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(54) **ATOMIZER, ATOMIZING TUBE ASSEMBLY FOR ATOMIZER, AND AEROSOL GENERATING DEVICE**

(57) An atomizer (100), an atomizing assembly for an atomizer (100), and an aerosol generating device are provided. The atomizer (100) includes a housing (10), where at least a part of the housing (10) defines a liquid storage cavity (11); and one end of the housing (10) is provided with a suction nozzle (12) having a suction nozzle opening (110) for aerosol output; an atomizing assembly, configured to atomize a liquid substrate to generate an aerosol; and an atomizing tube (30), where at least a part of an inner cavity of the atomizing tube (30) defines a part of an air outlet channel (13), and the air outlet channel (13) is used for guiding the aerosol to the suction nozzle opening (110); and a snap-fit member (50)

is provided on the atomizing tube (30). A fitting member (60) is provided on the suction nozzle (12), and snap-fit connection is formed between the snap-fit member (50) and the fitting member (60). The atomizing tube (30) is formed by stretching, and the snap-fit member (50) is riveted on the atomizing tube (30) after being formed. Therefore, the snap-fit member (50) can optimize the forming of a size and a rounded corner of the clamping end of the snap-fit member (50) based on the requirements of snap-fit connection with the fitting member (60), so that the snap-fit member (50) can be tightly connected with the fitting member (60).

EP 4 430 967 A1

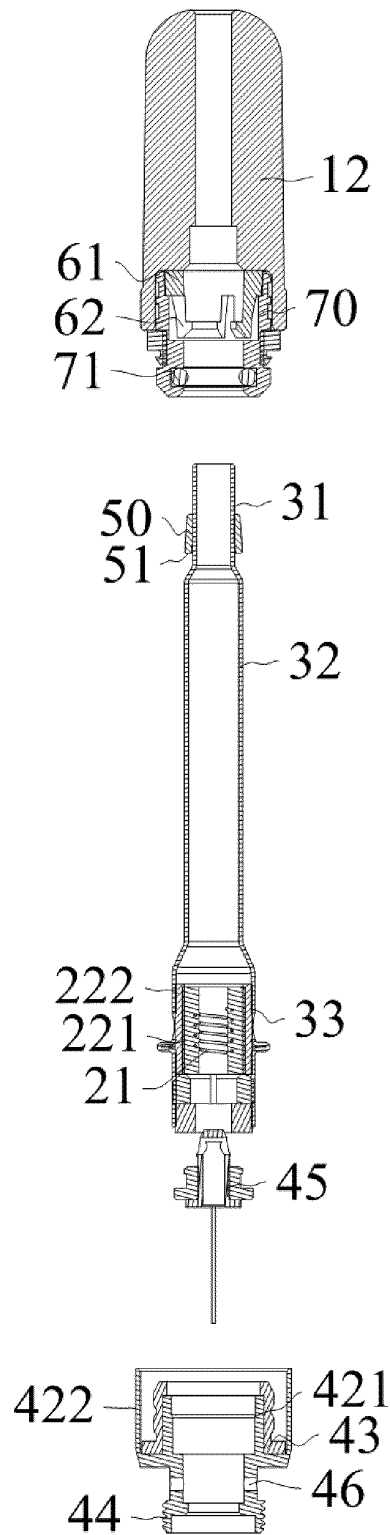


FIG. 4

Description

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to Chinese Patent Application No. 202122904299.1, filed with the China National Intellectual Property Administration on November 25, 2021 and entitled "ATOMIZER, ATOMIZING TUBE ASSEMBLY FOR ATOMIZER, AND AEROSOL GENERATING DEVICE", which is incorporated herein by reference in its entirety.

TECHNICAL FIELD

[0002] Embodiments of this application relate to the field of aerosol generating devices, and in particular, to an atomizer, an atomizing tube assembly for an atomizer, and an aerosol generating device.

BACKGROUND

[0003] An aerosol generating device includes a liquid storage cavity, an atomizing assembly, and a suction nozzle assembly, where a suction nozzle is mounted at one end of the liquid storage cavity, the atomizing assembly is generally mounted inside an atomizing tube, and one end of the atomizing tube is connected to the suction nozzle assembly, so that an inner cavity of the atomizing tube is in fluid communication with an inner cavity of the suction nozzle, and an aerosol can be guided to a suction nozzle opening through the atomizing tube and the suction nozzle. In the prior art, one end of the atomizing tube and the suction nozzle are in snap-fit connection. A snap fit is provided outside the atomizing tube, and the atomizing tube may be integrally formed in a stretching manner. However, if a snap-fit member on an outer wall of the atomizing tube is formed in a stretching manner, a wall thickness of a clamping end of the snap-fit member is small and a rounded corner is easily formed at an edge, which results in loose snap-fit connection between the snap-fit member and the suction nozzle. Therefore, it is difficult to form a snap-fit member that meets the requirements of snap-fit connection in the existing stretching manner.

SUMMARY

[0004] To resolve the problem of difficulty of forming of a snap-fit member on an atomizing tube of an atomizer in the prior art, an embodiment of this application provides an atomizer, including: a housing, where a liquid storage cavity for storing a liquid substrate is formed inside the housing; and one end of the housing is provided with a suction nozzle having a suction nozzle opening for aerosol output; an atomizing assembly, configured to atomize the liquid substrate to generate an aerosol; an atomizing tube, formed by stretching a metal substrate, where the atomizing tube defines at least a part of an air outlet

channel, and the air outlet channel is used for guiding the aerosol to the suction nozzle opening; a closed-ring snap-fit member, where the snap-fit member surrounds the atomizing tube and is fixed on an outer surface of the atomizing tube adjacent to the suction nozzle, the snap-fit member includes a clamping end extending in a radial direction of the atomizing tube, the suction nozzle is provided with a fitting member, and at least a part of the fitting member is configured to pass over the snap-fit member in an axial direction to form snap-fit connection with the clamping end.

[0005] In some embodiments, a protrusion size of the clamping end in the radial direction of the atomizing tube is greater than 0.3 mm.

[0006] In some embodiments, the fitting member has an undercut structure, and the undercut structure abuts against the clamping end of the snap-fit member.

[0007] In some embodiments, the fitting member is provided with a notch.

[0008] In some embodiments, a connecting sleeve is further provided between the suction nozzle and the housing; and the fitting member is arranged in the connecting sleeve.

[0009] In some embodiments, a part of an inner wall of the connecting sleeve abuts on the fitting member; and another part of the inner wall of the connecting sleeve abuts on the atomizing tube.

[0010] In some embodiments, a sealing element is arranged between the connecting sleeve and the atomizing tube, and the sealing element is arranged at one end of the connecting sleeve away from the suction nozzle.

[0011] In some embodiments, the atomizing assembly includes a liquid guide assembly and a heating element, where the liquid guide assembly includes a first liquid guide element and a second liquid guide element, the second liquid guide element is arranged around at least a part of the first liquid guide element, and the heating element is fixed on the first liquid guide element.

[0012] In some embodiments, the hardness of the first liquid guide element is greater than the hardness of the second liquid guide element.

[0013] In some embodiments, a liquid guide capability of the second liquid guide element is greater than a liquid guide capability of the first liquid guide element.

