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

(11) **EP 4 467 015 A1**

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

(43) Date of publication:
27.11.2024 Bulletin 2024/48

(21) Application number: **23769808.9**

(22) Date of filing: **14.03.2023**

(51) International Patent Classification (IPC):
A24F 40/40 *(2020.01)* ***A24F 40/10*** *(2020.01)*

(52) Cooperative Patent Classification (CPC):
A24F 40/10; A24F 40/40

(86) International application number:
PCT/CN2023/081442

(87) International publication number:
WO 2023/174306 (21.09.2023 Gazette 2023/38)

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

(30) Priority: **15.03.2022 CN 202210253182**
19.09.2022 CN 202211137791

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(54) ATOMISER AND ELECTRONIC ATOMISATION DEVICE

(57) An atomiser (100) and an electronic atomisation device. The atomiser (100) comprises: a proximal end (110) and a distal end (120), which face away from each other in a longitudinal direction; a mouthpiece component, which is located at the proximal end (110) and used for a user to draw in aerosol, wherein the mouthpiece component is internally provided with a first hollow (471) and a second hollow (472), which are sequentially arranged in the longitudinal direction, and a first step (473), which is defined between the first hollow (471) and the second hollow (472); a tubular element (60), which is used for outputting aerosol to the mouthpiece component; and a fastening element (50), which is coupled to the tubular element (60) and has one or more elastic arms (52) extending out toward the distal end (120), wherein the one or more elastic arms (52) extend into the first hollow (471) and abut against the first step (473), so as to fasten the mouthpiece component to the tubular element (60), which helps to stop the removal or separation of the mouthpiece component.

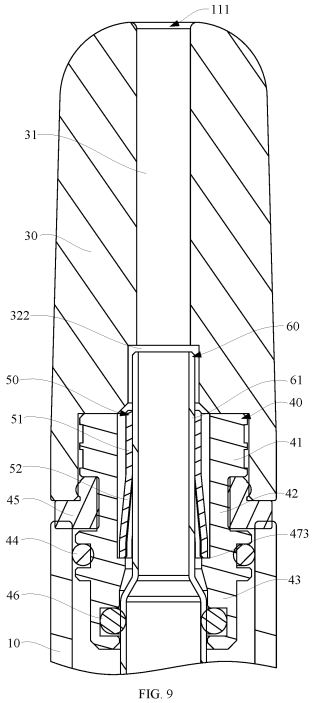

FIG. 9

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Description

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to Chinese Patent Application No. 202210253182.8, filed with the China National Intellectual Property Administration on March 15, 2022 and entitled "ULTRASONIC ATOMISER AND ELECTRONIC ATOMISATION DEVICE", and Chinese Patent Application No. 202211137791.3, filed with the China National Intellectual Property Administration on September 19, 2022 and entitled "ATOMISER AND ELECTRONIC ATOMISATION DEVICE", which are incorporated herein by reference in their entireties.

TECHNICAL FIELD

[0002] Embodiments of this application relate to the field of electronic atomisation technologies, and in particular, to an atomiser and an electronic atomisation device.

BACKGROUND

[0003] During use of tobacco products (such as cigarettes and cigars), tobacco is burned to produce tobacco smoke. Attempts are made to replace these tobacco-burning products by manufacturing products that release compounds without burning tobacco.

[0004] An example of this type of products is a heating device that releases compounds by heating rather than burning materials. For example, the materials may be tobacco or other non-tobacco products, and the non-tobacco products may or may not include nicotine. As another example, there are aerosol-providing products, for example, electronic atomisation devices. These devices usually contain liquid, and the liquid is heated to be vaporized, to generate an inhalable aerosol. The liquid may contain nicotine, and/or aromatics, and/or aerosol-generation substances (such as glycerin).

SUMMARY

[0005] An embodiment of this application provides an atomiser, including: a proximal end and a distal end, facing away from each other in a longitudinal direction;

a liquid storage cavity, configured to store a liquid substrate;

an atomisation component, configured to atomise the liquid substrate to generate aerosols;

a mouthpiece assembly, located at the proximal end and used for a user to draw in aerosols, where the mouthpiece assembly is internally provided with a first hollow and a second hollow that are sequentially arranged in the longitudinal direction, the first hollow is closer to the proximal end than the second hollow, and an inner diameter of the first hollow is greater than an inner diameter of the second hollow to define a first step between the first hollow and the second hollow;

a tubular element, at least partially defining an aerosol output channel that is configured to output aerosols to the mouthpiece assembly; and

a fastening element, coupled to the tubular element and having one or more elastic arms extending out toward the distal end, where the one or more elastic arms extend into the first hollow and abut against the first step, to tightly connect the mouthpiece assembly to the tubular element.

[0006] In a preferred implementation, the one or more elastic arms are configured to expand radially outwardly of the tubular element.

[0007] In a preferred implementation, the one or more elastic arms are at least partially configured to be arranged obliquely at an angle to the longitudinal direction.

[0008] In a preferred implementation, the fastening element further includes:

a main body portion, at least partially surrounding and coupled to an outer surface of the tubular element, where the one or more elastic arms are configured to extend from the main body portion toward the distal end.

[0009] In a preferred implementation, an included angle between the one or more elastic arms and the main body portion is an obtuse angle.

[0010] In a preferred implementation, an included angle between the one or more elastic arms and the main body portion ranges from 150 degrees to 179 degrees.

[0011] In a preferred implementation, the one or more elastic arms have a length of 1 mm to 12 mm; and/or the one or more elastic arms have a thickness of 0.1 mm to 2 mm.

[0012] In a preferred implementation, the one or more elastic arms are configured to be curved.

[0013] In a preferred implementation, the one or more elastic arms include metals or alloys or organic polymers.

[0014] In a preferred implementation, the plurality of elastic arms are separated or discrete from each other.

[0015] In a preferred implementation, the mouthpiece assembly includes a seal element configured to seal an opening of the liquid storage cavity, and a spacing between adjacent elastic arms is configured to allow air in the liquid storage cavity to be discharged when the seal element enters the opening.

[0016] In a preferred implementation, a distance between two adjacent elastic arms of the plurality of elastic arms ranges from 0.1 mm to 2 mm.

[0017] In a preferred implementation, the mouthpiece assembly includes:

a mouthpiece cap, at least partially defining an outer surface of the atomiser; and

a connecting element, at least partially accommodated and retained in the mouthpiece cap, where the connecting element is configured in a tubular shape

extending in the longitudinal direction, and the first hollow, the second hollow, and the step are surrounded and defined by an inner surface of the connecting element.

[0018] In a preferred implementation, the atomisation component includes:

a resistive heating coil, extending longitudinally for heating the liquid substrate to generate aerosols; and

a porous body, surrounding the resistive heating coil and configured to receive the liquid substrate of the liquid storage cavity and transfer the liquid substrate to the resistive heating coil, where

a distance between adjacent windings of the resistive heating coil ranges from 0.5 mm to 1.0 mm.

[0019] In a preferred implementation, the tubular element includes a first portion, a second portion, and a third portion that are sequentially arranged from the proximal end to the distal end; an outer diameter of the first portion is smaller than an outer diameter of the second portion, and the outer diameter of the second portion is smaller than an outer diameter of the third portion; the fastening element is coupled to the first portion; and the atomisation component is accommodated and retained in the third portion.

[0020] In a preferred implementation, the mouthpiece assembly includes a seal element configured to seal an opening of the liquid storage cavity, the tubular element includes a first portion and a second portion that are sequentially arranged from the proximal end to the distal end, an outer diameter of the first portion is smaller than an outer diameter of the second portion, and the seal element is configured to maintain a gap with the first portion to discharge air in the liquid storage cavity when entering the opening until being in contact with the second portion to seal the opening.

[0021] Another embodiment of this application further provides an atomiser, including a proximal end and a distal end, facing away from each other in a longitudinal direction; a liquid storage cavity, configured to store a liquid substrate; an atomisation component, configured to atomise the liquid substrate to generate aerosols; a mouthpiece assembly, located at the proximal end and used for a user to draw in aerosols, where the mouthpiece assembly is internally provided with a first hollow and a second hollow that are sequentially arranged in the longitudinal direction, the first hollow is closer to the proximal end than the second hollow, and an inner diameter of the first hollow is greater than an inner diameter of the second hollow to define a first step between the first hollow and the second hollow; and a tubular element, at least partially defining an aerosol output channel that is configured to output aerosols to the mouthpiece assembly, where the tubular element is provided with one or more elastic arms extending toward the distal end, and the one or more elastic arms extend into the first hollow through the second hollow and abut against the first step, to prevent the mouthpiece assembly from being separated or removed from the tubular element.

[0022] Another embodiment of this application further provides an atomiser, including: a main housing having a proximal end and a distal end; a liquid storage cavity, defined in the main housing and configured to store a liquid substrate, where the liquid storage cavity has an opening near the proximal end for injecting a liquid substrate; an atomisation component, configured to atomise the liquid substrate to generate aerosols; a mouthpiece assembly, connected to the proximal end and used for a user to draw in aerosols, where the mouthpiece assembly includes a seal element configured to seal the opening; and a tubular element, at least partially defining an aerosol output channel that is configured to output aerosols to the mouthpiece assembly, where the tubular element includes a first portion and a second portion that are sequentially arranged from the proximal end to the distal end, an outer diameter of the first portion is smaller than an outer diameter of the second portion, and a position at which the first portion and the second portion connect is longitudinally lower than an end surface of the proximal end of the main housing, where the seal element is configured to maintain a gap with the first portion to discharge air in the liquid storage cavity when entering the opening until being in contact with the second portion to seal the opening.

[0023] Another embodiment of this application further provides an electronic atomisation device, including an atomiser configured to atomise a liquid substrate to generate aerosols, and a power supply mechanism configured to supply power to the atomiser, where the atomiser includes the atomiser described above.

[0024] In the foregoing atomiser, the mouthpiece assembly abuts against the elastic arm that extends toward the distal end and that is of the fastening element, thereby forming a tight connection with the tubular element that outputs aerosols, which helps to stop removal or separation of the mouthpiece assembly.

