(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 4 458 180 A1**

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
06.11.2024 Bulletin 2024/45

(21) Application number: **22913788.0**

(22) Date of filing: **04.11.2022**

(51) International Patent Classification (IPC):
A24F 40/40 *(2020.01)* ***A24F 40/46*** *(2020.01)*
A24F 47/00 *(2020.01)*

(52) Cooperative Patent Classification (CPC):
A24F 40/40; A24F 40/46; A24F 47/00

(86) International application number:
PCT/CN2022/129725

(87) International publication number:
WO 2023/124525 (06.07.2023 Gazette 2023/27)

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC ME MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA
Designated Validation States:
KH MA MD TN

(30) Priority: **28.12.2021 CN 202111620889**

(71) Applicant: **Shenzhen Merit Technology Co., Ltd.**
Shenzhen, Guangdong 518105 (CN)

(72) Inventors:
- **LIANG, Feng**
  Shenzhen, Guangdong 518105 (CN)
- **ZHENG, Songjie**
  Shenzhen, Guangdong 518105 (CN)
- **GUO, Conghui**
  Shenzhen, Guangdong 518105 (CN)

(74) Representative: **Westphal, Mussgnug & Partner, Patentanwälte mbB**
Werinherstraße 79
81541 München (DE)

(54) HEAT-NOT-BURN AEROSOL GENERATING DEVICE AND AEROSOL GENERATING SYSTEM COMPRISING SAME

(57) Disclosed is a heat-not-burn aerosol generating device, including a device main body (1), an accommodating cylinder (2) located in the main body (1), and a heating element (3). The accommodating cylinder (2) has a bottom wall (22). The heating element (3) has a bottom end (32). The bottom end (32) of the heating element (3) is higher than the bottom wall (22) of the accommodating cylinder (2) in vertical height, and thus the bottom end (32) of the heating element (3) is higher than the end surface on one side of an aerosol generating substrate of an aerosol generating article in vertical height. Therefore, it is guaranteed that a part of regions on one side of a bottom end of the aerosol generating substrate of the aerosol generating article will not be encircled by the heating element, and thus, the temperature of this segment is relatively low, and an aerosol is hardly generated in this segment. Thus, the problem that the aerosol in this segment is condensed and flows out to pollute the bottom wall of a heating tube after inhaling is stopped is avoided. In addition, the end of an aerosol generating substrate segment (82) away from a filter segment (84) in the aerosol generating article of the present disclosure further has a tight segment (81).

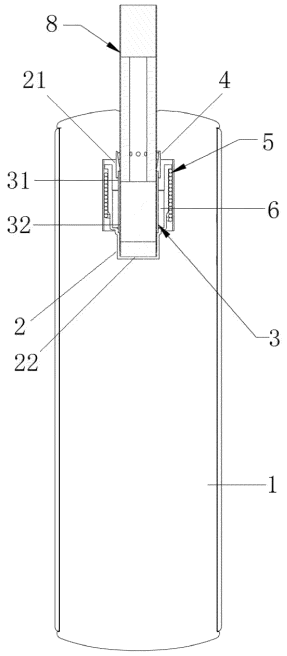

FIG. 1

EP 4 458 180 A1

Description

FIELD

[0001] The present disclosure relates to the technical field of low-temperature heat-not-burn aerosol generating devices, and particularly relates to a heat-not-burn aerosol generating device and an aerosol generating system comprising the same.

BACKGROUND

[0002] The heating temperature of a heat-not-burn aerosol generating substrate is usually 250-350°C. Compared with common burning cigarettes, heat-not-burn aerosol generating articles may greatly reduce harm of harmful substances in the aerosol generating substrate to smokers while reserving the taste of conventional cigarettes, without a high-temperature burning pyrolysis process, so that the release amount of tar and harmful substances in the aerosol generating substrate is reduced, and thus, the harm of second hand smoking may be greatly reduced.

[0003] At present, the heating technology for heating the aerosol generating article usually includes resistance heating or magnetic heating. Moreover, the form of a heating element usually includes a tubular heating tube for heating the around aerosol generating article in an encircling manner and/or a sheet/needlelike heating sheet/heating needle inserted into the aerosol generating article for heating. For the heating element by resistance heating, it heats the aerosol generating article by heat generated by a resistance circuit on the heating element energized. For the heating element by magnetic heating, it generates a current and heats by an induced magnetic field to heat the aerosol generating article. An existing heat-not-burn aerosol generating article includes a filter segment through which a user inhales by mouth and an aerosol generating substrate segment away from the filter segment. An air flow may enter the aerosol generating article from the end surface of the aerosol generating substrate segment and flows out from an end surface of the filter segment. The problem brought about by this is as follows: regardless of heating the aerosol generating substrate with the heating tube or the heating sheet/heating needle, on the one hand, when the user does not inhale, there is still a small amount of cold air enters the aerosol generating substrate through the end surface of the aerosol generating substrate segment, a small part of atomized aerosol in the aerosol generating substrate segment encounters the cold air and is condensed to form a liquid, and the liquid flows out from the end surface of the aerosol generating substrate to pollute an appliance; and on the other hand, when the user smokes, the negative pressure of the aerosol generating substrate segment is low, which makes the aerosol flow to the filter segment, and when the user does not inhale, without the inhaling of the user, under the action of the negative pressure, the small part of aerosol flows from the filter segment to the aerosol generating substrate segment and forms the liquid when being condensed, and the liquid flows out from the end surface of the aerosol generating substrate segment to pollute the appliance.

[0004] Besides, in an existing heat-not-burn aerosol generating device for heating the aerosol generating article with the heating tube, the bottom end of the heating tube generally flushes with the bottom end of the aerosol generating substrate, and the bottom wall surface of the heating tube supports the bottom end surface of the aerosol generating substrate. In this case, the heating tube heats the bottom end (the end away from the filter) of the aerosol generating substrate. The aerosol generated by atomization at the bottom end of the aerosol generating substrate segment has no time to be inhaled after inhaling is stopped, and the aerosol will be condensed and flows out from the end surface of the aerosol generating substrate segment to pollute the bottom of the heating tube. Further, if there is still external air entering from the end surface of the aerosol generating substrate segment in this case, the aerosol generated by atomization at the bottom end of the aerosol generating substrate segment is more likely to condense when encountering cold air and flows out to pollute the bottom wall of the heating tube.

[0005] Therefore, to prevent the atomized aerosol from being condensed again is an important method for preventing the appliance from being polluted.

[0006] In order to solve the above problems, the present disclosure is provided.

SUMMARY

[0007] The present disclosure provides a heat-not-burn aerosol generating device, including a device main body 1, an accommodating cylinder 2 located in the main body 1 for accommodating an aerosol generating article, and a heating element 3 for heating the aerosol generating article to generate an aerosol;

the accommodating cylinder 2 includes a top opening 21 into which the aerosol generating article is insertable and a bottom wall 22 opposite the top opening 21, and the aerosol generating article is inserted from the top opening 21 and is accommodated in the accommodating cylinder 2;

the heating element 3 includes a top end 31 and a bottom end 32 facing away from the top end 31; and

the bottom end 32 of the heating element 3 is higher than the bottom wall 22 of the accommodating cylinder 2 in vertical height. Here, the purpose of defining the bottom end 32 of the heating element 3 to be higher than the bottom wall 22 of the accommodating cylinder 2 in vertical height is as follows: when the

accommodating cylinder 2 does not accommodate the aerosol generating article, the bottom end 32 of the heating element 3 is higher than the end surface on one side of the aerosol generating substrate of the aerosol generating article in vertical height.

[0008] Preferably, the heating element 3 is a heating tube arranged separately from the accommodating cylinder 2, and the heating tube and the accommodating cylinder 2 jointly accommodate the aerosol generating article. That is, the heating tube and the accommodating cylinder 2 are two separate components.