[0014] In some embodiments, the snap-fit member is riveted on an outer surface of the atomizing tube.

[0015] In some embodiments, the atomizing tube includes a first section and a second section connected in sequence, an outer diameter of the second section is greater than an outer diameter of the first section, and the snap-fit member is fixed on an outer surface of the first section.

[0016] In some embodiments, the first section has a uniform outer diameter in an axial extension direction.

[0017] In some embodiments, the atomizing tube further includes a third section that is away from the first section and connected to the second section, an outer diameter of the third section is greater than the outer

diameter of the second section, and the atomizing assembly is accommodated in the third section.

[0018] This application further provides an aerosol generating device, including the foregoing atomizer and a power supply assembly that provides electric drive for the atomizer.

[0019] An embodiment of this application further provides an atomizing tube assembly for an atomizer, including: an atomizing tube, formed by stretching a metal substrate, where the atomizing tube defines at least a part of an air outlet channel, the atomizing tube includes a first section, a second section, and a third section connected in sequence, and outer diameters of the first section, the second section, and the third section increase in sequence; and a closed-ring snap-fit member, where the snap-fit member surrounds the first section of the atomizing tube and is fixed on an outer surface of the first section, the snap-fit member includes a clamping end extending in a radial direction of the atomizing tube, and the clamping end is used for forming snap-fit connection with a suction nozzle in the atomizer.

[0020] Beneficial effects of this application are as follows: A snap-fit member is fixed on an atomizing tube, the snap-fit member includes a clamping end extending in a radial direction of the atomizing tube, a suction nozzle is provided with a fitting member, and at least a part of the fitting member can pass over the snap-fit member in an axial direction to form stable snap-fit connection with the clamping end. The atomizing tube is integrally formed in a stretching manner, and the snap-fit member is a closed-ring structure, which can be fixedly connected to the atomizing tube after being formed separately. Therefore, a size and a rounded corner of the clamping end of the snap-fit member can be optimized in forming based on the requirements for snap-fit connection with the fitting member.

BRIEF DESCRIPTION OF THE DRAWINGS

[0021] One or more embodiments are exemplarily described with reference to the corresponding figures in the accompanying drawings, and the exemplary descriptions are not to be construed as limiting 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 structural diagram of an aerosol generating device according to an embodiment of this application;

FIG. 2 is a cross-sectional view of an atomizer according to an embodiment of this application;

FIG. 3 is an exploded view of an atomizer according to an embodiment of this application;

FIG. 4 is a cross-sectional view of main components of an atomizer after separation according to an embodiment of this application;

FIG. 5 is a three-dimensional diagram of a fitting member according to an embodiment of this application;

FIG. 6 is a diagram of a separation state of an atomizing tube and a snap-fit member according to an embodiment of this application; and

FIG. 7 is a three-dimensional diagram of an atomizing tube and an atomizing assembly after separation according to an embodiment of this application.

DETAILED DESCRIPTION

[0022] For ease of understanding this application, this application is described below in more detail with reference to accompanying drawings and specific implementations.

[0023] It should be noted that all the directional indicators (for example, upper, lower, left, right, front, rear, horizontal, and vertical) in the embodiments of this application are merely used to explain a relative position relationship, a motion status, and the like between components in a specific state (as shown in the accompanying drawings). If the specific state changes, the directional indicator correspondingly changes, the "connection" may be direct connection or indirect connection, and the "arranged", "arranged at", and "set at" may be directly or indirectly arranged.

[0024] In addition, descriptions involving "first" and "second" in this application are merely used for a purpose of description, and shall not be understood as an indication or implication of relative importance or implicit indication of a quantity of indicated technical features.

[0025] Therefore, features defining "first" and "second" may explicitly or implicitly include at least one of the features.

[0026] An aerosol generating device includes an atomizer 100 with an atomizing function. As shown in FIG. 1 and FIG. 2, the atomizer mainly includes a liquid storage cavity 11 and an atomizing assembly 20, where the liquid storage cavity 11 is configured to store a liquid substrate, and the atomizing assembly 20 is configured to heat the liquid substrate to generate an aerosol or a vapor. Based on different types of the liquid substrate stored inside the liquid storage cavity, the aerosol generating device may be classified into two types. When a liquid substrate containing nicotine and/or flavor components is stored inside the liquid storage cavity, the aerosol generating device may be referred to as an electronic cigarette, and the electronic cigarette may be an alternative to a traditional cigarette. When a liquid substrate containing pharmaceutical components is stored inside the liquid storage cavity, the aerosol generating device may be referred to as a medical inhalable device, and a vapor containing pharmaceutical components generated by the aerosol generating device is inhaled by a user and then enters a respiratory system of the user, which can produce a better treatment effect on respiratory system diseases.

[0027] The aerosol generating device may be config-

ured to be electrically driven, so that the aerosol generating device further includes a power supply assembly 200. A battery is arranged inside the power supply assembly, and the power supply assembly is electrically connected to the atomizing assembly inside the atomizer, thereby providing electric drive for the atomizer. The atomizer and the power supply assembly may be configured inside a closed housing, and a battery capacity of the power supply assembly is relatively small. When the liquid substrate inside the liquid storage cavity of the atomizer is consumed, the aerosol generating device may be discarded. The atomizer and the power supply assembly may also be configured as two separate components. Since the atomizer includes the liquid storage cavity for storing the liquid substrate, the atomizer may be configured to be replaced as a consumable. A battery with a larger capacity may be configured inside power supply component and provided with a charging function, so that the power supply assembly may be used continuously. Detachable connection between the atomizer and the power supply assembly may be selected from any one of the prior art, for example, magnetic connection, threaded connection, and snap-fit connection.

[0028] At present, a cylindrical atomizer 100 is used as an example to describe a structure of the atomizer in detail. It should be noted that, the atomizer 100 may be in any other shape in the prior art, which has no impact on the implementation of the solutions of specific embodiments of this application. Referring to FIG. 2 to FIG. 4, the atomizer 100 includes a housing 10, and the housing 10 is generally cylindrical with an opening at both ends. One end of the housing 10 is provided with a suction nozzle 12, and the suction nozzle 12 is generally flat. When the user uses the aerosol generating device, the mouth is mainly in contact with the flat suction nozzle 12. In some embodiments, the housing 10 and the suction nozzle 12 may be integrally formed. In some examples, the housing 10 and the suction nozzle 12 are made of different materials and separately formed. The housing 10 may be made of a transparent material, such as glass, so that the user can observe the consumption of the liquid substrate of the liquid storage cavity inside the housing. Since the suction nozzle 12 needs to be in contact with the mouth of the user, the suction nozzle 12 is made of a plastic material with higher safety performance, such as PPSU (polyphenylsulfone), to improve the safety performance of the user during long-term use.