BRIEF DESCRIPTION OF THE DRAWINGS

[0025] One or more embodiments are exemplarily described with reference to the corresponding figures in the accompanying drawings, and the descriptions are not to be construed as limiting 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 electronic atomisation device according to an embodiment;

FIG. 2 is a schematic diagram of an embodiment of an atomiser in FIG. 1;

FIG. 3 is a schematic exploded view of the atomiser

in FIG. 2 from a perspective;

FIG. 4 is a schematic sectional view of the atomiser in FIG. 2;

FIG. 5 is a schematic exploded view of the atomiser in FIG. 4 from a perspective;

FIG. 6 is a schematic diagram of a mouthpiece assembly in FIG. 5 after assembly;

FIG. 7 is a schematic diagram of an electrode assembly in FIG. 5 after assembly;

FIG. 8 is a schematic diagram of a tubular element assembled with an atomisation component and a fastening element in FIG. 5;

FIG. 9 is a view of a mouthpiece assembly assembled with a tubular element;

FIG. 10 is a schematic diagram of a fastening element from another perspective;

FIG. 11 is a schematic diagram of an atomisation component from another perspective;

FIG. 12 is a schematic diagram of a lower seal element from another perspective;

FIG. 13 is a schematic diagram of an atomisation component and a support element before assembly; and

FIG. 14 is a schematic diagram of the atomisation component assembled with the support element in FIG. 13.

DETAILED DESCRIPTION

[0026] For ease of understanding of this application, this application is described below in more detail with reference to the accompanying drawings and specific implementations.

[0027] This application provides an electronic atomisation device. Refer to FIG. 1. The electronic atomisation device includes: an atomiser 100, storing a liquid substrate and heating and atomising the liquid substrate to generate aerosols; and a power supply mechanism 200 supplying power to the atomiser 100.

[0028] In an optional implementation, for example, as shown in FIG. 1, the atomiser 100 and the power supply mechanism 200 can be removably coupled to each other. In addition, when coupled, the power supply mechanism 200 can be used to power the atomiser 100, so that the atomiser 100 atomises the liquid substrate to generate aerosols. Specifically, the atomiser 100 is removably coupled to one end that is along a length direction and is included in the power supply mechanism 200. The power supply mechanism 200 includes an electrical contact 230. When the atomiser 100 is coupled to the power supply mechanism 200, the electrical contact 230 is configured to form an electrical connection with the atomiser 100 to further provide power to the atomiser 100.

[0029] According to the preferred embodiment shown in FIG. 1, the atomiser 100 is at least partially raised, and when coupled to the power supply mechanism 200, the raised portion of the atomiser 100 extends into the power supply mechanism 200, thereby forming a detachable coupling.

[0030] The power supply mechanism 200 is internally provided with a seal piece 260 to provide seal when the atomiser 100 is coupled to the power supply mechanism 200. In the preferred implementation shown in FIG. 1, the seal piece 260 is configured to extend along a cross section direction of the power supply mechanism 200, and is preferably prepared by a flexible material such as silica gel, so as to prevent a liquid substrate seeped from the atomiser 100 from flowing to parts inside the power supply mechanism 200 such as a circuit board 220 and a gas flow sensor 250.

[0031] In the preferred implementation shown in FIG. 1, the power supply mechanism 200 further includes a battery cell 210, configured to supply power; and the circuit board 220, disposed between the battery cell 210 and the electrical contact 230. The circuit board 220 operably guides a current between the battery cell 210 and the electrical contact 230.

[0032] The power supply mechanism 200 includes the gas flow sensor 250, such as a microphone and an air pressure sensor, configured to sense inhalation airflow generated on the atomiser 100 during inhalation on the atomiser 100 by a user, so that the circuit board 220 controls the battery cell 210 to output power based on a detection signal of the gas flow sensor 250.

[0033] Further, in the preferred implementation shown in FIG. 1, another end of the power supply mechanism 200 facing away from the atomiser 100 is provided with a charging interface 240 that is configured to supply power to the battery cell 210.

[0034] Embodiments in FIG. 2 to FIG. 5 are schematic diagrams of a structure of the atomiser 100 in FIG. 1 according to an embodiment. The atomiser 100 includes an outer main body or a plurality of parts inside an outer housing (which may be referred to as a housing). An overall design of the outer main body or the outer housing may vary, and a type or configuration of the outer main body that may define an overall size and shape of the atomiser 100 may vary. Typically, an elongate main body may be formed by a single unitary housing, or an elongate housing may be formed by two or more separable main bodies. In some examples, the outer main body or the outer housing may be formed by a metal or alloy such as stainless steel and aluminum. Other suitable materials include various plastics (for example, polycarbonate), a metal-plating over plastic (metal-plating over plastic), ceramics, and the like. In addition, the outer main body or the outer housing is substantially circular in shape. Alternatively, in yet other implementations, the outer main body or the outer housing may have a generally cylindrical shape, or a generally elliptical cylindrical shape, or a generally flat cylindrical shape with its length greater than its width and its width greater than its thickness, or another regular or irregular shape.

[0035] Further refer to FIG. 2 to FIG. 5. The atomiser 100 has a proximal end 110 and a distal end 120 that face away from each other in a longitudinal direction. In use,

the proximal end 110 is an end for vaping by a user, and the distal end 120 is an end configured to be coupled to the power supply mechanism 200. The outer main body or the outer housing of the atomiser 100 is jointly defined by a plurality of parts. The parts specifically defining the outer main body or the outer housing of the atomiser 100 include: a mouthpiece cap 30 close to and defining the proximal end 110, the first electrode 21 close to and defining the distal end 120, and a substantially tubular main housing 10 extending longitudinally between the mouthpiece cap 30 and the first electrode 21.

[0036] Further refer to FIG. 3 to FIG. 5 and FIG. 7. The atomiser 100 is powered by an electrode assembly 20 close to and defining the distal end 120. Specifically, the electrode assembly 20 forms an electrical connection with the electrical contact 230 when connected to the power supply mechanism 200 and further provides power to the atomiser 100. Specifically, the electrode assembly 20 includes:

the first electrode 21, configured in a longitudinally extending annular shape, and having a first section 211 and a second section 212 that have different outer diameters, where the second section 212 is closer to the distal end 120 and defines the distal end 120, and a surface of the second section 212 is provided with external threads for forming a detachable connection with matching internal threads on the power supply mechanism 200; and

a second electrode 22, substantially in an annular shape that is arranged coaxially with the first electrode 21, where the second electrode 22 is accommodated and retained in the second section 212 of the first electrode 21. The first electrode 21 and the second electrode 22 are both made of metal or alloy with low resistivity, such as gold, silver, copper, nickel, or alloys including gold, silver, copper, and nickel. In use, one of the first electrode 21 and the second electrode 22 serves as a positive electrode, and the other serves as a negative electrode.

[0037] In addition, after assembly, a surface of the second electrode 22 at the distal end 120 is substantially flush with the second section 212 of the first electrode 21, and the second electrode 22 is at least partially exposed at the distal end 120, to facilitate contact and electrical connection between the second section 212 of the first electrode 21, the second electrode 22, and the power supply mechanism 200.

[0038] In addition, the first section 211 of the first electrode 21 is further internally provided with an annular support wall 214 extending facing away from the second section 212. Insertion space 215 is defined between the first section 211 and the support wall 214. During assembly, a lower end part of the main housing 10 facing toward the distal end 120 is inserted into the insertion space 215 to form assembly and fixation. In a more preferred implementation, the electrode assembly 20 further includes: a seal element 80, substantially annular, for example, flexible silicone seal ring, located in the insertion space 215 and surrounding the support wall 214. When the lower end part of the main housing 10 is inserted into the insertion space 215, the seal element 80 is radially squeezed or compressed by the main housing 10 and the support wall 214, to seal the main housing 10 and the support wall 214.

[0039] In addition, the electrode assembly 20 further includes:

an insulation element 23, substantially annular in shape, and located between the second section 212 of the first electrode 21 and the second electrode 22 to insulate the second section 212 and the second electrode 22. The insulation element 23 is, for example, an O-ring, a silicone ring, or the like.

[0040] In addition, an air inlet hole 213 running, in a radial direction, through a part of the second section 212 of the first electrode 21 close to the first section 211 is further provided, to allow external air to enter the atomiser 100 during inhalation.

[0041] Further refer to FIG. 3 to FIG. 5 and FIG. 8. The main housing 10 is internally provided with a plurality of parts for atomising and outputting a liquid substrate, specifically including:

a tubular element 60, having a first portion 61, a second portion 62, and a third portion 63 that are sequentially arranged in the longitudinal direction. Outer diameters/inner diameters of the first portion 61, the second portion 62, and the third portion 63 gradually increase. The first portion 61 is toward or close to the proximal end 110 and the third portion 63 is toward or close to the distal end 120.

[0042] After assembly, an end of the tubular element 60 close to the electrode assembly 20 is at least partially extended between the seal element 80 and the support wall 214 and is supported or abutted by the first electrode 21 to form a stop.

[0043] After assembly, the tubular element 60 is essentially accommodated and retained in the main housing 10. A liquid storage cavity 12 configured to store a liquid substrate is defined and formed between an outer surface of the tubular element 60 and an inner surface of the main housing 10. In addition, an end of the liquid storage cavity 12 facing the distal end 120 is sealed by the first electrode 21 and the seal element 80.

[0044] The third portion 63 of the tubular element 60 is provided with at least one or more liquid guide holes 631 for allowing the liquid substrate in the liquid storage cavity 12 to enter the third portion 63.

