(19) Europäisches Patentamt
European Patent Office
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(11) **EP 4 316 278 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
07.02.2024 Bulletin 2024/06

(21) Application number: **23186464.6**

(22) Date of filing: **19.07.2023**

(51) International Patent Classification (IPC):
A24F 40/20 *(2020.01)* ***A24F 40/46*** *(2020.01)*
H05B 3/46 *(2006.01)*

(52) Cooperative Patent Classification (CPC):
A24F 40/46; A24F 40/20; A24F 40/465; H05B 3/46

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

(30) Priority: **02.08.2022 CN 202210923967**

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(54) HEATING STRUCTURE AND ELECTRONIC ATOMIZATION DEVICE

(57) A heating structure and an electronic atomization device are provided. The heating structure includes a heating tube having two openings at both axial ends thereof and a base fixed to one axial end of the heating tube and covering the opening at the axial end of the heating tube. At least one of the heating tube and the base is provided with a heat insulation hole.

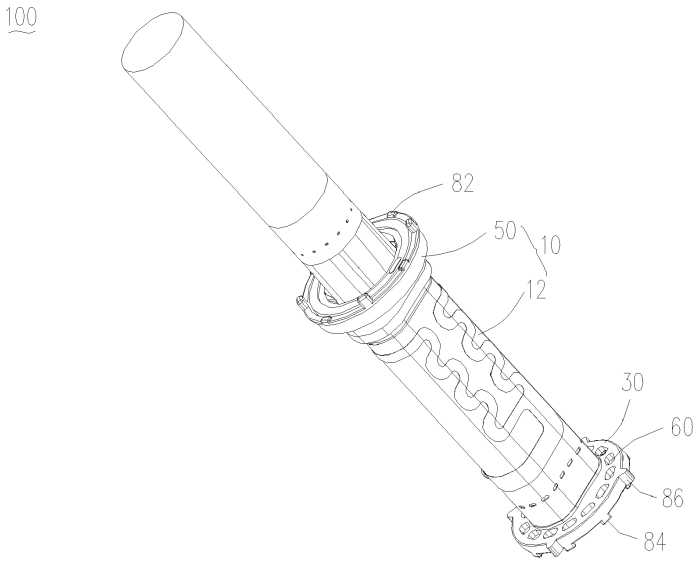

FIG. 1

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Description

TECHNICAL FIELD

[0001] The present invention relates to the field of atomization, in particular to a heating structure and an electronic atomization device.

BACKGROUND

[0002] Aerosol is a colloidal dispersion formed by small solid or liquid masses dispersed and suspended in a gaseous medium. Since the aerosol can be absorbed by the human body through the respiratory system, it provides users with a new alternative absorption method, such as an electronic atomization device that can heat an aerosol generating substrate of herbs or creams to generate aerosol, which is used in different fields to deliver inhalable aerosols to users, thus replacing conventional product forms and absorption methods.

[0003] Generally, the electronic atomization device atomizes the aerosol generating substrate that is a substrate material capable of generating aerosol when atomized. In the related art, the heat generated by the heating tube that heats the aerosol generating substrate is easily transferred to a housing to be dissipated, so that the electronic atomization device continuously transfers the heat to an outside during an atomization heating process, an energy consumption of a product is increased, and a standby time of the product is shorten.

SUMMARY

[0004] Accordingly, it is necessary to provide a heating structure and an electronic atomization device to address a problem of high energy consumption of conventional electronic atomization devices.

[0005] A heating structure includes a heating tube having two openings at both axial ends thereof and a base fixed to one axial end of the heating tube and covering the opening at the axial end of the heating tube. At least one of the heating tube and the base is provided with a heat insulation hole. In the foregoing heating structure, the base is fixed to one axial end of the heating tube and covers an opening at the axial end of the heating tube, so that the base is fixed to one axial end of the heating tube, and the base and the heating tube cooperatively form an accommodating cavity configured to accommodate an aerosol generating substrate. The heat insulation hole is provided on at least one of the heating tube and the base, so as to interrupt a heat transferring path from the heating tube to an outside through the heat insulation hole, thereby blocking or slowing down the heat transferred from the heating tube to the outside. The heat is prevented from being transferred to the outside, which can reduce the heat loss of the heating tube, and reduce the energy consumption of the electronic atomization device to save power, and a standby time of the electronic atomization device is prolonged.

[0006] In one of the embodiments, the heating tube includes a heating tube body and a guiding member, the guiding member is sleeved on one axial end of the heating tube body and is provided with a guiding hole in communication with the interior of the heating tube body, the heat insulation hole is provided on at least one of the heating tube body, the guiding member, and the base.

[0007] In one of the embodiments, the heat insulation hole is provided on the heating tube body.

