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(71) Applicant: **Shenzhen First Union Technology Co., Ltd.**
Shenzhen, Guangdong 518000 (CN)

(72) Inventors:
- **ZHANG, Wang**
  Shenzhen, Guangdong 518000 (CN)
- **ZHANG, Zhuang**
  Shenzhen, Guangdong 518000 (CN)
- **WU, Duoliang**
  Shenzhen, Guangdong 518000 (CN)
- **LU, Linhai**
  Shenzhen, Guangdong 518000 (CN)
- **LU, Zhiming**
  Shenzhen, Guangdong 518000 (CN)
- **XU, Zhongli**
  Shenzhen, Guangdong 518000 (CN)
- **LI, Yonghai**
  Shenzhen, Guangdong 518000 (CN)

(74) Representative: **Ran, Handong et al**
Maucher Jenkins
Seventh Floor Offices
Artillery House
11-19 Artillery Row
London SW1P 1RT (GB)

(54) ELECTRONIC ATOMIZATION DEVICE

(57) The present application provides an electronic atomization device, comprising: a housing having a proximal end and a distal end which face away from each other in a longitudinal direction; and a liquid storage cavity used for storing a liquid matrix; a heating element used for heating the liquid matrix to generate an aerosol; a battery cell used for providing power to the heating element; and an end cover which at least partially seals the distal end of the housing and is detachably connected to the housing, wherein the end cover is configured to be detachable from the housing to open the distal end of the housing, so as to remove the battery cell from the distal end of the housing, the end cover can be operated by a user to selectively move between an unlocking position and a locking position, the end cover in the unlocking position is allowed to be detached from the housing and the end cover in the locking position is prevented from being detached from the housing. During use of the electronic atomization device, the end cover in the unlocking position is detached from the housing to open the distal end, so as to remove the battery cell from the distal end of the housing.

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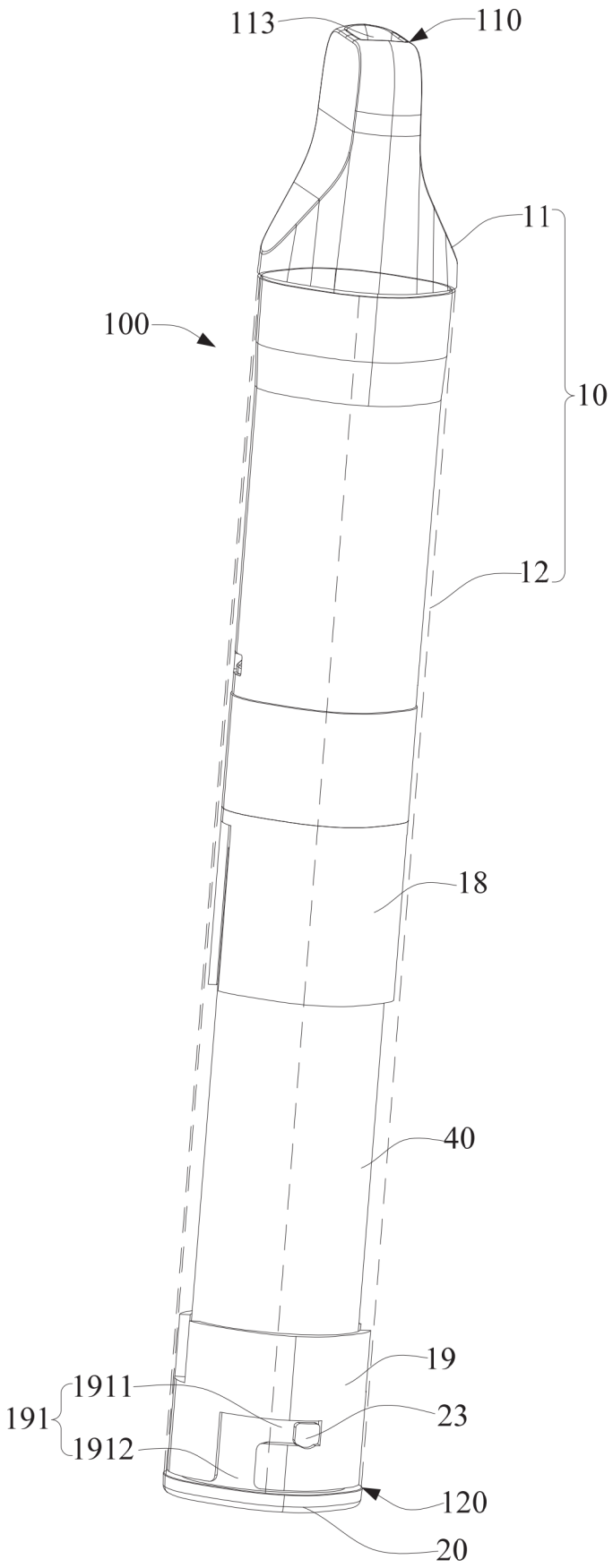


FIG. 7

Description

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priorities to Chinese Application No. 202322137822.1, filed with the China National Intellectual Property Administration on August 09, 2023 and entitled "ELECTRONIC ATOMIZATION DEVICE", and Chinese Application No. 202322877845.6, filed with the China National Intellectual Property Administration on October 25, 2023 and entitled "ELECTRONIC ATOMIZATION DEVICE", which are incorporated herein by reference in their entireties.

TECHNICAL FIELD

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

BACKGROUND

[0003] Tobacco products (such as cigarettes and cigars) burn tobacco during use to produce tobacco smoke. Attempts are made to replace these tobacco-burning products by making products that release compounds without burning.

[0004] An example of such products is a heating device, which releases compounds by heating rather than burning materials. For example, the materials may be tobacco or other non-tobacco products, and the non-tobacco products may or may not include nicotine. In another example, aerosol providing products exist, for example, the so-called electronic atomization devices. The devices usually contain a liquid. The liquid is heated and atomized, thereby generating inhalable aerosols. In a known electronic atomization device, a battery cell for supplying power is usually fixedly mounted in a shell of the device, to prevent a user from detaching or replacing the battery cell.

SUMMARY

[0005] One embodiment of this application provides an electronic atomization device, including:

a shell having a near end and a far 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 aerosols;
a battery cell configured to supply power to the heating element; and
an end cover which at least partially closes the far end of the shell and is detachably connected to the shell, where the end cover is configured to be removable from the shell to open the far end of the shell, so as to take out the battery cell from the far end of the shell.

[0006] The end cover is operated by a user to selectively move between an unlocking position and a locking position; and the end cover is allowed to be detached from the shell in the unlocking position and is prevented from being detached from the shell in the locking position.

[0007] In some embodiments, the end cover is configured to: be movable in the longitudinal direction of the shell in the unlocking position to be detached from the shell, and be prevented from moving in the longitudinal direction of the shell in the locking position to be prevented from being detached from the shell.

[0008] In some embodiments, the end cover is rotated by the user to drive the end cover to move from the locking position to the unlocking position.

[0009] In some embodiments, the electronic atomization device further includes:
a connecting element which is firmly connected to the shell and at least partially encloses the end cover, where the end cover is detachably connected to the shell by being detachably connected to the connecting element.

[0010] In some embodiments, the electronic atomization device further includes:
a clamping slot and a clamping boss, where the clamping slot is disposed on one of the connecting element and the end cover, and the clamping boss is disposed on the other one of the connecting element and the end cover.

[0011] The clamping slot includes a first portion extending in a circumferential direction of the shell and a second portion extending out of the first portion in the longitudinal direction of the shell; the clamping boss is configured to define the locking position of the end cover by extending into the first portion; and the clamping boss is configured to be movable from the first portion to the second portion to define the unlocking position of the end cover.

[0012] In some embodiments, the first portion includes a first end and a second end that face away from each other; and the second portion is configured to extend from the first end or the second end of the first portion in the longitudinal direction of the shell.

[0013] In some embodiments, the electronic atomization device further includes:
an elastomer disposed between the battery cell and the end cover to elastically support the battery cell.

[0014] In some embodiments, the elastomer is retained on the end cover and is able to be moved out of the shell when the end cover is detached from the shell.

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

a circuit board disposed between the battery cell and the heating element to guide current between the battery cell and the heating element; and
an elastic electrical contact configured to establish conductive connection between the battery cell and

the circuit board, where the electrical contact abuts against an electrode of the battery cell to achieve conduction to the battery cell.

[0016] In some embodiments, the electronic atomization device further includes:

an air inlet which is arranged on the end cover and is configured to allow air to enter the electronic atomization device; and
a movable seal element which is located within the end cover and is configured to be movable between a closing position and an opening position, to selectively close the air inlet in the closing position and open the air inlet in the opening position.

[0017] In some embodiments, the electronic atomization device further includes:
an operating element accommodated or mounted within the end cover, where the operating element is configured to be operated by the user to drive the seal element to move between the closing position and the opening position.
[0018] In some embodiments, the electronic atomization device further includes:
a positioning structure disposed between the end cover and the operating element to achieve positioning when the operating element drives the seal element to move to the closing position or the opening position.
[0019] In some embodiments, the end cover is internally provided with:
a partition wall including a first side close to the battery cell and a second side facing away from the first side. The air inlet is disposed on the partition wall and extends from the first side to the second side; the seal element is disposed on the first side of the partition wall; and the operating element is at least partially disposed on the second side of the partition wall.
[0020] In some embodiments, the seal element is further configured to: be switchable between a locked state and an unlocked state, be prevented from moving between the closing position and the opening position in the locked state, and be allowed to move between the closing position and the opening position in the unlocked state.
[0021] The operating element is configured to be pressed by the user to drive the seal element to switch from the locked state to the unlocked state; and the operating element is configured to be rotated by the user in the unlocked state to drive the seal element to move between the closing position and the opening position.
[0022] According to the electronic atomization device, the far end can be opened by removing the end cover from the shell in the unlocking position, so as to take out the battery cell from the far end of the shell.

BRIEF DESCRIPTION OF THE DRAWINGS

[0023] One or more embodiments are exemplarily described with reference to the corresponding figures in the accompanying drawings, and the descriptions are not to be construed as limiting the embodiments. Elements in the accompanying drawings that have same reference numerals are represented as similar elements, and unless otherwise particularly stated, the figures in the accompanying drawings are not drawn to scale.

FIG. 1 is a schematic structural diagram of an electronic atomization device in one view according to an embodiment;
FIG. 2 is a schematic structural diagram of the electronic atomization device in FIG. 1 in another view;
FIG. 3 is a schematic cross-sectional diagram of the electronic atomization device in FIG. 1 in one view;
FIG. 4 is a schematic exploded diagram of an end cover in FIG. 3 being detached from a far end of a shell;
FIG. 5 is a schematic structural diagram of a connecting element in FIG. 4 in one view;
FIG. 6 is a schematic exploded diagram of an end cover in FIG. 3 being detached from a far end of a shell;
FIG. 7 is a schematic diagram of an end cover and a connecting element in FIG. 3 being in a locking position;
FIG. 8 is a schematic diagram of the end cover in FIG. 7 being rotated to an unlocking position relative to the connecting element;
FIG. 9 is a schematic diagram of the end cover in FIG. 8 that moves from the unlocking position in a longitudinal direction to be detached from a far end of a shell;
FIG. 10 is a schematic exploded diagram of the end cover and an elastomer in FIG. 9;
FIG. 11 is a schematic diagram of an electronic atomization device according to another embodiment;
FIG. 12 is a schematic cross-sectional diagram of the electronic atomization device in FIG. 11 in one view;
FIG. 13 is a schematic diagram of an end cover and a connecting element in FIG. 12 being in a locking position;
FIG. 14 is a schematic diagram of the end cover in FIG. 13 being detached from a far end of a shell through rotating and moving operations;
FIG. 15 is a schematic cross-sectional diagram of one view after the end cover in FIG. 14, an elastomer, and an operating assembly are assembled;
FIG. 16 is a schematic exploded diagram of the end cover and the operating assembly in FIG. 15 in another view;
FIG. 17 is a schematic exploded diagram of the end cover and the operating assembly in FIG. 16 in another view;

FIG. 18 is a schematic diagram of the operating assembly in FIG. 15 that moves within the end cover to an opening position;

FIG. 19 is a schematic diagram of the operating assembly in FIG. 18 that moves within the end cover to a closing position;

FIG. 20 is a schematic cross-sectional diagram of an operating assembly in FIG. 11 that is located in a closing position within an end cover;

FIG. 21 is a schematic cross-sectional diagram of the operating assembly in FIG. 20 after being subjected to an inward pressing operation;

FIG. 22 is a schematic cross-sectional diagram of the operating assembly in FIG. 21 that is unlocked through a rotating operation;

FIG. 23 is a schematic cross-sectional diagram of the operating assembly in FIG. 22 that is driven by an elastic element to move to an opening position;

FIG. 24 is a schematic diagram of an electronic atomization device according to still another embodiment;

FIG. 25 is a schematic three-dimensional diagram of an air inlet in FIG. 24 being in an open state;

FIG. 26 is a schematic cross-sectional diagram of the electronic atomization device in FIG. 25 in one view;

FIG. 27 is a partially exploded diagram of the electronic atomization device in FIG. 24;

FIG. 28 is a schematic structural diagram of an end cover and a connecting element in FIG. 24 being in a locked state;

FIG. 29 is a schematic structural diagram of the end cover in FIG. 28 being rotated to an unlocked state relative to the connecting element;

FIG. 30 is a schematic structural diagram of the end cover in FIG. 29 being moved out of the connecting element in a longitudinal direction from the unlocked state;

FIG. 31 is a schematic structural diagram of the connecting element in FIG. 28;

FIG. 32 is a schematic structural diagram of the end cover in FIG. 28;

FIG. 33 is a schematic exploded diagram of the end cover in FIG. 32;

FIG. 34 is a schematic diagram of an air inlet in FIG. 32 being in a closed state;

FIG. 35 is a schematic diagram of an air inlet in FIG. 32 being in an open state;

FIG. 36 is a schematic structural diagram of a sliding cover in FIG. 32; and

FIG. 37 is a schematic structural diagram of a connecting element according to still another embodiment.

DETAILED DESCRIPTION

[0024] To facilitate the understanding of this application, this application is described in more detail below with reference to accompanying drawings and specific implementations.

[0025] This application provides an electronic atomization device configured to atomize a liquid substrate to generate aerosols.

[0026] FIG. 1 and FIG. 2 show a schematic diagram of an electronic atomization device 100 according to one embodiment, including a plurality of components disposed within an external main body or a shell (which may be referred to as a housing). The overall design of the external main body or the shell can vary, and a type or configuration of the external main body that can limit an overall size and shape of the electronic atomization device 100 can vary. Typically, a slender main body may be formed by a single integrated housing, or a slender housing can be formed by two or more separable main bodies.

[0027] For example, the electronic atomization device 100 may have a control main body at one end. The control main body includes a housing containing one or more reusable components (such as a rechargeable battery and/or a rechargeable super-capacitor storage battery, and various electronic devices for controlling operations of this product). In addition, the electronic atomization device has an external main body or a shell for inhalation at another end.

[0028] In some embodiments, the external main body or the shell of the electronic atomization device 100 basically defines an outer surface of the electronic atomization device 100. In a specific embodiment shown in FIG. 1 and FIG. 2, the electronic atomization device 100 includes:

a shell 10 which can contain one or more reusable components. The shell 10 has a near end 110 and a far end 120 that are opposite to each other in a longitudinal direction. During use, the near end 110 is an end for inhalation close to a user, and the far end 120 is one end away from the user.

[0029] In some examples, the shell 10 may be entirely or only partially made of a metal or alloy such as stainless steel or aluminum, or other appropriate materials including various plastics (for example, polycarbonate), metal-plating over plastic, ceramic, and the like.

[0030] In some embodiments, the shell 10 is formed jointly by a plurality of components. In addition, in some embodiments, the shell 10 is open at the far end 120.

[0031] As shown in FIG. 3 to FIG. 9, the shell 10 includes:

a first shell portion 11 and a second shell portion 12. The first shell portion 11 is close to or defines the near end 110, and the second shell portion 12 is close to or defines the far end 120.

[0032] As shown in FIG. 3, the electronic atomization device 100 further includes:

an air outlet 113 configured for inhalation by a user, where the air outlet 113 is located at the near end 110 of the shell 10 and is defined or formed by the first shell portion 11;

a liquid storage cavity 112 configured to store a liquid substrate; and an atomization assembly configured to extract the liquid substrate from the liquid storage cavity 112 and heat and atomize the liquid substrate. For the convenience of atomization and outputting, the liquid storage cavity 112 and the atomization assembly are both disposed near the near end 110. The electronic atomization device 100 further includes an aerosol outputting pipe 111 disposed in the longitudinal direction. The aerosol outputting pipe 111 at least partially extends within the liquid storage cavity 112, and the liquid storage cavity 112 is formed by a space between an outer wall of the aerosol outputting pipe 111 and an inner wall of the shell 10. An end portion of the aerosol outputting pipe 111 relative to the near end 110 is communicated with the air outlet 113 to output the aerosols generated by atomization of the atomization assembly to the air outlet 113 for inhalation.

[0033] In the embodiment shown in FIG. 3, the atomization assembly configured to atomize the liquid substrate includes:

a liquid guiding element 13 made of a capillary or porous material, such as sponge and cotton fibers, or made of a porous body such as porous ceramic, where the liquid guiding element 13 is perpendicular to the longitudinal direction of the shell 10, and the liquid guiding element 13 is in fluid communication with the liquid storage cavity 112, so as to extract the liquid substrate from the liquid storage cavity 112; and

a heating element 14 coupled externally to the liquid guiding element 13. For example, in FIG. 3, the heating element 14 is a spiral coil or a heating mesh that surrounds or winds part of the liquid guiding element 13. The heating element 14 is configured to heat at least part of the liquid substrate inside the liquid guiding element 13 to generate aerosols.

[0034] Or, in some changing embodiments, the liquid guiding element 13 can be constructed in various regular or irregular shapes and is partially in fluid communication with the liquid storage cavity 112 to receive the liquid substrate. Or, in other changing embodiments, the liquid guiding element 13 can be in more regular or irregular shapes, such as a polygonal block, a grooved shape with a groove in a surface, or an arch shape with a hollow channel inside.

[0035] Or, in still some changing embodiments, the heating element 14 may be coupled onto the liquid guiding element 13 through printing, deposition, sintering, physical assembling, or the like. In some other changing embodiments, the liquid guiding element 13 may have a flat or curved surface for supporting the heating element 14. The heating element 14 is formed on the flat or curved surface of a porous body 14 through mounting, printing, deposition, or the like. Or, in still some changing embodiments, the heating element 14 is a conductive trajectory formed on a surface of the liquid guiding element 13. In some implementations, the conductive trajectory of the heating element 14 may be in a form of a printed circuit formed by printing. In some embodiments, the heating element 14 is a patterned conductive trajectory. In still some other embodiments, the heating element 14 is planar. In still some embodiments, the heating element 14 is a conductive trajectory that extends in a sinuous, zigzag, reciprocating, or bent manner.

