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(54) **ELECTRONIC ATOMIZATION DEVICE**

(57) The present disclosure provides an electronic atomization device. The electronic atomization device includes an external housing having a proximal end and a distal end that face away from each other in a longitudinal direction; a liquid storage cavity, a heating element, and an air inlet; a movable sealing element movable between a closing position and an opening position to selectively close or open the air inlet; where the sealing element is further switchable between a locked state and an unlocked state, in the locked state, the sealing element is prevented from moving between the closing position and the opening position, and in the unlocked state, the sealing element is allowed to move between the closing position and the opening position; and an operation element arranged at the distal end and accommodated in the external housing; where the operation element is to be operated by a user to drive the sealing element to switch from the locked state to the unlocked state, and drive the sealing element to move between the closing position and the opening position in the unlocked state. According to the above electronic

atomization device, the operation element in the distal end of the external housing is operated by the user to unlock the sealing element, and then the sealing element moves between the closing position and the opening position to close or open the air inlet.

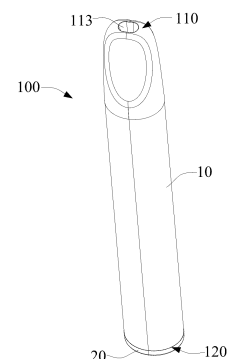


FIG. 1

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Description

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] The present disclosure claims priority to Chinese Patent Application No. 202321846211.8, filed with the China Patent Office on July 12, 2023 and entitled "ELECTRONIC ATOMIZATION DEVICE", which is incorporated herein by reference in its entirety.

TECHNICAL FIELD

[0002] Embodiments of the present disclosure relate to the technical field of electronic atomization, and in particular, to an electronic atomization device.

BACKGROUND

[0003] During use of tobacco products (such as cigarettes and cigars), tobacco is burnt to generate tobacco smoke. People try to replace these tobacco-burning products by manufacturing products that release compounds without burning.

[0004] An example of such products is a heating device that releases compounds by heating rather than burning a material. For example, the material can be tobacco or other non-tobacco products, and these non-tobacco products can contain nicotine or not. Aerosol providing products such as so-called electronic atomization devices are available as another example. These devices typically include liquid. After heated, the liquid is vaporized to generate inhalable aerosols. The liquid can include nicotine and/or a fragrance and/or an aerosol generating material (for example, glycerol). In a known electronic atomization device, a movable shield component is arranged on an air inlet to be operated by a user, so as to selectively open or close the air inlet, thereby preventing or allowing vaping.

SUMMARY

[0005] An electronic atomization device is provided in an embodiment of the present disclosure. The electronic atomization device includes an external housing having a proximal end and a distal end that face away from each other in a longitudinal direction;

a liquid storage cavity configured to store a liquid substrate;

a heating element configured to heat the liquid substrate to generate an aerosol;

an air inlet configured to allow air to enter the electronic atomization device;

a movable sealing element configured to move between a closing position and an opening position, so as to selectively close the air inlet at the closing position or open the air inlet at the opening position; where the sealing element is further configured to

switch between a locked state and an unlocked state, in the locked state, the sealing element is prevented from moving between the closing position and the opening position, and in the unlocked state, the sealing element is allowed to move between the closing position and the opening position; and an operation element arranged at the distal end and accommodated or mounted in the external housing; where the operation element is configured to be operated by a user, so as to drive the sealing element to switch from the locked state to the unlocked state, and drive the sealing element to move between the closing position and the opening position in the unlocked state.

[0006] In some embodiments, the operation element is pressed by the user to drive the sealing element to switch from the locked state to the unlocked state.

[0007] In some embodiments, the operation element is rotated by the user to drive the sealing element to move between the closing position and the opening position.

[0008] In some embodiments, movement of the sealing element between the closing position and the opening position includes rotation about a center axis of the sealing element; and/or

a switch of the sealing element between the locked state and the unlocked state includes movement in the longitudinal direction of the electronic atomization device.

[0009] In some embodiments, the electronic atomization device further includes:

a partition wall including a first side closer to the proximal end and a second side closer to the distal end; where the air inlet is provided in the partition wall, and extends from the first side to the second side; and

the sealing element is at least partially arranged on the first side of the partition wall.

[0010] In some embodiments, the operation element is arranged on the second side of the partition wall.

[0011] In some embodiments, the sealing element is connected to the partition wall in the locked state, and disconnected from the partition wall in the unlocked state.

In some embodiments, the sealing element is flexible;

the sealing element abuts against the partition wall in the locked state, and the sealing element is prevented from moving between the closing position and the opening position through a friction force of relative movement between the sealing element and the partition wall in a combination plane; and the sealing element is separated from the partition wall in the unlocked state.

[0012] In some embodiments, the electronic atomization device further includes:

a cell configured to provide power for the heating element; and
 a charging connector arranged at the distal end and configured to charge the cell; where the charging connector is mounted or held at the operation element.

[0013] In some embodiments, the electronic atomization device further includes:

an elastic element configured for biasing to drive the sealing element to switch from the unlocked state to the locked state when the sealing element is at the closing position and/or the opening position, or configured to bias the sealing element to keep the sealing element in the locked state.

[0014] In some embodiments, the operation element is provided with an exposed surface exposed to the distal end, and the exposed surface is recessed; and a plurality of convex edges are arranged on the exposed surface in a radial direction.

[0015] In some embodiments, the electronic atomization device includes:

a main housing extending and arranged between the proximal end and the distal end; and
 an end cap at least partially extending into the main housing from the distal end; where
 the operation element is accommodated or mounted in the end cap; and
 the partition wall is arranged in the end cap.

[0016] According to the above electronic atomization device, the operation element in the distal end of the external housing is operated by the user to unlock the sealing element, and then the sealing element moves between the closing position and the opening position to close or open the air inlet.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] One or more embodiments are illustratively described with reference to the corresponding figures in the accompanying drawings, and the illustrative descriptions do not constitute limitations on the embodiments. The elements with the same reference numerals in the accompanying drawings denote similar elements. The figures in the accompanying drawings are not drawn to scale, unless particularly stated otherwise.

FIG. 1 is a schematic diagram of an electronic atomization device according to an embodiment from one perspective;

FIG. 2 is a schematic diagram of the electronic atomization device in FIG. 1 from another perspective;

FIG. 3 is a schematic sectional view of the electronic atomization device in FIG. 1 from one perspective;

FIG. 4 is a schematic exploded view of the electronic

atomization device and an operation assembly in FIG. 1 from one perspective;

FIG. 5 is a schematic structural diagram of the operation assembly in FIG. 4 from another perspective;

FIG. 6 is a schematic sectional view of an end cap in FIG. 1 from another perspective;

FIG. 7 is a schematic exploded view of the operation assembly in FIG. 5 from yet another perspective;

FIG. 8 is a schematic exploded view of the operation assembly in FIG. 7 from still another perspective;

FIG. 9 is a schematic sectional view of the operation assembly in FIG. 3 at a closing position;

FIG. 10 is a schematic sectional view of the operation assembly in FIG. 9 pressed inwards;

FIG. 11 is a schematic sectional view of the operation assembly in FIG. 10 during unlocking through a rotation operation;

FIG. 12 is a schematic sectional view of the operation assembly in FIG. 11 driven by an elastic element to move to an opening position;

FIG. 13 is a schematic structural diagram of an electronic atomization device according to another embodiment from one perspective;

FIG. 14 is a schematic exploded view of the electronic atomization device and an operation assembly in FIG. 13 from one perspective;

FIG. 15 is a schematic sectional view of the electronic atomization device and the operation assembly in FIG. 14 in a disassembled state from one perspective;

FIG. 16 is a schematic exploded view of the operation assembly in FIG. 15 from another perspective;

FIG. 17 is a schematic exploded view of the operation assembly in FIG. 15 from yet another perspective;

FIG. 18 is a schematic sectional view of the operation assembly in FIG. 15 at a closing position;

FIG. 19 is a schematic sectional view of the operation assembly in FIG. 18 pressed inwards;

FIG. 20 is a schematic sectional view of the operation assembly in FIG. 19 during unlocking through a rotation operation;

FIG. 21 is a schematic sectional view of the operation assembly in FIG. 20 driven by an elastic element to move to an opening position; and

FIG. 22 is a schematic structural diagram of an electronic atomization device according to yet another embodiment.

DETAILED DESCRIPTION

[0018] For ease of understanding of the present disclosure, the present disclosure is described in further detail below with reference to the accompanying drawings and particular implementations.

[0019] The present disclosure provides an electronic atomization device. The electronic atomization device is configured to atomize a liquid substrate to generate an

aerosol.

[0020] FIG. 1 and FIG. 2 are each a schematic diagram of an electronic atomization device 100 in an embodiment. The electronic atomization device includes a plurality of components arranged in an external body or external housing (which may be referred to as a housing). An overall design of the external body or external housing may vary, and a type or configuration of the external body that may define an overall size and shape of the electronic atomization device 100 may vary. Generally, an elongated body may be formed by a single integral housing, or an elongated housing may be formed by two or more separable bodies.

[0021] For example, the electronic atomization device 100 may be provided with a control body at one end. The control body is provided with a housing including one or more reusable components (for example, a storage battery such as a rechargeable battery and/or a rechargeable supercapacitor, and various electronic devices configured to control operations of the product). The electronic atomization device is provided with the external body or external housing configured for vaping at the other end.

[0022] In some embodiments, the external body or external housing of the electronic atomization device 100 basically defines an external surface of the electronic atomization device 100. In the specific embodiment shown in FIG. 1 and FIG. 2, the external housing of the electronic atomization device 100 includes:

a main housing 10 that may include one or more reusable components; where the main housing 10 is provided with a proximal end 110 and a distal end 120 that face away from each other in a longitudinal direction; and during use, the proximal end 110 is an end closer to a user for vaping, and the distal end 120 is an end farther away from the user; and an end cap 20 combined with the distal end 120 of the main housing 10. After assembly, the main housing 10 and the end cap 20 jointly define the external body of the electronic atomization device 100.

[0023] In some examples, the main housing 10 and the end cap 20 of the external housing may be formed by metal (such as stainless steel and aluminum) or alloy. Other suitable materials include various types of plastic (for example, polycarbonate), metal-plating over plastic, ceramics, etc.

[0024] As shown in FIG. 1 and FIG. 2, the electronic atomization device 100 further includes:

an air outlet 113 configured to be vaped by the user and located at the proximal end 110 of the main housing 10.

[0025] As shown in FIG. 3, the electronic atomization device 100 further includes:

a liquid storage cavity 112 configured to store a liquid substrate, and an atomization assembly configured to suck the liquid substrate from the liquid storage cavity 112 and heat and atomize the liquid substrate. For ease of

vaporization and output, the liquid storage cavity 112 and the atomization assembly are arranged closer to the proximal end 110. The electronic atomization device 100 further includes an aerosol output tube 111 arranged in the longitudinal direction. The aerosol output tube 111 at least partially extends in the liquid storage cavity 112, and a space between an outer wall of the aerosol output tube 111 and an inner wall of the main housing 10 forms the liquid storage cavity 112. An end portion, opposite the proximal end 110, of the aerosol output tube 111 communicates with the air outlet 113 to output an aerosol generated through atomization by the atomization assembly to the air outlet 113 for inhalation.

[0026] In an embodiment shown in FIG. 3, the electronic atomization device 100 further includes:

a tubular element 12 such as a stainless steel tube, a ceramic tube, and a plastic tube extending and arranged in the liquid storage cavity 112 in the longitudinal direction. The tubular element 12 is in close-fit connection to the aerosol output tube 111 through riveting, interference, etc. After assembly, the atomization assembly is arranged inside the tubular element 12. A tube wall of the tubular element 12 is further provided with perforations, hollowed-out structures, etc., allowing the liquid substrate in the liquid storage cavity 112 to flow into the atomization assembly in the tubular element 12 for atomization after passing through the perforations or the hollowed-out structures.

[0027] In the embodiment shown in FIG. 3, the above atomization assembly includes:

a liquid guide element 13 made of a capillary material or a porous material, for example, a sponge, a cotton fiber, and a porous body such as a porous ceramic body. The liquid guide element 13 extends and is arranged in the tubular element 12 in the longitudinal direction. The liquid guide element 13 is constructed in a tubular shape. An outer surface of the liquid guide element 13 may suck and store the liquid substrate through holes in the tubular element 12, and store some liquid substrates. A liquid delivery direction is shown by an arrow R1 in FIG. 3.