[0009] Preferably, the heating tube is coaxially arranged in the accommodating cylinder 2, and the bottom end 32 of the heating tube is higher than the bottom wall 22 of the accommodating cylinder 2 in vertical height.

[0010] Preferably, the accommodating cylinder 2 is in the shape of a stepped tube as a whole and includes an upper portion and a lower portion that are different in diameter; at the joint of the upper and lower portions, i.e., the step, the diameter of the upper portion is larger than that of the lower portion, the top end of the lower portion is sleeved with the heating tube 3, and the upper portion encircles the outer side of the heating tube 3. That is, there is no heating tube on the inner side of the lower portion, and there is a heating tube on the inner side of the upper portion. Thus, the purpose that the bottom end of the heating tube 3 is higher than the bottom wall of the accommodating cylinder 2 in vertical height is achieved.

[0011] Further preferably, the heating tube is coaxially arranged above the accommodating cylinder 2, and the bottom end 32 of the heating tube is higher than the top end of the accommodating cylinder 2 in vertical height. That is, the heating tube and the accommodating cylinder 2 may be partially overlapped in the vertical direction or may be two completely separated segments.

[0012] Preferably, the heating element 3 and the accommodating cylinder 2 are integrated, and the heating element 3 is a part of the accommodating cylinder 2. That is, the portion of the accommodating cylinder 2 close to the top end has a heating function, which serves not only as the accommodating cylinder for accommodating the aerosol generating article, but also as the heating element for heating the aerosol generating article.

[0013] Preferably, a guide tube 4 for guiding the aerosol generating article is arranged at the top opening 21 of the accommodating cylinder 2.

[0014] The bottom wall 22 of the accommodating cylinder 2 may at least partially seal the end surface on one side of an aerosol generating substrate of the accommodated aerosol generating article to prevent or reduce a gas from entering the aerosol generating substrate from the end surface on one side of the aerosol generating substrate. It should be noted that here that the bottom wall 22 may at least partially seal the end surface on one side of the aerosol generating substrate, which is optional. When the end surface on one side of the aerosol generating substrate of the accommodated aerosol generating article has a seal member, the at least partial sealing arrangement of the end surface by the bottom wall 22 may be either omitted or reserved. However, when the end surface on one side of the aerosol generating substrate of the accommodated aerosol generating article has no seal member, i.e., when the gas can enter the aerosol generating substrate via the end surface without hindrance, the at least partial sealing arrangement of the end surface by the bottom wall 22 needs to be reserved.

[0015] Preferably, the heat-not-burn aerosol generating device is an electromagnetic heating device, the heating element 3 is peripherally wound with a coil 5 capable of generating electromagnetic induction, the heating element 3 is capable of receiving the electromagnetic induction generated by the coil 5 to heat, and the heating element 3 is selected from an electromagnetic metal material. A thermal insulation structure 6 is provided between the heating element 3 and the coil 5, and the thermal insulation structure 6 and the heating element 3 are arranged in a spaced manner.

[0016] Further preferably, the heat-not-burn aerosol generating device is a resistance type heating device, the heating element 3 is an insulation tube, and the heating element has a resistance heating wire on the inner surface and/or the outer surface. The insulation tube here may be selected from a tube body made from an insulation material such as a ceramic, or a tube body made from a non-insulation material subjected to insulation treatment. The inner surface and/or the outer surface have the resistance heating wire, and a resistance circuit may be formed by screen printing to heat the aerosol generating article through resistance heating. The arrangement of the heating tube in the present disclosure may be described by virtue of a heating mode of the electromagnetic heating tube and a resistance heating mode in the prior art.

[0017] In a second aspect of the present disclosure, provided is an aerosol generating system, including the heat-not-burn aerosol generating device in the first aspect and an aerosol generating article 8.

[0018] Preferably, the aerosol generating article includes a tight segment 81, an aerosol generating substrate segment 82, an airway segment 83, and a filter segment 84,

where the airway segment 83 is located between the aerosol generating substrate segment 82 and the filter segment 84;

the tight segment 81 is located at one end of the aerosol generating substrate segment 82 away from the filter segment 84;

the airway segment 83 has an airflow channel 831 axially penetrating the airway segment 83; and

the axial air permeability of the tight segment 81 is

less than that of the aerosol generating substrate segment 82. Preferably, the axial air permeability of the tight segment 81 is 0. That is, the gas is not allowed to pass through axially.

[0019] The tight segment 81, the aerosol generating substrate segment 82, the airway segment 83, and the filter segment 84 are segments coiled and formed in the aerosol generating article by a wrapper or segments filled and formed in the aerosol generating article by being filled into an integrally formed pipe fitting.

[0020] Preferably, the bottom end of the heating element 3 is higher than or flushes with the connection between the tight segment 81 and the aerosol generating substrate segment 82 in the vertical height.

[0021] Preferably, the tight segment 81 is selected from a non-aerosol generating material, and is selected from, but is not limited to, a carbon fiber material, a metal membrane, a ceramic or a high molecular material. The high molecular material is selected from, but is not limited to, polyethylene, polypropylene, polyvinyl chloride, polyethylene glycol terephthalate or polylactic acid.

[0022] Or, the material of the tight segment 81 is as same as that of the aerosol generating substrate segment 82 and both the materials are selected from an aerosol generating material, and the bulk density of the tight segment 81 is higher than that of the aerosol generating substrate segment 82. That is, the material of the tight segment 81 is consistent with that of the aerosol generating substrate segment 82 in this case and both the materials are the aerosol generating material. The degrees of compaction at both ends are completely inconsistent. The density of the tight segment 81 is higher than that of the aerosol generating substrate segment 82. The axial air permeability of the tight segment 81 is less than that of the aerosol generating substrate segment 82. When the tight segment 81 is the aerosol generating material, it may be integrally formed with the aerosol generating substrate segment 82 in an aerosol generating substrate manufacturing process, and a high density aerosol generating substrate segment is formed by a compaction process as the tight segment 81, which is easy to manufacture.

[0023] Preferably, the airway segment 83 is hollow and is provided with a side wall and a hollow cavity, and the hollow cavity is the airflow channel 831 axially penetrating the airway segment 83; and the airway segment 83 is cylindrical and is prepared from a cellulose acetate fiber material.

[0024] Preferably, a side flow hole 832 penetrating the side wall is further formed in the side wall of the airway segment 83; the axial position of the side flow hole 832 is close to the position of the aerosol generating substrate segment 82 and is away from the position of the filter segment 84; and the reason why the axial position of the side flow hole is closer to the position of the aerosol generating substrate segment 82 is that the closer the axial position of the side flow hole 832 is to the aerosol generating substrate segment 82, the easier it is to extract the aerosol from the aerosol generating substrate segment 82 is. The number of the side flow holes 832 may be, but is not limited to, 6-8.

[0025] Preferably, the airway segment 83 includes a first airway segment 833 close to the aerosol generating substrate segment 82 and a second airway segment 834 close to the filter segment 84; and the first airway segment 833 and the second airway segment 834 may be either integrated or separated.

[0026] The cross sectional area of the airflow channel 831 of the first airway segment 833 is smaller than or equal to or larger than that of the airflow channel 831 of the second airway segment 834. When the airway segment 83 is hollow, it is provided with a side wall and a hollow cavity, and the hollow cavity is the airflow channel 831 axially penetrating the airway segment 83. The inner diameter of the hollow cavity of the first airway segment 833 is less than or equal to or larger than the inner diameter of the hollow cavity of the second airway segment 834. In this case, a connection therebetween may be either a conical bevel or a vertical section, and either a flat angle structure or a chamfered structure. When the inner diameter of the hollow cavity of the first airway segment 833 is larger than the inner diameter of the hollow cavity of the second airway segment 834, more air is introduced by the first airway segment 833, so that the extraction effect on the aerosol is better, and the amount of the aerosol is larger. When the inner diameter of the hollow cavity of the first airway segment 833 is less than the inner diameter of the hollow cavity of the second airway segment 834, more aerosols may be gathered in the second airway segment 834, so that the condensation effect on the aerosol is better, the cooling effect on the aerosol is better, and the aerosol is more suitable to inhale.

