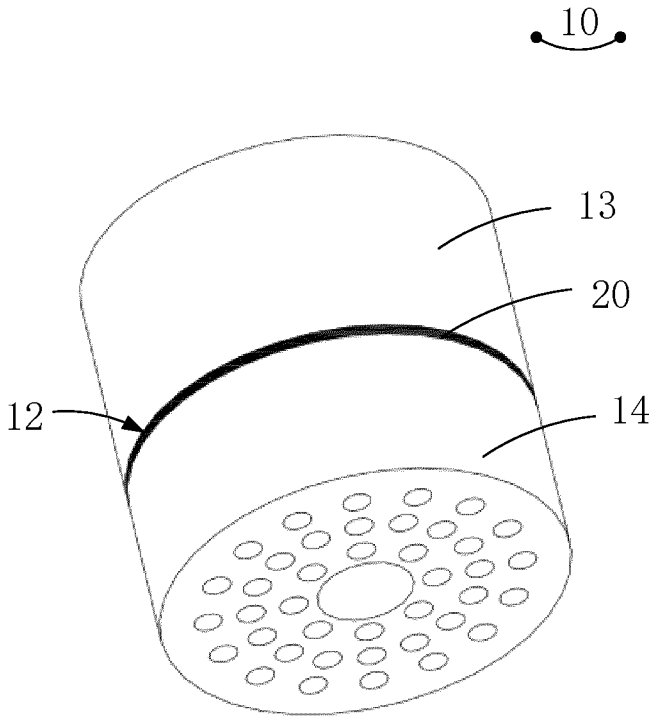

FIG. 3

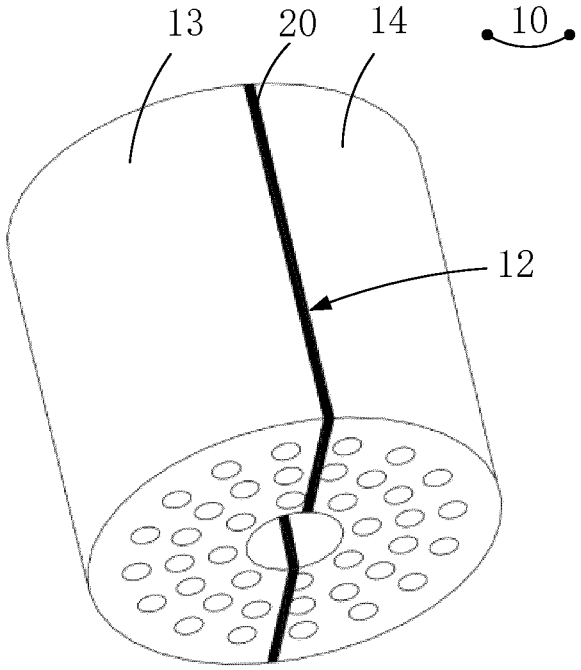

FIG. 4

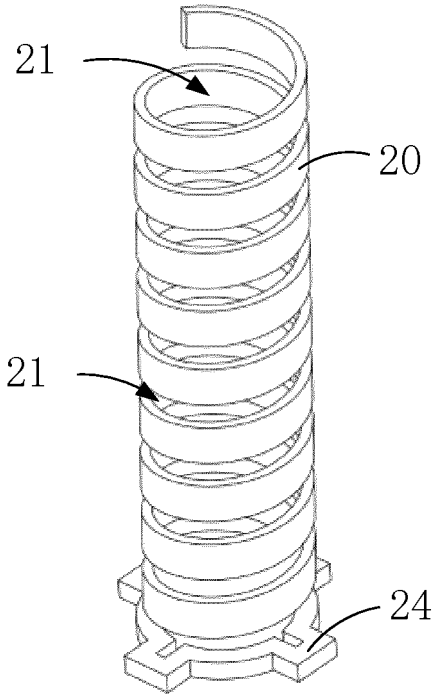

FIG. 5

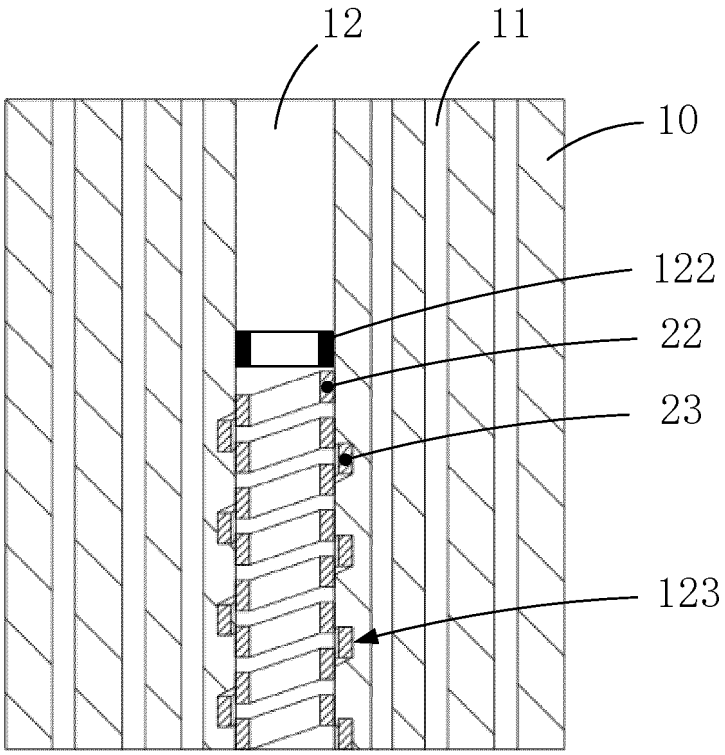

FIG. 6

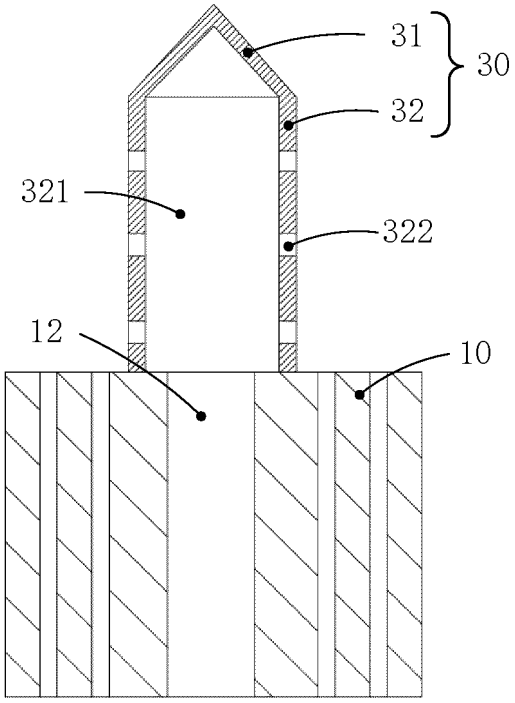
