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(54) **ATOMIZER AND ELECTRONIC ATOMIZATION DEVICE**

(57) An atomizer and an electronic atomization device are provided. The atomizer (100, 100a, 100b, 100c, 100d) includes an outer housing with therein: a liquid storage cavity (12, 12a, 12b, 12c, 12d); a heating element (40, 40a, 40c, 40d, 40f), configured to heat at least part of a liquid substrate to generate an aerosol; a capillary element, including a first portion (31, 31a, 31f) coupled to the heating element (40, 40a, 40c, 40d, 40f) and a second portion (32, 32a, 32b) extending from the first portion (31, 31a, 31f) toward the liquid storage cavity (12, 12a, 12b, 12c, 12d), the second portion (32, 32a, 32b) to absorb a liquid substrate from the liquid storage cavity and deliver it to the first portion (31, 31a, 31f); and a support (70, 70a, 70c, 70d), configured to hold the capillary element, the support (70, 70a, 70c, 70d) including a recess to accommodate at least part of the capillary element, the support (70, 70a, 70c, 70d) provided with a first trench (722) formed on a recess surface, and the first trench (722) extends in parallel with the second portion (32, 32a, 32b) of the capillary element and is adjacent to an outer surface of the second portion (32, 32a, 32b). Through an extension length of the first trench (722), a liquid substrate on a surface of the capillary element can be buffered, thereby equalizing an amount of liquid substrates supplied to the heating element (40, 40a, 40c, 40d, 40f) and alleviating splattering of liquid substrates.

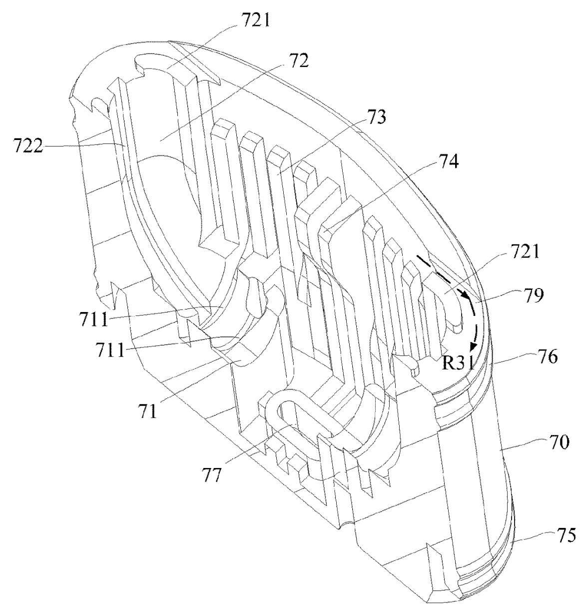

FIG. 8

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Description

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to a previous application with Chinese Patent Application No. 202111097119.1, filed with the China National Intellectual Property Administration on September 18, 2021 and entitled "ATOMIZER AND ELECTRONIC ATOMIZATION DEVICE", which is incorporated herein by reference in its entirety.

TECHNICAL FIELD

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

BACKGROUND

[0003] Smoking products (such as cigarettes and cigars) bum tobacco to produce tobacco smoke during use. Attempts are made to manufacture products that release compounds without burning of tobacco to replace these tobacco-burning products.

[0004] A heating device is an example of the products, which releases compounds by heating rather than burning of materials. For example, the materials may be tobacco or non-tobacco products that may or may not include nicotine. As another example, products providing aerosols, for example, electronic atomization devices, exist. The devices usually include an atomizable liquid, which is heated to be atomized, so as to generate an inhalable aerosol. In the above electronic atomization devices, a liquid guide element delivers excessive liquid substrates or delivers the liquid substrates excessively rapidly to a joint of a heating element, forming splattering of the liquid substrates during heating.

SUMMARY

[0005] An embodiment of this application provides an atomizer, configured to atomize a liquid substrate to generate an aerosol, and including an outer housing. The outer housing has arranged therein:

a liquid storage cavity, configured to store a liquid substrate;
a heating element, configured to heat at least part of the liquid substrate to generate an aerosol;
a capillary element, including a first portion coupled to the heating element and a second portion extending from the first portion toward the liquid storage cavity, where the second portion is constructed to absorb the liquid substrate from the liquid storage cavity and deliver the liquid substrate to the first portion; and
a support, configured to hold the capillary element, where the support includes a recess configured to accommodate at least part of the capillary element, the support is provided with a first trench formed on a surface of the recess, and the first trench extends in parallel with the second portion of the capillary element and is adj acent to an outer surface of the second portion.

[0006] In a preferred implementation, the recess includes a first holding recess configured to accommodate at least part of the first portion and a second holding recess configured to accommodate at least part of the second portion.

[0007] In a preferred implementation, the first trench extends from a surface of the second holding recess to the first holding recess.

[0008] In a preferred implementation, the second holding recess and the first holding recess are discrete.

[0009] In a preferred implementation, the surface of the recess includes two discrete portions.

[0010] In a preferred implementation, the first trench is a capillary trench.

[0011] In a preferred implementation, the first trench is constructed to be in fluid communication with the liquid storage cavity.

[0012] In a preferred implementation, at least part of the first trench is constructed to be bent.

[0013] In a preferred implementation, a second trench is arranged on the surface of the first holding recess.

[0014] In a preferred implementation, the second trench is arranged perpendicular to an extension direction of the first portion.

[0015] In a preferred implementation, the first trench extends to be in communication with the second trench.

[0016] In a preferred implementation, an extension length of the first trench in a longitudinal direction of the outer housing is greater than an extension length of the second portion.

[0017] In a preferred implementation, the capillary element is rigid.

[0018] In a preferred implementation, the capillary element includes a porous ceramic body.

[0019] In a preferred implementation, the first portion has an atomization surface facing away from the second portion, and the heating element is coupled to the atomization surface.

[0020] In a preferred implementation, the heating element includes a resistance heating trajectory coupled to the atomization surface.

[0021] In a preferred implementation, the outer housing further has arranged therein:

a first liquid guide element, constructed to extend in a direction perpendicular to a longitudinal direction of the outer housing and arranged between the liquid storage cavity and the capillary element in the longitudinal direction of the outer housing. The first liquid guide element has a first surface close to the liquid storage cavity in the longitudinal direction of the outer housing and a second surface facing away from the first surface. The first surface is configured to be in fluid communication with the liquid storage cavity to absorb the liquid substrate in the liquid storage cavity.

[0022] The second portion is constructed to be in contact with the second surface to absorb the liquid substrate.

[0023] In a preferred implementation, the atomizer further includes:

an air channel, configured to provide a fluid path for air to cross the first liquid guide element in the longitudinal direction of the outer housing to enter the liquid storage cavity.

[0024] The first trench is constructed to be in fluid communication with the liquid storage cavity through the air channel.

[0025] In a preferred implementation, the air channel includes a first channel portion formed between the first liquid guide element and the outer housing and a second channel portion formed between the first support and the first liquid guide element. The first trench is in communication with the second channel portion.

[0026] In a preferred implementation, the second channel portion includes a groove formed on the second surface of the first liquid guide element adjacent to the support.

[0027] In a preferred implementation, the outer housing further has arranged therein:

a first liquid guide element, constructed to extend in a direction perpendicular to a longitudinal direction of the outer housing and arranged between the liquid storage cavity and the capillary element in the longitudinal direction of the outer housing.

[0028] The second portion is constructed to at least partially run through the first liquid guide element in the longitudinal direction of the outer housing.

[0029] Another embodiment of this application further provides an electronic atomization device, including an atomizer configured to atomize a liquid substrate to generate an aerosol and a power supply assembly configured to supply power to the atomizer. The atomizer includes the atomizer described above.

[0030] An embodiment of this application provides an atomizer, including an outer housing. The outer housing has arranged therein:

- a liquid storage cavity, configured to store a liquid substrate and having an opening;
- a first liquid guide element, configured to cover the opening to seal the liquid storage cavity, so that the liquid substrate in the liquid storage cavity substantially leaves through the first liquid guide element, where the first liquid guide element has a first surface close to the liquid storage cavity in a longitudinal direction of the outer housing and a second surface facing away from the first surface; and the first surface is configured to be in fluid communication with the liquid storage cavity to absorb the liquid substrate in the liquid storage cavity;
- a second liquid guide element, in fluid communication with the second surface of the first liquid guide element to absorb a liquid substrate in the first liquid guide element, where the second liquid guide element has an atomization surface; and
- a heating element, coupled to the atomization surface and configured to heat at least part of a liquid substrate in the second liquid guide element to generate an aerosol.

[0031] In a preferred implementation, the first liquid guide element is made of an elastic organic porous material.

[0032] In a preferred implementation, the first liquid guide element has an elastic modulus or a rigidity less than that of a material of the liquid storage cavity and greater than that of a material of the second liquid guide element.

[0033] In a preferred implementation, the first liquid guide element directly contacts and covers the opening of the liquid storage cavity.

[0034] In a preferred implementation, the first liquid guide element is constructed in a shape of a sheet or a block perpendicular to the longitudinal direction of the outer housing.

[0035] In a preferred implementation, the first liquid guide element has a length direction perpendicular to the longitudinal direction of the outer housing and a width direction perpendicular to the longitudinal direction of the outer housing and the length direction. A length dimension of the first liquid guide element is greater than a width dimension.

[0036] In a preferred implementation, the first liquid guide element is anisotropic. Preferably, a flexural strength in the length direction is greater than a flexural strength in the width direction. More preferably, a liquid guide rate in the length direction is greater than a liquid guide rate in the width direction. Further preferably, the first liquid guide element includes fibers arranged and oriented substantially in the length direction.

[0037] In a preferred implementation, the first liquid guide element has a Shore hardness in a range of 20 A to 70 A. More preferably, the first liquid guide element has a Shore hardness in a range of 50 A to 70 A.

[0038] In a preferred implementation, the second liquid guide element is flexible and has a Shore hardness less than that of the first liquid guide element.

[0039] In a preferred implementation, a flexible sealing material is arranged between the first liquid guide element and the liquid storage cavity.

[0040] In a preferred implementation, the first liquid guide element is constructed substantially in a shape of an elliptical column.

[0041] In a preferred implementation, the first surface and/or the second surface of the first liquid guide element have patterns extending substantially in the length direction.

[0042] In a preferred implementation, a vapor output tube extending in the longitudinal direction is further arranged in the outer housing, which is configured to output the aerosol. A first plug-in hole for the vapor output tube to run through is arranged on the first liquid guide element.

[0043] In a preferred implementation, the first plug-in hole has an elliptical cross section. A length direction of the cross section of the first plug-in hole is parallel to the length direction of the first liquid guide element.

[0044] In a preferred implementation, the second liquid guide element is rigid.

[0045] In a preferred implementation, the second liquid guide element includes a porous ceramic body.

[0046] In a preferred implementation, the atomization surface is arranged to be located on a side of the second liquid guide element facing away from the first liquid guide element.

[0047] In a preferred implementation, the atomization surface is arranged to be located on a side of the second liquid guide element toward the first liquid guide element.

[0048] In a preferred implementation, the second liquid guide element is arranged to be in contact with the second surface to be in fluid communication with the second surface.

[0049] In a preferred implementation, the second liquid guide element includes a first portion extending in a direction perpendicular to the longitudinal direction of the outer housing and a second portion extending from the first portion toward the second surface.

[0050] The second portion is constructed to be in contact with the second surface.

[0051] The atomization surface is located on the first portion.

[0052] In a preferred implementation, an extension length of the first portion is greater than an extension length of the second portion.

[0053] In a preferred implementation, the second liquid guide element is further constructed to abut against the second surface to support at least part of the first liquid guide element.

[0054] In a preferred implementation, a first convex edge extending in the longitudinal direction of the outer housing is further arranged in the outer housing.

[0055] The first convex edge is constructed to abut against the first surface to hold at least part of the first liquid guide element.

[0056] In a preferred implementation, the liquid storage cavity has an opening. The first liquid guide element is configured to cover the opening to seal the liquid storage cavity, so that the liquid substrate in the liquid storage cavity substantially leaves through the first liquid guide element.

[0057] In a preferred implementation, the atomizer further includes:

a third liquid guide element, positioned between the second surface of the first liquid guide element and the second liquid guide element in the longitudinal direction of the outer housing. The second liquid guide element is in fluid communication with the second surface through the third liquid guide element.

[0058] In a preferred implementation, the third liquid guide element is flexible.

[0059] In a preferred implementation, the second liquid guide element is constructed to accommodate or support at least part of the third liquid guide element.

[0060] In a preferred implementation, the second liquid guide element has a notch, a groove, or a recess toward the first liquid guide element.

[0061] At least part of the third liquid guide element is accommodated or held in the notch, the groove, or the recess.

[0062] In a preferred implementation, the third liquid guide element is constructed in a shape of a strip, a block, or a column extending in the longitudinal direction of the outer housing.

[0063] In a preferred implementation, the third liquid guide element includes a third portion perpendicular to the longitudinal direction of the outer housing and a fourth portion extending in the longitudinal direction of the outer housing from the third portion.

[0064] The fourth portion is in contact with the second surface.

[0065] The third portion is in contact with the second liquid guide element.

[0066] In a preferred implementation, the second liquid guide element is constructed as a sheet or a plate perpendicular to the longitudinal direction of the main housing.

[0067] In a preferred implementation, the atomizer further includes:

a support, constructed to accommodate and hold at least part of the second liquid guide element and of the third liquid guide element.

[0068] In a preferred implementation, the support includes:

a first step, configured to support at least part of the second liquid guide element; and

a second step, configured to support at least part of the third liquid guide element.

[0069] The first step and the second step have different heights in a longitudinal direction of the outer housing.

[0070] In a preferred implementation, the atomizer further includes:

a support, constructed to abut against the second surface to hold at least part of the first liquid guide element.

[0071] In a preferred implementation, the atomizer further includes:

an air channel, configured to provide a fluid path for air to cross the first liquid guide element in a longitudinal direction of the outer housing to enter the liquid storage cavity.

[0072] In a preferred implementation, the outer housing has arranged therein: an inner wall, configured to define the liquid storage cavity configured to store the liquid substrate. The first liquid guide element has a peripheral side wall extending between the first surface and the second surface.

[0073] At least part of an air channel is formed between the peripheral side wall and the inner wall.

[0074] In a preferred implementation, a second convex edge extending in a longitudinal direction of the outer housing is arranged on the inner wall. The peripheral side wall has a flat and straight portion adjacent to the inner wall, and the flat and straight portion abuts against the second convex edge, so that a gap is retained between the peripheral side wall and the inner wall to define at least part of the air channel.

[0075] In a preferred implementation, the heating element includes a resistance heating trajectory formed on the atomization surface.

[0076] Another embodiment of this application further provides an atomizer, which is configured to atomize a liquid substrate to generate an aerosol, and includes an outer housing. The outer housing has arranged therein:

> a liquid storage cavity, configured to store a liquid substrate;
> a second liquid guide element, including a first portion extending in direction perpendicular to a longitudinal direction of the outer housing and a second portion extending from the first portion toward the liquid storage cavity, where
> the second portion is constructed to be in fluid communication with the liquid storage cavity to absorb the liquid substrate; and
> the first portion has an atomization surface facing away from the second portion; and
> a heating element, coupled to the atomization surface and configured to heat at least part of a liquid substrate in a second liquid guide element to generate an aerosol.

[0077] In a preferred implementation, the second liquid guide element is rigid.

[0078] In a preferred implementation, the second liquid guide element includes a porous ceramic body.

[0079] In a preferred implementation, an extension length of the first portion is greater than an extension length of the second portion.

[0080] In a preferred implementation, the atomizer further includes:

a first liquid guide element, constructed to extend in a direction perpendicular to a longitudinal direction of the outer housing and arranged between the liquid storage cavity and the second liquid guide element in the longitudinal direction of the outer housing. The first liquid guide element has a first surface close to the liquid storage cavity in the longitudinal direction of the outer housing and a second surface facing away from the first surface. The first surface is configured to be in fluid communication with the liquid storage cavity to absorb the liquid substrate in the liquid storage cavity.

[0081] The second portion is constructed to be in contact with the second surface to absorb the liquid substrate.

[0082] In a preferred implementation, the second liquid guide element is further constructed to abut against the second surface to support at least part of the first liquid guide element.

[0083] In a preferred implementation, a first convex edge extending in a longitudinal direction of the outer housing is further arranged in the outer housing.

the first convex edge is constructed to abut against the first surface to hold at least part of the first liquid guide element.

[0084] In a preferred implementation, the atomizer further includes:

a first liquid guide element, constructed to extend in the direction perpendicular to the longitudinal direction of the outer housing and arranged between the liquid storage cavity and the second liquid guide element in the longitudinal direction of the outer housing.

[0085] The second portion is constructed to at least partially run through the first liquid guide element in the longitudinal direction of the outer housing.

[0086] In a preferred implementation, the second portion has an insertion segment with a cross-sectional area less than those of other portions, and the insertion segment runs through the first liquid guide element to be in fluid communication with the liquid storage cavity.

[0087] In a preferred implementation, the second has a step defined by the insertion segment, and the step abuts against the second surface to support at least part of the first liquid guide element.

[0088] In a preferred implementation, the atomizer further includes:

an air channel, configured to provide a fluid path for air to cross the first liquid guide element in a longitudinal direction of the outer housing to enter the liquid storage cavity.

[0089] In a preferred implementation, the outer housing has arranged therein: an inner wall, configured to define the liquid storage cavity configured to store the liquid substrate.

[0090] The air channel includes a first channel portion. The first channel portion is formed between the first liquid guide element and the inner wall.

[0091] In a preferred implementation, the first liquid guide element has a peripheral side wall extending between the first surface and the second surface. The peripheral side wall has a flat and straight portion adjacent to the inner wall. A gap is retained between the flat and straight portion and the inner wall to form the first channel portion.

[0092] In a preferred implementation, a second convex edge extending in the longitudinal direction of the outer housing is arranged on the inner wall.

[0093] The peripheral side wall has a flat and straight portion close to the second convex edge, and the flat and straight portion abuts against the second convex edge, so that a gap is retained between the first liquid guide element and the inner wall to form the first channel portion.

[0094] In a preferred implementation, a support is constructed to define an atomization chamber surrounding at least part of the first portion and/or the heating element.

[0095] The air channel further includes a second channel portion for air in the atomization chamber to enter the first channel portion. At least part of the second channel portion is formed between the support and the first liquid guide element.

[0096] In a preferred implementation, a groove adjacent to the second surface of the first liquid guide element is arranged on the support, and the groove defines the second channel portion.

[0097] In a preferred implementation, the liquid storage cavity has an opening. The first liquid guide element is configured to cover the opening to seal the liquid storage cavity, so that the liquid substrate in the liquid storage cavity substantially leaves through the first liquid guide element.

[0098] Another embodiment of this application further provides an electronic atomization device, including the above atomizer and a power supply assembly configured to supply power to the atomizer.