[0008] In one of the embodiments, a plurality of heat insulation holes are spaced apart along the circumferential direction of the heating tube body.

[0009] In one of the embodiments, the heat insulation hole is provided on the base.

[0010] In one of the embodiments, the base includes a first portion and a second portion surrounding the first portion, the first portion covers the opening at the axial end of the heating tube body, and the second portion protrudes radially from the heating tube body, and the heat insulation hole is provided on the second portion.

[0011] In one of the embodiments, a plurality of heat insulation holes spaced apart around the first portion are provided on the second portion.

[0012] In one of the embodiments, the heat insulation hole is provided on the guiding member.

[0013] In one of the embodiments, the guiding member includes a guiding ring and a protruding ring, the guiding ring is sleeved on the other axial end of the heating tube body, the guiding hole is provided on the guiding ring, the protruding ring surrounds the guiding ring, and the heat insulation hole is provided on the protruding ring.

[0014] In one of the embodiments, at least one of the guiding member and the base is provided with a support protrusion, the support protrusion protrudes outward along the axial direction of the heating tube body or along the radial direction of the heating tube body.

[0015] In one of the embodiments, the support protrusion includes a first support protrusion provided on the guiding member, and the first support protrusion protrudes from the guiding member in the direction away from the base along the axial direction of the heating tube body.

[0016] In one of the embodiments, the support protrusion includes a second support protrusion provided on the base, and the second support protrusion protrudes from the base in the direction away from the guiding member along the axial direction of the heating tube body.

[0017] In one of the embodiments, the support protrusion includes a third support protrusion provided on the base, and the third support protrusion protrudes from the base along the radial direction of the heating tube body.

[0018] An electronic atomization device includes a housing and the aforementioned heating structure, the heating structure is received in the housing.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019]

FIG. 1 is a perspective view of a heating structure according to an embodiment of the present invention.

FIG. 2 is a perspective view of the heating structure shown in FIG. 1 viewed from another aspect.

FIG. 3 is a cross-sectional view of the heating structure shown in FIG. 1.

FIG. 4 is a perspective view of a heating tube body shown in FIG. 1.

FIG. 5 is a perspective view of a base shown in FIG. 1.

FIG. 6 is a perspective view of a guiding member shown in FIG. 1.

[0020] Description of reference numerals: 100, heating structure; 10, heating tube; 12, heating tube body; 30, base; 32, first portion; 34, second portion; 50, guiding member; 51, guiding hole; 52, guiding ring; 54, protruding ring; 60, heat insulation hole; 80, support protrusion; 82, first support protrusion; 84, second support protrusion; 86, third support protrusion.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0021] In order to make the above objects, features and advantages of the present invention more obvious and easier to understand, the specific embodiments of the present application are described in detail below in combination with the accompanying drawings. Many specific details are set forth in the following description to facilitate a full understanding of the invention. However, the present application can be implemented in many ways different from those described herein, and those skilled in the art can make similar improvements without violating the connotation of the invention. Therefore, the invention is not limited by the specific embodiments disclosed below. In the description of the present application, it should be understood that the terms "center", "longitudinal", "transverse", "length", "width", "thickness", "upper", "lower", "front", "rear", "left", "right", "vertical", "horizontal", "top", "bottom", "inner", "outer", "clockwise", "counterclockwise", "axial", "radial", "circumferential direction" are based on the azimuth or position relationship shown in the attached drawings, which is only for the convenience of describing the present application and simplifying the description, rather than indicating or implying that the device or element must have a specific azimuth, be constructed and operated in a specific azimuth, so it cannot be understood as a limitation of the present application.

[0022] In addition, the terms "first" and "second" are only used for descriptive purposes and cannot be understood as indicating or implying relative importance or implicitly indicating the number of indicated technical features. Thus, the features defined with "first" and "second" may explicitly or implicitly include at least one of the features. In the description of the present application, "multiple" means at least two, such as two, three, etc., unless otherwise expressly and specifically defined.

[0023] In the present invention, unless otherwise expressly specified and limited, the terms "mount", "connect", "contact", "fix" and other terms should be understood in a broad sense, for example, they can be fixed connections, removable connections, or integrated. It can be mechanical connection or electrical connection. It can be directly connected or indirectly connected through an intermediate medium. It can be the connection within two elements or the interaction relationship between two elements, unless otherwise expressly limited. For those skilled in the art, the specific meaning of the above terms in the present application can be understood according to the specific situation.

[0024] In the present invention, unless otherwise expressly specified and limited, the first feature "above" or "below" the second feature may be in direct contact with the first and second features, or the first and second features may be in indirect contact through an intermediate medium. Moreover, the first feature is "above" the second feature, but the first feature is directly above or diagonally above the second feature, or it only means that the horizontal height of the first feature is higher than the second feature. The first feature is "below" of the second feature, which can mean that the first feature is directly below or obliquely below the second feature, or simply that the horizontal height of the first feature is less than that of the second feature.