[0027] Preferably, when the heat-not-burn aerosol generating device is the electromagnetic heating device, the aerosol generating substrate segment 82 further has a sheet metal 7 arranged axially. The middle sheet metal 7 may also induce electromagnetism generated by the coil to heat.

[0028] Preferably, the airway segment 83 is cylindrical and is prepared from, but is not limited to, a cellulose acetate fiber material and a high molecular material.

[0029] The aerosol generating substrate segment 82 contains the aerosol generating material, and the aerosol generating material is an aerosol generating material in the form of particles or filaments.

[0030] Here, the forms of the aerosol generating material are only illustrated but are not limited to the above several forms actually, and aerosol generating media capable of generating the aerosol are applicable.

[0031] The total length of the aerosol generating article in the present disclosure may be 30-80 mm, where the range of the tight segment is 2-10 mm, preferably 5 mm; the length of the aerosol generating substrate segment 82 is 8-25 mm, preferably 12 mm; the length of the airway

segment 83 is 10-20 mm, preferably 15 mm; and the length of the filter segment 84 is 8-15 mm, preferably 10 mm.

[0032] On the premise of no conflicts, the above preferred solutions may be combined freely.

[0033] Compared with the prior art, the present disclosure has the following beneficial effects:

1. The heat-not-burn aerosol generating device provided by the present disclosure includes the device main body 1, the accommodating cylinder 2, and the heating element 3. The bottom end 32 of the heating element 3 is higher than the bottom wall 22 of the accommodating cylinder 2 in vertical height, and the bottom end 32 of the heating element 3 is higher than the end surface on one side of the aerosol generating substrate of the aerosol generating article in vertical height. Therefore, it is guaranteed that a part of regions on one side of the bottom end of the aerosol generating substrate of the aerosol generating article will not be encircled by the heating element, and thus, the temperature of this segment is relatively low, and an aerosol is hardly generated in this segment. Thus, the problem that the aerosol which is not inhaled in this segment is condensed and flows out from the end surface to pollute the bottom wall of the heating tube after inhaling is stopped is avoided.

2. In a preferred implementation of the present disclosure, the bottom wall 22 of the accommodating cylinder 2 may at least partially seal the end surface on one side of an aerosol generating substrate of the accommodated aerosol generating article to prevent or reduce a gas from entering the aerosol generating substrate from the end surface on one side of the aerosol generating substrate. A situation that cold air enters the aerosol generating substrate segment from the end surface of the aerosol generating substrate segment, a small part of aerosol atomized in the aerosol generating substrate segment encounters the cold air and is condensed to form a liquid, and the liquid flows out from the end surface of the aerosol generating substrate segment may be prevented.

3. In a present disclosure, the heating tube and the accommodating cylinder 2 may be two separate components, and the two components are coaxially arranged and are partially overlapped in the vertical direction or may be two completely separated segments. Besides, the heating tube and the accommodating cylinder 2 may also be integrated, and the heating element 3 is a part of the accommodating cylinder 2. That is, the portion of the accommodating cylinder 2 close to the top end has a heating function, which serves not only as the accommodating cylinder for accommodating the aerosol generating article, but also as the heating element for heating the aerosol generating article. Therefore, the structure is simpler and the implementation is easy.

4. In a preferred implementation of the present disclosure, because the tight segment 81 is arranged at the end of the aerosol generating substrate segment 82 away from the filter segment 84 in the used aerosol generating article 8 and the axial air permeability of the tight segment 81 is less than that of the aerosol generating substrate segment 82, the probability that air enters the aerosol generating substrate segment 82 from the tight segment 81 can be reduced and prevented, and a situation that cold air enters the aerosol generating substrate segment from the end surface of the aerosol generating substrate segment, a small part of aerosol atomized in the aerosol generating substrate segment encounters the cold air and is condensed to form a liquid, and the liquid flows out from the end surface of the aerosol generating substrate segment can be avoided.

4. In the prior art, gas passes through the end of the aerosol generating substrate segment in the inhaling process. The aerosol generating substrate segment is in the negative pressure state in the inhaling process, and therefore, at the moment of stopping inhaling, there will be problem that the aerosol which is not inhaled flows to the aerosol generating substrate segment back from the filter segment.

[0034] However, after the tight segment is added in front of the aerosol generating substrate segment, in the inhaling process of the user, because the external gas can hardly be supplemented by the tight segment to enter the aerosol generating substrate segment, the negative pressure of the aerosol generating substrate segment will not increase, and the aerosol can be prevented from flowing back to the aerosol generating substrate segment and flowing out from the end surface of the aerosol generating substrate segment when inhaling is stop, so as to further solve the problem that the aerosol condensate flows out from the end surface of the aerosol generating substrate segment to pollutant the appliance.

[0035] 5. In a preferred implementation, the tight segment 81 is selected from the non-aerosol generating material, but is not limited to a carbon fiber material, a metal membrane, a ceramic or a high molecular material, or the tight segment 81 is selected from the aerosol generating material, the density of the tight segment 81 is higher than that of the aerosol generating substrate segment 82, and the material selection range is wide. Besides, when the tight segment 81 is the aerosol generating material, it may be integrally formed with the aerosol generating substrate segment 82 in an aerosol generating substrate manufacturing process, and a high density aerosol generating substrate segment is formed by a compaction process as the tight segment 81, which

is easy to manufacture.

[0036] 6. In a preferred implementation, the side flow hole 832 penetrating the side wall is further formed in the side wall of the airway segment 83. The side flow hole is formed to facilitate inhaling of the aerosol, so as to reduce the inhaling resistance during inhaling.

[0037] 7. In a preferred implementation, the axial position of the side flow hole 832 is close to the position of the aerosol generating substrate segment 82 and is away from the position of the filter segment 84. The air introduced from the side flow hole plays a role of extracting the aerosol generated by the aerosol generating substrate segment 82.

[0038] 8. In a preferred implementation, the airway segment 83 includes the first airway segment 833 close to the aerosol generating substrate segment 82 and the second airway segment 834 close to the filter segment 84. The cross sectional area of the airflow channel 831 of the first airway segment 833 is smaller than or equal to or larger than that of the airflow channel 831 of the second airway segment 834. When the airway segment 83 is hollow, it is provided with a side wall and a hollow cavity, and the hollow cavity is the airflow channel 831 axially penetrating the airway segment 83. The inner diameter of the hollow cavity of the first airway segment 833 is less than or equal to or larger than the inner diameter of the hollow cavity of the second airway segment 834.

[0039] When the inner diameter of the hollow cavity of the first airway segment 833 is larger than the inner diameter of the hollow cavity of the second airway segment 834, more air is introduced by the first airway segment 833, so that the extraction effect on the aerosol is better, and the amount of the aerosol is larger.

[0040] When the inner diameter of the hollow cavity of the first airway segment 833 is less than the inner diameter of the hollow cavity of the second airway segment 834, more aerosols may be gathered in the second airway segment 834, so that the condensation effect on the aerosol is better, the cooling effect on the aerosol is better, and the aerosol is more suitable to inhale.

