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(54) ATOMIZER AND ELECTRONIC ATOMIZATION DEVICE

(57) An atomizer (100) and an electronic atomization device (200). The atomizer (100) includes: a heating element (10) having a heating cavity (11) formed therein, and at least one electrode assembly (30). Each electrode assembly (30) includes a first electrode (32) and a second electrode (34), and the first electrode (32) and the second electrode (34) are both arranged to extend into the heating cavity (11). An electric arc is formed between the first electrode (32) and the second electrode (34) to generate plasma in the heating cavity (11) through a control. An accommodating space (15) for accommodating aerosol-forming substrate is formed in the heating member (10). After an inside of the heating cavity (11) is heated under an action of the plasma, heat can be transferred to the accommodating space (15), and then the aerosol-forming substrate disposed in the accommodating space (15) is heated.

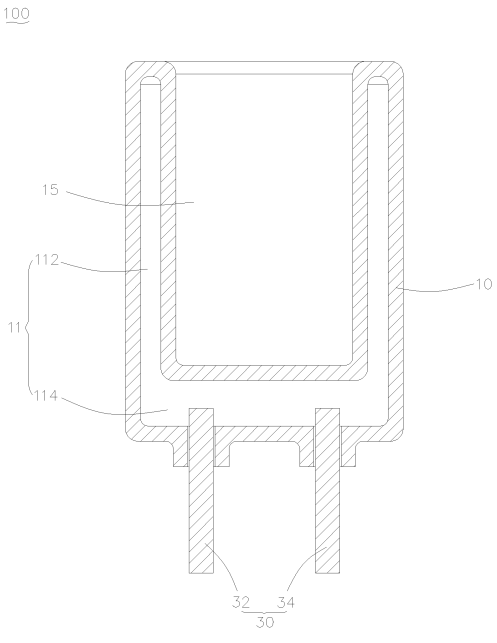

FIG. 1

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Description

TECHNICAL FIELD

[0001] The present application relates to the field of electronic atomization technology, in particular, to an atomizer and an electronic atomization device.

BACKGROUND

[0002] Aerosol is a colloidal dispersion system formed by small solid or liquid particles dispersed and suspended in a gas medium. Since aerosol can be absorbed by the human body through the respiratory system, it provides users with a new alternative absorption method. For example, an atomization device, which may generate aerosol through baking and heating the aerosol-forming substrate of herbal or cream, replacing conventional product forms and absorption methods, is applied in different fields to provide users with aerosol that can be taken in by the users.

[0003] The electronic atomization device usually heats the aerosol-forming substrate by adopting a heating manner of resistance or electromagnetic induction. However, a long preheating waiting time is required in these two heating manners, thus causing it inconvenient for users to use the electronic atomization device. Moreover, the resistance heating manner adopts an external power source to energize the resistive element to generate heat, and then the heated resistive element transfers the heat to the aerosol-forming substrate via thermal conduction. The heat conduction takes time and has a delay, so the resistance heating manner may cause the aerosol-forming substrate close to the resistive element to be over-toasted or even charred at high temperatures, resulting in poor taste consistency. Moreover, when the resistive heating member comes into contact with and heats the aerosol-forming substrate, the metal substance in the resistive heating member may enter the aerosol formed by atomization of the aerosol-forming substrate, thus affecting the taste of the atomized aerosol.

[0004] Therefore, the traditional heating manner for the aerosol-forming substrate needs a relatively long preheating time, and the taste of the atomized aerosol is not good.

SUMMARY

[0005] In view of this, it is necessary to provide an atomizer and an electronic atomization device to solve the problems that a traditional atomizer needs a relatively long preheating time, and brings poor taste of the atomized aerosol.

[0006] An atomizer includes:

a heating member having a heating cavity formed therein; and

at least one electrode assembly, where each electrode assembly includes a first electrode and a second electrode; the first electrode and the second electrode are both arranged to extend into the heating cavity; an electric arc is formed between the first electrode and the second electrode to generate plasma in the heating cavity through a control.

[0007] An accommodating space for accommodating aerosol-forming substrate is formed in the heating member.

[0008] In the above-mentioned atomizer, the first electrode and the second electrode are both arranged to extend into the heating cavity of the heating member, and an arc is generated by a breakdown between the first electrode and the second electrode which are AC-powered or DC-powered. Then, gas in the heating cavity is ionized to form the plasma, and the plasma heats the heating cavity. Furthermore, an accommodating space for accommodating the aerosol-forming substrate is formed in the heating member, and the accommodating space may conduct heat with the heating cavity. After the inside of the heating cavity is heated under the action of the plasma, the heat can be transferred to the accommodating space, and then the aerosol-forming substrate disposed in the accommodating space is heated. In this way, the heat generated by the plasma in the heating cavity is used to heat the aerosol-forming substrate quickly. The preheating waiting time is shortened, which is convenient for the user to use the atomizer and prevents the burnt residue of the aerosol-forming substrate caused by the too long preheating time, thereby enhancing the taste of the atomized aerosol. What's more, metal members such as electrodes needs not to be in direct contact with the aerosol-forming substrate during the heating process, which can prevent the aerosol-forming substrate from being mixed with metal substances after atomization, and further improve the taste of the atomized aerosol.

[0009] In an embodiment, the heating cavity is filled with inert gas.

[0010] In an embodiment, the air pressure in the heating cavity is less than standard atmospheric pressure.

[0011] In an embodiment, the heating member is made of any one of quartz glass, silicon carbide, silicon nitride, zirconia oxide, and alumina oxide.

[0012] In an embodiment, part of an outer surface of the heating member is recessed inward to form a first accommodating cavity with an opening at one end, and the heating cavity is arranged around an outer periphery of the first accommodating cavity.

[0013] The first accommodating cavity is constructed as the accommodating space.

[0014] In an embodiment, the heating cavity includes a first sub-cavity and a second sub-cavity; the first sub-cavity is annularly arranged around the outer periphery of the first accommodating cavity; and the second sub-cavity is located at the bottom of the first accommodating cavity away from the opening thereof, and in communi-

cation with the first sub-cavity.

[0015] The electrode assembly is arranged to extend into at least one of the first sub-cavity and the second sub-cavity.

[0016] In an embodiment, the heating member includes a mounting seat and a heating seat disposed on the mounting seat; the heating cavity is formed inside the mounting seat; a second accommodation cavity with an opening at one end is formed inside the heating seat; and the heating cavity is located at the bottom of the second accommodation cavity away from the opening thereof.

[0017] The second accommodation cavity is constructed as the accommodating space.

[0018] In an embodiment, the heating member includes a mounting seat, and a heating seat disposed on the mounting seat; the heating cavity includes a third sub-cavity and a fourth sub-cavity; the third sub-cavity is formed inside the mounting seat; and the fourth sub-cavity is formed inside the heating seat and in communication with the third sub-cavity.