[0036] As shown in FIG. 3, the shell 10 is further internally provided with:

an upper supporting element 15 and a lower supporting element 16 that are configured to be located on two sides of the liquid guiding element 13 in the longitudinal direction, so as to clamp and support the liquid guiding element 13 from upper and lower sides respectively. After assembling, the liquid guiding element 13 is supported and clamped between the upper supporting element 15 and the lower supporting element 16. A liquid channel 151 is disposed on the upper supporting element 15. During use, the liquid substrate inside the liquid storage cavity 112 is transferred to the liquid guiding element 13 after passing through the liquid channel 151 of the upper supporting element 15, as indicated by the arrow R1 in FIG. 3. A cavity surrounding the liquid guiding element 13 and/or the heating element 14 is also defined between the upper supporting element 15 and the lower supporting element 16. This cavity serves as an atomization cavity for release of aerosols generated by heating of the heating element 14.

[0037] As shown in FIG. 3, the shell 10 is further internally provided with:

a flexible seal element 17 disposed between the first shell portion 11 and the upper supporting element 15 to provide sealing between them.

[0038] As shown in FIG. 3, the shell 10 is further internally provided with:

a battery cell 40 configured to supply power to the heating element 14, where the battery cell 40 is disposed near the far end 120, or the battery cell 40 is accommodated and mounted within the second shell portion 12;

a circuit board 60 disposed between the battery cell 40 and the lower supporting element 16 to guide current between the battery cell 40 and the heating element 14, where the circuit board 60 is basically perpendicular to the longitudinal direction of the electronic atomization device 100;

a first elastic electrical contact 62 extending from the battery cell 40 to the circuit board 60, to conductively connect the battery cell 40 to the circuit board 60, where one end of the first elastic electrical contact 62 is welded to or abuts against the circuit board 60, and another end is connected to a positive/negative electrode of the battery cell 40 in an abutting manner

or a separable manner to achieve electrical conduction; the first elastic electrical contact 62 is separable from the battery cell 40; and

a second elastic electrical contact 61 which extends from the circuit board 60 into the lower supporting element 16 and is welded with or in contact with conductive pins at two ends of the heating element 14 within the lower supporting element 16 to form conductive connection, thereby connecting the heating element 14 to the circuit board 60.

[0039] As shown in FIG. 3, the shell 10 is further internally provided with:

an inner holder 18 which is located inside the second shell portion 12 and is disposed between the battery cell 40 and the circuit board 60 in the longitudinal direction. The inner holder 18 is configured to support and maintain the circuit board 60 and the first elastic electrical contact 61. Furthermore, the inner holder 18 is configured to at least partially accommodate and surround the battery cell 40.

[0040] The circuit board 60 is further provided with an airflow sensor, such as a microphone sensor or micro-electromechanical system (MEMS) sensor, to sense an airflow that is generated by inhalation of a user through the air outlet 113 and flows through an airflow channel. Thus, the electronic atomization device 100 and/or the circuit board 60 control the battery cell 40 to supply power to the heating element 14 based on a sensing result of the airflow sensor, thereby heating and atomizing the liquid substrate to generate aerosols.

[0041] As shown in FIG. 3 to FIG. 9, the electronic atomization device 100 further includes:

an end cover 20 coupled to and closing the far end 120 of the shell 10. The end cover 20 can be removed and detached from the far end 120 of the shell 10. The end cover 20 can be removed or detached from the far end 120 of the shell 10, and then the far end 120 of the shell 10 can be opened, so that the battery cell 40 can be taken out of or leave the shell 10 from the far end 120 of the shell 10.

[0042] As shown in FIG. 3 to FIG. 9, after assembling, the end cover 20 at least partially extends into the shell 10 from the far end 120. Furthermore, an air inlet 21 is disposed on the end cover 20 to cause external air to enter the electronic atomization device 100 after assembling. During inhalation, an airflow path passing through the electronic atomization device 100 is shown by the arrow R2 in FIG. 3. External air enters from the air inlet 21 of the end cover 20 and is transferred to the heating element 14 through a gap between the battery cell 40 and the shell 10 and the lower supporting element 16, and is outputted by the aerosol outputting pipe 111 to the air outlet 113 for user inhalation after carrying aerosols inside the atomization cavity.

[0043] To detachably connect the end cover 20 with the far end 120 of the shell 10, as shown in FIG. 3 to FIG. 9, the electronic atomization device 100 further includes:

a connecting element 19. In this embodiment, the connecting element 19 is located inside the shell 10 and is disposed at the far end 120. The connecting element 19 is firmly connected to the second shell portion 12 of the shell 10 into a whole in a tight fit manner such as riveting or interference. During use, the end cover 20 is detachably connected to the shell 10 by being detachably connected to the connecting element 19. In some embodiments, the connecting element 19 is made of rigid alloy such as stainless steel or polymer plastic.

[0044] As shown in FIG. 3 to FIG. 9, the connecting element 19 is basically constructed into a ring shape. A clamping slot 191 configured to be connected to the end cover 20 is disposed on the connecting element 19. The clamping slot 191 includes a first portion 1911 extending in a circumferential direction, and a second portion 1912 extending from the first portion 1911 towards the far end 120 in an axial direction. The second portion 1912 is opened towards the far end 120.

[0045] As shown in FIG. 3 to FIG. 9, the first portion 1911 has a first end 1913 and a second end 1914 that face away from each other. The second portion 1912 extends in the axial direction from the second end 1914 of the first portion 1911.

[0046] As shown in FIG. 3 to FIG. 9, the end cover 20 at least partially extends into the connecting element 19. A clamping boss 23 is disposed on the end cover 20. During use, the clamping boss 23 protrudes into the first portion 1911 of the clamping slot 191 and abuts against the first end 1913 of the first portion 1911 of the clamping slot 191, thus preventing the end cover 20 from being removed or detached in the longitudinal direction of the shell 10.

[0047] For the operating process of removing the end cover 20, refer to FIG. 7 to FIG. 9. First, the end cover 20 is rotated around a central axis, so that the clamping boss 23 moves from a locking position in which it abuts against the first end 1913 of the first portion 1911 to an unlocking position of the second portion 1912 of the second end 1914, as indicated by the arrow R3 in FIG. 8. Then, as indicated by the arrow R4 in FIG. 9, the end cover 20 is moved in the longitudinal direction, so that the clamping boss 23 leaves the clamping slot 191 along the second portion 1912. Thus, the connection between the end cover 20 and the connecting element 19 can be released, and the end cover 20 can be detached or removed from the far end 120 of the shell 10.

[0048] After the end cover 20 is removed, the far end 120 of the shell 10 is opened, and the battery cell 40 can be taken out of or removed from the far end 120 of the shell 10 by slight shaking or swinging. When the battery cell 40 is removed, the conductive connection can be cut off by breaking the contact with the first elastic electrical contact 62.

[0049] According to the preferred embodiment shown in FIG. 5, a basically arc-shaped sunken portion 1915 close to the first end 1913 is disposed within the first portion 1911 of the clamping slot 191. When abutting against the first end 1913, the clamping boss 23 of the end cover 20 is at least partially located within the sunken

portion 1915, thereby preventing the clamping boss 23 of the end cover 20 from being loosened or shaking on the first portion 1911. When a user pinches or grips the end cover 20 to rotate with fingers, it is easier to rotate the clamping boss 23 out of the sunken portion 1915.

[0050] According to the embodiment shown in FIG. 3 to FIG. 10, an elastomer 22 is disposed within the end cover 20, so that the elastomer 22 elastically abuts against and supports the battery cell 40 when the end cover 20 is coupled into the far end 120 of the shell 10. The elastomer 22 is prepared from a flexible or elastic material such as silicone or a thermoplastic elastomer (TPE) polymer. The elastomer 22 is connected to a second connecting structure 24 of the end cover 20 through a first connecting structure 222. Thus, when the end cover 20 is rotated or moved by a user, the elastomer 22 can move together with the end cover 20. In addition, the elastomer 22 can be removed from the shell 10 together with the end cover 20. A clearance portion 221 is further disposed on the elastomer 22 to provide a channel for the external air entering via the air inlet 21 to pass through the elastomer 22.

[0051] As shown in FIG. 3 to FIG. 9, when the end cover 20 is detachably connected to the first portion 1911 of the clamping slot 191 of the connecting element 19, by rotating the end cover 20 until the clamping boss 23 abuts against the first end 1913 of the first portion 1911, the locking position of the end cover 20 is defined. In the locking position, the end cover 20 is prevented from being moved in the longitudinal direction to be detached. By rotating the end cover 20 until the clamping boss 23 abuts against the second end 1914 of the first portion 1911, the unlocking position in which the end cover 20 is detachably connected to the connecting element 19 is formed. Later, in the unlocking position, the end cover 20 can be moved in the longitudinal direction and can be detached or removed from the shell 10.

[0052] In some embodiments, the connecting element 19 may be formed or defined by a portion of the shell 10. Or, the clamping slot 191 is formed or defined in the shell 10, and is then directly detachably connected to the end cover 20 through the shell 10.

[0053] Or, in still some changing embodiments, the clamping slot 191 may be disposed on an outer side surface of the end cover 20. In addition, the clamping boss 23 that fits the clamping slot 191 to form the detachable connection is disposed on the connecting element 19.

[0054] FIG. 11 and FIG. 12 show a schematic diagram of an electronic atomization device 100a in another changing embodiment. The electronic atomization device 100a in this embodiment includes:

a shell 10a including a near end 110a and a far end 120a that face away from each other, where the far end 120a of the shell 10a is open, and the shell 10a is defined or formed jointly by a first shell portion 11a and a second shell portion 12a;

an air outlet 113a located at the near end 110a for user inhalation;

an aerosol outputting channel 111a extending from the air outlet 113a towards the far end 120a, where the aerosol outputting channel 111a at least partially provides a channel for outputting aerosols to the air outlet 113a;

a liquid storage cavity 112a defined between the aerosol outputting channel 111a and the shell 10a to store a liquid substrate, where one side of the liquid storage cavity 112a facing the far end 120a is open;

a tubular element 15a, such as a stainless steel tube, a ceramic tube, or a plastic tube, which extends within the liquid storage cavity 112a in the longitudinal direction, where the tubular element 15a is in tight-fit connection, in a riveting or interference manner, with an aerosol outputting pipe forming the aerosol outputting channel 111a; a via hole or a hollow 151a is also disposed on a tube wall of the tubular element 15a, for the liquid substrate inside the liquid storage cavity 112a to pass through the via hole or the hollow 151a and flow into the tubular element 15a for atomization;

a liquid guiding element 13a made of a capillary or porous material, such as sponge or cotton fibers, or made of a porous body such as porous ceramic, where the liquid guiding element 13a extends within the tubular element 15a in the longitudinal direction; the liquid guiding element 13a is constructed into a tubular shape; an outer surface of the liquid guiding element 13a can extract the liquid substrate and store part of the liquid substrate through the via hole or the hollow 151a on the tubular element 15a, as indicated by the arrow R1 in FIG. 12; and

a heating element 14a coupled onto an inner surface of the liquid guiding element 13a, where the heating element 14a is configured to: heat at least part of the liquid substrate inside the liquid guiding element 13a to generate aerosols and release the aerosols into the aerosol outputting channel 111a. In this preferred embodiment, the heating element 14a is a cylindrical heating mesh, a spiral coil, or the like.

[0055] As shown in FIG. 11 and FIG. 12, the electronic atomization device 100a further includes:

a holder 16a which at least partially supports the tubular element 15a and closes an opening of the liquid storage cavity 112a facing the far end 120a;

a battery cell 40a which is located inside the second shell portion 12a and is disposed near the far end 120a;

a circuit board 60a which is provided with a micro control unit (MCU) controller and a circuit and is configured to guide current between the heating element 14a and the battery cell 40a, where the circuit board 60a is basically perpendicular to the

longitudinal direction of the electronic atomization device 100, and the circuit board 60a is disposed between the battery cell 40a and the holder 16a;
a first elastic electrical contact 62a extending from the battery cell 40a to the circuit board 60a, to conductively connect the battery cell 40a to the circuit board 60a, where one end of the first elastic electrical contact 62a is welded to or abuts against the circuit board 60a, and another end is connected to a positive/negative electrode of the battery cell 40a in an abutting manner or a separable manner to achieve conduction; the first elastic electrical contact 62a is separable from the battery cell 40a;
a second elastic electrical contact 61a which extends from the circuit board 60a into the holder 16a and is welded with or in contact with conductive pins at two ends of the heating element 14a within the holder 16 to form conductive connection, thereby connecting the heating element 14a to the circuit board 60a; and
an inner holder 18a which is located inside the second shell portion 12a and is disposed between the battery cell 40a and the circuit board 60a in the longitudinal direction, where the inner holder 18a is configured to support and maintain the circuit board 60a and the first elastic electrical contact 61a, and furthermore, the inner holder 18a is configured to at least partially accommodate and surround the battery cell 40a.

[0056] As shown in FIG. 13 and FIG. 14, the electronic atomization device 100a further includes:
an end cover 20a coupled to and closing the far end 120a of the shell 10a. The end cover 20a can be removed and detached from the far end 120a of the shell 10a. The end cover 20a can be removed or detached from the far end 120a of the shell 10a, and then the far end 120a of the shell 10a can be opened, so that the battery cell 40a can be taken out of or leave the shell 10a from the far end 120a of the shell 10a.

[0057] As shown in FIG. 13 and FIG. 14, after assembling, the end cover 20a at least partially extends from the far end 120a into the shell 10a. To detachably connect the end cover 20a with the far end 120a of the shell 10a, the electronic atomization device 100a further includes:
a connecting element 19a. In this embodiment, the connecting element 19a is located inside the shell 10a and is disposed at the far end 120a. The connecting element 19a is firmly connected to the second shell portion 12a of the shell 10a into a whole in a tight fit manner such as riveting or interference. During use, the end cover 20a is detachably connected to the shell 10a by being detachably connected to the connecting element 19a. In some embodiments, the connecting element 19a is made of rigid alloy such as stainless steel or polymer plastic.

[0058] The connecting element 19a is basically constructed into a ring shape. A clamping slot 191a configured to be connected to the end cover 20a is disposed on the connecting element 19a. The clamping slot 191a includes a first portion 1911a extending in a circumferential direction, and a second portion 1912a extending from the first portion 1911a towards the far end 120 in an axial direction. The second portion 1912a is opened towards the far end 120a.

[0059] As shown in FIG. 13 and FIG. 14, when connected to the far end 120a of the shell 10a, the end cover 20a at least partially extends into the connecting element 19a. A clamping boss 23a is disposed on the end cover 20a. During use, the clamping boss 23a protrudes into the first portion 1911a of the clamping slot 191a and abuts against the first end of the first portion 1911a of the clamping slot 191a, thus preventing the end cover 20a from being removed or detached in the longitudinal direction of the shell 10a.

[0060] For the operating process of removing the end cover 20a, refer to FIG. 14. First, the end cover 20a is rotated around a central axis, so that the clamping boss 23a moves from the first end of the first portion 1911a to the second portion 1912a of the second end, as indicated by the arrow R3 in FIG. 14. Then, as indicated by the arrow R4 in FIG. 14, the end cover 20a is moved in the longitudinal direction, so that the clamping boss 23a leaves the clamping slot 191a along the second portion 1912a. Thus, the connection between the end cover 20a and the connecting element 19a can be released, and the end cover 20a can be detached or removed from the far end 120a of the shell 10a.

[0061] After the end cover 20a is removed, the far end 120a of the shell 10a is opened, and the battery cell 40a can be taken out of or removed from the far end 120a of the shell 10a by slight shaking or swinging. When the battery cell 40a is removed, the conductive connection can be cut off by breaking the contact with the first elastic electrical contact 62a.

[0062] In the embodiment shown in FIG. 13 and FIG. 14, when the end cover 20a is coupled to the far end 120a of the shell 10a, the end cover 20a is at least partially exposed from the far end 120a of the shell 10a. Furthermore, a user can perform rotating and moving operations by gripping an exposed portion of the end cover 20a, thereby detaching and removing the end cover 20a from the shell 10a. In addition, in FIG. 13 and FIG. 14, a plurality of recesses 211a that are spaced apart from each other in the circumferential direction are disposed on the exposed portion of the end cover 20a, to enhance friction and prevent slippage when the user grips the exposed portion with the fingers for rotating and moving operations. This is advantageous for enhancing the convenience of user operation.

[0063] According to the embodiment shown in FIG. 12 to FIG. 15, an elastomer 22a is disposed on the end cover 20a, so that the elastomer 22a elastically abuts against and supports the battery cell 40a when the end cover 20a is coupled into the far end 120a of the shell 10a. The elastomer 22a is prepared from a flexible or elastic material such as silicone or a TPE polymer. The elastomer 22a is connected and fastened to the end cover 20a.

Thus, when the end cover 20a is rotated or moved by a user, the elastomer 22a can move together with the end cover 20a. In addition, the elastomer 22a can be removed from the shell 10a together with the end cover 20a.

[0064] According to the embodiment shown in FIG. 12 to FIG. 23, an operating assembly 30a is further disposed within the end cover 20a for being operated by a user to selectively open and close the air inlet 21a on the end cover 20a, thereby selectively allowing air to or preventing air from passing through the electronic atomization device 100a, so as to prevent aerosol outputting when it is not desired to output aerosols.

[0065] Specifically, as shown in FIG. 12 to FIG. 23, structures inside the end cover 20 further include:

a cylindrical outer side wall; and
a partition wall 25a which is disposed in a manner of being perpendicular to the longitudinal direction of the end cover 20a or the shell 10a and is located inside the outer side wall. The partition wall 25a includes a first side and a second side that face away from each other in the longitudinal direction of the end cover 20a or the shell, and an internal space of the end cover 20a is divided and defined by the partition wall 25a into two mutually separated space portions respectively located on the first side and the second side. Specifically, the internal space of the end cover 20a is divided by the partition wall 25a into the following spaces in the longitudinal direction:

a first mounting space 26a close to the first side of the partition wall 25a; and
a second mounting space 27a close to the second side of the partition wall 25a.

[0066] The first mounting space 26a faces the battery cell 40a. A fourth connecting structure 261a connected to the elastomer 22a is disposed on an inner side surface of the first mounting space 26a. Thus, when the end cover 20a is rotated or moved by the user, the elastomer 22a can move together with the end cover 20a.

[0067] As shown in FIG. 12 to FIG. 23, structures inside the end cover 20a further include:
an air inlet 21a disposed on the partition wall 25a to allow external air to enter the electronic atomization device 100a.

[0068] As shown in FIG. 12 to FIG. 23, structures of the operating assembly 30a include:
a connecting element 34a, a seal element 32a, and an operating element 31a that are disposed in the longitudinal direction.

[0069] After assembling, the operating element 31a is mainly mounted and accommodated inside the second mounting space 27a, and the operating element 31a is at least partially exposed at the far end 120a for being operated by the user, for example, for being pressed and rotated by the user.

[0070] The seal element 32a is located in the first mounting space 26a of the end cover 20a and can be moved under the driving of the operating element 31a to selectively close or open the air inlet 21a.

[0071] The connecting element 34a is coupled or connected to the seal element 32a, and is connected to the operating element 31a to establish connection between the operating element 31a and the seal element 32a, so that the user can drive the seal element 32a to move by operating the operating element 31a.