BRIEF DESCRIPTION OF THE DRAWINGS

[0099] One or more embodiments are exemplarily described with reference to corresponding figures in drawings, and the exemplary descriptions are not to be construed as a limitation on the embodiments. Elements in the drawings having the same reference numeral represent similar elements, and unless otherwise particularly stated, the figures in the drawings are not drawn to scale.

FIG. 1 is a schematic structural diagram of an electronic atomization device according to an embodiment of this application.
FIG. 2 is a schematic structural diagram of the atomizer in FIG. 1 according to an embodiment.
FIG. 3 is a schematic exploded view of the atomizer shown in FIG. 2 from a perspective.
FIG. 4 is a schematic exploded view of the atomizer shown in FIG. 2 from another perspective.
FIG. 5 is a schematic sectional view of the atomizer shown in FIG. 2 in a width direction.
FIG. 6 is shows a microtopographic map of oriented fibers for preparing a first liquid guide element.
FIG. 7 is a schematic diagram of a second liquid guide element in FIG. 5 after being assembled to a support.
FIG. 8 is a schematic sectional view of a support in FIG. 5 from another perspective.
FIG. 9 is a schematic structural diagram of a main housing in FIG. 5 from another perspective.
FIG. 10 is a schematic diagram of a second channel portion formed between a first liquid guide element and a main housing in FIG. 5.
FIG. 11 is a schematic sectional view of the atomizer shown in FIG. 2 in a thickness direction.
FIG. 12 is an enlarged view of a portion C in FIG. 11.
FIG. 13 is a schematic sectional view of the second liquid guide element in FIG. 5 after being assembled to the support.
FIG. 14 is a schematic structural diagram of a heating element in FIG. 5 from another perspective.
FIG. 15 is a schematic exploded view of an atomizer from a perspective according to another embodiment.
FIG. 16 is a schematic exploded view of the atomizer in FIG. 15 from another perspective.
FIG. 17 is a schematic sectional view of the atomizer in FIG. 15 in a width direction.
FIG. 18 is a schematic structural diagram of a second liquid guide element in FIG. 15 from another perspective.
FIG. 19 is a schematic structural diagram of a second liquid guide element in FIG. 18 from another perspective.
FIG. 20 is a schematic sectional view of an atomizer in a width direction according to another embodiment.
FIG. 21 is a schematic exploded view of the atomizer in FIG. 20 from a perspective.
FIG. 22 is a schematic diagram of a heating element formed on a second liquid guide element according to another embodiment.
FIG. 23 is a schematic exploded view of an atomizer from a perspective according to another embodiment.
FIG. 24 is a schematic exploded view of the atomizer in FIG. 23 from another perspective.
FIG. 25 is a schematic sectional view of the atomizer in FIG. 23 in a width direction.
FIG. 26 is a schematic diagram of a first liquid guide element, a second liquid guide element, and a third liquid guide element in FIG. 23 after assembly.
FIG. 27 is a schematic diagram of the second liquid guide element and the third liquid guide element in FIG. 26 after being assembled in a support.
FIG. 28 is a schematic structural diagram of a second liquid guide element in FIG. 23 from another perspective.
FIG. 29 is a schematic sectional view of the first liquid guide element, the second liquid guide element, and the third liquid guide element in FIG. 26 after assembly.
FIG. 30 is a schematic structural diagram of a second liquid guide element according to another embodiment.
FIG. 31 is a schematic sectional view of a support in FIG. 23 from another perspective.
FIG. 32 is a schematic exploded view of an atomizer

from a perspective according to another embodiment.

FIG. 33 is a schematic structural diagram of the atomizer in FIG. 32 from another perspective.

FIG. 34 is a schematic sectional view of the atomizer in FIG. 32 in a width direction.

FIG. 35 is a schematic diagram of a first liquid guide element, a second liquid guide element, and a third liquid guide element in FIG. 32 after assembly.

FIG. 36 is a schematic diagram of the first liquid guide element, the second liquid guide element, and the third liquid guide element in FIG. 32 after being assembled to a support.

FIG. 37 is a schematic structural diagram of a support in FIG. 32 from another perspective.

DETAILED DESCRIPTION

[0100] For ease of understanding of this application, this application is described below in more detail with reference to drawings and specific implementations.

[0101] An embodiment of this application provides an electronic atomization device. Referring to FIG. 1, the electronic atomization device includes: an atomizer 100, configured to store a liquid substrate and configured to atomize the liquid substrate to generate an aerosol; and a power supply assembly 200, configured to supply power to the atomizer 100.

[0102] In an optional implementation, for example, as shown in FIG. 1, the power supply assembly 200 includes: a receiving cavity 270, arranged at an end in a length direction and configured to receive and accommodate at least part of the atomizer 100; and a first electrical contact 230, at least partially exposed from a surface of the receiving cavity 270 and configured to supply power to the atomizer 100 when at least part of the atomizer 100 is received and accommodated in the power supply assembly 200.

[0103] According to a preferred implementation shown in FIG. 1, a second electrical contact 21 is arranged on an end portion of the atomizer 100 opposite to the power supply assembly 200 in the length direction, so that when at least part of the atomizer 100 is received in the receiving cavity 270, the second electrical contact 21 is in contact with and abuts against the first electrical contact 230 to form electrical connection.

[0104] A seal member 260 is arranged in the power supply assembly 200, and at least part of an internal space of the power supply assembly 200 is separated by the seal member 260 to form the receiving cavity 270. In the preferred implementation shown in FIG. 1, the seal member 260 is constructed to extend in a cross-section direction of the power supply assembly 200, and is preferably prepared by using a flexible material, so as to prevent a liquid substrate seeping from the atomizer 100 to the receiving cavity 270 from flowing to components such as a controller 220 and a sensor 250 inside the power supply assembly 200.

[0105] In the preferred implementation shown in FIG. 1, the power supply assembly 200 further includes: a battery core 210, facing away from another end of the receiving cavity 270 in the length direction and configured to supply power; and the controller 220, arranged between the battery core 210 and an accommodation cavity, where the controller 220 operably guides a current between the battery core 210 and the first electrical contact 230.

[0106] The power supply assembly 200 includes a sensor 250, which is configured to sense an inhalable airflow generated by the atomizer 100 during inhalation, so that the controller 220 controls, based on a detection signal of the sensor 250, the battery core 210 to output a current to the atomizer 100.

[0107] Further, in the preferred implementation shown in FIG. 1, a charging interface 240 is arranged on another end of the power supply assembly 200 facing away from the receiving cavity 270, and is configured to supply power to the battery core 210.

[0108] An embodiment in FIG. 2 to FIG. 5 shows schematic structural diagrams of the atomizer 100 in FIG. 1 according to an embodiment. The atomizer includes a main housing 10.

[0109] As shown in FIG. 2 and FIG. 3, the main housing 10 is substantially in a shape of a flat cylinder. An interior thereof is hollow, which is a necessary functional component configured to store and atomize a liquid substrate. The main housing 10 has a proximal end 110 and a distal end 120 opposite to each other in a length direction. According to common use requirements, the proximal end 110 is configured as an aerosol inhalation end for a user, and a suction nozzle A is arranged on the proximal end 110 for inhalation by the user. The distal end 120 is an end to be coupled to the power supply assembly 200, and the distal end 120 of the main housing 10 is an open space in which a detachable end cap 20 is mounted. The open space structure is configured for necessary functional components to be mounted inside the main housing 10.

[0110] Further, in a specific implementation shown in FIG. 2 to FIG. 3, the second electrical contact 21 runs into the atomizer 100 from a surface of the end cap 20, so that at least part of the second electrical contact is exposed from the atomizer 100, thereby coming into contact with the first electrical contact 230 to form electrical connection. In addition, a first air inlet 22 is further arranged on the end cap 20, which is configured for external air to enter the atomizer 100 during inhalation. Further referring to FIG. 3, the second electrical contact 21 is flush with the surface of the end cap 20 after being assembled.

[0111] Further referring to FIG. 3 to FIG. 5, the main housing 10 has arranged therein a liquid storage cavity 12 configured to store a liquid substrate and an atomization assembly configured to absorb the liquid substrate from the liquid storage cavity 12 and heat and atomize the liquid substrate. In a schematic structural sectional view shown in FIG. 5, a vapor conveying tube 11 in an axial direction is arranged in the main housing 10, and the liquid storage cavity 12 configured to store the liquid substrate is formed in a space between an outer wall of the vapor conveying tube 11 and an inner wall of the main housing 10. A first end of the vapor conveying tube 11 opposite to the proximal end 110 is in communication with the suction nozzle A, to convey the generated aerosol to the suction nozzle A for inhalation.

[0112] Further, as shown in the figure, the vapor conveying tube 11 and the main housing 10 are integrally molded by using a moldable material, so that the prepared liquid storage cavity 12 forms an open space or an opening which opens toward the distal end 120.

[0113] The main housing 10 further includes a second liquid guide element 30, a heating element 40, and a support 70.

[0114] The second liquid guide element 30 has a first portion 31 extending in a width direction of the main housing 10 and a second portion 32 extending in a longitudinal direction of the main housing 10 from the first portion 31. The second portion 32 is in fluid communication with the liquid storage cavity 12 through a first liquid guide element 50 in a shape of a sheet or a block. The second liquid guide element 30 is made of conventional flexible plant cotton, and the first liquid guide element 50 is prepared from oriented fibers and is in a hard form.

[0115] The heating element 40 surrounds at least part of the first portion 31 to heat at least part of a liquid substrate in the first portion 31 to generate an aerosol.

[0116] The support 70 is in a shape of a hollow cup or cylinder. An interior thereof is configured to hold the second liquid guide element 30 and define an atomization chamber surrounding the first portion 31. The aerosol generated by the heating element 40 through heating is released into the atomization chamber and then outputted to the vapor output tube 11. In addition, an upper end of the support 70 close to the liquid storage cavity 12 supports the first liquid guide element 50.

[0117] Specifically, the second liquid guide element 30 is a capillary element having an internal capillary channel therein, which absorbs and delivers the liquid substrate through capillary infiltration. For example, in some implementations, the second liquid guide element 30 is a capillary element prepared from a flexible fiber material in a shape of a strip or a rod, for example, a capillary element of cotton fibers, non-woven fabric fibers, or a sponge. Alternatively, in some variable implementations, the second liquid guide element 30 is a capillary element having an internal capillary channel therein, for example, a porous ceramic body or a foam metal. During use, the second portion 32 of the second liquid guide element 30 is configured to absorb the liquid substrate and then deliver the liquid substrate to the first portion 31 through capillary infiltration. The heating element 40 is constructed to surround at least part of the first portion 31 and heat at least part of the liquid substrate of the first portion 31 to generate an aerosol. As shown in FIG. 3 to FIG. 5, the heating element 40 is constructed as a spiral heating wire, and may be made of resistive metal, such as aludirome or nichrome.

[0118] In an optional implementation, an extension length of the first portion 31 of the second liquid guide element 30 in FIG. 5 is about 9 mm, and an extension length of the second portion 32 is about 7.5 mm. An inner diameter of the heating element 40 is in a range of about 2.3 mm to 2.6 mm.

[0119] In an implementation, the first liquid guide element 50 is a layer of organic porous fibers in a shape of a sheet or a block extending in a cross-sectional direction of the main housing 10. After assembly, an upper surface of the first liquid guide element 50 close to the liquid storage cavity 12 is opposite to the liquid storage cavity 12 and is configured to absorb the liquid substrate, and a lower surface facing away from the liquid storage cavity 12 delivers the liquid substrate to the second portion 32 of the second liquid guide element 30 with which the lower surface is in contact, as shown by an arrow R1 in FIG. 5. In addition, a first plug-in hole 51 for the vapor conveying tube 11 to run through is arranged on the first liquid guide element 50.

[0120] In a specific implementation, the first liquid guide element 50 is made of 138# hard synthetic organic polymer fiber cotton, which has a density in a range of 0.1 mg/mm^3 to 0.9 mg/mm^3. An overall weight of the first liquid guide element 50 is in a range of about 0.04 g to 0.06 g. The first liquid guide element 50 is prepared from oriented fibers substantially in an oriented arrangement in the length direction. For example, FIG. 6 shows a microtopographic map of polypropylene fibers having an oriented arrangement according to an embodiment. By arranging the oriented fibers in the length direction of the first liquid guide element 50, the first liquid guide element 50 is endowed with a high anti-bending property and a rigidity.

[0121] Further referring to FIG. 7 and FIG. 8, the support 70 has a recess configured to accommodate the second liquid guide element 30 therein. The recess includes:

a first holding recess 71, arranged on an inner bottom wall, extending in the width direction of the main housing 10, and configured to accommodate the first portion 31 of the second liquid guide element 30; and a second holding recess 72, extending in the longitudinal direction of the main housing 10 and configured to accommodate the second portion 32 of the second liquid guide element 30.

[0122] In a preferred implementation shown in FIG. 7 and FIG. 8, the support 70 is preferably prepared from flexible materials such as silicone and thermoplastic elastomers, and a first convex rib 76 and a second convex rib 75 extending in a circumferential direction are arranged on an outer wall surface of the support 70. In an implementation, the first convex rib 76 and the second convex rib 75 are configured to seal a gap between the support 70 and the main housing 10.

[0123] In terms of design of an airflow path during inhalation, in the implementation shown in FIG. 3, a second air inlet 77 toward the end cap 20 is further arranged on the support 70, which is configured for external air entering the atomizer through the first air inlet 22 to enter the atomization chamber in the support 70. Then the external air carries the aerosol in the atomization chamber and is outputted though the vapor conveying tube 11 running through the first plug-in hole 51.

[0124] Further, as shown in FIG. 7 and FIG. 8, a plurality of convex edges 73 extending longitudinally are arranged on an inner wall of the support 70, and a capillary trench 731 that can adsorb and retain an aerosol condensate in the atomization chamber is formed between the convex edges 73. In an implementation, each of the convex edges 73 has a width in a range of about 0.5 mm to 1.5 mm, and the capillary trench 731 has a width less than 2 mm.

[0125] Further referring to FIG. 7, FIG. 8, FIG. 9, FIG. 11, and FIG. 12, a first notch 111 is arranged on an air inlet end of the vapor output tube 11 facing away from the suction nozzle A. Preferably, two first notches 111 are arranged, which are arranged opposite to each other in a thickness direction of the main housing 10. To adapt to the first notch 111, a convex edge 74 at least partially extending into of the first notch 111 is arranged in the support 70. After assembly, surfaces on two sides of the convex edge 74 are not in contact with surfaces on two sides of the first notch 111, and a specific spacing is held between the convex edge 74 and the surfaces on the two sides of the first notch 111, as shown in FIG. 12. The spacing is controlled to be less than 2 mm to form a capillary channel enabling a capillary action between the convex edge and the first notch. The capillary force of the capillary channel adsorbs condensates in the vapor output tube 11 falling or flowing into the air inlet end, and guides the condensates into the atomization chamber of the support 70, thereby preventing the condensates from aggregating into a liquid column in the vapor output tube 11 and alleviating or eliminating a problem that the condensates are inhaled.

[0126] As shown in FIG. 7 and FIG. 8, to ensure that the convex edge 74 can extend into the first notch 111 of the vapor output tube 11, a protrusion height of the convex edge 74 is greater than that of the convex edge 73, and a width thereof is the same as that of the convex edge 73. Further, in the preferred implementation shown in FIG. 8, the protrusion height of the convex edge 74 varies. Specifically, an upper end portion in a longitudinal direction has a larger protrusion height than other portions.

[0127] In an implementation shown in FIG. 9, a cross-sectional shape of the vapor output tube 11 is an ellipse. In addition, the ellipse has a long axis B1 which is the width direction of the main housing 10 and a short axis B2 which is the thickness direction of the main housing 10, so that the condensate in the vapor output tube 11 tends to aggregate at an end portion of the major axis B1 with a relatively large curvature. Moreover, a second notch 112 close to at least one side in the width direction of the main housing 10 is arranged on an end portion of the vapor output tube 11. The second notch 112 forms a hollow space on the end portion of the major axis B1 with the relatively large curvature, so that condensates are prevented from aggregating herein and thereby aggregating at a position close to the first notch 111, which facilitates guidance of the condensates into the atomization chamber with the cooperation of the convex edge 74.

[0128] In the preferred implementation shown in FIG. 9, the first notch 111 has a larger width than the second notch 112. In an implementation, the width of the first notch 111 is about 2.4 mm, and the width of the second notch 112 is about 1 mm.

[0129] In an implementation shown in FIG. 11 and FIG. 12, the vapor output tube 11 has an oblique tube wall 113 close to the first notch 111. During use, the aerosol condensate on an inner wall of the vapor output tube 11 is directed toward the first notch 111 by the oblique tube wall 113, then is adsorbed by the capillary channel formed between the convex edge 74 and the first notch 111 to the surface of the convex edge 74, and then flows downward into the atomization chamber in the support 70. In addition, it may be learned from both FIG. 5 and FIG. 12 that the convex edge 74 is not in contact with the surface of the first notch 111.

[0130] During use, as the liquid substrate is consumed, a negative pressure in the liquid storage cavity 12 gradually increases, which prevents the liquid substrate from smoothly leaving the liquid storage cavity 12 and from being smoothly delivered to the second liquid guide element 30. Therefore, an air pressure equilibration channel configured to supplement the liquid storage cavity 12 with air is arranged in the atomizer 100, which alleviates the negative pressure in the liquid storage cavity 12 to ensure smooth delivery of the liquid substrate. Specifically, referring to FIG. 7 to FIG. 10, the air pressure equilibration channel includes two channel portions in successive communication, that is, a first channel portion shown by an arrow R31 in FIG. 7 and FIG. 8 and a second channel portion shown by an arrow R32 in FIG. 10; Specifically, at least one convex edge 14 is arranged on each of inner walls on two sides of the main housing 10 close to the width direction. Specifically, in FIG. 9 and FIG. 10, two convex edges 14 are arranged, and a specific spacing 141 is reserved between the two convex edges. To adapt to the spacing 141, in terms of structural arrangement, a peripheral side wall of the hard first liquid guide element 50 in the FIG. 3 has a flat and straight portion 52. After assembly, the flat and straight portion 52 abuts against the convex edge 14 to define the spacing and prevent the spacing 141 from being filled or blocked.

[0131] Further, an air groove 79 is arranged on a surface of the support 70 close to the first liquid guide element 50. In FIG. 7 and FIG. 8, the air groove 79 is located on two end portions on two sides of the support 70 close to the width direction. One side of the air groove 79 is in communication with a space in the support 70, that is, the atomization chamber, and an other side is in communication with the spacing 141, so that air in the atomization chamber can pass through the air groove 79 in the arrow direction R31 in FIG. 7 and FIG. 8, and then enter the liquid storage cavity 12 of the main housing 10 through the spacing 141 in the arrow direction R32 in the FIG. 10, to alleviate or eliminate the negative pressure in the liquid storage cavity 12.