[0019] Mutually facing outer surfaces of the mounting seat and the heating seat are constructed to form the accommodating space surrounding the heating seat.

[0020] In an embodiment, the heating seat and the mounting seat are integrally formed, or
the mounting seat and the heating seat are formed separately.

[0021] In an embodiment, the heating seat and the mounting seat are formed separately; a heat conduction chamber is formed between the heating seat and the mounting seat which are fixedly connected; and the heat conduction chamber is filled with thermal conductive medium.

[0022] An electronic atomization device, including the atomizer mentioned above.

[0023] In an embodiment, the electronic atomization device further includes a housing, the atomizer is disposed in the housing, and a gas inlet channel is formed in the housing and configured to go through an outer periphery of the heating member and enter the accommodating space.

[0024] In an embodiment, the heating member includes a mounting seat, and a heating seat disposed on the mounting seat; the heating cavity includes a third sub-cavity and a fourth sub-cavity; the third sub-cavity is formed inside the mounting seat; the fourth sub-cavity is formed inside the heating seat and in communication with the third sub-cavity; the electrode assembly is arranged to extend into the third sub-cavity; and mutually facing outer surfaces of the mounting seat and the heating seat are constructed to form the accommodating space surrounding the heating seat.

[0025] The gas inlet channel is configured to go through an outer periphery of a base and enter the accommodating space.

BRIEF DESCRIPTION OF THE DRAWINGS

[0026] In order to more clearly describe the solutions in the embodiments of the present application or in the prior art, the accompanying drawings to be used in the description of the embodiments or the prior art will be described briefly. Obviously, the drawings described hereinafter are only some embodiments of the present application. For ordinary skilled persons in the art, other drawings can also be obtained based on the following drawings without creative work.

FIG. 1 is a schematic structural view of an atomizer in an embodiment of the present application;
FIG. 2 is a schematic structural view of an atomizer in another embodiment of the present application;
FIG. 3 is a schematic structural view of an atomizer in yet another embodiment of the present application;
FIG. 4 is a schematic structural view of an atomizer in yet another embodiment of the present application;
FIG. 5 is a schematic structural view of an atomizer in yet another embodiment of the present application;
FIG. 6 is a schematic cross-sectional view of an electronic atomization device in an embodiment of the present application.

[0027] Reference signs: 100, atomizer; 10, heating member; 11, heating cavity; 112, first sub-cavity; 114, second sub-cavity; 116, third sub-cavity; 118, fourth sub-chamber; 12, mounting seat; 14, heating seat; 15, accommodating space; 30, electrode assembly; 32, first electrode; 34, second electrode; 50, heat conduction chamber; 200, electronic atomization device; 210, housing; 211, gas inlet channel.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0028] To make the objectives, features, and advantages of the present application more apparent and better understood, detailed explanations of specific embodiments are provided below with reference to accompanying drawings. Many specific details are disclosed in the following description to facilitate a comprehensive understanding of the present application. However, it should be noted that the present application can be implemented in various ways different from those described herein, and those skilled in the art may make similar improvements without departing from the contents of the present application. Therefore, the present application is not limited to the specific embodiments disclosed below.

[0029] In the description of the present application, it should be understood that the terms "central", "longitudinal", "transverse", "length", "width", "thickness", "upper", "lower", "front", "rear", "left", "right", "vertical", "horizontal", "top", "bottom", "inner", "outer", "clockwise",

"counterclockwise", "axial", "radial", "circumferential", etc. indicate the orientations or positional relationships on the basis of the drawings. These terms are only for describing the present application and simplifying the description, rather than indicating or implying that the related devices or elements must have the specific orientations, or be constructed or operated in the specific orientations, and therefore cannot be understood as limitations of the present application.

[0030] In addition, the terms "first" and "second" are used for illustrative purposes only, and cannot be understood as indicating or implying relative importance, or implicitly indicating the quantity of the indicated elements. Therefore, the element modified by "first" or "second" may explicitly or implicitly includes at least one of the elements. In the description of the present application, "a plurality of' means at least two, such as two, three, etc., unless otherwise specifically defined.

[0031] In the present application, unless otherwise clearly specified and defined, the terms "installed", "connected", "coupled", "fixed" and the like should be interpreted broadly. For example, an element may be fixedly connected, detachably connected, or integrated to the other element, may be mechanically connected, or electrically connected to the other element, may be directly connected to the other element or connected to the other element via an intermediate element, and may be an internal communication of two elements or an interaction relationship between two elements, unless otherwise specifically defined. For those of ordinary skill in the art, the specific meanings of the above-mentioned terms in the present application can be understood according to specific circumstances.

[0032] In the present application, unless otherwise specifically defined, an element, when being referred to as being located "on" or "under" another element, may be in direct contact with the other element or contact the other element via an intermediate element. Moreover, the element, when being referred to as being located "on", "above", "over" another element, may be located right above or obliquely above the other element, or merely located at a horizontal level higher than the other element; and the element, when being referred to as being located "under", "below", "beneath" another element, may be located right below or obliquely below the other element, or merely located at a horizontal level lower than the other element.

[0033] It should be noted that an element, when being referred to as being "fixed" or "attached" to another element, may be fixed or attached to the other element directly or via an intermediate element. An element, when referred to as being "connected" to another element, may be directly connected to the other element or via an intermediate element. Such terms as "vertical", "horizontal", "up", "down", "left", "right" and the like used herein are for illustrative purposes only and are not meant to be the only ways for implementing the present application.

[0034] Referring to FIG. 1, in an embodiment of the present application, an atomizer 100 is provided. The atomizer 100 heats aerosol-forming substrate through a plasma heating manner. By taking advantages of the high energy density characteristics of the plasma heating, instant and rapid heating and atomizing can be achieved, thereby effectively shortening the preheating time, preventing burnt residue due to a too long preheating time, and improving the taste of the atomized aerosol.

[0035] The atomizer 100 includes a heating member 10 and at least one electrode assembly 30. The heating member 10 has a heating cavity 11 formed therein. Each electrode assembly 30 includes a first electrode 32 and a second electrode 34. The first electrode 32 and the second electrode 34 are both arranged to extend into the heating cavity 11. In the heating cavity 11, an electric arc can be formed between the first electrode 32 and the second electrode 34 to generate plasma by a control. That is to say, the first electrode 32 and the second electrode 34 are both arranged to extend into the heating cavity 11 of the heating member 10, and an arc is generated by a breakdown between the first electrode 32 and the second electrode 34 which are AC-powered or DC-powered. Then, gas in the heating cavity 11 is ionized to form the plasma, and the plasma heats the heating cavity 11. Furthermore, an accommodating space 15 for accommodating the aerosol-forming substrate is formed in the heating member 10, and the accommodating space 15 may conduct heat with the heating cavity 11. After the inside of the heating cavity 11 is heated under the action of the plasma, the heat can be transferred to the accommodating space 15, and then the aerosol-forming substrate disposed in the accommodating space 15 is heated.