[0045] Further, the third portion 63 of the tubular element 60 is also provided with an atomisation component 70, configured to at least partially receive the liquid substrate entering from the liquid guide hole 631, and heat and atomise the liquid substrate to generate aerosols for inhalation. Specifically, the atomisation component 70 includes

a porous body 71, in some implementations, such as

porous ceramics, or porous glass, porous metal foam, or in other implementations, such as porous cotton, fiber cotton, sponge, or porous fiber. The porous body 71 is configured in a tubular shape extending longitudinally and substantially coaxially with the tubular element 60. An outer surface of the porous body 71 in a radial direction is at least partially in fluid communication with the liquid storage cavity 12 through the liquid guide hole 631 and is further used as a liquid absorbing surface to absorb the liquid substrate. An inner surface of the porous body 71 in the radial direction is used as an atomisation surface and is provided with a heating element 72 for heating and atomising the liquid substrate transferred to the heating element 72 through capillary channels in the porous body 71 to generate aerosols. The aerosols are released from the atomisation surface. In use, as shown by an arrow R1 in FIG. 4, the liquid substrate passes from the liquid storage cavity 12 through the liquid guide hole 631, then is provided to the outer surface of the porous body 71 for absorption, and infiltrates or is transferred, through the capillary channels in the porous body 71, to the heating element 72 for heating and atomisation.

[0046] Further, in an implementation, the third portion 63 of the tubular element 60 is further internally provided with:

an upper seal element 74, for example, a silicone ring or a silicone sleeve, where an upper end of the porous body 71 and the third portion 63 are sealed; and

a lower seal element 75, for example, a silicone ring or a silicone sleeve, where a lower end of the porous body 71 and the third portion 63 are sealed.

[0047] The upper seal element 74 spaces apart from the lower seal element 75, so that a portion of the outer surface of the porous body 71 located between the upper seal element 74 and the lower seal element 75 is exposed, so as to absorb the liquid substrate.

[0048] An internal hollow between the first portion 61 and the second portion 62 of the tubular element 60 is mainly configured to define an aerosol output channel configured to output aerosols.

[0049] Further refer to FIG. 3 to FIG. 6. The atomiser 100 further includes a mouthpiece assembly, used for a user to draw in aerosols. Specifically, the mouthpiece assembly includes:

the mouthpiece cap 30, close to and defining the proximal end 110, where the mouthpiece cap 30 is provided with an air inhalation hole 111 located at the proximal end 110, the mouthpiece cap 30 further has a plugging slot 32 facing away from the proximal end 110, the mouthpiece cap 30 further has a channel 31 extending from the plugging slot 32 to the air inhalation hole 111 along the longitudinal direction, the plugging slot 32 has a first plugging portion 321 and a second plugging portion 322 that are sequentially arranged in a direction moving toward the proximal end 110, the first plugging portion 321 and the second plugging portion 322 are coaxially arranged, and inner diameters of the first plugging portion 321 and the second plugging portion 322 are different, and the inner diameter of the first plugging portion 321 is larger than the inner diameter of the second plugging portion 322, and a step 323 is formed between the first plugging portion 321 and the second plugging portion 322; and

a rigid connecting element 40, substantially in a shape of a longitudinally extending tube, and having a connecting portion 41, a connecting portion 43, an extending portion 42 extending between the connecting portion 41 and the connecting portion 43 that are sequentially arranged in the longitudinal direction.

[0050] The connecting portion 41 is configured to connect the connecting element 40 and the mouthpiece cap 30. In some specific implementation, the connecting portion 41 of the connecting element 40 extends into the first plugging portion 321 of the plugging slot 32 of the mouthpiece cap 30, and the connecting portion 41 abuts against the step 323 of the plugging slot 32 to form a stop. In addition, the connecting portion 41 is riveted into the first plugging portion 321 of the plugging slot 32 of the mouthpiece cap 30, or glue is applied between the connecting portion 41 and the first plugging portion 321 of the plugging slot 32, so that the connecting portion 41 and the mouthpiece cap 30 are tightly connected to each other.

[0051] The connecting portion 43, after assembly, extends into the main housing 10 from an upper end of the main housing 10 and is connected to the tubular element 60. The mouthpiece assembly further includes a seal element 44, located between the connecting portion 43 and the main housing 10, to seal the connecting portion 43 and the main housing 10.

[0052] In addition, outer diameters of the connecting portion 41 and the connecting portion 43 are both larger than an outer diameter of the extending portion 42, so that a recess or groove surrounding the extending portion 42 is formed on a surface of the connecting element 40.

[0053] Further refer to FIG. 5 to FIG. 6. The mouthpiece assembly further includes a seal element 45, for example, a silicone ring or a silicone ring, fitted in the recess or groove defined by the extending portion 42. After assembly, the upper end of the main housing 10 toward the proximal end 110 is coaxial with the mouthpiece cap 30, and the seal element 45 is at least partially located between the connecting element 40 and the mouthpiece cap 30 in a radial direction and is radially compressed and extruded. The seal element 45 is also at least partially located between the upper end of the main housing 10 and the mouthpiece cap 30 in the longitudinal direction and is compressed or extruded in an axial direction to seal the upper end of the main housing 10 and the mouthpiece cap 30.

[0054] FIG. 6 shows a state after the connecting element 40 and the mouthpiece cap 30 are assembled and connected. The connecting portion 41 of the connecting element 40 is inserted into the mouthpiece cap 30 and is tightly connected to the mouthpiece cap 30. The connecting portion 43 of the connecting element 40 is located outside the mouthpiece cap 30.

[0055] Further refer to FIG. 6, FIG. 8, FIG. 9, and FIG. 10. The connecting portion 43 of the connecting element 40 is further configured to tightly connect the mouthpiece assembly to the first portion 61 of the tubular element 60. Specific connection implementation methods include:

a fastening element 50, tightly disposed on the first portion 61 of the tubular element 60, where the fastening element 50 is connected to and fixed with the connecting element 40, so that the mouthpiece assembly is connected to and fixed with the tubular element 60. The fastening element 50 is made of engineering plastics or organic polymers, spring steel, beryllium bronze, tin bronze, manganese steel, stainless steel, and other materials. The fastening element 50 has a length of about 4 mm to 15 mm. Further, a structure of the fastening element 50 includes:

a substantially annular main body portion 51, where the main body portion 51 surrounds and is tightly coupled to the first portion 61 of the tubular element 60 by welding, riveting, and interference; and

at least one or more elastic arms 52 extending axially from the main body portion 51, where the plurality of elastic arms 52 are separated from each other, and there is a notch or a gap 53 between adjacent elastic arms 52, so that the elastic arms do not elastically interfere with each other.

[0056] The plurality of elastic arms 52 have a curved surface shape or a curved arc shape.

[0057] The elastic arm 52 has a length dimension d1 of about 1 mm to 12 mm and a thickness of 0.1 mm to 2 mm.

[0058] A width dimension d2 of the notch or the gap 53 is 0.1 mm to 2 mm.

[0059] An extension length d3 of the main body portion 51 is 2 mm to 4 mm. To be specific, an extension length d1 of the elastic arm 52 is greater than the extension length d3 of the main body portion 51, and a diameter of the main body portion 51 ranges from 2 mm to 10 mm.

[0060] As shown in FIG. 8 to FIG. 10, the elastic arm 52 has an inclined portion 521 close to the main body portion 51 and a front end portion 522 facing away from the main body portion 51. The inclined portion 521 is arranged obliquely at an angle to the axial direction. Specifically, as shown in a preferred embodiment of FIG. 10, an included angle α formed between the inclined portion 521 and the main body portion 51 ranges from 150 degrees to 179 degrees and is an obtuse angle. The inclined portion 521 gradually expands outward in a direction facing away from the main body portion 51 instead of shrinking or narrowing inward. The front end portion 522 is disposed parallel to an axial direction rather than obliquely. The inclined portion 521 enables the elastic arm 52 made of metal, alloy, or engineering plastic to shrink or narrow inward during extrusion, and then return to outward expansion without the extrusion force.

[0061] After assembly, for example as shown in FIG. 8, the main body portion 51 of the fastening element 50 is in close contact with and tightly connected to the first portion 61 of the tubular element 60. The elastic arm 52 is kept at a distance from the first portion 61 of the tubular element 60 and therefore is in non-contact with the first portion 61.

[0062] For example, as shown in FIG. 8, because the elastic arm 52 is arranged obliquely, the distance between the elastic arm 52 and the first portion 61 of the tubular element 60 changes along the radial direction.

[0063] In terms of a structure for achieving tight connection with the fastening element 50, as shown in FIG. 5, FIG. 6, and FIG. 9, an internal hollow of the substantially tubular connecting element 40 includes at least:

a first hollow 471 and a second hollow 472 that are adjacent and have different inner diameters, where the first hollow 471 is closer to the proximal end 110, an inner diameter of the first hollow 471 is larger than an inner diameter of the second hollow 472, so that a step 473 is formed between the first hollow 471 and the second hollow 472.

[0064] During assembly, the first portion 61 of the tubular element 60 passes through the inner hollow of the connecting element 40 and then is inserted into the second plugging portion 322 of the plugging slot 32 of the mouthpiece cap 30. The elastic arm 52 of the fastening element 50 passes through the second hollow 472 into the first hollow 471, and then, the front end portion 522 abuts against the step 473, so that the mouthpiece assembly is tightly connected to the tubular element 60, and the mouthpiece assembly is prevented from separating or removing from the main housing 10. During assembly, the inner diameter of the second hollow 472 is slightly smaller than an outer diameter of the front end portion 522 of the elastic arm 52, and the inner diameter of the first hollow 471 is greater than or equal to the outer diameter of the front end portion 522 of the elastic arm 52, so that the elastic arm 52 is at least partially compressed or shrank inward when in the second hollow 472. When the elastic arm 52 completely passes through the second hollow 472 and then enters the first hollow 471, the elastic arm 52 changes from the compressed or shrank state to an expanded state, and abuts against the step 473 to form a stop.

[0065] After assembly, refer to FIG. 5 to FIG. 9. The inner hollow of the connecting element 40 is further provided with a seal element 46, such as a silicone ring or a seal ring, to seal the tubular element 60 and the connecting element 40.

[0066] In some examples, the mouthpiece assembly includes the seal element 44, the seal element 45, and the seal element 46 for sealing an opening of the liquid

storage cavity, and the notch or the gap 53 between adjacent elastic arms 52 is configured to allow air in the liquid storage cavity to be discharged when the seal element 46 enters the opening.