[0132] In the preferred implementation shown in FIG. 8 and FIG. 9, a plurality of convex edges 13 are further arranged in the main housing 10, which are configured to abut against and press the first liquid guide element 50 from the upper surface of the first liquid guide element 50 after assembly.

[0133] Similarly, a second trench 711 extending in the thickness direction of the main housing 10 is arranged on a wall of the first holding recess 71. The second trench 711 is located on the heating element 40 or two sides of a part of the first portion 31 surrounded by the heating element 40 in the width direction of the main housing 10. Finally, a gap or a space is formed between a part close to an atomization area heated by the heating element 40 and the first portion 31, which is configured to buffer the liquid substrate to prevent the liquid substrate from flowing or being delivered directly and quickly to the part surrounded by the heating element 40, to alleviate splattering of the liquid substrate.

[0134] Referring to FIG. 7 and FIG. 8, an inner wall of the second holding recess 72 has a first trench 722 extending from an upper end to the second trench 711 in the longitudinal direction. The first trench 722 is configured to adsorb and buffer a liquid substrate seeping out through the second channel portion of the pressure equilibration channel during air compensation, and can regulate efficiency of a liquid substrate flowing on a surface of the second portion 32. It may be learned from FIG. 8 that an upper end of the first trench 722 is in communication with the air groove 79. In this case, when the liquid substrate in the liquid storage cavity 12 seeps into the air groove 79 in a direction opposite to the direction shown by the arrow R32, the liquid substrate can be adsorbed into the first trench 722 and flow downward, as shown by the arrow R4 in FIG. 13.

[0135] In a preferred implementation, the first trench 722 is a capillary trench with a width and/or a depth less than 2 mm, which adsorbs and delivers the liquid substrate through capillary infiltration. In a more preferred implementation, the first trench 722 has a width and/or a depth in a range of about 0.5 mm to 1.5 mm.

[0136] Further referring to FIG. 8, the second holding recess 72 and the first holding recess 71 are spaced apart by the second trench 711, so that the second holding recess and the first holding recess are discrete. In addition, a surface of the second holding recess 72 is separated into at least two discrete portions by the first trench 722. Moreover, a surface of the first holding recess 71 is separated into at least two discrete portions by the second trench 711.

[0137] In this implementation, an extension length of the first trench 722 is greater than that of the second portion 32. The first trench at least partially extends into the first holding recess 71 along the air groove 79, and at least partially is adjacent to the surface of the first portion 31. Therefore, during use, the first trench 722 can directly supply the liquid substrate to the first portion 31.

[0138] Further referring to in FIG. 7 and FIG. 8, the air groove 79 is defined by protrusions 721 on the upper end of the support 70 surrounding the second holding recess 72. As shown in the figure, at least part of the air groove 79 is curved and surrounds the protrusions 721 of the second holding recess 72.

[0139] FIG. 14 is a schematic diagram of the heating element 40 from perspective. The heating element includes a first electrical pin 41 and a second electrical pin 42 arranged opposite to each other in the length direction and a first spiral coil 410 and a second spiral coil 420 extending between the first electrical pin 41 and the second electrical pin 42. In an implementation, the first spiral coil 410 and the second spiral coil 420 are simultaneously powered by the first electrical pin 41 and the second electrical pin 42, and are connected in parallel. Structurally, the first spiral coil 410 and the second spiral coil 420 are arranged snugly side by side. In an optional implementation, the first spiral coil 410 and the second spiral coil 420 each have about 3 to 10 turns or windings and an extension length in a range of about 4 mm to 7 mm. In FIG. 13, the first spiral coil and the second spiral coil each have 5 turns or windings and a design length of 6.5 mm.

[0140] According to FIG. 14, the first spiral coil 410 and the second spiral coil 420 are not arranged in an overlapping manner in a radial direction, and are arranged in parallel or staggered with respect to each other in an axial direction. At least the first spiral coil and the second spiral coil are at different positions relative to the first portion 31 in an extension direction of the first portion 31 after assembly, and therefore have higher contact area heating efficiency with the first portion 31.

[0141] A wire material used for the first electrical pin 41 and the second electrical pin 42 has a larger diameter than a wire material used for the first spiral coil 410 and the second spiral coil 420. In other words, the first electrical pin 41 and the second electrical pin 42 each are prepared by using a relatively thick wire, and the first spiral coil 410 and the second spiral coil 420 each are prepared by using a relatively thin wire to facilitate connection of two ends of the first spiral coil and the second spiral coil to the first electrical pin 41 and the second electrical pin 42. In a specific implementation, the first electrical pin 41 and the second electrical pin 42 each are prepared by using a wire with a diameter of about 0.25 mm, and the first spiral coil 410 and the second spiral coil 420 each are prepared by using a wire with a diameter of 0.15 mm.

[0142] In an optional implementation, the first spiral coil 410 and the second spiral coil 420 each are prepared by using suitable resistive metal or alloy, such as aludirome or nichrome, which have a relatively large temperature coefficient of resistance. The first electrical pin 41 and the second electrical pin 42 each serve as an electrical pin, and are prepared by using metal or alloy with relatively high conductivity and low resistivity, such as gold, silver, or copper, or each are an elongated pin prepared by forming a metal coating on an outer surface of a filamentous substrate.

[0143] Further referring to FIG. 14, the first electrical pin 41 includes an annular support portion 411 and an electrical connection portion 412.

[0144] The annular support portion 411 is connected to the first spiral coil 410 and the second spiral coil 420, and sizes of spirals, such as outer diameters or inner diameters of the annular support portion, the first spiral coil, and the second spiral coil are substantially the same. In this case, during assembly, the annular support portion 411 can surround the first portion 31 of the second liquid guide element 30, so that the annular support portion 411 of the first electrical pin 41 supports the first portion 31 of the second liquid guide element 30 after assembly. The electrical connection portion 412 runs to outside of the support 70 to abut against or to be welded with the second electrical contact 21.

[0145] Further referring to FIG. 13, the first spiral coil 410 and the second spiral coil 420 of the heating element 40 are not in contact with the inner wall of the support 70 and/or the wall of the first holding recess 71 after assembly. Instead, the first spiral coil and the second spiral coil are held on the inner wall of the support 70 and/or the wall of the first holding recess 71 through the annular support portion 411 of the first electrical pin 41, thereby supporting the heating element 40. During operation, the first electrical pin 41 and the second electrical pin 42 have a lower temperature than the first spiral coil 410 and the second spiral coil 420, thereby avoiding thermal damage to the support 70.

[0146] Further referring to FIG. 3 and FIG. 13, the electrical connection portion 412 of the first electrical pin 41 is in a shape of a bent hook. In the assembled structure, the support 70 has a lead hole 781 running from the inner wall to a surface toward the end cap 20 and a contact hole 782 arranged toward the end cap 20 and configured to accommodate at least part of the second electrical contact 21. After assembly, the electrical connection portion 412 runs through the lead hole 781 and then extends or bends into the contact hole 782 to form electrical connection to the second electrical contact 21.

[0147] The second electrical pin 42 has the same construction, connection, and assembly as the first electrical pin 41.

[0148] In an optional implementation, the heating element 40 has an inner diameter in a range of about 2 mm to 4 mm, and preferably, in a range of 2.3 mm to 2.6 mm. The heating element 40 has a resistance in a range of about 0.5 ohms to 2 ohms.

[0149] In a more preferred implementation, a spiral coil portion formed by the first spiral coil 410 and the second spiral coil 420 of the heating element 40 side by side has a length in a range of about 4.2 mm to 5 mm. In FIG. 14, 5 turns or windings are arranged, and each turn or winding has a length of about 1 mm.

[0150] Further, FIG. 15 to FIG. 17 are respectively a schematic exploded view and a schematic sectional view of an atomizer 100a according to another embodiment. The atomizer 100a includes a main housing 10a, a second liquid guide element 30a, a heating element 40a, a support 70a, an end cap 20a, and a second electrical contact 21a.

[0151] The main housing 10a has arranged therein a vapor output tube 11a extending in a longitudinal direction and a liquid storage cavity 12a defined by the vapor output tube 11a and an inner wall of the main housing 10a.

[0152] The second liquid guide element 30a has a first portion 31a extending in a width direction of the main housing 10a and a second portion 32a extending in a longitudinal direction of the main housing 10a from the first portion 31a. The second portion 32a is in fluid communication with the liquid storage cavity 12a through a first liquid guide element 50a in a shape of a sheet or a block. The first liquid guide element 50a is prepared from oriented fibers and is in a hard form. The second liquid guide element 30a is a rigid porous body, for example, a porous ceramic body.

[0153] The heating element 40a is formed on the first portion 31 to heat at least part of a liquid substrate in the first portion 31a to generate an aerosol.

[0154] The support 70a is in a shape of a hollow cup or cylinder. An interior thereof is configured to hold the second liquid guide element 30a and define an atomization chamber surrounding the first portion 31a. The aerosol generated by the heating element 40a through heating is released into the atomization chamber and then outputted to the vapor output tube 11a. In addition, an upper end of the support 70a close to the liquid storage cavity 12a supports the first liquid guide element 50a.

[0155] The end cap 20a is configured to seal an open end of the main housing 10a, and has a second electrical contact 21a and a first air inlet 22a arranged thereon.

[0156] The second electrical contact 21a runs through a contact hole 78a on the support 70a through the end cap 20a to abut against the heating element 40a, and is configured to supply power to the heating element 40a.

[0157] Further referring to FIG. 18 and FIG. 19, the second liquid guide element 30a prepared from the porous ceramic body is substantially in a shape of U. The second liquid guide element 30a has a length size d1 of about 13 mm, a width size d2 of about 3 mm, and a height size d4 of about 5 mm. A length size d11 of the first portion 31a of the second liquid guide element 30a is about 7 mm. In other words, a size of a U-shaped opening is 7 mm. A height size d41 of the first portion 31a is about 2 mm. A length size d3 of the second portion 32a of the second liquid guide element 30a is about is about 3 mm.

[0158] An outer surface 310 of the first portion 31a of the second liquid guide element 30a facing away from the U-shaped opening is constructed substantially in a shape of a plane, and the outer surface 310 is configured as an atomization surface 310a configured to atomize the liquid substrate. The heating element 40a is constructed to be coupled to the atomization surface 310a. In an implementation, a liquid substrate absorbed by the second portion 32a is delivered to the atomization surface 310a, and is heated and atomized by the heating element 40 to generate an aerosol. The aerosol is released into the atomization chamber in the support 70a through the atomization surface 310a, and then is outputted with an inhalable airflow.

[0159] In FIG. 19, the heating element 40a has a conductive portion 41a located on each of two ends and a resistance heating trajectory portion 42a extending zigzag in a length direction of the first portion 31a. During use, the second electrical contact 21a abuts against the conductive portion 41a to supply power to the resistance heating trajectory portion 42a. In some implementations, the resistance heating trajectory portion 42a is a trajectory formed through printing, etching, printing, or the like. In some other implementations, the resistance heating trajectory portion 42a is a patterned trajectory.

[0160] Based on the implementation, the second liquid guide element 30a is a rigid porous body. After assembly, a front end of the second portion 32a of the second liquid guide element 30a abuts against a lower surface of the first liquid guide element 50a to support the first liquid guide element 50a and to receive the liquid substrate from the first liquid guide element 50a.

[0161] Further, FIG. 20 to FIG. 21 are schematic structural diagrams of an atomizer 100b according to another embodiment. In the atomizer 100b, a hole 53b is arranged to run through a first liquid guide element 50b in a thickness direction. A second portion 321b of a second liquid guide element 30b runs through the hole 53b from a lower surface of the first liquid guide element 50b, and is exposed from a liquid storage cavity 12b to directly absorb a liquid substrate in the liquid storage cavity 12b. Specifically,

the second portion 321b of the second liquid guide element 30b has an insertion segment 321b with a relatively small outer diameter, and is in communication with the liquid storage cavity 12b after the insertion segment 321b runs through the hole 53b of the first liquid guide element 50b. In addition, a sectional width or length of the insertion segment 321b is 2 mm. In an implementation, a step is formed at a joint of the insertion segment 321b the second portion 321b. The step abuts against the lower surface of the first liquid guide element 50b, to support and hold the first liquid guide element 50b.

[0162] FIG. 22 is a schematic structural diagram of a second liquid guide element 30f that may be used for the atomizer 100b according to another embodiment. In this embodiment, an upper surface of a first portion 31f of the second liquid guide element 30f is constructed as an atomization surface 310f. A heating element 40f is formed on the atomization surface 310f defined by the upper surface. In addition, after assembly, the heating element 40f and/or the atomization surface 310f is toward the first liquid guide element 50b.

[0163] In a corresponding implementation, the heating element 40f is formed on the atomization surface 310f through printing, deposition, etching, mounting, or the like. A conductive portion 41f of the heating element 40f is connected to the second electrical contact 21b through an elastic piece, lead welding, or the like to supply power to the heating element 40f.

[0164] Alternatively, in other variable implementations, the second liquid guide element 30f may further have another shape or construction, for example, an L shape.

[0165] FIG. 23 to FIG. 25 are schematic structural diagrams of an atomizer 100c according to another embodiment. In this embodiment, the atomizer 100c includes a main housing 10c, an end cap 20c, and a first liquid guide element 50c.

[0166] The main housing 10c has a suction nozzle A configured for inhalation on a proximal end thereof. The main housing 10c has a vapor output tube 11c and a liquid storage cavity 12c defined by the vapor output tube 11c therein. The liquid storage cavity 12c has an opening toward a distal end.

[0167] The end cap 20c is coupled to an open space at the distal end of the main housing 10c, to define an outer housing of the atomizer 100c with the main housing 10c.

[0168] The first liquid guide element 50c is in a shape of a sheet or a block perpendicular to the main housing 10c, which crosses and covers the opening of the liquid storage cavity 12c after assembly, to seal the liquid storage cavity 12c, so that a liquid substrate in the liquid storage cavity 12c may substantially leave through only the first liquid guide element 50c. In a preferred implementation, the first liquid guide element 50c has a profile substantially in a shape of an ellipse. In a preferred implementation, the first liquid guide element 50c is made of the hard organic cotton for making the first liquid guide element 50 in the above embodiments.

[0169] The atomizer 100c further includes a second liquid guide element 30c, a heating element 40c, and a third liquid guide element 80c.

[0170] Referring to FIG. 24 and FIG. 26, the second liquid guide element 30c overall has a first side wall 31c and a second side wall 32c opposite to each other in a thickness direction and a notch located between the first side wall 31c and the second side wall 32c. The second liquid guide element 30c further has an atomization surface 310c facing away from the first side wall 31c and/or the second side wall 32c and/or the notch in a longitudinal direction. In the preferred implementation, the second liquid guide element 30c is rigid, and is made of the porous body in the above embodiments, for example, a porous ceramic body.

[0171] The heating element 40c is coupled to the atomization surface 310c to heat at least part of a liquid substrate in the second liquid guide element 30c to generate an aerosol and release the aerosol through the atomization surface 310c.

[0172] The third liquid guide element 80c is configured to deliver the liquid substrate between the first liquid guide element 50c and the second liquid guide element 30c, so that a liquid substrate absorbed by the first liquid guide element 50c is delivered to the second liquid guide element 30c. In a preferred implementation, the third liquid guide element 80c is flexible, for example, is a sponge. As shown in FIG. 26, after assembly, at least part of the third liquid guide element 80c is accommodated and held within a notch 33c of the second liquid guide element 30c, and is in contact with both the first liquid guide element 50c and the second liquid guide element 30c, to form fluid communication with the first liquid guide element and the second liquid guide element, so as to deliver the liquid substrate between the first liquid guide element and the second liquid guide element. As shown in the figure, the third liquid guide element 80c is substantially in a shape of a block, a column, or a strip, an upper end thereof abuts against the first liquid guide element 50c, and a lower end abuts against the second liquid guide element 30c, to implement liquid delivery between the first liquid guide element and the second liquid guide element.

[0173] In some variable embodiments, for example, a second liquid guide element 30e shown in FIG. 30. An upper surface of the second liquid guide element 30e has a groove 33e, and the groove 33e accommodates and holds at least part of the third liquid guide element 80c. In addition, after assembly, the third liquid guide element 80c is in contact with or abuts against a surface of the second liquid guide element 30e defining the groove 33e to form fluid communication, thereby delivering the liquid substrate.

[0174] Alternatively, in other variable implementations, an accommodating or supporting structure such as a clamping port, a holding cavity, or a recess is formed on the second liquid guide element 30c/30e, to accommodate at least part of the third liquid guide element 80c and support or hold the third liquid guide element 80c.

[0175] The atomizer further includes a support 70c configured to accommodate and hold the second liquid guide element 30c and the third liquid guide element 80c and define an atomization chamber for aerosol release with at least part of the atomization surface 310c; In addition, on the support 70c, an electrode hole 78c for a second electrical contact 21c to run through so as to abut against the heating element 40c is further arranged, and a second air inlet 77c for external air entering the atomizer through a first air inlet 22c to enter the atomization chamber is further arranged. In addition, the support 70c further abuts against a lower surface of the first liquid guide element 50c, to support and hold at least part of the first liquid guide element 50c. Moreover, after assembly, the vapor output tube 11c runs through a first plug-in hole 51d on the first liquid guide element 50c to be in fluid communication with the atomization chamber in the support 70c, so as to output an aerosol.

[0176] Further referring to FIG. 25 and FIG. 26, after assembly, the third liquid guide element 80c has an exposed portion 81c exposed from the notch of the second liquid guide element 30c in a length direction of the second liquid guide element 30c. After assembly, the exposed portion 81c is supported by the support 70c.

[0177] In the atomizer 100c in this embodiment, for an airflow structure or path, further refer to an arrow R2 in FIG. 27. After assembly, in the thickness direction, a gap exists between the first side wall 31c of the second liquid guide element 30c and the inner wall of the support 70c and between the second side wall 32c of the second liquid guide element 30c and the inner wall of the support 70c, to form a channel 71c. During inhalation, after air enters the atomization chamber defined by the atomization surface 310c through the second air inlet 77c, the air carries the aerosol and crosses the second liquid guide element 30c through the channel 71c, and then is outputted to the vapor output tube 11c at a central portion close to the vapor output tube 11c.

[0178] As shown in FIG. 24, FIG. 27, and FIG. 30, a retaining protrusion 72c configured to fix and hold the second liquid guide element 30c is arranged on the inner wall of the support 70c. After assembly, an upper end surface of the first side wall 31c and/or the second side wall 32c of the second liquid guide element 30c abuts against the retaining protrusion 72c, so that the second liquid guide element 30c is stably held in the support 70c.

[0179] Further referring to FIG. 27, to alleviate a negative pressure in the liquid storage cavity 12c, the support 70c has grooves 79c on two sides in a width direction, which are in airflow communication with a space in the support 70c, so that external air entering the atomization chamber can enter the grooves 79c according to the arrow R3, and then enter the liquid storage cavity 12c through a gap between a flat and straight portion 52c on a peripheral side wall of the first liquid guide element 50c and the main housing 10c.