[0028] The above atomization assembly further includes a heating element 14 combined with an inner surface of the liquid guide element 13 and configured to heat at least some liquid substrates in the liquid guide element 13 to generate the aerosol and release the aerosol to the aerosol output tube 111. In the optional implementation, the heating element 14 is a tubular heating mesh, a spiral coil, etc.

[0029] Alternatively, in some other variant implementations, the liquid guide element 13 may be further constructed in various regular or irregular shapes, and is partially in fluid communication with the liquid storage cavity 112 to receive the liquid substrate. Alternatively, in other variant implementations, the liquid guide element 13 may be in more regular or irregular shapes, such as a polygonal block shape, a channel shape having a groove in a surface, and a cambered shape having a hollow channel inside.

[0030] Alternatively, in yet some other variant implementations, the heating element 14 may be combined with the liquid guide element 13 through printing, depositing, sintering, physical assembling, etc. In yet some other variant implementations, the liquid guide element 13 may be provided with a flat surface or a curved surface configured to support the heating element 14, and the heating element 14 is formed on a flat surface or a curved surface of a porous body 14 through surface-mounting, printing, depositing, etc. Alternatively, in still some other variant implementations, the heating element 14 is a conductive trajectory formed on a surface of the liquid guide element 13. In some implementations, the conductive trajectory of the heating element 14 may be in a form of a printed circuit formed through printing. In some implementations, the heating element 14 is a patterned conductive trajectory. In some other implementations, the heating element 14 is planar. In some implementations, the heating element 14 is a conductive trajectory extending in a circuitous, meandering, reciprocal, or zigzagging manner.

[0031] With reference to FIG. 3, a flexible sealing base 15 is further arranged in the main housing 10. The sealing base 15 at least partially supports the tubular element 12, and seals an opening, facing away from the proximal end 110, of the liquid storage cavity 112. After assembly, the liquid storage cavity 112 defined by the aerosol output tube 111, the tubular element 12, and the main housing 10 is closed at an end portion closer to the proximal end 110. The opening, towards the distal end 120, of the liquid storage cavity 112 is sealed by the sealing base 15. A shape of the sealing base 15 is basically adapted to the opening, towards the distal end 120, of the liquid storage cavity 112. The above sealing base 15 further defines an air channel 151 penetrating the sealing base 15 in the longitudinal direction of the electronic atomization device 100, so that external air passes through the sealing base 15 and enters the atomization assembly during vaping.

[0032] With reference to FIG. 3, the electronic atomization device 100 further includes:

a cell 16 at least partially accommodated and held in the main housing 10 and configured to provide power for the heating element 14, where the cell 16 is located between the sealing base 15 and the distal end 120. Specifically, after leads are soldered to two ends of the heating element 14, and penetrate the sealing base 15, the two ends of the heating element are in conductive connection to the cell 16 to form a heating loop, so that the heating element 14 is powered by the cell 16 to generate Joule heat.

[0033] In some specific implementations, the electronic atomization device 100 further internally includes a circuit board (not shown in the figure), where related function circuits are integrated on the circuit board, the circuit board is arranged abutting against or in parallel with the cell 16. The circuit board such as a printed circuit board (PCB) extends in the longitudinal direction of the electronic atomization device 100, is substantially parallel with the cell 16, and abuts against or is attached to the

cell. The circuit board is in conductive connection to the cell 16. The two ends of the heating element 14 are connected to the circuit board after the leads are soldered to the two ends and penetrate the sealing base 15, so that the circuit board guides a current between the cell 16 and the heating element 14.

[0034] As shown in FIG. 3 to FIG. 8, the electronic atomization device 100 further includes:

an operation assembly 30 mounted in the end cap 20 and configured to be operated by a user to selectively open or close the air inlet 22 provided in the end cap 20.

[0035] Specifically, as shown in FIG. 3 to FIG. 8, the end cap 20 is basically constructed in a cylindrical shape. After assembly, the end cap 20 is basically surrounded by the main housing 10, or the end cap 20 at least partially extends into the main housing 10 from the distal end 120 of the main housing 10. The end cap 20 is partially located outside the distal end 120, and abuts against the distal end 120. In the embodiment, the end cap 20 is tightly connected to the main housing 10 through riveting, close fitting, etc., so that the end cap 20 and the main housing 10 cannot be disassembled from each other after assembly.

[0036] As shown in FIG. 3 to FIG. 8, the constructions in the end cap 20 further include:

a cylindrical outer side wall; and

a partition wall 21 arranged perpendicular to a longitudinal direction of the end cap 20 or the external housing and located in the outer side wall; where the partition wall 21 includes a first side 211 and a second side 212 that face away from each other in the longitudinal direction of the end cap 20 or the external housing, and the partition wall 21 partitions and defines an internal space of the end cap 20 into two space portions that are located on the first side 211 and the second side 212 respectively and partitioned from each other. Specifically, in the longitudinal direction, the partition wall 21 partitions the internal space of the end cap 20 into:

a first mounting space 251 closer to the first side 211 of the partition wall 21; and

a second mounting space 252 closer to the second side 212 of the partition wall 21.

[0037] As shown in FIG. 3 to FIG. 8, the constructions in the end cap 20 further include:

an air inlet 22 provided in the partition wall 21 and configured to allow external air to enter the electronic atomization device 100; and

a mounting hole 23 configured to allow the operation assembly 30 to penetrate and to be mounted in the end cap 20.

[0038] Correspondingly, the electronic atomization device 100 is internally provided with:

an airflow channel defining an airflow path from the air inlet 22 to an air outlet 113 via the atomization assembly to transfer the aerosol generated through the atomization assembly to the air outlet 113. The airflow path is shown by an arrow R2 in FIG. 3 and FIG. 12.

[0039] An airflow sensor 40 such as an air flow sensor and a micro-electro-mechanical system (MEMS) sensor is in airflow communication with the airflow channel to sense an airflow generated through vaping by the user via the air outlet 113 and flowing through the airflow channel. Further, the electronic atomization device 100 and/or the circuit board controls the cell 16 to provide power for the heating element 14, so as to heat and atomize the liquid substrate to generate the aerosol according to a sensing result of the airflow sensor 40.

[0040] In some embodiments, the airflow channel may be jointly defined by a plurality of components, gaps between the plurality of components, etc. For example, as shown in FIG. 3, air entering through the air inlet 22 flows to the sealing base 15 through a gap between the cell 16 and the main housing 10, then passes through the air channel 151 of the sealing base 15 to enter the tubular element 12, and finally passes through the heating element 14 to be output to the air outlet 113 through the aerosol output tube 111. Further, in the embodiment, the airflow channel is defined by the gap between the cell 16 and the main housing 10, the air channel 151 of the sealing base 15, a part of the tubular element 12, and the aerosol output tube 111.

[0041] As shown in FIG. 3 to FIG. 8, the constructions of the operation assembly 30 include: a connection element 31, a sealing element 32, and an operation element 34 that are arranged in the longitudinal direction.

[0042] After assembly, the operation element 34 is mainly mounted and accommodated in the second mounting space 252, and is at least partially exposed at the distal end 120 to be operated by the user, for example, to be pressed and rotated by the user.

[0043] The sealing element 32 is located in the first mounting space 251 of the end cap 20, and may be driven by the operation element 34 to move to selectively close or open the air inlet 22.

[0044] The connection element 31 is combined with or connected to the sealing element 32 and connected to the operation element 34, thereby establishing connection between the operation element 34 and the sealing element 32, so that the user can drive the sealing element 32 to move by operating the operation element 34.

[0045] In some embodiments, the driven movement of the sealing element 32 includes movement in the longitudinal direction of the end cap 20 and/or the external housing, and rotation about the center axes/center axis of the end cap 20 and/or the external housing.

[0046] As shown in FIG. 3 to FIG. 8, the connection element 31 is generally a countersunk screw that penetrates the sealing element 32, and is in threaded connection to the operation element 34. Specifically, the

connection element 31 includes a screw head 311 and a threaded rod 312; where the screw head 311 is basically in a sheet shape, and is combined with or attached to the sealing element 32; and the threaded rod 312 penetrates the sealing element 32, and is connected to the operation element 34. After assembly, the screw head 311 is located in the first mounting space 251.

[0047] As shown in FIG. 3 to FIG. 8, an avoidance notch 321 is provided in the sealing element 32. The sealing element 32 is rotatable about the center axes/center axis of the end cap 20 and/or the external housing through the operation element 34. Thus, the avoidance notch 321 is aligned with or staggered from the air inlet 22 in the partition wall 21, thereby selectively opening or closing the air inlet 22. In some embodiments, the sealing element 32 is made of a flexible material such as silicone and a thermoplastic elastomer.

[0048] As shown in FIG. 3 to FIG. 8, a first connection structure 322 such as a protrusion 322 is arranged on the sealing element 32. Correspondingly, a second connection structure 261 such as a groove 261 and a third connection structure 262 such as a groove 262 are provided in the first side 211 of the partition wall 21. When the sealing element 32 is located at the opening position for opening the air inlet 22, the first connection structure 322 extends into the second connection structure 261 to be connected, so as to form a locked state, and thus the sealing element 32 is stably held at the opening position. When the sealing element 32 is located at the closing position for closing the air inlet 22, the first connection structure 322 extends into the third connection structure 262 to be connected, so as to form a locked state, and thus the sealing element 32 is stably held at the closing position.

[0049] In the embodiment, the operation assembly 30/the sealing element 32 can be operated by the user by pressing the operation element 34, so that the operation assembly 30/the sealing element 32 moves in the longitudinal direction to unlock the locked state formed through the connection between the first connection structure 322 and the second connection structure 261 at the opening position, or unlock the locked state formed through the connection between the first connection structure 322 and the third connection structure 262 at the closing position.

[0050] As shown in FIG. 3 to FIG. 8, a plurality of first limiting protrusions 24 extending in the longitudinal direction are arranged on an inner side surface of the second mounting space 252 of the end cap 20. Second limiting protrusions 341 are arranged on an outer side surface of the operation element 34. Thus, when the user drives the operation element 34 to rotate from the closing position to the opening position, or from the opening position to the closing position with a finger, the operation element is limited through abutment of the second limiting protrusions 341 and the first limiting protrusions 24, so that a rotation angle of the operation element 34 is limited.

[0051] As shown in FIG. 3 to FIG. 8, the exposed

surface, exposed to the end cap 20 or the distal end 120, the operation element 34 is provided with a plurality of anti-slip convex edges 342 arranged in a radial direction. Thus, finger strength and slip resistance are achieved when the user drives the operation element 34 to rotate with the finger.

[0052] As shown in FIG. 3 to FIG. 8, the operation assembly 30 further includes:

an elastic element 33 configured to provide an elastic force to bias the sealing element 32 in a direction making the sealing element 32 face away from the proximal end 110. Thus, the sealing element 32 is locked at the opening position by driving the first connection structure 322 to be connected to the second connection structure 261, and locked at the closing position by driving the first connection structure 322 to be connected to the third connection structure 262.

[0053] In the specific embodiment shown in FIG. 3 to FIG. 8, the elastic element 33 includes a linear spring. During assembly, the elastic element 33 is located in the second mounting space 252, abuts against the partition wall 21 and the operation element 34, and is arranged between the partition wall and the operation element.

[0054] Reference can be made to FIG. 9 to FIG. 12 for an operation process in which the user operates the operation assembly 30 with the finger to drive the operation assembly 30 to move to open or close the air inlet 22.

[0055] FIG. 9 is a schematic diagram of the operation assembly 30 at the closing position. In FIG. 9, the sealing element 32 abuts against or is attached to the first side 211 of the partition wall 21, and shields and closes the air inlet 22. At the closing position in FIG. 9, the sealing element 32 is biased towards the distal end 120 under an elastic force of the elastic element 33. Thus, the sealing element 32 keeps abutting against or attached to the partition wall 21, and is locked by keeping the connection between the first connection structure 322 and the third connection structure 262.