[0072] In some embodiments, the driven movement of the seal element 32a includes movement in the longitudinal direction of the end cover 20a and/or the shell 10a, and rotation around the central axis of the end cover 20a and/or the shell 10a.

[0073] As shown in FIG. 12 to FIG. 23, the connecting element 34a uses a conventional countersunk screw, which is then threadedly connected to the operating element 31a after penetrating through the seal element 32a.

[0074] As shown in FIG. 12 to FIG. 23, a clearance notch 321a is disposed on the seal element 32a. The seal element 32a can be rotated around the central axis of the end cover 20a and/or the shell 10a through the operating element 31a, so as to align or stagger the clearance notch 321a with or from the air inlet 21a in the partition wall 25a, thus selectively opening or closing the air inlet 21a. In some embodiments, the seal element 32a is made of a flexible material such as silicone or a thermoplastic elastomer.

[0075] As shown in FIG. 12 to FIG. 23, a first connecting structure 322a, such as a protrusion, is disposed on the seal element 32a. Correspondingly, a second connecting structure 262a, such as a notch defined by a protrusion 263a, is disposed on the first side of the partition wall 25a. When the seal element 32a is in the closing position of closing the air inlet 21a, the first connecting structure 322a such as the protrusion extends into the second connecting structure 262a such as the notch to form connection and achieve a locked state, thereby stably maintaining the seal element 32a in the closing position and preventing the seal element 32a from rotating.

[0076] According to the embodiment shown in FIG. 12 to FIG. 23, a user can operate the operating assembly 30a/the seal element 32a by pressing the operating element 31a, so that the operating assembly 30a/the seal element 32a moves in the longitudinal direction, thereby disengaging the first connecting structure 322a from the second connecting structure 262a, and unlocking the connection between the first connecting structure 322a and the second connecting structure 262a in the closing position to achieve an unlocked state.

[0077] According to the embodiment shown in FIG. 12 to FIG. 23, a plurality of first positioning recesses 271a and second positioning recesses 272a that extend in the longitudinal direction are disposed on an inner side surface of the second mounting space 27a of the end cover 20a. A positioning protrusion 313a is disposed on an

outer side surface of the operating element 31a. Thus, when the user drives the operating element 31a with fingers to rotate from the closing position to the opening position or to rotate from the opening position to the closing position, the positioning protrusion 313a is snapped into one of the first positioning recess 271a and the second positioning recess 272a to provide positioning in the opening position, and is snapped into the other one of the first positioning recess 271a and the second positioning recess 272a to provide positioning in the closing position.

[0078] According to the embodiment shown in FIG. 12 to FIG. 23, a first limiting protrusion 273a that extends in the longitudinal direction is disposed on the inner side surface of the second mounting space 27a of the end cover 20a, to abut against a second limiting protrusion 314a disposed on the outer side surface of the operating element 31a to achieve limitation, so as to restrain an angle of rotation of the operating element 31a between the first limiting protrusions 273a, to prevent the rotating operation on the operating element 31a from being beyond an angle range defined by the first limiting protrusion 273a.

[0079] To facilitate rotating operation on the operating element 31a by the user, a surface of the operating element 31a exposed from the far end 120a has an operating convex edge 311a disposed in a radial direction. The user can rotate the operating element 31a by gripping the operating convex edge 311a with fingers.

[0080] According to the embodiment shown in FIG. 12 to FIG. 23, the operating assembly 30a further includes: an elastic element 33a configured to provide an elastic force to bias the seal element 32a towards the partition wall 25a, thereby making the seal element 32a drive the first connecting structure 322a and the second connecting structure 262a to be connected in the closing position to achieve locking.

[0081] According to the embodiment shown in FIG. 12 to FIG. 23, the elastic element 33a includes a linear spring. In addition, during assembling, the elastic element 33a is located within the second mounting space 27a, and abuts and is disposed between the partition wall 25a and the operating element 31a.

[0082] For the operating process in which the user operates the operating assembly 30a with fingers, thus driving the operating assembly 30a to move to open or close the air inlet 21a, refer to FIG. 20 to FIG. 23.

[0083] FIG. 20 shows a schematic diagram of the operating assembly 30a being in the closing position. In FIG. 20, the seal element 32a abuts against or closely fits the first side of the partition wall 25a, and blocks and closes the air inlet 21a. In addition, in the closing position of FIG. 20, under the elastic force of the elastic element 33a, the seal element 32a is biased towards the partition wall 25a, thereby keeping the seal element 32a abutting against or closely fitting the partition wall 25a and maintaining the connection between the first connecting structure 322a and the second connecting structure 262a to achieve locking.

[0084] FIG. 21 shows a schematic diagram in which a user unlocks the operating assembly 30a in the closing position in FIG. 20 by pressing the operating element 31a. As indicated by the arrow P11 in FIG. 21, the user drives, in a manner such as pressing, the operating element 31a with fingers to move towards the near end 110a, so that the seal element 32a moves to be separated from the partition wall 25a. In addition, the first connecting structure 322a of the seal element 32a is disengaged from the second connecting structure 262a of the end cover 20a, to achieve unlocking. In FIG. 21, the elastic element 33a mounted between the partition wall 25a and the operating element 31a is compressed.

[0085] FIG. 22 shows a schematic diagram in which a user rotates the operating assembly 30a to the opening position by driving the operating element 31a in FIG. 21 to rotate. As indicated by the arrow P12 in FIG. 22, the user rotates the operating element 31a in FIG. 22 with fingers, and the seal element 32a is driven to rotate to the opening position. In FIG. 22, the clearance notch 321a of the seal element 32a is aligned with the air inlet 21a in the partition wall 25a. The rotation of the seal element 32a can be around a central axis m.

[0086] FIG. 23 shows that an elastic recovery force of the elastic element 33a drives the operating element 31a in FIG. 22 to move, as indicated by the arrow P13 in FIG. 23, thereby making the seal element 32a move to fit or abut against the partition wall 25a to achieve stopping. In addition, in this position, the clearance notch 321a of the seal element 32a is aligned with the air inlet 21a on the partition wall 25a, so that air can enter the electronic atomization device 100a from the air inlet 21a, as indicated by the arrow R2 in FIG. 23.

[0087] As shown in FIG. 23, a gap exists between the operating element 31a located inside the second mounting space 27a and the end cover 20a, so that the air inlet 21a is kept in communication with external atmosphere through the gap between them. A port of the air inlet 21 on the second side of the partition wall 25a is always in communication with the external atmosphere. In addition, the seal element 32a rotates inside the first mounting space 26a to selectively block or avoid the port of the air inlet 21a on the first side of the partition wall 25a, thereby opening or closing the air inlet 21a.

[0088] Similarly, when a user performs an operation in a reverse order of the operating process shown in FIG. 20 to FIG. 23, the operating assembly 30a can be adjusted from the opening position in FIG. 23 to the closing position in FIG. 20.

[0089] Similarly, in still some changing embodiments, the end cover 20a can also be locked by connecting a third connecting structure disposed in the opening position to the first connecting structure 322a of the seal element 32a, to prevent the seal element 32a from being rotated from the opening position towards the closing position. Similarly, after the connection between the third connecting structure and the first connecting structure

322a of the seal element 32a is pressed to be released, to separate them and achieve the unlocked state, a user can drive the seal element 32a to rotate from the opening position towards the closing position.

[0090] FIG. 24 to FIG. 27 show a schematic diagram of an electronic atomization device 100b in still another changing embodiment. The electronic atomization device 100b in this embodiment includes:

a shell 10b having a near end 110b and a far end 120b that are opposite to each other in a longitudinal direction. During use, the near end 110b is an end for inhalation close to a user, and the far end 120b is one end away from the user.

[0091] As shown in FIG. 26, the electronic atomization device 100b further includes: a liquid storage cavity 112b configured to store a liquid substrate; and an atomization assembly configured to extract the liquid substrate from the liquid storage cavity 112b and heat and atomize the liquid substrate. For the convenience of atomization and outputting, the liquid storage cavity 112b and the atomization assembly are both disposed near the near end 110b.

[0092] The atomization assembly includes a liquid guiding element 13b made of a capillary or porous material, such as sponge and cotton fibers, or made of a porous body such as porous ceramic. In this embodiment, as shown in FIG. 26, the liquid guiding element 13b is perpendicular to the longitudinal direction of the shell 10b, and the liquid guiding element 13b is in fluid communication with the liquid storage cavity 112b, so as to extract the liquid substrate from the liquid storage cavity 112b.

[0093] The atomization assembly further includes a heating element 14b to heat a liquid aerosol generating substrate to form inhalable aerosols. The heating element 14b can be a resistive heating element, an electromagnetic induction heating element, an infrared radiation heating element, or the like. In this embodiment, as shown in FIG. 26, the heating element 14b is a spiral coil or a heating mesh that surrounds or winds part of the liquid guiding element 13b. In other embodiments, the atomization assembly may further include an ultrasonic atomization sheet that generates highfrequency oscillations to ultrasonically atomize the liquid aerosol generating substrate to form inhalable aerosols.

[0094] The electronic atomization device 100b further includes: a battery cell 40b configured to supply power to the heating element 14b. The battery cell 40b is disposed near the far end 120b.

[0095] As shown in FIG. 28 to FIG. 30, the electronic atomization device 100b further includes: an end cover 20b which at least partially closes the far end 120b of the shell 10b and is detachably connected to the shell 10b. The end cover 20b is configured to be removable from the shell 10b to open the far end 120b of the shell 10b, so as to take out the battery cell 40b from the far end 120b of the shell 10b. The end cover 20b can be operated by a user to selectively switch between a locking position A and an unlocking position B. The end cover 20b is allowed to be detached from the shell 10b in the unlocking position B, and is prevented from being detached from the shell 10b in the locking position A.

[0096] The end cover 20b is configured to: be rotatably movable by a first predetermined distance in the longitudinal direction of the shell 10b to switch from the locking position to the unlocking position, and be linearly movable in the unlocking position by a second predetermined distance in the longitudinal direction of the shell 10b to be detached from the shell 10b.

[0097] In some embodiments, as shown in FIG. 29, when the end cover 20b is in the unlocking position B, a clearance space 50b is formed between an end cover bottom 200b and the far end 120b of the shell 10b, so that a user reaches into the clearance space 50b to operate the end cover 20b and detach the end cover 20b from the shell 10b.

[0098] Further, to detachably connect the end cover 20b to the far end 120b of the shell 10b, as shown in FIG. 28 to FIG. 31, the electronic atomization device 100b further includes: a connecting element 19b. In this embodiment, the connecting element 19b is located inside the shell 10b and is disposed at the far end 120b. The connecting element 19b can be firmly connected to the shell 10b into a whole in a tight fit manner such as riveting or interference. The connecting element 19b is basically constructed into a ring shape and at least partially encloses the end cover 20b. During use, the end cover 20b is detachably connected to the shell 10b by being detachably connected to the connecting element 19b. In some embodiments, the connecting element 19b can be made of rigid alloy such as stainless steel or polymer plastic.

[0099] In some embodiments, a detachable connection relationship is established between the connecting element 19b and the end cover 20b through a clamping slot 191b and a clamping boss 23b. The clamping slot 191b is disposed on one of the connecting element 19b and the end cover 20b, and the clamping boss 23b is disposed on the other one of the connecting element 19b and the end cover 20b.

[0100] Referring to FIG. 28, the clamping slot 191b includes a first portion 1911b obliquely extending relative to the longitudinal direction of the shell 10b, and a second portion 1912b extending out of the first portion 1911b in the longitudinal direction of the shell 10b. The clamping boss 23b is configured to define the locking position A of the end cover 20b by extending into the first portion 1911b, and the clamping boss 23b is configured to be movable from the first portion 1911b to the second portion 1912b to make the end cover 20b switch from the locking position A to the unlocking position B.

[0101] Further, an angle between the first portion 1911b and the second portion1912b is obtuse. Specifically, the angle between the first portion 1911b and the second portion1912b is between 90° and 135°.

[0102] The first portion 1911b obliquely extends rela-

tive to the longitudinal direction of the shell 10b, and the second portion1912b extends out of the first portion 1911b in the longitudinal direction of the shell 10b, so that the clamping boss 23b obliquely moves from the first portion 1911b in the longitudinal direction of the shell 10b to the second portion1912b. Thus, when the end cover 20b switches from the locking position A to the unlocking position B, the clearance space 50b is formed between the end cover 20b and the far end 120b of the shell 10b, which allows the user to reach into this clearance space 50b and pull out the end cover 20b from the shell 10b along the second portion1912b conveniently.

[0103] In some embodiments, the second portion 1912b terminates at the far end 120b of the shell 10b, and an opening is defined at the far end 120b, so that it is convenient to move the clamping boss 23b out of the opening along the second portion 1912b, thereby facilitating the detachment of the end cover 20b from the shell 10b by the user.

[0104] Further, the first portion 1911b includes a first end 1913b and a second end 1914b that face away from each other. The second portion 1912b is configured to extend in the longitudinal direction of the shell 10b from the second end 1914b of the first portion 1911b.

[0105] In some embodiments, as shown in FIG. 31 and FIG. 32, the clamping slot 191b is formed in the connecting element 19b. The clamping slot 191b includes a first portion 1911b obliquely extending in the longitudinal direction of the shell 10b, and a second portion 1912b extending in the longitudinal direction of the shell 10b from a second end 1914b of the first portion 1911b towards the far end 120b. In addition, the second portion 1912b is opened towards the far end 120b.

[0106] A clamping boss 23b is disposed on an end cover side wall 201b. During use, the clamping boss 23b protrudes into the first portion 1911b and abuts against the first end 1913b of the first portion 1911b, thus preventing the end cover 20b from being removed or detached in the longitudinal direction of the shell 10b.

[0107] For the operating process of removing the end cover 20b, refer to FIG. 28 to FIG. 30. First, the end cover 20b is rotated around a central axis, so that the clamping boss 23b moves from the locking position A in which it abuts against the first end 1913b to the unlocking position B of the second portion 1912b of the second end 1914b, as indicated by the arrow R1 in FIG. 7. In the moving process of the clamping boss 23b, the end cover bottom 200b gradually moves away from the far end 120b of the shell 10b. When the clamping boss 23b is in the unlocking position B, the clearance space 50b is formed between the end cover bottom 200b and the far end 120b. Then, as indicated by the arrow R2 in FIG. 8, the end cover 20b is moved in the longitudinal direction, so that the clamping boss 23b leaves the clamping slot 191b along the second portion 1912b. Thus, the connection between the end cover 20b and the connecting element 19b can be released, and the end cover 20b can be detached or removed from the far end 120b of the shell 10b.

[0108] It is worth noting that during the rotation of the end cover 20b in the direction indicated by the arrow R1, the first portion 1911b is configured to extend obliquely in the longitudinal direction of the shell 10b, so that when the clamping boss 23b moves along the first portion 1911b, the end cover bottom 200b gradually moves away from the far end 120b of the shell 10b, thereby forming the clearance space 50b, which is convenient for a user to hold the clearance space 50b and easily move the end cover 20b out of the second portion 1912b in the direction indicated by the arrow R2.

[0109] In some embodiments, a stop step 1915b that the clamping boss 23b abuts against is arranged at the first end 1913b of the first portion 1911b, and the clamping boss 23b prevents the end cover 20b from moving from the locking position A to the unlocking position B by abutting against the stop step 1915b. When the end cover 20b needs to be unlocked, a user pinches or grips the end cover 20b with fingers and rotates the end cover 20b in the direction indicated by the arrow R1, to separate the clamping boss 23b from the stop step 1915b and then move the clamping boss 23b out of the locking position A. After that, the end cover 20b can be rotated to rotate the clamping boss 23b from the first portion 1911b into the second portion 1912b to form the unlocking position of the end cover 20b. Afterwards, the user grips the end cover 20b and performs a pulling operation in the direction indicated by the arrow R2, so that the clamping boss 23b is moved out of the clamping slot 191b along the second portion 1912b, thereby detaching the end cover 20b from the shell 10b.

[0110] According to the preferred embodiment shown in FIG. 28, FIG. 31, and FIG. 33, the stop step 1915b of the first end 1913b is an arc-shaped convex portion. An arc-shaped sunken portion 230b that matches the arc-shaped convex portion is arranged at an edge of the clamping boss 23b. When the clamping boss 23b abuts against the first end 1913b, the arc-shaped convex portion is located inside the arc-shaped sunken portion 230b, thereby preventing the clamping boss 23b from being loosened or shaking on the first portion 1911b. When a user pinches or grips the end cover 20b to rotate with fingers, it is easier to separate the arc-shaped convex portion from the arc-shaped sunken portion 230b, thus moving the clamping boss 23b out of the locking position A.

[0111] FIG. 37 shows a schematic diagram of a connecting element 19c in still another changing embodiment. In this embodiment, the clamping slot 191c disposed on the connecting element 19c includes:

a first portion 1911c arranged obliquely relative to a longitudinal direction of the connecting element 19c; and

a second portion 1912c extending in the longitudinal direction from the second end of the first portion 1911c. After assembling, the second portion 1912c basically extends to the far end 120b of the shell 10b;

and the second portion 1912c is opened at the far end 120b.

[0112] An abutment step 1913c is disposed at the first end of the first portion 1911c such that the clamping boss 23b abuts against the abutment step 1913c when the end cover 20b is in the locking position, thereby preventing the end cover 20b from rotatably moving to the unlocking position B. When the end cover 20b needs to be unlocked, a user presses the end cover 20b, as indicated by the arrow P21 in FIG. 37, and the clamping boss 23b moves relative to the abutment step 1913c to be staggered from the abutment step 1913c. After that, the end cover 20b can be rotated to rotate the clamping boss 23b from the first portion 1911c into the second portion 1912c, to form the unlocking position of the end cover 20b. Afterwards, the user grips the end cover 20b and performs a pulling operation, so that the clamping boss 23b is moved out of the clamping slot 191c along the second portion 1912c to release their detachable connection, thereby detaching the end cover 20b from the shell 10b.

[0113] As shown in FIG. 32 to FIG. 36, the electronic atomization device 100b further includes:

an air inlet 21b which is formed in the end cover bottom 200b to allow air to enter the electronic atomization device 100b; and

a sliding cover 22b which is arranged at the end cover bottom 200b and is configured to slide relative to the end cover 20b, so as to open or close the air inlet 21b.

[0114] In some embodiments, as shown in FIG. 33, the end cover bottom 200b is provided with a groove 202b. The air inlet 21b is formed within the groove 202b. The sliding cover 22b is embedded into the groove 202b and slides along the groove 202b to open or close the air inlet 21b. FIG. 34 shows a schematic diagram of the sliding cover 22b closing the air inlet 21b. FIG. 35 shows a schematic diagram of the sliding cover 22b opening the air inlet 21b.

[0115] Further, an operating portion 220b is arranged at a top of the sliding cover 22b. The operating portion 220b is configured to be operated by a user, thus driving the sliding cover 22b to slide inside the groove 202b, to open or close the air inlet 21b.