[0180] Further referring to FIG. 28 and FIG. 29, in this embodiment, the structure of the second liquid guide element 30c further includes a substrate portion 34c and a connection portion 35c.

[0181] The substrate portion 34c is located on a lower end side of the second liquid guide element 30c in the longitudinal direction, and extends between the first side wall 31c and the second side wall 32c. In addition, an extension length of the substrate portion 34c in the length direction of the second liquid guide element 30c is the same as an extension length of the first side wall 31c and/or the second side wall 32c. As shown in the figure, a lower surface of the substrate portion 34c is used as the atomization surface 310c, and a lower end of the third liquid guide element 80c abuts against an upper surface of the substrate portion 34c.

[0182] The connection portion 35c is located on an upper end side of the second liquid guide element 30c in the longitudinal direction, and is arranged close to a central portion of the second liquid guide element 30c. Similarly, the connection portion 35c extends between the first side wall 31c and the second side wall 32c. In addition, an extension length of the connection portion 35c in the length direction of the second liquid guide element 30c is less than the extension length of the first side wall 31c and/or the second side wall 32c and/or the substrate portion 34c. In this way, a region not covered by the connection portion 35c forms the notch 33c.

[0183] Moreover, a space 36c extending in the length direction is defined between the connection portion 35c and the substrate portion 34c. After assembly, the space 36c is surrounded or shielded by the third liquid guide element 80c. In this way, the space 36c may be configured to receive or buffer a liquid substrate seeping out through a surface of the third liquid guide element 80c, to adjust an amount or efficiency of supply of the liquid substrate to the atomization surface 310c.

[0184] Further, as shown in FIG. 29, after assembly, at least part of the connection portion 35c of the second liquid guide element 30c is opposite to the first plug-in hole 51c of the first liquid guide element 50c in the longitudinal direction of the main housing 10c. Therefore, in an implementation, the connection portion 35c may be configured to receive an aerosol condensate falling from the vapor output tube 11c.

[0185] Further, FIG. 31 is a schematic sectional view of the support 70c from a perspective. The support 70c has a first step 73c and a second step 74c provided or formed therein.

[0186] The first step 73c is configured to support the second liquid guide element 30c. Specifically, after assembly, at least part on an end side in a length direction of the atomization surface 310c of the second liquid guide element 30c abuts against the first step 73c. In addition, the electrode hole 78c extends or runs into the first step 73c, so that the second electrical contact 21c can abut against a conductive portion of the heating element 40c on the atomization surface 310c after running through the electrode hole 78c, thereby supplying power to the heating element 40c.

[0187] The second step 74c is configured to support the exposed portion 81c of the third liquid guide element 80c protruding from the notch 33c of the second liquid guide element 30c.

[0188] It may be learned from FIG. 31 that, the first step 73c and the second step 74c have different heights in the longitudinal direction. The first step 73c and the second step 74c are arranged on two sides of an inner surface of the support 70c close to the width direction.

[0189] Further referring to FIG. 31, the first step 73c and an inner bottom wall 76c of the support 70c have different heights in the longitudinal direction. In this case, after assembly, a spacing 340c is formed between the atomization surface 310c of the second liquid guide element 30c and the inner bottom wall 76c of the support 70c, which forms the atomization chamber configured to accommodate the aerosol. In this embodiment, as shown in FIG. 31, a capillary trench 75c is arranged on a side wall of the spacing 340c and on the inner bottom wall 76c. The capillary trench 75c has a width in a range of about 0.5 mm to 2 mm to adsorb an aerosol condensate in the atomization chamber.

[0190] FIG. 32 to FIG. 35 are schematic structural diagrams of an atomizer 100d according to another embodiment. In this embodiment, the atomizer 100d includes a main housing 10d, an end cap 20d, a first liquid guide element 50d, a second liquid guide element 30d, a heating element 40d, and a third liquid guide element 80d.

[0191] The main housing 10d has a suction nozzle A configured for inhalation on a proximal end thereof. The main housing 10d has a vapor output tube 11d and a liquid storage cavity 12d defined by the vapor output tube 11d therein. The liquid storage cavity 12d has an opening toward a distal end.

[0192] The end cap 20d is coupled to an open space at the distal end of the main housing 10d, to define an outer housing of the atomizer 100d with the main housing 10d.

[0193] The first liquid guide element 50d is in a shape of a sheet or a block perpendicular to the main housing 10d. In a preferred implementation, the first liquid guide element 50d has a profile substantially in a shape of an ellipse. In a preferred implementation, the first liquid guide element 50d is made of the hard organic cotton for making the first liquid guide element 50 in the above embodiments.

[0194] Referring to FIG. 35, the second liquid guide element 30d is overall in a shape of a sheet or a plate perpendicular to a longitudinal direction of the main housing 10d. An upper surface thereof in a thickness direction is in fluid communication with the first liquid guide element 50d to receive a liquid substrate. A lower surface thereof in the thickness direction is constructed as an atomization surface 310d. In the preferred implementation, the second liquid guide element 30d is rigid, and is made of the porous body in the above embodiments, for example, a porous ceramic body.

[0195] The heating element 40d is formed on the atomization surface 310d, and is configured to heat at least part of a liquid substrate in the second liquid guide element 30d to generate an aerosol.

[0196] The third liquid guide element 80d is positioned between the first liquid guide element 50d and the second liquid guide element 30d in the longitudinal direction of the main housing 10d, to deliver the liquid substrate between the first liquid guide element and the second liquid guide element.

[0197] Further referring to FIG. 33 and FIG. 35, the third liquid guide element 80d is a substantially in a shape of U, and includes a third portion 81d in a direction perpendicular to the longitudinal direction of the main housing 10d and a fourth portion 82d extending from the third portion 81d toward the first liquid guide element 50d. After assembly, the third portion 81d is in contact with and abuts against an upper surface of the second liquid guide element 30d to form fluid communication with the second liquid guide element 30d, and the fourth portion 82d extends to and abuts against a lower surface of the first liquid guide element 50d to form fluid communication with the first liquid guide element 50d.

[0198] In a preferred implementation shown in FIG. 34 and FIG. 35, an extension length of the third portion 81d is greater than a length of the second liquid guide element 30d. Therefore, after assembly, at least part of the third portion 81d protrudes relative to the second liquid guide element 30d, and protruding portion abuts against a support 70d and is at least partially supported by the support 70d. Similarly, the third portion 81d further abuts against the second liquid guide element 30d, so that the third portion 81d is at least partially supported by the second liquid guide element 30d.

[0199] Further referring to FIG. 36, two side walls of the support 70d in a thickness direction each have a window 76d extending in the longitudinal direction. After assembly, an output channel is defined between the window 76d and an inner wall of the main housing 10d. Specifically, an extension length of the window 76d in the longitudinal direction covers at least an atomization chamber 340d defined by the atomization surface 310d of the second liquid guide element 30d, so that air entering the atomization chamber 340d through a second air inlet 77d can enter the output channel defined between the window 76d and the inner wall of the main housing 10d, and then crosses a U-shaped opening of the third liquid guide element 80d according to an arrow R2 in the figure to be outputted to the vapor output tube 11d.

[0200] Further referring to FIG. 36, in this embodiment, a groove 79d is arranged on a surface of the support 70c adjacent to the first liquid guide element 50d, this recess being in airflow communication with the output channel indicated by the arrow R2. Therefore, after assembly, when a negative pressure in the liquid storage cavity 12d exceeds a specific threshold range, the air can successively pass through a first channel portion defined by the groove 79d indicated by an arrow R31 in FIG. 36 and a second channel portion defined between a flat and straight portion 52d of a peripheral side wall of the first liquid guide element 50d and the inner wall of the main housing 10d, to enter the liquid storage cavity 12d to alleviate the negative pressure.

[0201] Further referring to FIG. 37, in this embodiment, the support 70d has a first boss 73d, a second boss 74d, an electrode hole 78d, and a capillary trench 75d.

[0202] The first boss 73d is configured to abut against the atomization surface 310d of the second liquid guide element 30d, to support the second liquid guide element 30d.

[0203] The second boss 74d is configured to abut against a part of the third liquid guide element 80d protruding from or exposed from the second liquid guide element 30d, to support the third liquid guide element 80d.

[0204] The electrode hole 78d is configured for a second electrical contact 21d to run through to abut against the atomization surface 310d, so as to supply power to the heating element.

[0205] The capillary trench 75d is formed on an inner bottom wall of the support 70d and on a surface of a space between the first boss 73d and the inner bottom wall, to adsorb an aerosol condensate in the atomization chamber.

[0206] It should be noted that, the specification and the drawings of this application provide the preferred embodiments of this application, but this application is not limited to the embodiments described in this specification. Further, a person of ordinary skill in the art may make improvements or modifications according to the above descriptions, and all the improvements and modifications fall within the protection scope of the appended claims of this application.

Claims

1. An atomizer, configured to atomize a liquid substrate to generate an aerosol, and comprising an outer housing, wherein the outer housing has arranged therein:

   a liquid storage cavity, configured to store a liquid substrate;
   a heating element, configured to heat at least part of the liquid substrate to generate an aerosol;
   a capillary element, comprising a first portion coupled to the heating element and a second portion extending from the first portion toward the liquid storage cavity, wherein the second portion is constructed to absorb the liquid substrate from the liquid storage cavity and deliver the liquid substrate to the first portion; and
   a support, configured to hold the capillary element, wherein the support comprises a recess configured to accommodate at least part of the capillary element, the support is provided with a first trench formed on a surface of the recess, and the first trench extends in parallel with the second portion of the capillary element and is adj acent to an outer surface of the second portion.

2. The atomizer according to claim 1, wherein the recess comprises a first holding recess configured to accommodate at least part of the first portion and a second holding recess configured to accommodate at least part of the second portion.

3. The atomizer according to claim 2, wherein the first trench extends from a surface of the second holding

recess to the first holding recess.

4. The atomizer according to claim 2, wherein the second holding recess and the first holding recess are discrete.

5. The atomizer according to any of claims 1 to 4, wherein the surface of the recess comprises two discrete portions.

6. The atomizer according to any of claims 1 to 4, wherein the first trench is a capillary trench.

7. The atomizer according to any of claims 1 to 4, wherein the first trench is constructed to be in fluid communication with the liquid storage cavity.

8. The atomizer according to any of claims 1 to 4, wherein at least part of the first trench is constructed to be bent.

9. The atomizer according to any of claims 1 to 4, wherein a second trench is arranged on the surface of the recess.

10. The atomizer according to claim 9, wherein the second trench is arranged perpendicular to an extension direction of the first portion.

11. The atomizer according to claim 10, wherein the first trench extends to be in communication with the second trench.

12. The atomizer according to any of claims 1 to 4, wherein the capillary element is rigid.

13. The atomizer according to claim 12, wherein the capillary element comprises a porous ceramic body.

14. The atomizer according to any of claims 1 to 4, wherein the first portion has an atomization surface facing away from the liquid storage cavity, and the heating element is coupled to the atomization surface.

15. The atomizer according to claim 14, wherein the heating element comprises a resistance heating trajectory coupled to the atomization surface.

16. The atomizer according to any of claims 1 to 4, wherein the outer housing further has arranged therein:

a first liquid guide element, constructed to extend in a direction perpendicular to a longitudinal direction of the outer housing and arranged between the liquid storage cavity and the capillary element in the longitudinal direction of the outer housing, wherein the first liquid guide element has a first surface close to the liquid storage cavity in the longitudinal direction of the outer housing and a second surface facing away from the first surface, and the first surface is configured to be in fluid communication with the liquid storage cavity to absorb the liquid substrate in the liquid storage cavity; and
the second portion is constructed to be in contact with the second surface to absorb the liquid substrate.

17. The atomizer according to claim 16, further comprising:

an air channel, configured to provide a fluid path for air to cross the first liquid guide element in the longitudinal direction of the outer housing to enter the liquid storage cavity, wherein
the first trench is constructed to be in fluid communication with the air channel to form fluid communication with the liquid storage cavity.

18. The atomizer according to claim 17, wherein the air channel comprises a first channel portion formed between the first liquid guide element and the outer housing, and a second channel portion formed between the first support and the first liquid guide element, and the first trench is in communication with the second channel portion.

19. The atomizer according to claim 18, wherein the second channel portion comprises a groove formed on the second surface of the first liquid guide element adjacent to the support.

20. The atomizer according to claim 16, wherein a rigidity of the capillary element is greater than a rigidity of the first liquid guide element.

21. The atomizer according to any of claims 1 to 4, wherein the outer housing further has arranged therein:

a first liquid guide element, constructed to extend in a direction perpendicular to a longitudinal direction of the outer housing and arranged between the liquid storage cavity and the capillary element in the longitudinal direction of the outer housing, wherein
the second portion is constructed to at least partially run through the first liquid guide element in the longitudinal direction of the outer housing.

22. An electronic atomization device, comprising the atomizer according to any of claims 1 to 21 and a power supply assembly configured to supply power to the atomizer.