[0025] It should be noted that when an element is called "fixed to" or "provided on" another element, it can be directly on another element or there can be a centered element. When an element is considered to be "connected" to another element, it can be directly connected to another element or there may be intermediate elements at the same time. The terms "vertical", "horizontal", "up", "down", "left", "right" and similar expressions used herein are for the purpose of illustration only and do not represent the only embodiment.

[0026] Referring to FIG. 1 to FIG. 3, a heating structure 100 is provided according to an embodiment of the present invention. The heating structure 100 includes a heating tube 10 and a base 30. The heating tube 10 is of a hollow structure having two openings at both axial ends thereof. The base 30 is fixed to one axial end of the heating tube 10 and covers the opening at the axial end of the heating tube 10, so that the base 30 is fixed to the axial end of the heating tube 10. The base 30 and the heating tube 10 cooperatively form an accommodating cavity configured to accommodate an aerosol generating substrate.

[0027] When the heating structure 100 is in use, the heating tube 10 generates heat to heat and atomize the aerosol generating substrate inside the heating tube 10. In an embodiment, the heating tube 10 is a resistance-

type heating tube. For example, the heating tube 10 is provided with a resistance wire, and heat generated by the resistance wire is transferred to the heating tube 10, so that the heating tube 10 can transfer heat to the aerosol generating substrate. In another embodiment, the heating tube 10 generates heat through a principle of electromagnetic induction. For example, an electromagnetic induction coil is sleeved on the heating tube 10, so that the heating tube 10 can generate heat under an action of the electromagnetic induction coil. The manner in which the heating tube 10 generates heat is not limited hereto.

[0028] Further, at least one of the heating tube 10 and the base 30 is provided with a heat insulation hole 60, which can interrupt a heat transferring path from the heating tube 10 to an outside, thereby blocking or slowing down the heat transferred from the heating tube 10 to the outside. The heat is prevented from being transferred to the outside, which can reduce the heat loss of the heating tube 10, and reduce the energy consumption of the electronic atomization device to save power, and a standby time of the electronic atomization device is prolonged.

[0029] Further, a shape of the heat insulation hole 60 is circular, square or racetrack, which is not limited herein.

[0030] In some embodiments, the heating tube 10 includes a heating tube body 12 and a guiding member 50. The guiding member 50 is sleeved on the other axial end of the heating tube body 12, and is provided with a guiding hole 51 in communication with the interior of the heating tube body 12, so as to allow the aerosol generating substrate to be smoothly inserted into the accommodating cavity through the guiding hole 51. Optionally, the guiding member 50 and the heating tube body 12 may be formed separately or integrally. The guiding member 50 may be a guiding tube or other guiding structure, which is not limited herein. In some other embodiments, the guiding member 50 can be omitted.

[0031] Referring to FIG. 4, in some embodiments, the heat insulation hole 60 is provided on the heating tube body 12, so as to interrupt a heat transferring path from the heating tube body 12 to the outside through the heat insulation hole 60, thereby blocking or slowing down the heat transferred from the heating tube body 12 to the outside. The heat is prevented from being transferred to the outside, which can reduce the energy consumption of the electronic atomization device, and the standby time of the electronic atomization device is prolonged. Further, a plurality of heat insulation holes 60 are spaced apart along the circumferential direction of the heating tube body 12, so as to block heat from all circumferential directions of the heating tube body 12 through the plurality of heat insulation holes 60, and the heat is uniformly blocked from being transferred to the outside along the circumferential direction of the heating tube body 12. Optionally, a distance between the heat insulation hole 60 and a bottom end of the heating tube body 12 is about 1mm to 10mm, and a width of a gap between adjacent two heat insulation holes 60 is about 0.4mm to 3mm. In some embodiment, the heat insulation holes 60 are through holes extending radially along heating tube body 12. In an alternative embodiment, the heat insulation hole 60 may be a blind hole recessed radially along the heating tube body 12. A depth of the heat insulation hole 60 is not limited herein.

[0032] Referring to FIGS. 1 to 3 and FIG. 5, in some embodiments, the heat insulation hole 60 is provided on the base 30, so as to interrupt the heat transferring path from the heating tube 10 to the outside through the heat insulation hole 60, thereby blocking or slowing down the heat transferred from the heating tube 10 to the outside. The heat is prevented from being transferred to the outside, which can reduce the energy consumption of the electronic atomization device, and the standby time of the electronic atomization device is prolonged.

