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(54) AEROSOL GENERATION DEVICE AND CONTROL METHOD

(57) The present application provides an aerosol generation device and a control method. The aerosol generation device comprises: a chamber used for receiving at least a part of an aerosol generation article; a heater at least partially inserted into the aerosol generation article for heating; a holding element used for at least partially holding the aerosol generation article; and a driving element used for driving the movement of one of the holding element and the heater relative to the other, such that the aerosol generation article held by the holding element can eliminate or reduce adhesion or bonding to the surface of the heater during movement. According to the foregoing aerosol generation device, the aerosol generation article and the heater are moved, such that the adhesion or bonding therebetween is reduced, and it is beneficial to pulling out the aerosol generation article from the chamber by a user without an extractor.

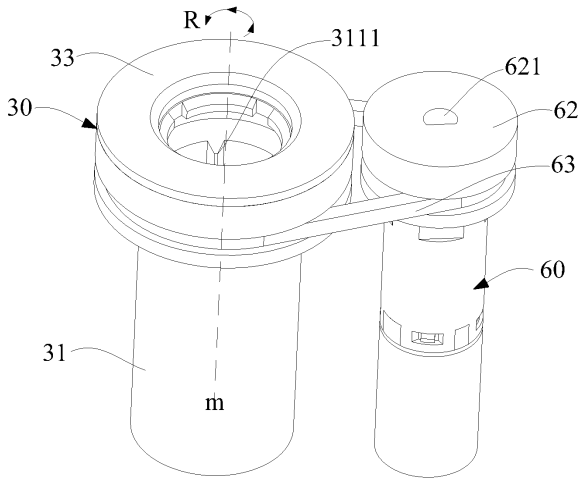

FIG. 4

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Description

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to Chinese Patent Application No. 202210507896.7, filed with the China National Intellectual Property Administration on May 10, 2022 and entitled "AEROSOL GENERATING DEVICE AND CONTROL METHOD", Chinese Patent Application No. 202211378480.6, filed with the China National Intellectual Property Administration on November 4, 2022 and entitled "AEROSOL GENERATING DEVICE AND CONTROL METHOD THEREOF", and Chinese Patent Application No. 202222943936.0, filed with the China National Intellectual Property Administration on November 4, 2022 and entitled "AEROSOL GENERATING DEVICE", which are incorporated herein by reference in their entireties.

TECHNICAL FIELD

[0002] Embodiments of this application relate to the field of heat-not-burn aerosol generating technologies, and in particular, to an aerosol generating device and a control method.

BACKGROUND

[0003] Tobacco products (such as cigarettes, cigars, and the like) burn tobacco during use to produce tobacco smoke. Attempts are made to replace these tobacco-burning products by manufacturing products that release compounds without burning.

[0004] An example of this type of products is a heating apparatus that releases compounds by heating rather than burning materials. For example, the materials may be tobacco or other non-tobacco products. These non-tobacco products may include or not include nicotine. Known heating apparatus receive tobacco or non-tobacco products through a tubular extractor element, and the extractor element receiving the tobacco or non-tobacco products is removed from the heating apparatus or moved outward to a predetermined position after use, to help extract the tobacco or non-tobacco products.

SUMMARY

[0005] An embodiment of this application provides an aerosol generating device, configured to heat an aerosol generating article to generate aerosols, and including:

a chamber, configured to receive at least a part of the aerosol generating article;
a heater, at least partially inserted into the aerosol generating article for heating;
a holding element, configured to at least partially hold the aerosol generating article;
a driving element, having a rotating shaft; and
a rotatable wheel, configured to be rotatable under driving of the rotating shaft of the driving element, where
the holding element is configured to be rotatable relative to the heater around a central axis of the chamber in response to rotation of the rotatable wheel, to enable the aerosol generating article held by the holding element to eliminate or reduce adhesion or bonding to a surface of the heater during rotation.

[0006] In some implementations, the holding element is configured to be in contact with one or more surface regions of the aerosol generating article to squeeze or compress the aerosol generating article.

[0007] In some implementations, the holding element includes at least one or more convexes extending to the chamber, and the convexes are configured to clamp the aerosol generating article when the aerosol generating article is received in the chamber.

[0008] In some implementations, the holding element includes a plurality of convexes arranged at intervals around a circumferential direction of the chamber; and the plurality of convexes are configured to be in contact with the aerosol generating article to hold the aerosol generating article among the plurality of convexes.

[0009] In some implementations, the aerosol generating device further includes:
a transmission belt, where the holding element rotates relative to the heater through the transmission belt in response to the rotation of the rotatable wheel.

[0010] In some implementations, the holding element includes a circumferential surface; and the transmission belt is joined to a part of the circumferential surface of the holding element.

[0011] In some implementations, the transmission belt is joined to at least a part of a surface of the rotatable wheel, to further form a belt wheel transmission mechanism with the rotatable wheel; and the holding element further rotates through belt drive of the belt wheel transmission mechanism in response to the rotation of the rotatable wheel.

[0012] In some implementations, the holding element is at least partially constructed in a tubular shape and has a first segment and a second segment arranged sequentially along an axial direction; and an outer diameter of the second segment is greater than an outer diameter of the first segment, where

the first segment is configured to hold the aerosol generating article; and
at least a part of a surface of the second segment is joined to the transmission belt to be configured as a driven wheel in the belt drive.

[0013] In some implementations, the rotatable wheel is configured as a driving wheel in the belt drive; and
a ratio of an outer diameter of the driving wheel to an outer

diameter of the driven wheel ranges from 0.1 to 10.

[0014] In some implementations, an extension arm is arranged on the holding element, and the extension arm is configured to extend outward along a radial direction of the chamber; and the extension arm is coupled to the rotatable wheel, to further enable the holding element to rotate in response to the rotation of the rotatable wheel.

[0015] In some implementations, a hole extending along a length direction of the extension arm is provided on the extension arm; and

a guiding protrusion deviating from the rotating shaft is arranged on the rotatable wheel, where the guiding protrusion at least partially extends into the hole.

[0016] In some implementations, the guiding protrusion is arranged deviating from a center of the rotatable wheel.

[0017] In some implementations, the driving element is electric.

[0018] In some implementations, the aerosol generating device further includes:

an outer shell, defining an outer surface of the aerosol generating device; and including a first side end and a second side end that face away from each other along a width direction, where

the holding element is arranged close to the first side end; and

the driving element is arranged close to the second side end.

[0019] In some implementations, the holding element at least partially surrounds or defines the chamber.

[0020] In some implementations, the convexes include a first convex and a second convex arranged sequentially along an axial direction of the chamber; and

one of the first convex and the second convex is rigid, and the other is flexible.

[0021] In some implementations, the aerosol generating device further includes: a controller, configured to control, according to a predetermined frequency or predetermined interval time, the driving element to drive the holding element to rotate.

[0022] In some implementations, the aerosol generating device further includes:

a battery core, configured to provide power; and

a controller, configured to control the power provided by the battery core to the heater, to maintain a temperature of the heater at a preset temperature within predetermined heating time; and

configured to control the driving element to drive the holding element to rotate at least once before the predetermined heating time ends.

[0023] In some implementations, the aerosol generating device further includes:

a battery core, configured to provide power; and

a controller, configured to control the power provided by the battery core to the heater, provide power enabling a temperature of the heater to rise from an initial temperature to a first preset temperature in a first stage, provide power enabling the temperature of the heater to decrease to a second preset temperature in a second stage, and provide power enabling the temperature of the heater to maintain at a third preset temperature in a third stage; and

configured to control the driving element to drive the holding element to rotate in the first stage and/or the third stage, and prevent the driving element from driving the holding element to rotate in the second stage.

[0024] Another embodiment of this application provides an aerosol generating device, configured to heat an aerosol generating article to generate aerosols, and including:

a chamber, configured to receive at least a part of the aerosol generating article;

a heater, at least partially inserted into the aerosol generating article for heating;

a holding element, configured to at least partially hold the aerosol generating article;

a base or a flange, configured to partially hold the heater; and

a driving element, configured to enable, by driving the base or the flange to rotate, the heater to rotate relative to the aerosol generating article held by the holding element around a central axis of the chamber, to eliminate or reduce adhesion or bonding between the aerosol generating article and a surface of the heater.

[0025] In some implementations, an extension arm is arranged on the base or the flange, and the extension arm is configured to extend outward along a radial direction of the chamber; and

the driving element is configured to enable the heater to rotate by driving the extension arm of the base or the flange to rotate.

[0026] Still another embodiment of this application further provides a control method for an aerosol generating device, the aerosol generating device including:

a chamber, configured to receive at least a part of an aerosol generating article;

a heater, at least partially inserted into the aerosol generating article for heating;

a holding element, configured to at least partially hold the aerosol generating article; and

a battery core, configured to provide power enabling a temperature of the heater to rise from an initial temperature to a first preset temperature in a first stage, provide power enabling the temperature of the heater to decrease to a second preset temperature in

a second stage, and provide power enabling the temperature of the heater to maintain at a third preset temperature in a third stage; and

the method including:

driving, in the first stage, one of the holding element and the heater to move relative to the other at least once;

driving, in the third stage, one of the holding element and the heater to move relative to the other at least once; and driving, within predetermined time before the third stage ends, one of the holding element and the heater to move relative to the other at least once.

[0027] According to the foregoing aerosol generating device, the holding element and the heater are driven to move relative to each other a plurality of times in a plurality of stages of a heating process, which is beneficial to pulling out the aerosol generating article by a user at any time.

[0028] In some implementations, the predetermined time before the third stage ends is less than 20s.

[0029] Still another embodiment of this application provides an aerosol generating device, configured to heat an aerosol generating article to generate aerosols, and including:

a chamber, configured to receive at least a part of the aerosol generating article;

a heater, at least partially inserted into the aerosol generating article for heating;

a holding element, configured to at least partially hold the aerosol generating article; and

a driving element, configured to drive one of the holding element and the heater to move relative to the other, to enable the aerosol generating article held by the holding element to eliminate or reduce adhesion or bonding to a surface of the heater during movement.

[0030] In some implementations, the movement includes rotation around a central axis of the chamber.

[0031] In some implementations, the driving element has a rotating shaft; and

one of the holding element and the heater is configured to be rotatable relative to the other in response to rotation of the rotating shaft.

[0032] In some implementations, the driving element is configured to drive, through belt drive, one of the holding element and the heater to rotate relative to the other.

[0033] In some implementations, one of the holding element and the heater is at least partially configured as a driven wheel in the belt drive.

[0034] In some implementations, the holding element is at least partially constructed in a tubular shape and has a first segment and a second segment arranged sequentially along an axial direction; and an outer diameter of the second segment is greater than an outer diameter of the first segment, where

the first segment is configured to hold the aerosol generating article; and

the second segment is configured as a driven wheel in the belt drive.

[0035] In some implementations, the aerosol generating device further includes:

a rotatable wheel, configured to be rotatable under driving of the driving element and configured as a driving wheel in the belt drive to drive one of the holding element and the heater to rotate.

[0036] In some implementations, a ratio of an outer diameter of the driving wheel to an outer diameter of the driven wheel ranges from 0.1 to 10.

[0037] In some implementations, one of the holding element and the heater includes a circumferential surface; and

the aerosol generating device further includes:

a transmission belt, joined to a part of the circumferential surface of one of the holding element and the heater, where one of the holding element and the heater rotates relative to the other through the transmission belt in response to the rotation of the rotating shaft.

[0038] In some implementations, an extension arm is arranged on one of the holding element and the heater; the extension arm is configured to extend outward along a radial direction of the chamber; and

the driving element is configured to enable, by driving the extension arm to rotate around a central axis of the chamber, one of the holding element and the heater to rotate relative to the other.

[0039] In some implementations, a hole is provided on the extension arm; and

the aerosol generating device further includes:

a rotatable wheel, configured to be rotatable under driving of the rotating shaft of the driving element, where a guiding protrusion deviating from the rotating shaft is arranged on the rotatable wheel; and the guiding protrusion at least partially extends into the hole, to drive the extension arm to rotate around the central axis of the chamber.

[0040] In some implementations, the guiding protrusion is arranged deviating from a center of the rotatable wheel.

[0041] In some implementations, the hole is provided extending along a length direction of the extension arm.

[0042] In some implementations, the movement includes linear movement along an axial direction of the chamber.

[0043] In some implementations, the aerosol generating device further includes:

an outer shell, defining an outer surface of the aerosol generating device, where a size of the outer shell is constant during movement of the holding element.

[0044] In some implementations, the holding element is configured to be insufficient to extract the aerosol generating article from the chamber and/or insufficient to approximately separate the aerosol generating article

from the heater during movement.

[0045] In some implementations, the holding element is configured to be unable to extend from the aerosol generating device during movement.

[0046] In some implementations, the heater is constructed in a sheet shape; and the movement includes linear movement along a width direction of the heater.

[0047] In some implementations, a length of the chamber is less than a length of the aerosol generating article, so that the aerosol generating article is at least partially exposed outside the aerosol generating device when received in the chamber; and

the aerosol generating device is configured as that the aerosol generating article can only be pulled out from the chamber by a user by operating an exposed part of the aerosol generating article.

[0048] In some implementations, the driving element is electric.

[0049] In some implementations, the aerosol generating device further includes:

an outer shell, defining an outer surface of the aerosol generating device; and including a first side end and a second side end that face away from each other along a width direction, where

the holding element is arranged close to the first side end; and

the driving element is arranged close to the second side end.

[0050] In some implementations, the holding element at least partially surrounds or defines the chamber.

[0051] In some implementations, the aerosol generating device further includes: a controller, configured to prevent the driving element from driving the movement when a user inhales the aerosol generating article.

[0052] In some implementations, the aerosol generating device further includes: a controller, configured to control, according to a predetermined frequency or predetermined interval time, the driving element to drive the movement.

[0053] In some implementations, the aerosol generating device further includes:

a battery core, configured to provide power; and

a controller, configured to control the power provided by the battery core to the heater, to maintain a temperature of the heater at a preset temperature within predetermined heating time; and

configured to control the driving element to drive the movement at least once before the predetermined heating time is reached.

[0054] In some implementations, the controller is configured to control the driving element to drive the movement within less than 20s before the predetermined heating time.

[0055] In some implementations, the aerosol generating device further includes:

a battery core, configured to provide power; and

a controller, configured to control the power provided by the battery core to the heater, provide power enabling a temperature of the heater to rise from an initial temperature to a first preset temperature in a first stage, provide power enabling the temperature of the heater to decrease to a second preset temperature in a second stage, and provide to enable the temperature of the heater to maintain at a third preset temperature in a third stage; and

configured to control the driving element to drive the movement in the first stage and/or the third stage, and prevent the driving element from driving the movement in the second stage.

[0056] In some implementations, the aerosol generating device further includes:

a controller, configured to control the heater to heat the aerosol generating article according to predetermined heating time; and further configured to control, after the predetermined heating time ends, the driving element to drive one of the holding element and the heater to return to an initial position.

[0057] According to the foregoing aerosol generating device, the aerosol generating article and the heater are moved, so that the adhesion or bonding therebetween generated due to heating is reduced, and it is beneficial to pulling out the aerosol generating article from the chamber by a user without an extractor.

BRIEF DESCRIPTION OF THE DRAWINGS

[0058] One or more embodiments are exemplarily described with reference to the corresponding figures in the accompanying drawings, and the description does not constitute a limitation to the embodiments. Elements in the accompanying drawings that have same reference numerals are represented as similar elements, and unless otherwise particularly stated, the figures in the accompanying drawings are not drawn to scale.

FIG. 1 is a schematic diagram of an aerosol generating device according to Embodiment 1;

FIG. 2 is a schematic cross-sectional view of the aerosol generating device in FIG. 1 from a perspective;

FIG. 3 is a schematic cross-sectional view of an inner shell in FIG. 2 from a perspective;

FIG. 4 is a schematic diagram of a driving element and a holding mechanism in FIG. 3 after being assembled from a perspective;

FIG. 5 is a schematic exploded view of a driving element and a holding mechanism in FIG. 4 before being assembled;

FIG. 6 is a schematic cross-sectional view of a driving element and a holding mechanism in FIG. 4 after

being assembled;
FIG. 7 is a schematic diagram of a driving element and a holding mechanism according to another embodiment;
FIG. 8 is a schematic diagram of a driving element and a holding mechanism according to another embodiment;
FIG. 9 is a schematic diagram of a driving element and a holding mechanism according to another embodiment;
FIG. 10 is a schematic diagram of a driving element and a holding mechanism according to another embodiment;
FIG. 11 is a schematic cross-sectional view of the driving element and the holding mechanism in FIG. 10;
FIG. 12 is a schematic exploded view of the driving element and the holding mechanism in FIG. 11;
FIG. 13 is a schematic diagram of a driving element and a holding mechanism according to another embodiment;
FIG. 14 is a schematic diagram of the driving element driving the holding mechanism to move to a second position in FIG. 13;
FIG. 15 is a schematic diagram of a sheet-like heating element in FIG. 14 from a perspective;
FIG. 16 is a schematic diagram of a driving element and a holding mechanism according to another embodiment;
FIG. 17 is a schematic diagram of a heating curve of heating an aerosol generating article within predetermined heating time according to an embodiment;
FIG. 18 is a three-dimensional schematic diagram of an aerosol generating device according to Embodiment 2 of this application in a direction;
FIG. 19 is a schematic exploded view of the aerosol generating device in FIG. 18 in a direction;
FIG. 20 is a schematic cross-sectional view of the aerosol generating device in FIG. 18 in a direction;
FIG. 21 is a three-dimensional schematic diagram of the aerosol generating device in FIG. 18 with a part of a housing hidden;
FIG. 22 is a schematic diagram of another implementation of a transmission manner between a driving wheel and a holding element according to Embodiment 2 of this application;
FIG. 23 is a schematic exploded view of an aerosol generating device from a perspective according to an embodiment of Embodiment 3 of this application;
FIG. 24 is a schematic cross-sectional view of an aerosol generating device in a direction according to Embodiment 3 of this application;
FIG. 25 is a three-dimensional schematic diagram of an aerosol generating device with some components hidden according to Embodiment 3 of this application; and
FIG. 26 is a three-dimensional schematic diagram of FIG. 25 in another direction.

DETAILED DESCRIPTION

[0059] 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"/"being fixedly connected to" another element, the element may be directly on the another element, or one or more intermediate element 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. The terms "upper", "lower", "left", "right", "inner", "outer", and similar expressions used in this specification are only used for an illustrative purpose.

[0060] Unless otherwise defined, meanings of all technical and scientific terms used in this specification are the same as those usually understood by a person skilled in the art to which this application belongs. The terms used in this specification of this application are only 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 related listed items.

[0061] In addition, the technical features provided in different embodiments of this application to be described below may be combined with each other as long as no conflict occurs.

[0062] In the embodiments of this application, the expression "mount" means to fix or restrict an element or an apparatus to a specific position or place in a manner including welding, screwing, snapping, bonding, and the like. The element or the apparatus may keep still at the specific position or place or move within a limited range. The element or the apparatus can be disassembled or cannot be disassembled after being fixed or restricted to the specific position or place, which is not limited in the embodiments of this application.

[0063] In addition, the terms "first" and "second" are used only for a description purpose, and shall not be construed as indicating or implying relative importance or implying a quantity of indicated technical features. Therefore, a feature defined by "first" or "second" can explicitly or implicitly include one or more of such features. In the description of this application, unless otherwise specifically limited, "a plurality of" means at least two, for example, two or three.

[0064] For ease of understanding of this application, this application is described in further detail below with reference to the accompanying drawings and specific implementations.

Embodiment 1

[0065] An embodiment of this application provides an aerosol generating device, configured to receive an aero-

sol generating article and heat the aerosol generating article to generate aerosols for inhalation.