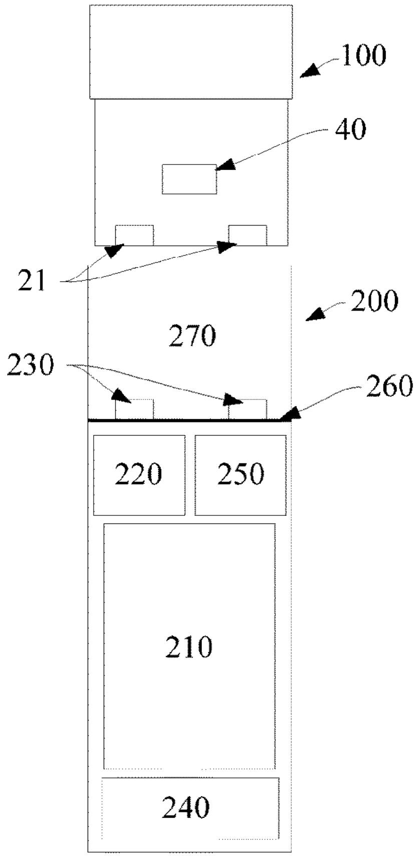


FIG. 1

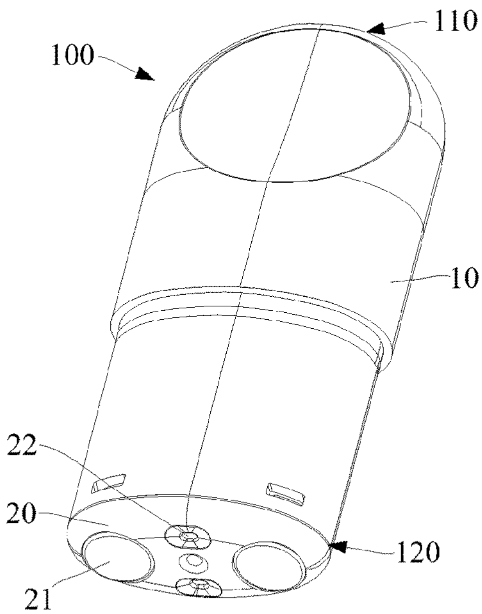


FIG. 2

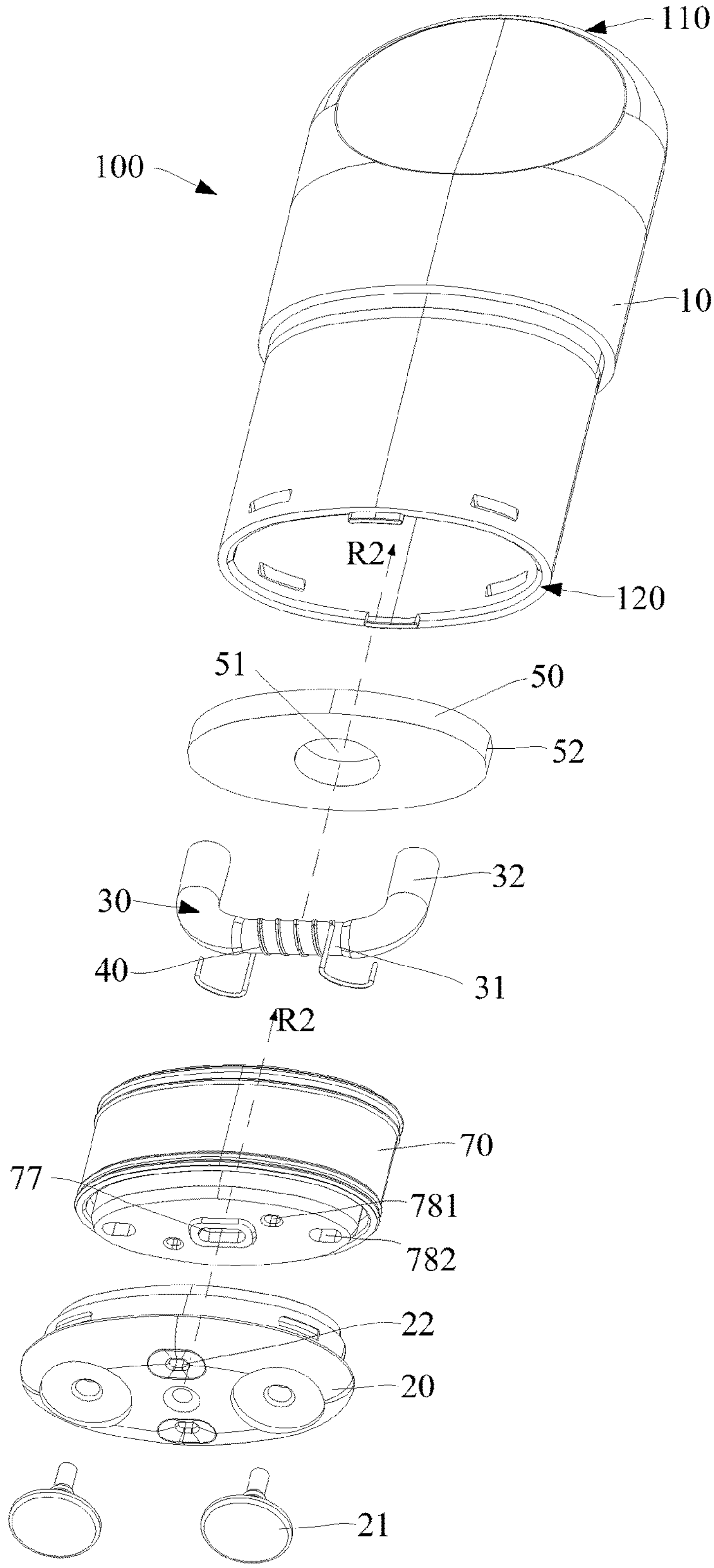


FIG. 3

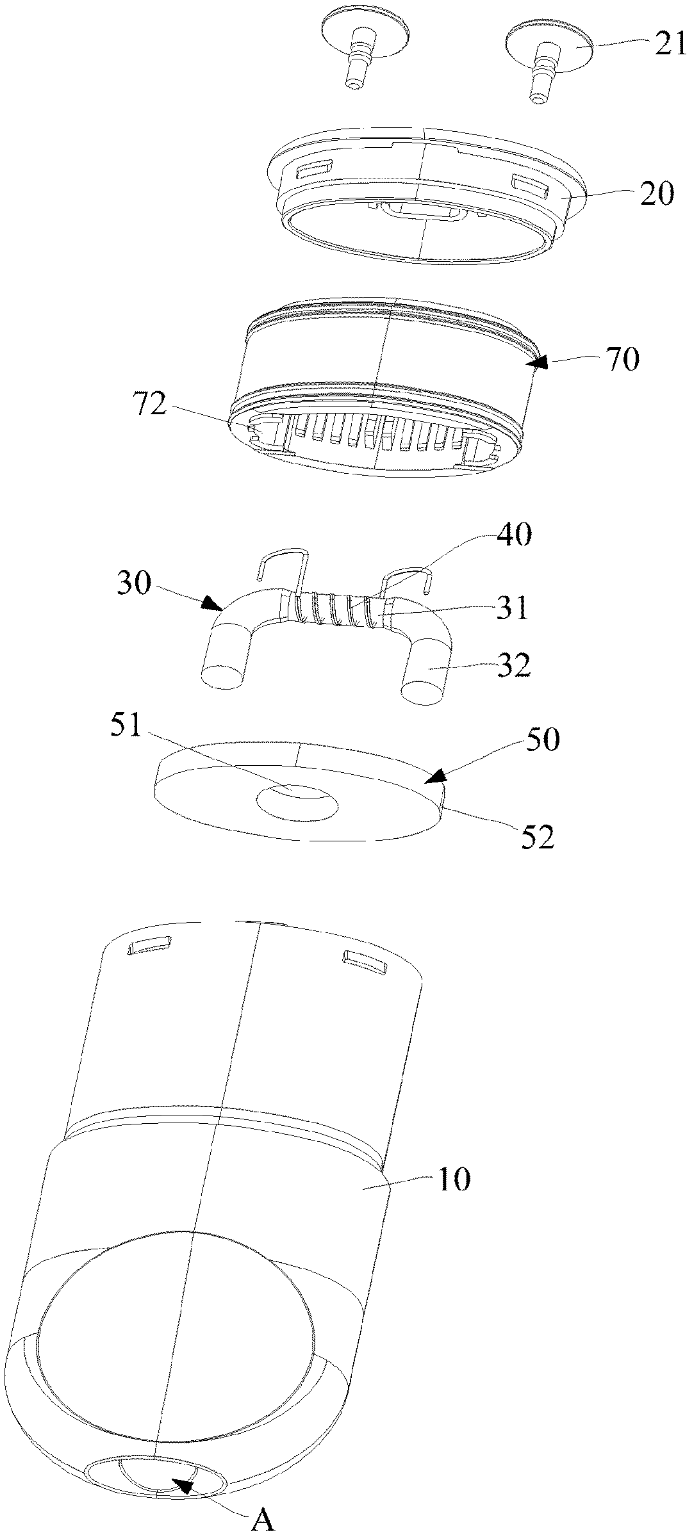


FIG. 4

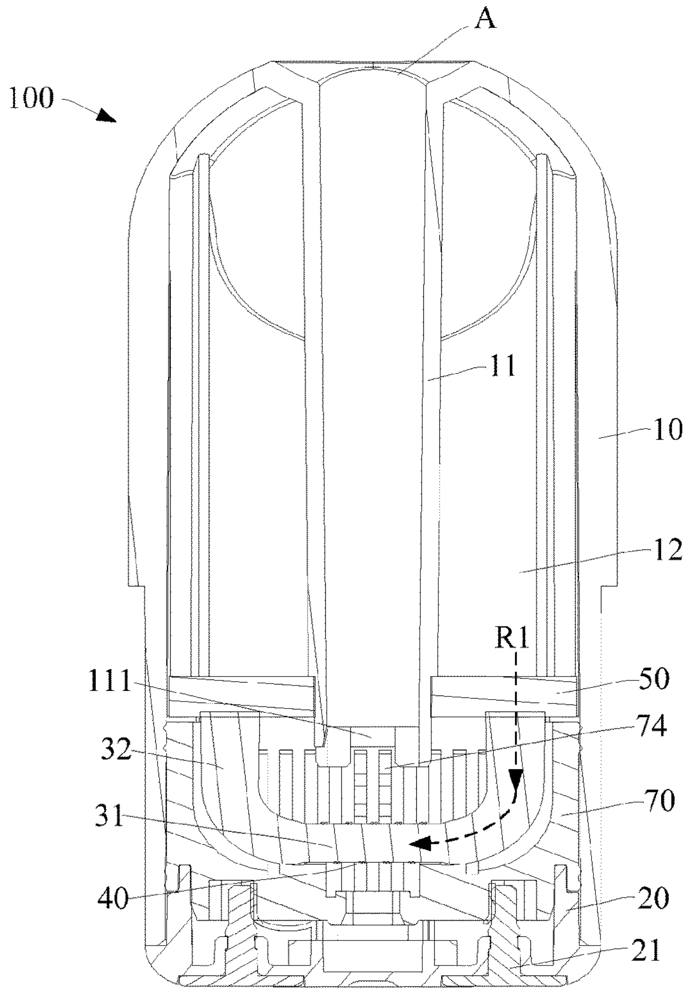


FIG. 5

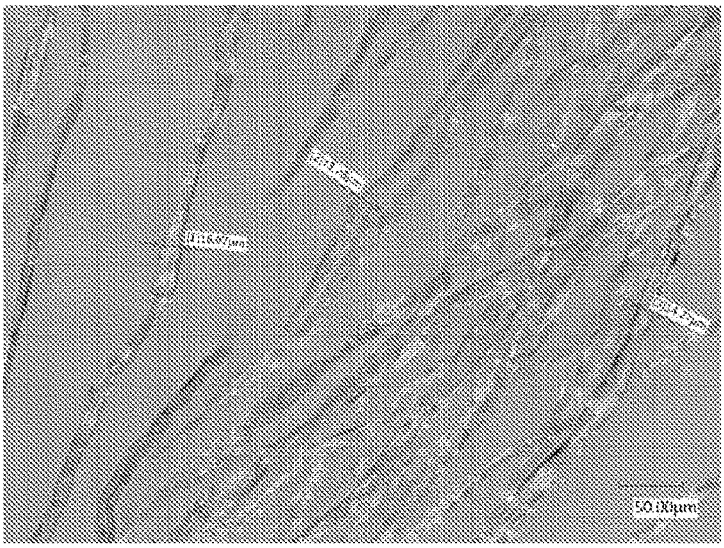


FIG. 6

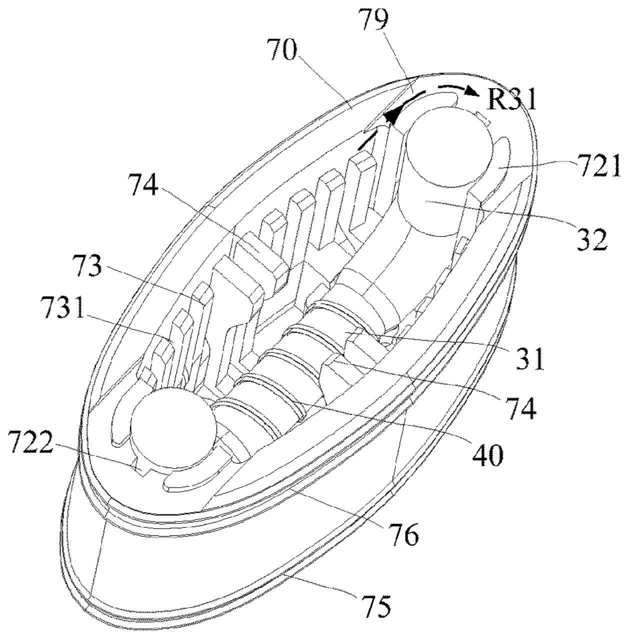

79
70
R31
721
74
32
73
731
31
74
722
40
76
75

FIG. 7

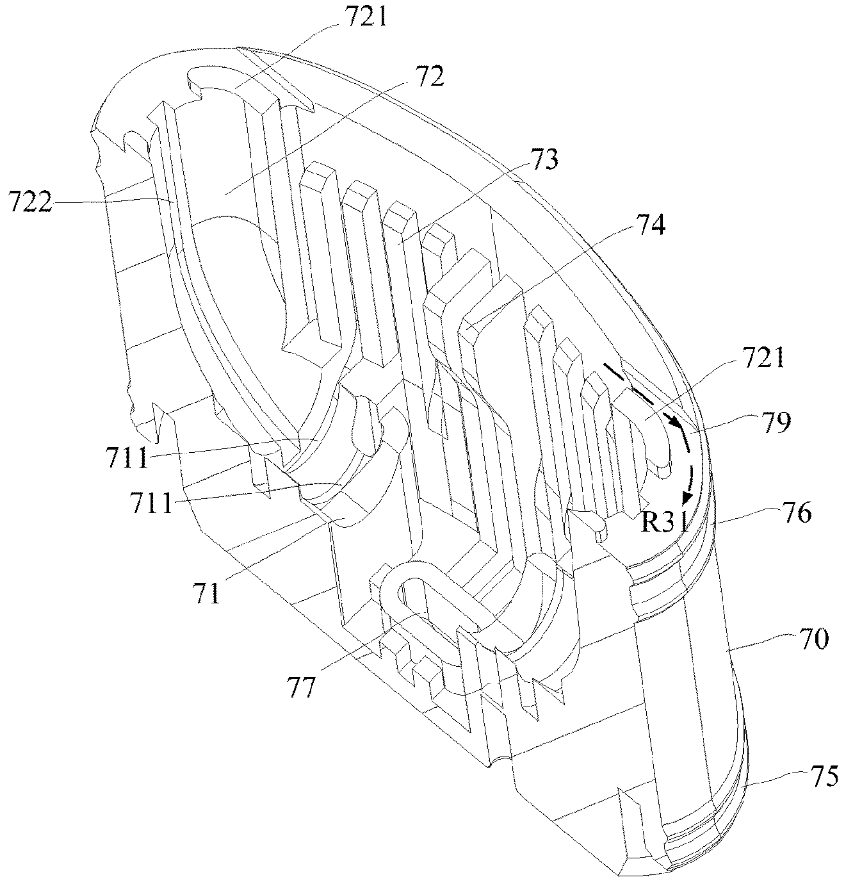

721
72
722
73
74
721
79
711
711
R31
76
71
70
77
75

FIG. 8

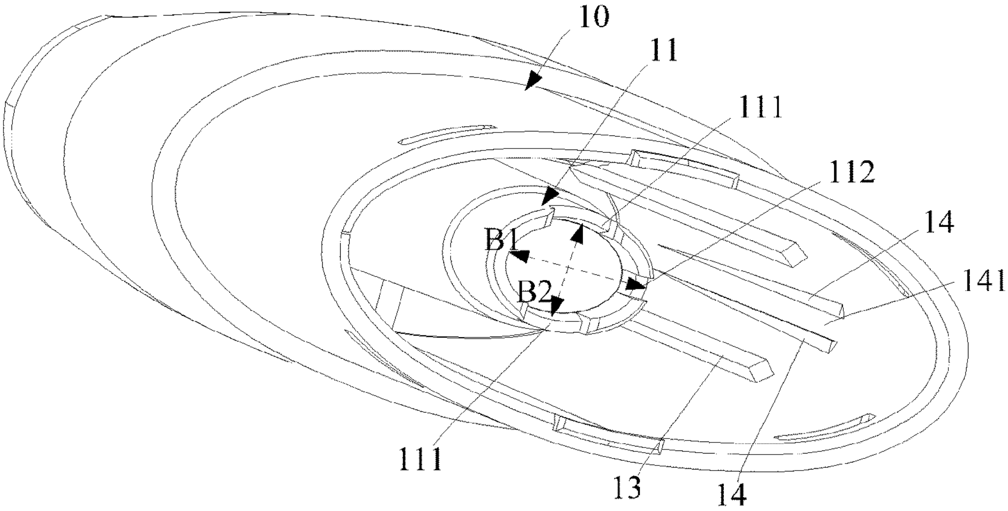


FIG. 9