[0036] In this way, the heat generated by the plasma in the heating cavity 11 is used to heat the aerosol-forming substrate quickly. The preheating waiting time is shortened by taking the advantages of the high energy density characteristics of the plasma heating, which is convenient for the user to use the atomizer and prevents the burnt residue of the aerosol-forming substrate caused by the too long preheating time, thereby enhancing the taste of the atomized aerosol. What's more, metal members such as electrodes needs not to be in direct contact with the aerosol-forming substrate during the heating process, which can prevent the aerosol-forming substrate from being mixed with metal substances after atomization, and further improve the taste of the atomized aerosol.

[0037] In some embodiments, the first electrode 32 and the second electrode 34 of each electrode assembly 30 are made of any one of tungsten alloy, carbon fiber, and copper alloy. Diameters of the first electrode 32 and the second electrode 34 are in a range from 0.4 to 1.0mm, and a distance between the first electrode 32 and the second electrode 34 is in a range from 5mm to 10mm.

[0038] Referring to FIG. 1, optionally, the number of the electrode assembly 30 is one. Referring to FIG. 2, optionally, the number of the electrode assembly 30 is

multiple, and the multiple electrode assemblies 30 may be discharged in parallel at the same time, or the multiple electrode assemblies 30 are discharged in sequence. Moreover, on the heating member 10, all of the first electrodes 32 and all of the second electrodes 34 are symmetrically distributed relative to a symmetrical reference, so as to form a uniform temperature field in the heating cavity 11.

[0039] In some embodiments, the heating cavity 11 is filled with inert gas. An electric arc is generated between the first electrode 32 and the second electrode 34 in the heating cavity 11 after a breakdown therebetween, and the inert gas filled in the heating cavity 11 may be ionized to form the plasma and generate heat, and the generated heat may be efficiently transferred to the accommodating space 15 through the inert gas, thereby improving the heat transfer efficiency. For example, the heating cavity 11 is filled with gases such as helium, neon, or argon. It is understandable that in other embodiments, the heating cavity 11 may also be filled with air, which is not limited here.

[0040] In some embodiments, a gas pressure inside the heating cavity 11 is less than the standard atmospheric pressure, so that the pressure inside the heating cavity 11 is kept at a low level and does not exert an excessive pressure on the cavity wall of the heating cavity 11 (i.e., on the heating member 10), thus allowing the wall thickness and strength of the heating member 10 to be reduced, and further improving the heat transfer efficiency. For example, the gas pressure inside the heating cavity 11 is from one fifth of one standard atmospheric pressure to one standard atmospheric pressure. Preferably, the gas pressure inside the heating cavity 11 is from one fifth of one standard atmospheric pressure to one third of one standard atmospheric pressure. It is understandable that in other embodiments, the gas pressure inside the heating cavity 11 may also be one standard atmospheric pressure, and is not limited herein.

[0041] Optionally, the heating member 10 is made of any one of quartz glass, silicon carbide, silicon nitride, zirconium oxide, and alumina oxide, such that the heating member 10 has a better insulation property, thus avoiding electric leakages when the gas inside the heating member 10 is ionized, and that the heating member 10 has a better thermal conductivity, thus making it easy for the heat generated by the ionized gas in the heating cavity 11 to be transferred to the accommodating space 15 through the heating member 10. Alternatively, the wall thickness of the heating member 10 is in a range from 0.4mm to 1.0mm, such that the strength requirements may be met and the heat may be conducted high efficiently.

[0042] Referring to FIG. 1 and FIG. 2, in some embodiments, part of the outer surface of the heating member 10 is recessed inward to form a first accommodating cavity with an opening at one end, and the heating cavity 11 is arranged around an outer periphery of the first accommodating cavity. The first accommodating cavity is constructed as the accommodating space 15. That is, part of the outer surface of the heating member 10 is recessed inward to form the first accommodating cavity, furthermore, the heating cavity 11 is arranged around the first accommodating cavity, such that the heat generated inside the heating cavity 11 may be transferred to any positions at the outer periphery of the first accommodating cavity, thereby heating the aerosol-forming substrate in the first accommodating cavity evenly and quickly.

[0043] Further, the heating cavity 11 includes a first sub-cavity 112 and a second sub-cavity 114. The first sub-cavity 112 is annularly arranged around the outer periphery of the first accommodating cavity, and the second sub-cavity 114 is located at the bottom of the first accommodating cavity away from the opening thereof, and is in communication with the first sub-cavity 112. That is, the first sub-cavity 112 surrounds the outer peripheral side of the first accommodating cavity, the second sub-cavity 114 is located at the bottom of the first accommodating cavity, and the first sub-cavity 112 and the second sub-cavity 114 communicate to form the heating cavity 11 completely surrounding the outer periphery of the first accommodating cavity, such that heat in the first heating cavity 11 is evenly transferred in all directions.

[0044] Moreover, the electrode assembly 30 is arranged to extend into at least one of the first sub-cavity 112 and the second sub-cavity 114, that is, the electrode assembly 30 may be arranged to extend into the first sub-cavity 112, or the electrode assembly 30 may be arranged to extend into the second sub-cavity; or multiple electrode assemblies 30 may be arranged, and the electrode assemblies 30 are arranged to extend into the first sub-cavity 112 and the second sub-cavity respectively, such that the electrode assembly 30 generates an electric arc to ionize the gas in the heating cavity 11, forming the plasma and generating heat. For example, the electrode assembly 30 is arranged to extend into only the first sub-cavity 112, the heat generated when the gas is ionized in the electrode assembly 30 may be transferred to the second sub-cavity 114, and the aerosol-forming substrate in the accommodating space 15 is heated through the first sub-cavity 112 and the second sub-cavity 114. Similarly, if the electrode assembly 30 is arranged to extend into only the second sub-cavity 114, the heat generated in the second sub-cavity 114 may be transferred to the first sub-cavity 112, and the aerosol-forming substrate in the accommodating space 15 is heated through the first sub-cavity 112 and the second sub-cavity 114.

[0045] It can be understood that in other embodiments, the heating cavity 11 only includes any one of the first sub-cavity 112 and the second sub-cavity 114, which is not limited herein, and the heating cavity 11 may also transfer the heat therein to the adjacent accommodating space 15.