[0066] Further, in an optional implementation, a tobacco-contained material that releases volatile compounds from substrates when being heated is preferably used as the aerosol generating article. Alternatively, a non-tobacco material that can be suitable for electrical heating smoke generation after being heated may be used. Preferably, a solid substrate is used as the aerosol generating article, which may include one or more of powders, particles, shreds, strips, or flakes of one or more of a vanilla leaf, a tobacco leaf, homogenized tobacco, or expanded tobacco. Alternatively, the solid substrate may include additional tobacco or non-tobacco volatile flavor compounds, so as to be released when the substrate is heated.

[0067] Further, FIG. 1 to FIG. 3 show schematic diagrams of an aerosol generating device 100 according to a specific embodiment, and the aerosol generating device includes a plurality of components arranged in an external main body or an outer shell (which may be referred to as a housing). A total design of the external main body or the outer shell is variable, and a form or a configuration of the external main body that can define a total size and a shape of the aerosol generating device 100 is variable. Generally, the external main body may be formed by a single integrated housing, or the external main body may be formed by two or more separable main bodies.

[0068] For example, the aerosol generating device 100 may include a control main body at one end, where the control main body includes a housing including one or more reusable components (for example, a rechargeable battery and/or a storage battery of a rechargeable supercapacitor, and various electronic devices configured to control operations of the product), and include an external main body or an outer shell of a component configured to receive an aerosol generating article 1000 and heat the aerosol generating article.

[0069] Further, in the specific embodiments shown in FIG. 1 and FIG. 2, the aerosol generating device 100 includes:

an outer shell, substantially defining an outer surface of the aerosol generating device and including a proximal end 110 and a distal end 120 that are opposite to each other along a length direction, where during use, the proximal end 110 is an end that is close to a user for operations to receive, heat, and inhale the aerosol generating article 1000; and the distal end 120 is an end away from the user.

[0070] In some examples, the outer shell may be made of metal such as stainless steel or aluminum or alloy. Other suitable material including various plastics (for example, polycarbonate), metal-plating over plastic, ceramics, and the like may also be used.

[0071] Further, as shown in FIG. 1 and FIG. 2, the outer shell of the aerosol generating device 100 includes:

a first housing 10, arranged close to the proximal end 110 along the length direction and defining the proximal end 110 of the outer shell, where the first housing 10 defines a receiving opening 111 at the proximal end 110, and the aerosol generating article 1000 is removably received in the aerosol generating device 100 through the receiving opening 111; and

a second housing 20, arranged close to the distal end 120 along the length direction and defining the distal end 120 of the outer shell, where in the implementations shown in FIG. 1 and FIG. 2, the first housing 10 and the second housing 20 are both in a tubular shape with a hollow structure; and the first housing 10 and the second housing 20 are substantially arranged coaxially and have cross-sectional shapes that are substantially the same.

[0072] In addition, as shown in FIG. 2, after the aerosol generating article 1000 is received in the aerosol generating device 100, a part of the aerosol generating article is still exposed outside the aerosol generating device 100; and the exposed part is, for example, a filter tip, which helps inhalation by the user.

[0073] As shown in FIG. 1 and FIG. 2, the outer shell of the aerosol generating device 100 is in a lengthwise flat shape; in the outer shell of the aerosol generating device 100, a length size is greater than a width size, and the width size is greater than a thickness size; and after being assembled, the outer shell of the aerosol generating device 100 is approximately in a cuboid shape. In addition, the aerosol generating device 100 further includes a left side end 130 and a right side end 140 that face away from each other along a width direction.

[0074] Further, as shown in FIG. 2 and FIG. 3, the aerosol generating device 100 further includes:

an inner shell 150 in a lengthwise shape, where the inner shell 150 is partially accommodated and held in the first housing 10 and partially accommodated and held in the second housing 20.

[0075] The inner shell 150 defines a holding portion 151 close to the distal end 120, and the holding portion is configured to fix and hold a battery core 21.

[0076] The inner shell 150 defines a holding portion 152 and a screw hole 153 located in the holding portion 152; and a circuit board 22 is accommodated and held in the holding portion 152 and is fixedly connected to the screw hole 153 through a fastener such as a screw.

[0077] The circuit board 22 may include a controller. The controller may include a microprocessor, and the microprocessor may be a programmable microprocessor. The controller may include other electronic components. The inner shell 150 further includes an annular wall 1521 located at the holding portion 152, to surround, protect, or fix an important electronic element on the circuit board 22 such as the controller or a vibration motor.

[0078] Further, as shown in FIG. 2 and FIG. 3, the inner shell 150 further defines:

an accommodating space 154, close to the proximal

end 110, where the accommodating space 154 extends longitudinally; and the accommodating space 154 is close to the right side end 140; and
an accommodating space 155 and an accommodating space 156, provided sequentially along a longitudinal direction and being in communication with each other, where the accommodating space 156 and the accommodating space 155 are coaxially or longitudinally aligned; the accommodating space 156 has an inner diameter or volume smaller than that of the accommodating space 155; the accommodating space 155 and the accommodating space 156 are close to the left side end 130; and the accommodating space 155 is closer to the proximal end 110 than the accommodating space 156.

[0079] Further, as shown in FIG. 2 and FIG. 3, the aerosol generating device 100 further includes:

a holding mechanism 30, assembled and accommodated in the accommodating space 155, to receive and/or hold the aerosol generating article 1000;
a heater 40, constructed in a lengthwise pin, needle, or sheet shape, where the heater 40 at least partially extends into the accommodating space 155 and/or the holding mechanism 30 from the accommodating space 156, and when the aerosol generating article 1000 is received and/or held in the holding mechanism 30, the heater 40 can be inserted into the aerosol generating article 1000 for heating; and
a base or a flange 50 surrounding and combined on the heater 40 and arranged in the accommodating space 156, where the accommodating space 156 fastens and holds the base or the flange 50 to stabilize and hold the heater 40.

[0080] In some implementations, the heater 40 is a resistive heater that generates joule heat through a supplied direct current Alternatively, in some other implementations, the heater 40 is an induction heater prepared by using an inductive material, so that the heater can be penetrated by a variable magnetic field to generate heat. Alternatively, in some other implementations, the heater 40 is an infrared heater that heats the aerosol generating article 1000 by radiating infrared rays.

[0081] Further, as shown in FIG. 2 and FIG. 3, the aerosol generating device 100 further includes:
a driving element 60 such as a motor, accommodated and held in the accommodating space 154, where in this embodiment, the driving element 60 is configured to drive the holding mechanism 30 to rotate relative to the heater 40 along a central axis.

[0082] Further, as shown in FIG. 2 and FIG. 3:
The accommodating space 155 defines an opening 157 on an end portion of the inner shell 150 close to the proximal end 110, to mount and receive the holding mechanism 30; and the accommodating space 154 defines an opening 158 on the end portion of the inner shell 150 close to the proximal end 110, for the driving element 60 to at least partially extend from the inner shell 150 from the accommodating space 154.

[0083] An inner bottom wall of the accommodating space 155 facing away from the opening 157 includes a plurality of protrusions 1561; and gaps exist among the plurality of protrusions 1561, to form channels for air to enter the holding mechanism 30.

[0084] Further, as shown in FIG. 2 and FIG. 4 to FIG. 6, the holding mechanism 30 includes:
a lengthwise holding element 31, which is hollow inside and is prepared by a rigid material such as an organic polymer or ceramics. The holding element 31 includes a segment 311 and a segment 312 that are arranged sequentially along a longitudinal direction, where an outer diameter of the segment 311 is smaller than an outer diameter of the segment 312, so that a step is defined between outer surfaces of the two segments. After assembly, the segment 311 of the holding element 31 extends into the accommodating space 155 through the opening 157, and an end portion of the segment 311 facing away from the segment 312 abuts against the plurality of protrusions 1561; and after assembly, the step on an outer surface of the holding element 31 abuts against an upper end of the inner shell 150, and the segment 312 is exposed outside the accommodating space 155 and is longitudinally clamped between the first housing 10 and the inner shell 150.

[0085] During use, the hollow portion in the holding element 31 defines a chamber configured to receive the aerosol generating article 1000; the segment 311 is not opened at the end portion facing away from the segment 312, for the aerosol generating article 1000 received in the segment 311 to abut against to stop the aerosol generating article; and a hole is provided on the end portion of the segment 311 facing away from the segment 312, for the heater 40 to pass through into the aerosol generating article 1000 in the holding element 31 for heating.

[0086] An end portion of the holding element 31 at the segment 312 is opened and is opposite to the receiving opening 111 of the proximal end 110; and the aerosol generating article 1000 inserted from the receiving opening 111 can be inserted into the holding element 31 through the open end of the holding element 31.

[0087] A plurality of longitudinally extending convexes 3111 are arranged on an inner wall of the holding element 31, so that the convexes can stably clamp and fasten the aerosol generating article 1000 when the aerosol generating article 1000 is received in the holding element 31. The plurality of convexes 3111 extend along a longitudinal direction; and the plurality of convexes 3111 are arranged at intervals along a circumferential direction of the holding element 31. A width of each of the convexes 3111 is in a shape of a cone gradually decreasing along a radial direction of the holding element 31.

[0088] When the plurality of convexes 3111 come into contact with a surface region of the aerosol generating

article 1000, the convexes squeeze or compress the surface region of the aerosol generating article 1000, to tightly clamp the aerosol generating article 1000.

[0089] A step 3122 and a positioning slot 3121 are provided on an inner surface of the segment 312 of the holding element 31.

[0090] The holding mechanism 30 further includes a flexible holding element 32; the holding element 32 is prepared by a flexible material such as silicone or thermoplastic elastomer; the holding element 32 is substantially annular and includes a positioning convex 322 extending outward along a radial direction; after assembly, the holding element 32 is accommodated and held in the segment 312 and abuts against the step 3122; and the positioning convex 322 of the holding element 32 extends into the positioning slot 3121, to provide positioning in the assembly and present the holding element 32 from rotating relative to a tube 31.

[0091] Further, the holding element 32 includes a plurality of clamping convexes 321 extending inward along the radial direction, to at least partially clamp the aerosol generating article 1000 received in the holding element 31. During implementation, the clamping convexes 321 of the holding element 32 are made of a flexible material, and clamping of the clamping convexes 321 to the aerosol generating article 1000 has a greater friction force than clamping of the convexes 3111 to the aerosol generating article 1000, so that the clamping is more stable. The plurality of clamping convexes 321 are also arranged at intervals along a circumferential direction.

[0092] Further, the holding mechanism 30 further includes a cover 33 which is constructed into a relatively thin sheet-like body. After assembly, the cover 33 is configured to cover an opening portion of the holding element 31, to prevent the holding element 32 from being loosened or dropped from the opening of the holding element 31.

[0093] Further, as shown in FIG. 2 and FIG. 4 to FIG. 6, the driving element 60 is connected to the holding mechanism 30 in a belt drive manner, to drive the holding mechanism 30 to rotate in the belt drive manner. The "belt drive" is a mechanical term, and is a type of mechanical transmission of using a flexible belt tensioned on a belt wheel to implement movement or power transmission. The "belt drive" includes, according to different transmission principles, friction-type belt transmission relying on friction force transmission between the belt and the belt wheel and synchronization-type belt transmission relying on engaged transmission between teeth on the belt and the belt drive. The "belt drive" in the embodiments of FIG. 2 and FIG. 4 to FIG. 6 is friction-type belt transmission.

[0094] In the embodiments of FIG. 2 and FIG. 4 to FIG. 6, the aerosol generating device specifically includes:

a rotatable wheel 62, located between the inner shell 150 and the first housing 10, where an axial direction of the rotatable wheel 62 and an axial direction of the holding mechanism 30 are arranged in parallel; and a rotating shaft 61 of the driving element 60 extends from the accommodating space 154 through the opening 158, and is inserted into a middle hole 621 of the rotatable wheel 62; and

an annular transmission belt 63, for example, a flexible belt, joined to the rotatable wheel 62 and a part of a circumferential surface of the segment 312 of the holding element 31, to form belt drive between the rotatable wheel and the segment of the holding element, where during implementation, the rotatable wheel 62 is used as a driving wheel in the belt drive, and the segment 312 of the holding element 31 forms a driven wheel in the belt drive. Specifically, during implementation, a groove 622 surrounding the rotatable wheel 62 is provided on a circumferential surface of the rotatable wheel 62, a groove 3123 surrounding the segment 312 is provided on the circumferential surface of the segment 312 of the holding element 31, and the annular transmission belt 63 is assembled in the groove 622 and the groove 3123 for transmission. When the rotating shaft 61 of the driving element 60 rotates, the rotating shaft may drive the holding element 31 through the rotatable wheel 62 to rotate around a central axis m.

[0095] Alternatively, in some other variant implementations, transmission is implemented between the driving element 60 and the holding element 31 through transmission mechanisms such as friction-wheel drive, chain drive, gear drive, a worm gear and worm, a swing rod mechanism, or a linkage mechanism, so that the driving element 60 drives the holding element 31 to rotate.

[0096] Alternatively, in some other variant implementations, the driving element 60 is an air cylinder or a hydraulic cylinder.

[0097] In some variant implementations, the rotatable wheel 62 is a gear. The gear drive is more conducive to accurate control over a rotation angle than the belt drive; and requirements on production, processing, and preparation of gear components of the gear drive may be higher than those of the belt drive.

[0098] The segment 312 of the holding element 31 can rotate in response to rotation of the rotating shaft 61 of the driving element 60 and/or the rotatable wheel 62. The rotation of the rotating shaft 61 of the driving element 60 and/or the rotatable wheel 62 can be transmitted to the holding element 31 through the transmission belt 63.

[0099] When organic matters of the aerosol generating article 1000 are heated by the heater 40, aerosol condensate or solid phase slag is generated. As a result, the aerosol generating article 1000 is closely adhered or bonded to a surface of the heater 40, which is not conducive to removing the aerosol generating article 1000 from the receiving opening 111 by the user. In this implementation, the heater 40 is in a shape of a needle extending along the central axis m of the holding element 31. During use, when the driving element 60 drives the holding element 31 to rotate, the aerosol generating

article 1000 held in the holding element 31 can rotate relative to the heater 40, to reduce close adhesion or bonding between the aerosol generating article 1000 and the surface of the heater 40, which is conducive to successfully pulling out the aerosol generating article 1000 from the holding element 31 by the user.

[0100] In a more preferred implementation, after heating is completed, the driving element 60 may drive the holding element 31 to rotate along only one direction, for example, rotate along a counterclockwise direction as shown by an arrow R in FIG. 4 or a clockwise direction.

[0101] Alternatively, in more variant implementations, the driving element 60 drives the holding element 31 to rotate along both the counterclockwise direction and the clockwise direction. For example, the driving element 60 drives the holding element 31 to rotate by at least one cycle along the counterclockwise direction and then rotate by one cycle along the clockwise direction, this is conducive to reducing close adhesion or bonding between the aerosol generating article 1000 and the surface of the heater 40.

[0102] In a more preferred implementation, the driving element 60 drives the holding element 31 to rotate at a rotation speed ranging from 0.5 r/s to 5 r/s. The driving element 60 drives the holding element 31 to substantially rotate at a uniform or constant rotation speed. Alternatively, in some other implementations, the driving element 60 drives the holding element 31 to rotate at a variable rotation speed, for example, a gradually increasing rotation speed or a gradually decreasing rotation speed.

[0103] In a more preferred implementation, the segment 311 of the holding element 31 has an inner diameter of about 7.8 mm and an outer diameter of about 8.6 mm; and a protruding height of each convex 3111 relative to the inner surface of the segment 311 approximately ranges from 1.0 mm to 2.5 mm. The segment 312 of the holding element 31 has an inner diameter of about 8.4 mm and an outer diameter of about 9.8 mm.

[0104] An outer diameter of the rotatable wheel 62 approximately ranges from 5.0 mm to 7.6 mm, and the outer diameter of the rotatable wheel 62 is smaller than the outer diameter of one or two of the segment 311 and/or the segment 312 of the holding element 31, this is conducive to reducing the aerosol generating article 1000 from being twisted off during rotation.

[0105] In a more preferred implementation, a ratio of the outer diameter of the rotatable wheel 62 to the outer diameter of the segment 312 used as the driven wheel ranges from 0.1 to 10.

[0106] During implementation, the holding mechanism 30, and especially, the holding element 31 cannot be removed outside the outer shell.

[0107] Further, FIG. 7 is a schematic diagram of a driving element 60a and a holding mechanism 30a in an aerosol generating device 100 according to still another embodiment. In this embodiment, the holding mechanism 30a includes:

a holding element 31a in which a chamber configured to accommodate and hold the aerosol generating article 1000 is defined, where a plurality of convexes and flexible clamping elements configured to clamp the aerosol generating article 1000 are arranged on an inner wall of the holding element 31a; and

a cover 33a is arranged at an upper end of the holding element 31a, to cover and hold the flexible clamping elements in the holding element 31a.

[0108] The holding element 31a further includes a lengthwise extension arm 3121a extending outward along a radial direction; an elongated guiding hole 3122a is provided on the extension arm 3121a; and in a preferred implementation in FIG. 7, the guiding hole 3122a is a waist-shaped hole extending along a length direction of the extension arm 3121a.

[0109] The driving element 60a is, for example, a motor, and a rotating shaft 61a of the driving element 60a is inserted into a rotatable wheel 62a; a guiding protrusion 622a deviating from a center or the rotating shaft 61a is arranged on the rotatable wheel 62a; and the guiding protrusion 622a at least partially extends into the guiding hole 3122a. In this implementation, when the driving element 60a drives the rotatable wheel 62a to rotate, the guiding protrusion 622a moves in the guiding hole 3122a to drive the holding element 31a to rotate.

[0110] In this embodiment, as shown in FIG. 7, the driving element 60a drives the holding element 31a to rotate at a specific angle α, as shown by an arrow R in FIG. 7. In addition, the driving element 60a drives the holding element 31a to rotate around a central axis m. In this preferred implementation, the driving element 60a drives the holding element 31a clamping the aerosol generating article 1000 to rotate at an angle α less than 180 degrees; and preferably, less than 90 degrees.

[0111] In a more preferred implementation, the driving element 60a drives the holding element 31a clamping the aerosol generating article 1000 to rotate along a clockwise direction and a counterclockwise direction in turn and in a reciprocating manner.

[0112] Alternatively, FIG. 8 and FIG. 9 show schematic diagrams of a driving element 60b and a holding mechanism in an aerosol generating device 100 according to still another embodiment. In this implementation, the aerosol generating device includes:

a holding element 31b in which a chamber configured to accommodate the aerosol generating article 1000 is defined, where in this embodiment, an inner wall of the holding element 31b is substantially smooth, and no convex configured to clamp the aerosol generating article 1000 is arranged on the inner wall of the holding element 31b;

a holder 71b, configured to accommodate and mount the holding element 31b, where the holder 71b extends longitudinally, and a side opening 711b is

provided on the holder 71b along a longitudinal direction, to at least partially expose the holding element 31b;

a holder 72b, substantially extending perpendicular to a longitudinal direction of the aerosol generating device 100, where the holder 72b abuts against and is fixed to an upper end of the holder 71b;

an annular element 32b, arranged coaxially and aligned with the holding element 31b along the longitudinal direction, where the annular element 32b is supported and held by the holder 72b; and a plurality of convexes 321b configured to clamp the aerosol generating article 1000 are arranged on an inner wall of the annular element 32b;

a rotatable wheel 62b, connected to a rotating shaft 61b of the driving element 60b and can further rotate under driving of the rotating shaft 61b of the driving element 60b, where the rotatable wheel 62b is mounted on the holder 72b and is supported and held by the holder 72b; and

a transmission belt 63b, for example, a flexible belt, implementing transmission between the rotatable wheel 62b and the annular element 32b. The rotatable wheel 62b forms a driving wheel in belt drive, and the annular element 32b forms a driven wheel in the belt drive. During implementation, the annular element 32b clamps the aerosol generating article 1000 and then rotates around a central axis m of the holding element 31b/the annular element 32b, to eliminate adhesion and bonding to the heater 40b.