[0116] According to the embodiment shown in FIG. 36, the operating portion 220b is a long-strip-shaped convex edge formed by outward protrusion of the top of the sliding cover 22b, which is convenient for a user to grip with fingers and facilitates operations. It should be noted that the operating portion 220b can be constructed in another shape to facilitate user operation and drive the sliding cover 22b to slide.

[0117] In some embodiments, as shown in FIG. 36, a seal gasket 221b is also arranged inside the sliding cover 22b. When the sliding cover 22b closes the air inlet 21b, the seal gasket 221b can ensure the sealing property between the sliding cover 22b and the air inlet 21b.

[0118] Further, as shown in FIG. 32 and FIG. 33, the end cover 20b further includes a seal ring 203b. An annular slot 204b is formed in an outer side of an upper end of the end cover 20b. The seal ring 203b is sleeve on the annular slot 204b. The seal ring 203b is in interference fit with an inner wall of the connecting element 19b to ensure the sealing property between the end cover 20b and the connecting element 19b.

[0119] In some embodiments, as shown in FIG. 32, the end cover side wall 201b encloses to form a cavity 24b. A partition wall 25b is disposed inside the cavity 24b in the longitudinal direction of the end cover 20b. The cavity 24b is divided into a first cavity 241b located on an outer side of the partition wall 25b and a second cavity 242b located on an inner side of the partition wall 25b. The air inlet 21b is in communication with the first cavity 241b.

[0120] Further, as shown in FIG. 26 and FIG. 32, an air vent groove 250b is formed in the partition wall 25b on one side close to the air inlet 21b. The air vent groove 250b forms an airflow channel 26b between the air inlet 21b and the second cavity 242b, and the airflow channel is in fluid communication with external air, so that the external air flows from the air inlet 21b into the second cavity 242b of the end cover 20b.

[0121] As shown in FIG. 26, the electronic atomization device 100b further includes:

an air outlet 113b configured for inhalation by a user, where the air outlet 113b is located at the near end 110b of the shell 10b; and

an aerosol outputting pipe 111b disposed in the longitudinal direction of the shell 10b. The aerosol outputting pipe 111b at least partially extends within the liquid storage cavity 112b, and the liquid storage cavity 112b is formed by a space between an outer wall of the aerosol outputting pipe 111b and an inner wall of the shell 10b. An end portion of the aerosol outputting pipe 111b relative to the near end 110b is communicated with the air outlet 113 to output the aerosols generated by atomization of the atomization assembly to the air outlet 113b for inhalation.

[0122] During inhalation, an airflow path passing through the electronic atomization device 100b is shown by the arrow R5 in FIG. 26. External air enters from the air inlet 21b of the end cover 20b into the second cavity 242b of the end cover 20b via the airflow channel 26b, and is upwards transferred from the second cavity 242b to the atomization assembly through the gap between the battery cell 40b and the shell 10b. After carrying aerosols inside the atomization cavity, the external air is outputted by the aerosol outputting pipe 111b to the air outlet 113b for user inhalation.

[0123] It should be noted that the preferred embodiments of this application are provided in the specification and the accompanying drawings of this application, but are not limited to the embodiments described in this

specification. Further, a person of ordinary skill in the art can make improvements or modifications according to the foregoing descriptions, and all of the improvements and modifications shall fall within the protection scope of the appended claims of this application.

Claims

1. An electronic atomization device, comprising:

a shell having a near end and a far 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 aerosols;
a battery cell configured to supply power to the heating element; and
an end cover which at least partially closes the far end of the shell and is detachably connected to the shell, wherein:

the end cover is configured to be removable from the shell to open the far end of the shell, so as to take out the battery cell from the far end of the shell;
the end cover is operatable by a user to selectively move between an unlocking position and a locking position, wherein the end cover is allowed to be detached from the shell in the unlocking position and is prevented from being detached from the shell in the locking position.

2. The electronic atomization device according to claim 1, wherein the end cover is configured to:

be movable in the longitudinal direction of the shell in the unlocking position to be detached from the shell; and
be prevented from moving in the longitudinal direction of the shell in the locking position to be prevented from being detached from the shell.

3. The electronic atomization device according to claim 1 or 2, wherein the end cover is rotatable by the user to drive the end cover to move from the locking position to the unlocking position.

4. The electronic atomization device according to claim 1 or 2, further comprising a connecting element which is firmly connected to the shell and at least partially encloses the end cover, wherein the end cover is detachably connected to the shell by being detachably connected to the connecting element.

5. The electronic atomization device according to claim 4, further comprising a clamping slot and a clamping boss, wherein:

the clamping slot is disposed on one of the connecting element and the end cover, and the clamping boss is disposed on the other one of the connecting element and the end cover;
the clamping slot comprises a first portion extending in a circumferential direction of the shell and a second portion extending out of the first portion in the longitudinal direction of the shell;
the clamping boss is configured to define the locking position of the end cover by extending into the first portion; and
the clamping boss is configured to be movable from the first portion to the second portion to define the unlocking position of the end cover.

6. The electronic atomization device according to claim 5, wherein the first portion comprises a first end and a second end that face away from each other, and the second portion is configured to extend from the first end or the second end of the first portion in the longitudinal direction of the shell.

7. The electronic atomization device according to claim 1 or 2, further comprising an elastomer disposed between the battery cell and the end cover to elastically support the battery cell.

8. The electronic atomization device according to claim 7, wherein the elastomer is retained on the end cover and is able to be moved out of the shell when the end cover is detached from the shell.

9. The electronic atomization device according to claim 1 or 2, further comprising:

a circuit board disposed between the battery cell and the heating element to guide current between the battery cell and the heating element; and
an elastic electrical contact configured to establish conductive connection between the battery cell and the circuit board, wherein the electrical contact abuts against an electrode of the battery cell to achieve electrical conduction with the battery cell.

10. The electronic atomization device according to claim 1 or 2, further comprising:

an air inlet which is arranged on the end cover and is configured to allow air to enter the electronic atomization device; and
a movable seal element which is located within

the end cover and is configured to be movable between a closing position and an opening position, to selectively close the air inlet in the closing position and open the air inlet in the opening position.

11. The electronic atomization device according to claim 10, further comprising an operating element accommodated or mounted within the end cover, wherein the operating element is configured to be operatable by the user to drive the seal element to move between the closing position and the opening position.

12. The electronic atomization device according to claim 11, further comprising a positioning structure disposed between the end cover and the operating element to achieve positioning when the operating element drives the seal element to move to the closing position or the opening position.

13. The electronic atomization device according to claim 11, wherein the end cover is internally provided with a partition wall comprising a first side close to the battery cell and a second side facing away from the first side, wherein:

the air inlet is disposed on the partition wall and extends from the first side to the second side;
the seal element is disposed on the first side of the partition wall; and
the operating element is at least partially disposed on the second side of the partition wall.

14. The electronic atomization device according to claim 11, wherein:

the seal element is further configured to be switchable between a locked state and an unlocked state, be prevented from moving between the closing position and the opening position in the locked state, and be allowed to move between the closing position and the opening position in the unlocked state;
the operating element is configured to be pressable by the user to drive the seal element to switch from the locked state to the unlocked state; and
the operating element is configured to be rotatable by the user in the unlocked state to drive the seal element to move between the closing position and the opening position.

15. The electronic atomization device according to claim 1, wherein the end cover is configured to: be rotatably movable by a first predetermined distance in the longitudinal direction of the shell to switch from the locking position to the unlocking position, and be linearly movable in the unlocking position by a second predetermined distance in the longitudinal direction of the shell to be detached from the shell.

16. The electronic atomization device according to claim 15, wherein a clearance space is formed between the end cover and the far end of the shell in the unlocking position to allow the user to reach into the clearance space to operate the end cover and remove the end cover from the shell.

17. The electronic atomization device according to claim 4, further comprising a clamping slot and a clamping boss, wherein:

the clamping slot is disposed on one of the connecting element and the end cover, and the clamping boss is disposed on the other one of the connecting element and the end cover;
the clamping slot comprises a first portion obliquely extending relative to the longitudinal direction of the shell, and a second portion extending out of the first portion in the longitudinal direction of the shell;
the clamping boss is configured to define the locking position of the end cover by extending into the first portion; and
the clamping boss is configured to be movable from the first portion to the second portion to make the end cover switch from the locking position to the unlocking position.

18. The electronic atomization device according to claim 17, wherein the second portion terminates at the far end of the shell and defines an opening in the far end.

19. The electronic atomization device according to claim 17 or 18, wherein:

an angle between the first portion and the second portion is an obtuse angle; and/or
the angle between the first portion and the second portion is between 90° and 135°.

20. The electronic atomization device according to claim 17, wherein the first portion is provided with a stop step that the clamping boss abuts against, wherein the clamping boss prevents the end cover from moving from the locking position to the unlocking position by abutting against the stop step.

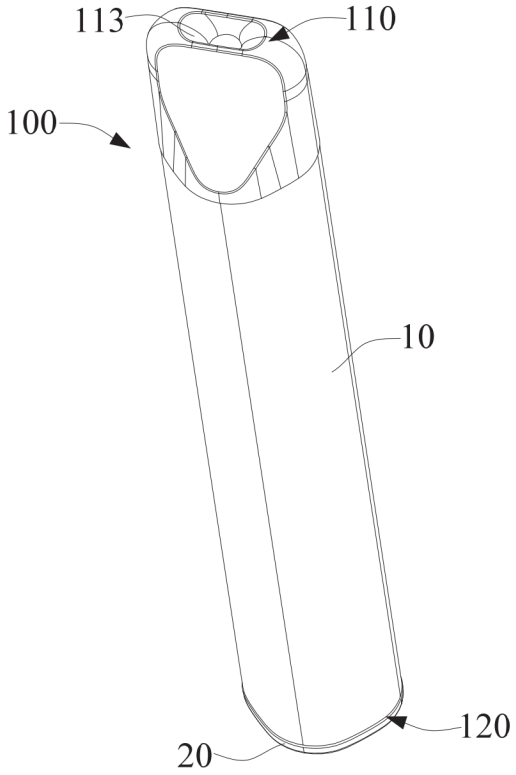


FIG. 1

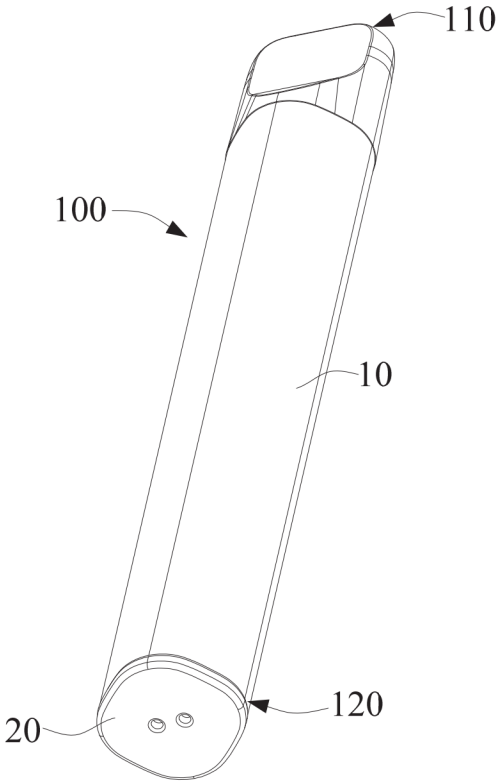
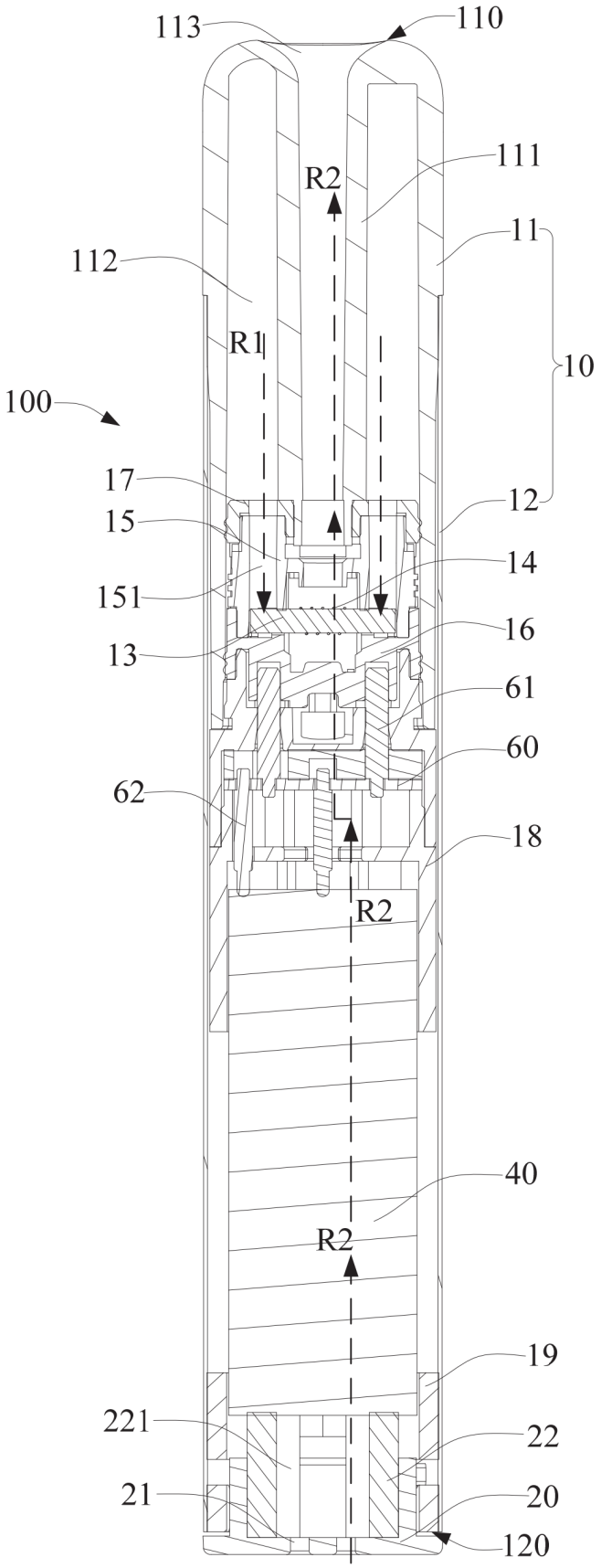


FIG. 2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R2
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R1
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60
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18
R2
40
R2
19
221
22
21
20
120

FIG. 3

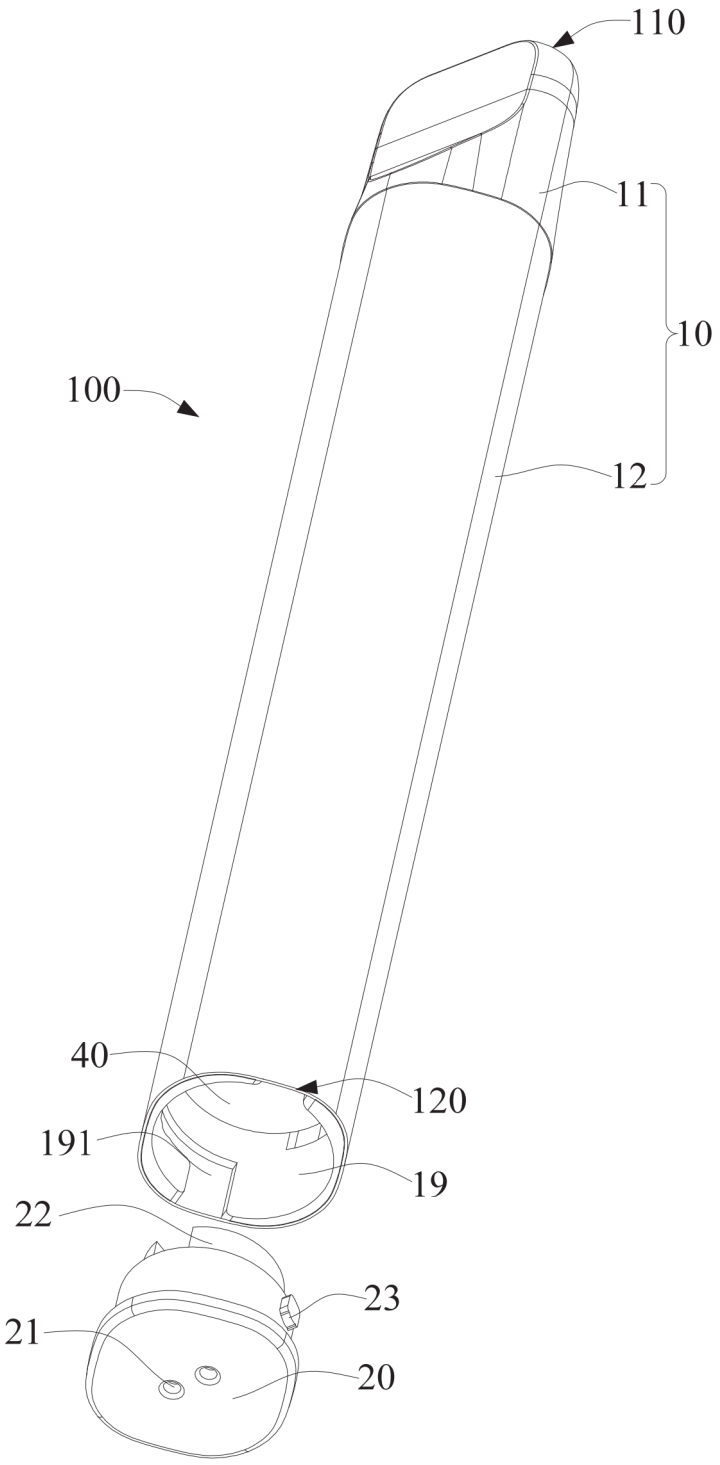
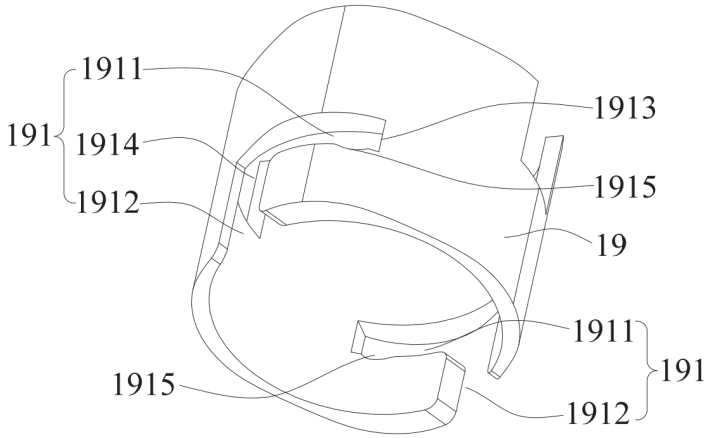


