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(54) **ATOMIZATION DEVICE AND ELECTRONIC CIGARETTE HAVING SAME**

(57) Disclosed are an atomization device (1) and an electronic cigarette having the same. The atomization device (1) includes a shell (100) and an atomization core (200). The shell (100) has a length direction, a width direction, and a thickness direction. The shell (100) is internally provided with an oil storage chamber (110), a gas passage (120) and an atomization chamber (130) communicating with the gas passage (120). The shell (100) is provided with a gas inlet (131) communicating with the atomization chamber (130) and a gas suction port (121) communicating with the gas passage (120). The atomization core (200) is arranged in the shell (100) and communicates with the oil storage chamber (110) and the atomization chamber (130) respectively. The atomization core (200) is configured to atomize a to-be-atomized medium in the oil storage chamber (110). Any two of the oil storage chamber (110), the atomization chamber (130), the atomization core (200) and the gas passage (120) are arranged along other directions of the shell (100) except for the thickness direction.

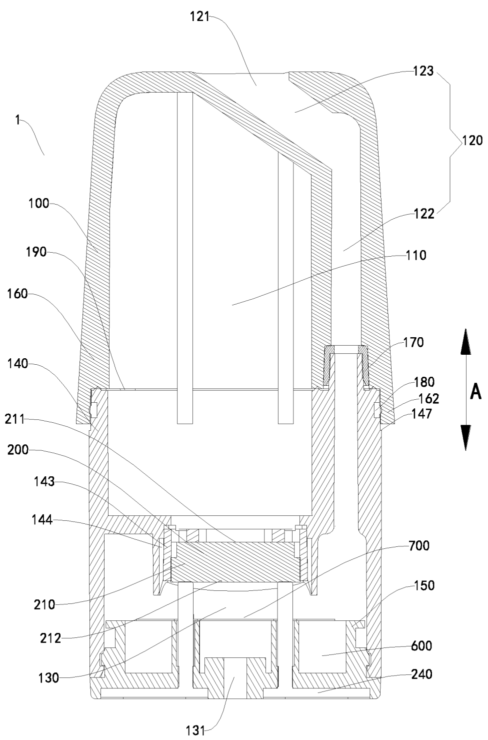

FIG. 1

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Description

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] The present disclosure claims priority to Chinese Patent Application No. 202111557607.6, filed on December 19, 2021 and entitled "ATOMIZATION DEVICE AND ELECTRONIC CIGARETTE HAVING SAME", the entire content of which is incorporated herein by reference.

FIELD

[0002] The present disclosure relates to the technical field of electronic cigarettes, and more specifically, to an atomization device and an electronic cigarette having the same.

BACKGROUND

[0003] With increasingly stringent tobacco control and restrictions worldwide, the demand for electronic cigarettes is increasing year by year. As a substitute for traditional tobacco, the electronic cigarettes not only can simulate the sensory experience of smoking, but also have a much lower degree of health damage than traditional tobacco consumption.

[0004] An electronic cigarette typically includes a cartridge and a cigarette rod. The cartridge is installed in the cigarette rod and can generate smoke that can be consumed by a human body. The cartridge includes an oil storage chamber, a gas passage, an atomization chamber and an atomization core. The oil storage chamber is internally provided with tobacco tar for generating the smoke. The tobacco tar enters the atomization chamber through the atomization core to be atomized into the smoke, and the smoke is inhaled by a user through the gas passage.

[0005] In related technologies, an atomization device used as a cartridge is poor in use experience. This is due to unreasonable structure and relative position settings of the oil storage chamber, the gas passage, the atomization chamber and the atomization core, which cannot effectively reduce a thickness of the atomization device and is not conducive to flattening design. The user cannot comfortably bite it with upper and lower lips and inhale during use.

SUMMARY

[0006] The present disclosure aims to resolve at least one of the technical problems in the related art. Therefore, an objective of the present disclosure is to provide an atomization device, which has advantages of being conducive to flattening design, more suitable for electronic cigarettes to improve comfort and use experience and the like.

[0007] The present disclosure further provides an electronic cigarette having the above atomization device.