[0056] FIG. 10 is a schematic diagram of unlocking the operation assembly 30 located at the closing position in FIG. 9 by pressing the operation element 34 by the user. As shown by an arrow P1 in FIG. 10, the operation element 34 is driven by the user with the finger through pressing, etc., so as to move towards the proximal end 110, so that the sealing element 32 is separated from the partition wall 21 through movement. The connection structure 322 of the sealing element 32 is separated from the third connection structure 262, so that unlocking is formed. In FIG. 10, the elastic element 33 mounted between the partition wall 21 and the operation element 34 is compressed.

[0057] FIG. 11 is a schematic diagram of rotating the operation assembly to the opening position by driving the operation element 34 in FIG. 10 to rotate by the user. As shown by an arrow P2 in FIG. 11, through an operation by the user with the finger, the operation element 34 in FIG. 10 is rotated, and drives the sealing element 32 to rotate to the opening position. In FIG. 11, the avoidance notch

321 of the sealing element 32 is aligned with the air inlet 22 in the partition wall 21.

[0058] FIG. 12 shows movement of the operation element 34 in FIG. 11 driven through an elastic restoring force of the elastic element 33, as shown by an arrow P3 in FIG. 12. Thus, the sealing element 32 moves to be attached to or to abut against the partition wall 21, so as to be stopped. The connection between the first connection structure 322 of the sealing element 32 and the second connection structure 261 on the partition wall 21 is kept to form locking.

[0059] As shown in FIG. 11 and FIG. 12, a gap exists between a portion, located in the second mounting space 252, of the operation element 34 and the end cap 20, so that the air inlet 22 keeps communicating with the external atmosphere through the gap between the operation element and the end cap. A port, in the second side 212 of the partition wall 21, of the air inlet 22 keeps communicating with the external atmosphere constantly. The sealing element 32 rotates in the first mounting space 251 to selectively shield or avoid the port, in the first side 211 of the partition wall 21, of the air inlet 22, so as to open or close the air inlet 22.

[0060] Similarly, when the user performs operations according to operation processes opposite to those in FIG. 9 to FIG. 12, the operation assembly 30 can be adjusted from the opening position in FIG. 12 to the closing position in FIG. 9.

[0061] FIG. 13 to FIG. 15 are each a schematic diagram of an electronic atomization device 100a according to another embodiment. In the embodiment, the electronic atomization device 100a includes:

- a main housing 10a including a proximal end 110a and a distal end 120a;
- an inner housing 20a at least partially extending into the main housing 10a from the distal end 120a and tightly connected to the main housing 10a through close fit such as riveting and interference;
- an air outlet 113a located at the proximal end 110a of the main housing 10a;
- an aerosol output tube 111a extending from the air outlet 113a towards the distal end 120a;
- a tubular element 12a coaxial with the aerosol output tube 111a and provided with perforations 121a allowing a liquid substrate to penetrate;
- a liquid storage cavity 112a arranged around the aerosol output tube 111a and/or the tubular element 12a;
- a liquid guide element 13a located in the tubular element 12a and sucking the liquid substrate from the liquid storage cavity 112a through the perforations 121a;
- a heating element 14a configured to heat at least some liquid substrates in the liquid guide element 13a to generate an aerosol;
- a sealing base 15a at least partially supporting the tubular element 12a and sealing an opening, to-

wards the distal end 120a, of the liquid storage cavity 112a;

a cell 16a at least partially supported and held by the inner housing 20a and located between the sealing base 15a and the distal end 120a; a main control circuit board (not shown in the figure) provided with a microcontroller unit (MCU), a circuit, etc. and arranged abutting against or in parallel with the cell 16a, where the main control circuit board such as a PCB extends in a longitudinal direction of the electronic atomization device 100a, is substantially parallel with the cell 16a, and abuts against or is attached to the cell; and

pogo pins 142a arranged between the cell 16a and the sealing base 15a, where the pogo pins 142a are in conductive connection to the main control circuit board, and the heating element 14a is in conductive connection to the cell 16a after conductive pins or leads are soldered to or abut against the pogo pins 142a, so that the cell 16a provides power for the heating element 14a.

[0062] As shown in FIG. 13 to FIG. 15, the electronic atomization device 100a further includes:

a partition wall 21a defined by a part of the inner housing 20a, where a portion, arranged or defined in the inner housing 20a, of the partition wall 21a is located between the cells 16a, and the partition wall 21a is further provided with a mounting hole 23a; an air inlet 22a provided in the partition wall 21a and configured to allow external air to enter the electronic atomization device 100a;

an airflow channel defining an airflow path from the air inlet 22a to the air outlet 113a via the heating element 14a; and

an airflow sensor 40a located between the partition wall 21a and the cell 16a and configured to sense an airflow flowing through the airflow channel.

[0063] As shown in FIG. 13 to FIG. 17, the electronic atomization device 100a further includes:

an operation assembly 30a mounted in the inner housing 20a and arranged closer to the distal end 120a; where during assembly, after penetrating the mounting hole 23a of the partition wall 21a, the operation assembly 30a is tightly held in the inner housing 20a. In the embodiment, the operation assembly 30a includes:

a countersunk screw 31a including a screw head 311a and a threaded rod 312a;

a flexible sealing element 32a provided with an avoidance notch 321a;

an elastic element 33a such as a spring;

an operation element operated by a user to drive the sealing element 32a to open or close the air inlet 22a, or to perform unlocking; where in the embodiment, the operation element includes a first operation com-

ponent 34a and a second operation component 35a that are connected to each other; the first operation component 34a is provided with a clamping slot, the second operation component 35a is provided with a hook 353a, and the second operation component is tightly connected to the first operation component 34a by connecting the hook 353a to the clamping slot 343a of the first operation component 34a; an exposed surface of the second operation component 35a is to be operated by the user;

a charging connector 36a such as a universal serial bus (usb) type-c charging connector configured to charge the cell 16; and

a charging circuit board 37a electrically connected to the charging connector 36a and electrically connected to the cell 16a or the main control circuit board through soldered leads, etc.; where the charging circuit board 37a is configured to control a process of charging the cell 16 through the charging connector 36a, including a charging current, power, etc.

[0064] The charging connector 36a and the charging circuit board 37a are accommodated and held in the operation element formed by the first operation component 34a and the second operation component 35a jointly. After assembly, the second operation component 35a and the first operation component 34a securely hold the charging connector 36a and the charging circuit board 37a in the second operation component and the first operation component. The second operation component 35a is at least partially exposed to be operated by the user, so as to drive the sealing element 32a to open or close the air inlet 22a. The second operation component 35a is provided with a charging port 354a opposite the charging connector 36a and connected to an external connector.

[0065] After assembly, the countersunk screw 31 penetrates the sealing element 32a, and is connected to the first operation component 34a, thereby establishing connection between the sealing element 32a and the second operation component 35a. The elastic element 33a is mounted between the first operation component 34a and the partition wall 21a. After assembly, a gap is kept between the inner housing 20a and the operation assembly 30, and a port in one side, towards the distal end 120a, of the air inlet 22a keeps communicating with the external atmosphere through the gap between the inner housing 20a and the operation assembly 30.

[0066] As shown in FIG. 13 to FIG. 17, a first limiting protrusion 24a is further arranged in the inner housing 20a. A second limiting protrusion 351a is arranged on the second operation component 35a. During driven rotation, the second operation component 35a is stopped after the first limiting protrusion 24a cooperates with the second limiting protrusion 351a to form abutment, so that the second operation component is limited when rotated to the opening position and/or the closing position.

[0067] As shown in FIG. 13 to FIG. 17, the sealing

element 32a is located between the cell 16a and the partition wall 21a. In the embodiment, a surface 3210a, towards the partition wall 21a, of the sealing element 32a is provided with no connection structure configured to be locked by being connected to the partition wall 21a. Further, in the embodiment, under elastic biasing by the elastic element 33a, the surface 3210a of the flexible sealing element 32a is attached to the partition wall 21a to generate a large friction force or a large damping force. When the user drives the second operation component 35a to rotate, so as to cause the sealing element 32a to rotate relative to the partition wall 21a, locking is formed through the friction force or the damping force between the surface 3210a and the partition wall 21a. In this case, rotation of the second operation component 35a driven by the user is unsmooth in operation. However, when the user presses the second operation component 35a to move the sealing element 32a, so as to separate the surface 3210a from the partition wall 21a, the friction force or the damping force between the surface and the partition wall is removed to form unlocking, so that rotation of the second operation component 35a driven by the user is smooth in operation.

[0068] In the embodiment, reference can be made to FIG. 18 to FIG. 21 for a process in which the user drives the sealing element 32a to open or close the air inlet 22a through the second operation component 35a.

[0069] In FIG. 18, the sealing element 32a is biased by the elastic element 33a to be attached to the partition wall 21a, and the avoidance notch 321a of the sealing element 32a is staggered from the air inlet 22a, so that the air inlet 22a is closed by the sealing element 32a. In FIG. 19, the user presses the second operation component 35a, as shown by an arrow P1, to separate the sealing element 32a from the partition wall 21a. For example, in FIG. 19, the sealing element is separated from the partition wall through pressing to generate a distance d1, and thus contact locking between the sealing element and the partition wall is removed. In FIG. 20, the user rotates the second operation component 35a to drive the sealing element 32a to rotate, so that the avoidance notch 321a of the sealing element 32a is aligned with the air inlet 22a to open the air inlet 22a. In FIG. 21, the sealing element 32a is driven to abut against the partition wall 21a through an elastic restoring force of the elastic element 33a, so that locking is formed at the opening position.

[0070] Similarly, the user can further perform operations according to operation processes opposite to the above, to drive the sealing element 32a to adjust from the opening position to the closing position, so as to close the air inlet 22a.

[0071] As shown in FIG. 18 to FIG. 21, the charging connector 36a and the charging circuit board 37a synchronously move along with a movement operation of the second operation component 35a. Correspondingly, in the embodiment, a sufficient length of the conductive lead connecting the charging circuit board 37a to the main control circuit board is reserved. Thus, in a movement

process of the charging circuit board 37a, the length of the conductive lead is sufficient to keep the connection to the main control circuit board.

[0072] FIG. 22 is a schematic diagram of an electronic atomization device 100b according to yet another variant embodiment. In the embodiment, the electronic atomization device 100b includes:

a main housing 10b, and an end cap 20b located in the main housing 10b; where the end cap 20b is arranged closer to a distal end 120b; and a cell 16b located in the main housing 10b and configured to provide power for an atomization assembly.

[0073] The end cap 20b is provided with a partition wall 21b arranged perpendicular to a longitudinal direction, and an air inlet 22b is provided in the partition wall 21b.

[0074] An elastic element 33b such as silicone and a thermoplastic elastomer is arranged between the cell 16b and the partition wall 21b.

[0075] A sealing element 32b of an operation assembly 30b is located between the partition wall 21b and the elastic element 33b. A countersunk screw 31b penetrates the sealing element 32b, and is connected to an operation element 34b by penetrating the sealing element 32b, thereby establishing connection between the sealing element 32b and the operation element 34b. During use, a user operates the sealing element 32b to move in the longitudinal direction and rotate, so that the sealing element 32b is configured between a closing position for closing the air inlet 22b and an opening position for opening the air inlet 22b.

[0076] In the embodiment in FIG. 22, the elastic element 33b located between the cell 16b and the partition wall 21b replaces a spring to provide an elastic force, so that the sealing element 32b is biased towards a locked state of abutting against the partition wall 21b. When the user presses the operation element 34b for unlocking, the countersunk screw 31b presses the elastic element 33b. After the user completes the operation, the countersunk screw 31b and the sealing element 32b are driven through an elastic restoring force of the compressed elastic element 33b to move towards the partition wall 21b, so as to be locked, as shown by an arrow P3 in FIG. 22.

[0077] In the embodiment shown in FIG. 22, an airflow sensor 40b is wrapped or mounted in the elastic element 33b.

[0078] It should be noted that the preferred embodiments of the present disclosure are provided in the description and the accompanying drawings of the present disclosure, but are not limited to the embodiments described in the description. Further, a person of ordinary skill in the art can make improvements or modifications according to the above descriptions, and all the improvements and modifications should fall within the scope of protection of the appended claims of the present disclosure.