FIG. 4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1912

FIG. 5

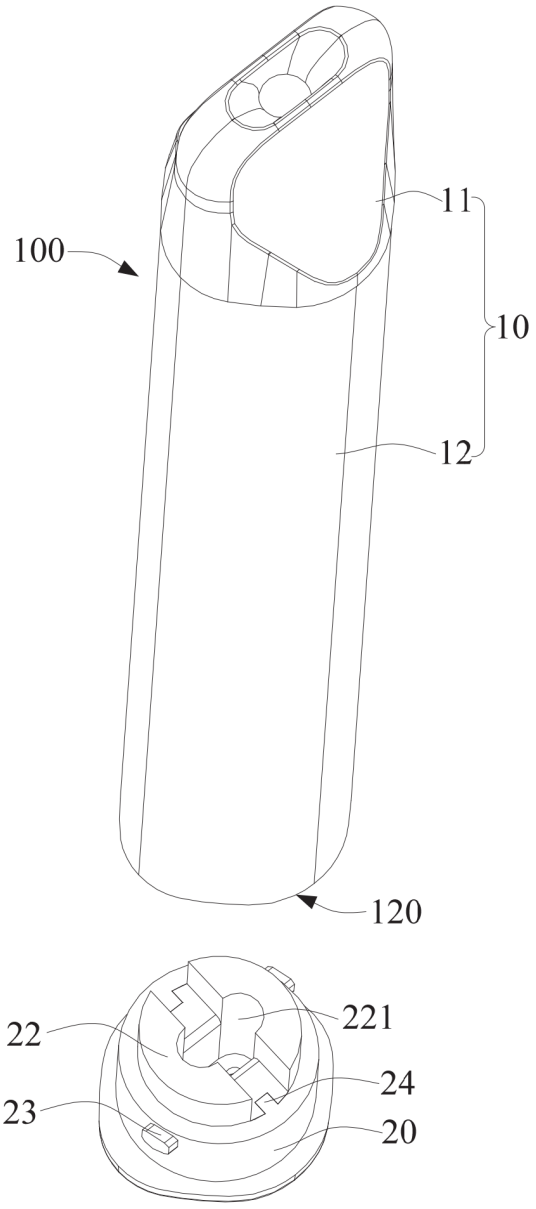
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FIG. 6

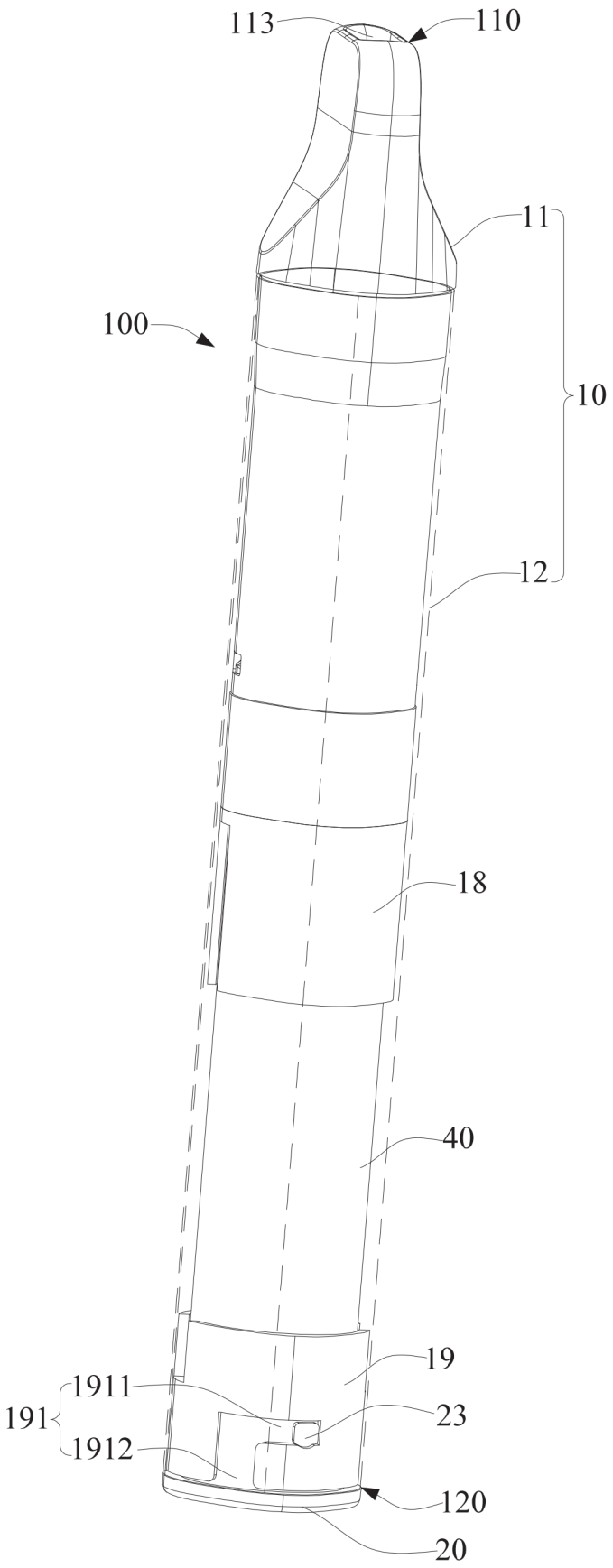


FIG. 7

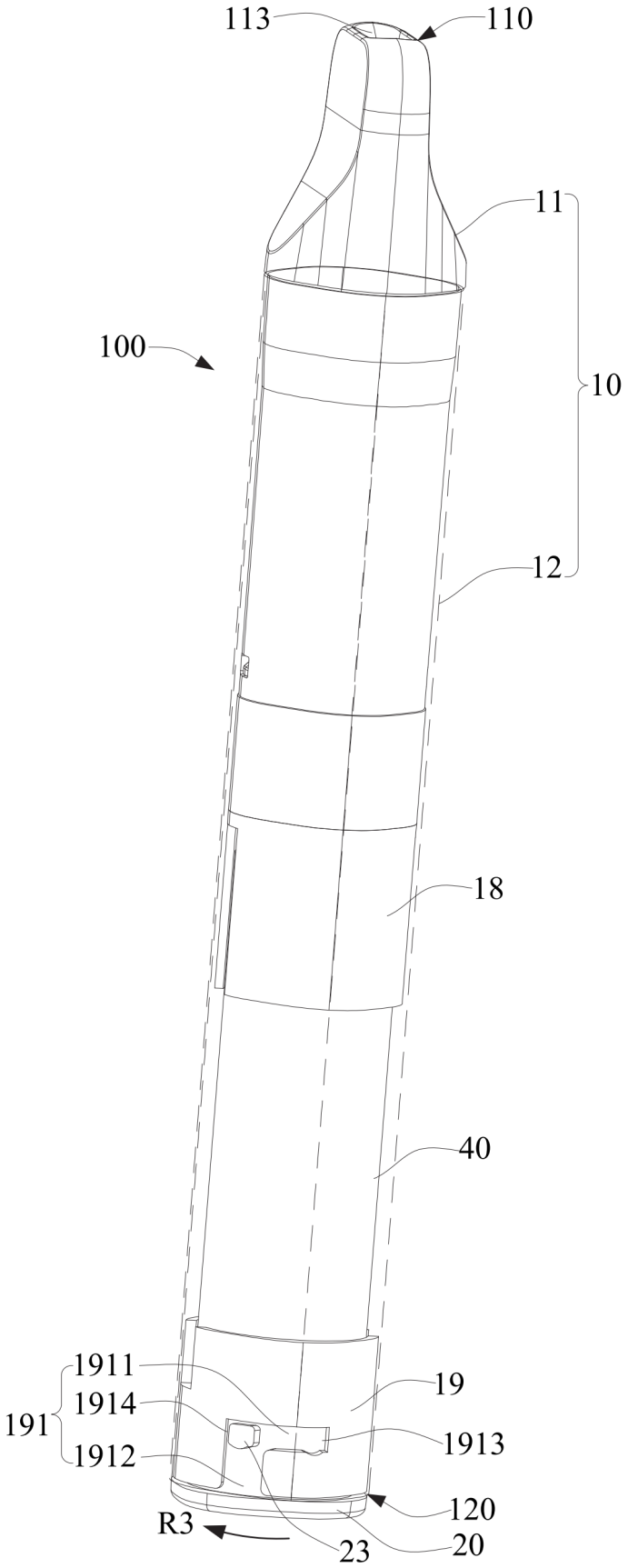


FIG. 8

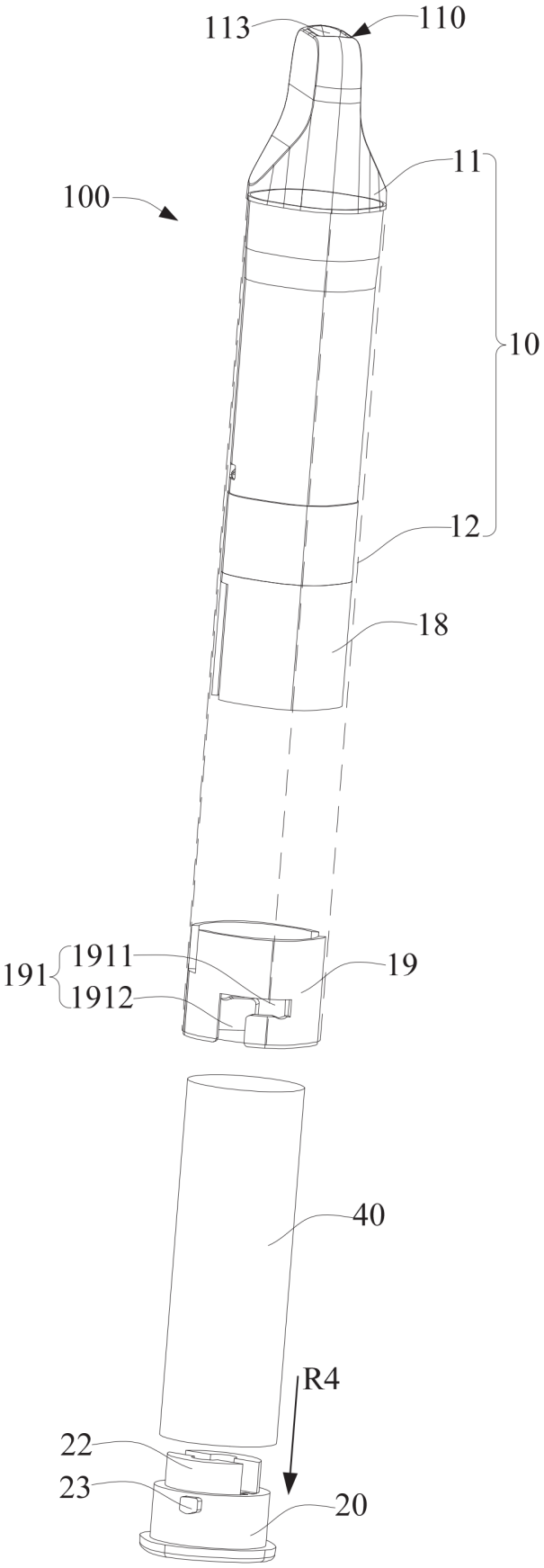


FIG. 9

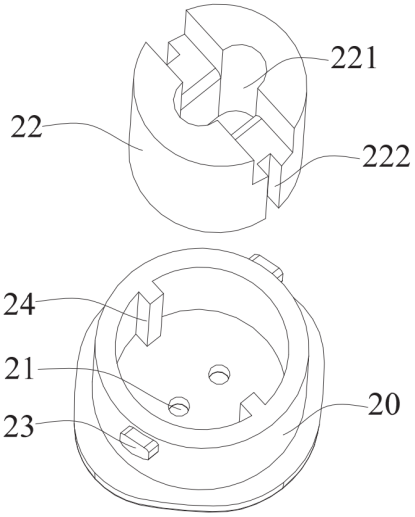


FIG. 10

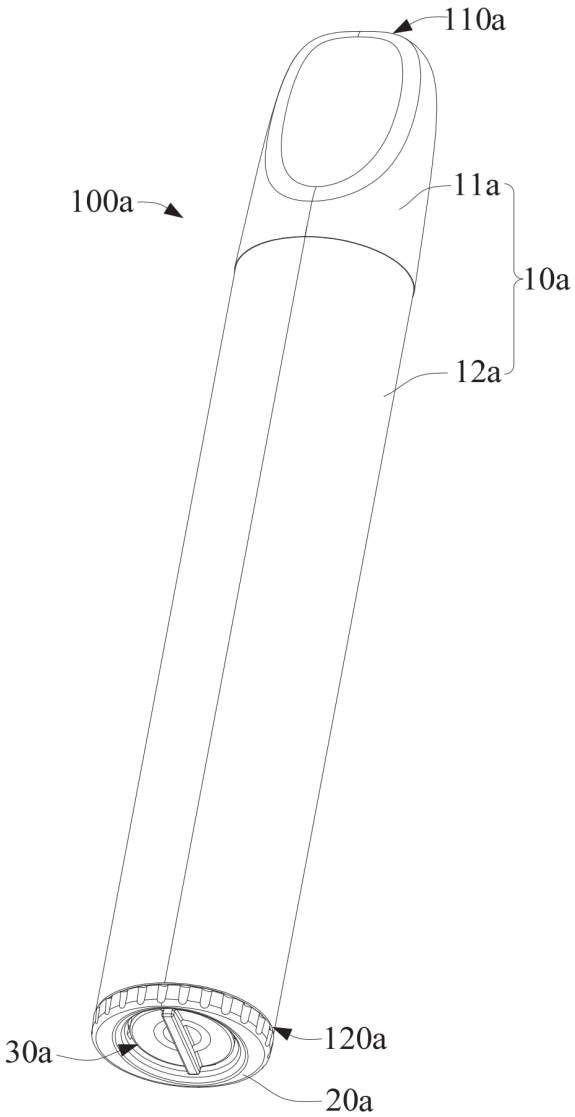
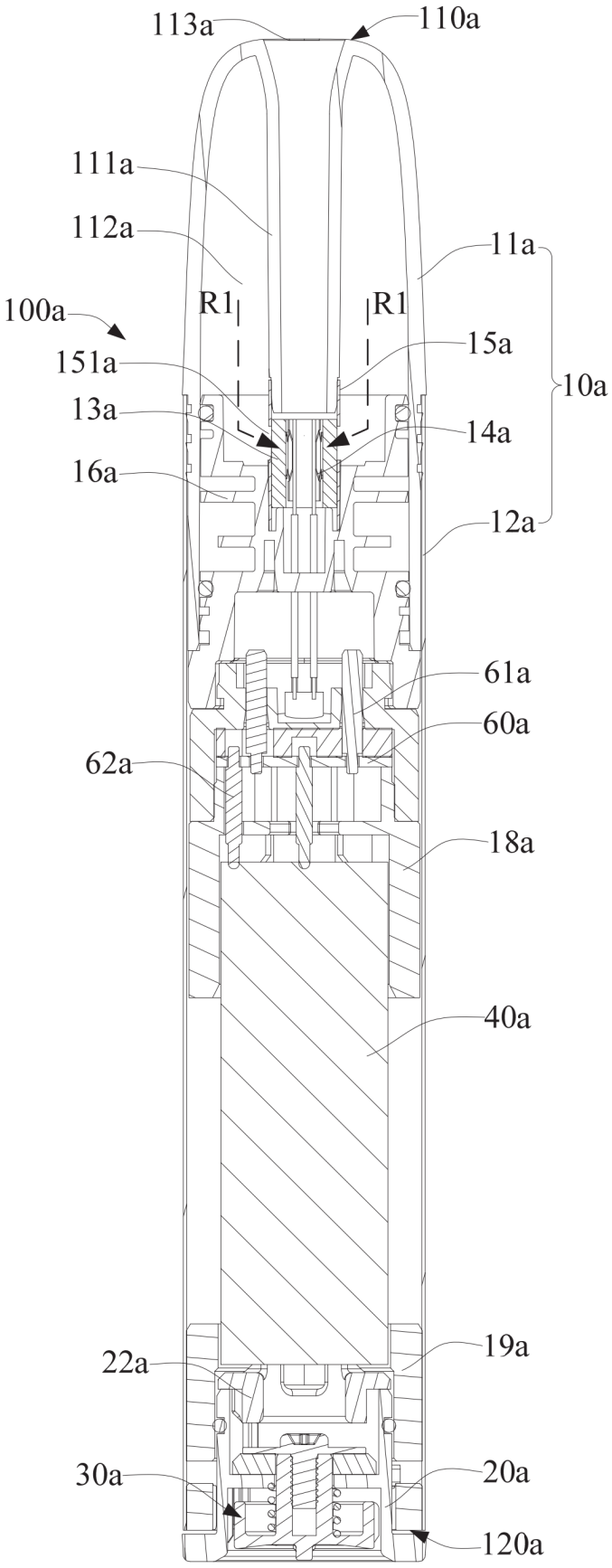