[0046] Referring to FIG. 3, in other embodiments, the heating member 10 includes a mounting seat 12, and a

heating seat 14 disposed on the mounting seat 12. The heating cavity 11 includes a third sub-cavity 116 and a fourth sub-cavity 118. The third sub-cavity 116 is formed inside the mounting seat 12, and the fourth sub-cavity 118 is formed inside the heating seat 14 and communicates with the third sub-cavity 116. The electrode assembly 30 is arranged to extend into the third sub-cavity 116. Mutually facing outer surfaces of the mounting seat 12 and the heating seat 14 are constructed to form the accommodating space 15 surrounding the heating seat 14. Optionally, the heating seat 14 is in a strip shape, and the fourth sub-cavity 118 is formed inside the heating seat 14 and configured to extend along the axial direction of the heating seat 14, and communicates with the third sub-cavity 116.

[0047] That is, the heating seat 14 is constructed as a heating needle, and the accommodating space 15 for accommodating the aerosol-forming substrate is defined and formed between the heating seat 14 and the mounting seat 12. During a usage of the atomizer 100, the aerosol-forming substrate is inserted on the heating seat 14, and the aerosol-forming substrate is disposed and fixed in the space (i.e., the accommodating space 15) between the mutually facing outer surfaces of the heating seat 14 and the mounting seat 12. Moreover, the third sub-cavity 116 is formed inside the mounting seat 12, and the fourth sub-cavity 118 is formed inside the heating seat 14 and communicates with the third sub-cavity 116, and the electrode assembly 30 is arranged to extend into the third sub-cavity 116. When the gas in the third sub-cavity 116 is ionized by the electric arc formed by a breakdown between the first electrode 32 and the second electrode 34, the plasma and the heat are formed in the third sub-cavity 116, and the formed heat can also be transferred from the third sub-cavity 116 to the fourth sub-cavity 118, making the heating seat 14 transfer heat to heat the aerosol-forming substrate.

[0048] Referring to FIG. 4 and FIG. 5, in some embodiments, the heating member 10 includes a mounting seat 12 and a heating seat 14 arranged on the mounting seat 12. The heating cavity 11 is formed inside the mounting seat 12. A second accommodation cavity with an opening at one end is formed inside the heating seat 14. The heating cavity 11 is located at the bottom of the second accommodation cavity away from the opening thereof. The second accommodation cavity is constructed as the accommodating space 15. That is, the heating cavity 11 is formed inside the mounting seat 12 of the heating member 10. Heat is generated inside the heating cavity 11 through the action of the first electrode 32 and the second electrode 34, and the generated heat may be transferred to the second accommodating cavity of the heating seat 14 disposed at the top, namely, transferred to the accommodating space 15, thus heating the aerosol-forming substrate in the accommodating space 15.

[0049] Referring to FIG. 4, optionally, the heating seat 14 and the mounting seat 12 are integrally formed to simplify the device. Referring to FIG. 5, optionally, the heating seat 14 and the mounting seat 12 are formed separately. The heating seat 14 and the mounting seat 12 may be manufactured separately in a standardized manner, making it easy to make the atomizer 100 a standard product and improving the universality of the atomizer 100 multipurpose.

[0050] Referring to FIG. 5, further, the heating seat 14 and the mounting seat 12 are formed separately. A heat conduction chamber 50 is formed between the heating seat 14 and the mounting seat 12 which are fixedly connected. The heat conduction chamber 50 is filled with thermal conductive medium to efficiently transfer the heat generated inside the mounting seat 12 to the accommodating space 15 of the heating seat 14 through the thermal conductive medium, thereby ensuring thermal conductive performance. The thermal conductive medium is a phase-change thermal interface conductive medium, such as toluene, water, naphthalene, dowtherm, or aluminum bromide, which has good heat exchange efficiency.

[0051] Referring to FIG. 6, in an embodiment of the present application, an electronic atomization device 200 is provided. The electronic atomization device 200 includes the atomizer 100 above, requires a relatively short preheating waiting time, and brings a better taste of atomized aerosol.

[0052] In some embodiments, the electronic atomization device 200 further includes a housing 210. The atomizer 100 is disposed inside the housing 210. A gas inlet channel 211 is formed in the housing 210 and configured to go through the outer periphery of the heating member 10 and enter the accommodating space 15, such that when a user is taking in aerosol through the electronic atomization device 200, after air outside flows into the housing 210, it first flows through the outer periphery of the heating member 10, taking away the heat on the outer surface of the heating member 10, and increasing the temperature of the air flow itself at the same time, then the air enters into the accommodating space 15 to mix with the aerosol generated by atomization in the accommodating space 15, and finally the air carrying aerosol flows into the user's mouth for the user to inhale. In this way, under the guidance of the gas inlet channel 211, the air flow first passes through the outer periphery of the heating member 10, and then enters the accommodating space 15, such that, on one hand, the outer periphery of the heating member 10 may be cooled, and on the other hand, the air flowing into the accommodating space 15 may be preheated, thus improving the atomization effect.

[0053] Specifically, the heating member 10 includes the mounting seat 12 and the heating seat 14 disposed on the mounting seat 12, the heating cavity 11 includes the third sub-cavity 116 and the fourth sub-cavity 118, the third sub-cavity 116 is formed inside the mounting seat 12, and the fourth sub-cavity 118 is formed inside the heating seat 14 and in communication with the third sub-cavity 116. The electrode assembly 30 is arranged

to extend into the third sub-cavity 116, and the mutually facing outer surfaces of the mounting seat 12 and the heating seat 14 are constructed to form the accommodating space 15 surrounding the heating seat 14. That is, the mounting seat 12 of the heating member 10 forms the third sub-cavity 116. Heat is generated in the third sub-cavity 116 through the action of the first electrode 32 and the second electrode 34, and the generated heat can be transferred to the fourth sub-cavity 118 of the heating seat 14 to heat the aerosol-forming substrate inserted on the heating seat 15.

[0054] Moreover, the gas inlet channel 211 is configured to go through the outer periphery of the mounting seat 12 to the accommodating space 15, such that the gas inlet channel 211 first goes through the outer periphery forming the third sub-cavity 116, and that the air flow enters the accommodating space 15 of the heating seat 14 after exchanging heat with the outer surface of the mounting seat 12.

[0055] It is understandable that in other embodiments, the gas inlet channel 211 may not go through the mounting seat 12, but directly enter the accommodating space 15 from the outside, thus simplifying the structure of the gas inlet channel. The arrangement of the gas inlet channel 211 is not limited herein.

[0056] The technical features of the above-mentioned embodiments can be combined arbitrarily. In order to make the description concise, not all possible combinations of the technical features are described in the embodiments. However, as long as there is no contradiction in the combination of these technical features, the combinations should be considered as in the scope of the present application.

[0057] The above-described embodiments are only several implementations of the present application, and the descriptions are relatively specific and detailed, but they should not be construed as limiting the scope of the present application. It should be understood by those of ordinary skill in the art that various modifications and improvements can be made without departing from the concept of the present application, and all fall within the protection scope of the present application. Therefore, the patent protection of the present application shall be defined by the appended claims.