[0033] Further, the base 30 includes a first portion 32 and a second portion 34 surrounding the first portion 32. The first portion 32 covers the opening at one axial end of the heating tube body 12. The second portion 34 protrudes radially from the heating tube body 12, and the heat insulation hole 60 is provided on the second portion 34. In this way, the first portion 32 covers the opening at one end of the heating tube body 12, so that the first portion 32 and the heating tube body 12 cooperatively form the accommodating cavity configured to accommodate the aerosol generating substrate. Optionally, the first portion 32 is received in the opening at the axial end of the heating tube body 12, and the first portion 32 is fixed to the heating tube body 12 while covering the opening.

[0034] In addition, the second portion 34 is provided around a periphery of the first portion 32, and the heat insulation hole 60 is provided on the second portion 34, so that other components, such as the electromagnetic induction coil, can be fixed an outer side of the heating tube body 12 through the second portion 34. The heat insulation hole 60 provided on the second portion 34 can interrupt the heat transferring path from the heating tube 10 to the outside through the base 30, so as to prevent the heat from diffusing to the outside.

[0035] Specifically, a plurality of heat insulation holes 60 spaced around the first portion 32 are provided on the second portion 34. The heat is blocked from all circumferential directions of the base 30 through the plurality of heat insulation holes 60, and the heat is uniformly blocked from being transferred to the outside in the circumferential direction of the base 30. Optionally, a distance between the heat insulation hole 60 and an outer edge of the second portion 34 is about 0.5mm to 5mm, and the width of the gap between adjacent two heat insulation holes 60 is about 0.4mm to 3mm. In some embodiment, the heat insulation holes 60 are through holes extending through the base 30 in the axial direction. In an alternative embodiment, the heat insulation hole 60 may be a blind hole recessed radially along the base 30. A depth of the heat insulation hole 60 is not limited herein.

[0036] Referring to FIGS. 1 to 3 and FIG. 5, in some

embodiments, the heat insulation hole 60 is provided on the guiding member 50, so as to interrupt the heat transferring path from the heating tube body 12 to the outside through the heat insulation hole 60, thereby blocking or slowing down the heat transferred from the heating tube body 12 to the outside. The heat is prevented from being transferred to the outside, which can reduce the energy consumption of the electronic atomization device, and the standby time of the electronic atomization device is prolonged. Further, the guiding member 50 includes a guiding ring 52 and a protruding ring 54. The guiding ring 52 is sleeved on one axial end of the heating tube body 12 and is provided with a guiding hole 51. The protruding ring 54 surrounds the guiding ring 52, and the heat insulation hole 60 is provided on the protruding ring 54. In this way, other components can be fixed an outer side the heating tube body 12 by the protruding ring 54, for example, the electromagnetic induction coil is fixed between the protruding ring 54 and the second portion 34. In addition, the heat insulation hole 60 provided on the protruding ring 54 can block the heat transferring path from the heating tube 10 to the outside through the guiding member 50, so as to prevent the heat from diffusing to the outside.

[0037] Referring to FIGS. 1, 5 and 6, in some embodiments, at least one of the guiding member 50 and the base 30 is provided with a support protrusion 80 protruding outward along the axial direction of the heating tube body 12 or along the radial direction of the heating tube body 12. The support protrusion 80 is an outermost support point of the entire heating structure 100. When the heating structure 100 is mounted in a housing, the heating structure 100 is in point contact with the housing through the support protrusion 80. A contact area between the heating structure 100 and the housing is reduced, the heat transferring path from the heating tube 10 to the housing is further reduced, and the heat is further prevented from diffusing to the outside.

[0038] Referring to FIGS. 1 and 6, the support protrusion 80 further includes a first support protrusion 82 provided on the guiding member 50. The first support protrusion 82 protrudes from the guiding member 50 in the direction away from the base 30 along the axial direction of the heating tube body 12. In other words, the first support protrusion 82 is provided on a top of the guiding member 50, so that the guiding member 50 and the housing are in point contact with each other in the axial direction of the heating tube body 12 through the first support protrusion 82. A top of the heating structure 100 is thermally isolated in the axial direction of the heating tube body 12, thereby further preventing heat from being transferred axially to the housing along the top of the heating tube body 12, and the heat diffusion is reduced.

[0039] Referring to FIG. 1 and FIG. 5, further, the support protrusion 80 includes a second support protrusion 84 provided on the base 30. The second support protrusion 84 protrudes from the base 30 in the direction away from the guiding member 50 along the axial direction of the heating tube body 12. In other words, the second support protrusion 84 is provided at a bottom of the base 30, so that the base 30 and the housing are in point contact with each other in the axial direction of the heating tube body 12 through the second support protrusion 84. A bottom of the heating structure 100 is thermally isolated in the axial direction of the heating tube body 12, thereby further preventing heat from being transferred axially to the housing along the bottom of the heating tube body 12, and the heat diffusion is reduced.