FIG. 11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120a

FIG. 12

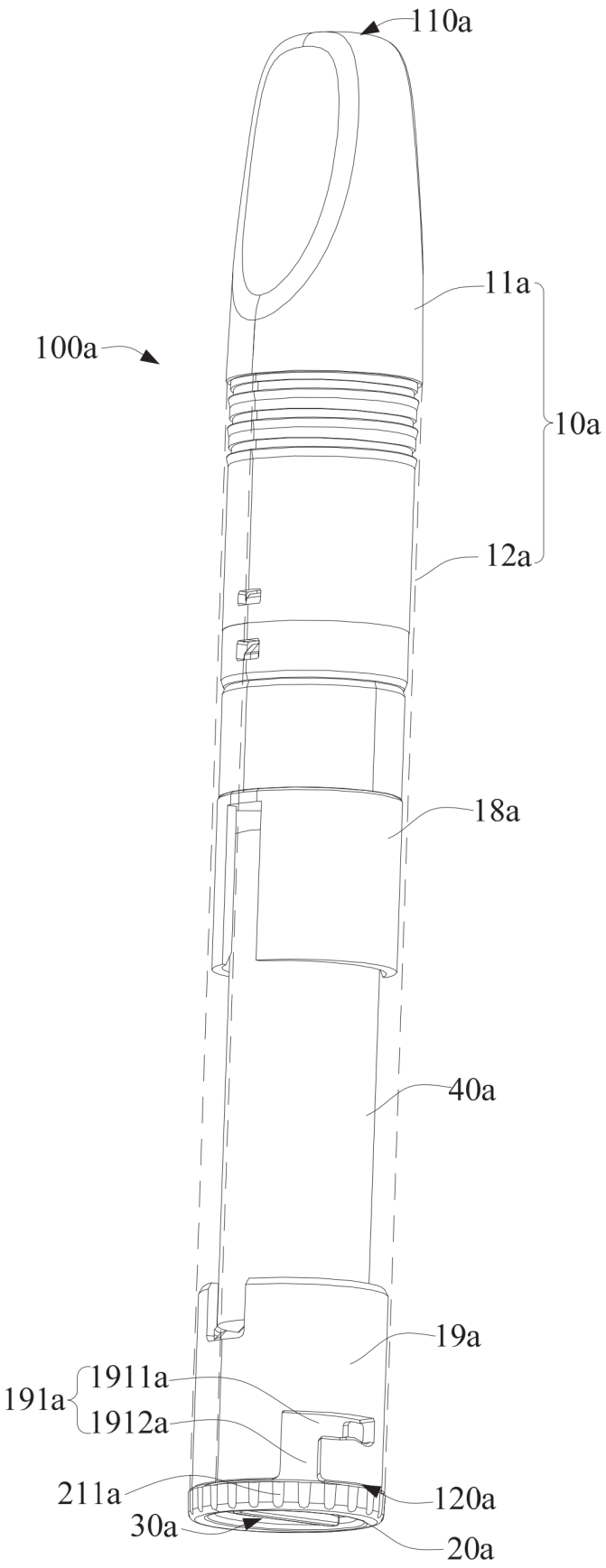
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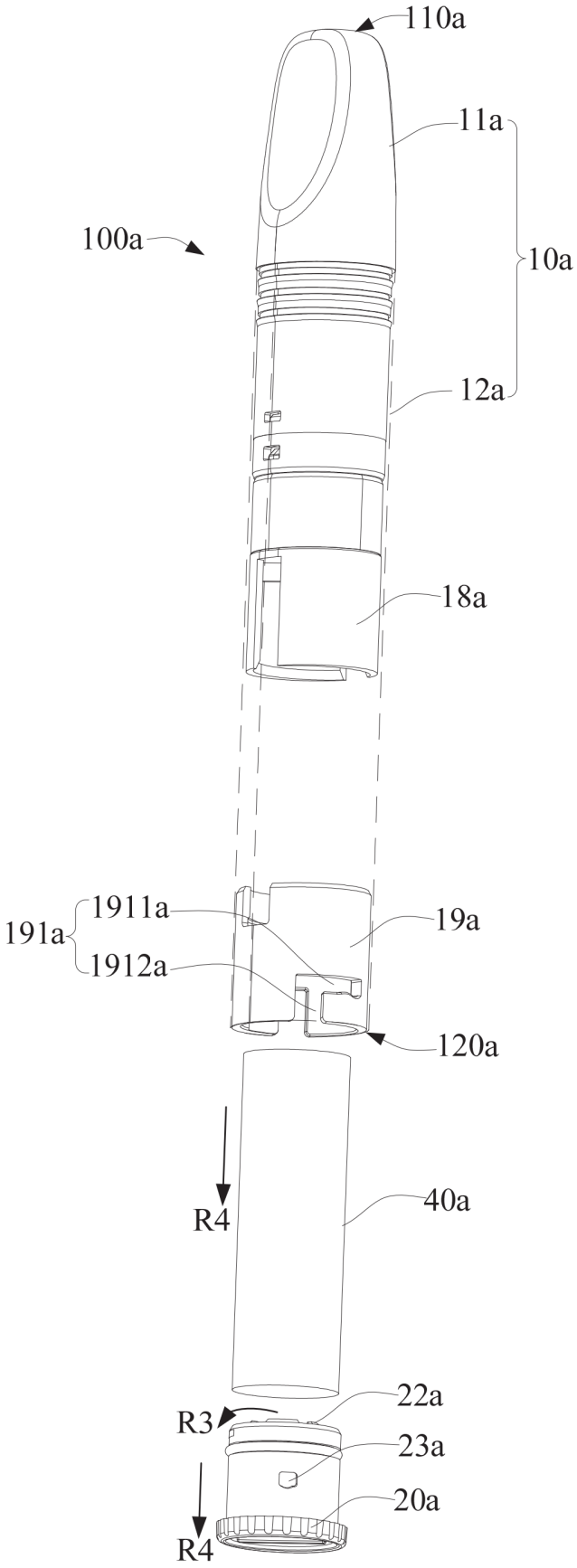
FIG. 13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R4

FIG. 14

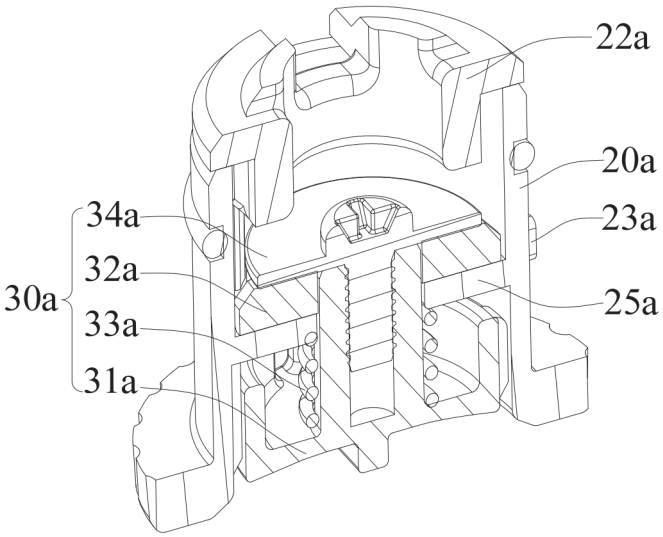
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FIG. 15

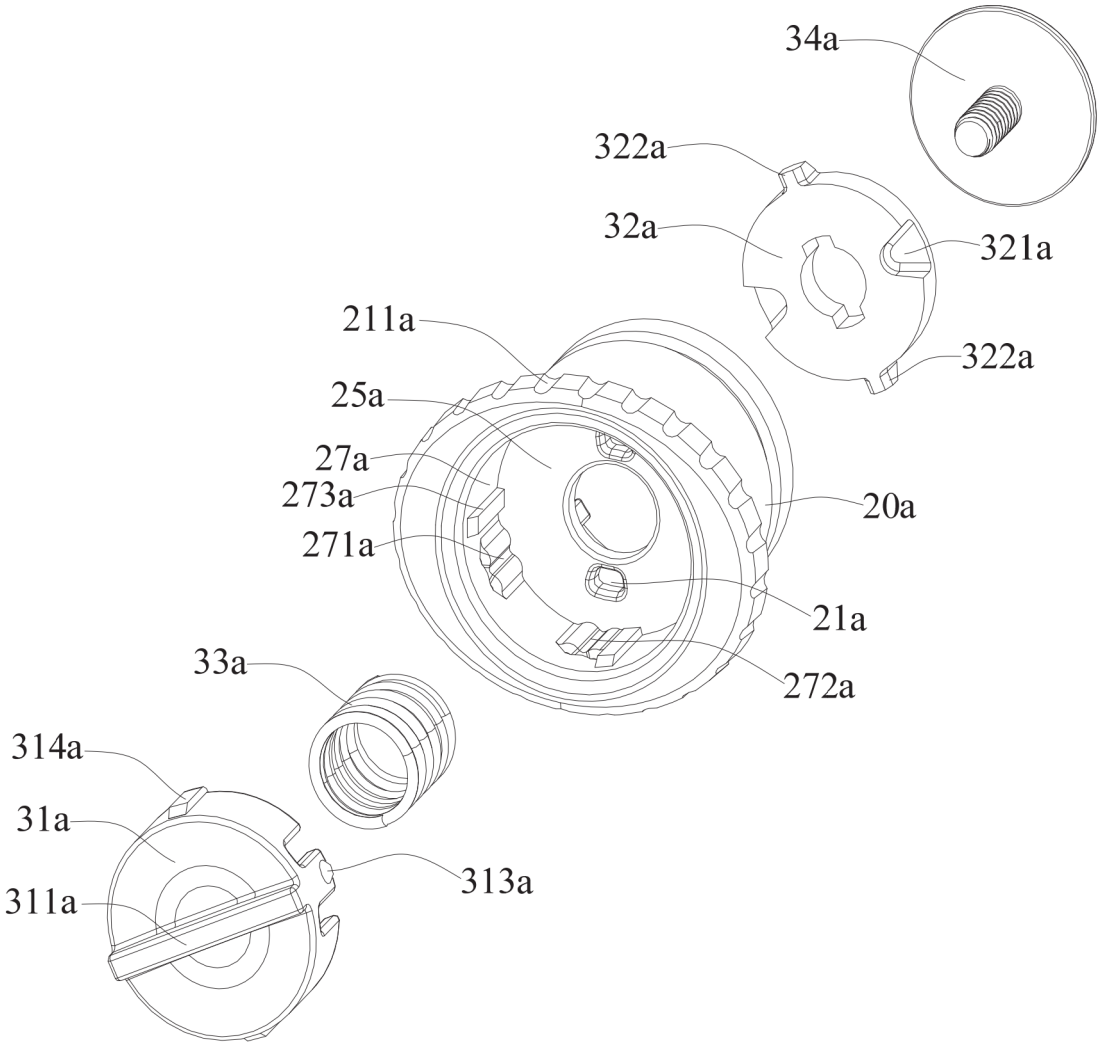
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FIG. 16

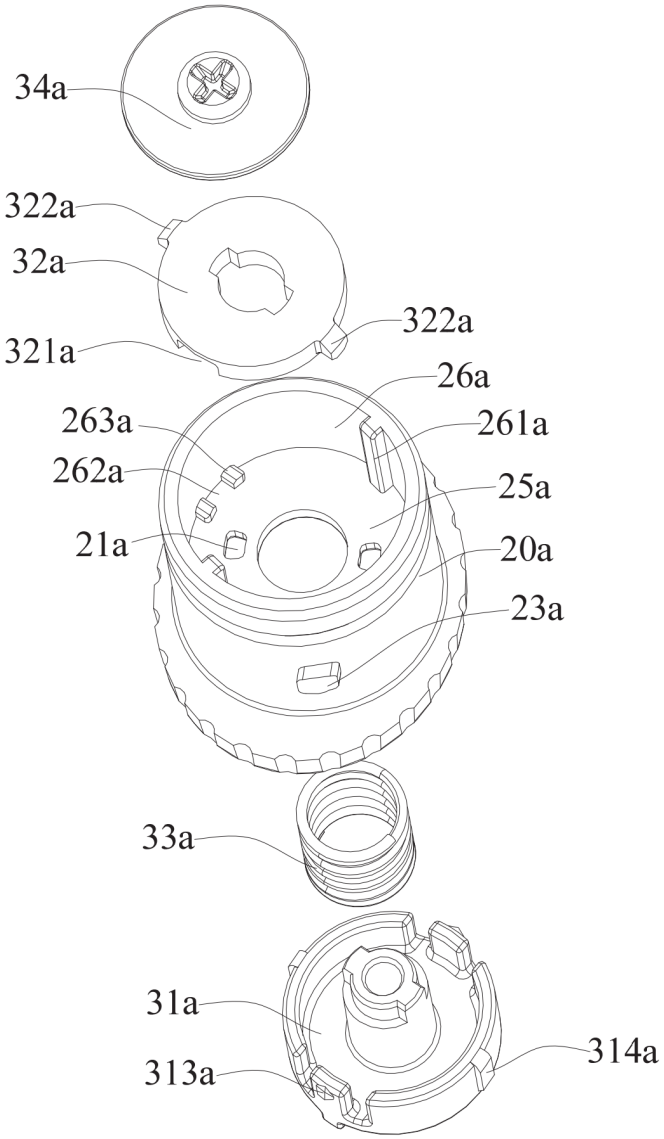
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FIG. 17

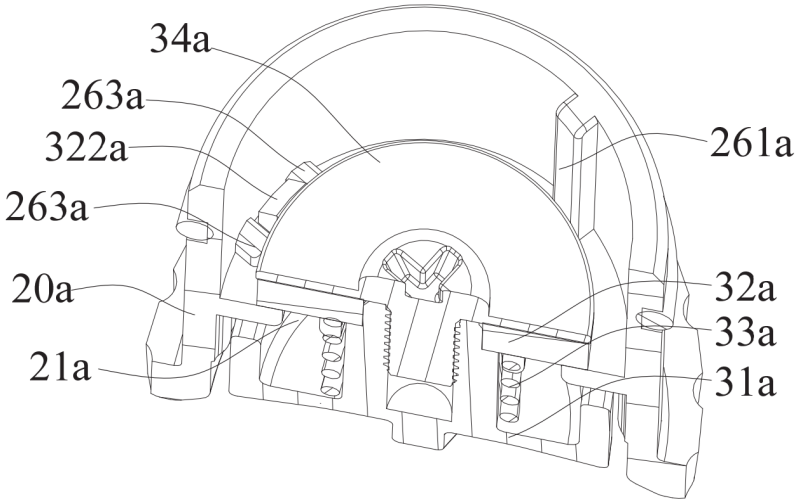
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FIG. 18

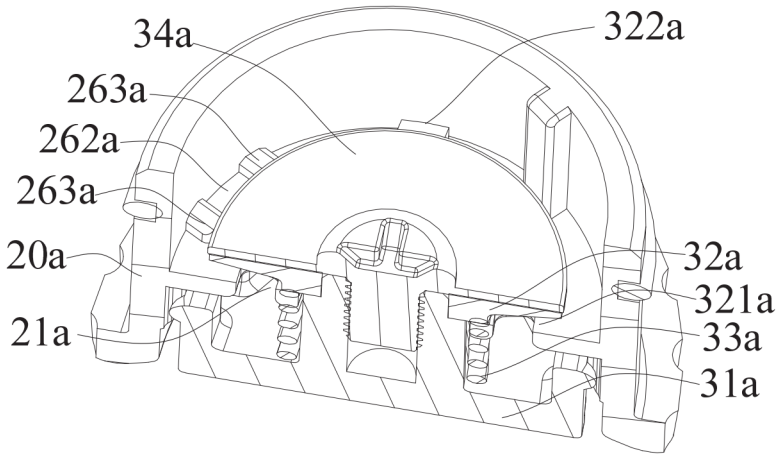
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FIG. 19

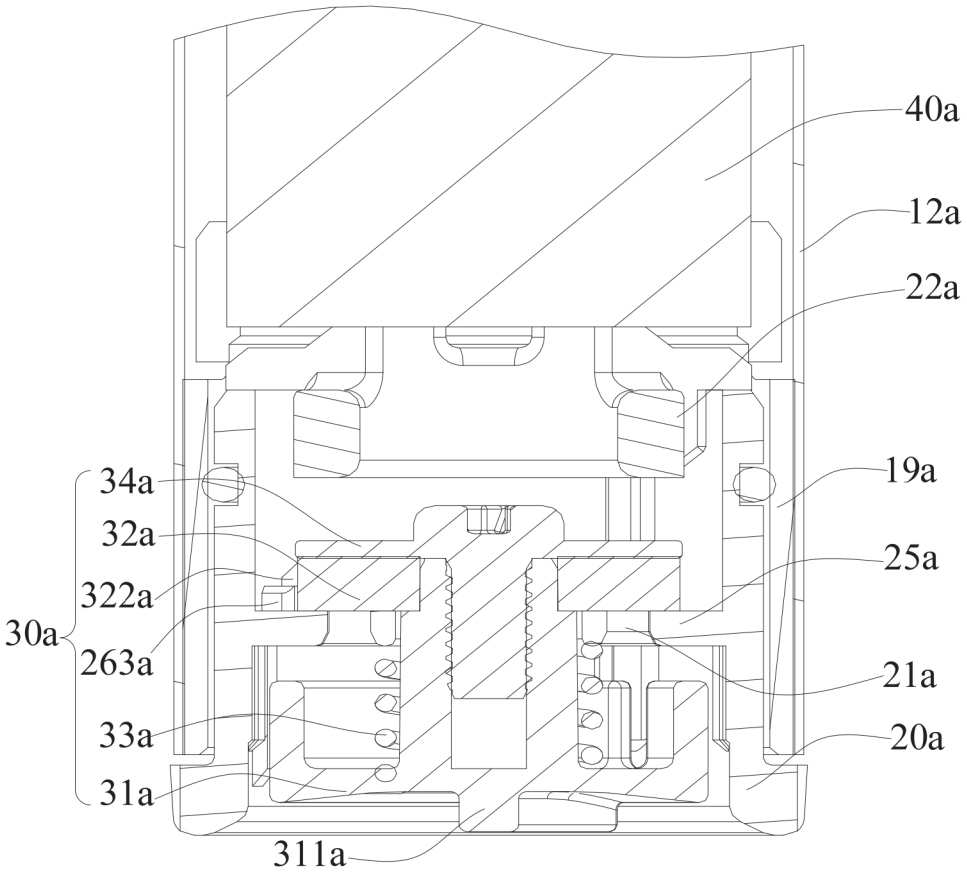
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FIG. 20

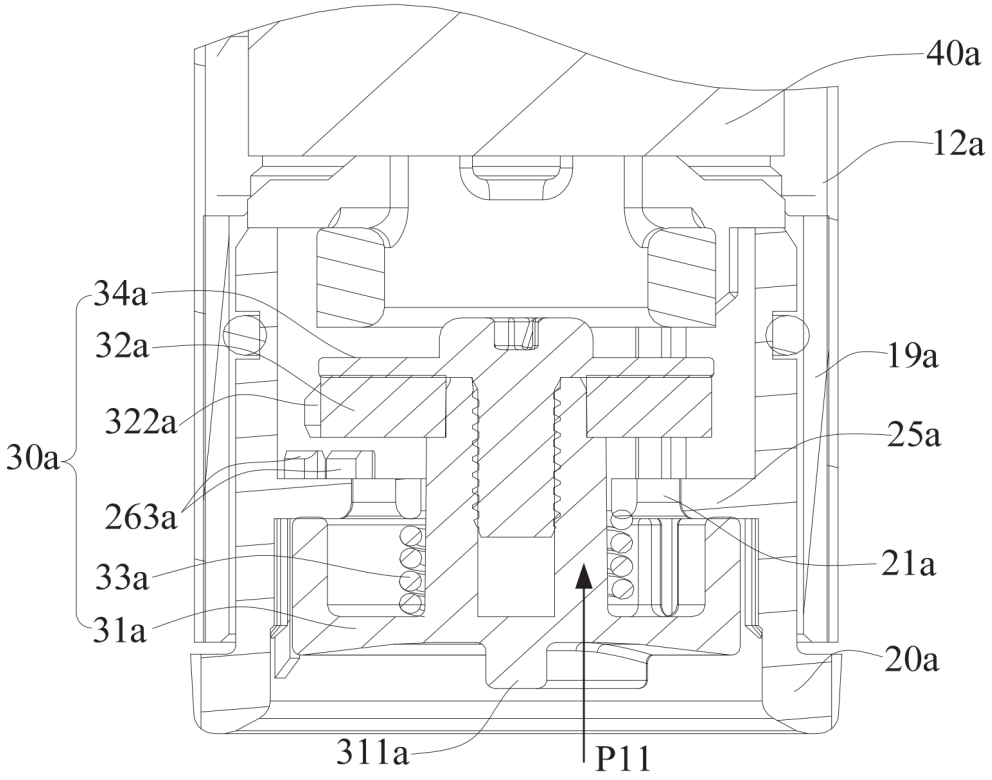
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FIG. 21