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Claims

1. An electronic atomization device, comprising: an external housing having a proximal end and a distal end that face away from each other in a longitudinal direction;

a liquid storage cavity configured to store a liquid substrate;
a heating element configured to heat the liquid substrate to generate an aerosol;
an air inlet configured to allow air to enter the electronic atomization device;
a movable sealing element configured to move between a closing position and an opening position, so as to selectively close the air inlet at the closing position or open the air inlet at the opening position; wherein the sealing element is further configured to switch between a locked state and an unlocked state, in the locked state, the sealing element is prevented from moving between the closing position and the opening position, and in the unlocked state, the sealing element is allowed to move between the closing position and the opening position; and
an operation element arranged at the distal end and accommodated or mounted in the external housing; wherein the operation element is configured to be operated by a user, so as to drive the sealing element to switch from the locked state to the unlocked state, and drive the sealing element to move between the closing position and the opening position in the unlocked state.

2. The electronic atomization device according to claim 1, wherein the operation element is pressed by the user to drive the sealing element to switch from the locked state to the unlocked state.
3. The electronic atomization device according to claim 1 or 2, wherein the operation element is rotated by the user to drive the sealing element to move between the closing position and the opening position.
4. The electronic atomization device according to claim 1 or 2, wherein movement of the sealing element between the closing position and the opening position comprises rotation about a center axis of the sealing element; and/or
a switch of the sealing element between the locked state and the unlocked state comprises movement in the longitudinal direction of the electronic atomization device.

5. The electronic atomization device according to claim

1 or 2, further comprising:

a partition wall comprising a first side closer to the proximal end and a second side closer to the distal end; wherein the air inlet is provided in the partition wall, and extends from the first side to the second side; and
the sealing element is arranged on the first side of the partition wall.

6. The electronic atomization device according to claim 5, wherein the operation element is at least partially arranged on the second side of the partition wall.

7. The electronic atomization device according to claim 5, wherein the sealing element is connected to the partition wall in the locked state, and disconnected from the partition wall in the unlocked state.

8. The electronic atomization device according to claim 5, wherein the sealing element is flexible; the sealing element abuts against the partition wall in the locked state, and the sealing element is prevented from moving between the closing position and the opening position through a friction force of relative movement between the sealing element and the partition wall in a combination plane; and the sealing element is separated from the partition wall in the unlocked state.

9. The electronic atomization device according to claim 5, further comprising:

a cell configured to provide power for the heating element; and
a charging connector arranged at the distal end and configured to charge the cell; wherein the charging connector is mounted or held at the operation element.

10. The electronic atomization device according to claim 1 or 2, further comprising:
an elastic element configured for biasing to drive the sealing element to switch from the unlocked state to the locked state when the sealing element is at the closing position and/or the opening position, or configured to bias the sealing element to keep the sealing element in the locked state.

11. The electronic atomization device according to claim 1 or 2, wherein the operation element is provided with an exposed surface exposed to the distal end, and the exposed surface is recessed; and
a plurality of anti-slip convex edges are arranged on the exposed surface in a radial direction.

12. The electronic atomization device according to claim 5, comprising:

a main housing extending and arranged between the proximal end and the distal end; and an end cap at least partially extending into the main housing from the distal end; wherein the operation element is accommodated or 5 mounted in the end cap; and the partition wall is arranged in the end cap.

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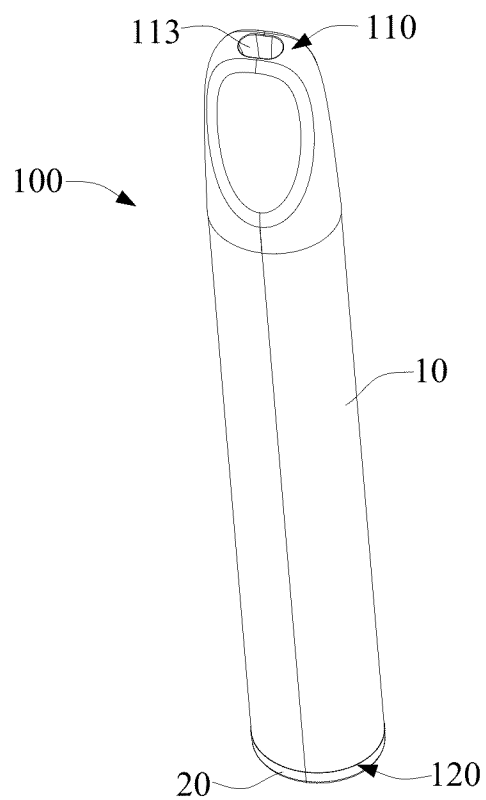