[0040] Specifically, the support protrusion 80 includes a third support protrusion 86 provided on the base 30, the third support protrusion 86 protrudes from the base 30 in the radial direction of the heating tube body 12. In other words, the third support protrusion 86 is provided protruding from an outer peripheral surface of the base 30, so that the base 30 and the housing are in point contact with each other in the radial direction of the heating tube body 12 through the third support protrusion 86. The heating structure 100 is thermally isolated in the radial direction of the heating tube body 12, thereby further preventing heat from being transferred to the housing along the radial direction of the heating tube body 12, and the heat diffusion is reduced.

[0041] In this embodiment, the support protrusions 80 include the first support protrusion 82, the second support protrusion 84, and the third support protrusion 86. The first support protrusion 82 and the second support protrusion 84 support the heating structure 100 at points at opposite ends of the heating tube body 12 in the axial direction, and the third support protrusion 86 supports the heating structure 100 at points along the radial direction of the heating tube body 12, so that an upper end surface, a lower end surface, and an outer peripheral surface of the entire heating structure 100 are in point contact with the housing. A contact area between each outer peripheral surface of the heating structure 100 and the housing is reduced, which effectively blocks or slows down the transferring of heat to the housing.

[0042] In an embodiment of the present invention, an electronic atomizer is provided, which includes a housing and the heating structure 100 in any one of the aforementioned embodiments. The heating structure 100 is sleeved in the housing, so as to protect the heating structure 100 through the housing. The heating structure 100 includes the heating tube 10 and the base 30. The heating tube 10 is configured as a hollow structure with the two openings at both axial ends. The base 30 is fixed to one axial end of the heating tube 10 and covers the opening at the axial end of the heating tube 10, so that the base 30 is fixed on the axial end of the heating tube 10. The base 30 and the heating tube 10 cooperatively form the accommodating cavity configured to accommodate the aerosol generating substrate.

[0043] When the heating structure 100 is in use, the heating tube 10 generates heat to heat and atomize the aerosol generating substrate inside the heating tube 10. In an embodiment, the heating tube 10 is a resistance-

type heating tube. For example, the heating tube 10 is provided with a resistance wire, and heat generated by the resistance wire is transferred to the heating tube 10, so that the heating tube 10 transfers heat to the aerosol generating substrate. In another embodiment, the heating tube 10 generates heat through electromagnetic induction. For example, an electromagnetic induction coil is sleeved on the heating tube 10, so that the heating tube 10 generates heat under an action of the electromagnetic induction coil. The way in which the heating tube 10 generates heat is not limited herein.

[0044] At least one of the heating tube 10 and the base 30 is provided with a heat insulation hole 60, so as to interrupt a heat transferring path from the heating tube 10 to an outside through the heat insulation hole 60, thereby blocking or slowing down the heat transferred from the heating tube 10 to the outside. The heat is prevented from being transferred to the outside, which can reduce the heat loss of the heating tube 10, and reduce the energy consumption of the electronic atomization device to save power, and the standby time of the electronic atomization device is prolonged.

Claims

1. A heating structure (100), comprising:

   a heating tube (10) having two openings at both axial ends thereof; and
   a base (30) fixed to one axial end of the heating tube (10) and covering the opening at the axial end of the heating tube (10);
   wherein at least one of the heating tube (10) and the base (30) is provided with a heat insulation hole (60).

2. The heating structure (100) according to claim 1, wherein the heating tube (10) comprises a heating tube body (12) and a guiding member (50), the guiding member (50) is sleeved on one axial end of the heating tube body (12) and is provided with a guiding hole (51) in communication with the interior of the heating tube body (12), wherein the heat insulation hole (60) is provided on at least one of the heating tube body (12), the guiding member (50), and the base (30).

3. The heating structure (100) according to claim 2, wherein the heat insulation hole (60) is provided on the heating tube body (12).

4. The heating structure (100) according to claim 3, wherein a plurality of heat insulation holes (60) are spaced apart along the circumferential direction of the heating tube body (12).

5. The heating structure (100) according to claim 2, wherein the heat insulation hole (60) is provided on the base (30).

6. The heating structure (100) according to claim 5, wherein the base (30) comprises a first portion (32) and a second portion (34) surrounding the first portion (32), the first portion (32) covers the opening at the axial end of the heating tube body (12), the second portion (34) protrudes radially from the heating tube body (12), and the heat insulation hole (60) is provided on the second portion (34).

7. The heating structure (100) according to claim 6, wherein a plurality of heat insulation holes (60) spaced apart around the first portion (32) are provided on the second portion (34).

8. The heating structure (100) according to claim 2, wherein the heat insulation hole (60) is provided on the guiding member (50).