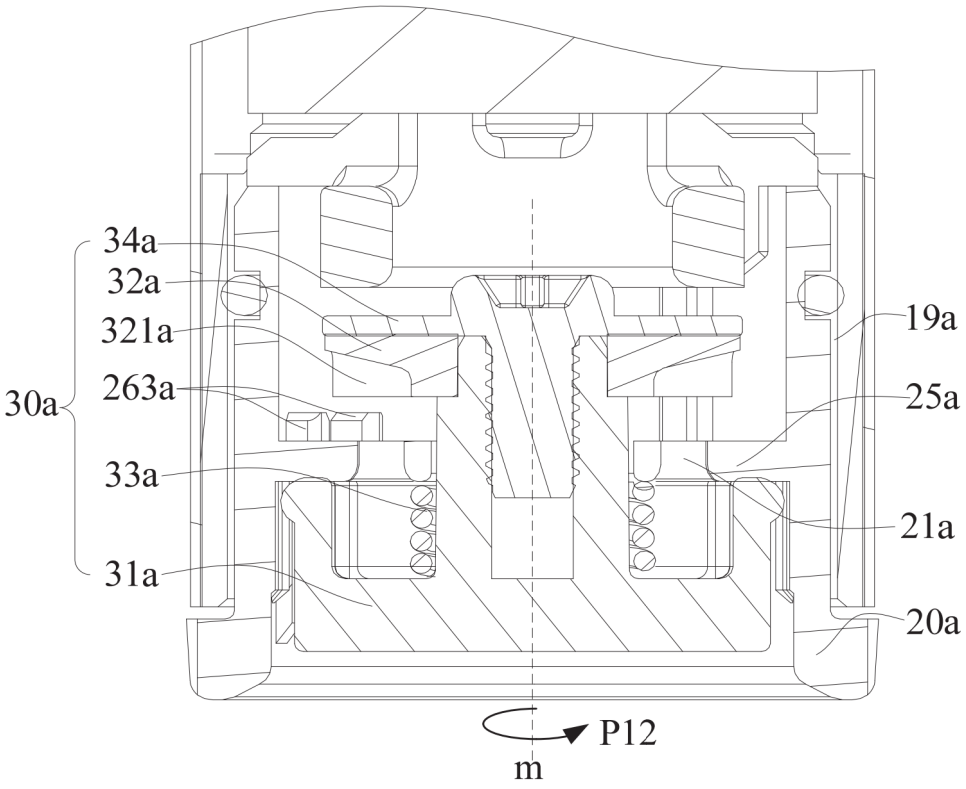
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FIG. 22

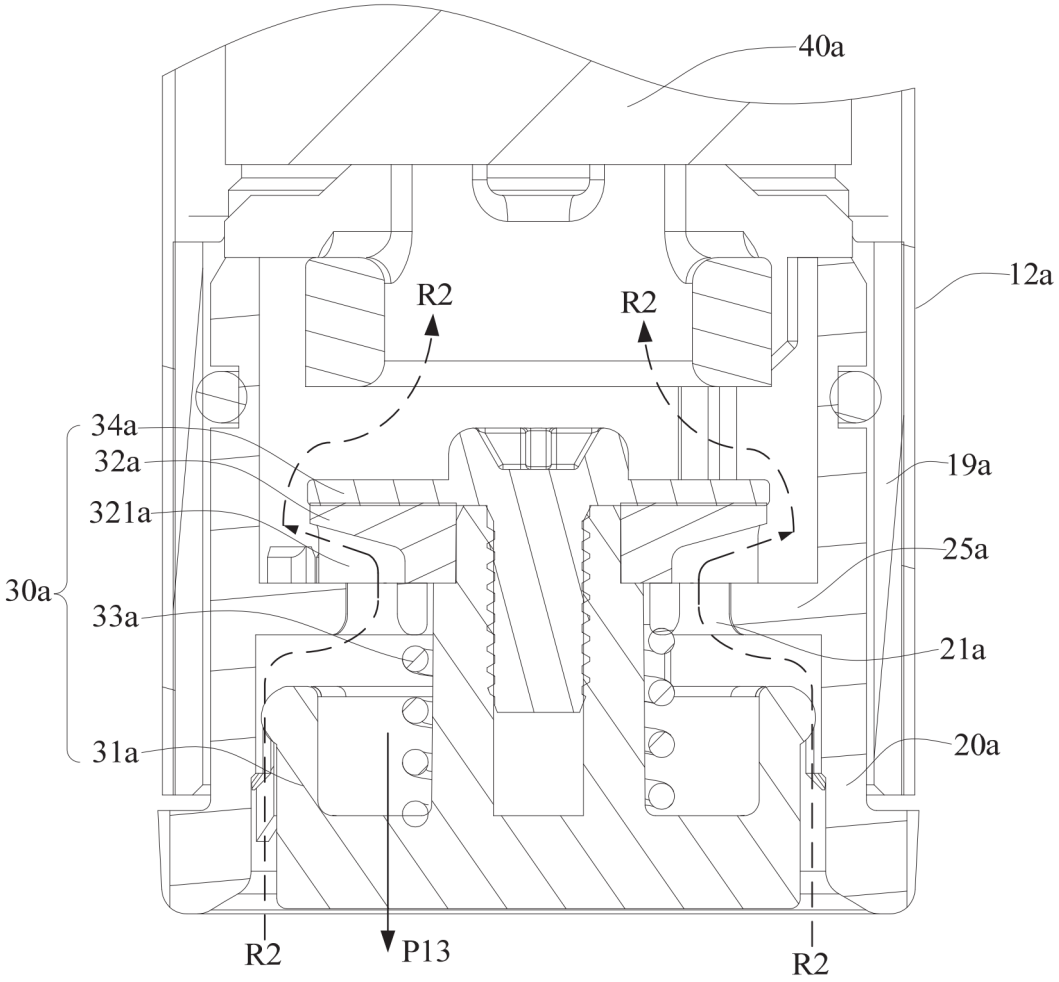


FIG. 23

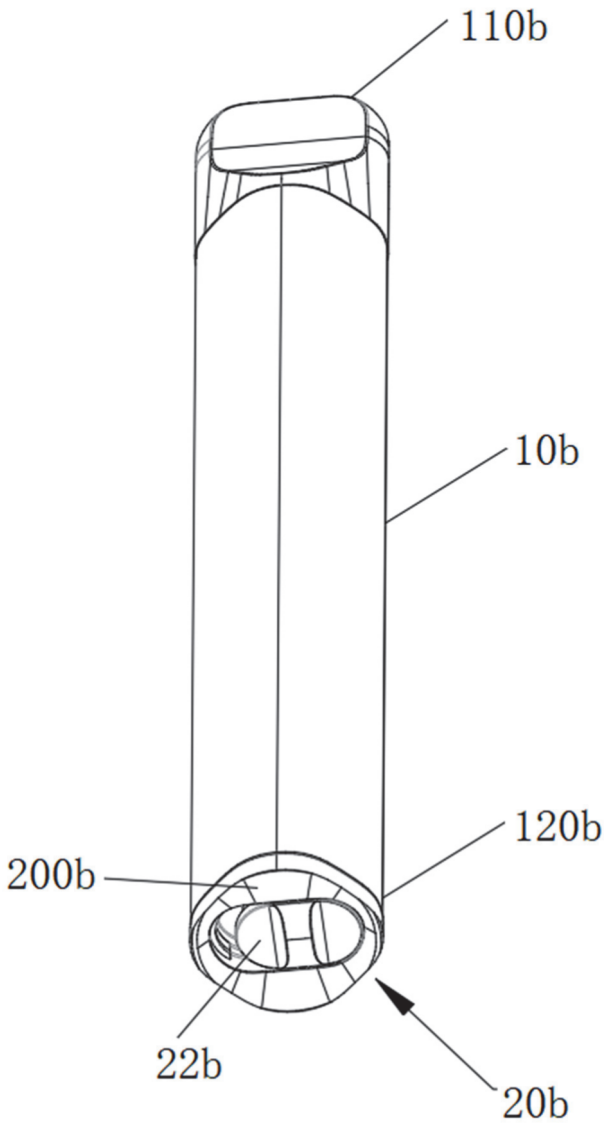


FIG. 24

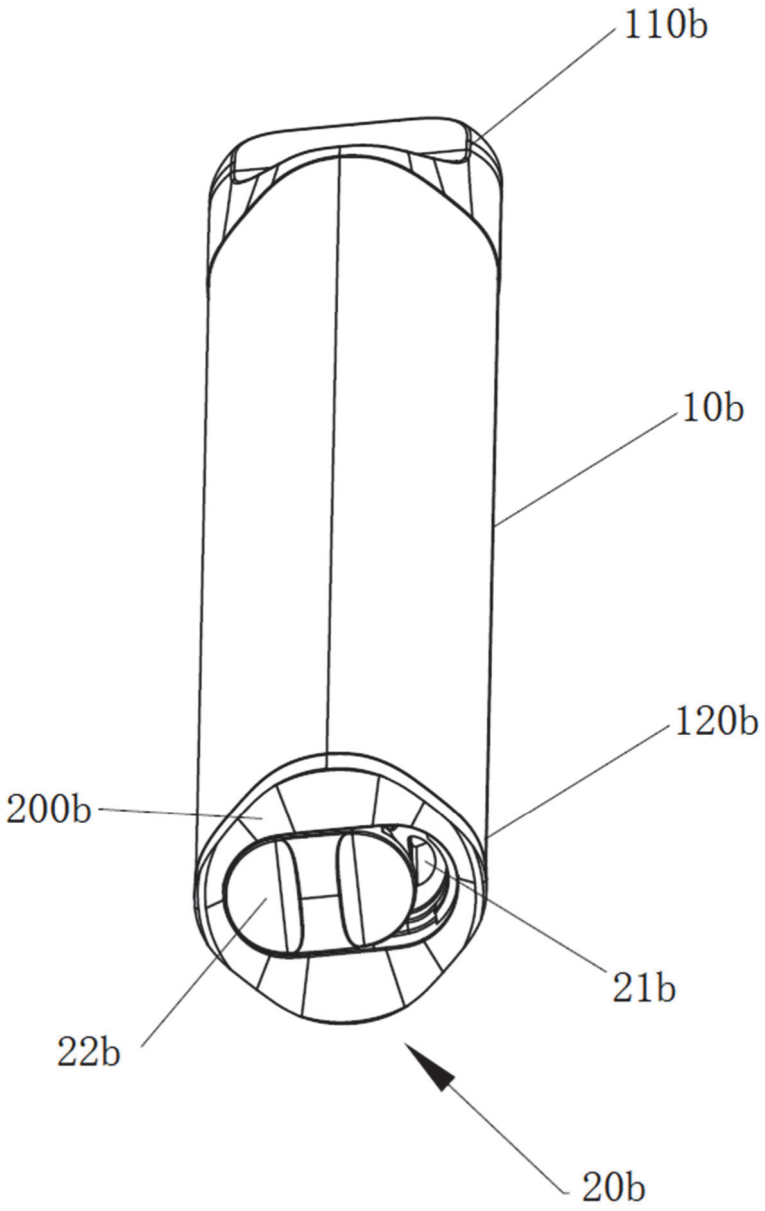
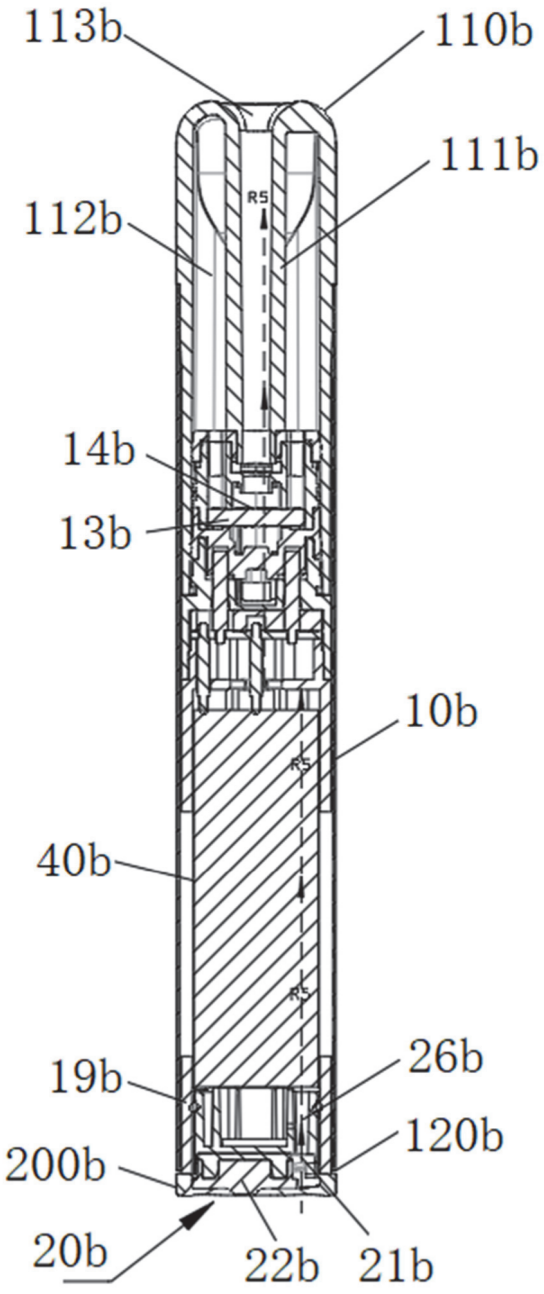


FIG. 25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21b

FIG. 26

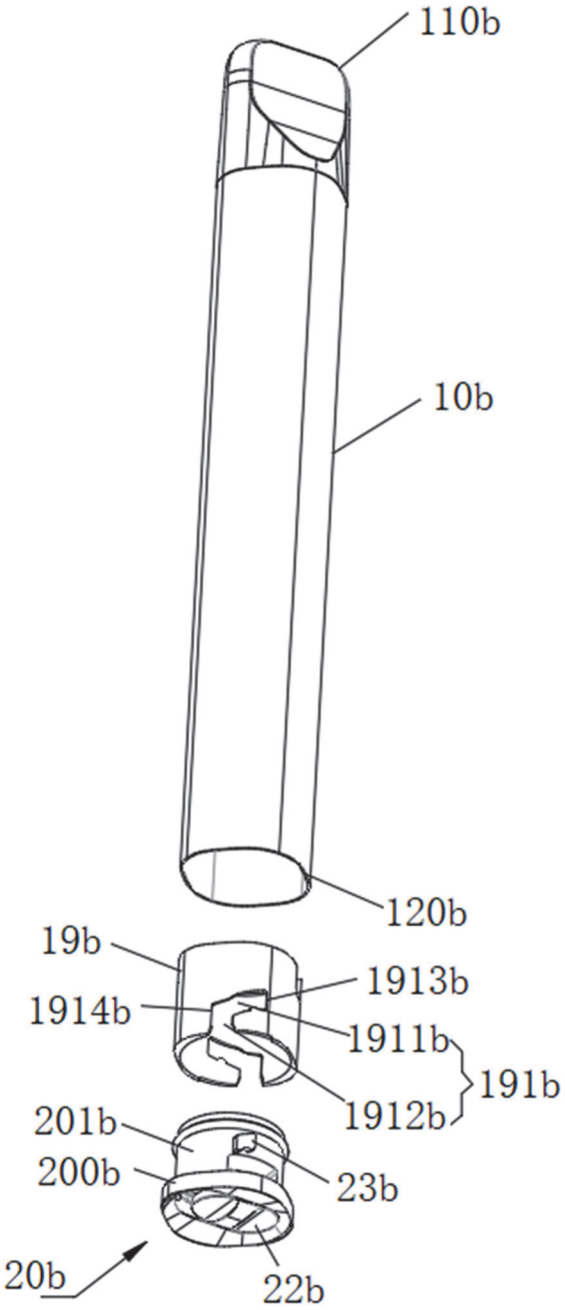
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FIG. 27

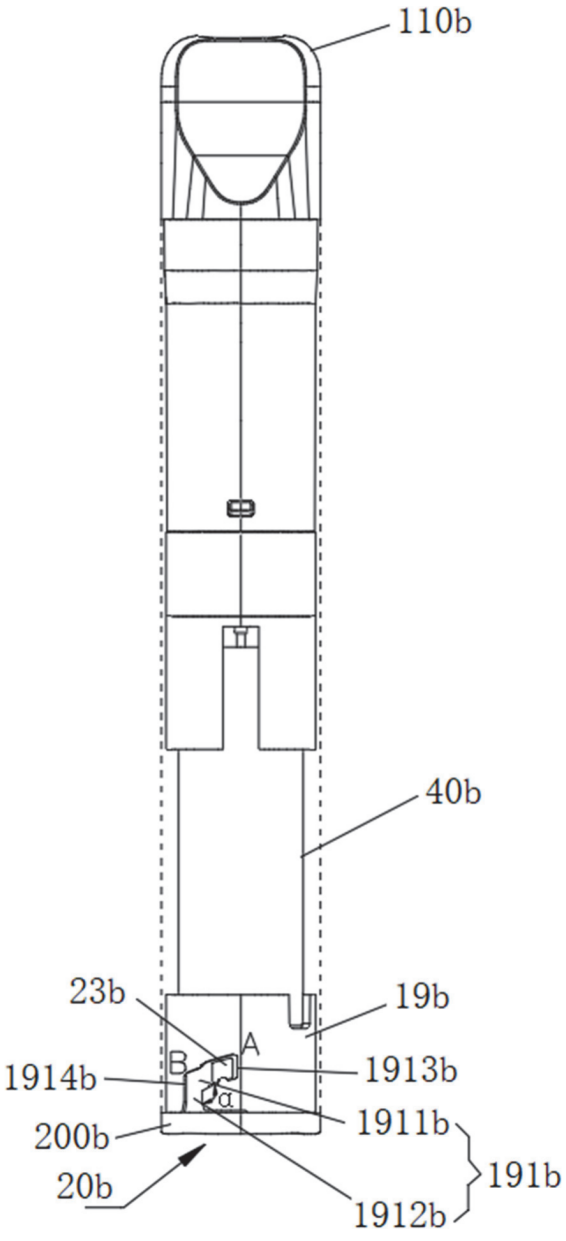

FIG. 28

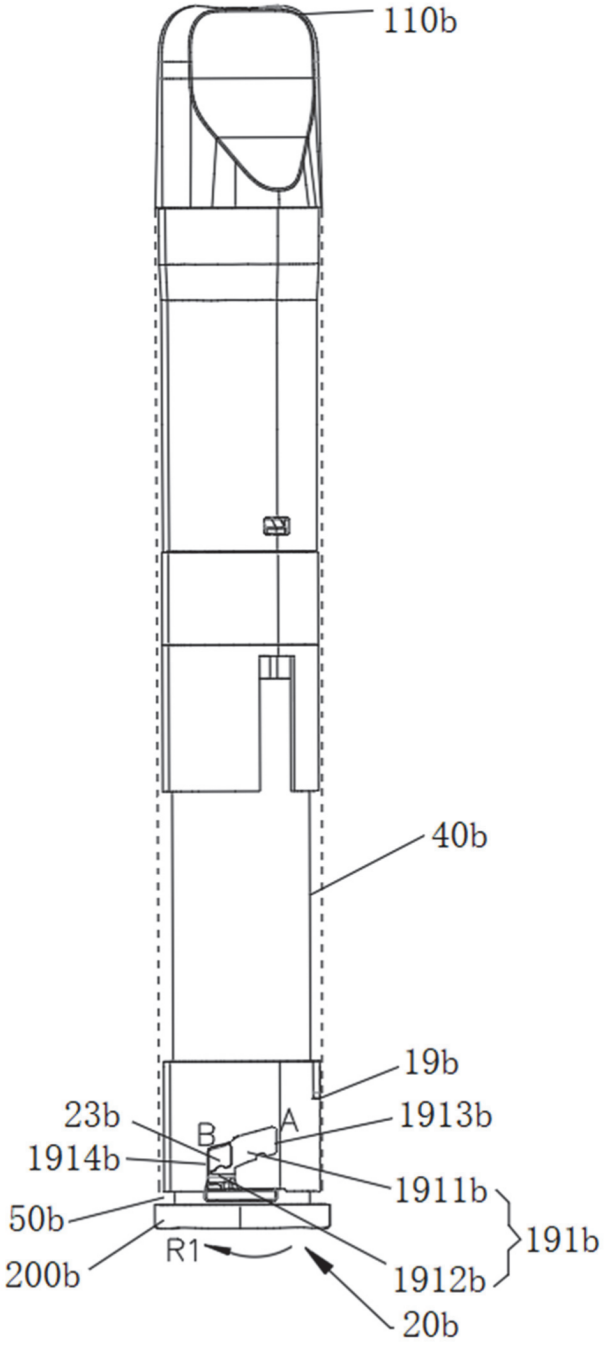
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FIG. 29