[0029] A part of an internal space of the housing 10 forms the liquid storage cavity 11, and a part of the internal space of the housing 10 is used for fixedly mounting the atomizing assembly 20. The atomizing assembly 20 includes a heating element 21 and a liquid guide element 22. Some parts of the liquid guide element 22 are in fluid communication with the liquid storage cavity 11, and some parts of the liquid guide element 22 are in contact with the heating element 21, so that the liquid substrate inside the liquid storage cavity 11 can flow to the heating element 21 through the liquid guide element 22 and be

atomized by the heating element 21 to form an aerosol. The heating element 21 may be a spiral heating wire made of at least one of materials such as stainless steel, nickel-chromium alloy, iron-chromium-aluminum alloy, and metal alloy, or a grid-shaped heating sheet. The liquid guide element 22 may be roughly classified into two types based on different preparation materials. A first type of liquid guide element is made of a material with a capillary structure, such as non-woven fabrics or fiber cotton. In addition to being capable of transferring the liquid substrate, this type of liquid guide element can also store an amount of liquid substrate. A second type of liquid guide element is made of a ceramic material with a hard porous structure. This type of liquid guide element has sufficient hardness to provide support for the heating element. In some embodiments, the liquid guide element 22 may use any one of the first type of liquid guide element or the second type of liquid guide element to transfer liquid. In some embodiments, the first type of liquid guide element may be fixedly wound on a periphery of the heating element, and then the first type of liquid guide element with the heating element fixed thereon is fixed in an accommodating cavity formed by the second type of liquid guide element. In some embodiments, the heating element is fixed in the accommodating cavity formed by the second type of liquid guide element, and then the first type of liquid guide element is wound on a periphery of the second type of liquid guide element. By combining the foregoing two types of liquid guide elements, the liquid guide assembly can not only provide support for the heating element, but also meet liquid storage and transfer requirements.

[0030] Referring to FIG. 2 and FIG. 6, the atomizing assembly includes a first liquid guide element 221, and a second liquid guide element 222 arranged at a periphery of the first liquid guide element. The second liquid guide element 222 is configured to transfer the liquid substrate inside the liquid storage cavity 11 to the first liquid guide element 221. The heating element 21 is fixed in the accommodating cavity formed by the first liquid guide element 221. The hardness of the first liquid guide element 221 is greater than the hardness of the second liquid guide element 222, and a liquid transfer and storage capability of the second liquid guide element 222 is greater than that of the first liquid guide element. A length of the second liquid guide element 222 extending in a longitudinal direction of the housing 10 is greater than a length of the first liquid guide element 221 extending in the longitudinal direction of the housing 10, so that the second liquid guide element 222 maintains consistent liquid supply capacity and speed at each position of the first liquid guide element 221, thereby avoiding local dry heating of the heating element 21 due to a relative lack of liquid substrate supply.

[0031] An atomizing tube 30 for fixing the atomizing assembly is also arranged inside the housing 10. The atomizing tube is configured into a plurality of sections. The atomizing tube 30 includes a first section 31, a sec-

ond section 32, and a third section 33 based on different outer diameters. The outer diameters of the third section 33, the second section 32, and the first section 32 decrease in sequence.

[0032] A first boss 311 is formed between the first section 31 and the second section 32, and a second boss 312 is formed between the second section 32 and the third section 33. At least a part of the first section 31 of the atomizing tube 30 extends outside the housing 10, and the second section 32 of the atomizing tube 30 and the third section 33 of the atomizing tube 30 are accommodated inside the housing 10. The atomizing assembly 20 is fixed in an inner cavity of the third section 33, and a top surface of the atomizing assembly 20 abuts on an inner wall surface of the second boss 312. An atomizing cavity 23 is formed by the inner cavity of the third section 33, and an aerosol formed in the atomizing cavity 23 may be guided into a suction nozzle opening 110 of the suction nozzle 12 through an air outlet channel 13. Inner cavities of the second section 32 and the first section 31 are in communication with the atomizing cavity 23, and the inner cavities of the second section 32 and the inner cavity of the first section 31 define the air outlet channel 13. The atomizing tube 30 is provided with an opening at both ends, an external airflow may enter the atomizing cavity 23 through a bottom opening of the atomizing tube 30, and a top opening of the atomizing tube 30 is in communication with the suction nozzle opening 110.

[0033] A base 40 is also arranged inside the housing, and the base is generally in a shape of a plunger. The base 40 includes a cover body portion 41 and a sleeve portion 42 extending from the cover body portion 41 in the longitudinal direction of the housing. The sleeve portion 42 includes an outer sleeve 421 and an inner sleeve 422. The outer sleeve 421 is sleeved on a part of an outer surface of the housing 10, and the inner sleeve 422 is sleeved on a part of an outer surface of the atomizing tube 30. Apart of the housing 10 is accommodated in an annular cavity defined by the outer sleeve 421 and the inner sleeve 422, and a sealing sleeve 43 is further provided between the housing 10 and the inner sleeve 422. Two ends of the sealing sleeve 43 are respectively provided with an outer flange and an inner flange. The outer flange abuts on a bottom surface of the housing 10, and the inner flange abuts on a bottom surface of the inner sleeve 422 of the base 40, to prevent liquid from leaking to the outside from a connection gap between two components. The atomizing assembly 20 is accommodated in the inner cavity of the third section 33 of the atomizing tube 30, and a plurality of layers of sealing rings are further sleeved in the inner cavity of the third section 33 of the atomizing tube 30. The sealing ring on the top layer longitudinally abuts on a bottom surface of the atomizing assembly 20, which further improves sealing performance of the entire atomizer 100.

[0034] When the atomizer 100 is in threaded connection with the power supply assembly 200, one end of the base 40 away from the liquid storage cavity 11 is further

provided with a threaded sleeve 44. The atomizer 100 is in threaded connection with the power supply assembly through the threaded sleeve 44 of the base 40. An electrical connector 45 is further arranged in an inner cavity of the threaded sleeve. One end of the electrical connector 45 is electrically connected to the heating element 21, and the other end of the electrical connector 45 is electrically connected to the power supply assembly 200. An air inlet 46 is further provided on the base 40. The air inlet 46 is in communication with the inner cavity of the third section 33 of the atomizing tube 30, and the external airflow enters the atomizing cavity 23 through the air inlet 46.

[0035] A first flange 35 is further formed on an outer wall of the third section 33 of the atomizing tube 30. The atomizing tube 30 abuts on a top surface of the sealing sleeve 43 in the base 40 in the longitudinal direction of the housing 10 through the first flange 35. The first flange 35 has a width. On one hand, stability of the connection between the atomizing tube 30 and the base 40 can be enhanced. On the other hand, the first flange 35 has a large width. For example, the first flange 35 protrudes in a radial direction of the atomizing tube 30 by no less than 1.0 mm, and may be formed in a stretching manner during molding of the atomizing tube 30.

[0036] A liquid guide hole 34 is further provided on the atomizing tube 30. One side of the liquid guide hole 34 is in communication with the liquid storage cavity 11, and the other side of the liquid guide hole 34 is in communication with the second liquid guide element 222 of the atomizing assembly 20. Since the atomizing assembly 20 is arranged in the inner cavity of the third section 33 of the atomizing tube 30, the liquid guide hole 34 is provided on the third section 33 of the atomizing tube 30. In a preferred embodiment, a plurality of liquid guide holes 34 are evenly spaced in a circumferential direction of the atomizing tube 30, and the liquid guide hole 34 roughly corresponds to a middle section position of the second liquid guide element 222 in the longitudinal direction of the housing 10, so that the liquid substrate inside the liquid storage cavity 11 can be evenly transferred to each position of the second liquid guide element 222 through the liquid guide hole.