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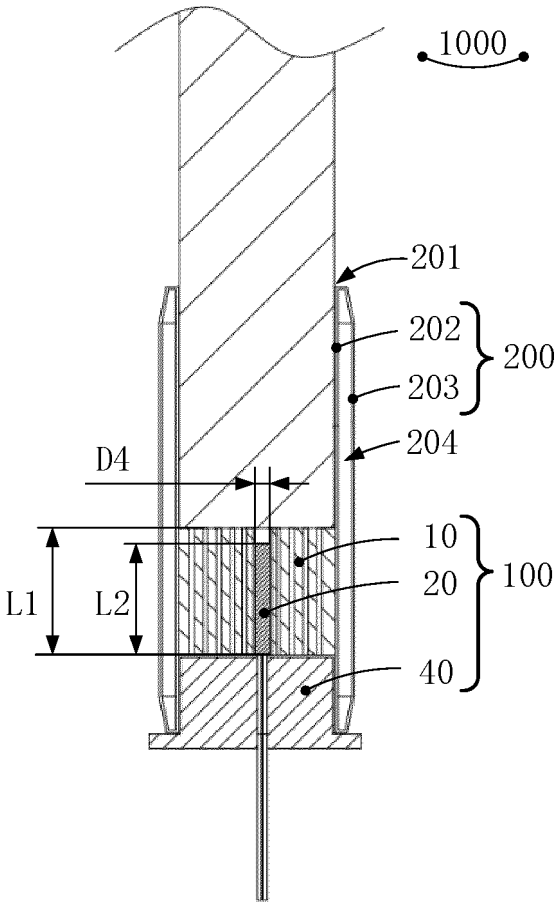
FIG. 7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201
202
200
203
204
D4
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100
20
L1
L2
40