[0067] In some preferred implementations, the tubular element 60 is made of a metal or alloy tube, such as a stainless steel tube, to form, through stretching manners such as elastic stretching and dynamic stretching, the first portion 61, the second portion 62, and the third portion 63 that have different inner diameters/outer diameters. In the preferred implementation shown in FIG. 8, the first portion 61 has a length of about 8 mm to 12 mm, an inner diameter of 1 mm to 3 mm, and a wall thickness of about 0.1 mm to 0.3 mm. The second portion 62 has a length of about 15 mm to 30 mm, an inner diameter of 2 mm to 6 mm, and a wall thickness of about 0.1 mm to 0.3 mm. The third portion 63 has a length of 10 mm to 15 mm, an inner diameter of 5 mm to 10 mm, and a wall thickness of about 0.1 mm to 0.3 mm.

[0068] In some examples, the mouthpiece assembly includes the seal element 44, the seal element 45, and the seal element 46 for sealing an opening of the liquid storage cavity. The seal element 44 and the seal element 45 are close to an end surface of the proximal end of the main housing 10, and the seal element 46 is spaced apart from the seal element 44 and the seal element 45 in the longitudinal direction. The tubular element 60 includes the first portion 61 and the second portion 62 that are sequentially arranged from the proximal end to the distal end. An outer diameter of the first portion 61 is smaller than an outer diameter of the second portion 62. A position at which the first portion 61 and the second portion 62 connect is longitudinally lower than an end surface of the proximal end of the main housing 10. In this way, the seal element 46 is configured to maintain a gap with the first portion 61 to discharge air in the liquid storage cavity when entering the opening until being in contact with an outer surface of the second portion 62 to seal the opening. In addition, the seal element 44 and the seal element 45 remains in contact with the proximal end of the main housing 10. In this way, that unnecessarily increasing the pressure in the liquid storage cavity causes liquid leakage can be avoided during the process of installing the mouthpiece assembly to the main housing.

[0069] Further refer to FIG. 11. A structure of the porous body 71 of the atomisation component 70 includes: a through hole 711 axially running through the porous body 71, where the through hole 711 has an inner diameter of about 1 mm to 3 mm.

[0070] The porous body 71 is formed by molding a moldable material such as porous ceramics around the heating element 72 such as a spiral heating coil and then integrally sintering.

[0071] The porous body 71 has an extension length of about 5 mm to 10 mm. In a specific implementation, the porous body 71 has a length of 7.2 mm.

[0072] As further shown in FIG. 11 and FIG. 12, the porous body 71 has a portion 712 with an increased outer diameter at a lower end close to the distal end 120, so that a step 713 is defined on the outer surface of the porous body 71.

[0073] The portion 712 with an increased outer diameter has an axially extending positioning protrusion 715.

[0074] The lower seal element 75 includes a radially inwardly extending abutment portion 751 and an axially extending seal portion 752. After assembly, the abutment portion 751 abuts against the step 713 for assembling and fixing. The seal portion 752 surrounds the portion 712 with an increased outer diameter and seals the lower end of the porous body 71 and the tubular element 60. The inner surface of the abutment portion 751 of the lower seal element 75 is provided with a positioning recess 753 for fitting with the positioning protrusion 715 to provide positioning when the lower seal element 75 is wrapped or sleeved on the lower end of the porous body 71. The positioning recess 753 fits with the positioning protrusion 715 to prevent the lower seal element 75 and the porous body 71 from rotating relative to each other after assembly.

[0075] Further refer to FIG. 11. The portion 712 with an increased outer diameter has an outer diameter of 4.8 mm, and a part of the portion 712 with an increased outer diameter has an extension length of 1 mm to 2 mm. A surface of the portion 712 with an increased outer diameter is provided with an air recess 714 running through the portion 712 with an increased outer diameter. The air recess 714 is bent or circuitous. In a preferred implementation, the air recess 714 has a width of about 0.1 mm to 0.5 mm. In use, air entering through the air inlet hole 213 can pass through the air recess 714, then enter a position between the upper seal element 74 and the lower seal element 75 in the third portion 63 of the tubular element 60, and then escape through the liquid guide hole 631 into the liquid storage cavity 12 to relieve negative pressure of the liquid storage cavity 12, as shown by an arrow R3 in FIG. 8 and FIG. 11.

[0076] Further referring to FIG. 8, the heating element 72 is a resistive heating coil or a solenoid coil. The heating element 72 is made of a resistive metal or an alloy material, such as commonly used iron-chromium-aluminum, nickel-chromium-aluminum, nickel-chromium, nickel-iron, silver-palladium, and stainless steel.

[0077] The coil-structured heating element 72 has approximately 3 to 8 windings or turns.

[0078] A diameter of a wire material of the coil-structured heating element 72 is 0.1 mm to 0.3 mm.

[0079] An inner diameter of the coil-structured heating element 72 is substantially equal to an inner diameter of the through hole 711 of the porous body 71, and has an inner diameter of about 1 mm to 3 mm.

[0080] The coil-structured heating element 72 has an axial extension length of 3 mm to 6 mm, preferably 3.2 mm to 4.5 mm.

[0081] In some implementations, the coil-structured heating element 72 is completely embedded in an inner

surface of the through hole 711 of the porous body 71. In some implementations, the coil-structured heating element 72 is at least partially exposed or protrudes from the inner surface of the through hole 711 of the porous body 71.

[0082] In some implementations, a distance between adjacent windings or turns of the coil-structured heating element 72 is substantially constant in the axial direction.

[0083] In some implementations, a distance between adjacent windings or turns of the coil-structured heating element 72 is about 0.5 mm to 1.0 mm, to facilitate preventing heat accumulation.

[0084] In still some implementations, a distance between adjacent windings or turns of the coil-structured heating element 72 varies in the axial direction. Preferably, for example, the distance between adjacent windings or turns gradually increases from two ends to the middle along the axial direction.

[0085] A first wire 721 is connected to an upper end of the coil-structured heating element 72 to form electrical connection. A second wire 722 is connected to a lower end of the coil-structured heating element 72 to form electrical connection.

[0086] After assembly, the air recess 714 is obscured by the lower seal element 75. A channel for adding air to the liquid storage cavity 12 is formed between the lower seal element 75 and the porous body 71. Alternatively, in some other variable implementations, the air recess 714 is formed on the inner surface or on an outer surface of the lower seal element 75. After assembly, an air passage is defined between the inner surface of the lower seal element 75 and the porous body 71, or between the outer surface of the lower seal element 75 and the third portion 63 of the tubular element 60, to add air to the liquid storage cavity 12 to relieve negative pressure.

[0087] Further in a more preferred implementation, the heating element 72 abuts against or is connected to the first electrode 21 and the second electrode 22 through the elongated first wire 721 and the elongated second wire 722, separately, so as to power the heating element 22.

[0088] Further refer to FIG. 3 to FIG. 5, FIG. 8, FIG. 13, and FIG. 14. The atomiser 100 further includes:
a support base 76, supporting the atomisation component 70/the porous body 71 from the lower end.

[0089] After assembly, the support base 76 is at least partially accommodated and retained in the support wall 214 of the first electrode 21, and abuts against the support wall 214 to form a stop. A material of the support base 76 is preferably flexible silicone.

[0090] The support base 76 is provided with a first wire hole 762 and a second wire hole 763. The first wire 721 passes through the first wire hole 762 and is connected to the first electrode 21 by abutment, contact, welding, or another manner. The second wire 722 passes through the second wire hole 763 and is connected to the second electrode 22 by abutment, contact, welding, or another manner.

[0091] The support base 76 has a receiving cavity 764 opposite to the through hole 711 of the porous body 71 along the longitudinal direction, for receiving and retaining condensate after aerosols are condensed.

[0092] The support base 76 has a hole 765 extending from an outer surface into the receiving cavity 764. The hole 765 is opposite to or in airflow communication with the air inlet hole 213 on the first electrode 21. During drawing in aerosols, an air flow path is shown by an arrow R2 in FIG. 4, FIG. 13, and FIG. 14. External air enters the support base 76 through the air inlet hole 213 and the hole 765 in sequence, then passes through the through hole 711 of the porous body 71, and carries the aerosols to be output from the tubular element 60 to the channel 31 of the mouthpiece cap 30. The external air carrying the aerosols is finally inhaled at the air inhalation hole 111.

[0093] As further shown in FIG. 14, the surface of the support base 76 further has a wall 761 protruding toward the distal end 120, facilitating surrounding and fixing of the first wire 721 passing through the support base 76, separating or separation or fixation of the first wire 721, preventing the first wire 721 from being in contact or entanglement with the second wire 722/the second electrode 22 due to bending or the like during assembly.

[0094] It should be noted that the specification and the accompanying drawings of this application provide preferred embodiments of this application, but is not limited to embodiments described in this specification. Further, a person of ordinary skill in the art may make improvements or modifications based on the foregoing descriptions, and all the improvements and modifications shall fall within the protection scope of the appended claims of this application.

Claims

1. An atomiser, comprising a proximal end and a distal end, facing away from each other in a longitudinal direction;

   a liquid storage cavity, configured to store a liquid substrate;
   an atomisation component, configured to atomise the liquid substrate to generate aerosols;
   a mouthpiece assembly, located at the proximal end and used for a user to draw in aerosols, wherein the mouthpiece assembly is internally provided with a first hollow and a second hollow that are sequentially arranged in the longitudinal direction, the first hollow is closer to the proximal end than the second hollow, and an inner diameter of the first hollow is greater than an inner diameter of the second hollow to define a first step between the first hollow and the second hollow;
   a tubular element, at least partially defining an aerosol output channel that is configured to output aerosols to the mouthpiece assembly; and

a fastening element, coupled to the tubular element and having one or more elastic arms extending out toward the distal end, wherein the one or more elastic arms extend into the first hollow and abut against the first step, to tightly connect the mouthpiece assembly to the tubular element.

2. The atomiser according to claim 1, wherein the one or more elastic arms are configured to expand radially outwardly of the tubular element.

3. The atomiser according to claim 1 or 2, wherein the one or more elastic arms are at least partially configured to be arranged obliquely at an angle to the longitudinal direction.

4. The atomiser according to claim 1 or 2, wherein:

the fastening element further comprises a main body portion, at least partially surrounding and coupled to an outer surface of the tubular element, and
the one or more elastic arms are configured to extend from the main body portion toward the distal end.