[0113] In the embodiments of FIG. 8 and FIG. 9, a base or a flange 50b surrounds and is combined outside the heater 40b; and the aerosol generating device 100 holds the base or the flange 50b to stably mount the heater 40b.

[0114] In the embodiments of FIG. 8 and FIG. 9, the holding element 31b has a length approximately ranging from 10 mm to 20 mm. The annular element 32b and the holding element 31b are arranged at an interval; and A gap d1 between the annular element 32b and the holding element 31b along an axial direction approximately ranges from 2 mm to 8 mm. An extension length of the annular element 32b along the axial direction is greater than 5 mm, which is conductive to prevent the aerosol generating article 1000 from being twisted off during rotation. Preferably, the annular element 32b has a length approximately ranging from 5 mm to 10 mm.

[0115] Alternatively, in still another implementation shown in FIG. 10 and FIG. 11, the aerosol generating device 100 includes:

a holding element 31c in which a chamber configured to accommodate the aerosol generating article 1000 is defined, where in this embodiment, an inner wall of the holding element 31c is substantially smooth, and no convex configured to clamp the aerosol generating article 1000 is arranged on the inner wall of the holding element 31b;

a holder 71c, configured to accommodate and mount the holding element 31c, where the holder 71c extends longitudinally, and a side opening 711c is provided on the holder 71c along a longitudinal direction, to at least partially expose the holding element 31c;

a holder 72c, substantially extending perpendicular to a longitudinal direction of the aerosol generating device 100, where the holder 72c abuts against and is fixed to an upper end of the holder 71c;

an annular element 32c, arranged coaxially and aligned with the holding element 31c along the longitudinal direction, where the annular element 32c is supported and held by the holder 72c; and a plurality of convexes 321c configured to clamp the aerosol generating article 1000 are arranged on an inner wall of the annular element 32c;

a heater 40c, at least partially inserted into the holding element 31c; and

a base or a flange 50c, including:

a base portion 51c surrounding and combined with the heater 40c, which is configured to hold the heater 40c; and

an elongated extension arm 52c extending outward along a radial direction from the base portion 51c, and an elongated guiding hole 521c is provided on the extension arm 52c.

[0116] In addition, a driving element 60c is, for example, a motor, and a rotating shaft of the driving element 60c is inserted into a rotatable wheel 62c; a guiding protrusion 621c deviating from a center is arranged on the rotatable wheel 62c; and the guiding protrusion 621a at least partially extends into the guiding hole 521c. In this implementation, when the driving element 60c drives the rotatable wheel 62c to rotate, the guiding protrusion 621c moves in the guiding hole 521c to drive the base portion 51c to rotate, to finally enable the heater 40c to rotate relative to the clamped aerosol generating article 1000, thereby eliminating adhesion or bonding between the heater and the aerosol generating article.

[0117] Alternatively, in some other variant implementations, the base or the flange 50c may include only the base portion 51c and is connected to the driving element 60c through belt drive, so that the driving element 60c drives the heater 40c to rotate relative to the clamped aerosol generating article 1000.

[0118] As shown in the embodiments of FIG. 10 to FIG. 12, the heater 40c is a resistive heater and is connected to a circuit board 22 through a conductive lead 41c; and in the embodiments, the conductive lead 41c needs to have a longer length than usual to prevent the conductive lead 41c from being tensioned or broken by the heater 40c during rotation.

[0119] In this implementation, a length of the conductive lead 41c is greater than 25 mm; more preferably, the length is greater than 35 mm; and more preferably, the length is greater than 45 mm. In this implementation, the

driving element 60c drives the heater 40c to rotate in a non-constant direction, to prevent the conductive lead 41c from being wound and broken when the direction is constant. Therefore, in this implementation, the driving element 60c drives the heater 40c to rotate along a counterclockwise direction and a clockwise direction in turn and in a reciprocating manner. Preferably, the driving element 60c drives the heater 40c to rotate at an angle less than 90 degrees.

[0120] Alternatively, in some other variant implementations, the driving element includes a first rotating shaft at a first end along the longitudinal direction and includes a second rotating shaft at a second end along the longitudinal direction. The first rotating shaft of the driving element is configured to drive the holding element to hold rotation of the aerosol generating article 1000 around the central axis of the chamber; and the second rotating shaft of the driving element is configured to drive the base or the flange to rotate, to drive the heater to rotate around the central axis of the chamber. During implementation, the driving element can drive relative rotation between the aerosol generating article 1000 and the heater through the first rotating shaft and/or the second rotating shaft.

[0121] Alternatively, FIG. 13 to FIG. 15 show schematic diagrams of a driving element 60d and a holding mechanism 30d in an aerosol generating device 100 according to still another variant embodiment. In this embodiment, the holding mechanism 30d includes:

a holding element 31d in which a chamber configured to receive and hold the aerosol generating article 1000 is defined, where the holding element 31d includes a segment 311d and a segment 312d; and the segment 311d includes a plurality of longitudinally extending convexes 3111d inside to clamp or hold the aerosol generating article 1000;
a flexible holding element 32d, in an annular shape and including a clamping convex 321 configured to clamp the aerosol generating article 1000; and
a cover 33d, configured to cover and fasten the holding element 32d at an upper end of the holding element 31d.

[0122] A heater 40d is constructed in a shape of a sheet or a blade that at least partially extends in the holding element 31d. In a specific implementation shown in FIG. 15, the heater 40d has a length of about 19 mm, a width of 5 mm, and a thickness of 0.5 mm.

[0123] The driving element 60d includes a telescopic shaft 61d that moves in a telescopic manner. In some implementations, the driving element 60d is a commonly used telescopic motor. In some other implementations, the telescopic shaft 61d of the driving element 60d is formed by adding a screw-nut or a steering bearing to a rotating shaft of a common rotating motor, to convert circumferential rotation into telescopic movement.

[0124] The driving element 60d is configured to drive the holding mechanism 30d to move along a width direction of the heater 40d, to eliminate adhesion or bonding between the aerosol generating article 1000 and a surface of the heater 40d. For example, FIG. 13 shows a schematic diagram of a relative position of the holding mechanism 30d and the heater 40d, in which the heater 40d is substantially located at a central axis of the holding mechanism 30d. FIG. 14 shows a schematic diagram of the holding mechanism 30d moving to another position, in which the heater 40d is substantially deviated from the central axis of the holding mechanism 30d.

[0125] In this embodiment, the driving element 60d drives the holding mechanism 30d to move toward two sides along a width direction of the heater 40d in turn and in a reciprocating manner; and after movement, the holding mechanism 30d further needs to be reset to an initial position shown in FIG. 13.

[0126] In some preferred implementations, in the movement of the holding mechanism 30d driven by the driving element 60d, a maximum movement distance of the holding mechanism 30d along the width direction of the heater 40d is less than 3 mm.

[0127] In the embodiments of FIG. 13 and FIG. 14, the heater 40d is immovable; and the driving element 60d drives the holding mechanism 30d to move relative to the heater 40d. Alternatively, in some other variant embodiments, the holding mechanism 30d is fixed and immovable, and the driving element 60d drives the heater 40d to move relative to the holding mechanism 30d.

[0128] Alternatively, FIG. 16 shows a schematic diagram of a driving element 60e and a holding mechanism in an aerosol generating device 100 according to still another variant embodiment. In this embodiment, the aerosol generating device includes:

a holding element 31e, configured to receive and hold the aerosol generating article 1000;
a heater 40e, at least partially extending into and received in the holding element 31e, where a base or a flange 50e surrounds and is fixed to the outside of the heater 40e, to facilitate assembly of the heater 40e in the aerosol generating device 100; and
a driving element 60e, driving a connecting arm 62e connected to the holding element 31e to enable the holding element 31e to move relative to the heater 40e along an axial direction.

[0129] Alternatively, in another variant implementation, the driving element 60e drives the heater 40e to move relative to the holding element 31e along the axial direction of the holding element 31e.

[0130] In some implementations, movement of the holding element 31e is limited within the outer shell of the aerosol generating device 100; and the holding element 31e never extends from the outer shell during movement. The user cannot touch and operate the holding element 31e to move. In this implementation, the holding element 31e is not connected to the outer shell;

and when the holding element 31e is driven to move along a longitudinal direction of the outer shell, a size or a length of the outer shell is unchanged.

[0131] During implementation, the heater 40e has a length approximately ranging from 15 mm to 20 mm, and a distance by which the holding element 31e holds the aerosol generating article 1000 is controlled to approximately range from 2 mm to 5 mm. That is, there is no need to substantially extract or remove the aerosol generating article 1000 from the aerosol generating device, and there is also no need to substantially separate the aerosol generating article 1000 from the heater 40e.

[0132] In some implementations, the driving element 60e drives the holding element 31e to move along the axial direction in a reciprocating manner; and after movement, the holding element 31e further needs to be reset to an initial state shown in FIG. 16.

[0133] During implementation, the user can only remove the aerosol generating article 1000 from the outer shell/the chamber/the holding mechanism by clamping or operating a part of the aerosol generating article 1000 exposed outside the outer shell.

[0134] In an implementation, movement of the aerosol generating article 1000 driven by the driving element 60/60a/60b/60c/60d/60e relative to the heater 40/40a/40b/40c/40d/40e is controlled by the controller of the circuit board 22 according to predetermined time.

[0135] For example, FIG. 17 shows a schematic diagram of a heating curve of the aerosol generating article 1000 within the predetermined time according to an embodiment. In a heating process, the controller of the circuit board 22 controls the heater 40/40a/40b/40c/40d/40e to provide a heating temperature to the aerosol generating article 1000 according to a predetermined heating curve. In some implementations, the heating curve is within the predetermined time, and the predetermined time is set based on an amount of aerosols that can be generated by the aerosol generating article 1000 and an inhalation duration (for example, 4 min) that can be accepted by the user. For example, according to the heating curve in FIG. 17, the heating process includes:

a first stage S1: preheating is performed by quickly rising a temperature from a room temperature to a first preset temperature T1 within time 11, which may be referred to as a preheating stage;

a second stage S2: the temperature is decreased from the first preset temperature T1 to a second preset temperature T2 within time t2; and

a third stage S3: the heating temperature is substantially maintained at a third preset temperature that is equal to the second preset temperature T2 until time t3 ends, to stably heat the aerosol generating article 1000 under the second preset temperature T2 to generate aerosols for inhalation; and heating is stopped after inhalation is completed to naturally cool the aerosol generating article 1000. Alternatively, in some other variant implementations, in an inhalation process in the third stage S3, the third preset temperature may be higher or lower than the second preset temperature T2.

[0136] Correspondingly, in some implementations, the controller controls, according to a specific frequency or predetermined interval time, the driving element 60/60a/60b/60c/60d/60e to drive the aerosol generating article 1000 to move relative to the heater 40/40a/40b/40c/40d/40e. Therefore, adhesion or bonding strength between the aerosol generating article 1000 and the heater 40/40a/40b/40c/40d/40e in the heating process can be reduced or prevented. For example, relative movement between the aerosol generating article and the heater is driven according to a time interval ranging from 20s to 180s. More preferably, the relative movement between the aerosol generating article and the heater is driven according to a time interval of 120s, 60s, or 30s.

[0137] Alternatively, in some other implementations, the controller controls the relative movement between the aerosol generating article 1000 and the heater 40/40a/40b/40c/40d/40e within specific time of the heating curve. For example, in an embodiment, in the preheating stage (0 to the time t1) of the first stage S1, relative movement between the aerosol generating article 1000 and the heater 40/40a/40b/40c/40d/40e is driven once, to reduce adhesion generated under a high temperature in the preheating stage; and relative movement is driven at least twice in the third stage S3 (the time t2 to the time t3). movement is driven at least once within predetermined time before the third stage S3 ends, so that the user can immediately pull out the aerosol generating article 1000 when inhalation ends. The driving element is forbidden or prevented from driving the aerosol generating article and the heater to generate relative movement in the second stage S2.

[0138] In some preferred implementations, one of the at least two movement driven in the third stage S3 (the time t2 to the time t3) is performed within the predetermined time before the third stage S3 ends. In some preferred implementations, the predetermined time before the third stage S3 ends is 20s. More preferably, the predetermined time before the third stage S3 ends is 10s. More preferably, the predetermined time is 5s. More preferably, the predetermined time is 3s.

[0139] According to the foregoing, one movement is performed within the predetermined time adjacent to the end moment t3 of the heating process, so that the user can pull out the aerosol generating article 1000 after inhalation ends.

[0140] During implementation, at least one of the at least two movement driven in the third stage S3 (the time t2 to the time t3) is performed between the moment t2 and the predetermined time before the third stage S3 ends, for example, (time obtained by subtracting the predetermined time from the time t2 to the time t3).

[0141] During implementation, the foregoing "one movement" is a process in which the rotating shaft of the driving element starts rotating to drive the holding element and the heater to change from a relative static state to a relative dynamic state and the rotating shaft of the driving element stops rotating to drive the holding element and the heater to change from the relative dynamic state to the relative static state. Alternatively, "one movement" is a process in which the holding element and the heater change from a relative static state to a state of moving relative to each other and then return to the relative static state. Certainly, in "one movement", the relative movement between the holding element and the heater is substantially continuous or uninterrupted.

[0142] In some implementations, "one movement" may be performed along a fixed direction; or "one relative movement" may be performed along two opposite directions in turn or in a reciprocating manner.

[0143] In some implementations, movement time of "one movement" is controlled to range from 1s to 10s; and more preferably, the movement time of "one movement" is controlled to range from 2s to 6s.

[0144] Alternatively, in some other implementations, the controller controls, after detecting that the heating ends, the relative movement between the aerosol generating article 1000 and the heater 40/40a/40b/40c/40d/40e. For example, the controller controls to prevent the relative movement before the heating process of the aerosol generating article 1000 ends (for example, 0 to the time t3), to prevent the heating process from being affected. After the heating process ends, the controller controls the relative movement within the predetermined time (for example, 3s, 5s, 10s, or 20s), which is conducive to pulling out the aerosol generating article 1000 by the user after inhalation ends.

[0145] Alternatively, in some other implementations, the controller controlling the relative movement within 10s or 20s before inhalation ends, for example, before the time t3, is conducive to pulling out the aerosol generating article 1000 by the user after the inhalation ends.

[0146] In some other implementations, when the heating process of the aerosol generating article 1000 according to the heating curve within the predetermined time ends, the driving can be further controlled to reset the holding element and the heater that move relative to each other, to initial positions of the holding element and the heater before the movement.

[0147] In still another embodiment, the controller controls the relative movement to avoid an inhalation action of the user to the aerosol generating article 1000. Specifically, the controller determines the inhalation of the user by detecting a temperature decrease caused when an inhalation airflow of the user flows through the heater 40/40a/40b/40c/40d/40e during inhalation; and the controller further prevents the relative moment when detecting the inhalation action of the user.

[0148] In still another specific embodiment, the controller determines the inhalation action of the user according to a difference between power provided to the heater 40/40a/40b/40c/40d/40e during inhalation and target power for maintaining the heating temperature at a preset temperature of the heating curve.

[0149] In still another variant implementation, movement of the aerosol generating article 1000 relative to the heater 40/40a/40b/40c/40d/40e is driven under the control of the user. For example, an input element (not shown in the figure) is arranged on the outer shell of the aerosol generating device 100, for the user to operate to form an input signal; and the controller controls the relative movement according to the input signal of the user. In some implementations, the input element is selected from a mechanical button, a film button, a mechanical switch, a rotary encoder, a dial, a knob, a capacitive touch button, a resistive touch button, an operating lever, a slider, a trigger button, a touch screen, and a magnetic switch.

Embodiment 2

[0150] An embodiment of this application provides an aerosol generating device 100. As shown in FIG. 18 to FIG. 20, the aerosol generating device 100 is provided with a first chamber 10A, a heater 40, a circuit board 22, a battery core 21, and a holding element 31, where the battery core 21 and the heater 40 are electrically connected to the circuit board 22, and the circuit board 22 is provided with a controller of the aerosol generating device 100, so that the controller of the aerosol generating device 100 can control the battery core 21 to provide power to the heater 40. The holding element 31 defines a second chamber 51, and the holding element 31 is accommodated in the first chamber 10A. The second chamber 51 is configured to receive and hold an aerosol generating article 1000 used together with the aerosol generating device 100, and at least a part of the heater 40 extends into the second chamber 51, so that the heater 40 can be inserted into the aerosol generating article 1000 for heating to generate aerosols. It may be easily understood that the battery core 21 may be a rechargeable battery core or a non-rechargeable battery core.

[0151] Preferably, the aerosol generating article 1000 is a material containing tobacco that releases volatile compounds from a substrate when being heated. Alternatively, a non-tobacco material that can be suitable for electrical heating smoke generation after being heated may be used. Preferably, a solid substrate is used as the aerosol generating article 1000, which may include one or more of powders, particles, shreds, strips, or flakes of one or more of a vanilla leaf, a tobacco leaf, homogenized tobacco, or expanded tobacco. Alternatively, the solid substrate may include additional tobacco or non-tobacco volatile flavor compounds, so as to be released when the substrate is heated. In this embodiment, description is provided by using an example in which the aerosol generating article 1000 is a cigarette in which tobacco materials are filled.

[0152] As shown in FIG. 20, the heater 40 is con-

structed in a lengthwise pin, needle, or sheet shape, so that the heater can be smoothly inserted into the aerosol generating article 1000 for heating. In some embodiments, the heater 40 is a resistive heating element that generates joule heat through a supplied direct current. Alternatively, in some other implementations, the heater 40 is an induction heating element prepared by using an inductive material, so that the heater can be penetrated by a variable magnetic field to generate heat. Alternatively, in some other implementations, the heater 40 is an infrared heating element that heats the aerosol generating article 1000 by radiating infrared rays.

[0153] In some embodiments, as shown in FIG. 17 and FIG. 18, a plurality of longitudinally extending convex edges 52 are formed on an inner wall of the second chamber 51, the plurality of convex edges 52 uniformly surround the inner wall of the second chamber 51, and the plurality of convex edges 52 encircle to form a clamping space, so that when the aerosol generating article 1000 is accommodated in the second chamber 51, the aerosol generating article 1000 can be clamped by the plurality of convex edges 52 and held in the holding element 31.

[0154] Still referring to FIG. 20 and FIG. 21, the aerosol generating device 100 further includes a driving wheel 60A and a driving element 60, where the driving element 60 includes a rotating shaft 61, the rotating shaft 61 is connected to the driving wheel 60A, and the rotating shaft 61 rotates to drive the driving wheel 60A to rotate. In addition, a driven wheel 31A is arranged on the holding element 31, and the driven wheel 31A rotates to drive the holding element 31 to rotate. Because the aerosol generating article 1000 is clamped by the convex edges 52 and held in the holding element 31, a sufficient friction force exists between the aerosol generating article 1000 and the convex edges 52, so that the holding element 31 can drive, during rotation, the aerosol generating article 1000 to rotate synchronously. The driving wheel 60Ais in meshing transmission with the driven wheel 31A through gears, so that when the driving element 60 drives the rotating shaft 61 to rotate, the rotating shaft 61 drives the driving wheel 60A to rotate, and the driving wheel 60A drives the driven wheel 31A to rotate, to further drive the aerosol generating article 1000 to rotate relative to the heater 40. Under the action of the relative rotation, adhesion of tobacco in the aerosol generating article 1000 to the heater 40 can be effectively alleviated.

[0155] In some embodiments, the driving element 60 is an air cylinder or a hydraulic cylinder. In addition, a transmission relationship between the driving wheel 60A and the holding element 31 is not limited to meshing transmission through gears. In some embodiments, transmission may be alternatively performed between the driving wheel and the holding element through transmission mechanisms such as chain drive, a worm gear and worm, a swing rod mechanism, a linkage mechanism, or a belt pulley. In a specific embodiment, FIG. 22 shows a belt pulley transmission manner, both the driving wheel 60A and the driven wheel 31A are belt pulleys, a transmission belt 61B is arranged between the driving wheel 60A and the driven wheel 31A, and the transmission belt 61B may be a flexible belt, so that rotation of the driving wheel 60A can drive the transmission belt 61B to move, and the movement of the transmission belt 61B further drives the driven wheel 31A to rotate, to implement transmission between the driving wheel 60A and the holding element 31.