Claims

1. An atomizer, **characterized by** comprising:

a heating member having a heating cavity formed therein; and

at least one electrode assembly, wherein: each electrode assembly comprises a first electrode and a second electrode; the first electrode and the second electrode are both arranged to extend into the heating cavity; an electric arc is formed between the first electrode and the second electrode to generate plasma in the heating cavity through a control;

wherein an accommodating space for accommodating aerosol-forming substrate is formed in the heating member.

2. The atomizer according to claim 1, wherein the heating cavity is filled with inert gas.

3. The atomizer according to claim 1, wherein a gas pressure in the heating cavity is less than a standard atmospheric pressure.

4. The atomizer according to claim 1, wherein the heating member is made of any one of quartz glass, silicon carbide, silicon nitride, zirconia oxide, and alumina oxide.

5. The atomizer according to any one of claims 1 to 4, wherein part of an outer surface of the heating member is recessed inward to form a first accommodating cavity with an opening at one end, and the heating cavity is arranged around an outer periphery of the first accommodating cavity;

wherein the first accommodating cavity is constructed as the accommodating space.

6. The atomizer according to claim 5, wherein the heating cavity comprises a first sub-cavity and a second sub-cavity; the first sub-cavity is annularly arranged around the outer periphery of the first accommodating cavity; the second sub-cavity is located at the bottom of the first accommodating cavity away from the opening thereof, and in communication with the first sub-cavity; and

the electrode assembly is arranged to extend into at least one of the first sub-cavity and the second sub-cavity.

7. The atomizer according to claim 1, wherein the heating member comprises a mounting seat and a heating seat disposed on the mounting seat; the heating cavity is formed inside the mounting seat; a second accommodation cavity with an opening at one end is formed inside the heating seat;

and the heating cavity is located at the bottom of the second accommodation cavity away from the opening thereof;

wherein the second accommodation cavity is constructed as the accommodating space.

8. The atomizer according to claim 1, wherein the heating member comprises a mounting seat, and a heating seat disposed on the mounting seat; the heating cavity comprises a third sub-cavity and a fourth sub-cavity; the third sub-cavity is formed inside the mounting seat; and the fourth sub-cavity is formed inside the heating seat and in communication with

the third sub-cavity;
wherein the electrode assembly is arranged to extend into the third sub-cavity; and mutually facing outer surfaces of the mounting seat and the heating seat are constructed to form the accommodating space surrounding the heating seat.

9. The atomizer according to claim 7 or 8, wherein the heating seat and the mounting seat are integrally formed; or
the heating seat and the mounting seat are formed separately.

10. The atomizer according to claim 9, wherein the heating seat and the mounting seat are formed separately; a heat conduction chamber is formed between the heating seat and the mounting seat which are fixedly connected; and the heat conduction chamber is filled with thermal conductive medium.

11. An electronic atomization device, **characterized by** comprising the atomizer according to any one of the above claims 1-10.

12. The electronic atomization device according to claim 11, wherein the electronic atomization device further comprises a housing, the atomizer is disposed in the housing, and a gas inlet channel is formed in the housing and configured to go through an outer periphery of the heating member and enter the accommodating space.

13. The electronic atomization device according to claim 12, wherein:

the heating member comprises a mounting seat, and a heating seat disposed on the mounting seat; the heating cavity comprises a third sub-cavity and a fourth sub-cavity; the third sub-cavity is formed inside the mounting seat; the fourth sub-cavity is formed inside the heating seat and in communication with the third sub-cavity; the electrode assembly is arranged to extend into the third sub-cavity; and mutually facing outer surfaces of the mounting seat and the heating seat are constructed to form the accommodating space surrounding the heating seat;
the gas inlet channel is configured to go through an outer periphery of a base and enter the accommodating space.