BRIEF DESCRIPTION OF THE DRAWINGS

[0041]

FIG. 1 is a schematic structural diagram of an aerosol generating system formed by combining an aerosol generating article with a tight segment and a heat-not-burn aerosol generating device in Embodiment 1;

FIG. 2 is a schematic structural diagram of the aerosol generating article with a tight segment in Embodiment 1;

FIG. 3 is a schematic structural diagram of an aerosol generating system formed by combining an aerosol generating article with a tight segment and a heat-not-burn aerosol generating device in Embodiment 4;

FIG. 4 is a schematic structural diagram of the aerosol generating article with a tight segment in Embodiment 4;

FIG. 5 is a schematic structural diagram of the aerosol generating article with a tight segment in Embodiment 5;

FIG. 6 is a schematic structural diagram of the aerosol generating article with a tight segment in Embodiment 6;

FIG. 6 is a schematic structural diagram of the aerosol generating article with a tight segment in Embodiment 7;

[0042] List of numerals: 1-device main body of; 2-accommodating cylinder; 21-top opening; 22-bottom wall; 3-heating element; 31-top end; 32-bottom end; 4-guide tube; 5-coil; 6-thermal insulation structure; 7-sheet metal; 8-aerosol generating article; 81-tight segment; 82-aerosol generating substrate segment; 83-airway segment; 84-filter segment; 831-airflow channel; 832-side flow hole; 833-first airway segment; 834-second airway segment.

DETAILED DESCRIPTION

[0043] The present disclosure will be further described in detail below with reference to embodiments.

[0044] Persons skilled in the art will understand that the embodiments below are merely used for explaining the present disclosure and are not to limit the scope of the present disclosure. The embodiments without specific technologies or conditions indicated are carried out according to technologies or conditions described by literature in the art or description of a product. The used materials or equipment not indicated by manufacturers are conventional products which can be purchased.

[0045] Persons skilled in the art may understand that unless otherwise specified, the singular forms "a", "an", "the" and "this" used herein may also include plural forms. It should be further understood that the expression "include" used in the description of the present disclosure refers to the existence of the characteristics, integers, steps, operations, components and/or assemblies, but not excludes the existence or addition of one or more other characteristics, integers, steps, operations, components, assemblies and/or their groups. It should be understood that when a component is referred to as being "connected to" another component, it may be directly connected to the another component or there may be an intermediate component. In addition, "connection" used herein may include wireless connection.

[0046] In the description of the present disclosure,

unless otherwise specified, "a plurality of' means two or more than two. Orientation or position relationships indicated by the terms such as "inside", "up", "down" and the like are based on orientation or position relationships shown in the drawings, and are used only for ease and brevity of illustration and description of the present disclosure, rather than indicating or implying that the mentioned device 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 the present disclosure.

[0047] In the description of the present disclosure, it should be noted that unless otherwise explicitly specified and limited, the terms "mount", "connect", "connection", and "provided with" should be understood in a broad sense. For example, the connection may be fixed connection, detachable connection, or integral connection; or the connection may be mechanical connection or electrical connection; or the connection may be direct connection, or indirect connection through an intermediate. Persons of ordinary skill in the art may understand the specific meanings of the foregoing terms in the present disclosure according to specific situations.

[0048] Persons skilled in the art may understand that unless otherwise defined, all terms used herein including technical terms and scientific terms have the same meanings as those commonly understood by persons of ordinary skill in the art. It should be further understood that those terms defined in a general dictionary should be understood as having meanings consistent with the meanings in the context in the prior art. Unless otherwise defined herein, those terms will not be explained by idealized or too formal implications.

EMBODIMENT 1

[0049] In the embodiment, the total length of an aerosol generating article 8 may be 42 mm, where the range of the tight segment is 5 mm, the length of the aerosol generating substrate segment 82 is 12 mm, the length of the airway segment 83 is 15 mm, and the length of the filter segment 84 is 10 mm.

[0050] The aerosol generating article 8 with a tight segment shown in FIG. 2 includes a tight segment 81, an aerosol generating substrate segment 82, an airway segment 83, and a filter segment 84,

where the airway segment 83 is located between the aerosol generating substrate segment 82 and the filter segment 84;

the tight segment 81 is located at one end of the aerosol generating substrate segment 82 away from the filter segment 84;

the airway segment 83 has an airflow channel 831 axially penetrating the airway segment 83; and

The axial air permeability of the tight segment 81 is less than that of the aerosol generating substrate segment 82.

[0051] The tight segment 81 is selected from a non-aerosol generating material such as a carbon fiber material.

[0052] The airway segment 83 is hollow and is provided with a side wall and a hollow cavity, and the hollow cavity is the airflow channel 831 axially penetrating the airway segment 83.

[0053] A side flow hole 832 penetrating the side wall is further formed in the side wall of the airway segment 83.

[0054] The axial position of the side flow hole 832 is close to the position of the aerosol generating substrate segment 82 and is away from the position of the filter segment 84.

[0055] The number of the side flow holes 832 is 6.

[0056] The airway segment 83 is cylindrical and is prepared from a cellulose acetate fiber material.

[0057] As shown in FIG. 1, the heat-not-burn aerosol generating device used includes a device main body 1, an accommodating cylinder 2 located in the main body 1 for accommodating an aerosol generating article, and a heating element 3 for heating the aerosol generating article to generate an aerosol;

the accommodating cylinder 2 includes a top opening 21 into which the aerosol generating article is inserted and a bottom wall 22 opposite to the top opening 21, and the aerosol generating article is inserted from the top opening 21 and is accommodated in the accommodating cylinder 2;

the heating element 3 includes a top end 31 and a bottom end 32 facing away from the top end 31; and

the bottom end 32 of the heating element 3 is higher than the bottom wall 22 of the accommodating cylinder 2 in vertical height.

[0058] The heating element 3 is a heating tube arranged separately from the accommodating cylinder 2, and the heating tube and the accommodating cylinder 2 jointly accommodate the aerosol generating article. The heating tube is coaxially arranged in the accommodating cylinder 2, and the bottom end 32 of the heating tube is higher than the bottom wall 22 of the accommodating cylinder 2 in vertical height.

[0059] The accommodating cylinder 2 is in the shape of a stepped tube as a whole and includes an upper portion and a lower portion that are different in diameter; the joint of the upper and lower portions, i.e., the step, the diameter of the upper portion is larger than that of the lower portion, the top end of the lower portion is sleeved with the heating tube 3, and the upper portion encircles the outer side of the heating tube 3.

[0060] A guide tube 4 for guiding the aerosol generat-

ing article is arranged at the top opening 21 of the accommodating cylinder 2.

[0061] The heat-not-burn aerosol generating device is an electromagnetic heating device, the heating element 3 is peripherally wound with a coil 5 capable of generating electromagnetic induction, the heating element 3 is capable of receiving the electromagnetic induction generated by the coil 5 to heat, and the heating element 3 is selected from an electromagnetic metal material. A thermal insulation structure 6 is provided between the heating element 3 and the coil 5, and the thermal insulation structure 6 and the heating element 3 are arranged in a spaced manner.

[0062] The bottom end of the heating tube 3 is higher than the connection between the tight segment 81 and the aerosol generating substrate segment 82 in the vertical height.

EMBODIMENT 2

[0063] The aerosol generating article used in the embodiment is consistent with that in Embodiment 1, and the difference is that the heat-not-burn aerosol generating device is different from that in Embodiment 1.

[0064] According to the heat-not-burn aerosol generating device used in the embodiment, the heating element 3 is a heating tube arranged separately from the accommodating cylinder 2, and the heating tube and the accommodating cylinder 2 jointly accommodate the aerosol generating article. The heating tube is coaxially arranged above the accommodating cylinder 2, and the bottom end 32 of the heating tube 3 is higher than the top end of the accommodating cylinder 2 in vertical height. Other features of the heat-not-burn aerosol generating device are consistent with those in Embodiment 1.

EMBODIMENT 3

[0065] The aerosol generating article used in the embodiment is consistent with that in Embodiment 1, and the difference is that the heat-not-burn aerosol generating device is different from that in Embodiment 1.