FIG. 1

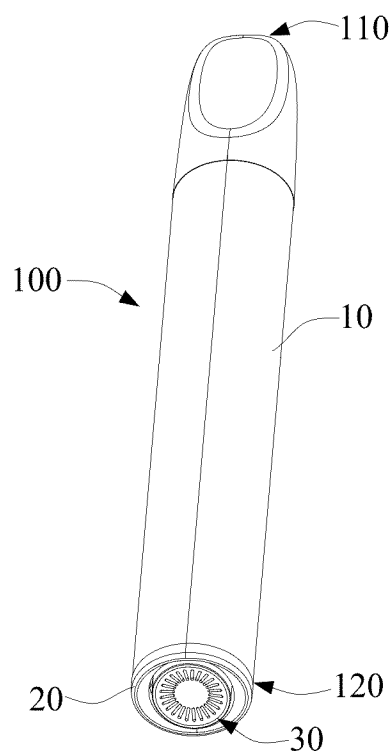


FIG. 2

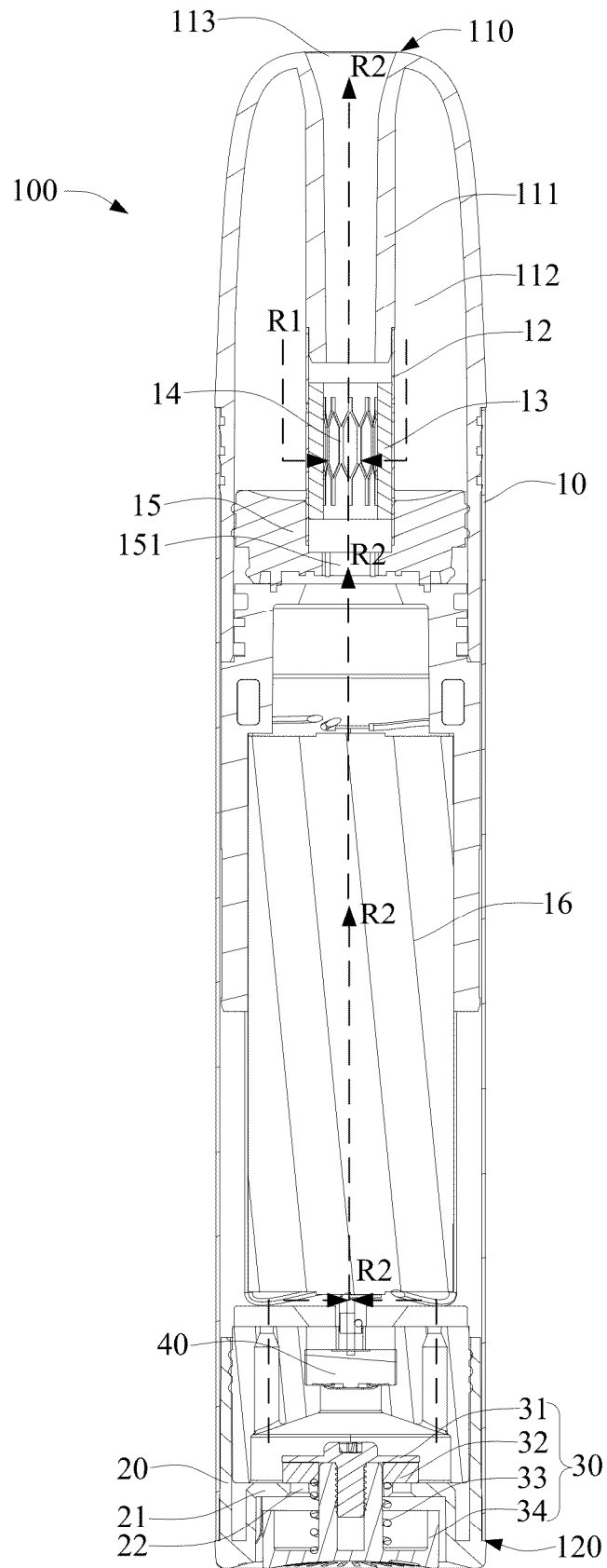


FIG. 3

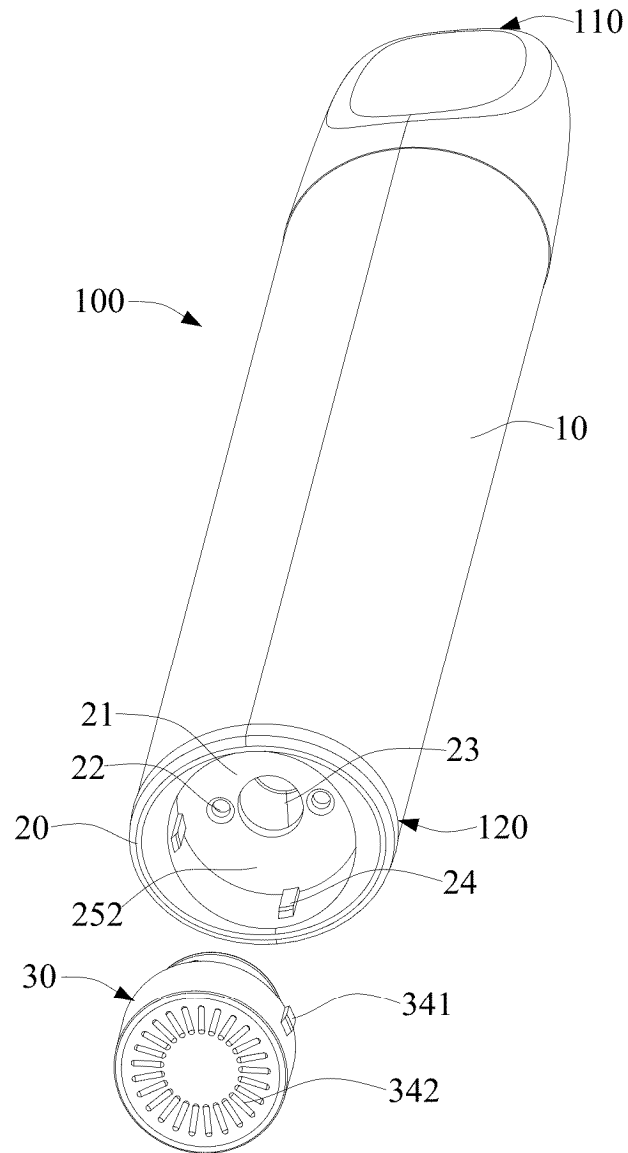


FIG. 4

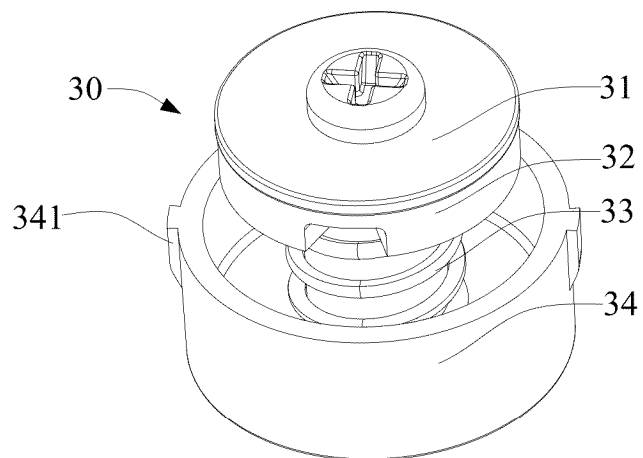


FIG. 5

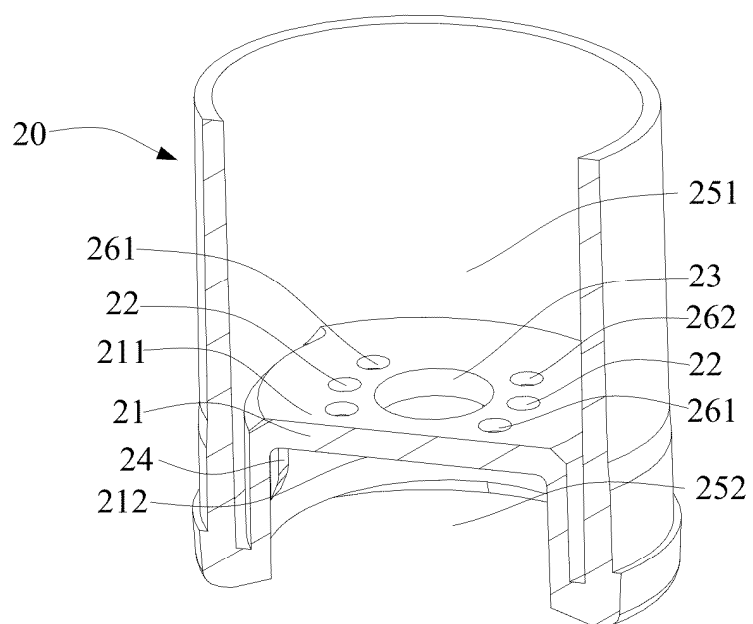


FIG. 6

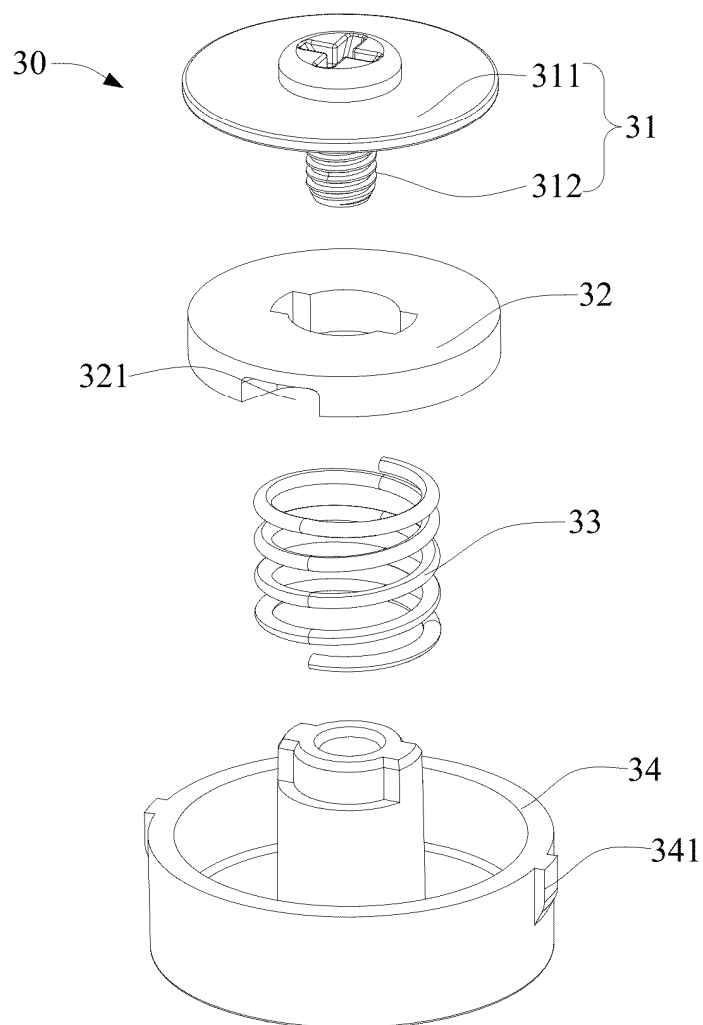


FIG. 7

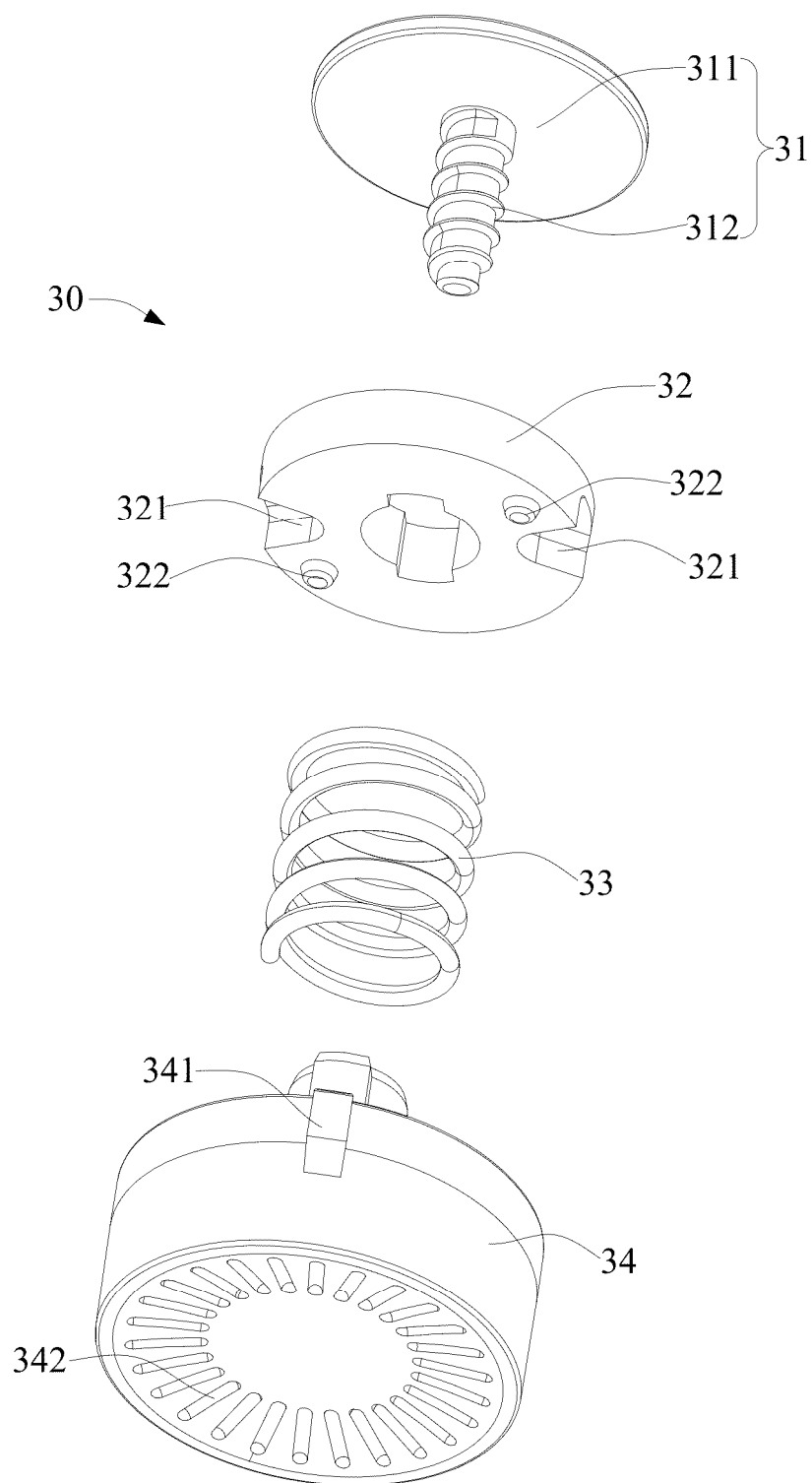


FIG. 8

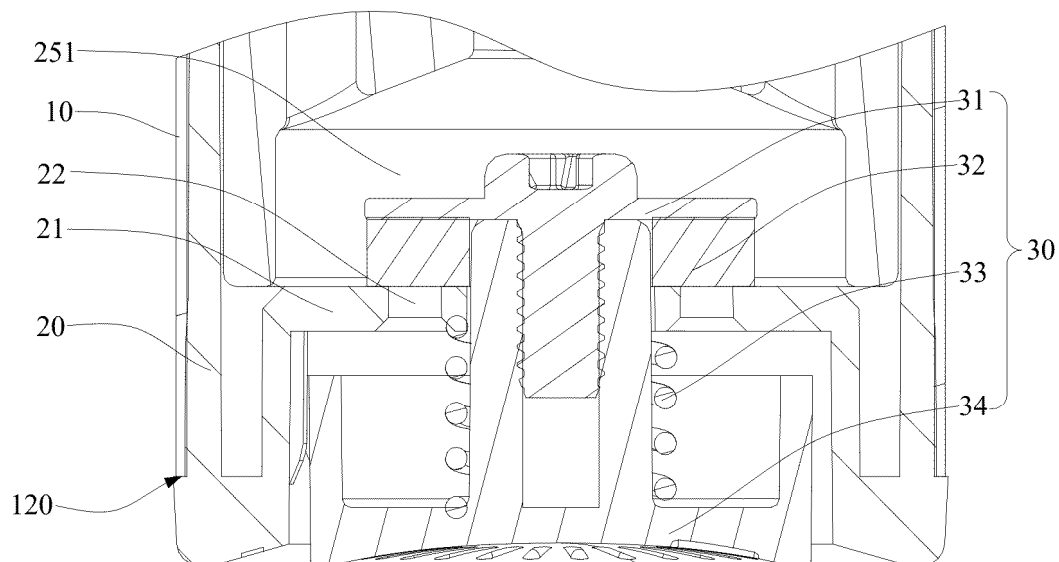


FIG. 9

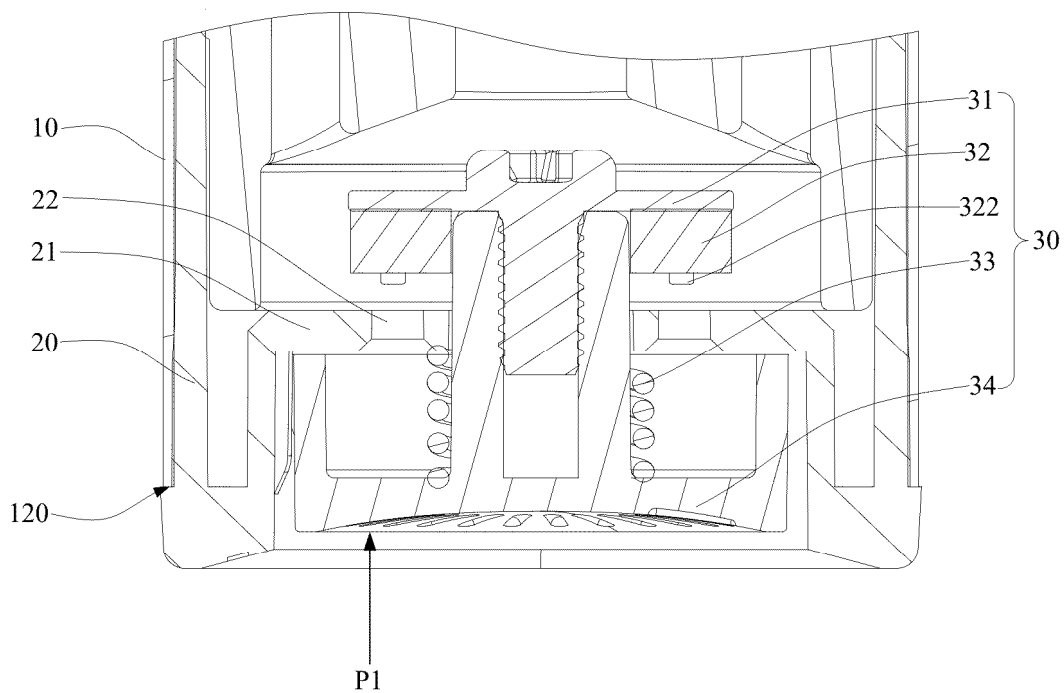


FIG. 10

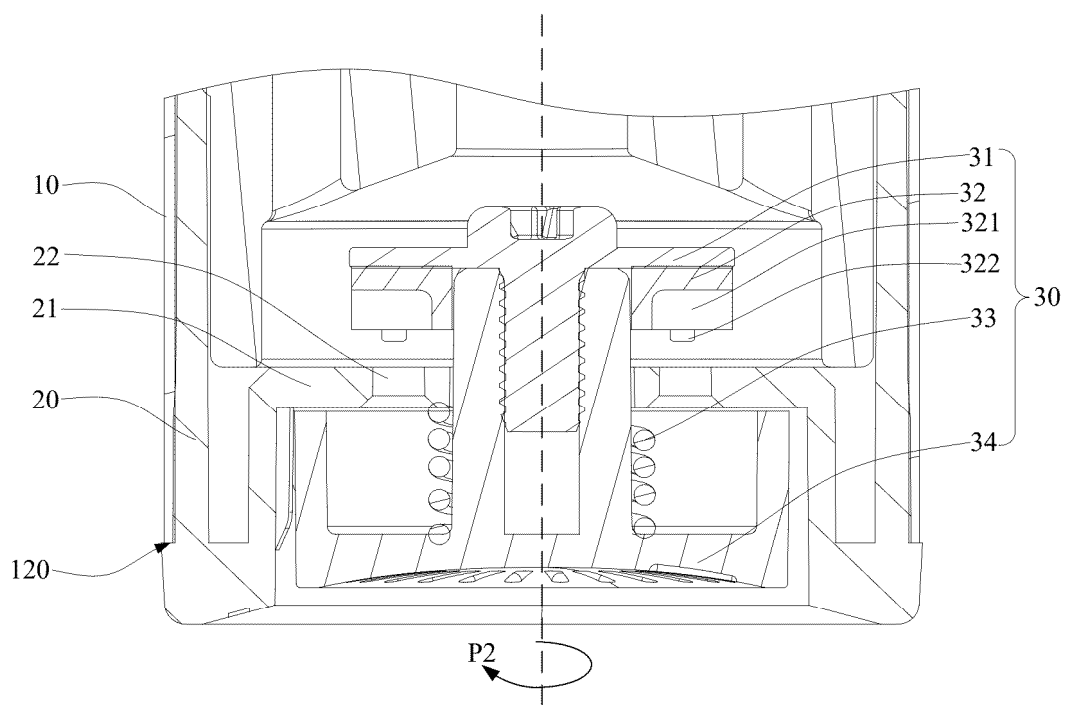


FIG. 11

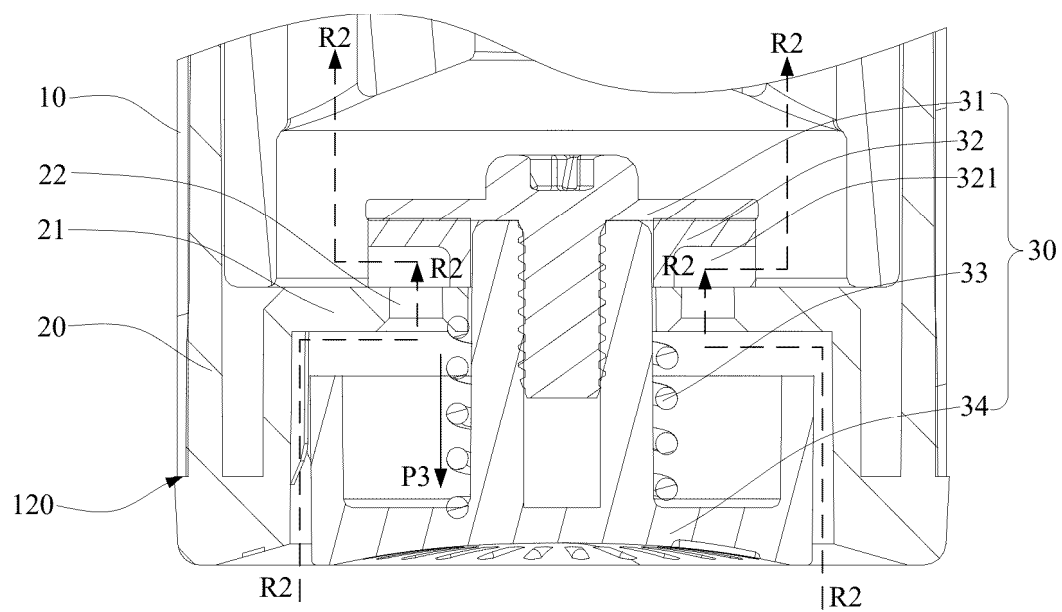


FIG. 12

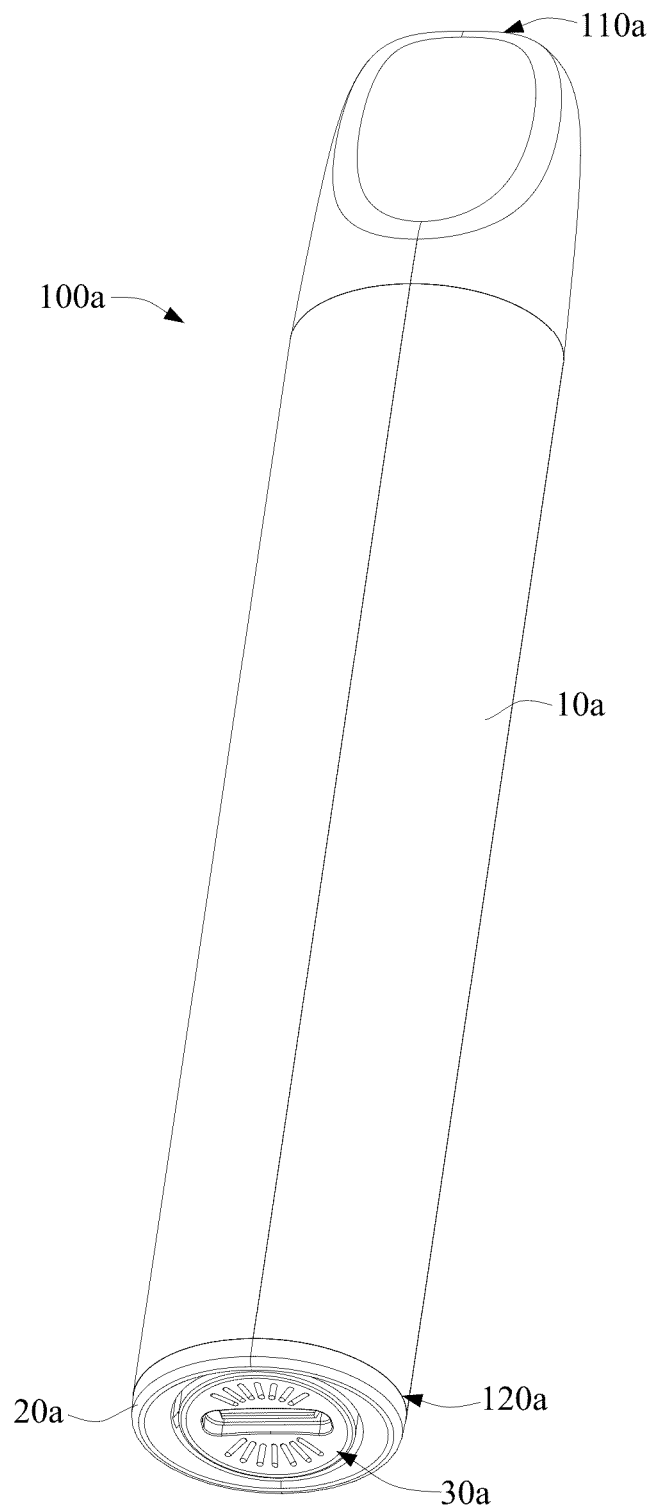


FIG. 13

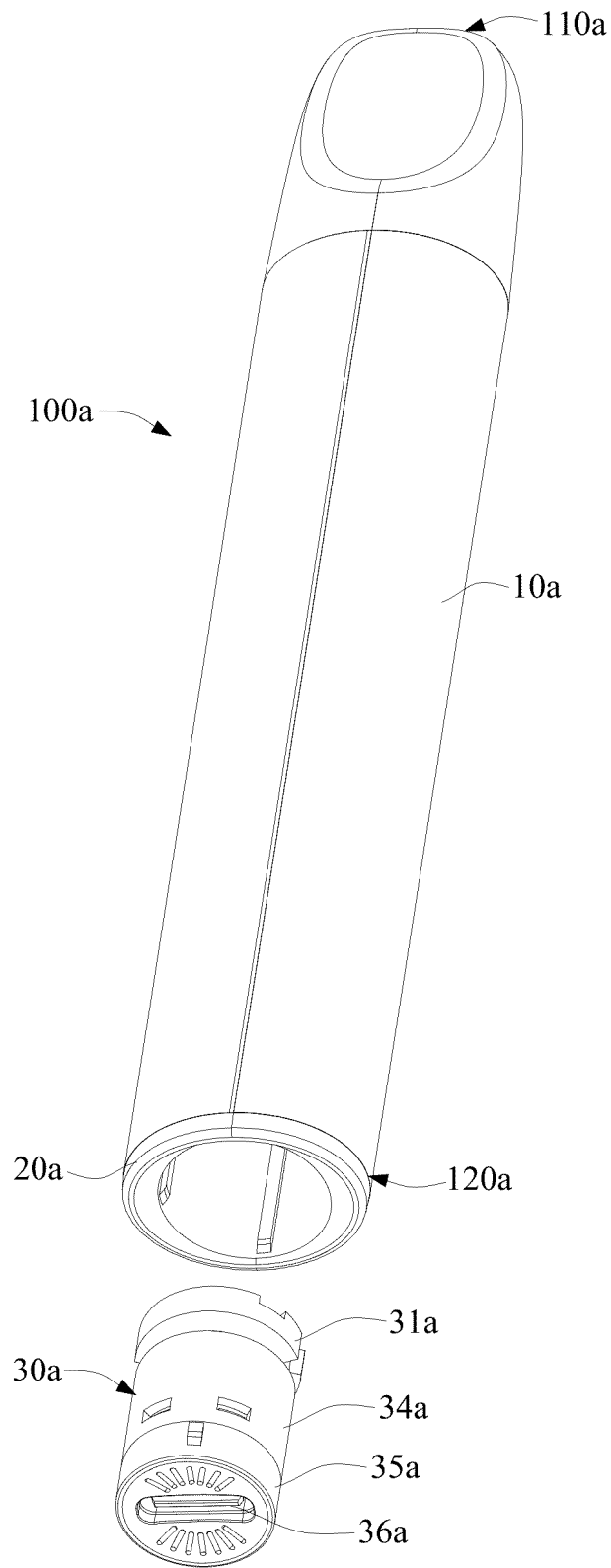


FIG. 14

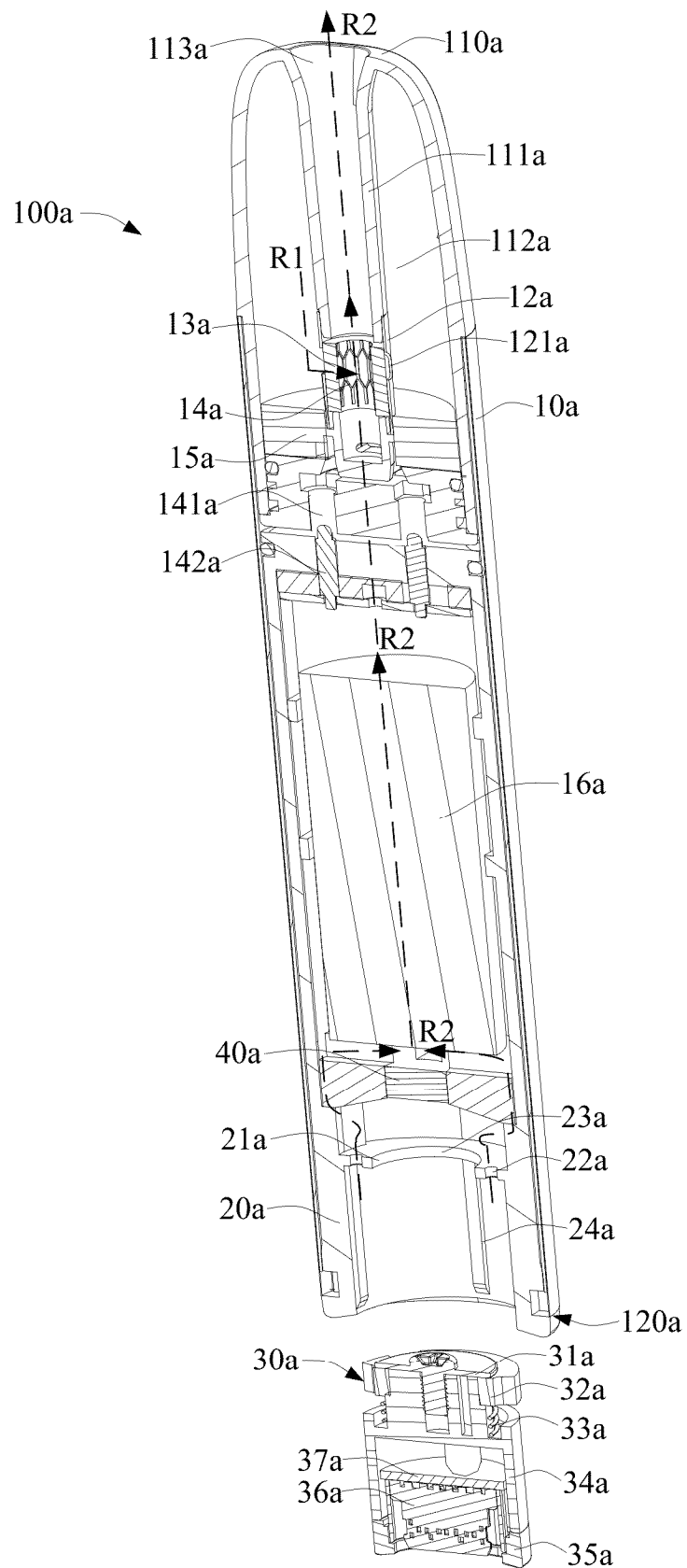


FIG. 15

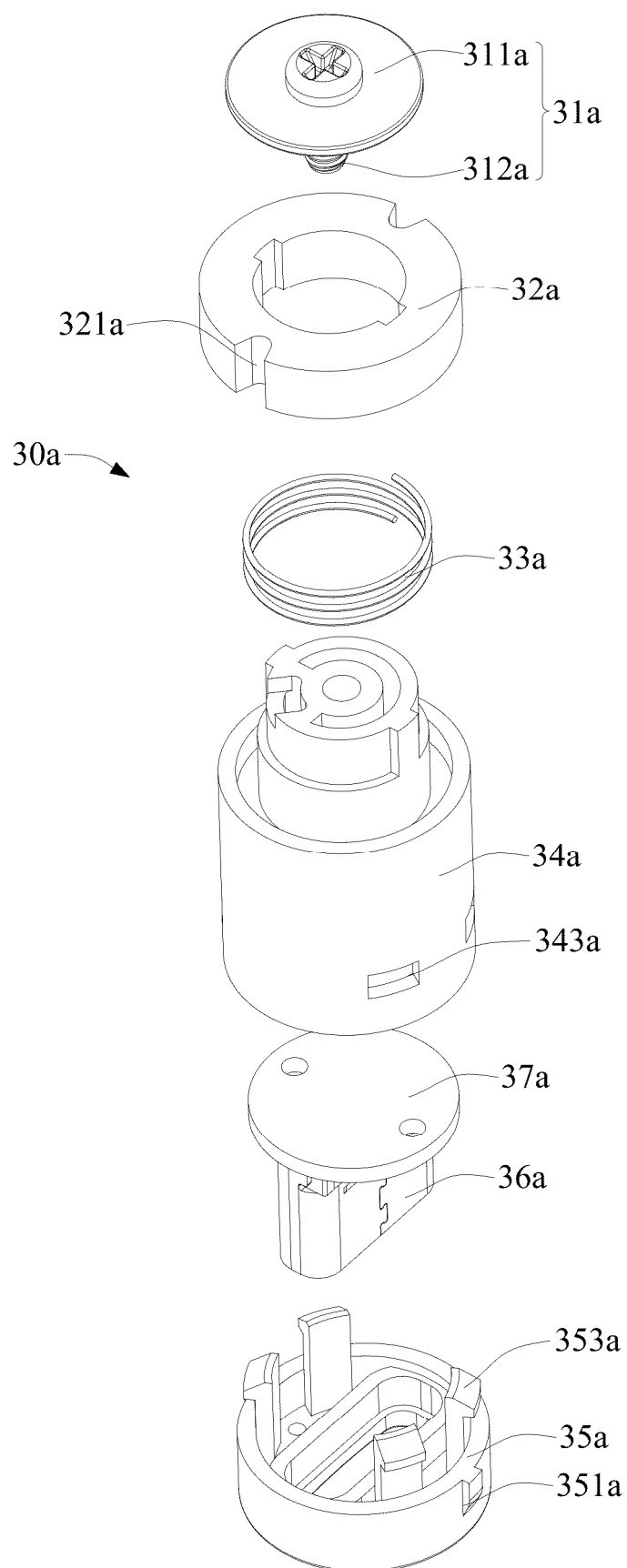


FIG. 16

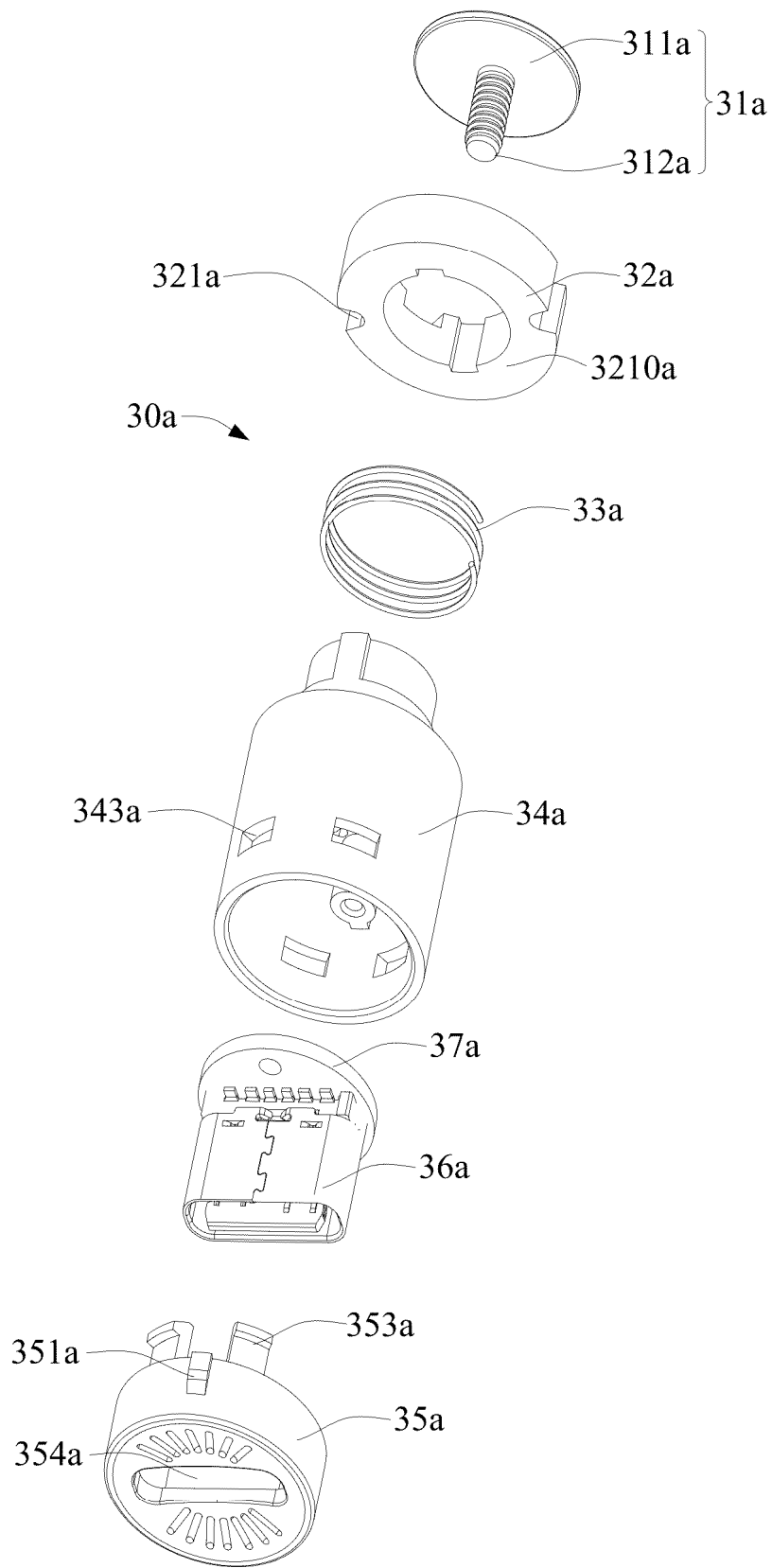


FIG. 17

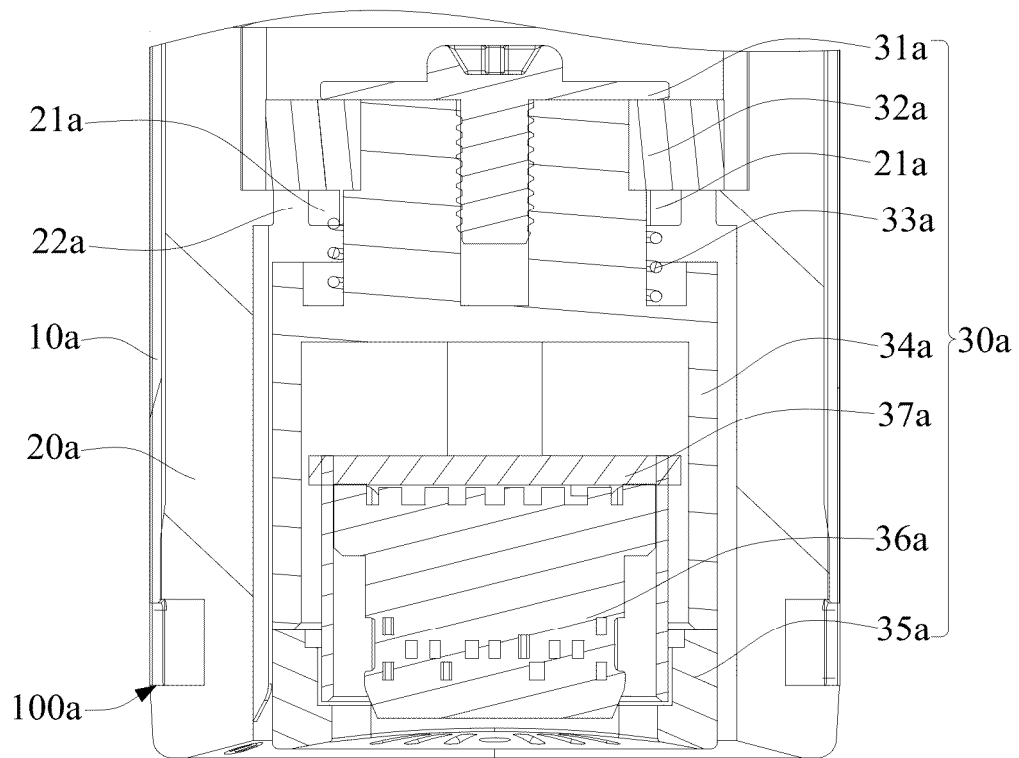