[0156] It should be noted that, in some embodiments, the holding element 31 may be directly mounted in the aerosol generating device 100, and in an entire stage of inserting the aerosol generating article 1000 into the holding element 31 and taking out the aerosol generating article from the holding element 31, the holding element 31 is always connected to the aerosol generating device 100. In some other embodiments, the holding element 31 may be alternatively separated from the aerosol generating device 100. As shown in FIG. 17, the aerosol generating device 100 includes a first part 80 and a second part 90, both the holding element 31 and the driving wheel 60A are arranged in the first part 80, and the first chamber 10A, the heater 40, the circuit board 22, the battery core 21, and the driving element 60 are all arranged in the second part 90. The first part 80 may be combined with or separated from the second part 90, and the holding element 31 is partially exposed to the first part 80. When the first part 80 is combined with the second part 90, the holding element 31 is accommodated in the first chamber 10A. The user may also operate the first part 80 to separate the first part 80 from the second part 90, and the holding element 31 is also separated from the second part 90, so that the user can operate the first part 80 to extract the aerosol generating article 1000. In this case, the first part 80 play a role similar to a cigarette extractor.

[0157] The holding element 31 and the second part 90 are constructed to be separable, so that the holding element 31 can be taken out from the first chamber 10A, helping clean an inner wall of the first chamber 10A; and the holding element 31 can also be taken out independently for cleaning. However, in the entire stage of inserting the aerosol generating article 1000 into the holding element 31 and taking out the aerosol generating article from the holding element 31, the holding element 31 is also always connected to the aerosol generating device 100.

[0158] In some embodiments, the driving wheel 60A may not be arranged in the aerosol generating device 100, and the driven wheel 31A in transmission with the driving wheel 60A does not need to be arranged on the holding element 31 either, provided that the rotating shaft 61 of the driving element 60 is inserted into the holding element 31, so that rotation of the rotating shaft 61 can drive the holding element 31 to rotate, to further drive the aerosol generating article 1000 to rotate. Alternatively, in some embodiments, the holding element 31 does not need to rotate but the heater 40 rotates, to implement relative rotation between the aerosol generating article

1000 and the heater 40. For example, the heater 40 is generally provided with a bottom base. In this case, the rotating shaft 61 of the driving element 60 may be inserted into the bottom base of the heater 40, the rotating shaft 61 rotates to drive the bottom base to rotate, and the bottom base rotates to further drive the heater 40 to rotate.

[0159] In some embodiments, still referring to FIG. 21, the holding element 31 includes an open end 54 for the aerosol generating article 1000 to enter the second chamber 51, and a gear 531 on the driven wheel 31A is arranged around the open end 54. By arranging the gear 531 at the open end 54 of the holding element 31, structure designs of other components of the aerosol generating device 100 can be facilitated.

[0160] In some embodiments, the driven wheel 31A and the holding element 31 are integrally formed, to reduce an assembly process of the aerosol generating device 100, and improve the assembly efficiency of the aerosol generating device 100. Certainly, in some other embodiments, the driven wheel 31A may be alternatively an independent component and fixed to the holding element 31 through a fixing device, provided that the holding element 31 is driven to rotate when the driven wheel 31A rotates.

[0161] Still referring to FIG. 17, FIG. 17 shows a schematic diagram of the heating curve of the aerosol generating article 100 within the predetermined time in the foregoing embodiment. In a working process of the aerosol generating device 100, the controller on the circuit board 22 controls the heater 40 according to a predetermined heating curve. In some implementations, the heating curve is within the predetermined time, and the predetermined time is set based on an amount of aerosols that can be generated by the aerosol generating article 1000 and an inhalation duration (for example, 4 min) that can be accepted by the user. For example, according to the heating curve in FIG. 17, the heating process includes:

a first stage S1: a temperature is quickly risen from a room temperature or an initial temperature to a first preset temperature T1 within time 11;

a second stage S2: the temperature is decreased from the first preset temperature T1 to a second preset temperature T2 within time t2; and

a third stage S3: the heating temperature is substantially maintained at the second preset temperature T2 until time t3 ends, to stably heat the aerosol generating article 1000 under the second preset temperature T2 to generate aerosols for inhalation, and heating is stopped after inhalation is completed to naturally cool the aerosol generating article 1000.

A shape of the heating curve is not limited to the shape shown in FIG. 17, and in some other embodiments, the second preset temperature T2 in the second stage S2 may be substantially the same as the first preset temperature T1 or may be higher than the first preset temperature T1.

[0162] It should be noted that, the first stage S1 and the second stage S2 are collectively referred to as a preheating stage, and the third stage S3 may be referred to as an inhalation stage. After the preheating stage is completed, the controller of the circuit board 22 controls a feedback element to provide feedback to the user, to notify the user that preheating has been completed and inhalation can be started, where the feedback element may be a vibration motor or an indicator light. In the inhalation stage, the controller controls the battery core 21 to provide relatively small power to the heater 40, to substantially maintain the temperature at the second preset temperature T2, where the power is less than power provided by the battery core 21 to the heater 40 in the preheating stage.

[0163] The preheating stage is to increase a temperature of the aerosol generating article 1000 to a temperature that can generate a satisfying amount of aerosols, and when the preheating stage ends, solid tobacco in the aerosol generating article 1000 may have reached a temperature for releasing volatile components contained in the tobacco. In the preheating stage, the power provided to the heater 40 may depend on a first preheating temperature set by the controller. Alternatively, in the preheating stage, preset power is provided to enable the heater 40 to reach the first preheating temperature. The first preset temperature is not limited to a value, and generally may be within a temperature range.

[0164] The inhalation stage means that aerosols can be generated by the aerosol generating device 100 at a satisfying rate and inhaled by the user. In the inhalation stage, the temperature may be substantially maintained at the second preset temperature T2, where the second preset temperature is not limited to a value and generally may be within a temperature range; or the temperature of the heater 40 may be decreased to a third preset temperature T3 by reducing the power provided to the heater 40, where the third preset temperature T3 is lower than the second preset temperature T2; or the temperature of a heating element may be increased to a fourth preset temperature T4 by increasing the power provided to the heater 40, where the fourth preset temperature T4 is higher than the second preset temperature T2.

[0165] Based on the aerosol generating device 100 described in the foregoing embodiments, an embodiment of this application further provides a control method for the aerosol generating device 100, to control, within the predetermined time, the driving element 60 to drive the holding element 31 or the heater 40 to rotate, so as to implement relative rotation between the aerosol generating article 1000 in the holding element 31 and the heater 40, thereby alleviating adhesion of tobacco in the aerosol generating article 1000 to the heater 40 under the action of the relative rotation.

[0166] Specifically, the method includes: controlling, in the preheating stage, the driving element 60 to drive one

of the holding element 31 or the heater 40 to rotate relative to the other, and controlling the driving element 60 to stop working when or before the preheating stage ends.

[0167] According to the description of the foregoing embodiments, the heating curve of the heater 40 is decided by the controller of the circuit board 22, and the driving element 60 is also electrically connected to the controller, so that the controller can completely control the driving element 60 to work or not according to a current state of the heater 40.

[0168] The preheating stage generally lasts for short time (within 30s), and the heater 40 can be risen to a temperature for releasing the volatile components contained in the tobacco in the aerosol generating article 1000 in short time. In this case, the tobacco in the aerosol generating article 1000 is easily adhered to the heater 40. Therefore, in the preheating stage, the driving element 60 is controlled to drive one of the holding element 31 or the heater 40 to rotate relative to the other, so that relative movement can be generated between the aerosol generating article 1000 and the heater 40, and adhesion of the tobacco in the aerosol generating article 1000 to the heater 40 can be effectively alleviated under the action of the relative rotation. Specifically, the driving element 60 can be controlled to stop working when or before the preheating stage ends. In addition, because the third stage is the inhalation stage, if the driving element 60 is controlled to work in this case, inhalation by the user is easily affected, bringing poor use experience to the user.

[0169] Besides, tobacco leaves in the tobacco generally contain moisture, which is also referred to as tobacco leaf moisture or tobacco leaf water content, and under the action of the moisture, the tobacco leaves are adhered to the heater 40 once being heated. When the moisture in the tobacco leaves has been evaporated in the preheating stage, the water content of the tobacco leaves in the inhalation stage is extremely low, and the tobacco leaves are not easily adhered to the heater 40 under a high temperature condition, so that it is only required to control one of the holding element 31 or the heater 40 to rotate relative to the other in the preheating stage. It may be understood that, in some other embodiments, to fully alleviate adhesion of the tobacco in the aerosol generating article 1000 to the heater 40, one of the holding element 31 or the heater 40 may be additionally controlled to rotate relative to the other in the inhalation stage.

[0170] In some embodiments, the method further includes: controlling, before the preheating stage starts, the driving element 60 to drive one of the holding element 31 or the heater 40 to rotate relative to the other.

[0171] When the preheating stage starts, the driving element 60 is controlled to work, so that relative rotation is generated between the holding element 31 and the heater 40 when the heater 40 just starts performing heating, and as the temperature of the heater 40 gradually rises, the tobacco in the aerosol generating article 1000 can be hardly adhered to the heater 40 due to the relative rotation between the holding element 31 and the heater 40. The driving element 60 is controlled to start working when the preheating stage starts, and the driving element 60 is controlled to stop working when the preheating stage ends, so that the driving element 60 works in the entire preheating stage. That is, the relative rotation exists between the holding element 31 and the heater 40 in the entire preheating stage, which is more conducive to alleviating adhesion of the tobacco in the aerosol generating article 1000 to the heater 40.

[0172] In addition, controlling the driving element 60 to start working when the preheating stage starts and to stop working when the preheating stage ends may also be used as one piece of feedback information to notify the user. That is, the user can start inhalation after observing that the aerosol generating article 1000 stops rotating, namely, when the aerosol generating article 1000 stops rotating, the preheating stage has ended, the heater 40 enters the inhalation stage, and the user can start inhalation. If the rotation is stopped before the preheating stage ends, addition feedback information is required to notify the user that the preheating stage has ended.

[0173] In some embodiments, the method further includes: controlling the driving element 60 to drive the holding element 31 to drive the aerosol generating article 1000 to rotate relative to the heater 40.

[0174] The heater 40 generally includes electrode leads, and the electrode leads are electrically connected to the circuit board 22, so that when the heater 40 rotates, the electrode leads rotate synchronously. As a result, the electrode leads are wound together. Therefore, in preferred arrangement, the holding element 31 rotates, and an electrical connection manner between the heater 40 and a motherboard 20 does not need to be improved.

[0175] In a further embodiment, to better alleviate adhesion of the tobacco in the aerosol generating article 1000 to the heater 40 during rotation of the holding element 31, rotation time of the holding element 31 during rotation is not less than 15s, or a rotation number of the holding element 31 is not less than 3. Longer rotation time or a greater rotation number of the holding element 31 is more conducive to alleviating adhesion of the tobacco in the aerosol generating article 1000 to the heater 40. However, if the rotation time of the holding element 31 is excessively long or the rotation number of the holding element is excessively great, more electric power is correspondingly consumed. Alternatively, in a further embodiment, a rotation direction of the holding element 31 may include both a counterclockwise direction and a clockwise direction. For example, if the rotation time of the holding element 31 is 15s, the holding element may rotate along the counterclockwise direction in the first 7s, and rotate along the clockwise direction in the last 8s. Alternatively, the holding element 31 may change the rotation direction at an interval of predetermined time. By changing the rotation direction, adhesion of the tobacco in the aerosol generating article 1000 to the heater 40 can

also be further alleviated.

[0176] In some embodiments, when the holding element 31 or the heater 40 rotates, the aerosol generating device 100 can provide rotation feedback information to the user, thereby improving the use experience of the user. The method may further include:

driving, in a process that one of the holding element 31 or the heater 40 rotates relative to the other, a light assembly to generate a light effect, where the light effect is different from a light effect generated in the inhalation stage.

[0177] Specifically, the aerosol generating device 100 may be provided with a light assembly, where the light assembly is electrically connected to the controller of the circuit board 22, and the controller can control the light assembly to generate a corresponding light effect. For example, in the inhalation stage, the holding element 31 or the heater 40 has stopped rotating, and the controller can control the light assembly to generate red light. When the holding element 31 or the heater 40 rotates in the preheating stage, the controller can control the light assembly to generate a light effect different from that in the inhalation stage, for example, generate blue light or green light. In some embodiments, a current rotation speed of the holding element 31 or the heater 40 may also be displayed by controlling the light effect. For example, the blue light corresponds to a relatively fast rotation speed, and the green light corresponds to a relatively slow rotation speed. Alternatively, in some embodiments, whether the holding element 31 or the heater 40 is rotating may also be displayed through the light effect. For example, the blue light corresponds to a case that the holding element 31 or the heater 40 does not rotate, and the green light corresponds to a case that the holding element 31 or the heater 40 rotates.

[0178] In some embodiments, the feedback information further includes vibration feedback. In this case, the aerosol generating device 100 is provided with a vibration feedback element (not shown in the figure), where the vibration feedback element is electrically connected to the controller of the circuit board 22, the vibration feedback element may be a motor, and the controller may control the vibration feedback element to vibrate; and

the method further includes: driving the vibration feedback element to vibrate, where a time sequence of driving the holding element 31 to drive the aerosol generating article 1000 to stop rotating is synchronized or nearly synchronized with a time sequence of driving the vibration feedback element to start vibrating.

[0179] Specifically, a time sequence of the controller controlling the holding element 31 to rotate is substantially the same as a time sequence of the controller controlling the vibration feedback element. That is, when the holding element 31 starts rotating, the vibration feedback element also starts vibrating; and when the holding element 31 stops rotating, the vibration feedback element also stops vibrating, so that the user can determine whether the holding element 31 is rotating according to vibration of the vibration feedback element.

[0180] An embodiment of this application further provides a control method for the aerosol generating device 100, to control, within the predetermined time, the driving element 60 to drive the holding element 31 or the heater 40 to rotate, so as to implement relative rotation between the aerosol generating article 1000 in the holding element 31 and the heater 40. The method includes:

[0181] Controlling, within first 25s of a heating period of the heater 40, the driving element 60 to drive one of the holding element 31 or the heater 40 to rotate relative to the other.

[0182] Specifically, the heating period of the heater 40 includes the foregoing preheating stage and the inhalation stage, and the first 25s may fall within the preheating stage or may fall within the inhalation stage. If the preheating stage lasts for short time, the first 25s fall within the inhalation stage; and if the preheating stage lasts for long time, the first 25s fall within the preheating stage. The holding element 31 or the heater 40 may rotate continuously within the first 25s of the heating period or may rotate within a time period in the first 25, for example, may preferably rotate within a 15th second to a 25th second of the heating period.

[0183] An embodiment of this application further provides a control method for an aerosol generating system. The aerosol generating system includes the aerosol generating device 100 and the aerosol generating article 1000 described in the foregoing embodiments, and the method includes:

controlling the driving element 60 to drive the holding element 31 to rotate in the preheating stage, to enable the aerosol generating article 1000 to be in a rotating state; and controlling the driving element 60 to stop working in the inhalation stage, to enable the aerosol generating article 1000 to be in a static state.

[0184] Specifically, as described in the foregoing embodiments, the holding element 31 can accommodate and hold the aerosol generating article 1000 in the second chamber 51 of the holding element 31, so that when the driving element 60 drives the holding element 31 to rotate, the holding element 31 can drive the aerosol generating article 1000 to rotate synchronously, to further enable the aerosol generating article 1000 to rotate relative to the heater 40. Therefore, the holding element 31 may be controlled to rotate in the preheating stage to enable the aerosol generating article 1000 to be in the rotating stage in the preheating stage, and the driving element 60 is controlled to stop working in the inhalation stage to enable the aerosol generating article 1000 to be in the static state in the inhalation stage, thereby alleviating adhesion of the tobacco in the aerosol generating article 1000 to the heater 40 due to a high temperature in the preheating stage.

[0185] It should be noted that, alleviating easy adhesion of the aerosol generating article 1000 to the heater 40 20 due to a high temperature in a heating process is not limited to the manner of enabling the aerosol generating article 1000 and the heater 40 to rotate relative to

each other. In some other embodiments, the holding element 31 and the heater 40 may move relative to each other, that is, the aerosol generating article 1000 and the heater 40 are enabled to move relative to each other. For example, the aerosol generating article 1000 and the heater 40 are enabled to move relative to each other in an up-down direction, a left-right direction, or a front-rear direction, provided that the aerosol generating article 1000 and the heater 40 move relative to each other.

Embodiment 3

[0186] An embodiment of this application provides an aerosol generating device 100. As shown in FIG. 23 and FIG. 24 with reference to FIG. 18, the aerosol generating device 100 is provided with a chamber 10A, a heater 40, a circuit board 22, a battery core 21, and a holding element 31, where the battery core 21 and the heater 40 are electrically connected to the circuit board 22, and the circuit board 22 is provided with a controller of the aerosol generating device 100, so that the controller of the aerosol generating device 100 can control the battery core 21 to provide power to the heater 40. The holding element 31 defines a second chamber 51, and the holding element 31 is accommodated in the chamber 10A. The second chamber 51 is configured to receive and hold an aerosol generating article 1000 used together with the aerosol generating device 100. That is, the holding element 31 can carry the aerosol generating article 1000 to be together accommodated in the chamber 10A. At least a part of the heater 40 extends into the second chamber 51, so that the heater 40 can be inserted into the aerosol generating article 1000 for heating to generate aerosols. It may be easily understood that the battery core 21 may be a rechargeable battery core or a non-rechargeable battery core.

[0187] Preferably, the aerosol generating article 1000 is a material containing tobacco that releases volatile compounds from a substrate when being heated. Alternatively, a non-tobacco material that can be suitable for electrical heating smoke generation after being heated may be used. Preferably, a solid substrate is used as the aerosol generating article 1000, which may include one or more of powders, particles, shreds, strips, or flakes of one or more of a vanilla leaf, a tobacco leaf, homogenized tobacco, or expanded tobacco. Alternatively, the solid substrate may include additional tobacco or non-tobacco volatile flavor compounds, so as to be released when the substrate is heated. In this embodiment, description is provided by using an example in which the aerosol generating article 1000 is a cigarette in which tobacco materials are filled.

[0188] The heater 40 is constructed in a lengthwise pin, needle, or sheet shape, so that the heater can be smoothly inserted into the aerosol generating article 1000 for heating. In some embodiments, the heater 40 is a resistive heating element that generates joule heat through a supplied direct current. Alternatively, in some other implementations, the heater 40 is an induction heating element prepared by using an inductive material, so that the heater can be penetrated by a variable magnetic field to generate heat. Alternatively, in some other implementations, the heater 40 is an infrared heating element that heats the aerosol generating article 1000 by radiating infrared rays.

[0189] In some embodiments, as shown in FIG. 23 and FIG. 24, a plurality of longitudinally extending convex edges 52 are formed on an inner wall of the second chamber 51, the plurality of convex edges 52 uniformly surround the inner wall of the second chamber 51, and the plurality of convex edges 52 encircle to form a holding space, so that when the aerosol generating article 1000 is accommodated in the second chamber 51, the aerosol generating article 1000 can be clamped by the plurality of convex edges 52 and held in the holding space.