[0066] According to the heat-not-burn aerosol generating device used in the embodiment, the heating element 3 and the accommodating cylinder 2 are integrated, and the heating element 3 is a part of the accommodating cylinder 2. That is, the portion of the accommodating cylinder 2 close to the top end has a heating function, which serves not only as the accommodating cylinder for accommodating the aerosol generating article, but also as the heating element for heating the aerosol generating article. Other features of the heat-not-burn aerosol generating device are consistent with those in Embodiment 1.

EMBODIMENT 4

[0067] As shown in FIG. 3, the heat-not-burn aerosol generating device used in the embodiment is consistent with that in Embodiment 1. The difference is that the aerosol generating articles are different.

[0068] The different between the structure of the aerosol generating article 8 with a tight segment shown in FIG. 4 and that in Embodiment 1 is as follows: the aerosol generating substrate segment 82 further has a sheet metal 7 arranged axially therein. The middle sheet metal 7 may also induce electromagnetism generated by the coil to heat.

EMBODIMENT 5

[0069] The heat-not-burn aerosol generating device used in the embodiment is consistent with that in Embodiment 1. The difference is that the aerosol generating articles are different.

[0070] The different between the structure of the aerosol generating article 8 with a tight segment shown in FIG. 5 and that in Embodiment 1 is as follows: the airway segment 83 includes a first airway segment 833 close to the aerosol generating substrate segment 82 and a second airway segment 834 close to the filter segment 84. The first airway segment 833 and the second airway segment 834 are two separable segments.

[0071] The cross sectional area of the airflow channel 831 of the first airway segment 833 is smaller than or that of the airflow channel 831 of the second airway segment 834. When the airway segment 83 is hollow, it is provided with a side wall and a hollow cavity, and the hollow cavity is the airflow channel 831 axially penetrating the airway segment 83. The inner diameter of the hollow cavity of the first airway segment 833 is less than the inner diameter of the hollow cavity of the second airway segment 834, and in this case, the connection therebetween may be a conical bevel.

[0072] When the inner diameter of the hollow cavity of the first airway segment 833 is less than the inner diameter of the hollow cavity of the second airway segment 834, more aerosols may be gathered in the second airway segment 834, so that the condensation effect on the aerosol is better, the cooling effect on the aerosol is better, and the aerosol is more suitable to inhale.

EMBODIMENT 6

[0073] The heat-not-burn aerosol generating device used in the embodiment is consistent with that in Embodiment 1. The difference is that the aerosol generating articles are different.

[0074] The different between the structure of the aerosol generating article 8 with a tight segment shown in FIG. 6 and that in Embodiment 1 is as follows: the airway segment 83 includes a first airway segment 833 close to the aerosol generating substrate segment 82 and a second airway segment 834 close to the filter segment 84. The first airway segment 833 and the second airway segment 834 are two separable segments.

[0075] The cross sectional area of the airflow channel 831 of the first airway segment 833 is larger than or that of the airflow channel 831 of the second airway segment 834. When the airway segment 83 is hollow, it is provided with a side wall and a hollow cavity, and the hollow cavity is the airflow channel 831 axially penetrating the airway segment 83. The inner diameter of the hollow cavity of the first airway segment 833 is larger than the inner diameter of the hollow cavity of the second airway segment 834, and in this case, the connection therebetween may be a conical bevel.

[0076] When the inner diameter of the hollow cavity of the first airway segment 833 is larger than the inner diameter of the hollow cavity of the second airway segment 834, more air is introduced by the first airway segment 833, so that the extraction effect on the aerosol is better, and the amount of the aerosol is larger.

EMBODIMENT 7

[0077] The heat-not-burn aerosol generating device used in the embodiment is consistent with that in Embodiment 1. The difference is that the aerosol generating articles are different.

[0078] The different between the structure of the aerosol generating article 8 with a tight segment shown in FIG. 7 and that in Embodiment 1 is as follows:

the material of the tight segment 81 is selected from an aerosol generating material and the density of the tight segment 81 is higher than that of the aerosol generating substrate segment 82. That is, the material of the tight segment 81 is consistent with that of the aerosol generating substrate segment 82 in this case and both the materials are the aerosol generating material. The degrees of compaction at both ends are completely inconsistent. The density of the tight segment 81 is higher than that of the aerosol generating substrate segment 82. The axial air permeability of the tight segment 81 is less than that of the aerosol generating substrate segment 82.

[0079] The tight segment 81 may be integrally formed with the aerosol generating substrate segment 82 in an aerosol generating substrate manufacturing process, and a high density aerosol generating substrate segment is formed by a compaction process as the tight segment 81, which is easy to manufacture.

Claims

1. A heat-not-burn aerosol generating device, comprising:

a device main body (1);
an accommodating cylinder (2) located in the main body (1) and configured to accommodate an aerosol generating article; and
a heating element (3) configured to heat the aerosol generating article to generate an aerosol,
wherein the accommodating cylinder (2) comprises a top opening (21) into which the aerosol generating article is insertable and a bottom wall (22) opposite the top opening (21), and the aerosol generating article is inserted from the top opening (21) and is accommodated in the accommodating cylinder (2),
wherein the heating element (3) comprises a top end (31) and a bottom end (32) facing away from the top end (31), and
wherein the bottom end (32) of the heating element (3) is higher than the bottom wall (22) of the accommodating cylinder (2) in vertical height.

2. The heat-not-burn aerosol generating device of claim 1, wherein the heating element (3) is a heating tube arranged separately from the accommodating cylinder (2), and the heating tube and the accommodating cylinder (2) jointly accommodate the aerosol generating article.

3. The heat-not-burn aerosol generating device of claim 2, wherein the heating tube is coaxially arranged in the accommodating cylinder (2), and the bottom end (32) of the heating tube is higher than the bottom wall (22) of the accommodating cylinder (2) in vertical height.

4. The heat-not-burn aerosol generating device of claim 3, wherein the accommodating cylinder (2) is in the shape of a stepped tube as a whole, and comprises an upper portion and a lower portion that are different in diameter,

wherein a diameter of the upper portion is larger than a diameter of the lower portion,
wherein a top end of the lower portion is sleeved with the heating tube, and
wherein the upper portion encircles an outer side of the heating tube.

5. The heat-not-burn aerosol generating device of claim 2, wherein the heating tube is coaxially arranged above the accommodating cylinder (2), and the bottom end (32) of the heating tube is higher than the top end of the accommodating cylinder (2) in vertical height.

6. The heat-not-burn aerosol generating device of claim 1, wherein the heating element (3) and the accommodating cylinder (2) are integrated, and the heating element (3) is a part of the accommodating cylinder (2).

7. The heat-not-burn aerosol generating device of claim 1, wherein a guide tube (4) configured to guide the aerosol generating article is arranged at the top

opening (21) of the accommodating cylinder (2).

8. The heat-not-burn aerosol generating device of claim 1, wherein the bottom wall (22) of the accommodating cylinder (2) at least partially seals an end surface on one side of an aerosol generating substrate of the accommodated aerosol generating article to prevent or reduce a gas from entering the aerosol generating substrate from the end surface on one side of the aerosol generating substrate.

9. The heat-not-burn aerosol generating device of claim 1, wherein the heat-not-burn aerosol generating device is an electromagnetic heating device, the heating element (3) is peripherally wound with a coil (5) configured to generate electromagnetic induction,

wherein the heating element (3) is configured to receive the electromagnetic induction generated by the coil (5) to generate heat, and
wherein the heating element (3) is selected from an electromagnetic metal material.

10. The heat-not-burn aerosol generating device of claim 9, wherein a thermal insulation structure (6) is provided between the heating element (3) and the coil (5), and the thermal insulation structure (6) and the heating element (3) are arranged in a spaced manner.

11. The heat-not-burn aerosol generating device of claim 1, wherein the heat-not-burn aerosol generating device is a resistance type heating device, the heating element (3) is an insulation tube, and the heating element (3) has a resistance heating wire on an inner surface and/or an outer surface thereof.