FIG. 18

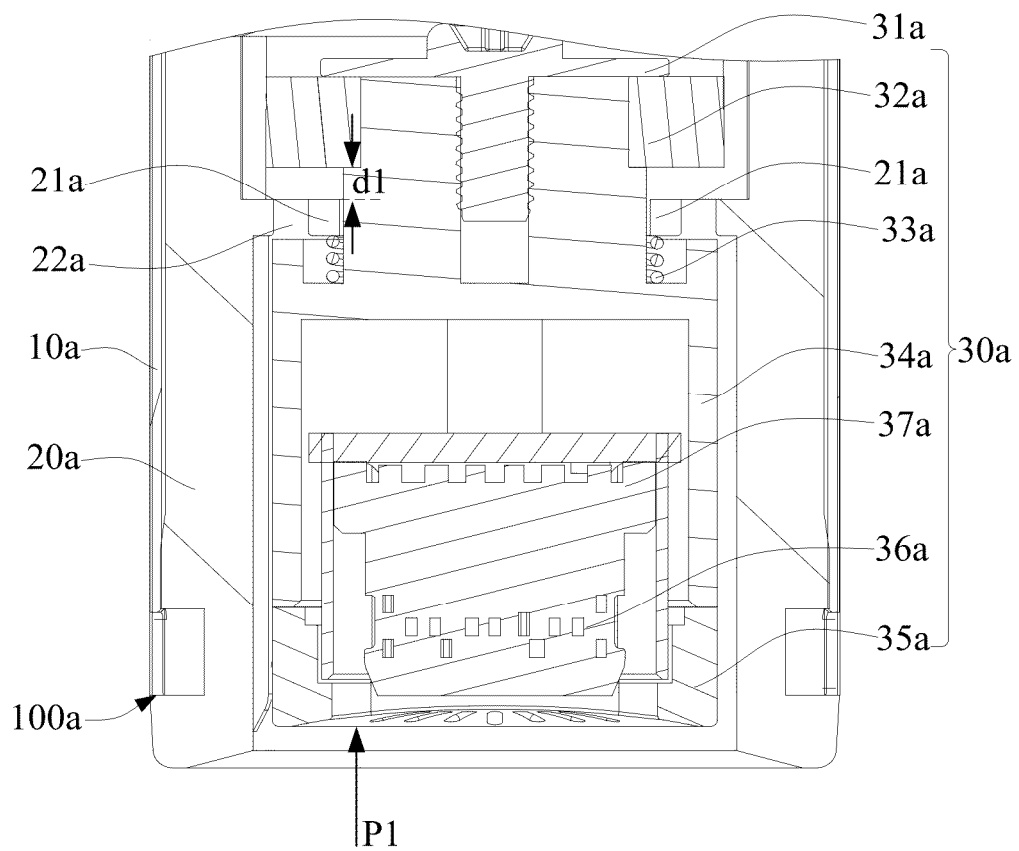


FIG. 19

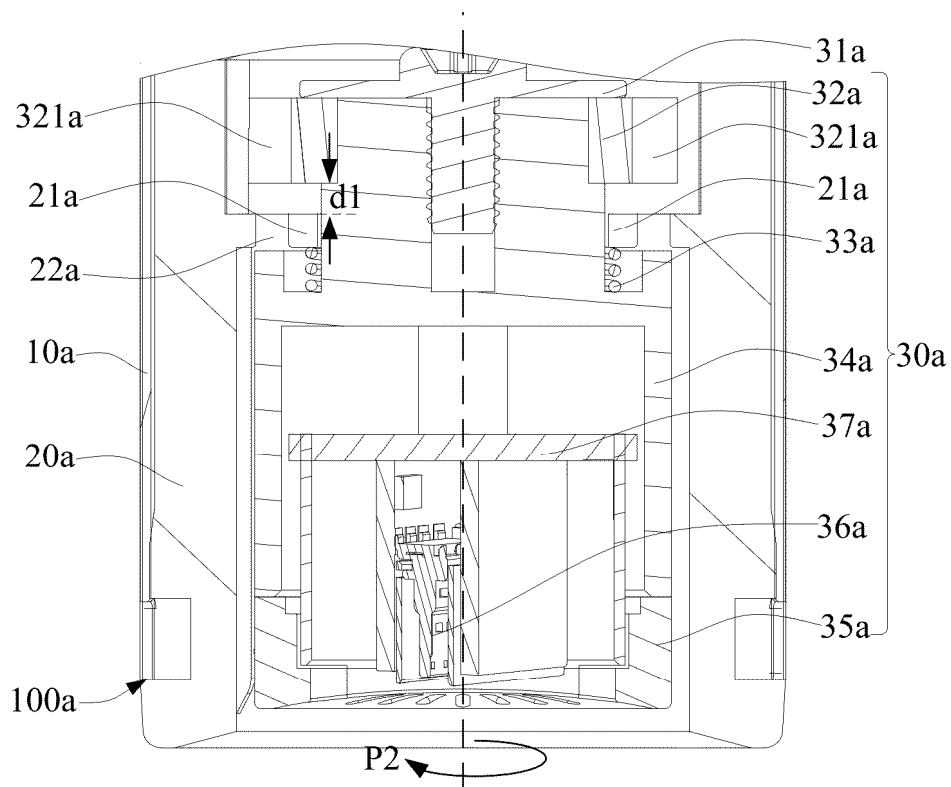


FIG. 20

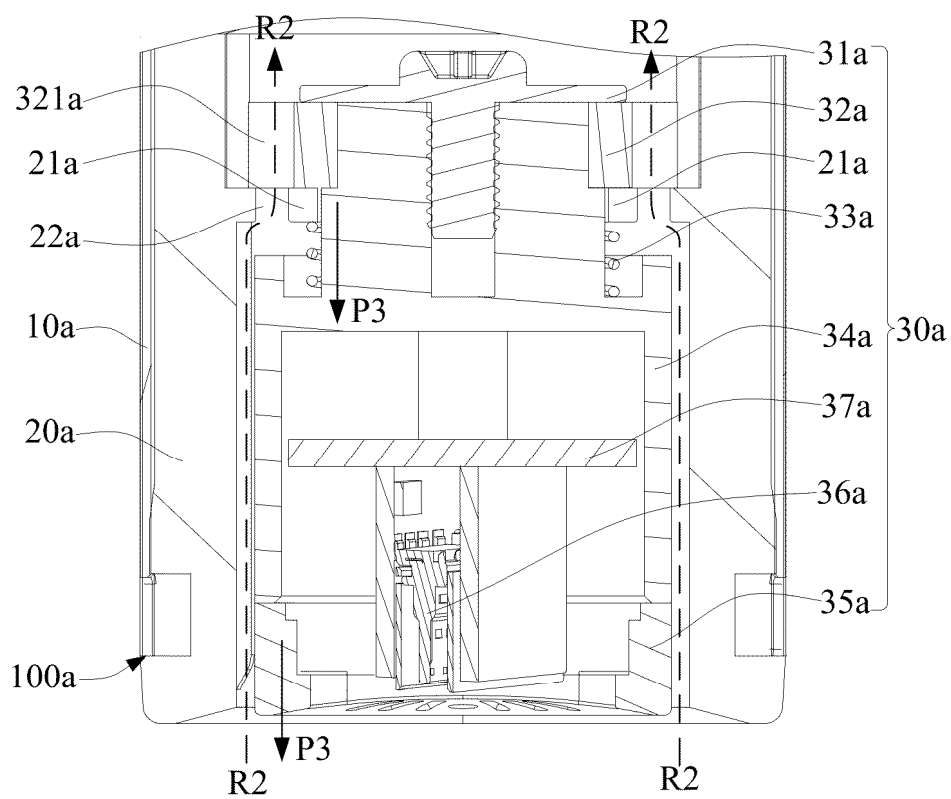


FIG. 21

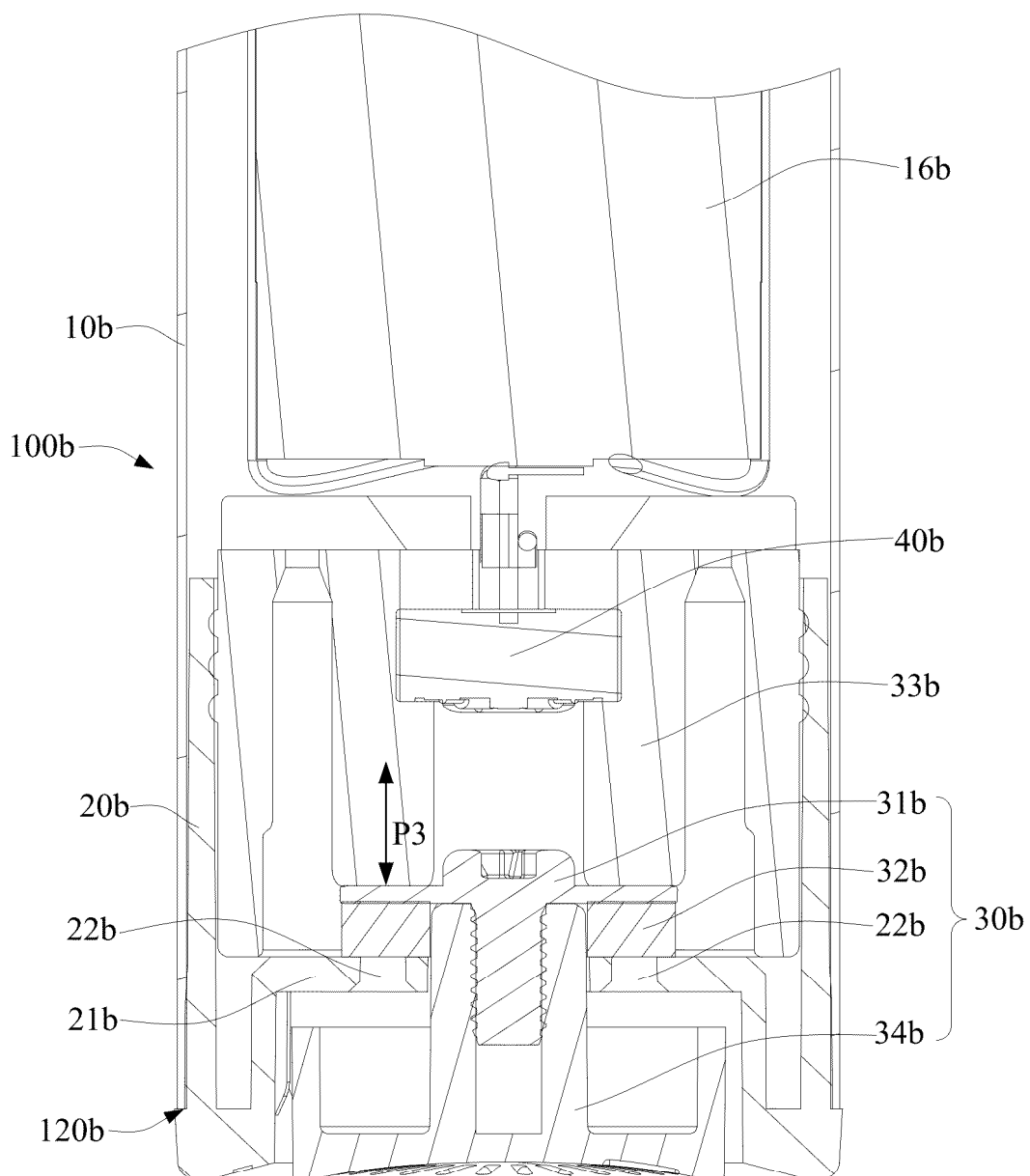


FIG. 22

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2024/103681

A. CLASSIFICATION OF SUBJECT MATTER

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)

IPC: A24F

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

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

CNTXT, ENTXTC, DWPI, CNKI: 谢宝锋, 谢远秋, 胡瑞龙, 徐中立, 李永海, 深圳市合元, 锁定, 解锁, 旋转, 转动, 进气, 气流, 开, 闭, 合, 调节, 弹簧, 雾化, 电子烟, 密封, 缺口, 槽, electronic, atomization, seal+, closed, open, unlocked, locked, air, inlet

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 220458606 U (SHENZHEN FIRST UNION TECHNOLOGY CO., LTD.) 09 February 2024 (2024-02-09) claims 1-12	1-12