5. The atomiser according to claim 4, wherein an included angle between the one or more elastic arms and the main body portion is an obtuse angle.

6. The atomiser according to claim 4, wherein an included angle between the one or more elastic arms and the main body portion ranges from 150 degrees to 179 degrees.

7. The atomiser according to claim 1 or 2, wherein the one or more elastic arms have a length of 1 mm to 12 mm; and/or the one or more elastic arms have a thickness of 0.1 mm to 2 mm.

8. The atomiser according to claim 1 or 2, wherein the one or more elastic arms are configured to be curved.

9. The atomiser according to claim 1 or 2, wherein the one or more elastic arms comprise metals or alloys or organic polymers.

10. The atomiser according to claim 1 or 2, wherein the plurality of elastic arms are separated or discrete from each other.

11. The atomiser according to claim 10, wherein the mouthpiece assembly comprises a seal element configured to seal an opening of the liquid storage cavity, and a spacing between adjacent elastic arms is configured to allow air in the liquid storage cavity to be discharged when the seal element enters the opening.

12. The atomiser according to claim 1 or 2, wherein a distance between two adjacent elastic arms of the plurality of elastic arms ranges from 0.1 mm to 2 mm.

13. The atomiser according to claim 1 or 2, wherein the mouthpiece assembly comprises:

a mouthpiece cap, at least partially defining an outer surface of the atomiser; and
a connecting element, at least partially accommodated and retained in the mouthpiece cap, wherein the connecting element is configured in a tubular shape extending in the longitudinal direction, and the first hollow, the second hollow, and the first step are surrounded and defined by an inner surface of the connecting element.

14. The atomiser according to claim 1 or 2, wherein the atomisation component comprises:

a resistive heating coil, extending longitudinally for heating the liquid substrate to generate aerosols; and
a porous body, surrounding the resistive heating coil and configured to receive the liquid substrate of the liquid storage cavity and transfer the liquid substrate to the resistive heating coil, wherein a distance between adjacent windings of the resistive heating coil ranges from 0.5 mm to 1.0 mm.

15. The atomiser according to claim 1 or 2, wherein:

the tubular element comprises a first portion, a second portion, and a third portion that are sequentially arranged from the proximal end to the distal end;
an outer diameter of the first portion is smaller than an outer diameter of the second portion, and the outer diameter of the second portion is smaller than an outer diameter of the third portion;
the fastening element is coupled to the first portion; and
the atomisation component is accommodated and retained in the third portion.

16. The atomiser according to claim 1, wherein the mouthpiece assembly comprises a seal element configured to seal an opening of the liquid storage cavity, the tubular element comprises a first portion and a second portion that are sequentially arranged from the proximal end to the distal end, an outer diameter of the first portion is smaller than an outer diameter of the second portion, and the seal element is configured to maintain a gap with the first portion to

discharge air in the liquid storage cavity when entering the opening until being in contact with the second portion to seal the opening.

17. An atomiser, comprising a proximal end and a distal end, facing away from each other in a longitudinal direction;

a liquid storage cavity, configured to store a liquid substrate;
an atomisation component, configured to atomise the liquid substrate to generate aerosols;
a mouthpiece assembly, located at the proximal end and used for a user to draw in aerosols, wherein the mouthpiece assembly is internally provided with a first hollow and a second hollow that are sequentially arranged in the longitudinal direction, the first hollow is closer to the proximal end than the second hollow, and an inner diameter of the first hollow is greater than an inner diameter of the second hollow to define a first step between the first hollow and the second hollow; and
a tubular element, at least partially defining an aerosol output channel that is configured to output aerosols to the mouthpiece assembly, wherein the tubular element is provided with one or more elastic arms extending toward the distal end, and the one or more elastic arms extend into the first hollow through the second hollow and abut against the first step, to prevent the mouthpiece assembly from being separated or removed from the tubular element.

18. An atomiser, comprising:

a main housing having a proximal end and a distal end;
a liquid storage cavity, defined in the main housing and configured to store a liquid substrate, wherein the liquid storage cavity has an opening near the proximal end for injecting a liquid substrate;
an atomisation component, configured to atomise the liquid substrate to generate aerosols;
a mouthpiece assembly, connected to the proximal end and used for a user to draw in aerosols, where the mouthpiece assembly comprises a seal element configured to seal the opening; and
a tubular element, at least partially defining an aerosol output channel that is configured to output aerosols to the mouthpiece assembly, wherein the tubular element comprises a first portion and a second portion that are sequentially arranged from the proximal end to the distal end, an outer diameter of the first portion is smaller than an outer diameter of the second portion, and a position at which the first portion and the second portion connect is longitudinally lower than an end surface of the proximal end of the main housing,
wherein the seal element is configured to maintain a gap with the first portion to discharge air in the liquid storage cavity when entering the opening until being in contact with the second portion to seal the opening.

19. An electronic atomisation device, comprising an atomiser configured to atomise a liquid substrate to generate aerosols, and a power supply mechanism configured to supply power to the atomiser, wherein the atomiser comprises the atomiser according to any one of claims 1 to 18.