[0190] Still referring to FIG. 24 and FIG. 21, the holding element 31 is provided with an open end 54 for the aerosol generating article 1000 to enter, and the aerosol generating device 100 further includes a rotatable wheel 60A and a driving element 60, where the driving element 60 includes a rotating shaft 61, the rotating shaft 61 is connected to the rotatable wheel 60A, and the rotating shaft 61 rotates to drive the rotatable wheel 60A to rotate. In addition, a driven wheel 31A is arranged on the holding element 31, and the driven wheel 31A rotates to drive the holding element 31 to rotate. Because the aerosol generating article 1000 is clamped by the convex edges 52 and held in the first chamber 51, a sufficient friction force exists between the aerosol generating article 1000 and the convex edges 52, so that the holding element 31 can drive, during rotation, the aerosol generating article 1000 to rotate synchronously. A gear 531 is arranged on the driven wheel 31A, the rotatable wheel 60Ais in meshing transmission with the driven wheel 31A through gears, so that when the driving element 70 drives the rotating shaft 61 to rotate, the rotating shaft 61 drives the rotatable wheel 60A to rotate, and the rotatable wheel 60A drives the driven wheel 31Ato rotate, to further drive the aerosol generating article 1000 to rotate relative to the heater 40. Under the action of the relative rotation, adhesion of tobacco in the aerosol generating article 1000 to the heater 40 can be effectively alleviated.

[0191] In some embodiments, the driving element 60 is an air cylinder or a hydraulic cylinder. In addition, a transmission relationship between the rotatable wheel 60A and the holding element 31 is not limited to meshing transmission through gears. In some embodiments, transmission may be alternatively performed between the rotatable wheel and the holding element through transmission mechanisms such as chain drive, a worm gear and worm, a swing rod mechanism, a linkage mechanism, or a belt pulley. In a specific embodiment, FIG. 22 shows a belt pulley transmission manner, both the rotatable wheel 60A and the driven wheel 31A are belt pulleys, a transmission belt 61B is arranged between rotatable wheel 60A and the driven wheel 31A, and the

transmission belt 61B may be a flexible belt, so that rotation of the rotatable wheel 60A can drive the transmission belt 61B to move, and the movement of the transmission belt 61B further drives the driven wheel 31A to rotate, to implement transmission between the rotatable wheel 60A and the holding element 31.

[0192] Still referring to FIG. 24, the aerosol generating device 100 includes a proximal end 110 and a distal end 120 that are arranged opposite to each other along a length direction. Because a volume of the aerosol generating device 100 is generally designed to be relative small for the user to carry, the driving element 60 and the circuit board 22 both extend along the length direction of the aerosol generating device 100, to reduce structure space occupied by the driving element 60 and the circuit board 22 as much as possible, thereby avoiding a large increase in the volume of the aerosol generating device 100 caused by adding the driving element 60 to the aerosol generating device 100.

[0193] In some embodiments, as shown in FIG. 25, for ease of fully utilizing structure space, the circuit board 22 includes a first part 22A and a second part 22B, where the first part 22A and the second part 22B are electrically connected to each other for mutual communication between the first part 22A and the second part 22B. In addition, the first part 22A and the second part 22B are arranged in different directions, that is, the first part 22A and the second part 32 are not located on a same complete circuit board 22. The first part 22A and the second part 22B are respectively provided with corresponding electronic components. The circuit board 22 is split into the first part 22A and the second part 22B, so that there is no need to integrate all the electronic components on the same circuit board, which increases a volume of the circuit board 22 and is not convenient to structure designs of other components.

[0194] In a further embodiment, still referring to FIG. 25, a connection portion 33 between the first part 22A and the second part 22B is implemented by using a flexible printed circuit (FPC 22). The FPC can be freely bent or folded, has light weight and a thin thickness, and is easy to assembly, so that using the FPC for connection can improve the efficiency of production and assembly and can maintain the requirement on a small volume of the aerosol generating device 100.

[0195] In a further embodiment, still referring to FIG. 25, to further facilitate production and assembly and save structure space, the first part 22A and the second part 22B are perpendicular to each other.

[0196] In a further embodiment, the first part 22A is configured for a small current signal to pass by, and the second part 22B is configured for a large current signal to pass by. For example, the first part 22A may be electrically connected to a low-power device such as an LED lamp 311 or a switch button 312, and the second part 22B is electrically connected to a high-power device such as the heater 40 or the battery core 21. In this way, the small current signal and the large current signal are separated from each other to reduce mutual interference.

[0197] In a further embodiment, as shown in FIG. 26, the first part 22A and the second part 22B define an accommodating space 34, and the driving element 60 extends in the accommodating space 34, so that there is no need to arrange the driving element 60 at another position, thereby further saving structure space, which is conducive to maintaining the requirement on a small volume of the aerosol generating device 100.

[0198] In some embodiments, still referring to FIG. 24, for ease of electrical connection between the circuit board 22 and the driving element 60, the circuit board 22 and the driving element 60 are arranged on a same side of the holding element 31, that is, arranged on a same side of the chamber 10A, so that the circuit board 22 is close to the driving element 60, thereby facilitating the electrical connection between the driving element 60 and the circuit board 22. In a further embodiment, to prevent a high temperature of the heater 40 from being transferred to the electronic components of the circuit board 22 and affecting the reliability of the electronic components on the circuit board 22, the driving element 60 extends between the chamber 10A and the circuit board 22, to enable the circuit board 22 to be away from the chamber 10A as much as possible, thereby preventing the high temperature of the heater 40 in the chamber 10A from being transferred to the electronic components on the circuit board 22.

[0199] In some embodiments, the rotatable wheel 60A is arranged at the proximal end of the aerosol generating device 100, so that the rotating shaft 61 of the driving element 60 can extend into the rotatable wheel to drive the rotatable wheel 60A to rotate. In addition, arranging the rotatable wheel 60A at the proximal end of the aerosol generating device 100 is also conducive to saving structure space.

[0200] In a further embodiment, at least a part of a housing at the proximal end of the aerosol generating device 100 is transparent, so that when the rotatable wheel 60A rotates and/or the driven wheel 31A on the holding element 31 rotates, the user can directly observe the rotation through the transparent part, thereby improving the technological aesthetics and coolness of the aerosol generating device 100.

[0201] It should be noted that, the specification and the accompanying drawings of this application illustrate preferred embodiments of this application, but this application is not limited to the embodiments described in this specification. Further, a person of ordinary skill in the art may make improvements or modifications according to the foregoing description, and all the improvements and modifications shall fall within the protection scope of the appended claims of this application.

Claims

1. An aerosol generating device, configured to heat an

aerosol generating article to generate aerosols, and comprising:

a chamber, configured to receive at least a part of the aerosol generating article;
a heater, at least partially inserted into the aerosol generating article for heating;
a holding element, configured to at least partially hold the aerosol generating article;
a driving element, having a rotating shaft; and
a rotatable wheel, configured to be rotatable under driving of the rotating shaft of the driving element, wherein
the holding element is configured to be rotatable relative to the heater around a central axis of the chamber in response to rotation of the rotatable wheel, to enable the aerosol generating article held by the holding element to eliminate or reduce adhesion or bonding to a surface of the heater during rotation.

2. The aerosol generating device according to claim 1, wherein the holding element is configured to be in contact with one or more surface regions of the aerosol generating article to squeeze or compress the aerosol generating article.

3. The aerosol generating device according to claim 1, wherein the holding element comprises at least one or more convexes extending to the chamber, and the convexes are configured to clamp the aerosol generating article when the aerosol generating article is received in the chamber.

4. The aerosol generating device according to claim 1, wherein the holding element comprises a plurality of convexes arranged at intervals around a circumferential direction of the chamber; and the plurality of convexes are configured to be in contact with the aerosol generating article to hold the aerosol generating article among the plurality of convexes.

5. The aerosol generating device according to any one of claims 1 to 4, further comprising:
a transmission belt, wherein the holding element rotates relative to the heater through the transmission belt in response to the rotation of the rotatable wheel.

6. The aerosol generating device according to claim 5, wherein the holding element comprises a circumferential surface; and the transmission belt is joined to a part of the circumferential surface of the holding element.

7. The aerosol generating device according to claim 5, wherein the transmission belt is joined to at least a part of a surface of the rotatable wheel, to further form a belt wheel transmission mechanism with the rotatable wheel; and the holding element further rotates through belt drive of the belt wheel transmission mechanism in response to the rotation of the rotatable wheel.

8. The aerosol generating device according to claim 7, wherein the holding element is at least partially constructed in a tubular shape and has a first segment and a second segment arranged sequentially along an axial direction; and an outer diameter of the second segment is greater than an outer diameter of the first segment, wherein

the first segment is configured to hold the aerosol generating article; and
at least a part of a surface of the second segment is joined to the transmission belt to be configured as a driven wheel in the belt drive.

9. The aerosol generating device according to claim 8, wherein the rotatable wheel is configured as a driving wheel in the belt drive; and
a ratio of an outer diameter of the driving wheel to an outer diameter of the driven wheel ranges from 0.1 to 10.

10. The aerosol generating device according to any one of claims 1 to 4, wherein an extension arm is arranged on the holding element, and the extension arm is configured to extend outward along a radial direction of the chamber; and the extension arm is coupled to the rotatable wheel, to further enable the holding element to rotate in response to the rotation of the rotatable wheel.

11. The aerosol generating device according to claim 10, wherein a hole extending along a length direction of the extension arm is provided on the extension arm; and
a guiding protrusion deviating from the rotating shaft is arranged on the rotatable wheel, and the guiding protrusion at least partially extends into the hole.

12. The aerosol generating device according to claim 11, wherein the guiding protrusion is arranged deviating from a center of the rotatable wheel.

13. The aerosol generating device according to any one of claims 1 to 4, wherein the rotatable wheel comprises a gear.

14. The aerosol generating device according to any one of claims 1 to 4, further comprising:

an outer shell, defining an outer surface of the aerosol generating device, and comprising a first side end and a second side end that face

away from each other along a width direction, wherein
the holding element is arranged close to the first side end; and
the driving element is arranged close to the second side end.

15. The aerosol generating device according to any one of claims 1 to 4, wherein the holding element at least partially surrounds or defines the chamber.

16. The aerosol generating device according to claim 3 or 4, wherein the convexes comprise a first convex and a second convex arranged sequentially along an axial direction of the chamber; and
one of the first convex and the second convex is rigid, and the other is flexible.

17. The aerosol generating device according to any one of claims 1 to 4, further comprising: a controller, configured to prevent the driving element from driving the holding element to rotate when a user inhales the aerosol generating article.

18. The aerosol generating device according to any one of claims 1 to 4, further comprising:

a battery core, configured to provide power; and
a controller, configured to:

control the power provided by the battery core to the heater, to maintain a temperature of the heater at a preset temperature within predetermined heating time; and
control the driving element to drive the holding element to rotate at least once before the predetermined heating time ends.

19. The aerosol generating device according to any one of claims 1 to 4, further comprising:

a battery core, configured to provide power; and
a controller, configured to:

control the power provided by the battery core to the heater, provide power enabling a temperature of the heater to rise from an initial temperature to a first preset temperature in a first stage, provide power enabling the temperature of the heater to decrease to a second preset temperature in a second stage, and provide power enabling the temperature of the heater to maintain at a third preset temperature in a third stage; and
control the driving element to drive the holding element to rotate in the first stage and/or the third stage, and prevent the driving element from driving the holding element to rotate in the second stage.

20. An aerosol generating device, configured to heat an aerosol generating article to generate aerosols, and comprising:

a chamber, configured to receive at least a part of the aerosol generating article;
a heater, at least partially inserted into the aerosol generating article for heating;
a holding element, configured to at least partially hold the aerosol generating article;
a base or a flange, configured to hold the heater; and
a driving element, configured to enable, by driving the base or the flange to rotate, the heater to rotate relative to the aerosol generating article held by the holding element around a central axis of the chamber, to eliminate or reduce adhesion or bonding between the aerosol generating article and a surface of the heater.

21. The aerosol generating device according to claim 20, wherein an extension arm is arranged on the base or the flange, and the extension arm is configured to extend outward along a radial direction of the chamber; and
the driving element is configured to enable the heater to rotate by driving the extension arm of the base or the flange to rotate.

22. A control method for an aerosol generating device, the aerosol generating device comprising:

a chamber, configured to receive at least a part of an aerosol generating article;
a heater, at least partially inserted into the aerosol generating article for heating;
a holding element, configured to at least partially hold the aerosol generating article; and
a battery core, configured to provide power enabling a temperature of the heater to rise from an initial temperature to a first preset temperature in a first stage, provide power enabling the temperature of the heater to decrease to a second preset temperature in a second stage, and provide power enabling the temperature of the heater to maintain at a third preset temperature in a third stage;
and the method comprising:

driving, in the first stage, one of the holding element and the heater to move relative to the other at least once;
driving, in the third stage, one of the holding element and the heater to move relative to the other at least once; and
driving, within predetermined time before

the third stage ends, one of the holding element and the heater to move relative to the other at least once.

23. The control method for an aerosol generating device according to claim 22, wherein the predetermined time before the third stage ends is less than 20s.