9. The heating structure (100) according to claim 8, wherein the guiding member (50) comprises a guiding ring (52) and a protruding ring (54), the guiding ring (52) is sleeved on one axial end of the heating tube body (12), the guiding hole (51) is provided on the guiding ring (52), the protruding ring (54) surrounds the guiding ring (52), and the heat insulation hole (60) is provided on the protruding ring (54).

10. The heating structure (100) according to any one of claim 2 to claim 9, wherein at least one of the guiding member (50) and the base (30) is provided with a support protrusion (80), and the support protrusion (80) protrudes outward along the axial direction of the heating tube body (12) or along the radial direction of the heating tube body (12).

11. The heating structure (100) according to claim 10, wherein the support protrusion (80) comprises a first support protrusion (82) provided on the guiding member (50), and the first support protrusion (82) protrudes from the guiding member (50) in the direction away from the base (30) along the axial direction of the heating tube body (12).

12. The heating structure (100) according to claim 10, wherein the support protrusion (80) comprises a second support protrusion (84) provided on the base (30), and the second support protrusion (84) protrudes from the base (30) in the direction away from the guiding member (50) along the axial direction of the heating tube body (12).

13. The heating structure (100) according to claim 10, wherein the support protrusion (80) comprises a third support protrusion (86) provided on the base (30), and the third support protrusion (86) protrudes from

the base (30) along the radial direction of the heating tube body (12).

14. An electronic atomization device, comprising a housing and the heating structure (100) according to any one of claims 1 to 13, wherein the heating structure (100) is received in the housing.