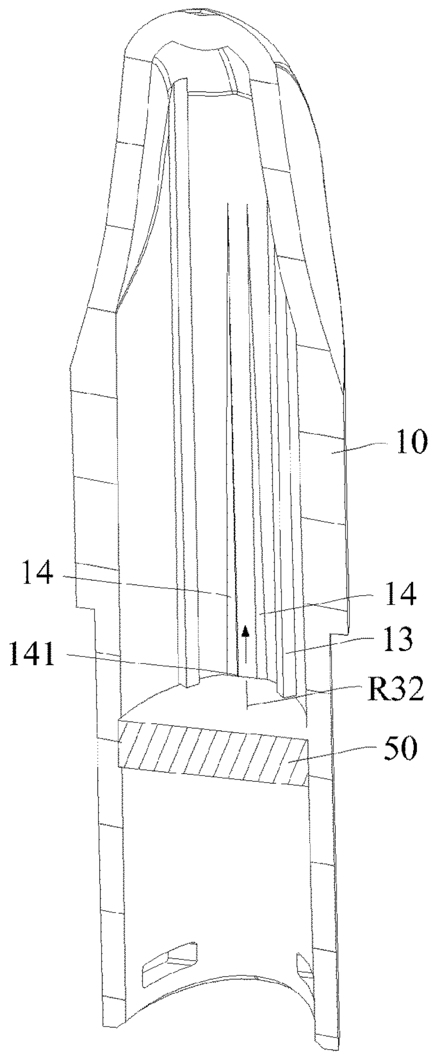


FIG. 10

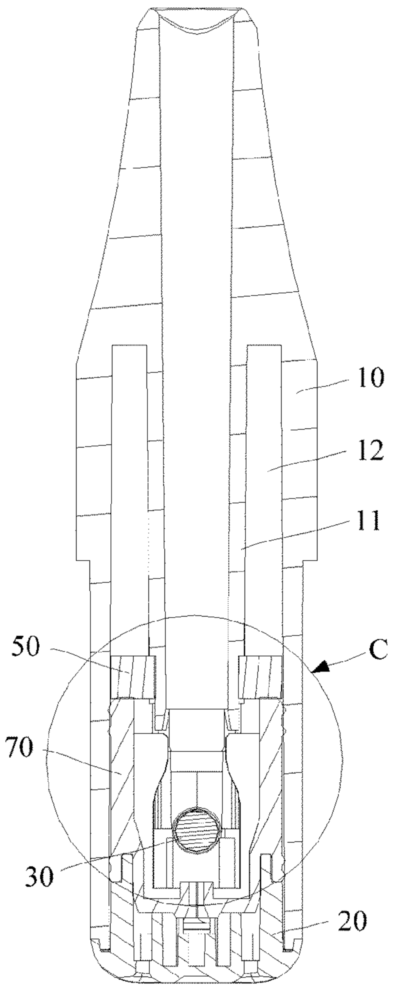


FIG. 11

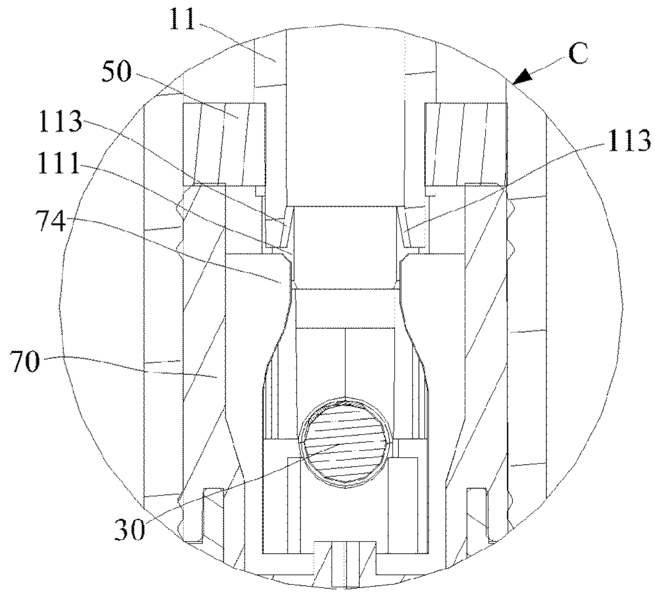


FIG. 12

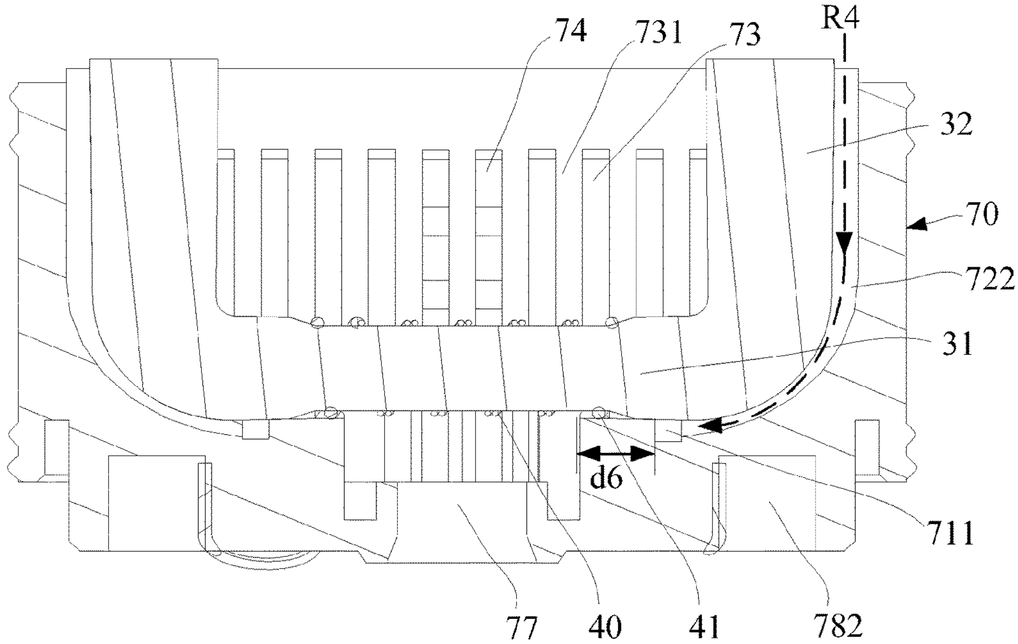

74
731
73
R4
32
70
722
31
711
d6
77
40
41
782

FIG. 13

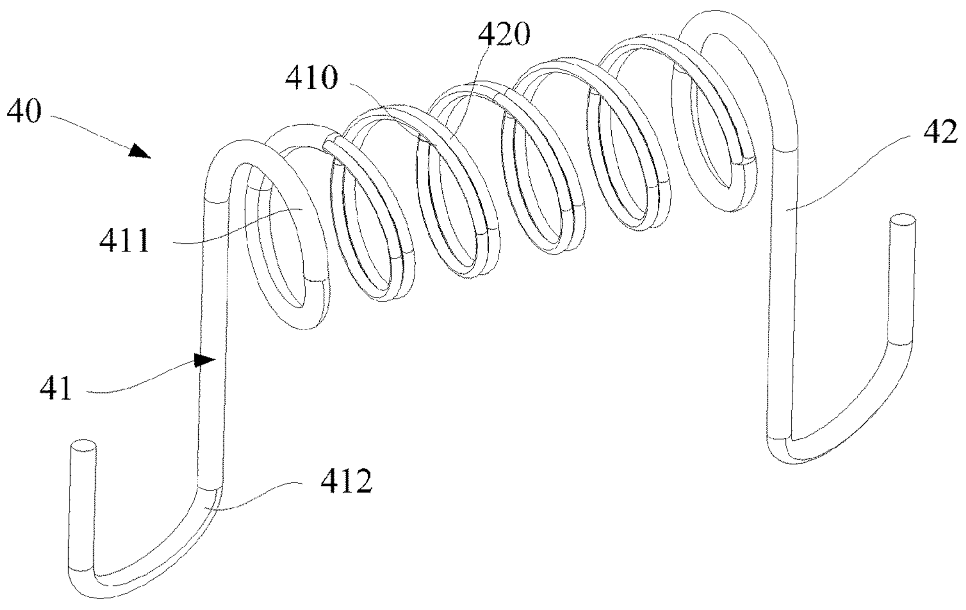

420
410
40
42
411
41
412

FIG. 14

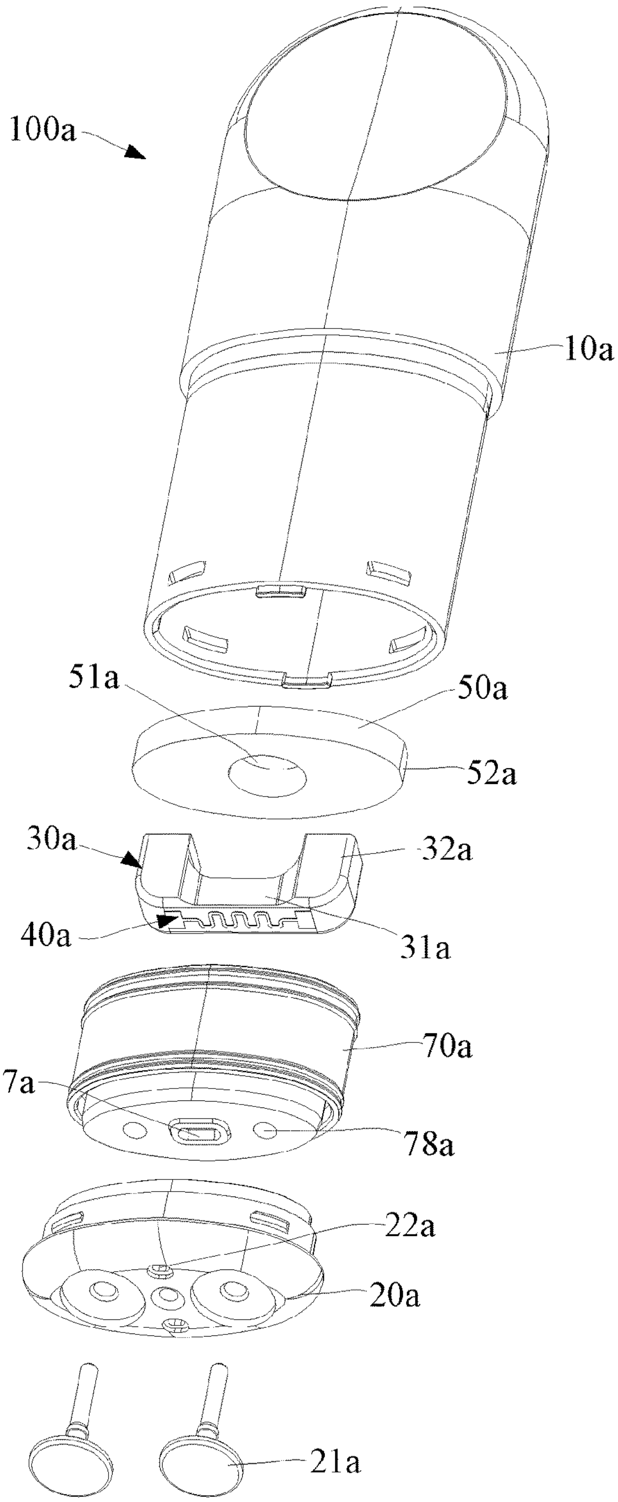


FIG. 15

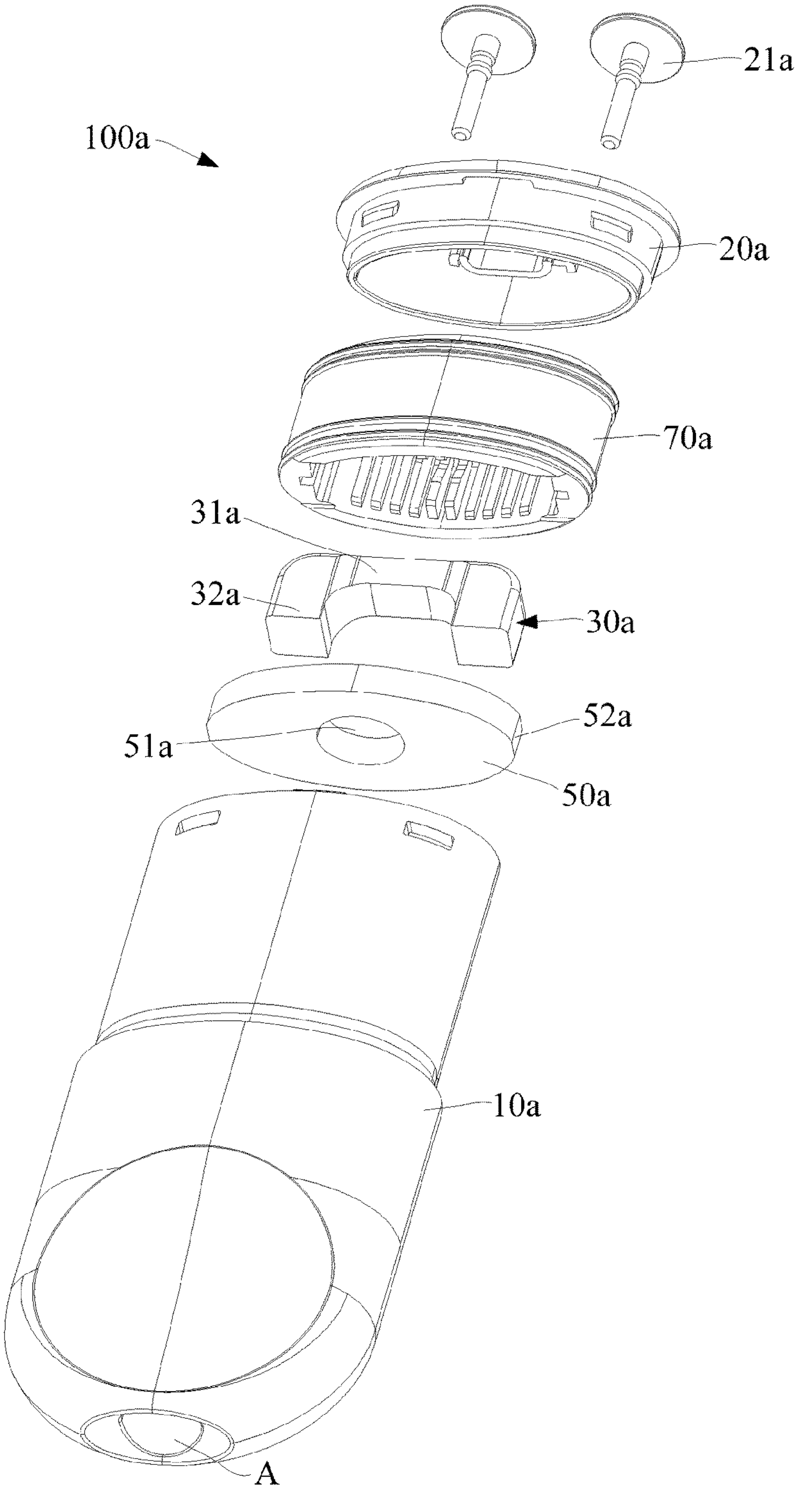
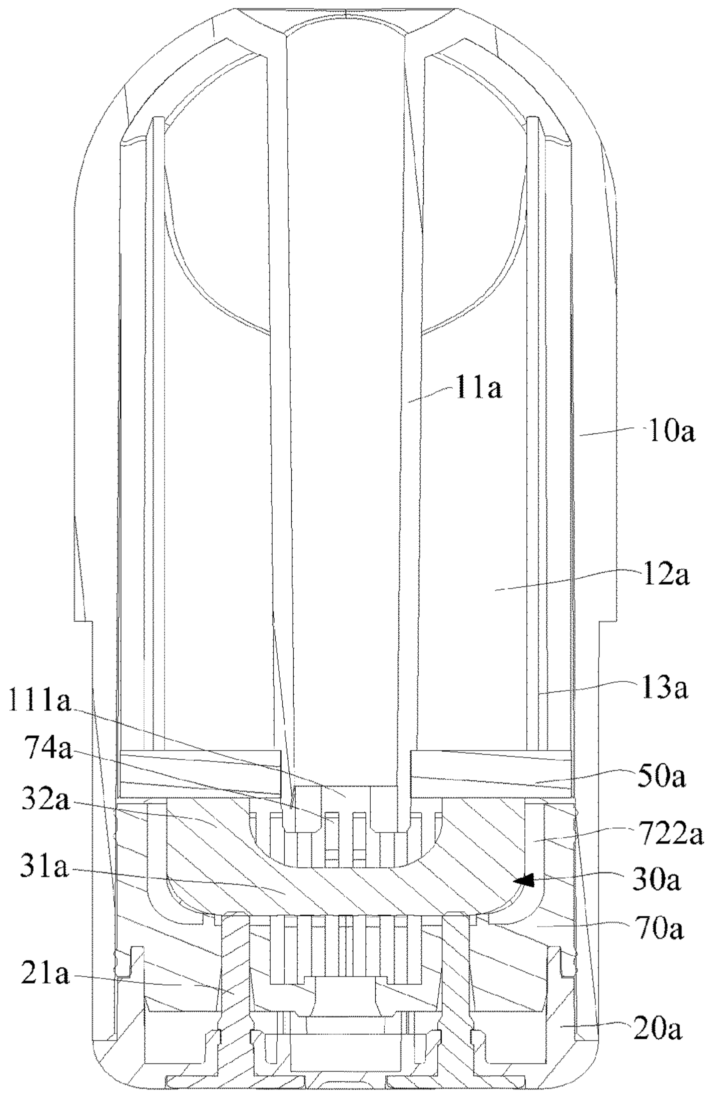


FIG. 16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10a
12a
13a
111a
74a
32a
31a
21a
50a
722a
30a
70a
20a