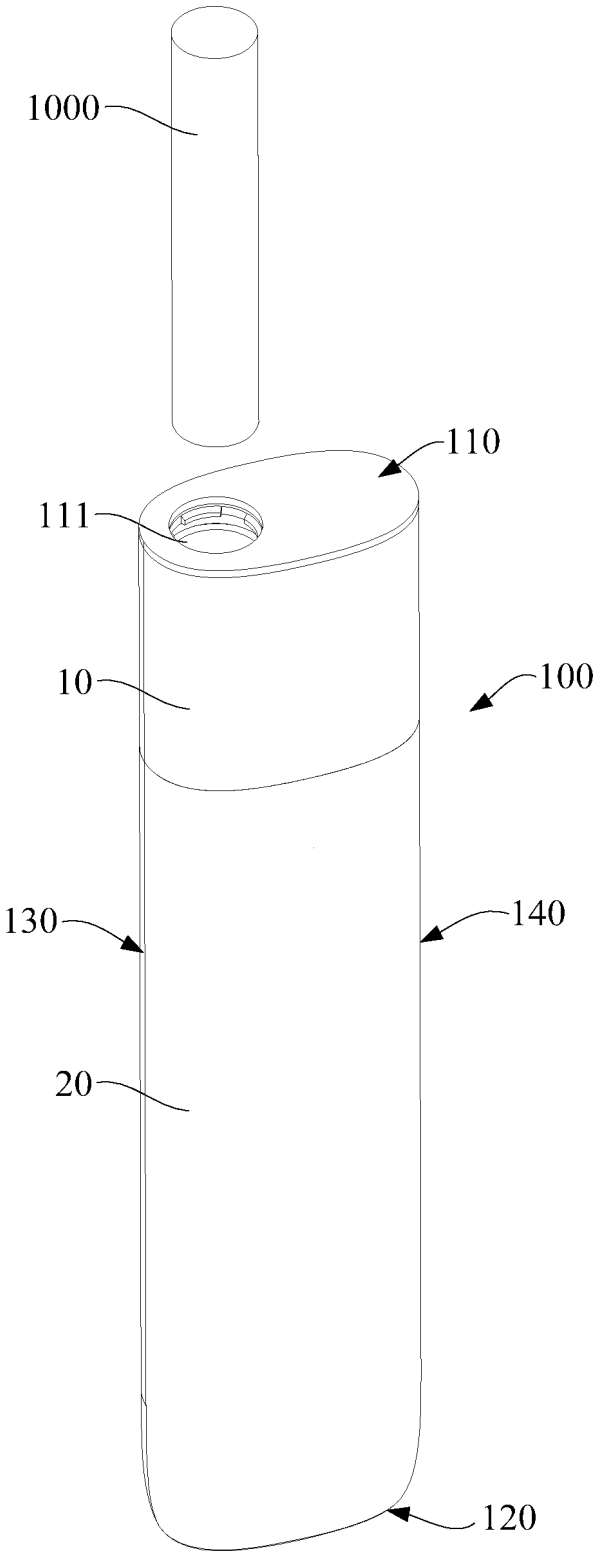

FIG. 1

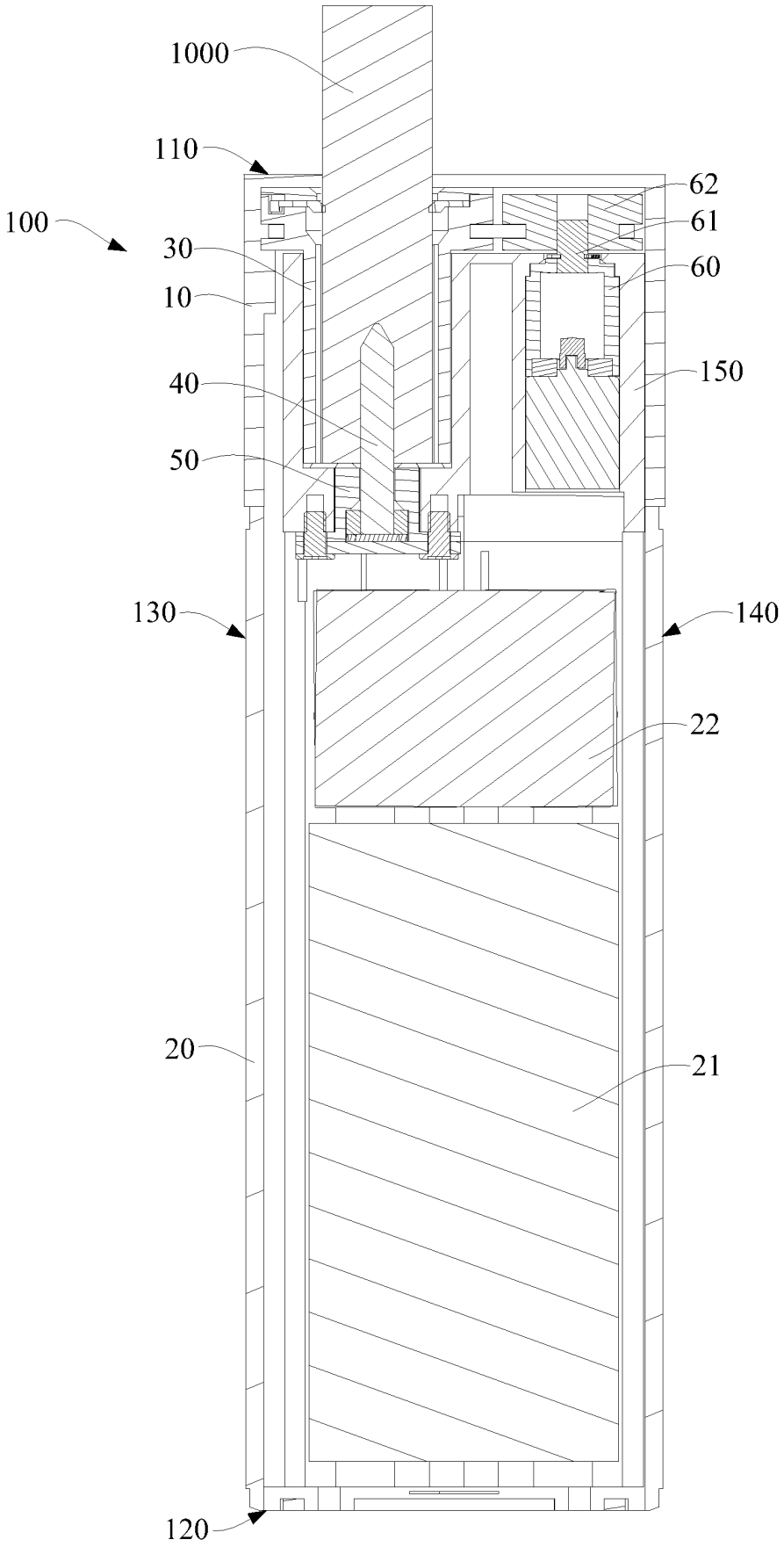

FIG. 2

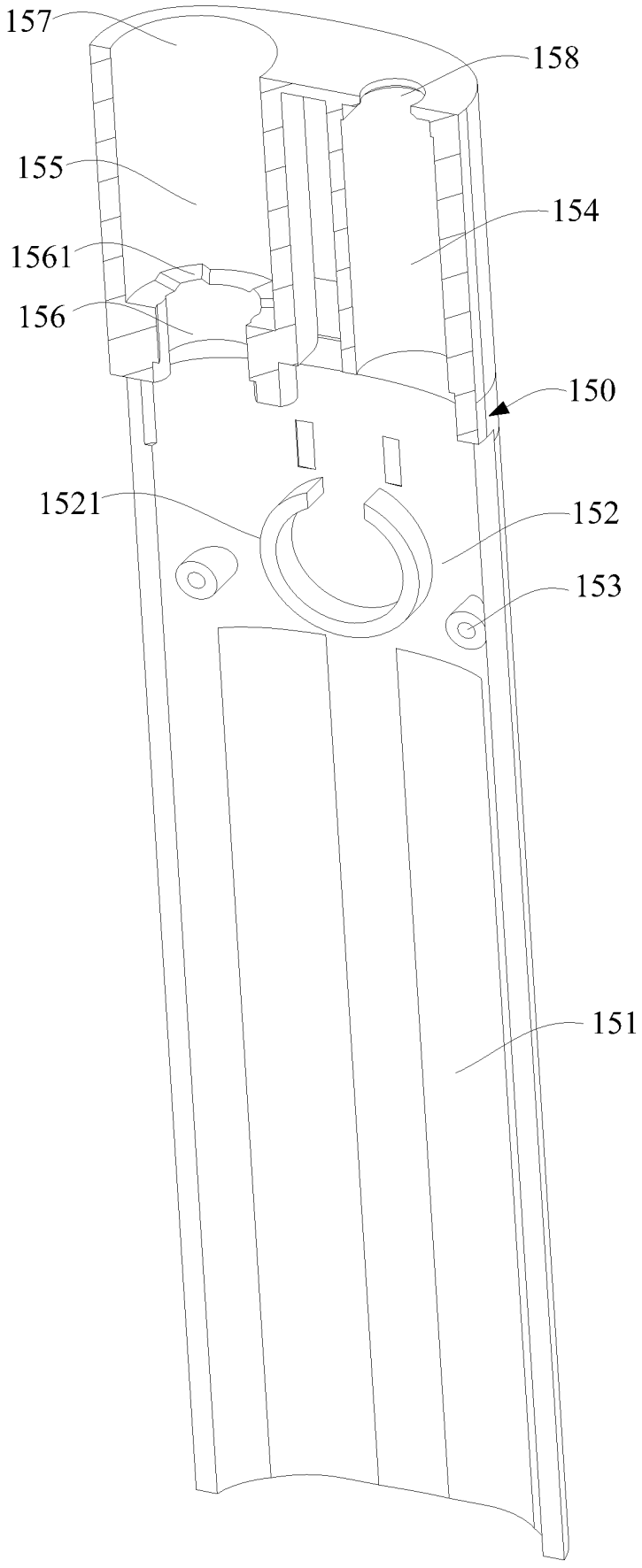

FIG. 3

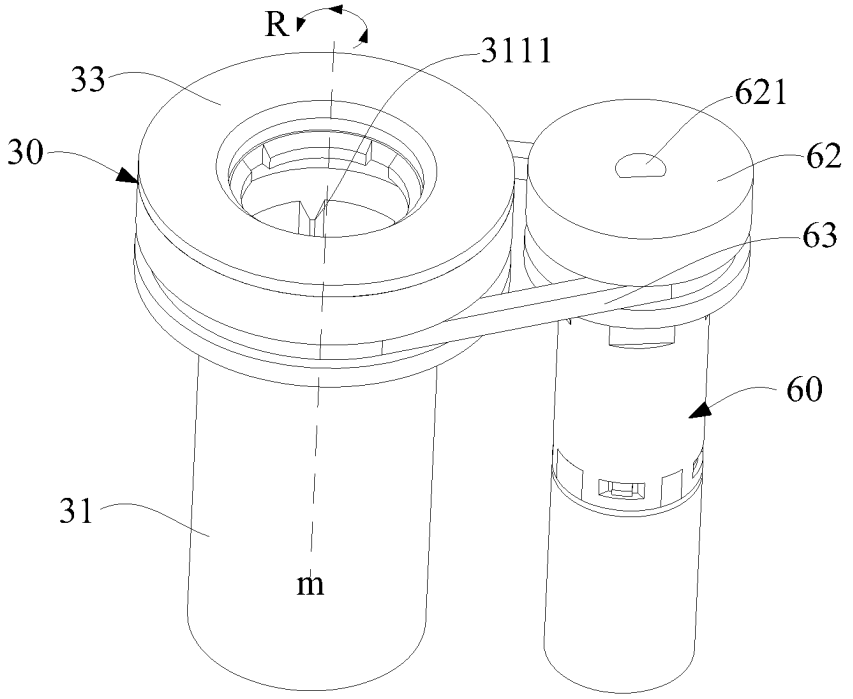
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FIG. 4

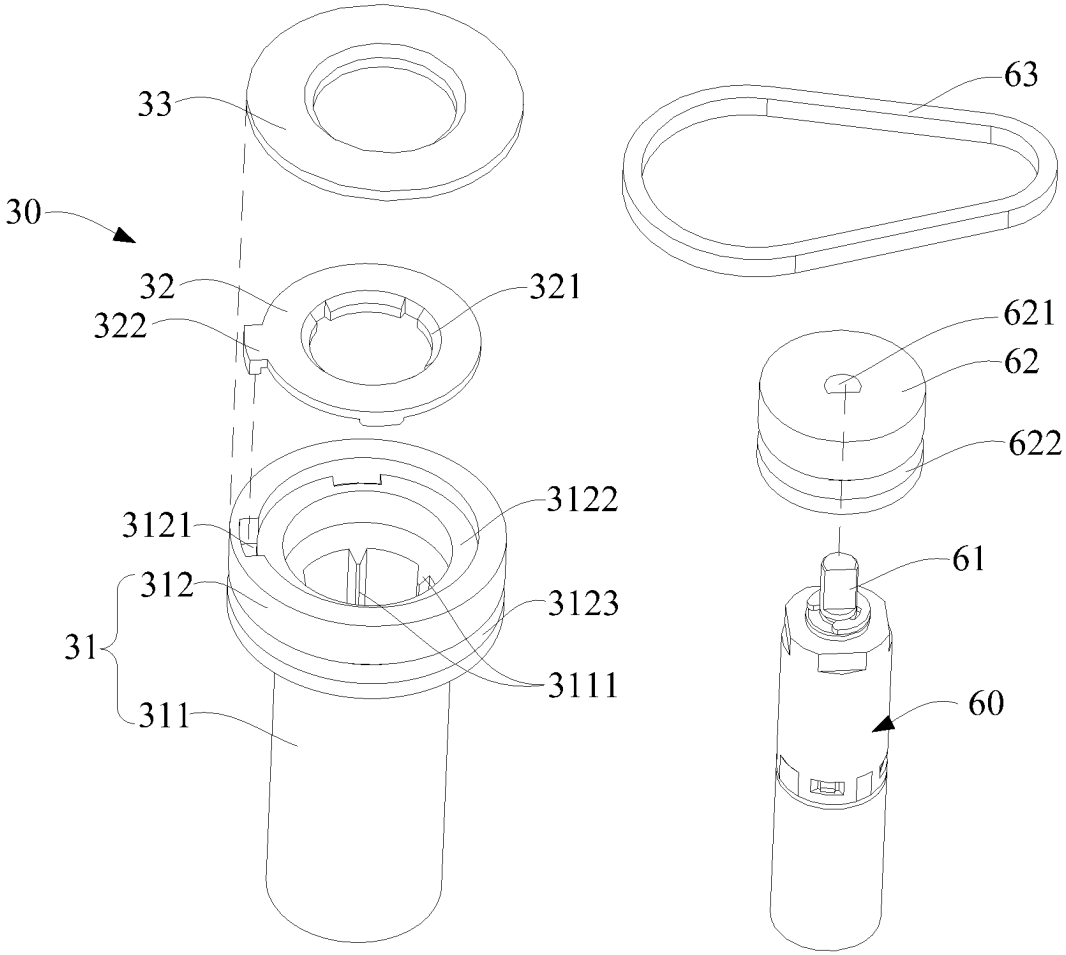
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FIG. 5

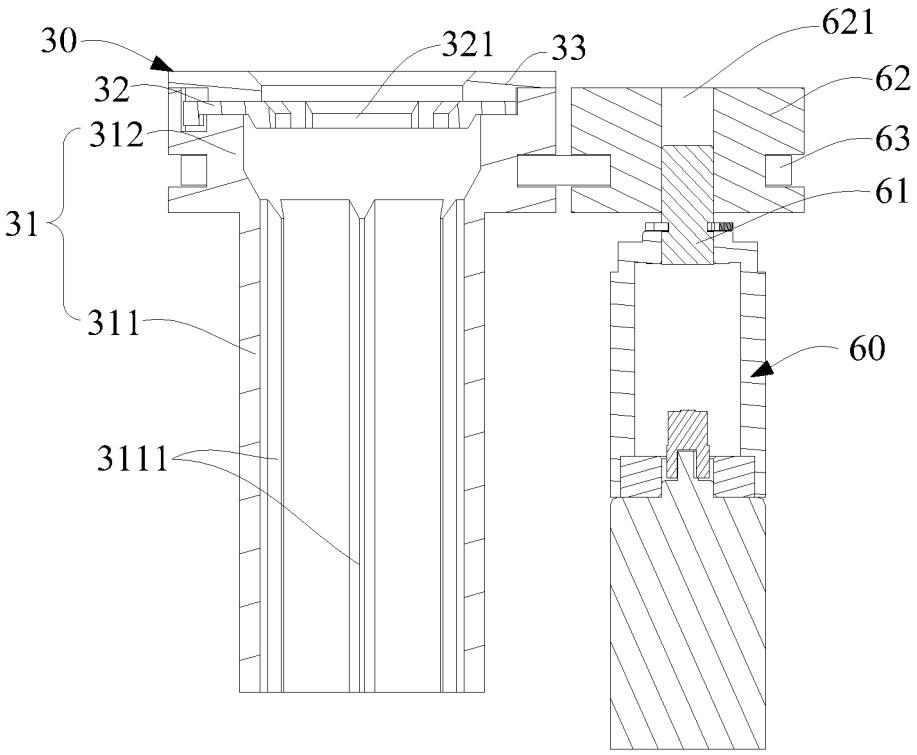
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FIG. 6

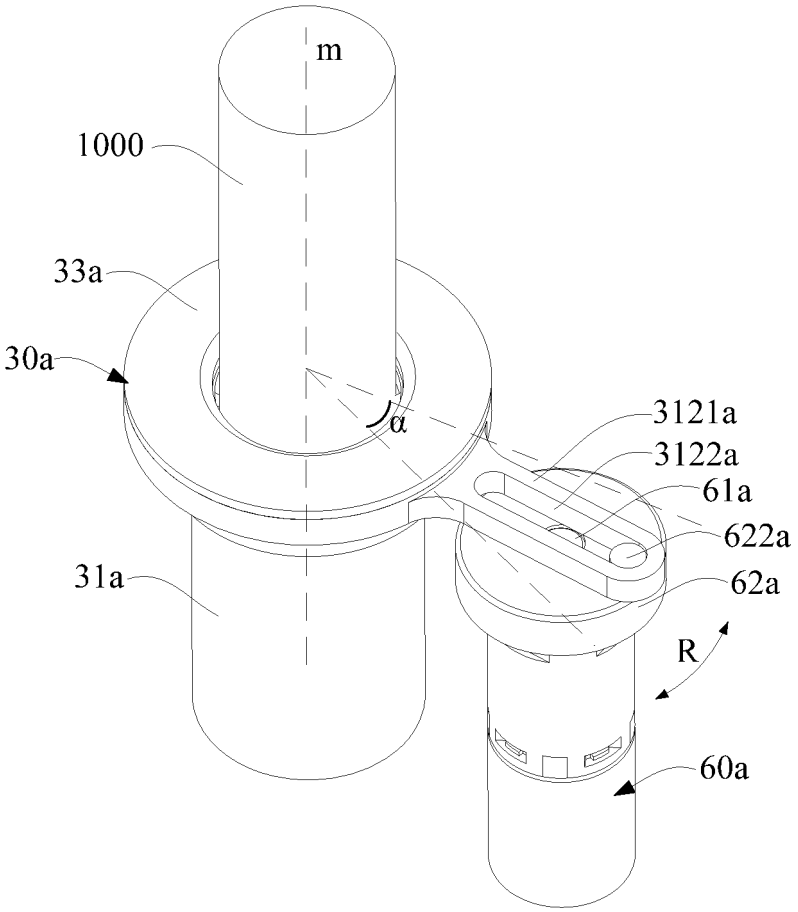
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FIG. 7

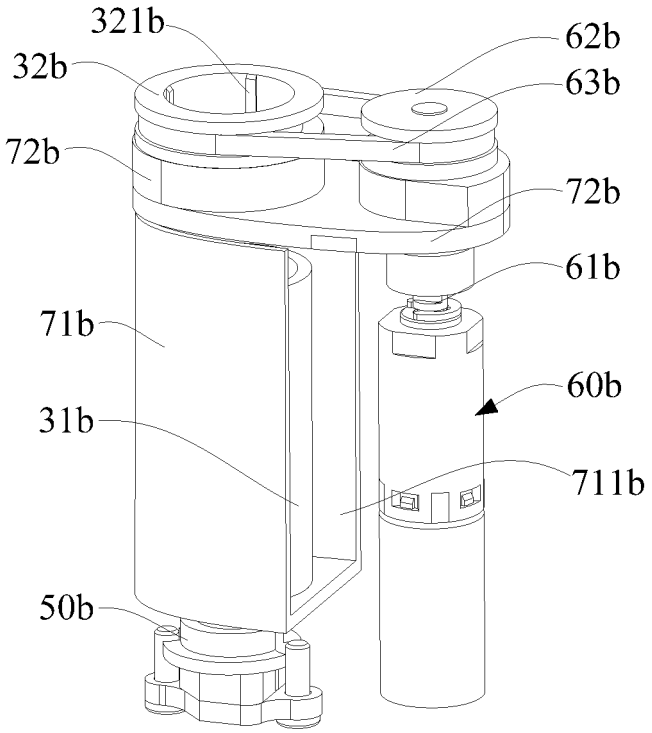
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FIG. 8

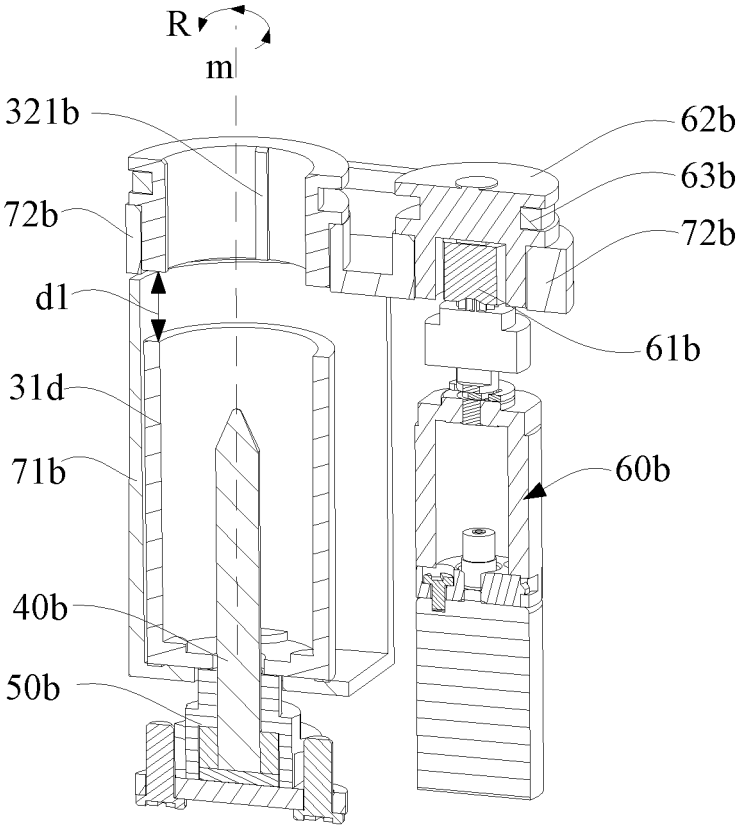
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FIG. 9

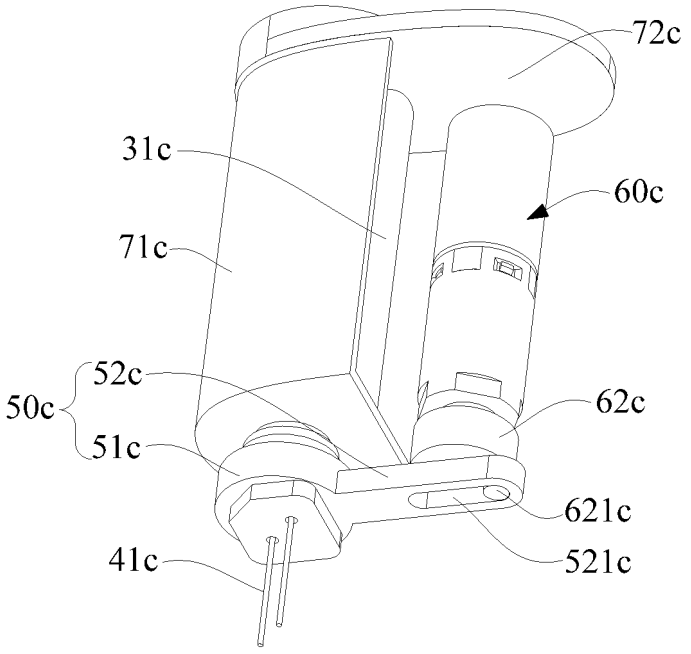
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FIG. 10

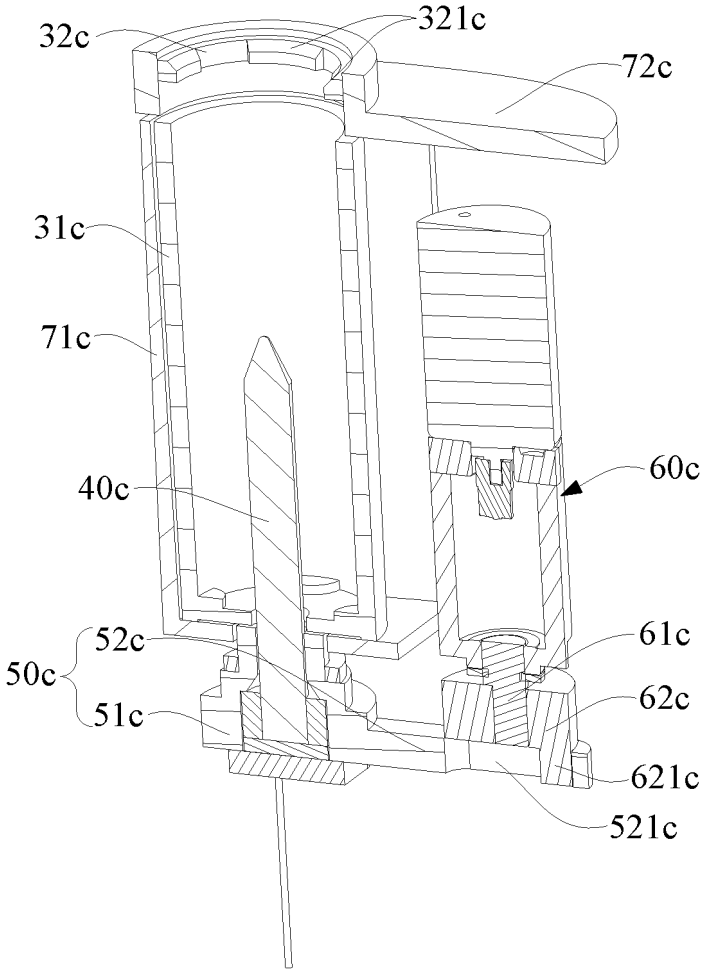
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FIG. 11