FIG. 8

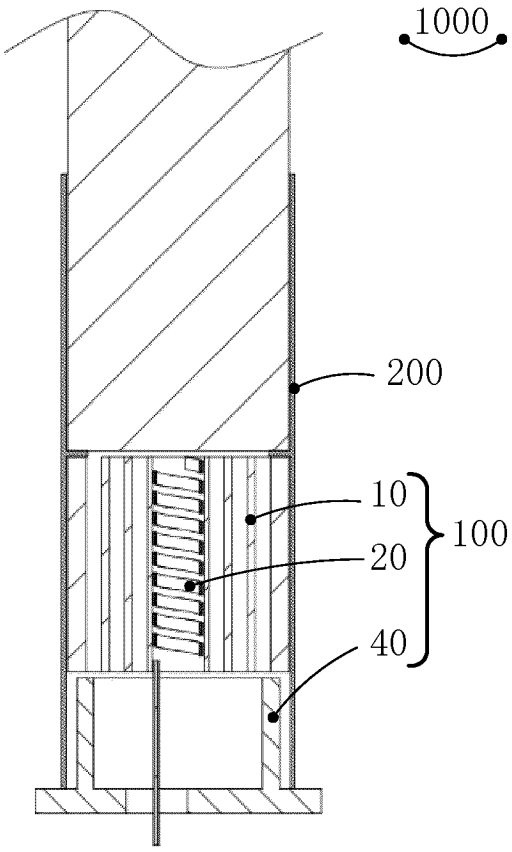

FIG. 9

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2023/103803

A. CLASSIFICATION OF SUBJECT MATTER

A24F40/46(2020.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC:A24F

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

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

CNTXT, ENTXTC, CJFD, CNKI: 气溶胶, 烟, 加热, 导气, 通道, 腔, aerosol, tobacco, cigarette, heating, channel, cavity

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 217986690 U (SHENZHEN FIRST UNION TECHNOLOGY CO., LTD.) 09 December 2022 (2022-12-09) claims 1-24	1-24
PX	CN 115553507 A (SICHUAN SANLIAN NEW MATERIAL CO., LTD. et al.) 03 January 2023 (2023-01-03) description, paragraphs [0026]- [0043], and figures 1-10	1-24
X	CN 112089113 A (HUIZHOU PEIGESI TECHNOLOGY CO., LTD.) 18 December 2020 (2020-12-18) description, paragraphs [0052]-[0061] and [0069]-[0075], and figures 2-9	1-16, 21-24
Y	CN 112089113 A (HUIZHOU PEIGESI TECHNOLOGY CO., LTD.) 18 December 2020 (2020-12-18) description, paragraphs [0052]-[0061] and [0069]-[0075], and figures 2-9	17-20
Y	CN 112137179 A (SHENZHEN AISUO TECHNOLOGY RESEARCH CO., LTD.) 29 December 2020 (2020-12-29) description, paragraphs [0045] and [0046], and figures 3-6	17

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

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
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"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
14 August 2023	**22 August 2023**

Name and mailing address of the ISA/CN	Authorized officer
China National Intellectual Property Administration (ISA/CN) **China No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088**	Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2023/103803

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	CN 214127020 U (SHENZHEN INNOKIN TECHNOLOGY CO., LTD.) 07 September 2021 (2021-09-07) description, paragraph [0027], and figures 3, 5, and 6	18-20
A	CN 214802329 U (SHENZHEN AISUO TECHNOLOGY RESEARCH CO., LTD.) 23 November 2021 (2021-11-23) entire document	1-24
A	WO 2022114682 A1 (KT&G CORP.) 02 June 2022 (2022-06-02) entire document	1-24

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

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2023/103803

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN 217986690 U	09 December 2022	None	
CN 115553507 A	03 January 2023	None	
CN 112089113 A	18 December 2020	None	
CN 112137179 A	29 December 2020	None	
CN 214127020 U	07 September 2021	None	
CN 214802329 U	23 November 2021	None	
WO 2022114682 A1	02 June 2022	JP 2023519694 A	12 May 2023
		EP 4087422 A1	16 November 2022
		US 2023083787 A1	16 March 2023
		KR 20220072627 A	02 June 2022

Form PCT/ISA/210 (patent family annex) (July 2022)

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- CN 202210802011 **[0001]**