[0037] At least a part of the first section 31 of the atomizing tube 30 extends outside the housing 10 and is connected to the suction nozzle 12. The atomizing tube 30 is generally made of a metal material, and therefore is sufficiently rigid to support the atomizing assembly 20. However, the suction nozzle 12 is preferably made of a plastic material. The suction nozzle 12 needs to be in non-detachable connection with the atomizing tube 30 to prevent the user from removing the suction nozzle 12 from one end of the housing 10, which causes the liquid storage cavity 11 to be in an open state. On one hand, if such operation is performed by a minor, a non-atomized liquid substrate may be inhaled by a minor user. On the other hand, if users can easily open the liquid storage cavity 11, some users may add the liquid substrate un-

favorable for healthy use to the inside of the liquid storage cavity, causing a risk of being unfavorable for safe use by users. Therefore, from a perspective of safe and healthy use of the aerosol, a tight connection structure is required between the two assemblies to prevent the suction nozzle 12 from being removed from one end of the housing 10.

[0038] In an embodiment of this application, hard-to-detach snap-fit connection is made between the suction nozzle 12 and the atomizing tube 30. Specifically, a snap-fit member 50 is arranged on a connecting section of the atomizing tube 30 and the suction nozzle 12, that is, the first section 31 of the atomizing tube 30, and a fitting member 60 is arranged on the suction nozzle 12. The atomizing tube 30 and the snap-fit member 50 are made of a metal material, and the fitting member 60 is made of a plastic material having some elasticity. Since the elasticity of the fitting member 60 is greater than the elasticity of the snap-fit member 50, the fitting member 60 is configured to generate elastic deformation in a fitting space between the atomizing tube 30 and the suction nozzle 12. When the user rotates the suction nozzle 12 or pulls the suction nozzle 12 upward along the housing 10, the fitting member 60 can generate deformation, so that it is difficult to generate a large friction force between the fitting member 60 and the snap-fit member 50, and therefore it is difficult to separate the fitting member 60 and the snap-fit member 50. Furthermore, the suction nozzle 12 is connected to one end of the housing 10 through a connecting sleeve 70. The suction nozzle 12 has a hollow inner cavity with an opening at both ends, the opening at one end is smaller to form the suction nozzle opening 110, and the connecting sleeve 70 is accommodated in an inner cavity of the suction nozzle 12 through the opening at the other end. The connecting sleeve 70 is preferably made of a metal material with some rigidity. When the housing 10 is made of glass, an exposed part of the connecting sleeve 70 has a better sense of design. The fitting member 60 is fixed in an inner cavity of the connecting sleeve 70. A part of an inner wall of the connecting sleeve 70 abuts on an outer wall of the fitting member 60, and the other part of the inner wall of the connecting sleeve 70 abuts on an outer wall of the atomizing tube 30. A sealing element is further arranged at a contact section between the connecting sleeve 70 and the atomizing tube 30 to prevent the liquid substrate inside the liquid storage cavity from leaking to the outside through a joint between the two components. Since the connecting sleeve 70 extends longitudinally from the inner cavity of the suction nozzle 12 to the liquid storage cavity 11 of the housing 10, the sealing element is arranged at a fitting position between the connecting sleeve 70 and the atomizing tube 30, which can effectively prevent the liquid substrate from leaking to the outside from a surface of the connecting sleeve 70.

[0039] An upper end of the fitting member 60 is substantially flush with an upper end of the connecting sleeve 70 and longitudinally abuts on an inner wall of the suction

nozzle 12 together with the connecting sleeve 70. Referring to FIG. 2, FIG. 3, and FIG. 5, the fitting member 60 may be roughly divided into two parts, namely a first part 61 and a second part 62. The first part 61 maintains a tight fit with the connecting sleeve 70 and is fixed in the inner cavity of the connecting sleeve 70. A part of a wall surface of the second part 62 is inclined toward the atomizing tube 30 and forms an undercut structure 63, and the undercut structure 63 is used for forming tight circumferentially wrapped snap-fit connection with the snap-fit member 50. In some embodiments, to facilitate deformation of the fitting member 60, a plurality of notches 64 are provided on a wall of the second part 62 of the fitting member 60, and the plurality of notches 64 are provided at intervals in a circumferential direction of the fitting member 60. When the fitting member 60 is subjected to a circumferential rotational force, the fitting member 60 can be circumferentially contracted around the snap-fit member 50 of the atomizing tube 30 without causing a large friction force with the snap-fit member 50 to separate from the snap-fit member 50. The undercut structure 63 of the fitting member 60 is arranged between an abutting surface of the snap-fit member 50 and the first boss 311 of the atomizing tube 30, so that even if the fitting member 60 is subjected to a pulling force in a longitudinal direction, the undercut structure 63 of the fitting member 60 is limited by a double limiting structure of the snap-fit member 50 and the atomizing tube 30, and is difficult to separate from the snap-fit member 50.

[0040] In some embodiments, an abutting surface between the snap-fit member 50 and the fitting member 60 in the longitudinal direction perpendicular to the housing 10 is sufficiently large to form stable interference between the snap-fit member 50 and the fitting member 60. Specifically, the snap-fit member 50 is configured as a closed-ring structure, and the snap-fit member 50 includes a clamping end 51 extending in a radial direction of the atomizing tube 30, and the undercut structure 63 on the fitting member 60 on the suction nozzle 12 passes over the snap-fit member 50 to abut against the clamping end 51 of the snap-fit member 50, so that circumferentially wrapped snap-fit connection is formed between the atomizing tube 30 and the suction nozzle 12, and the connection structure is more stable. To form a sufficiently large contact surface, in some examples, the clamping end 51 of the snap-fit member 50 protrudes in the radial direction of the atomizing tube 30 by a sufficient width and an end portion of the snap-fit member cannot form a large rounded corner. For example, a wall thickness of an abutting end of the snap-fit member 50 is greater than 0.3 mm. In an optional example, a plurality of snap-fit members 50 may be arranged in the longitudinal direction of the housing 10 on the outer wall of the atomizing tube 30 to enhance interference between the two components.

[0041] An embodiment of this application further provides a specific molding manner of the atomizing tube 30. Referring to FIG. 6 and FIG. 7, the atomizing tube is

made of a metal material, for example, preferably 316 stainless steel material. In a preferred example, the atomizing tube 30 is formed by stretching a metal substrate. Compared with a traditional computer number control (CNC) molding manner, a molding cycle is shortened and cost saving. Stretch forming is a common processing method for forming a hollow open component by using a ductile flat metal substrate.

[0042] A stretching process may be used to make a thin-walled stamping part in shapes such as cylinder, rectangle, trapezoid, sphere, and cone. Stretch forming is also referred to as deep stretching forming. During deep stretching forming, a stamping device is mainly used. Some or all flat substrates are pulled into a concave mold cavity by using a pressure of a punch to form a container with a bottom. Processing of a side wall of the container in a direction parallel to a stretching direction is simple stretching processing. In the stretching of a cylindrical stamping part with a flange, the flange and the bottom are planar, a side wall of the cylinder is axially symmetrical, the deformation is evenly distributed on the same circumference, and the blank on the flange generates deep stretching deformation.