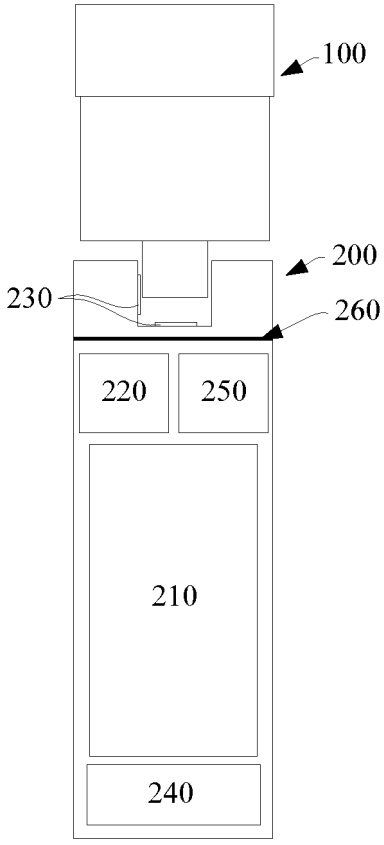

FIG. 1

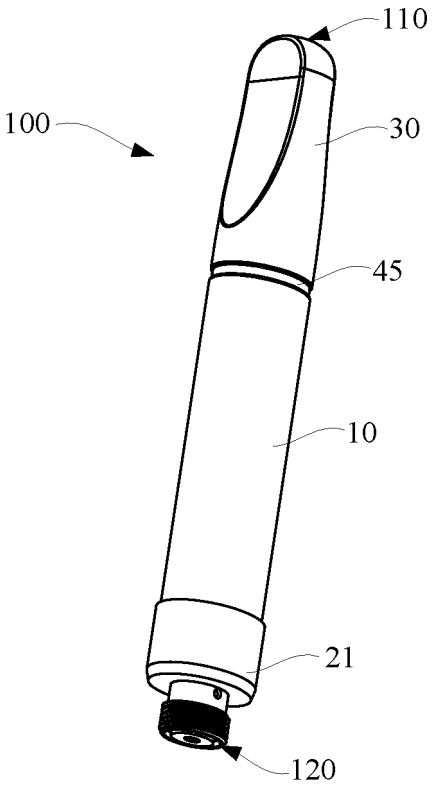

FIG. 2

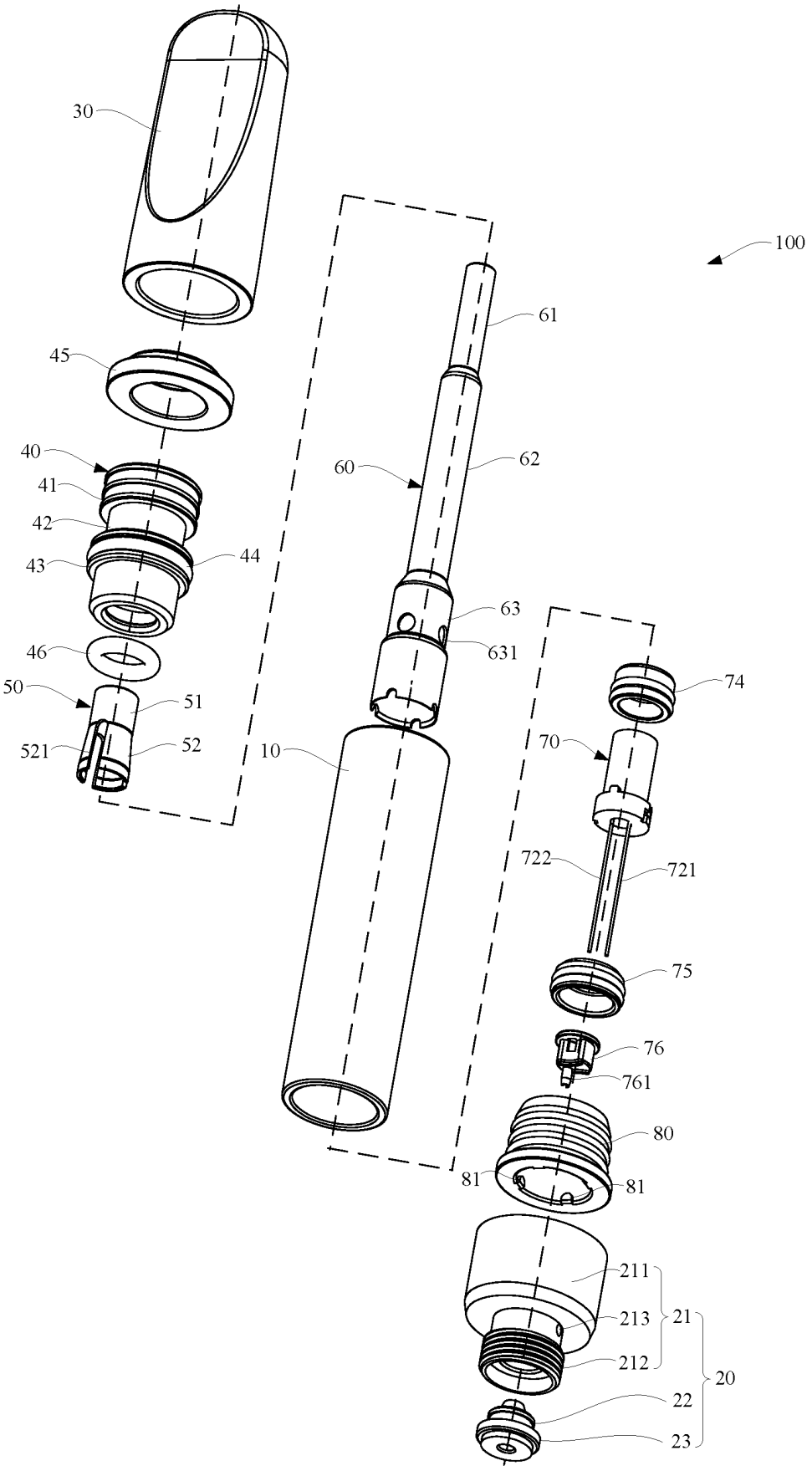
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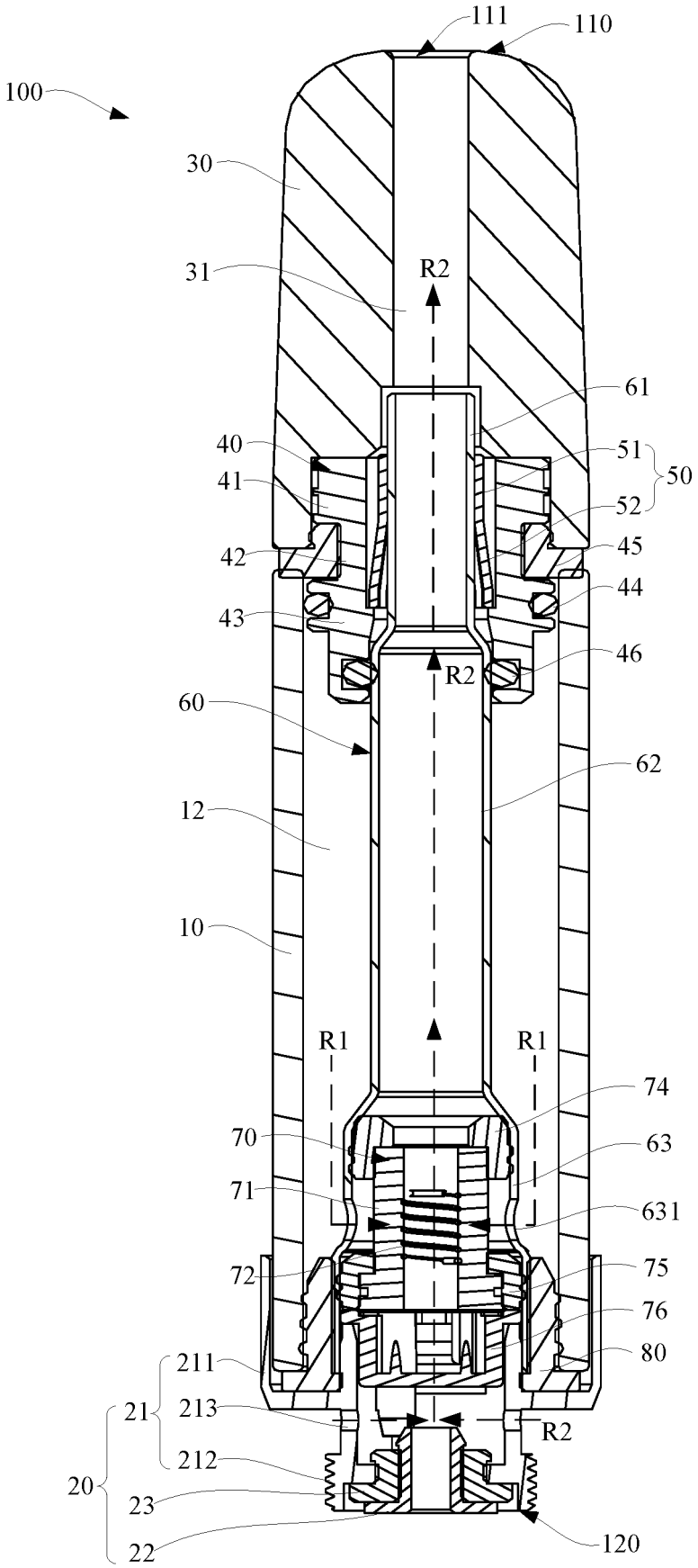
FIG. 3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R1
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FIG. 4

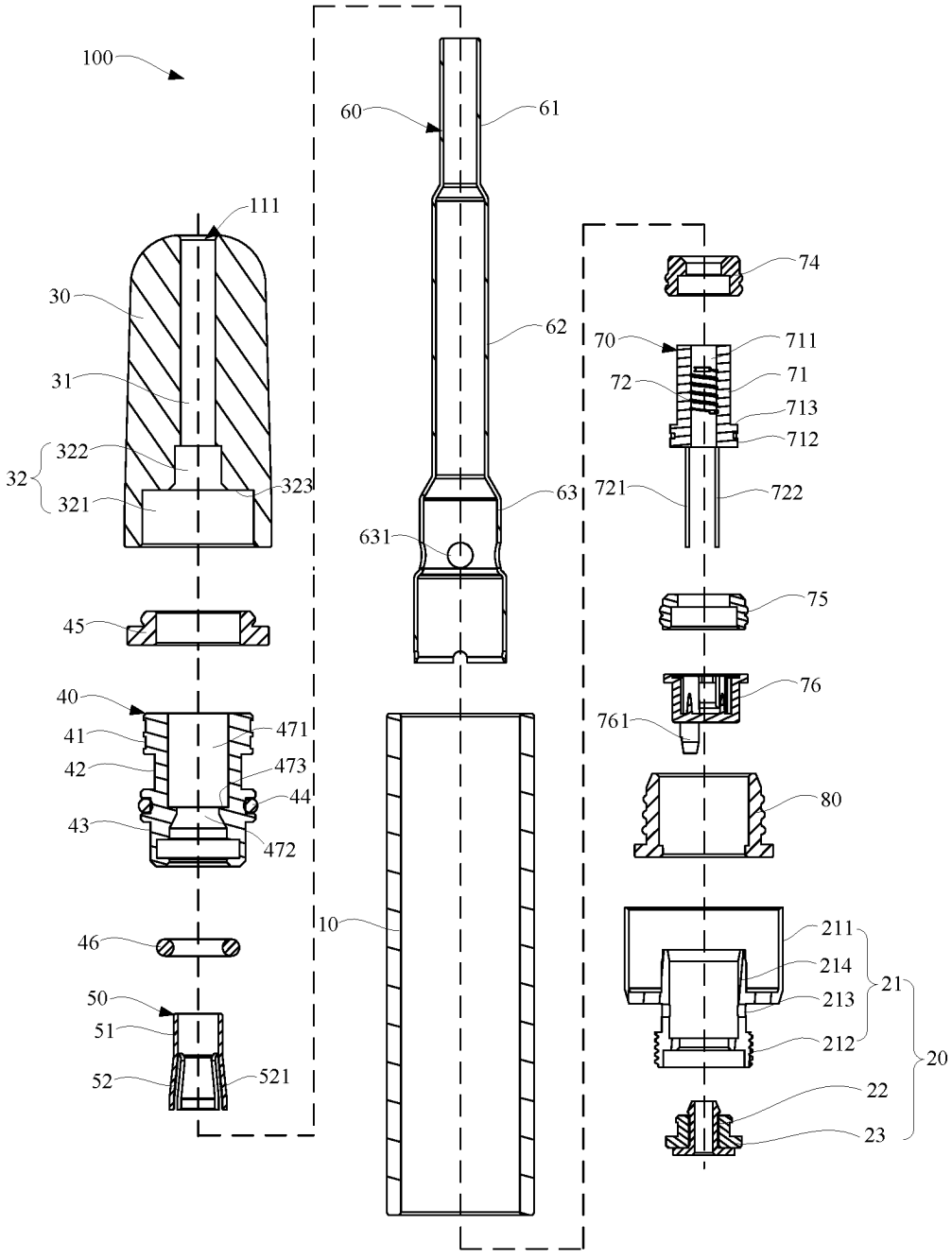
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FIG. 5

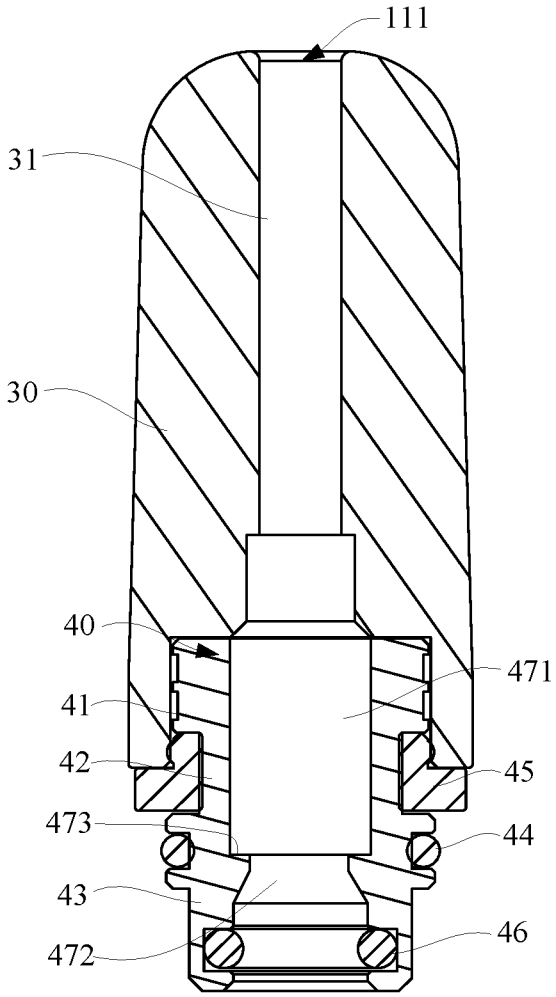
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FIG. 6