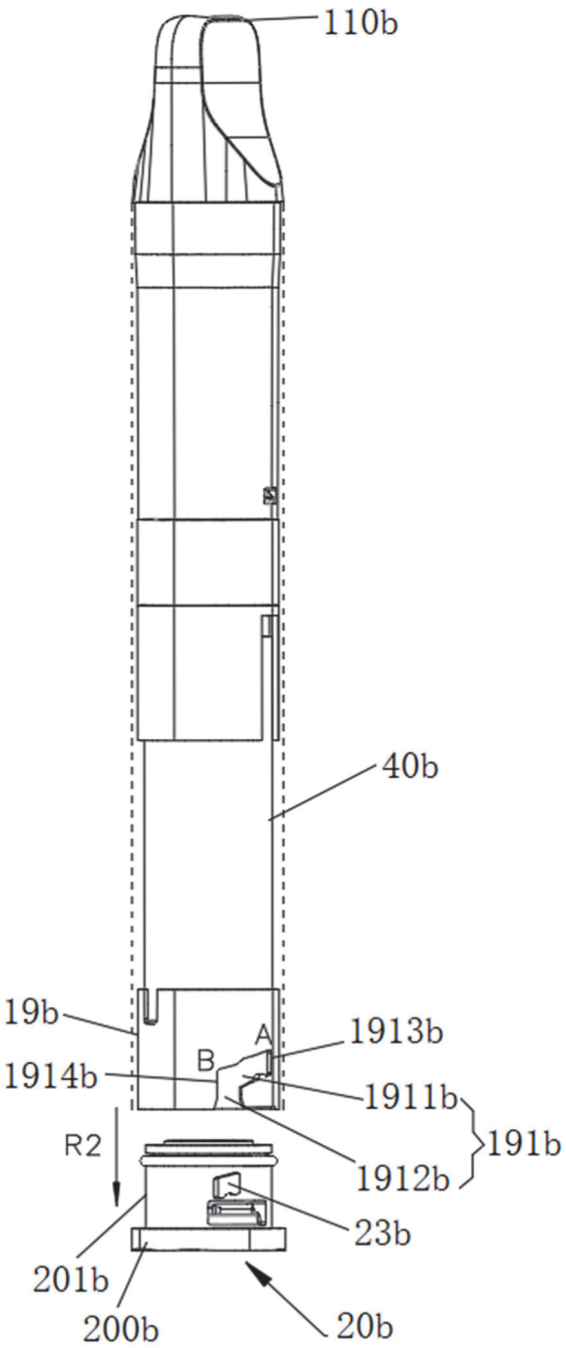
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FIG. 30

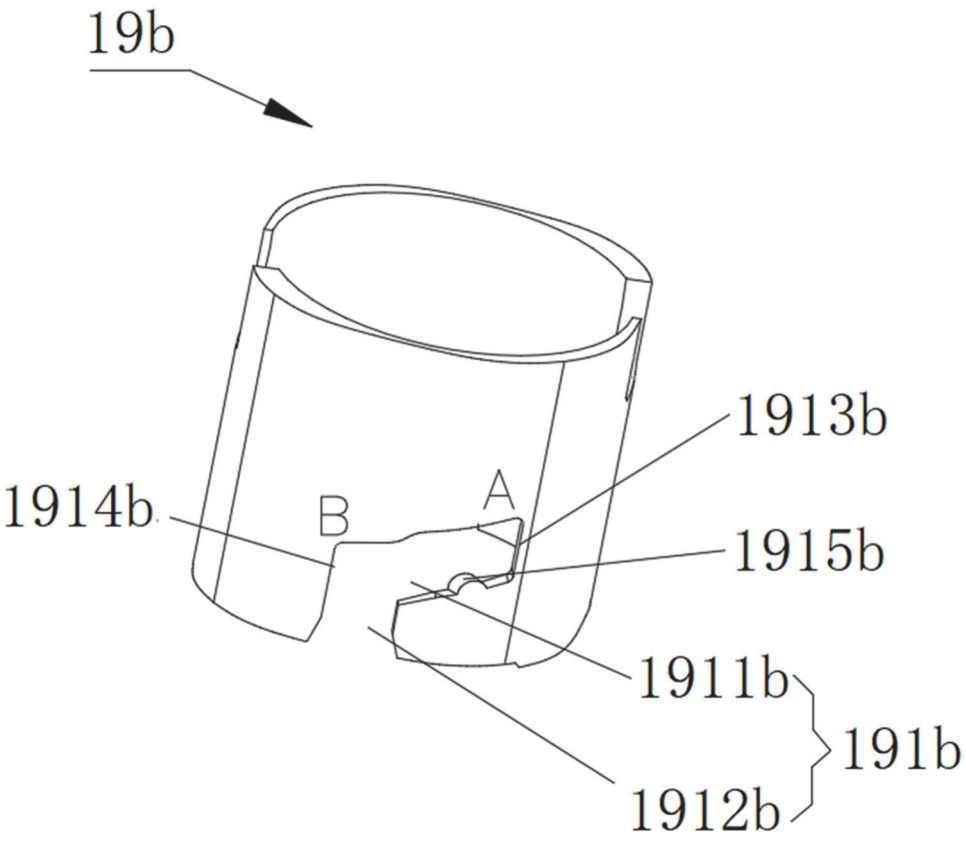
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FIG. 31

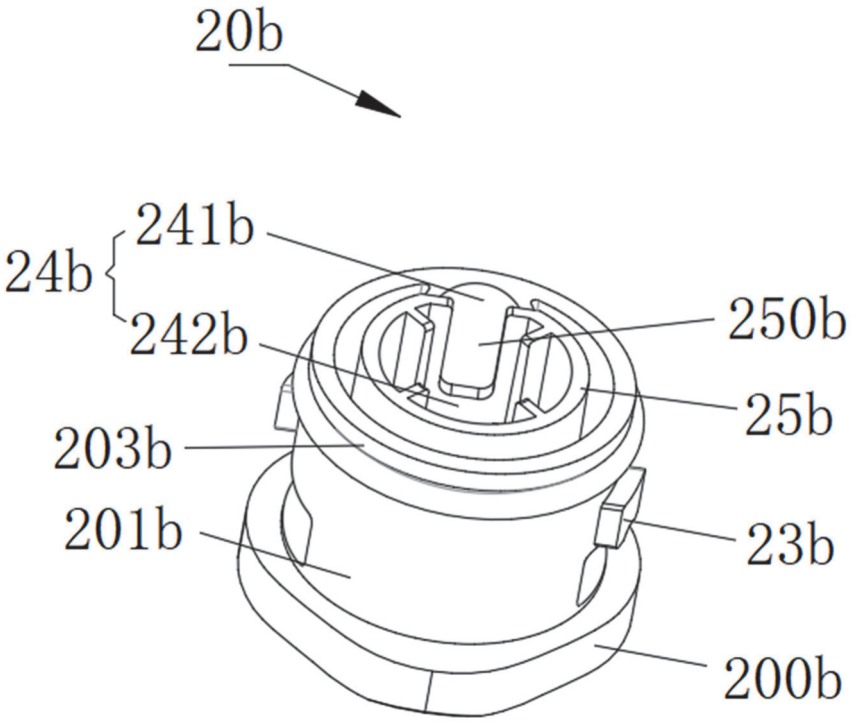
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FIG. 32

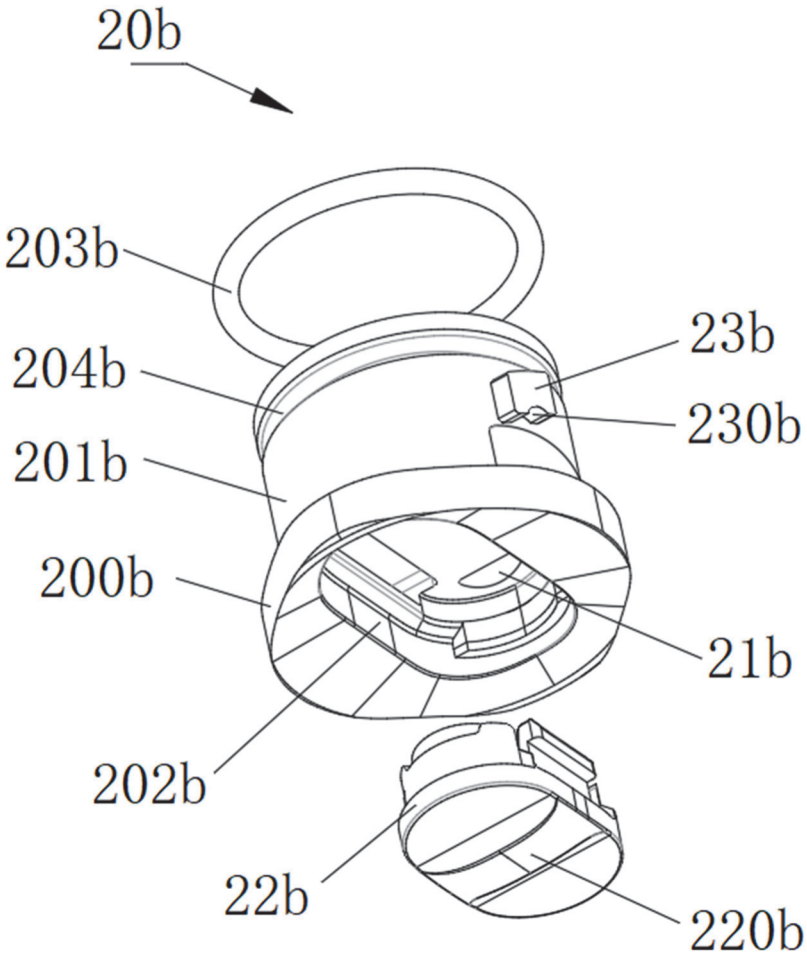

FIG. 33

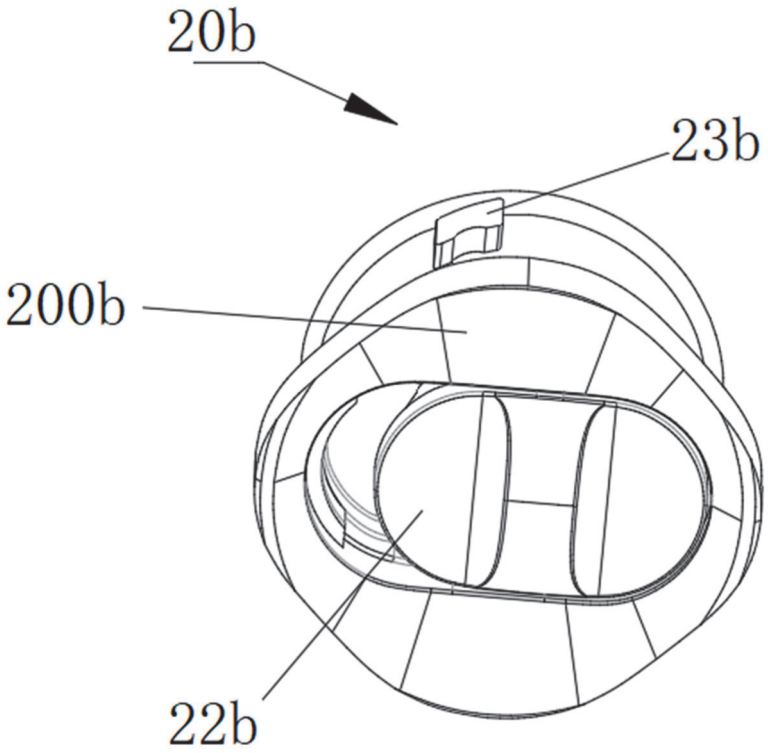

FIG. 34

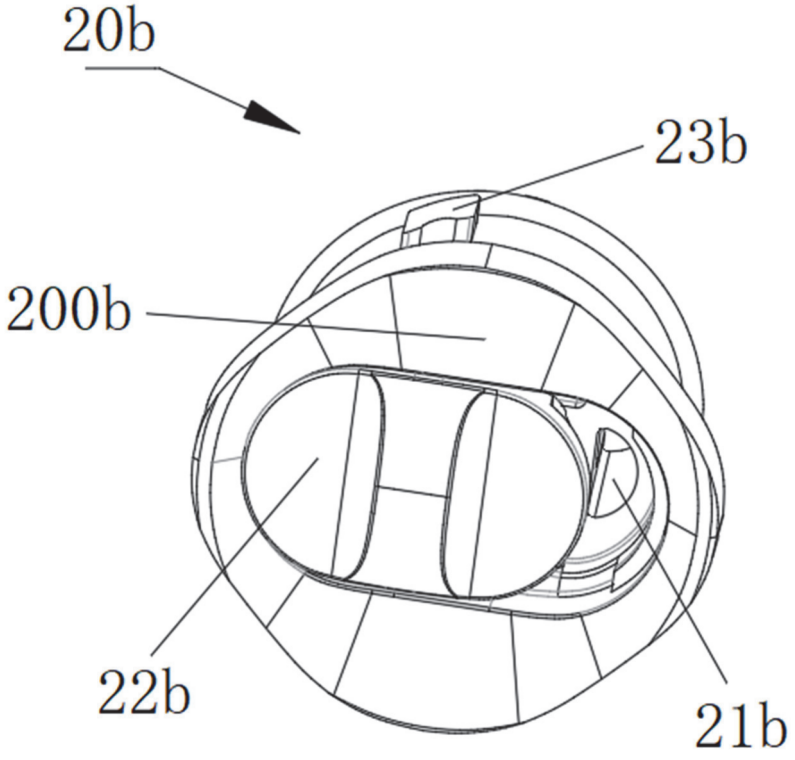

FIG. 35

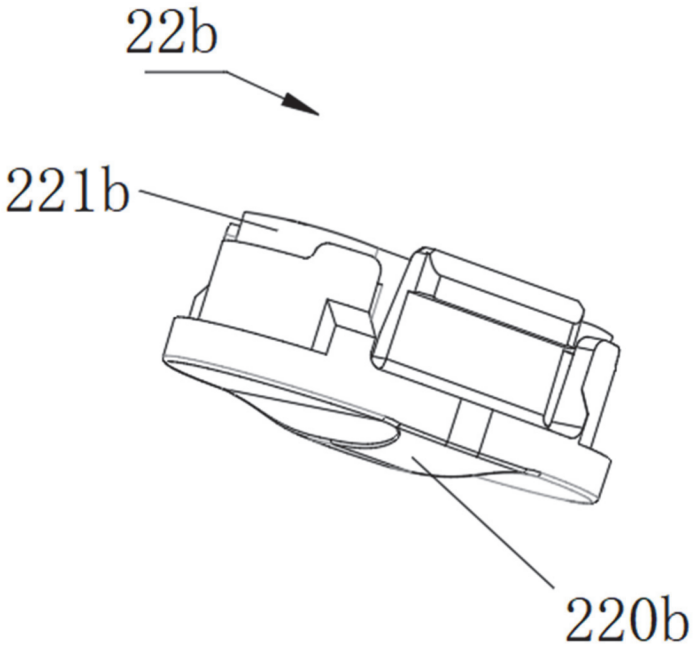

FIG. 36

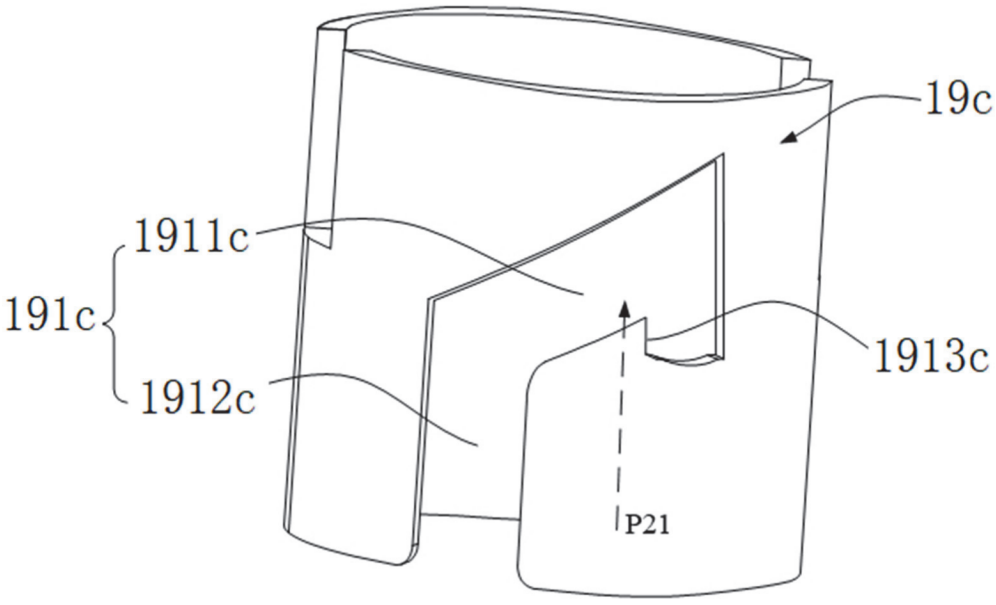

FIG. 37

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2024/110367

A. CLASSIFICATION OF SUBJECT MATTER

A24F40/46(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: 电子烟, 雾化, 电池, 电芯, 电源, 盖, 锁, 关闭, 打开, 更换, 拆卸, cigarette, electronic, atomiz+, battery, cell, power, cover, lock, close, open, change, disassembly

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 220712901 U (SHENZHEN FIRST UNION TECHNOLOGY CO., LTD.) 05 April 2024 (2024-04-05) description, paragraphs [0004]-[0036], and figures 1-23	1-14
PX	CN 220987657 U (SHENZHEN FIRST UNION TECHNOLOGY CO., LTD.) 24 May 2024 (2024-05-24) description, paragraphs [0059]-[0081], and figures 1-20	1-4, 15-20
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☑ Further documents are listed in the continuation of Box C. ☑ See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
31 October 2024	**06 November 2024**

Name and mailing address of the ISA/CN	Authorized officer
China National Intellectual Property Administration (ISA/CN) **China No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088**	Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2024/110367

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