[0043] Since the clamping end 51 of the snap-fit member 50 has a wall thickness and a large rounded corner cannot be formed at an edge, it is difficult to form the snap-fit member 50 on the outer wall of the atomizing tube 30 by an integral deep stretching manner. In a preferred embodiment, the snap-fit member 50 is configured as a closed-ring structure, and has a relatively simple overall structure, so that the snap-fit member 50 can be fixed on the outer surface of the atomizing tube adjacent to the suction nozzle 12 after being separately formed. The snap-fit member 50 is made of a metal material. Therefore, the snap-fit member 50 is preferably fixed to the atomizing tube 30 by riveting. After the fixation is completed, the snap-fit member 50 is arranged entirely around the atomizing tube 30.

[0044] A specific molding manner of the atomizing tube 30 is as follows:

First step: Stretch a sheet metal piece to form a tubular part of the atomizing tube 30. Since the atomizing tube includes three sections with different diameters, an atomizing tube with a depth may be formed by repeated stretching.

Second step: Punch the top opening of the atomizing tube 30.

Third step: Form the first flange 35 of the atomizing tube 30 by flanging.

Fourth step: Punch the liquid guide hole 34 at a side of the atomizing tube 30.

Fifth step: Perform grinding, passivation and inspection after ultrasonic cleaning on burrs generated on the atomizing tube 30. Since the atomizing tube needs to pass a food and drug administration (FDA) certification test, and when an inner tube of the atomizing tube is inspected, it needs to be wiped with

a cotton swab on which discoloration and oil stain cannot be generated.

Sixth step: Rivet the formed metal snap-fit member on the atomizing tube. Since the metal snap-fit member is separately formed, the wall thickness of the abutting end of the snap-fit member may be greater than 0.3 mm, for example, may be 0.4 mm, 0.5 mm, 0.6 mm, or 0.7 mm, based on the need to be in a tight fit with the fitting member. A specific size of the wall thickness may be optimized and adjusted based on a size of a contact end of the fitting member. In addition, a transitional rounded corner cannot be formed at an edge of the abutting end of the snap-fit member to avoid reducing the interference between the snap-fit member and the fitting member.

[0045] The atomizing tube assembly formed in the foregoing manner includes the atomizing tube 30 and the snap-fit member 50. The atomizing tube 30 formed in a stretching manner includes the first section 31, the second section 32, and the third section 33 that are connected in sequence, and the outer diameters of the first section 31, the second section 32, and the third section 33 increase in sequence. To facilitate fixing the snap-fit member 50, the first section 31 of the atomizing tube 30 has a uniform outer diameter. The snap-fit member 50 is configured to form a closed-ring structure, and can be riveted on the outer surface of the first section 31 of the atomizing tube 30 after be formed separately. The snap-fit member 50 includes the clamping end 51 extending in the radial direction of the atomizing tube 30. The clamping end 51 can form snap-fit connection with another component in the atomizer 100, and the component includes the suction nozzle 12 or the housing 10.

[0046] It should be noted that, the specification of this application and the accompanying drawings thereof illustrate preferred embodiments of this application, but this application is not limited to the embodiments described in the specification. Further, a person of ordinary skill in the art may make improvements or variations according to the foregoing description, and all the improvements and variations shall fall within the protection scope of the appended claims of this application.

Claims

1. An atomizer, comprising:

a housing, wherein a liquid storage cavity for storing a liquid substrate is formed inside the housing; and one end of the housing is provided with a suction nozzle having a suction nozzle opening for aerosol output;
an atomizing assembly, configured to atomize the liquid substrate to generate an aerosol;
an atomizing tube, formed by stretching a metal substrate, wherein the atomizing tube defines

- at least a part of an air outlet channel, and the air outlet channel is used for guiding the aerosol to the suction nozzle opening; and
a closed-ring snap-fit member, wherein the snap-fit member surrounds the atomizing tube and is fixed on an outer surface of the atomizing tube adjacent to the suction nozzle, the snap-fit member comprises a clamping end extending in a radial direction of the atomizing tube, the suction nozzle is provided with a fitting member, and at least a part of the fitting member is configured to pass over the snap-fit member in an axial direction to form snap-fit connection with the clamping end.
2. The atomizer according to claim 1, wherein a protrusion size of the clamping end in the radial direction of the atomizing tube is greater than 0.3 mm.
 3. The atomizer according to claim 1, wherein the fitting member has an undercut structure, and the undercut structure abuts against the clamping end of the snap-fit member.
 4. The atomizer according to claim 1, wherein the fitting member is provided with a notch.
 5. The atomizer according to claim 1, wherein a connecting sleeve is further provided between the suction nozzle and the housing; and the fitting member is arranged in the connecting sleeve.
 6. The atomizer according to claim 5, wherein a part of an inner wall of the connecting sleeve abuts on the fitting member; and another part of the inner wall of the connecting sleeve abuts on the atomizing tube.
 7. The atomizer according to claim 6, wherein a sealing element is arranged between the connecting sleeve and the atomizing tube, and the sealing element is arranged at one end of the connecting sleeve away from the suction nozzle.
 8. The atomizer according to claim 1, wherein the atomizing assembly comprises a liquid guide assembly and a heating element, the liquid guide assembly comprises a first liquid guide element and a second liquid guide element, the second liquid guide element is arranged around at least a part of the first liquid guide element, and the heating element is fixed on the first liquid guide element.
 9. The atomizer according to claim 8, wherein the hardness of the first liquid guide element is greater than the hardness of the second liquid guide element.
 10. The atomizer according to claim 8, wherein a liquid guide capability of the second liquid guide element is greater than a liquid guide capability of the first liquid guide element.
 11. The atomizer according to claim 1, wherein the snap-fit member is riveted on an outer surface of the atomizing tube.
 12. The atomizer according to claim 1, wherein the atomizing tube comprises a first section and a second section connected in sequence, an outer diameter of the second section is greater than an outer diameter of the first section, and the snap-fit member is fixed on an outer surface of the first section.
 13. The atomizer according to claim 12, wherein the first section has a uniform outer diameter in an axial extension direction.
 14. The atomizer according to claim 12, wherein the atomizing tube further comprises a third section that is away from the first section and connected to the second section, an outer diameter of the third section is greater than the outer diameter of the second section, and the atomizing assembly is accommodated in the third section.
 15. An aerosol generating device, comprising: the atomizer according to any one of claims 1 to 14, and a power supply assembly that provides electric drive for the atomizer.
 16. An atomizing tube assembly for an atomizer, comprising:
an atomizing tube, formed by stretching a metal substrate, wherein the atomizing tube defines at least a part of an air outlet channel, the atomizing tube comprises a first section, a second section, and a third section connected in sequence, and outer diameters of the first section, the second section, and the third section increase in sequence; and
a closed-ring snap-fit member, wherein the snap-fit member surrounds the first section of the atomizing tube and is fixed on an outer surface of the first section, the snap-fit member comprises a clamping end extending in a radial direction of the atomizing tube, and the clamping end is used for forming snap-fit connection with a suction nozzle in the atomizer.