PX	CN 220712901 U (SHENZHEN FIRST UNION TECHNOLOGY CO., LTD.) 05 April 2024 (2024-04-05) description, paragraphs 63-162, and figures 1-23	1-12
PX	CN 220274916 U (SHENZHEN FIRST UNION TECHNOLOGY CO., LTD.) 02 January 2024 (2024-01-02) description, paragraphs 54-77 and 97, and figures 1-9	1-12
Y	CN 217284767 U (ALD GROUP LTD.) 26 August 2022 (2022-08-26) description, paragraphs 35-64, and figures 1-7	1-12
Y	CN 217826790 U (SHENZHEN SMISS TECHNOLOGY CO., LTD.) 18 November 2022 (2022-11-18) description, paragraphs 35-42 and 51, and figures 1-4	1-12

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

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"D" document cited by the applicant in the international application	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"E" earlier application or patent but published on or after the international filing date	"&" document member of the same patent family
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

18 October 2024

Date of mailing of the international search report

23 October 2024

Name and mailing address of the ISA/CN

China National Intellectual Property Administration (ISA/
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Beijing 100088

Authorized officer

Telephone No.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2024/103681

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C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	CN 218773360 U (ALD GROUP LTD.) 31 March 2023 (2023-03-31) entire document	1-12
A	US 2018271174 A1 (JOYETECH EUROPE HOLDING G.M.B.H.) 27 September 2018 (2018-09-27) entire document	1-12

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CN2024/103681

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