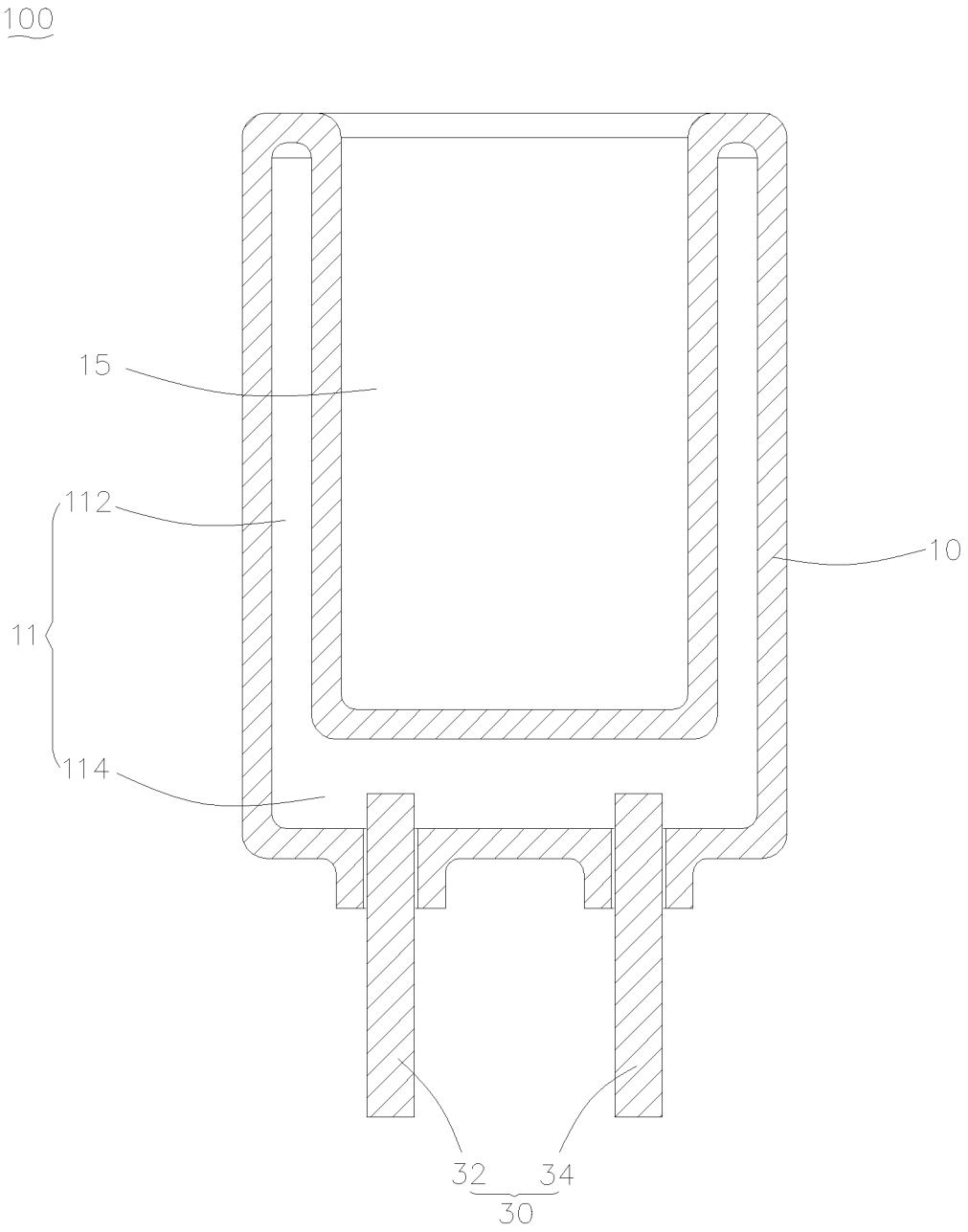

FIG. 1

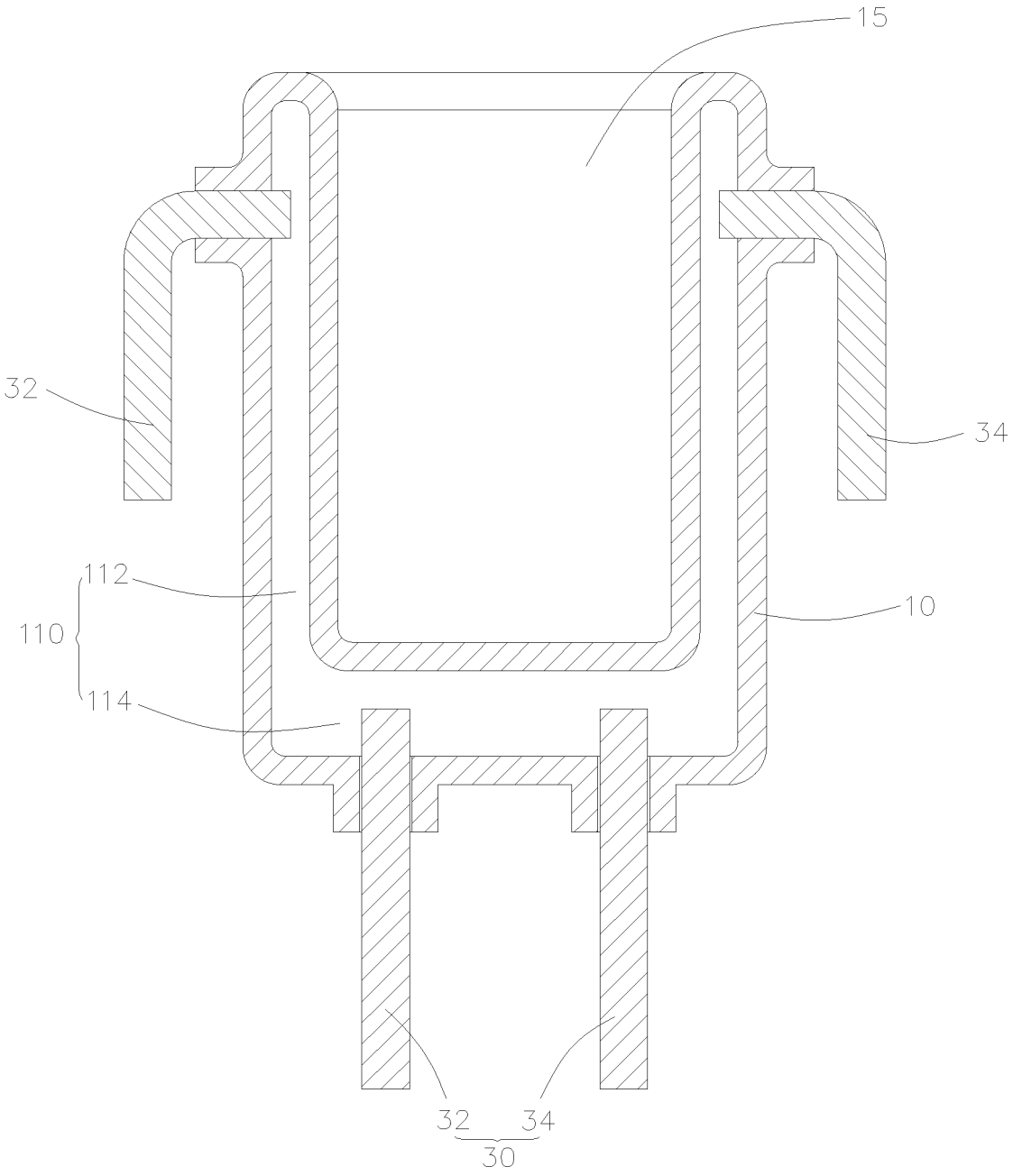

FIG. 2

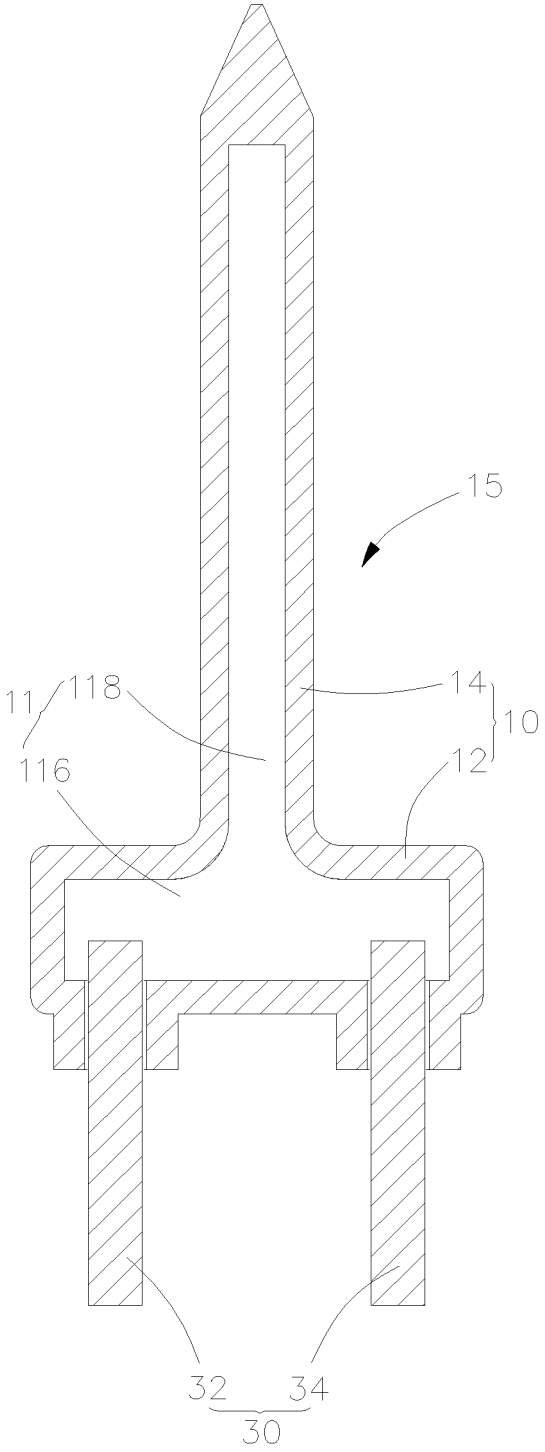

FIG. 3

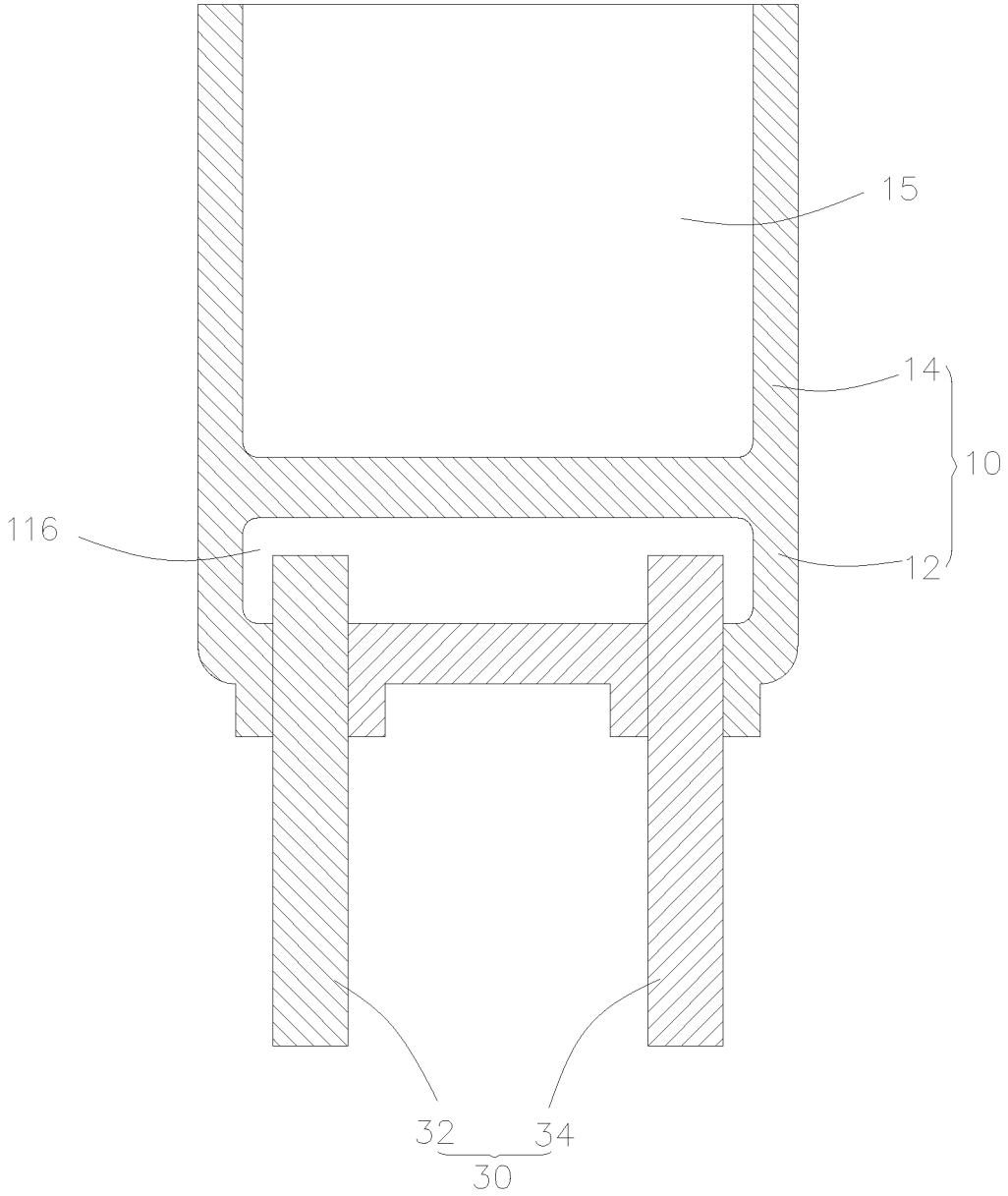

FIG. 4

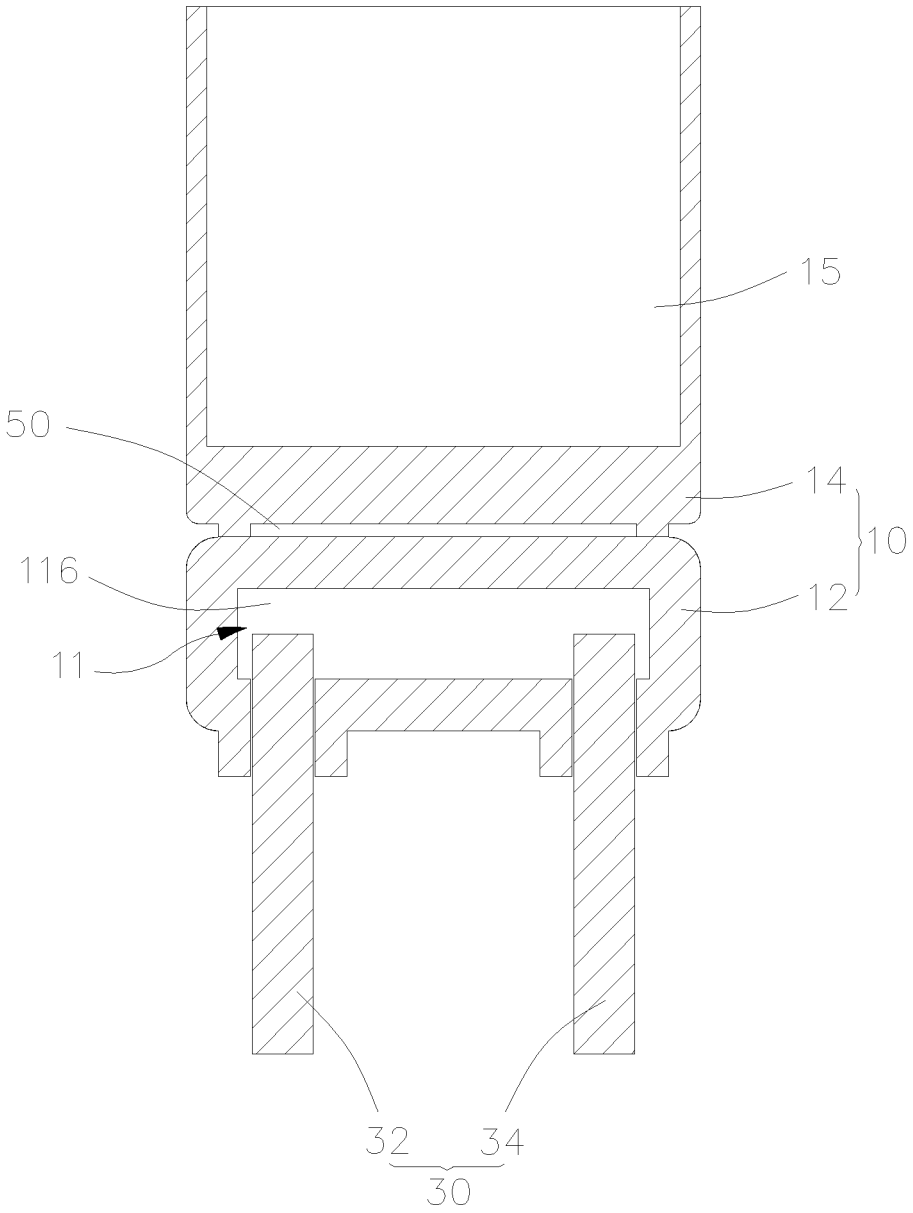

FIG. 5

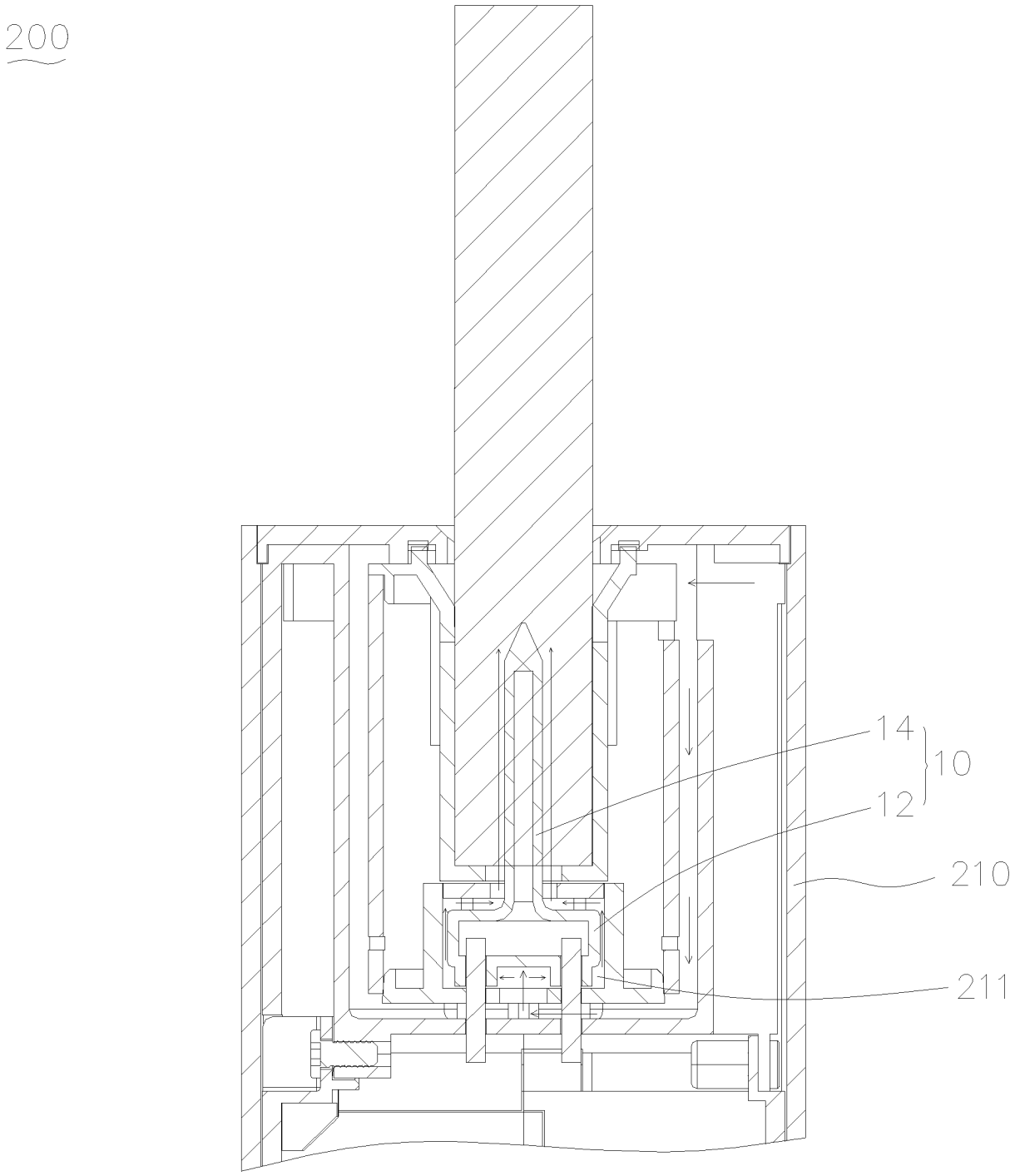

FIG. 6

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2022/129433

A. CLASSIFICATION OF SUBJECT MATTER

A24F 47/00(2020.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A24F

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

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

CNABS, CNTXT, VEN, CNKI: 电子烟, 雾化器, 发热体, 电弧, 等离子体, electronic cigarette, atomizer, heat+, electric arc, plasma