12. An aerosol generating system, comprising:

the heat-not-burn aerosol generating device of any one of claims 1 to11; and
an aerosol generating article (8).

13. The aerosol generating system of claim 12, wherein the aerosol generating article (8) comprises a tight segment (81), an aerosol generating substrate segment (82), an airway segment (83), and a filter segment (84),

wherein the airway segment (83) is located between the aerosol generating substrate segment (82) and the filter segment (84),
wherein the tight segment (81) is located at one end of the aerosol generating substrate segment (82) away from the filter segment (84),
wherein the airway segment (83) has an airflow channel (831) axially penetrating the airway segment (83), and
wherein an axial air permeability of the tight segment (81) is less than an axial air permeability of the aerosol generating substrate segment (82).

14. The aerosol generating system of claim 13, wherein the bottom end (32) of the heating element (3) is higher than or flush with a connection between the tight segment (81) and the aerosol generating substrate segment (82) in vertical height.

15. The aerosol generating system of claim 13, wherein the tight segment (81) is selected from a non-aerosol generating material such as a carbon fiber material, a metal membrane, a ceramic, or a high molecular material.

16. The aerosol generating system of claim 13, wherein a material of the tight segment (81) is a same material as that of the aerosol generating substrate segment (82), and both the same materials are selected from an aerosol generating material, and
wherein a bulk density of the tight segment (81) is higher than a bulk density of the aerosol generating substrate segment (82).

17. The aerosol generating system of claim 13, wherein the airway segment (83) is hollow and is provided with a side wall and a hollow cavity,

wherein the hollow cavity is the airflow channel (831) axially penetrating the airway segment (83), and
wherein the airway segment (83) is cylindrical and is prepared from a cellulose acetate fiber material.

18. The aerosol generating system of claim 13, wherein a side flow hole (832) penetrating the side wall is formed in the side wall of the airway segment (83), and
wherein an axial position of the side flow hole (832) is close to a position of the aerosol generating substrate segment (82) and is away from a position of the filter segment (84).

19. The aerosol generating system of claim 13, wherein the airway segment (83) comprises a first airway segment (833) close to the aerosol generating substrate segment (82) and a second airway segment (834) close to the filter segment (84), and
wherein a cross sectional area of the airflow channel (831) of the first airway segment (833) is smaller than or equal to or larger than a cross sectional area of the airflow channel (831) of the second airway segment (834).

20. The aerosol generating system of claim 13, wherein when the heat-not-burn aerosol generating device is the electromagnetic heating device, the aerosol generating substrate segment (82) comprises a sheet metal (7) arranged axially therein.