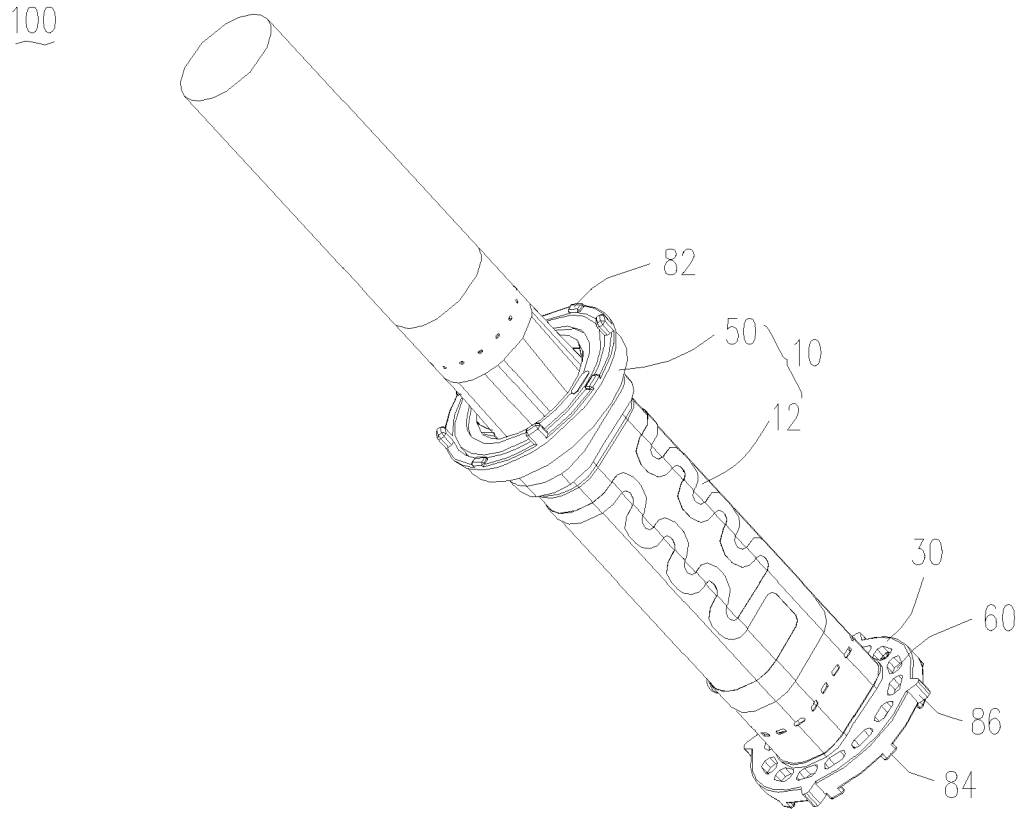

FIG. 1

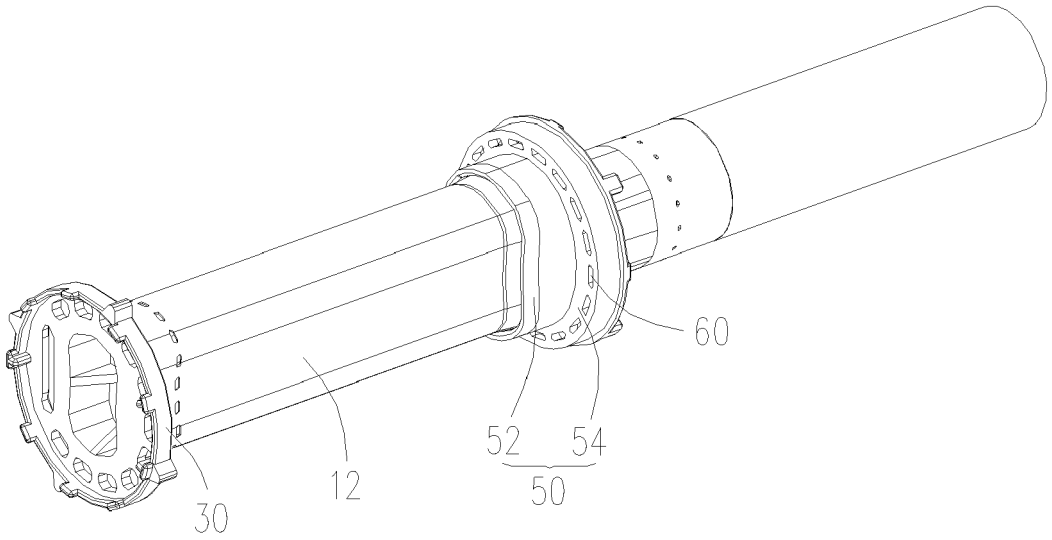

FIG. 2

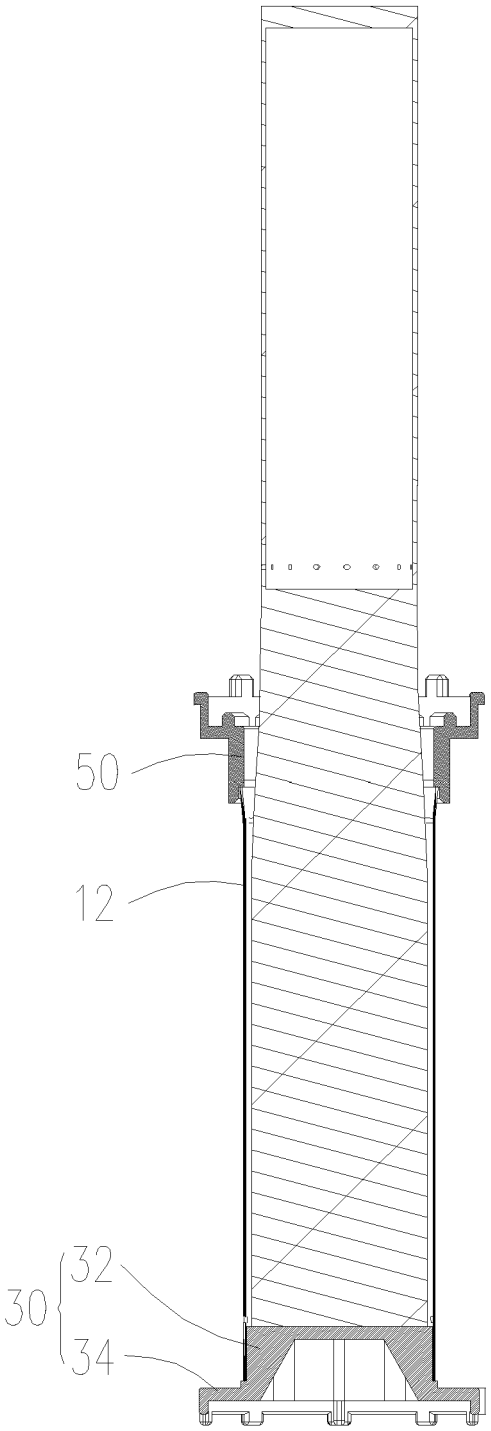

FIG. 3

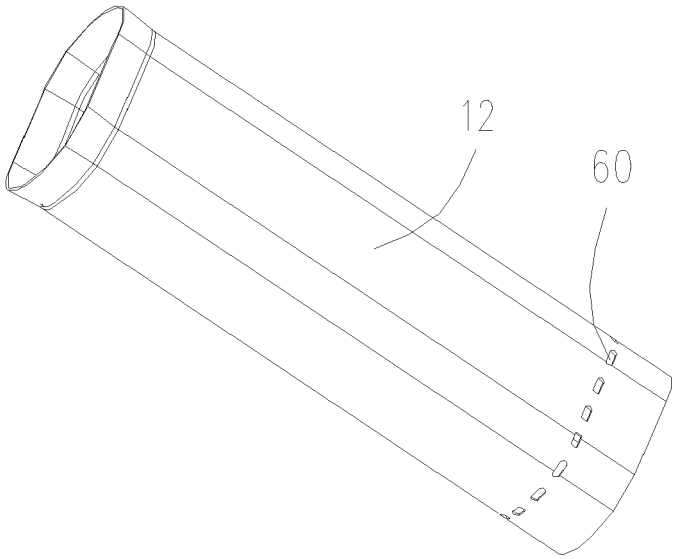

FIG. 4

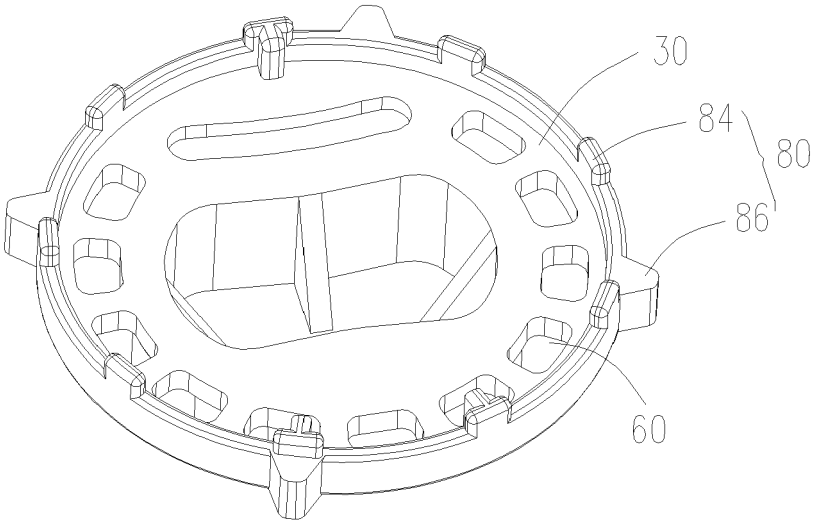

FIG. 5

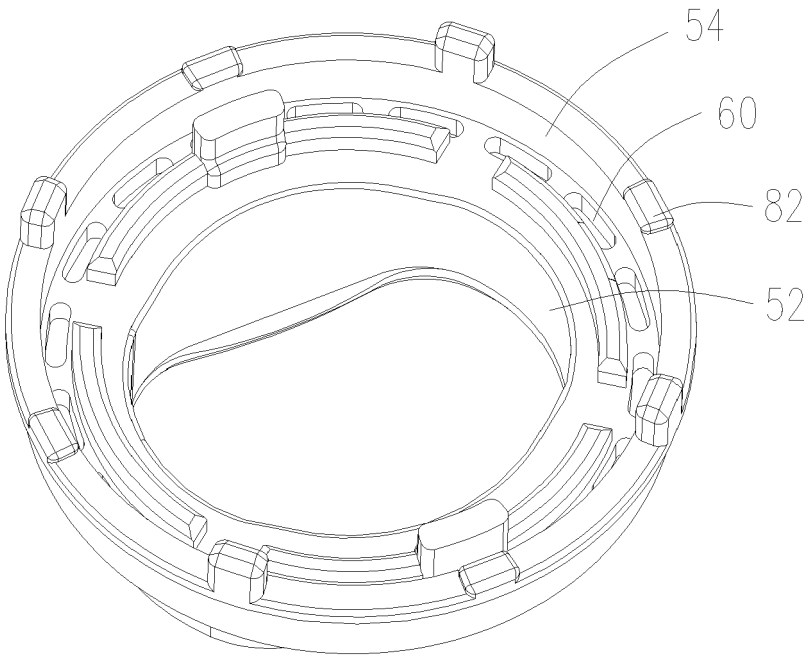

FIG. 6

Europäisches Patentamt
European Patent Office
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EUROPEAN SEARCH REPORT

Application Number
EP 23 18 6464

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 2022/017162 A1 (SHENZHEN SMOORE TECHNOLOGY LTD [CN]) 27 January 2022 (2022-01-27) * abstract; figure 3 *	1-14	INV. A24F40/20 A24F40/46 H05B3/46
X	CN 212 545 566 U (SHENZHEN SMOORE TECHNOLOGY LTD) 19 February 2021 (2021-02-19) * the whole document *	1-14	
X	US 2019/142069 A1 (QIU WEIHUA [CN]) 16 May 2019 (2019-05-16) * paragraph [0051] - paragraph [0054]; figures 5,6 *	1-14	
X	US 2018/303166 A1 (QIU WEI-HUA [CN]) 25 October 2018 (2018-10-25) * paragraph [0058] - paragraph [0060]; figure 3 *	1-14	
X	CN 214 903 779 U (HUIZHOU XINHONGWEI TECH CO LTD) 30 November 2021 (2021-11-30) * the whole document *	1-14	TECHNICAL FIELDS SEARCHED (IPC) A24F H05B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	28 November 2023	Gea Haupt, Martin

CATEGORY OF CITED DOCUMENTS

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