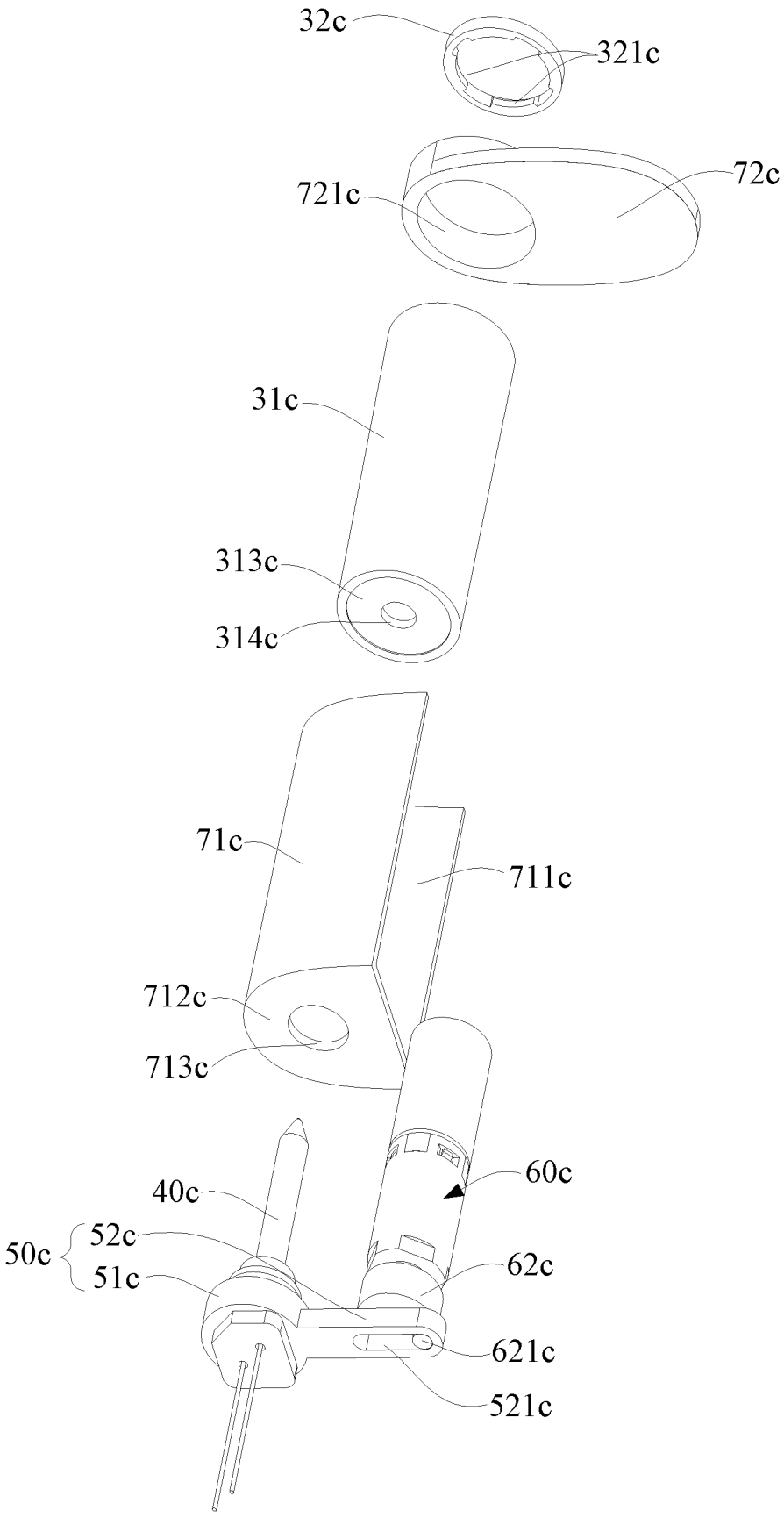
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FIG. 12

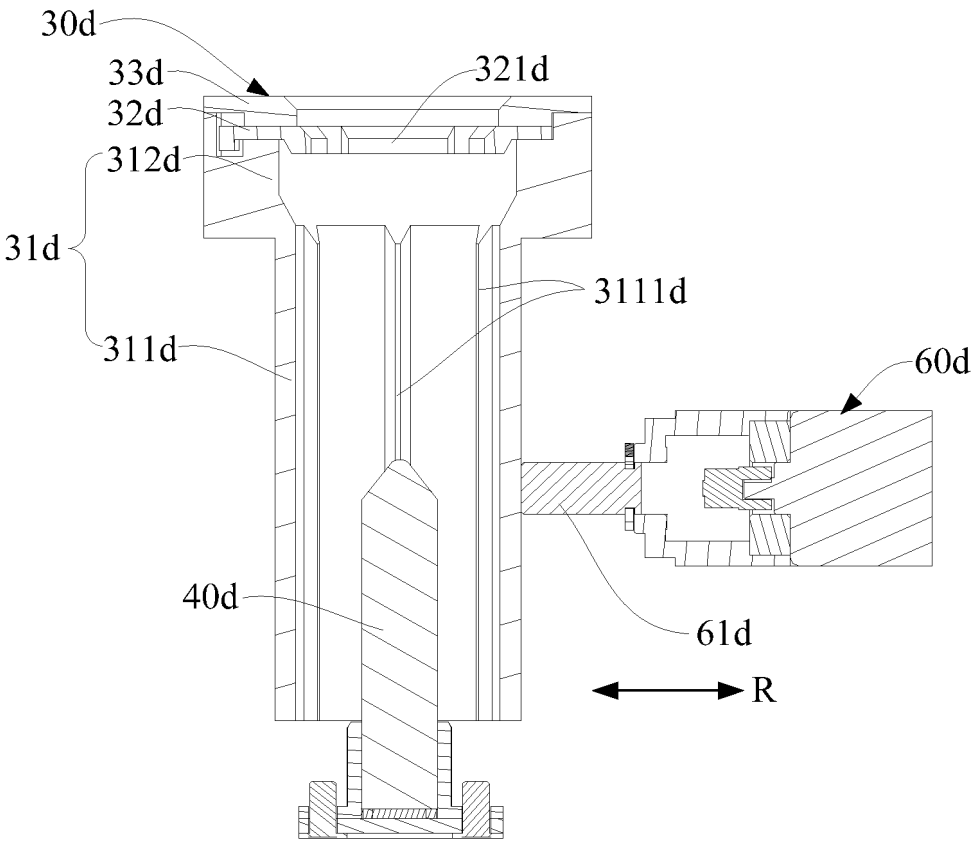
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FIG. 13

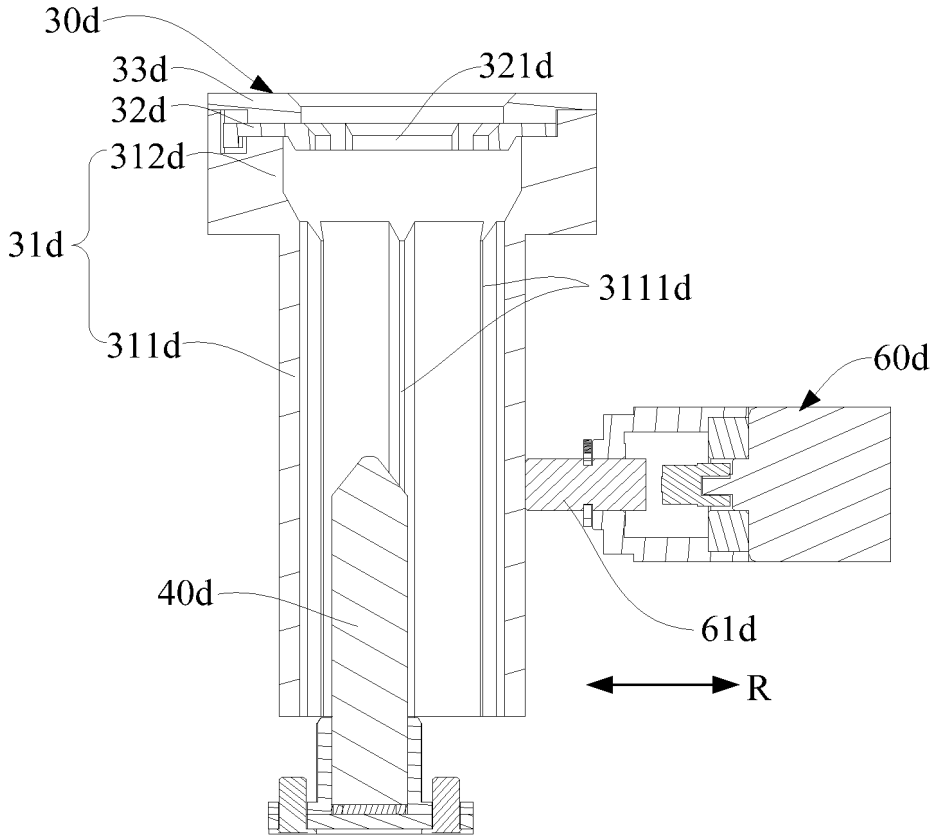
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FIG. 14