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CN 203952435 U (LI SHUYAN) 26 November 2014 (2014-11-26) description, paragraphs 47-52, and figures 1-2	1-13
X	CN 204579893 U (ZHAO HUIPING) 26 August 2015 (2015-08-26) description, paragraphs 51-61, and figures 1-5	1-13
X	CN 108308725 A (SHENGHAI ELECTRONIC (SHENZHEN) CO., LTD.) 24 July 2018 (2018-07-24) description, paragraphs 47-51, and figures 1-4	1-13
A	WO 2021044023 A1 (JT INTERNATIONAL S.A.) 11 March 2021 (2021-03-11) entire document	1-13

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

* Special categories of cited documents:
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"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 January 2023	**17 January 2023**
Name and mailing address of the ISA/CN **China National Intellectual Property Administration (ISA/CN)** **No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088, China** Facsimile No. **(86-10)62019451**	Authorized officer Telephone No.

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

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2022/129433

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN 203952435 U	26 November 2014	None	
CN 204579893 U	26 August 2015	None	
CN 108308725 A	24 July 2018	CN 208211472 U	11 December 2018
WO 2021044023 A1	11 March 2021	JP 2022547403 A	14 November 2022
		US 2022361574 A1	17 November 2022
		TW 202110347 A	16 March 2021
		KR 20220056215 A	04 May 2022
		CN 114340419 A	12 April 2022
		EP 4025082 A1	13 July 2022

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