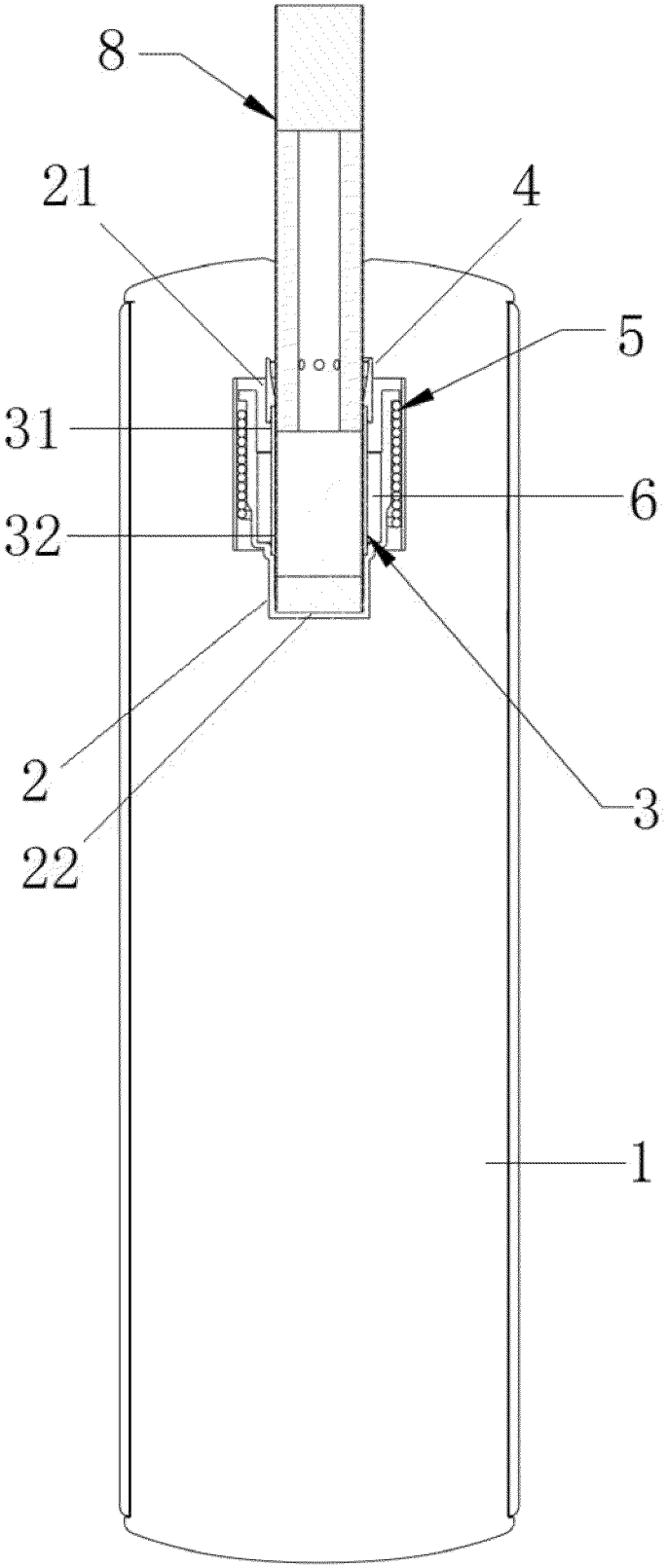

FIG. 1

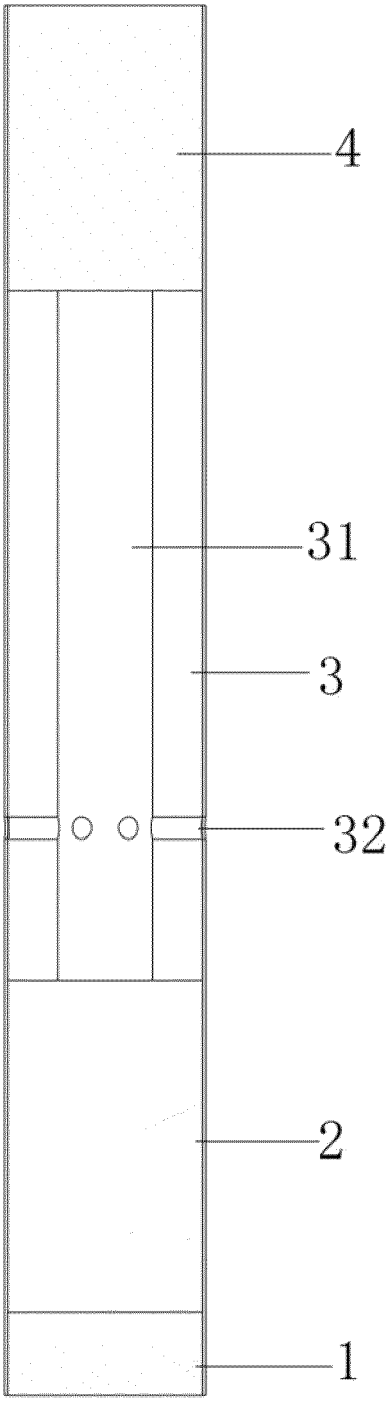

FIG. 2

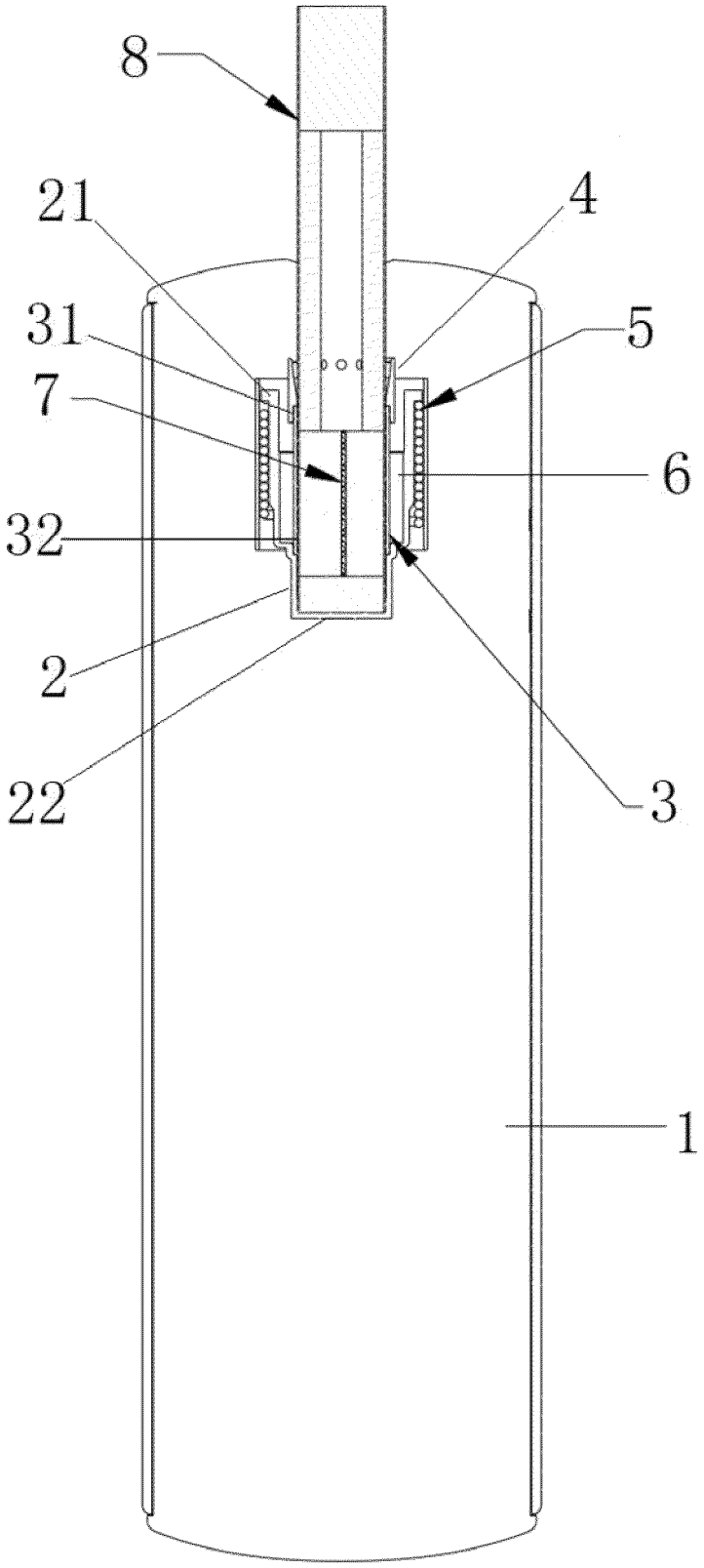

FIG. 3

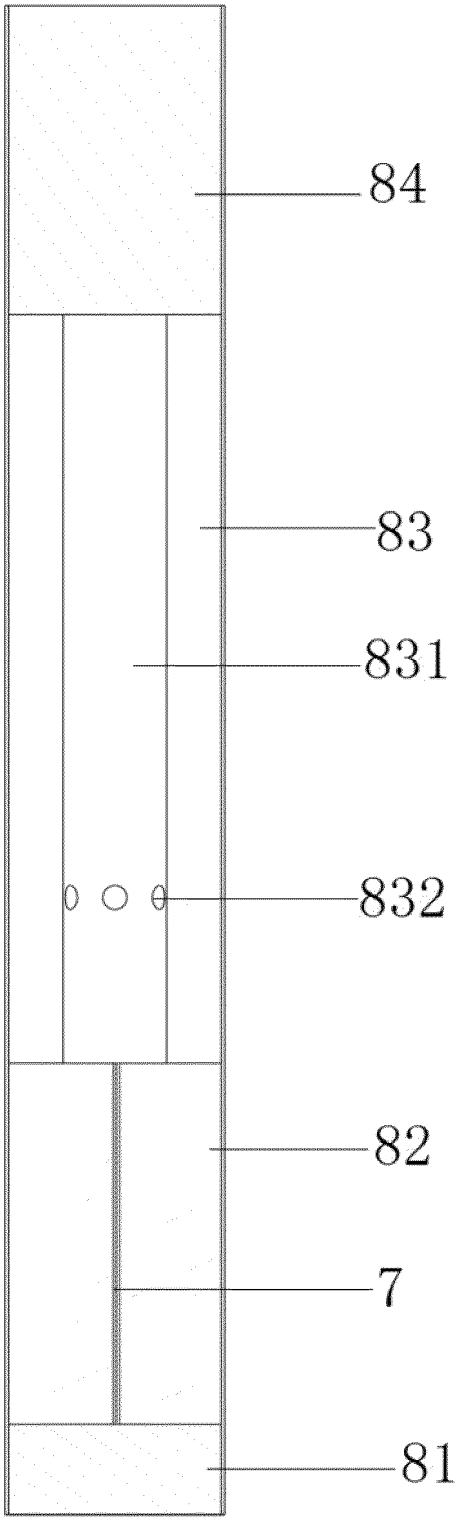

FIG. 4

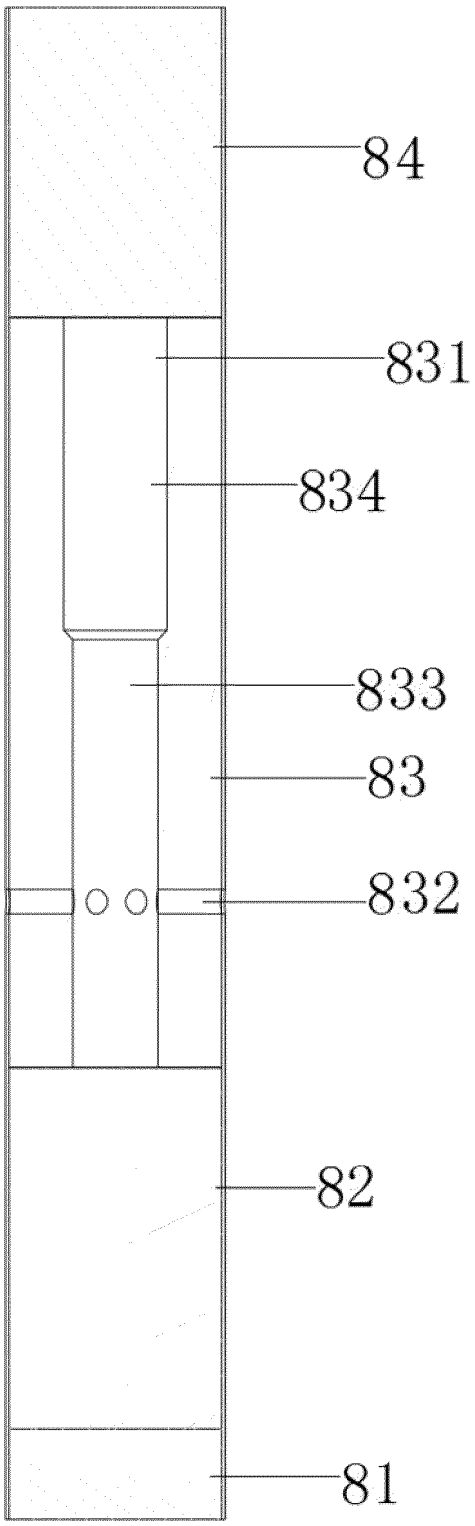

FIG. 5

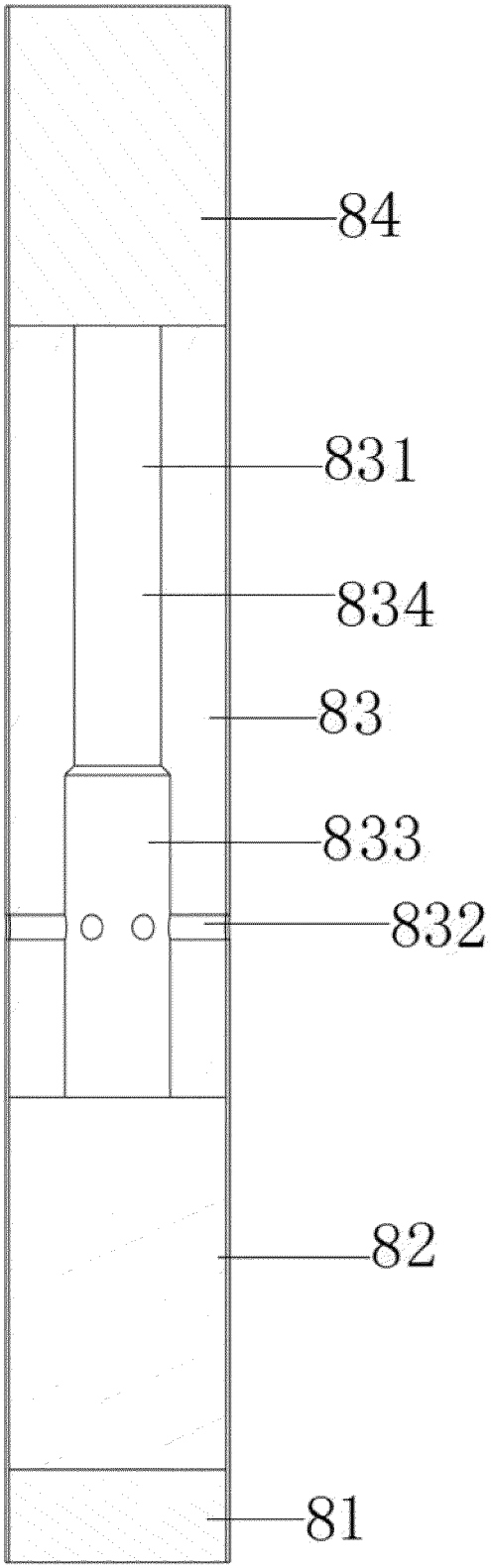

FIG. 6

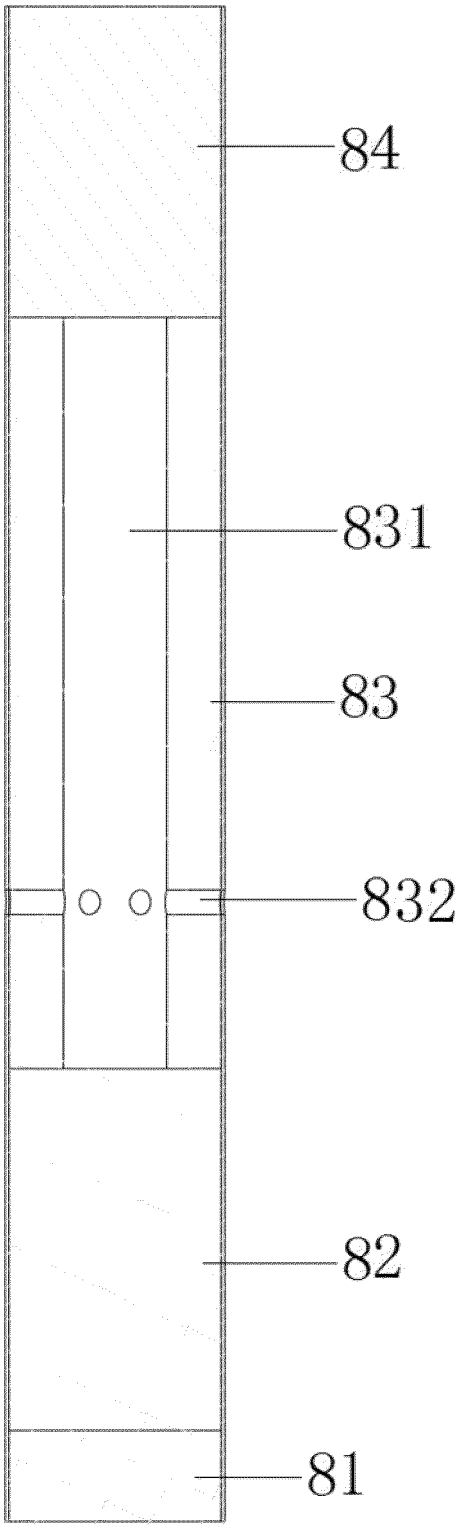

FIG. 7

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2022/129725

A. CLASSIFICATION OF SUBJECT MATTER

A24F 40/40(2020.01)i; A24F 40/46(2020.01)i; A24F 47/00(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)

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; CNKI; WPABSC; ENTXTC; WPABS; ENTXT: 深圳麦时科技, 容纳腔, 容纳室, 加热, 发热, 电磁, 磁场, 线圈, 冷凝, 污染, cavity, heat+, magnetic field, electromagnetic, coil, condensat+, pollut+

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 217218164 U (SHENZHEN MAISHI TECHNOLOGY CO., LTD.) 19 August 2022 (2022-08-19) claims 1-20, and description, paragraphs [0007]-[0052]	1-20
X	CN 113747809 A (PHILIP MORRIS PRODUCTS S.A.) 03 December 2021 (2021-12-03) description, paragraphs [0090]-[0093] and [0096]-[0098], and figures 1-6	1, 7, 9, 10, 12-20
A	CN 109393576 A (CHINA TOBACCO ANHUI INDUSTRIAL CO., LTD.) 01 March 2019 (2019-03-01) entire document	1-20