FIG. 17

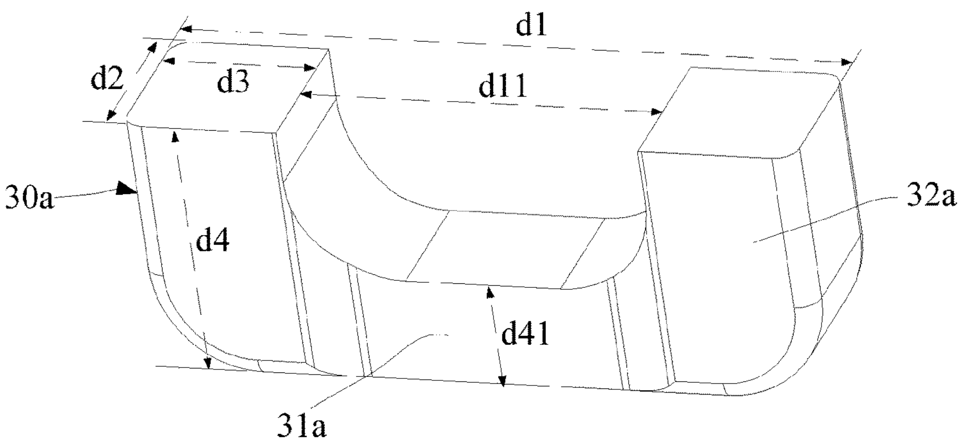

d1
d2
d3
d11
30a
d4
32a
d41
31a

FIG. 18

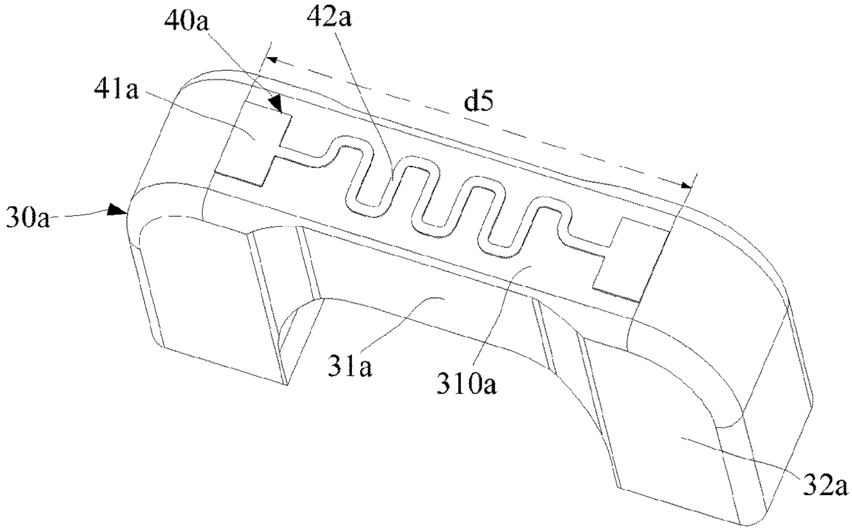

40a
42a
41a
d5
30a
31a
310a
32a

FIG. 19

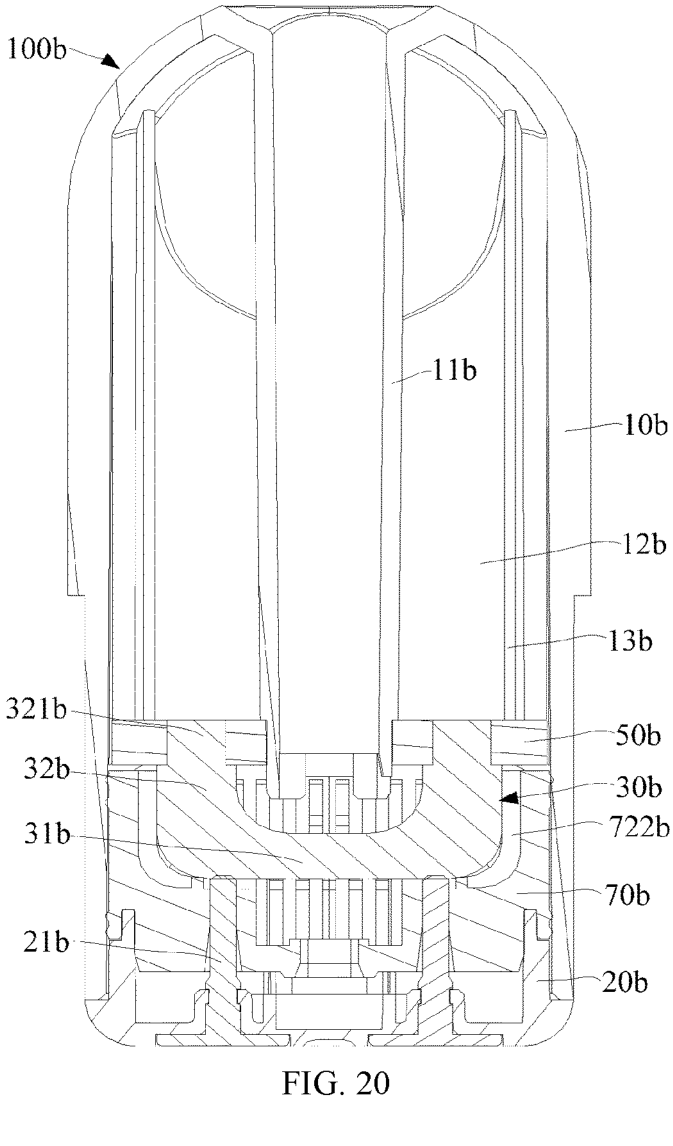

100b
11b
10b
12b
13b
321b
50b
32b
30b
31b
722b
70b
21b
20b

FIG. 20

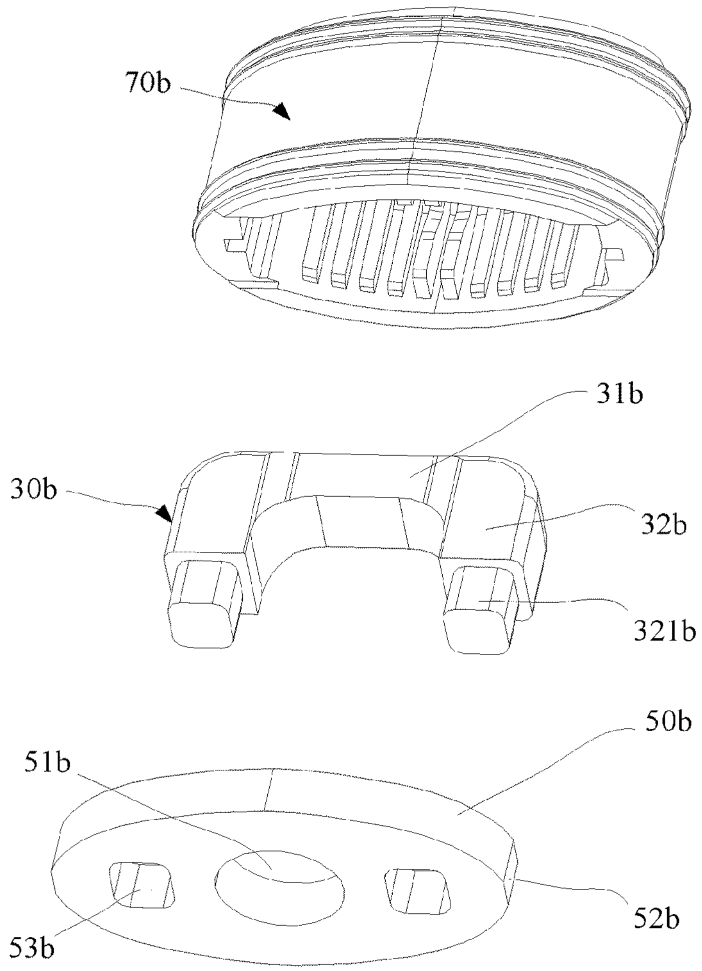


FIG. 21

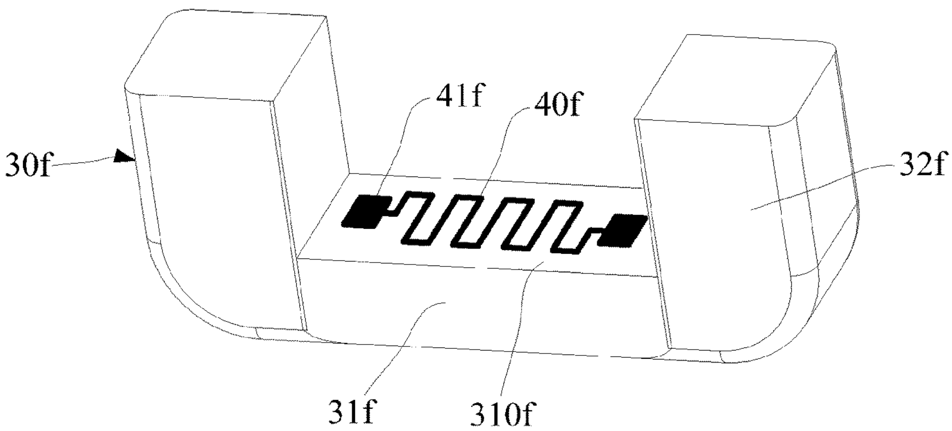


FIG. 22

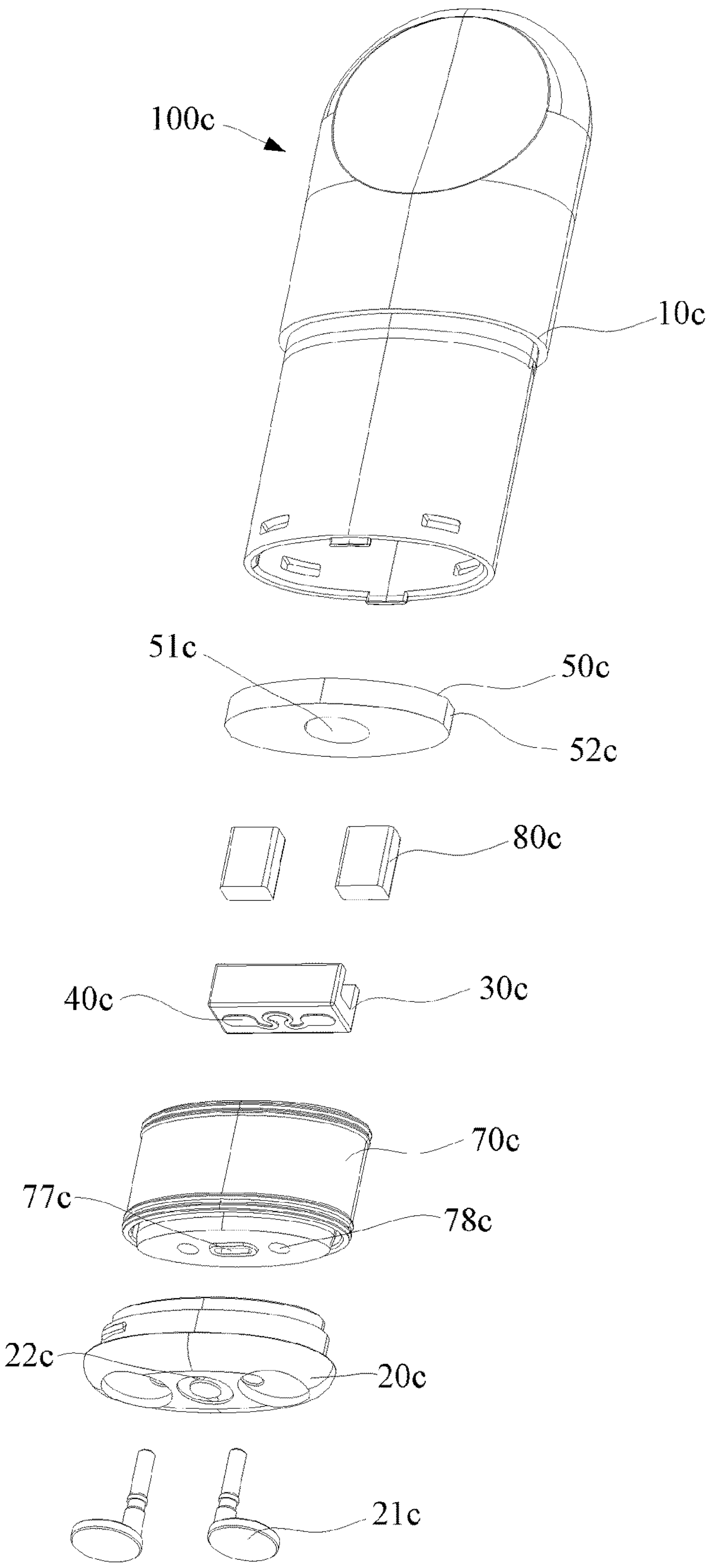


FIG. 23

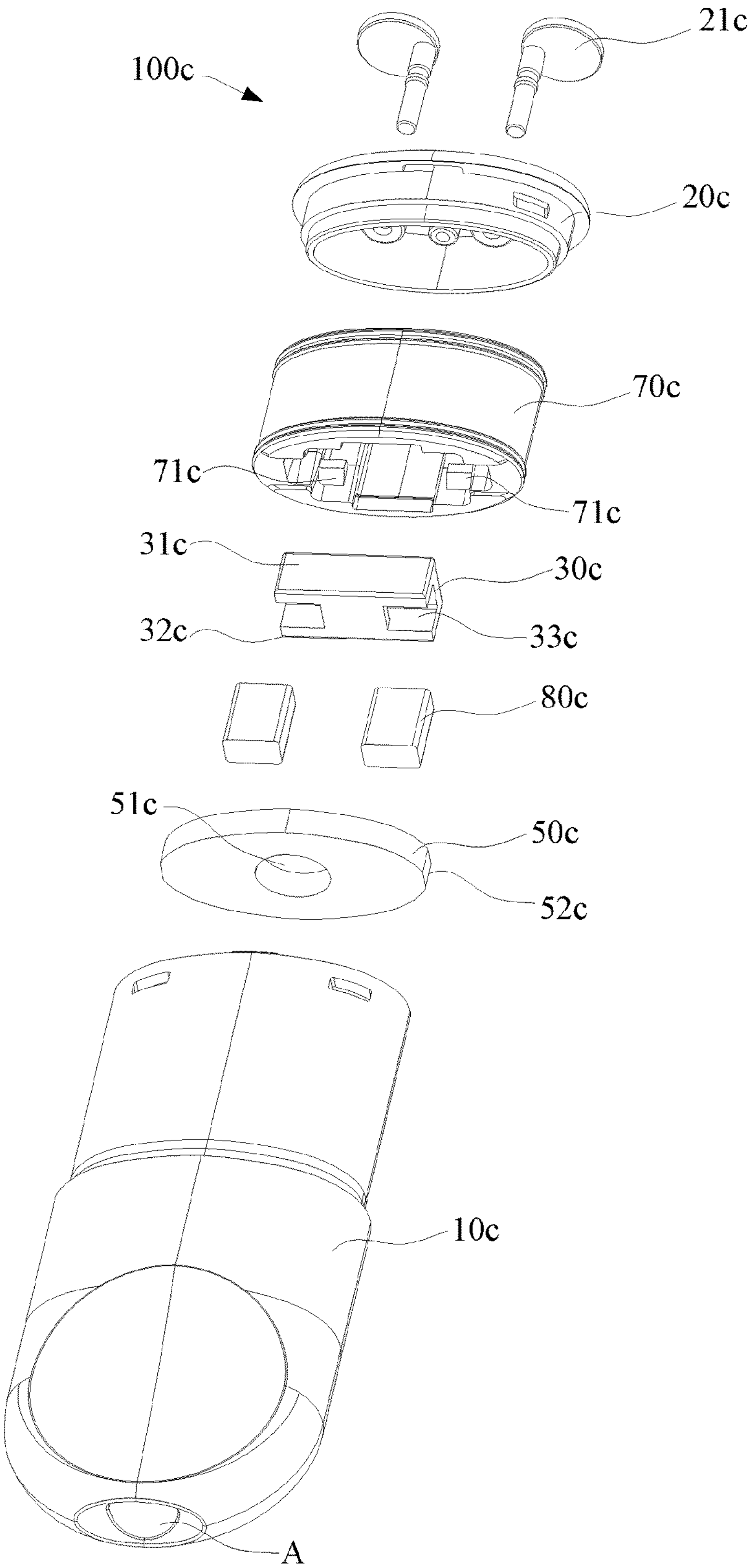
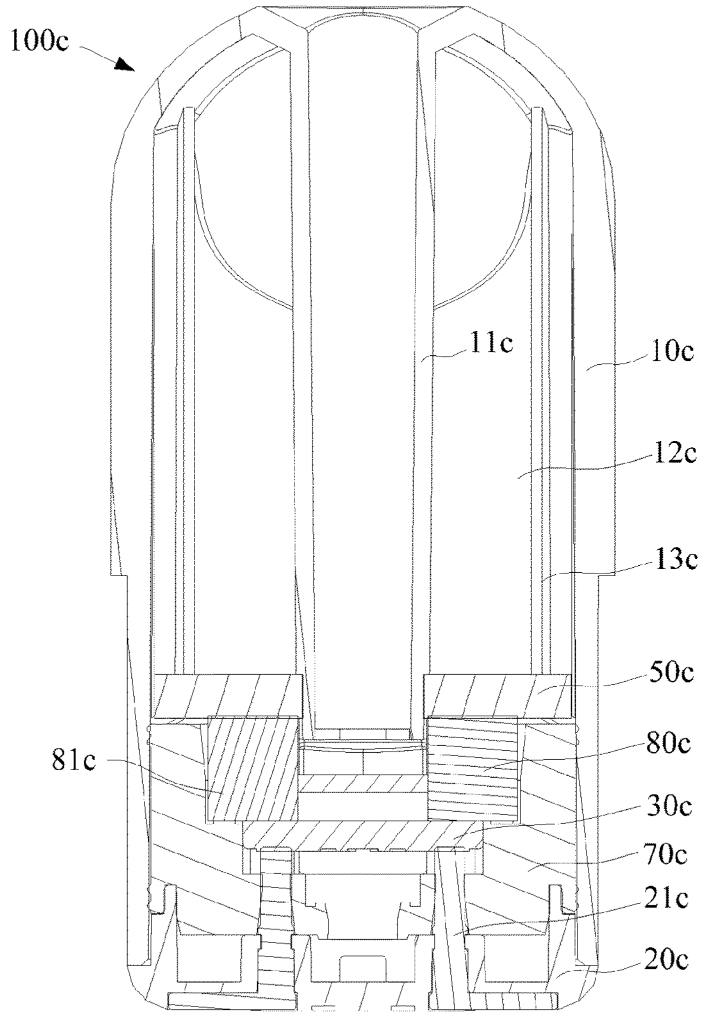


FIG. 24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12c
13c
50c
81c
80c
30c
70c
21c
20c