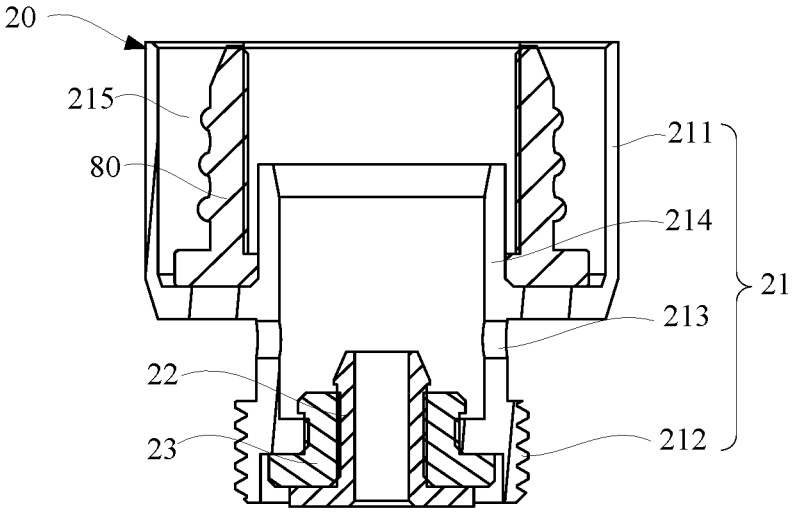
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FIG. 7

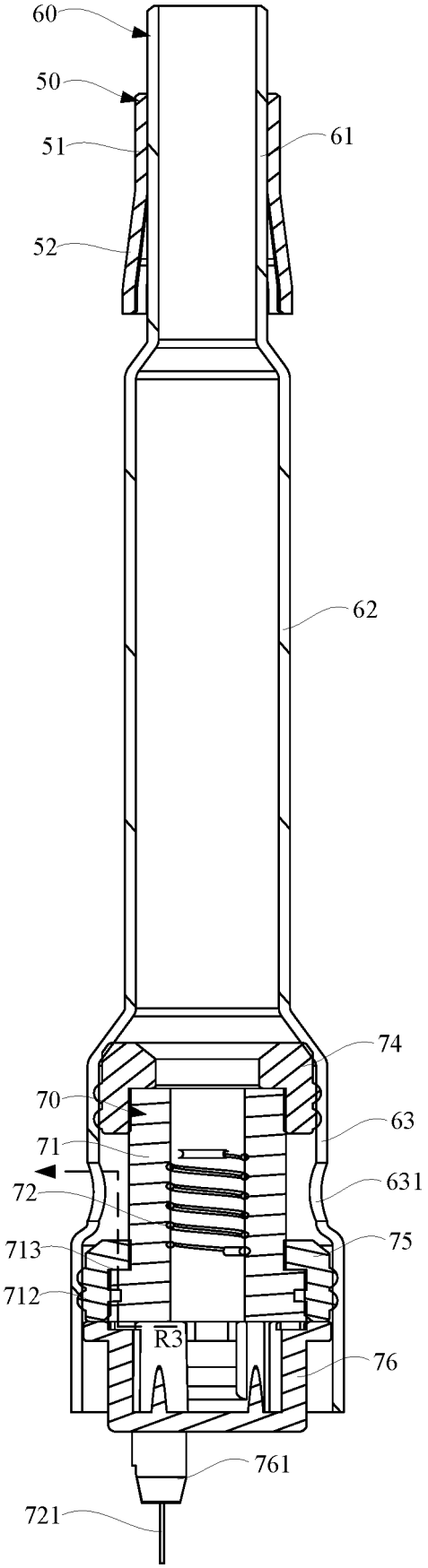

FIG. 8

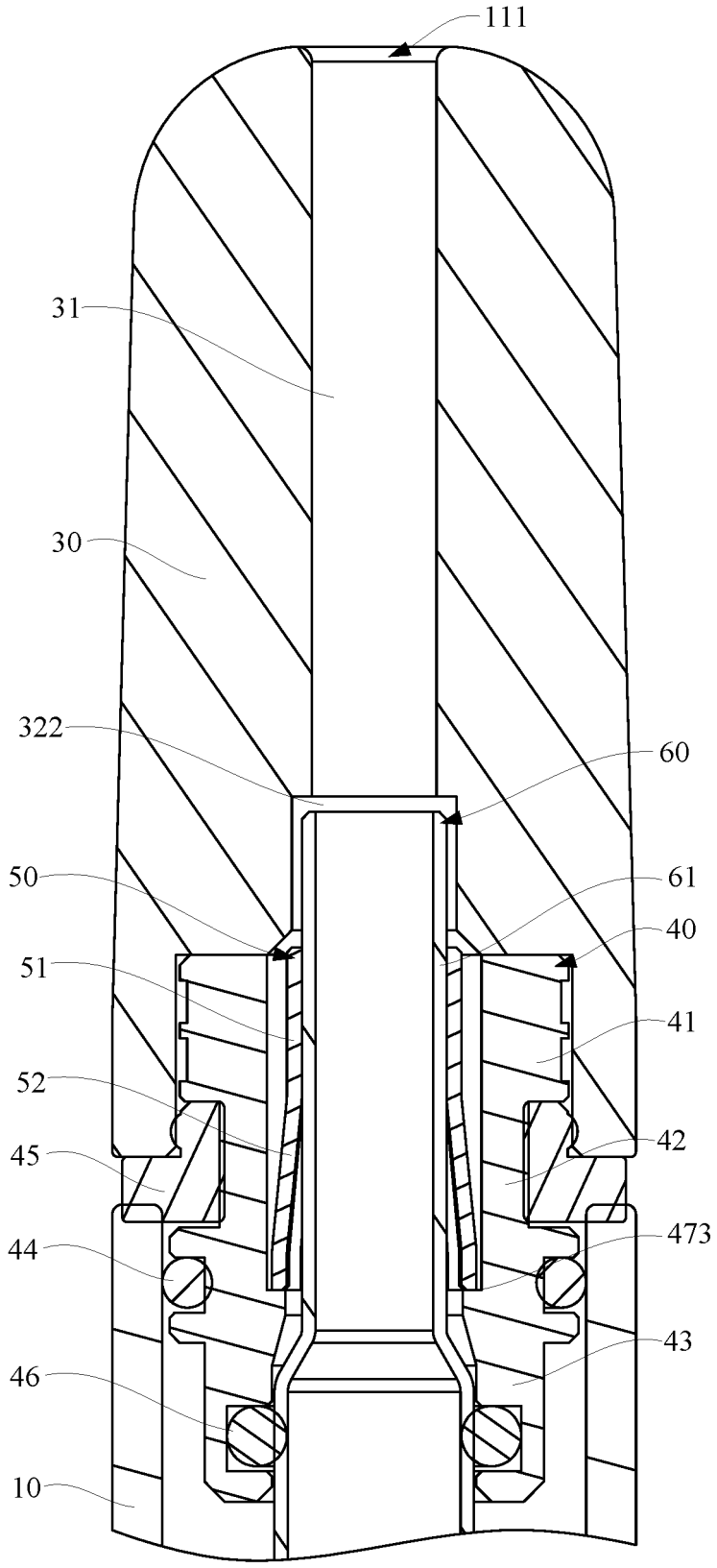

FIG. 9

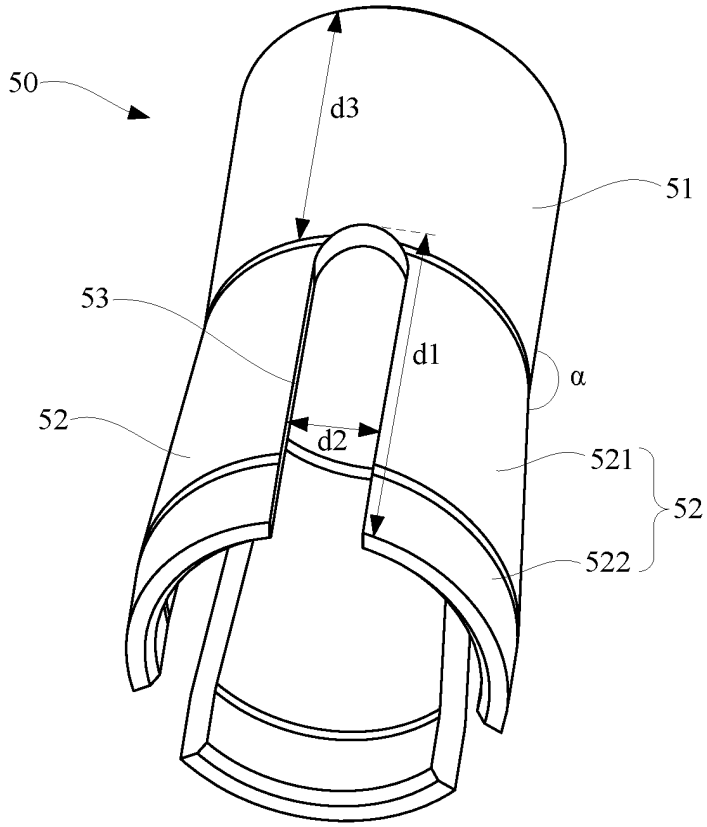
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FIG. 10

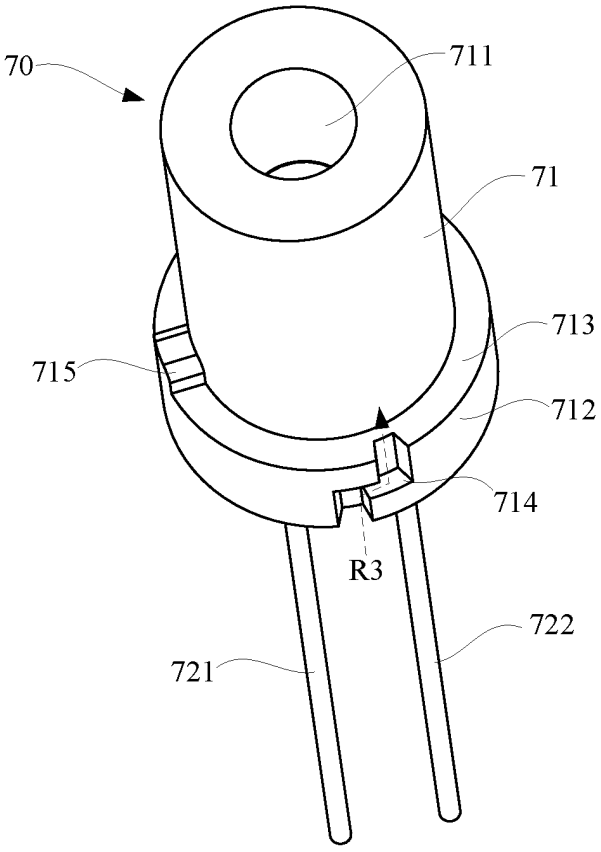
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FIG. 11