A	CN 108669654 A (CHONGQING CHINA TOBACCO INDUSTRY CO., LTD.) 19 October 2018 (2018-10-19) entire document	1-20
A	CN 107466122 A (SUZHOU SANHUAN ELECTRONIC TECHNOLOGY CO., LTD.) 12 December 2017 (2017-12-12) entire document	1-20

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

Date of the actual completion of the international search	Date of mailing of the international search report
09 January 2023	**18 January 2023**
Name and mailing address of the ISA/CN **China National Intellectual Property Administration (ISA/CN)** **No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088, China** Facsimile No. **(86-10)62019451**	Authorized officer Telephone No.

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

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2022/129725

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN 217218164 U	19 August 2022	None	
CN 113747809 A	03 December 2021	JP 2022531097 A	06 July 2022
		KR 20220002398 A	06 January 2022
		US 2022211113 A1	07 July 2022
		EP 3958696 A1	02 March 2022
		IL 287356 A	01 December 2021
		WO 2020216765 A1	29 October 2020
		BR 112021017539 A2	09 November 2021
CN 109393576 A	01 March 2019	None	
CN 108669654 A	19 October 2018	CN 208609921 U	19 March 2019
CN 107466122 A	12 December 2017	None	

Form PCT/ISA/210 (patent family annex) (January 2015)