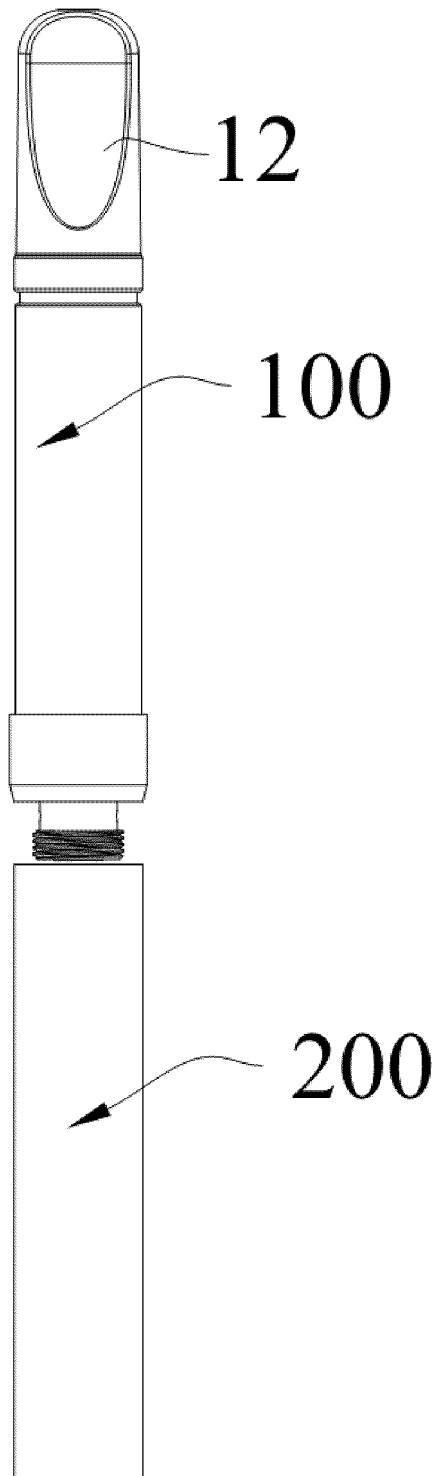


FIG. 1

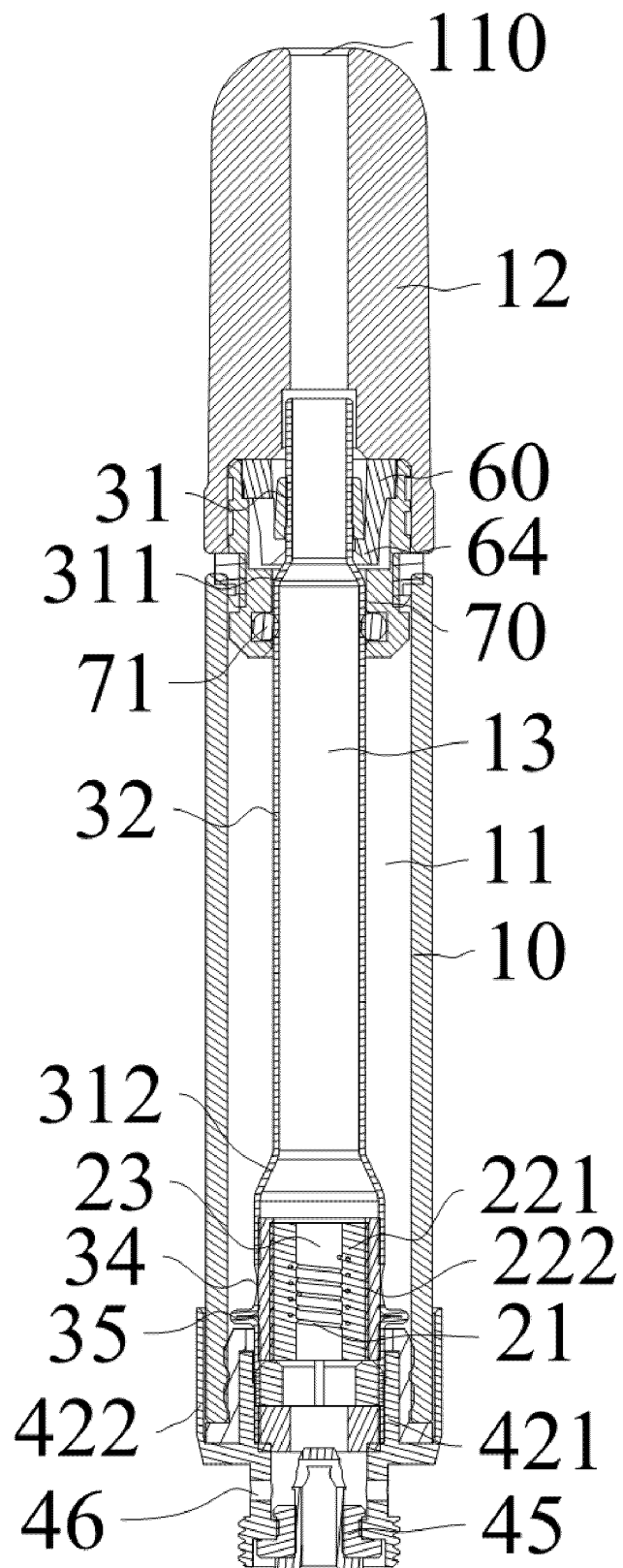


FIG. 2

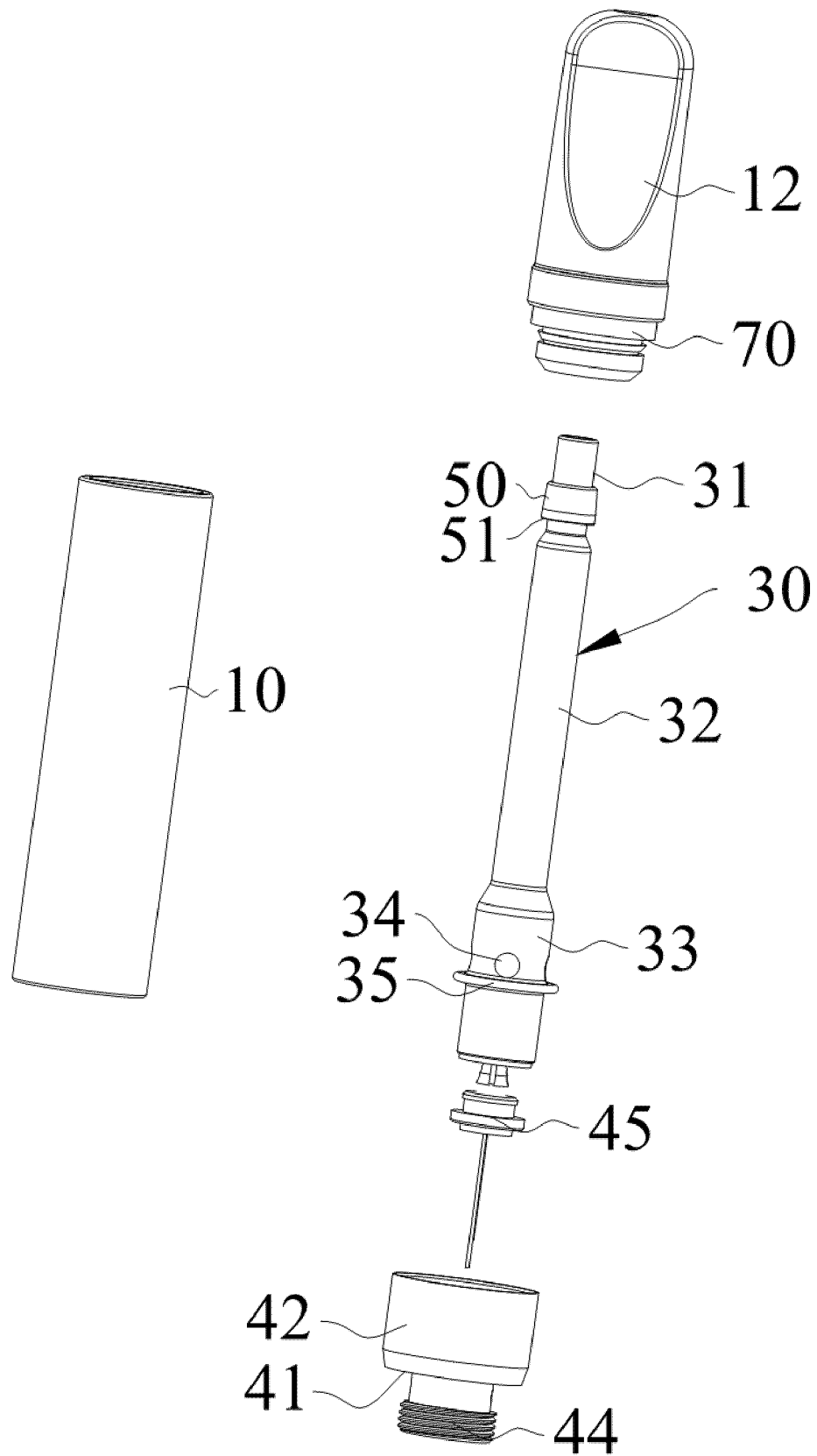


FIG. 3

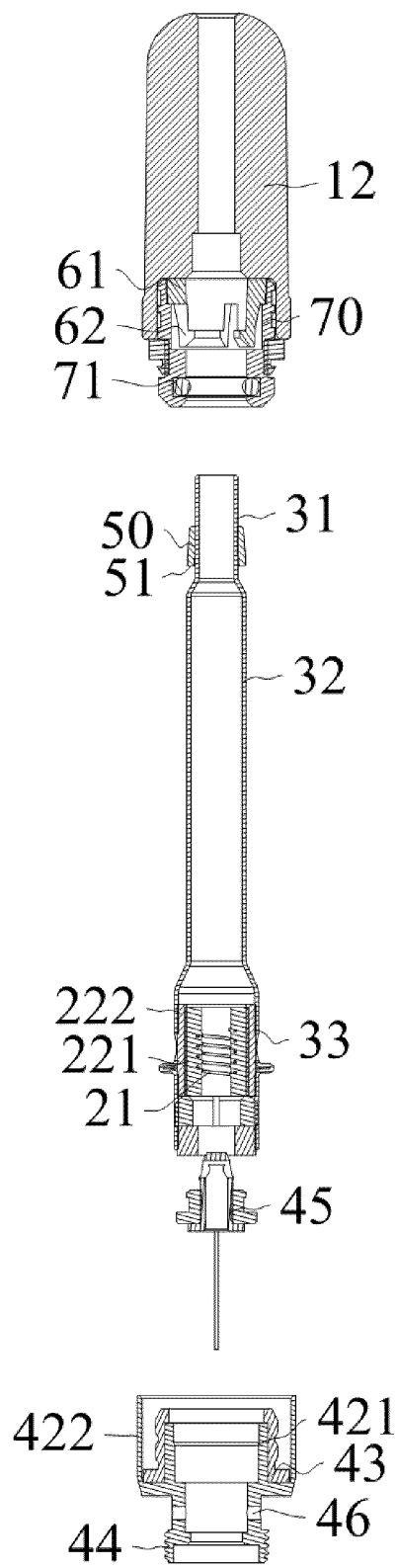


FIG. 4

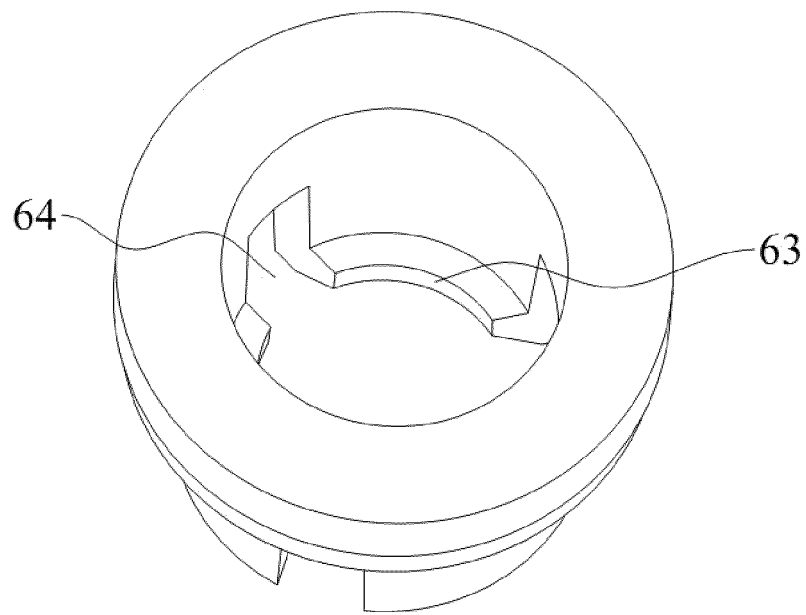


FIG. 5

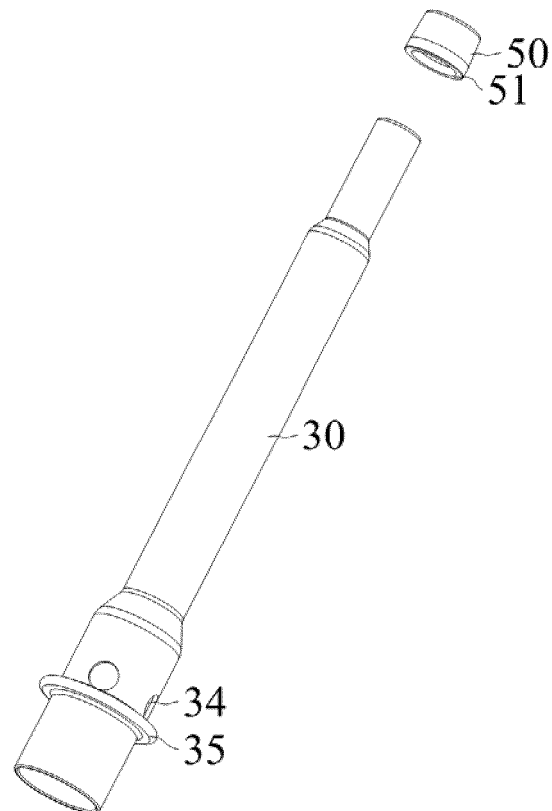


FIG. 6

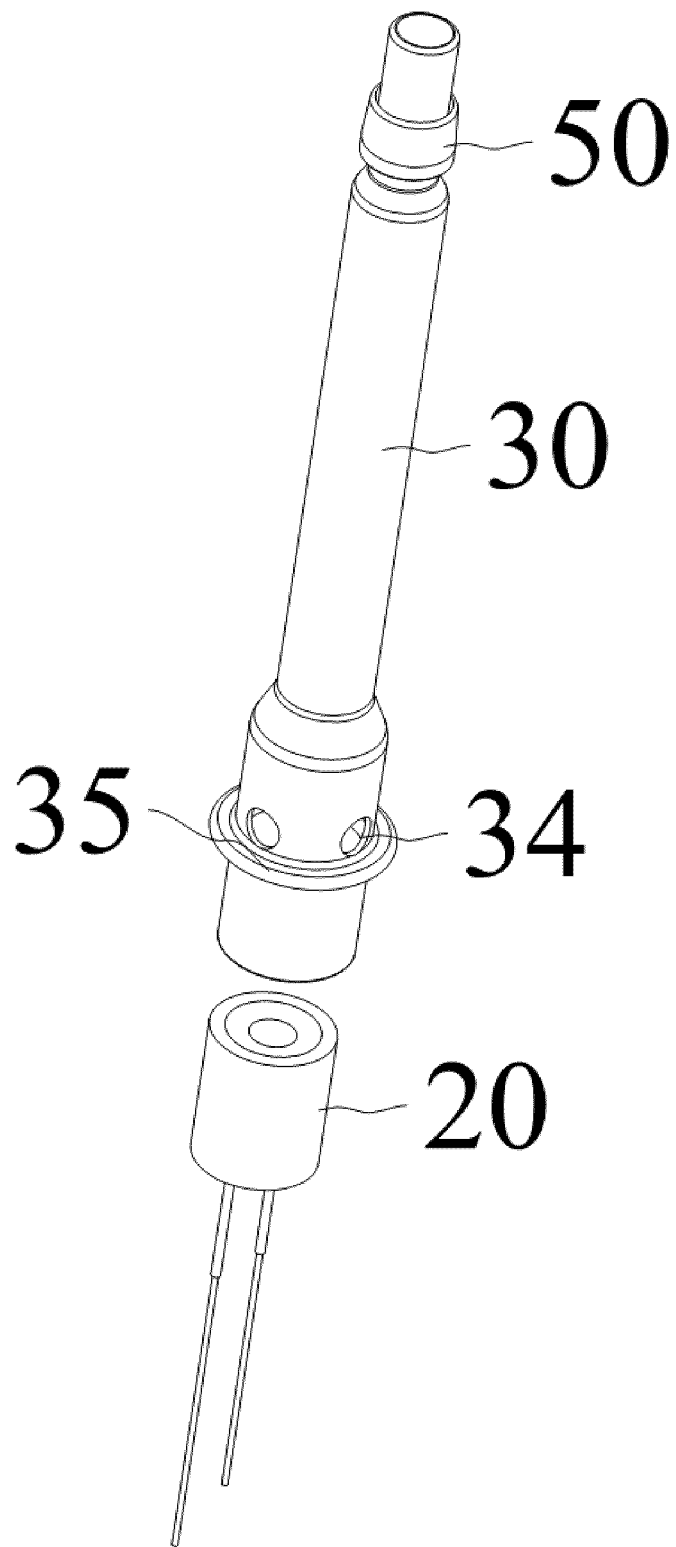


FIG. 7

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2022/132999

A. CLASSIFICATION OF SUBJECT MATTER A24F40/40(2020.01)i;A24F40/49(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) CNTXT: CNABS; WPABS; VEN; WEB OF KNOWLEDGE: 电子烟, 雾化装置, 雾化器, 气溶胶, 加热, 组件, 壳体, 吸嘴, 出气通道, 卡扣; E-cigarette, e-cigar, atomiz+, atomizing+, aerosol, Heating, Assembly, Housing, Mouthpiece, Air Outlet Channel, Snap																		
C. DOCUMENTS CONSIDERED TO BE RELEVANT <table border="1"> <thead> <tr> <th>Category*</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>PX</td> <td>CN 216983564 U (SHENZHEN FIRST UNION TECHNOLOGY CO., LTD.) 19 July 2022 (2022-07-19) claims 1-16</td> <td>1-16</td> </tr> <tr> <td>X</td> <td>CN 210611016 U (SHENZHEN SMOORE TECHNOLOGY LTD.) 26 May 