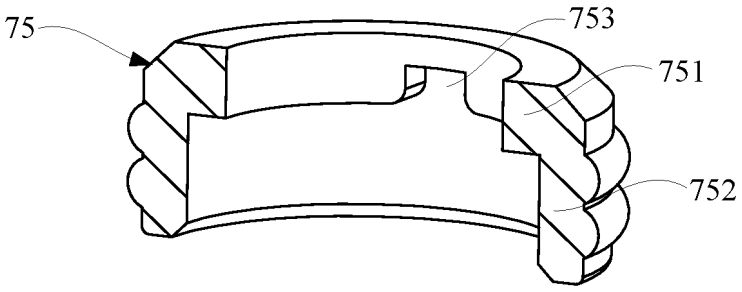
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FIG. 12

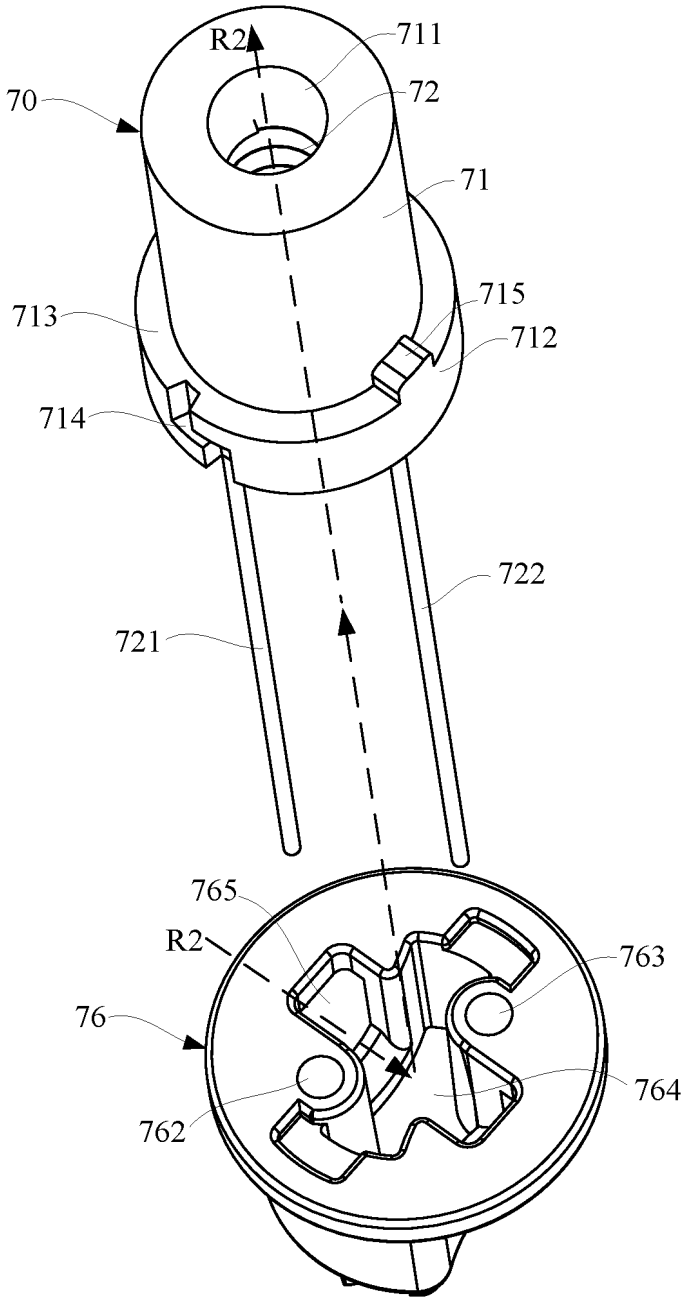
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FIG. 13

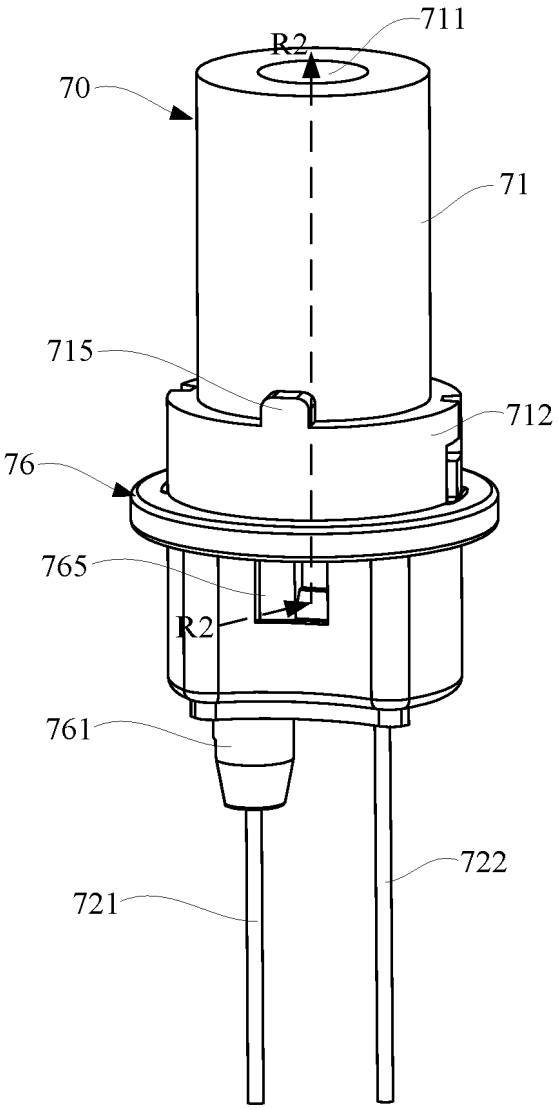

FIG. 14

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2023/081442

A. CLASSIFICATION OF SUBJECT MATTER

A24F40/40(2020.01)i;A24F40/10(2020.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: A24F 40/-; A24F 47/-

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

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

CNTXT, ENTXTC, VEN: 电子烟, 雾化, 弹性臂, 台阶, 紧固, 移除, 拆卸, 注液, 密封, E-cigarette, atomiz+, resilient, elastic, arm, step, fasten+, remov+, dismount+, liquid, oil, fill+, inject+, seal+

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 218073511 U (SHENZHEN FIRST UNION TECHNOLOGY CO., LTD.) 20 December 2022 (2022-12-20) claims 1-19	1-19
Y	CN 210611016 U (SHENZHEN SMOORE TECHNOLOGY LIMITED) 26 May 2020 (2020-05-26) description, paragraphs 0031-0044, and figures 1-11	1-19
Y	CN 206433758 U (JOYETECH EUROPE HOLDING GMBH) 25 August 2017 (2017-08-25) description, paragraphs 0118-0119, figure 5	1-19
Y	CN 111588083 A (SHENZHEN IVPS TECHNOLOGY CO., LTD.) 28 August 2020 (2020-08-28) description paragraphs 0053-0054, figures 3, 6	1-19
Y	CN 212590242 U (SHENZHEN SMOORE TECHNOLOGY LIMITED) 26 February 2021 (2021-02-26) description, paragraphs 0036-0050, and figures 1-7	1-19

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

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"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
10 May 2023	**03 July 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.

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

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2023/081442

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	CN 214962615 U (SHENZHEN FIRST UNION TECHNOLOGY CO., LTD.) 03 December 2021 (2021-12-03) description paragraphs 0028-0029, figures 2, 6	1-19
Y	CN 215347043 U (SHENZHEN FIRST UNION TECHNOLOGY CO., LTD.) 31 December 2021 (2021-12-31) description, paragraphs 0037-0063, and figures 1-5	1-19
A	CN 108539447 A (JIANGSU SOARWHALE GREEN TECHNOLOGY CO., LTD.) 14 September 2018 (2018-09-14) entire document	1-19
A	CN 215347024 U (SHENZHEN FIRST UNION TECHNOLOGY CO., LTD.) 31 December 2021 (2021-12-31) entire document	1-19
A	US 2022015434 A1 (PHILIP MORRIS PRODUCTS S.A.) 20 January 2022 (2022-01-20) entire document	1-19

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

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2023/081442

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

Invention 1: Claims 1-17 and claim 19, which refers to any one of claims 1-17, relate to atomizer with a first hollow and a second hollow provided in a mouthpiece assembly and an electronic atomization device.

Invention 2: Claim 18 and claim 19, which refers to claim 18, relate to an atomizer with a mouthpiece assembly comprising a sealing element and an electronic atomization device.

The same or corresponding technical features of "an atomizer comprising a proximal end and a distal end", "a liquid storage cavity being used for storing a liquid matrix", "an atomization assembly being used for atomizing the liquid matrix to generate an aerosol", "a mouthpiece assembly being provided at the proximal end and being used for a user to suction", and "a tubular element at least partially defining an aerosol output channel, and being used for outputting the aerosol to the mouthpiece assembly" of the two inventions are well known in the art. Therefore, the two inventions do not have a same or corresponding special technical feature that defines a contribution which the inventions make over the prior art, do not have a technical relationship therebetween, do not fall within a single general inventive concept, and thus do not satisfy the requirement of unity of invention and do not comply with PCT Rule 13.1.

1. ☑ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

☑ No protest accompanied the payment of additional search fees.

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2023/081442

Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)			Publication date (day/month/year)
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REFERENCES CITED IN THE DESCRIPTION

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- CN 202210253182 **[0001]**
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