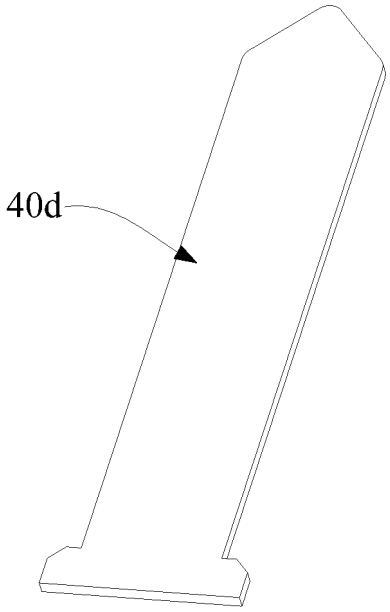

FIG. 15

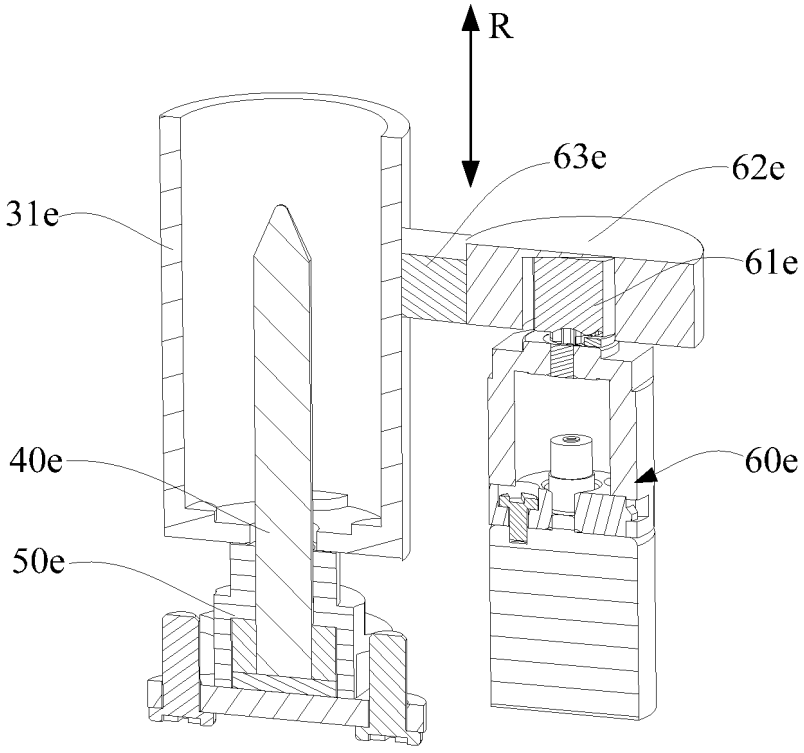

FIG. 16

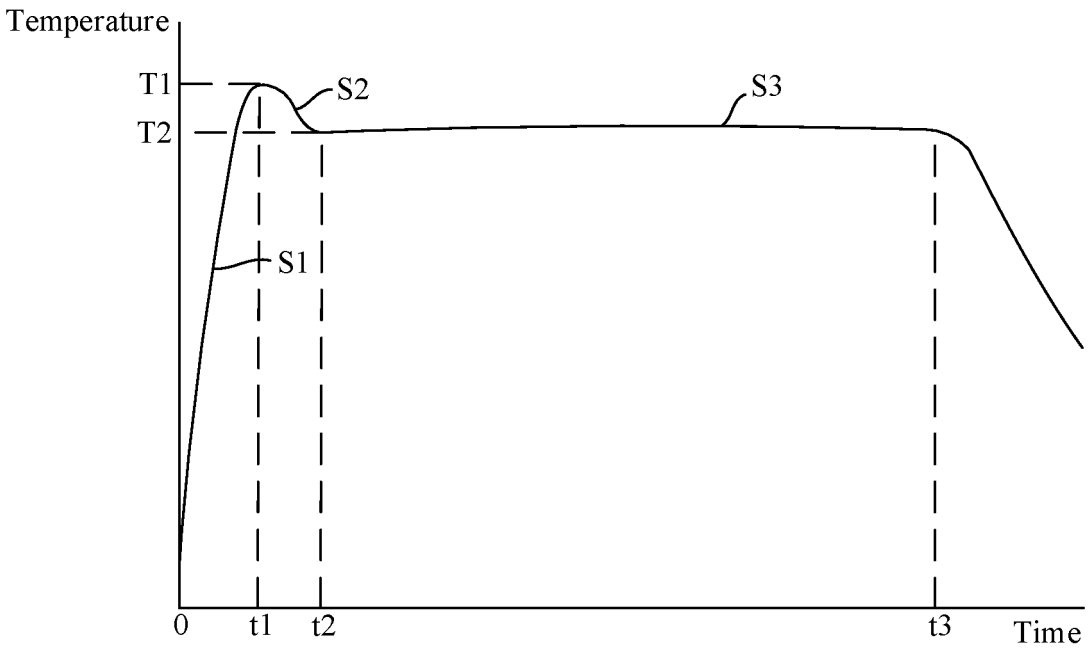

FIG. 17

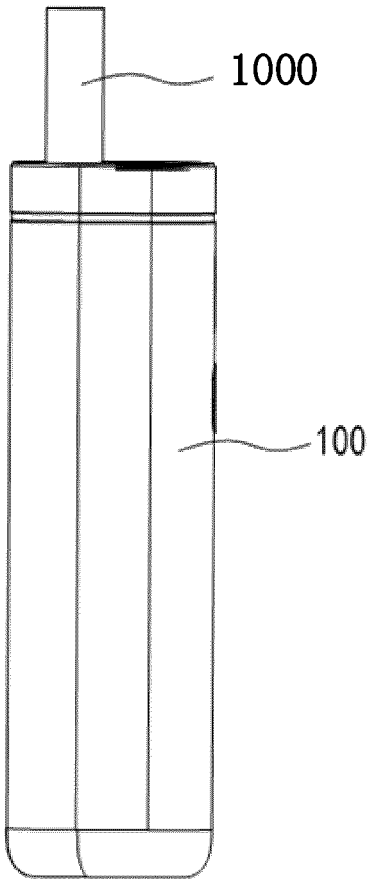

FIG. 18

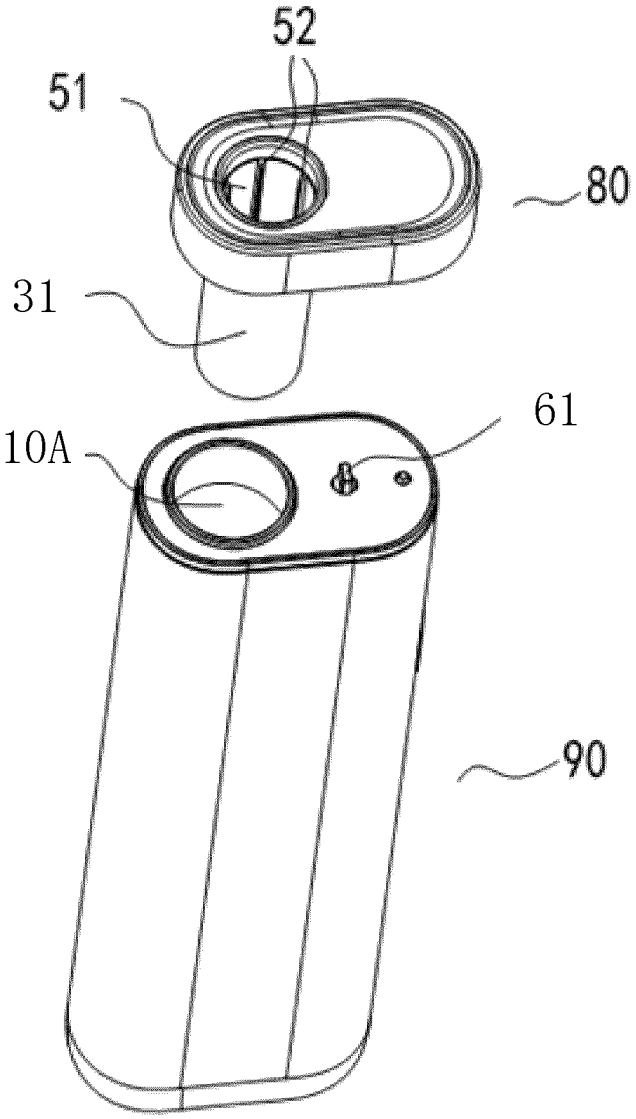

FIG. 19

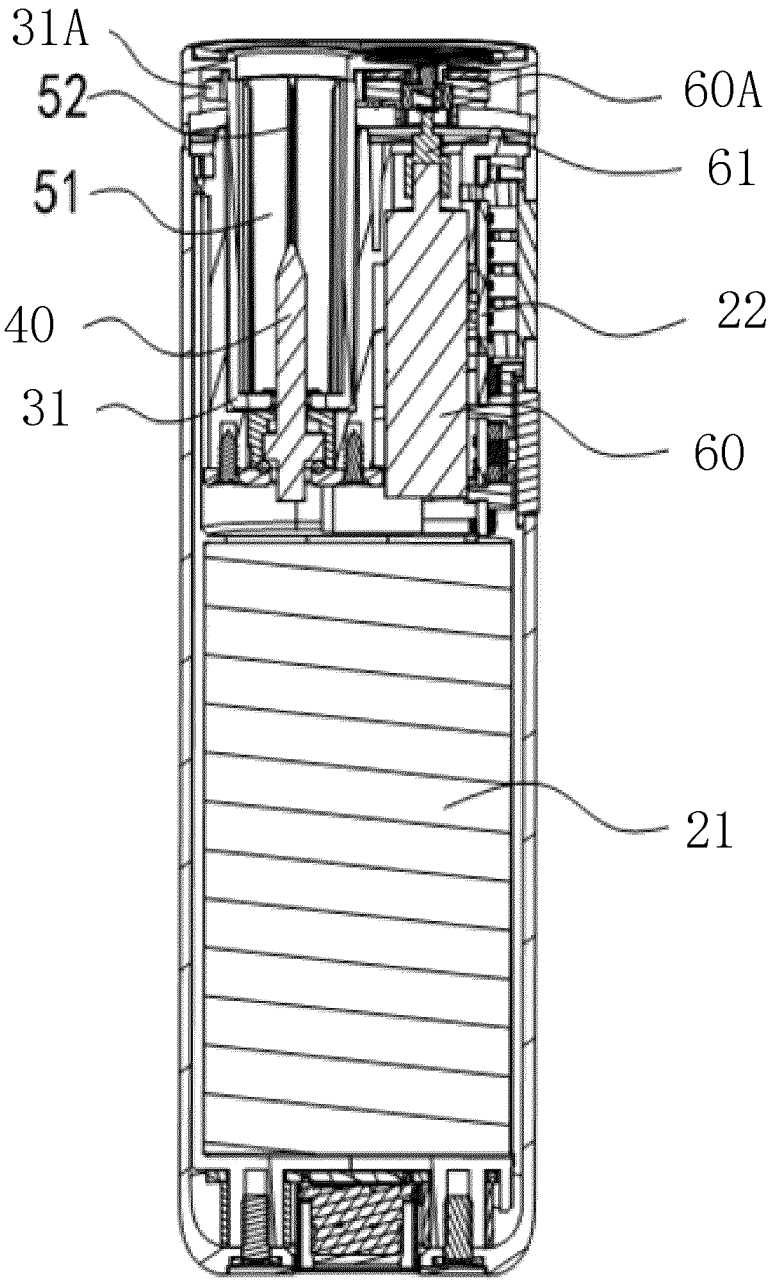

FIG. 20

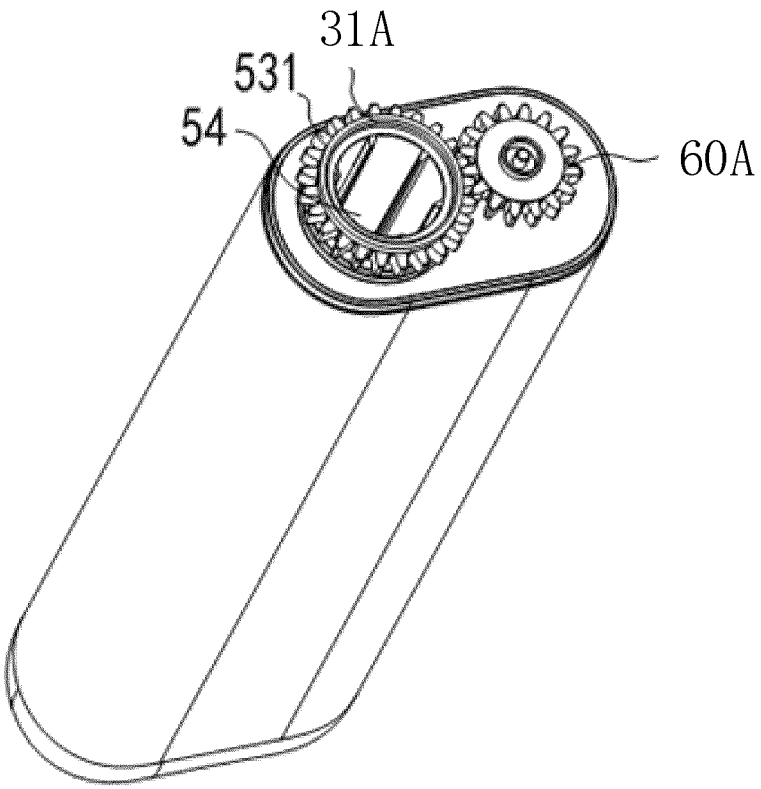

FIG. 21

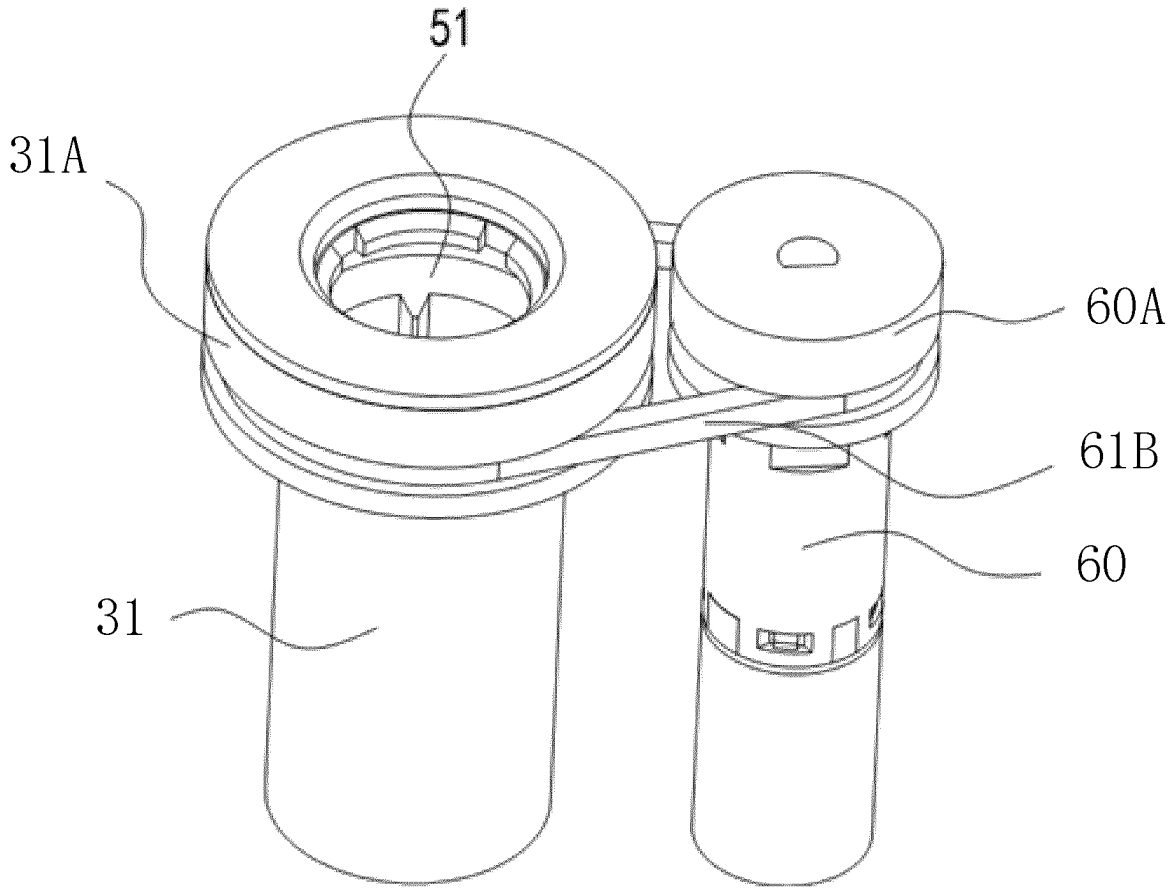

FIG. 22

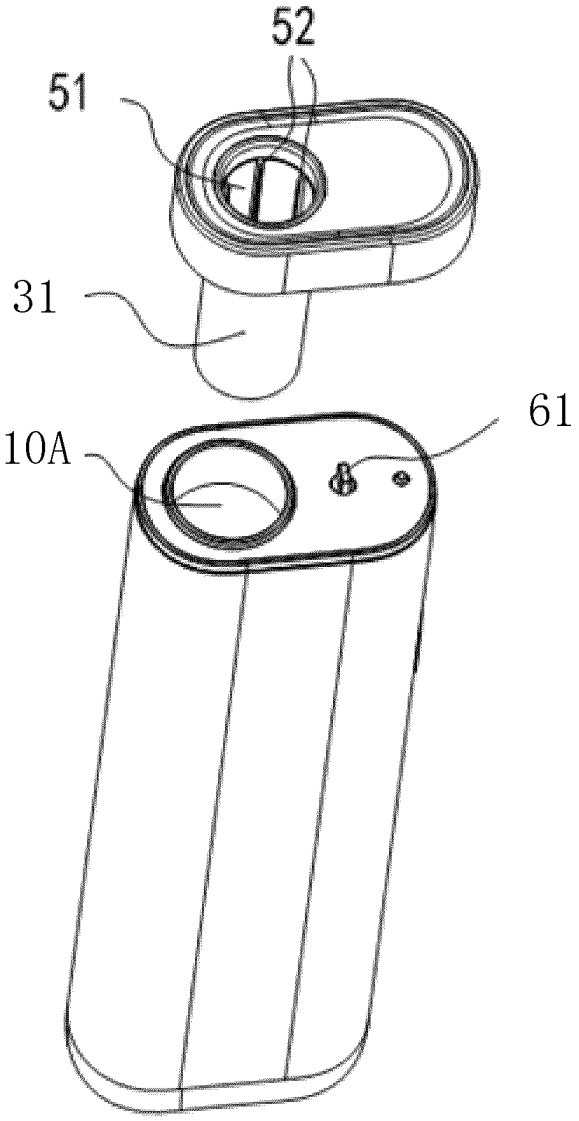

FIG. 23

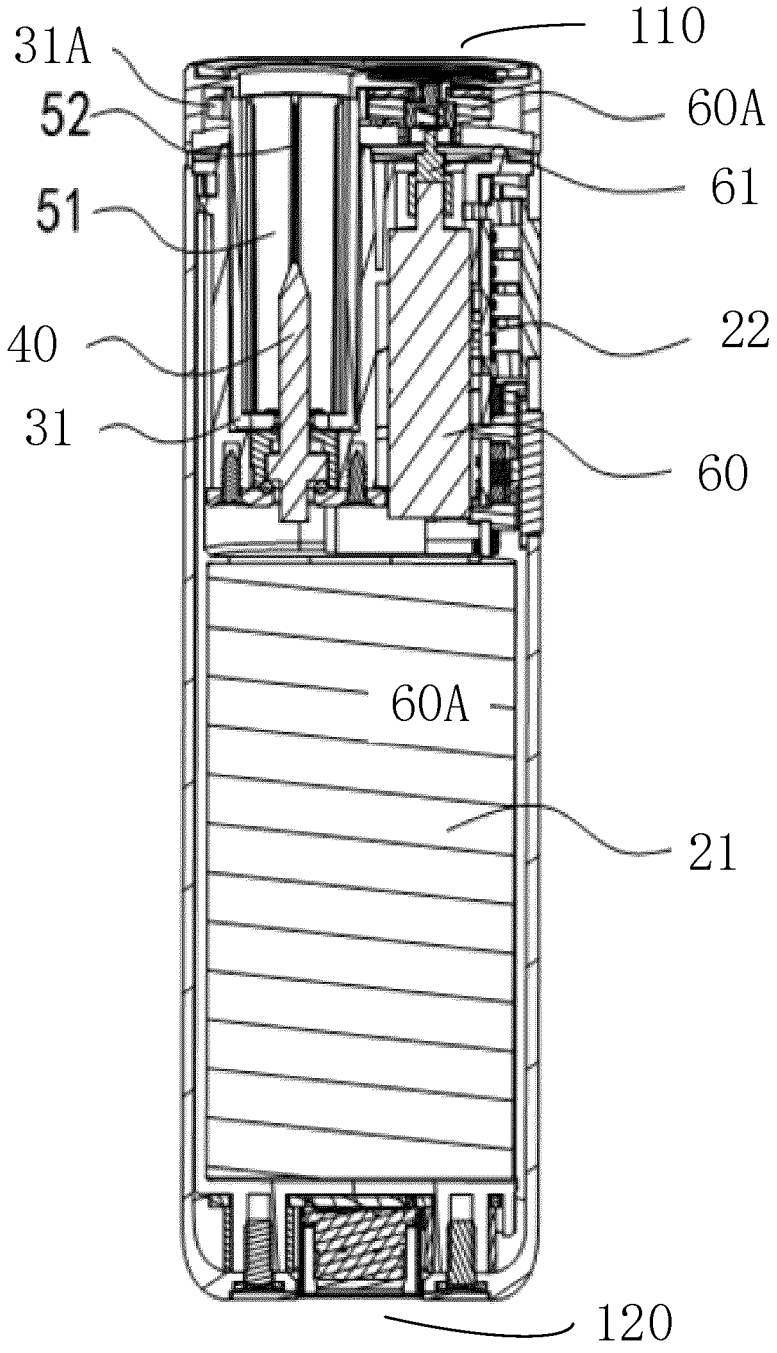

FIG. 24

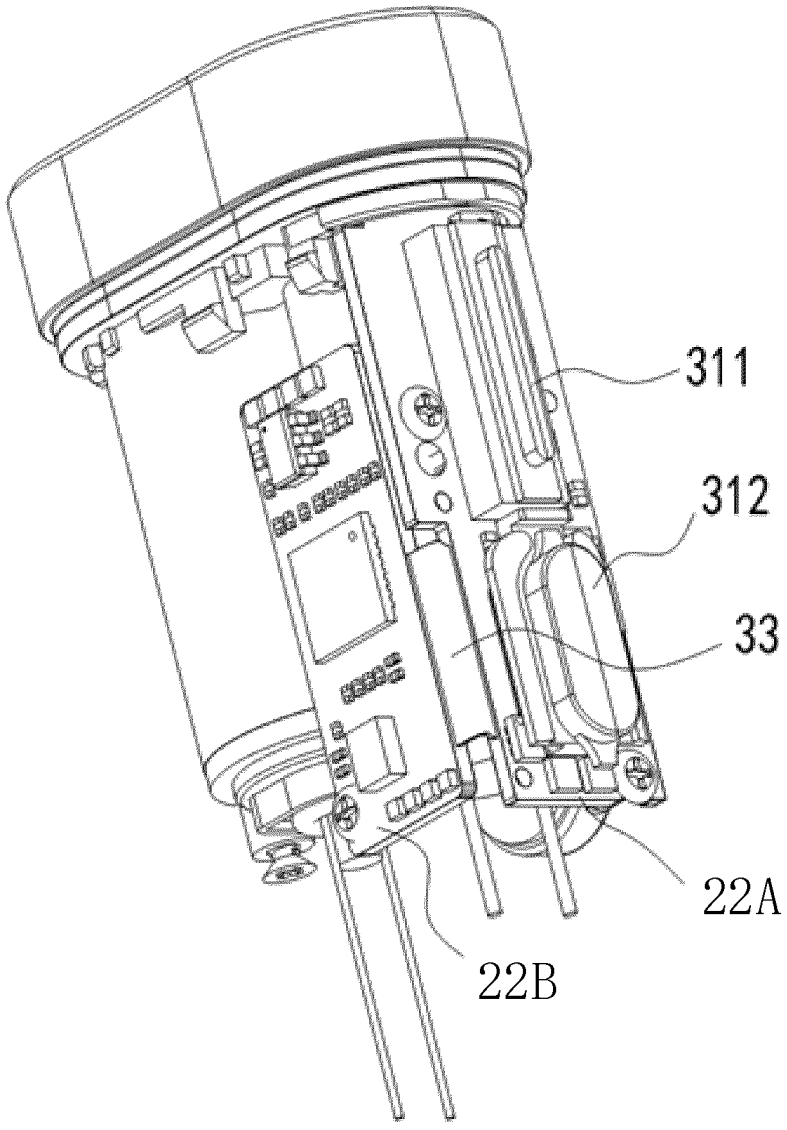

FIG. 25

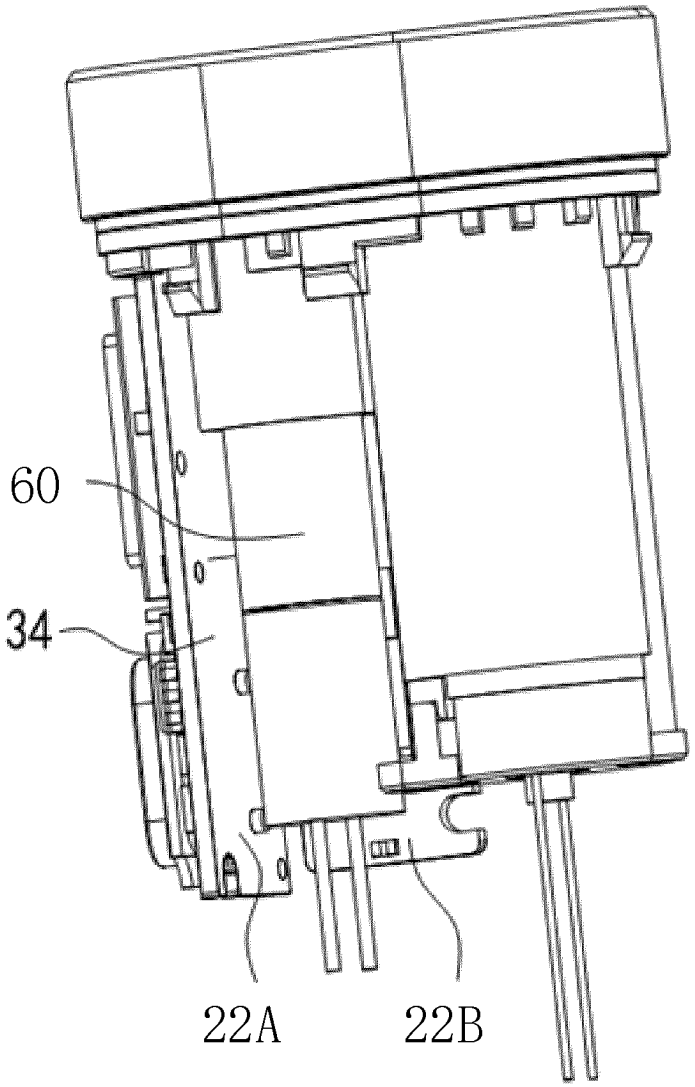

FIG. 26

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2023/093259

A. CLASSIFICATION OF SUBJECT MATTER

A24F40/40(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: A24F40 A24F47

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)

CNABS, CNTXT: 加热, 电热, 烟草, 烟料, 烟丝, 烟支, 卷烟, 气溶胶, 制品, 基质, 前驱体, 材料, 旋转, 转动, 粘附, 粘结, 粘连, 黏附, 黏结, 黏连, 板结, 残留, 分离, 电机, 马达, 预热; VEN, WOTXT, EPTXT, USTXT: heat, tobacco, cigarette, aerosol, product, matrix, substrate, material, rotate, revolve, adhesion, paste, residual, separate, motor, pre-heat

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 217609550 U (SHENZHEN FIRST UNION TECHNOLOGY CO., LTD.) 21 October 2022 (2022-10-21) claims 1-30, and description, paragraphs 4-127	1-23
X	CN 112369682 A (HUBEI CHINA TOBACCO INDUSTRY CO., LTD.) 19 February 2021 (2021-02-19) description, paragraphs 40-68, and figures 1-5	20-23
Y	CN 112369682 A (HUBEI CHINA TOBACCO INDUSTRY CO., LTD.) 19 February 2021 (2021-02-19) description, paragraphs 40-68, and figures 1-5	1-19
Y	CN 208228309 U (SHANGHAI NEW TOBACCO PRODUCT RESEARCH INSTITUTE CO., LTD. et al.) 14 December 2018 (2018-12-14) description, paragraphs 31-46, and figures 1-6	1-19
X	CN 210726681 U (CHINA TOBACCO HUNAN INDUSTRIAL CO., LTD.) 12 June 2020 (2020-06-12) description, paragraphs 4-69, and figures 1-16	20-23

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

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"A" document defining the general state of the art which is not considered to be of particular relevance
"D" document cited by the applicant in the international application
"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
05 August 2023	**14 August 2023**
Name and mailing address of the ISA/CN **China National Intellectual Property Administration (ISA/CN)** **China No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088**	Authorized officer Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2023/093259

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	CN 210726681 U (CHINA TOBACCO HUNAN INDUSTRIAL CO., LTD.) 12 June 2020 (2020-06-12) description, paragraphs 4-69, and figures 1-16	1-19
Y	CN 215958355 U (SHENZHEN FIRST UNION TECHNOLOGY CO., LTD.) 08 March 2022 (2022-03-08) description, paragraphs 4-85, and figures 1-6	1-19
A	CN 111248503 A (SHENZHEN ROYAL TOBACCO INDUSTRIAL LIMITED) 09 June 2020 (2020-06-09) entire document	1-23
A	EP 3711553 A1 (NERUDIA LTD.) 23 September 2020 (2020-09-23) entire document	1-23

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

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2023/093259

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN 217609550 U	21 October 2022	None	
CN 112369682 A	19 February 2021	WO 2021088673 A1	14 May 2021
		KR 20220002376 A	06 January 2022
		EP 3967167 A1	16 March 2022
		RU 2779140 C1	02 September 2022
CN 208228309 U	14 December 2018	None	
CN 210726681 U	12 June 2020	None	
CN 215958355 U	08 March 2022	None	
CN 111248503 A	09 June 2020	WO 2020108187 A1	04 June 2020
		CN 209331184 U	03 September 2019
EP 3711553 A1	23 September 2020	None	

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 202210507896 **[0001]**
- CN 202211378480 **[0001]**
- CN 202222943936 **[0001]**