2020 (2020-05-26) description, paragraphs 29-46, and figures 1-11</td> <td>1-16</td> </tr> <tr> <td>X</td> <td>CN 111011930 A (SHENZHEN SMOORE TECHNOLOGY LTD.) 17 April 2020 (2020-04-17) description, paragraphs 1-74, and figures 1-10</td> <td>1-16</td> </tr> <tr> <td>X</td> <td>CN 111011929 A (SHENZHEN SMOORE TECHNOLOGY LTD.) 17 April 2020 (2020-04-17) description, paragraphs 1-74, and figures 1-10</td> <td>1-16</td> </tr> <tr> <td>X</td> <td>CN 202932040 U (HUANG HAIHUA) 15 May 2013 (2013-05-15) description, paragraphs 1-17, and figures 1-2</td> <td>1-16</td> </tr> </tbody> </table>	Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	PX	CN 216983564 U (SHENZHEN FIRST UNION TECHNOLOGY CO., LTD.) 19 July 2022 (2022-07-19) claims 1-16	1-16	X	CN 210611016 U (SHENZHEN SMOORE TECHNOLOGY LTD.) 26 May 2020 (2020-05-26) description, paragraphs 29-46, and figures 1-11	1-16	X	CN 111011930 A (SHENZHEN SMOORE TECHNOLOGY LTD.) 17 April 2020 (2020-04-17) description, paragraphs 1-74, and figures 1-10	1-16	X	CN 111011929 A (SHENZHEN SMOORE TECHNOLOGY LTD.) 17 April 2020 (2020-04-17) description, paragraphs 1-74, and figures 1-10	1-16	X	CN 202932040 U (HUANG HAIHUA) 15 May 2013 (2013-05-15) description, paragraphs 1-17, and figures 1-2	1-16
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Date of the actual completion of the international search 14 February 2023	Date of mailing of the international search report 17 February 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 Facsimile No. (86-10)62019451	Authorized officer Telephone No.																	

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2022/132999

C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	CN 204292196 U (HUIZHOU KIMREE TECHNOLOGY CO., LTD.) 29 April 2015 (2015-04-29) entire document	1-16
A	EP 3153037 A1 (O-NET AUTOMATION TECHNOLOGY SHENZHEN LTD.) 12 April 2017 (2017-04-12) entire document	1-16
A	EP 3831229 A1 (CHINA TOBACCO HUNAN INDUSTRIAL CO., LTD.) 09 June 2021 (2021-06-09) entire document	1-16

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Information on patent family members

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		US 10849362 B2	01 December 2020
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