FIG. 25

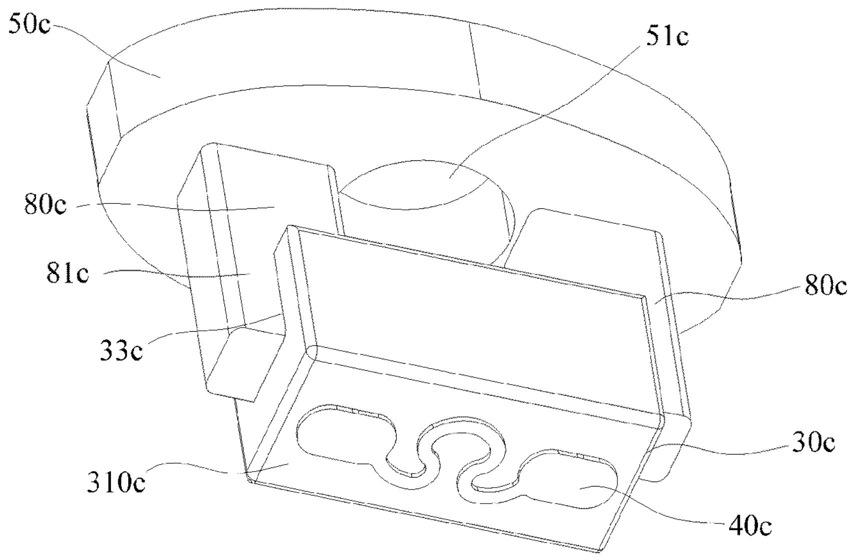

50c
51c
80c
81c
80c
33c
30c
310c
40c

FIG. 26

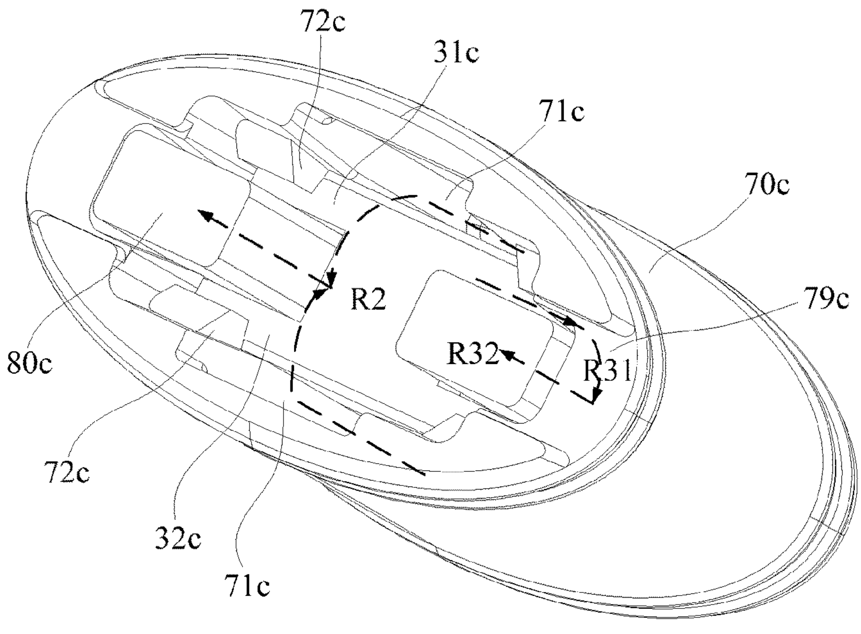

72c
31c
71c
70c
R2
79c
80c
R32
R31
72c
32c
71c

FIG. 27

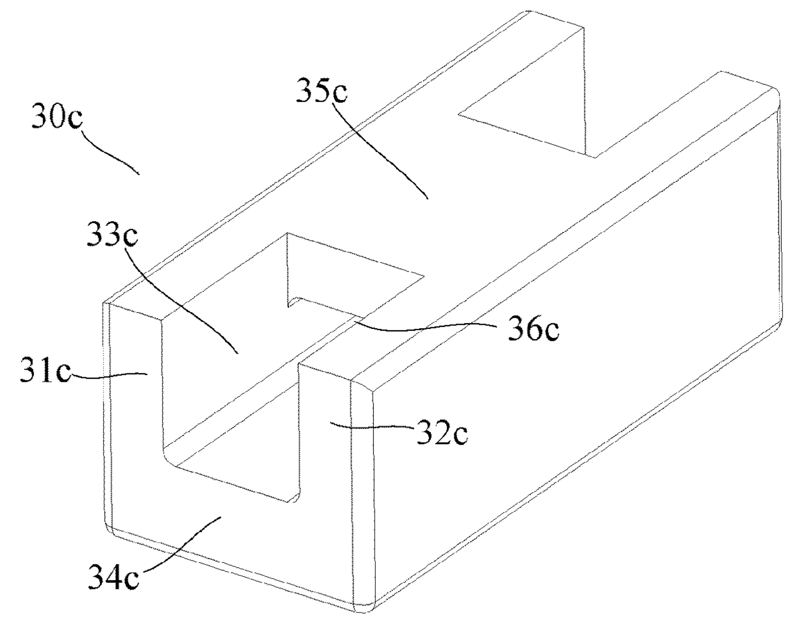

30c
35c
33c
36c
31c
32c
34c

FIG. 28

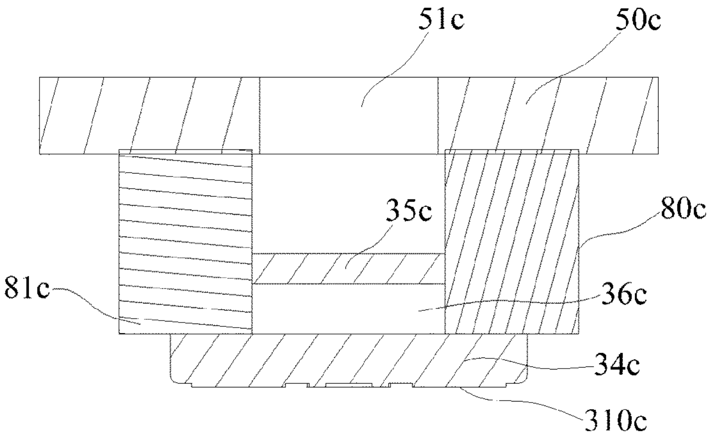


FIG. 29

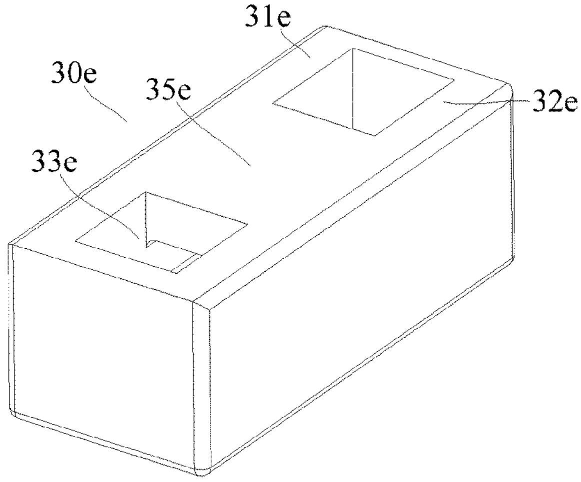


FIG. 30

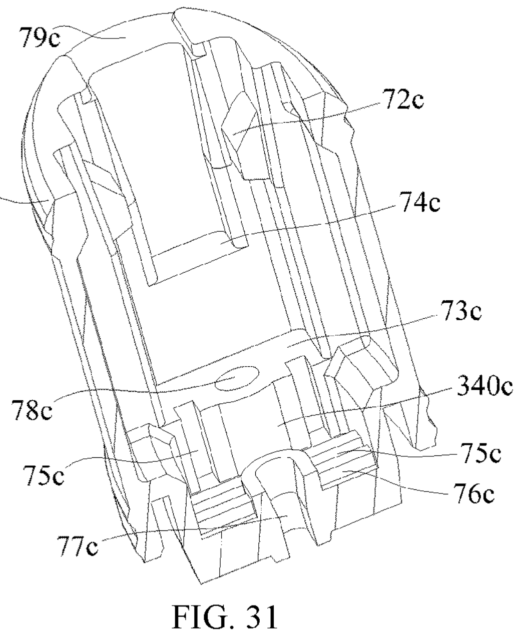


FIG. 31

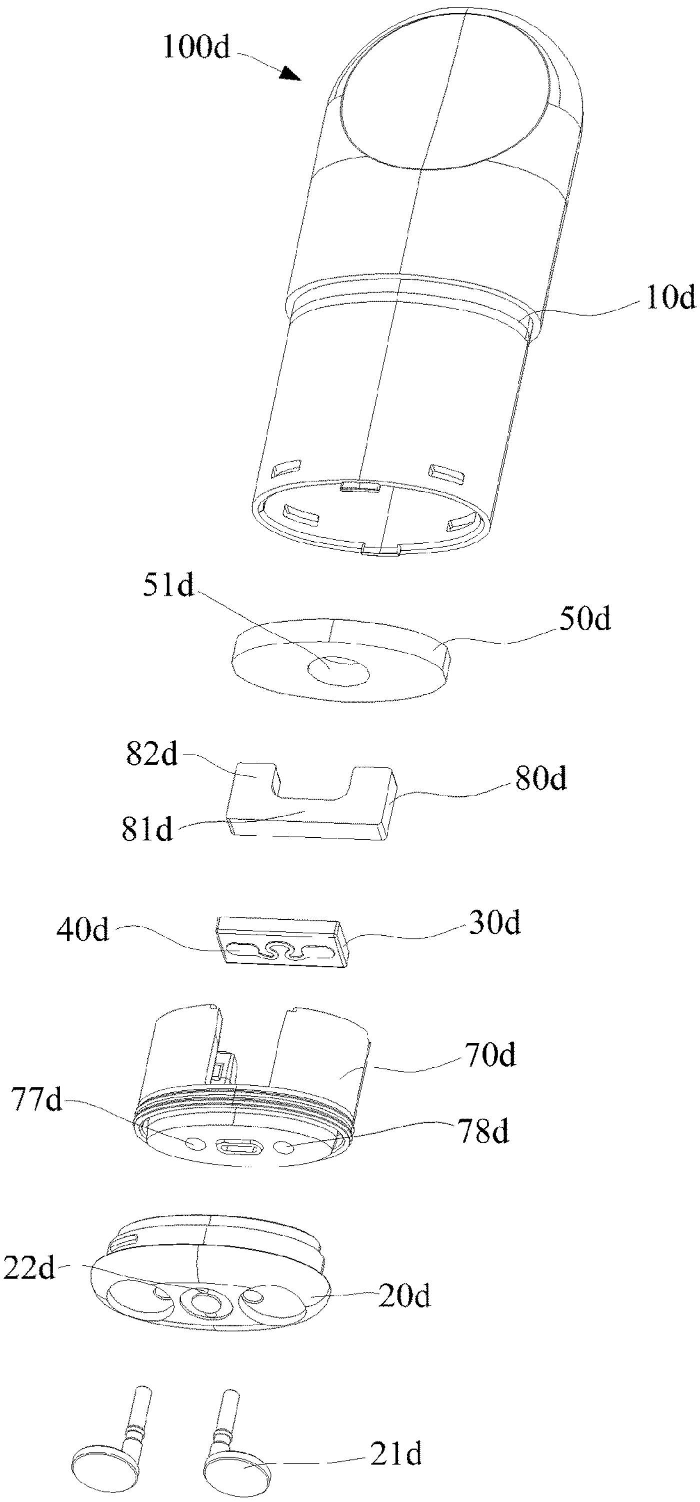


FIG. 32

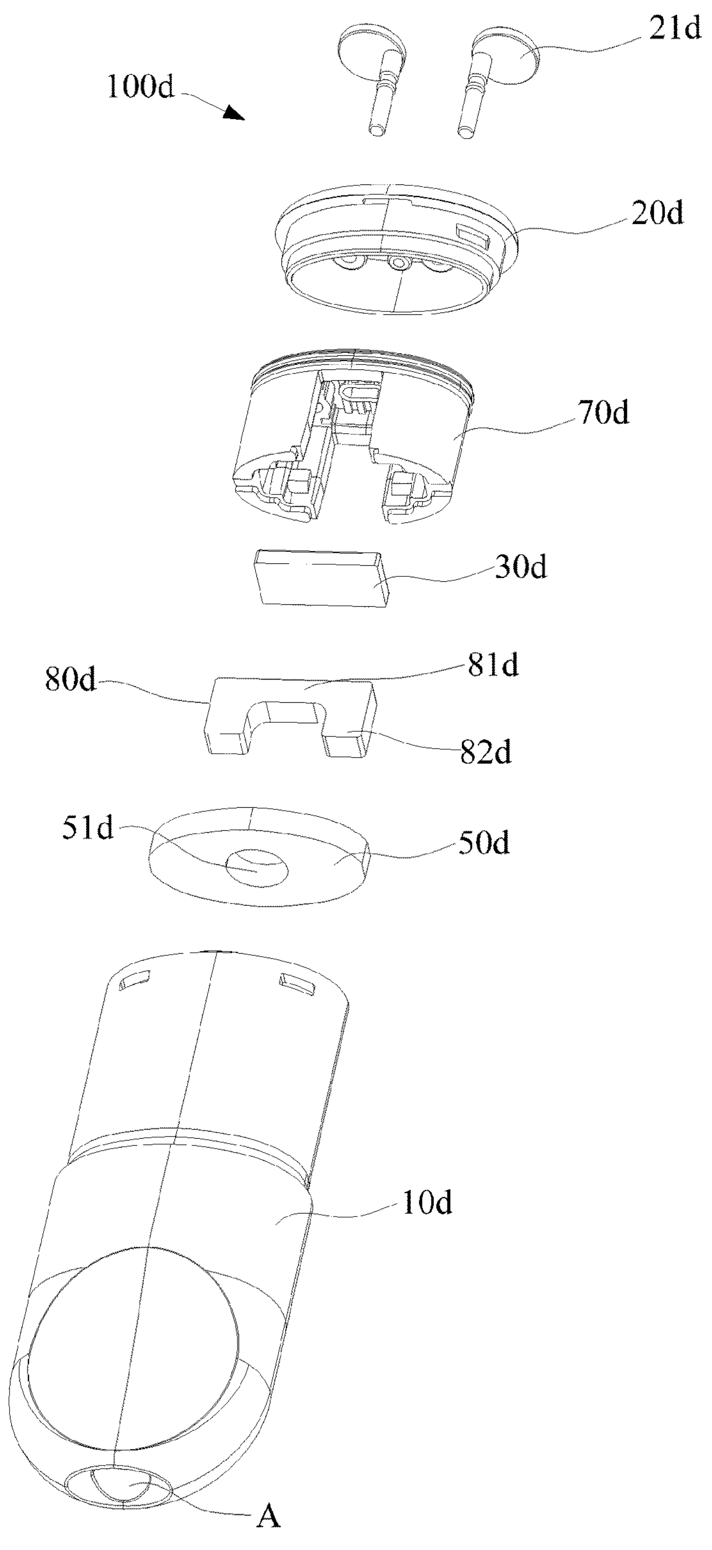
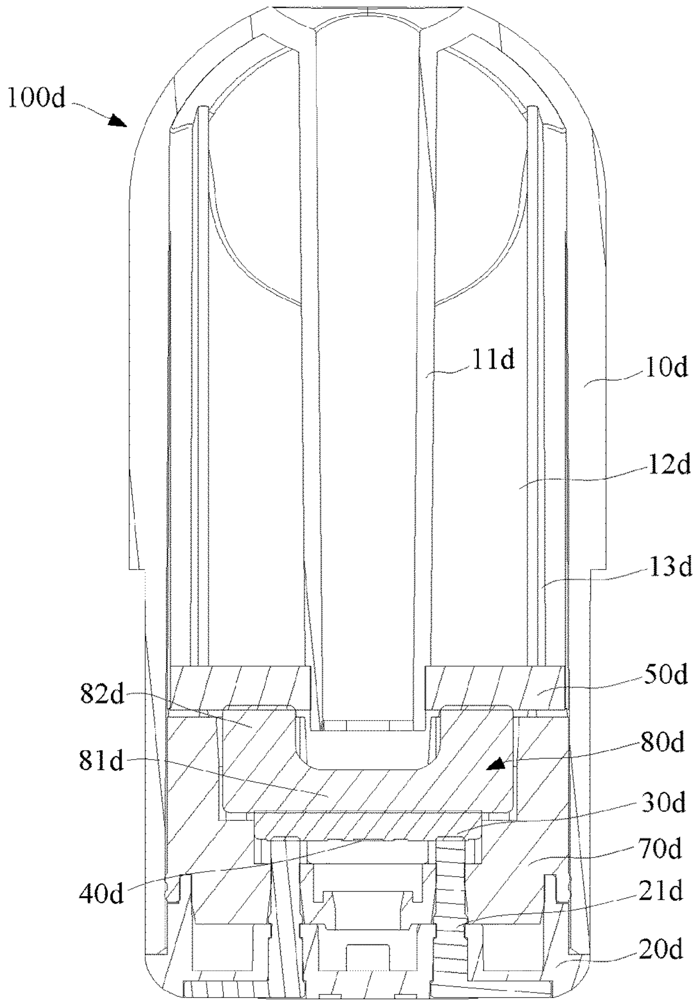


FIG. 33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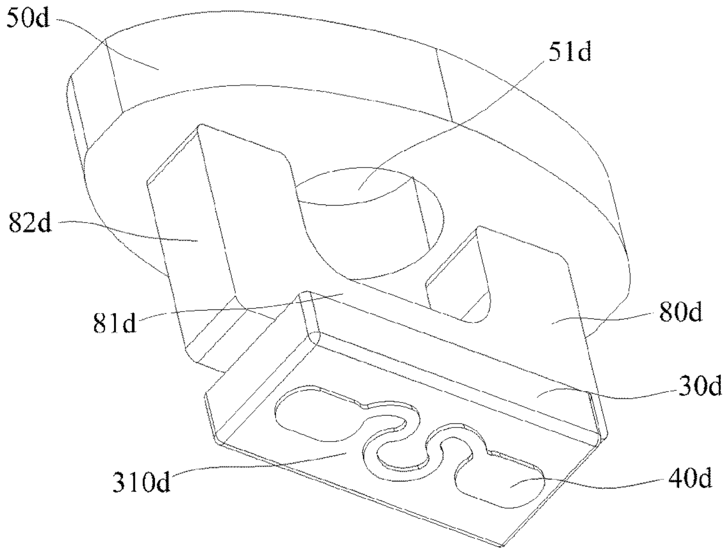
82d
80d
81d
30d
70d
40d
21d
20d

FIG. 34


50d
51d
82d
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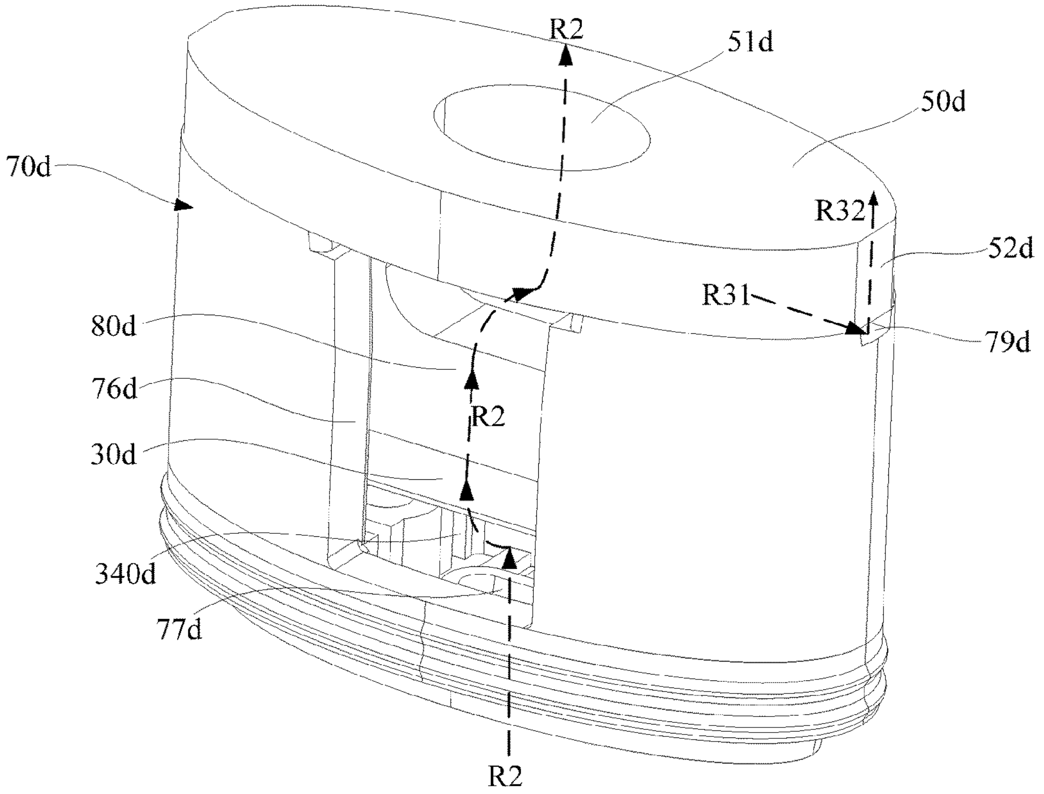
81d
30d
310d
40d

FIG. 35


R2
51d
50d
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R32
52d
R31
79d
80d
76d
R2
30d
340d
77d
R2

FIG. 36

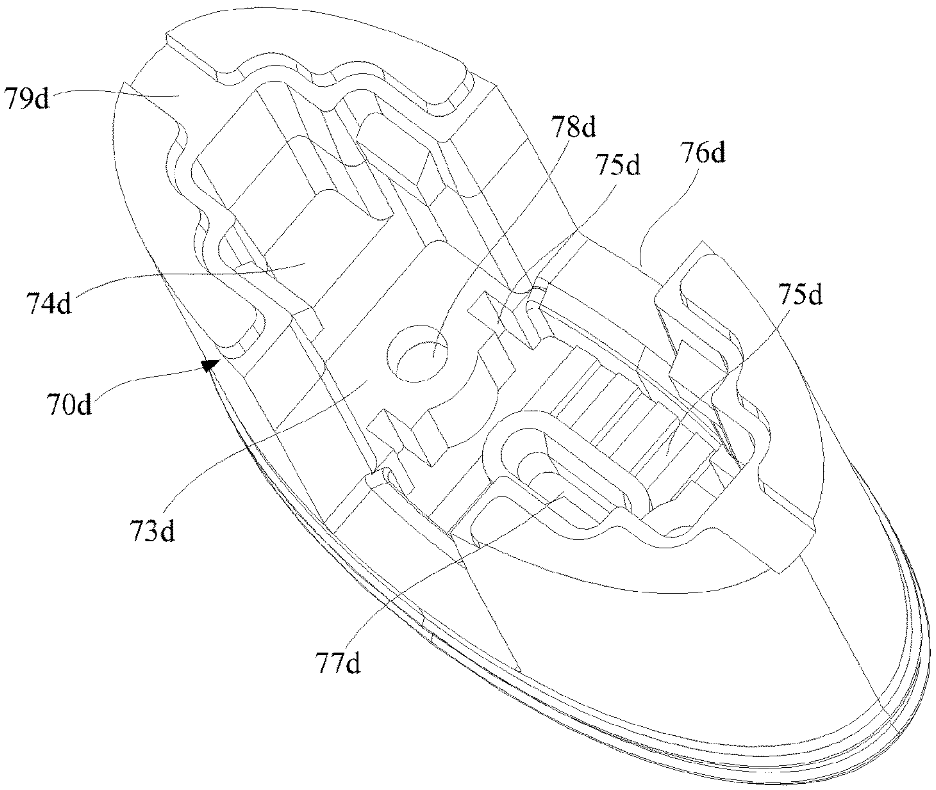
79d
78d
75d
76d
75d
74d
70d
73d
77d

FIG. 37

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2022/119486

A. CLASSIFICATION OF SUBJECT MATTER

A24F 40/10(2020.01)i; A24F 40/46(2020.01)i; A24F 40/42(2020.01)i; A24F 40/40(2020.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A24F 40;A24F 47

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

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

WPABSC; CNTXT; WPABS; ENTXT; CJFD; DWPI; ENTXTC; VEN: 导液, 吸液, 储液, 液体引导, 烟液引导, 导油, 棉, 纤维, 海绵, 陶瓷, 雾化, 加热, 毛细, 沟, 槽, atomiz+ or heat+, capillary, groove? , cannelure?, cotton, fibre, fiber, sponge, spongia, spongio+, guid+, stor+, reserv+, absorb+

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 216983562 U (SHENZHEN FIRST UNION TECHNOLOGY CO., LTD.) 19 July 2022 (2022-07-19) claims 1-22	1-22
Y	CN 104366695 A (SHENZHEN SMOORE TECHNOLOGY LIMITED) 25 February 2015 (2015-02-25) description, paragraphs [0047]-[0060] and [0070], and figures 1-7 and 11-14	1-22
Y	CN 110613171 A (SHENZHEN SMOORE TECHNOLOGY LIMITED) 27 December 2019 (2019-12-27) description, paragraphs [0056]-[0060], and figures 4-8	1-22
Y	CN 104366694 A (SHENZHEN SMOORE TECHNOLOGY LIMITED) 25 February 2015 (2015-02-25) description, paragraphs [0045]-[0058] and [0067], and figures 1-7 and 11-14	1-22
Y	CN 204245151 U (SHENZHEN SMOORE TECHNOLOGY LIMITED) 08 April 2015 (2015-04-08) description, paragraphs [0045]-[0058] and [0067], and figures 1-7 and 11-14	1-22

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

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- "&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
17 November 2022	**30 November 2022**

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Facsimile No. **(86-10)62019451**	Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2022/119486

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Y	CN 110613172 A (SHENZHEN SMOORE TECHNOLOGY LIMITED) 27 December 2019 (2019-12-27) description, paragraphs [0060]-[0070], and figures 4-8	1-22
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Information on patent family members

International application No.
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CN 104366694 A	25 February 2015	CN 104366694 B	28 July 2017
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		EP 3369327 A1	05 September 2018
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		US 2022218037 A1	14 July 2022

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