[0008] In order to achieve the above objective, according to an embodiment of a first aspect of the present disclosure, an atomization device is provided, and includes: a shell. The shell has a length direction, a width direction and a thickness direction. The shell is internally provided with an oil storage chamber, a gas passage and an atomization chamber communicating with the gas passage. The shell is provided with a gas inlet communicating with the atomization chamber and a gas suction port communicating with the gas passage. The atomization device further includes an atomization core. The atomization core is arranged in the shell and communicates with the oil storage chamber and the atomization chamber respectively. The atomization core is configured to atomize a to-be-atomized medium in the oil storage chamber. Any two of the oil storage chamber, the atomization chamber, the atomization core and the gas passage are arranged along other directions of the shell except for the thickness direction.

[0009] The atomization device according to the embodiment of the present disclosure has advantages of being conducive to flattening design, more suitable for electronic cigarettes to improve comfort and use experience and the like.

[0010] According to some embodiments of the present disclosure, an atomization core sealing member is at most arranged between two side walls of the shell in the thickness direction and the atomization core.

[0011] According to some embodiments of the present disclosure, at least a portion of the gas passage and the oil storage chamber are arranged along the width direction of the shell. At least a portion of the gas passage and the atomization chamber are arranged along the length direction or the width direction of the shell. At least a portion of the gas passage and the atomization core are arranged along the width direction or the length direction of the shell.

[0012] According to some embodiments of the present disclosure, each of the atomization chamber and the atomization core, and the oil storage chamber are arranged along the length direction of the shell.

[0013] According to some embodiments of the present disclosure, the gas passage includes: a gas inlet section. The gas inlet section is located on a side of the shell in the width direction and extends along the length direction of the shell. The gas inlet section has a first end of the gas inlet section and a second end of the gas inlet section. The first end of the gas inlet section communicates with the atomization chamber. The gas passage further includes a gas outlet section. The gas outlet section is obliquely arranged relative to the length direction of the shell. The gas outlet section has a first end of the gas outlet section and a second end of the gas outlet section. The first end of the gas outlet section communicates with the second end of the gas inlet section. The second end of the gas outlet section communicates with the gas suction port.

[0014] According to some embodiments of the present disclosure, the gas passage includes: a gas inlet section. The gas inlet section is located on the side of the shell in the width direction and extends along the length direction of the shell. The gas inlet section has a first end of the gas inlet section and a second end of the gas inlet section. The first end of the gas inlet section communicates with the atomization chamber. The gas passage further includes a gas outlet section. The gas outlet section extends along the width direction of the shell. The gas outlet section has the first end of the gas outlet section and the second end of the gas inlet section. The first end of the gas outlet section communicates with the second end of the gas inlet section. The second end of the gas outlet section communicates with the gas suction port.

[0015] According to some embodiments of the present disclosure, the gas inlet is located on an end surface of an end of the shell in the length direction, or the gas inlet is located on a side wall of the shell in the width direction and close to an end of the shell in the length direction. The second end of the gas outlet section and the gas suction port are located at a center of an end surface of another end of the shell in the length direction.

[0016] According to some embodiments of the present disclosure, the gas inlet is located at a center of an end surface of an end of the shell in the length direction. The second end of the gas outlet section and the gas suction port are located at a center of an end surface of another end of the shell in the length direction.

[0017] According to some embodiments of the present disclosure, the shell is internally provided with an atomization core installation structure. The atomization core is installed on the atomization core installation structure.

[0018] According to some embodiments of the present disclosure, the shell is internally provided with a vent. The vent is a through hole formed in a separator, or the vent is a vent channel formed between the separator and an inner wall of the shell. The gas passage communicates with the atomization chamber through the vent.

[0019] According to some embodiments of the present disclosure, the atomization core and the vent are staggered along the width direction.

[0020] According to some embodiments of the present disclosure, the vent is closer to the inner wall of the shell relative to the atomization core.

[0021] According to some embodiments of the present disclosure, the atomization core installation structure is integrally formed with at least a portion of the shell.

[0022] According to some embodiments of the present disclosure, the shell includes: a shell body. The gas suction port, the oil storage chamber and the gas passage are arranged on the shell body. The shell further includes a base. The base is located at an end of the shell body in the length direction of the shell and is in sealing connection with the shell body. The gas inlet is formed in the base. The atomization chamber is defined by the shell body and the base jointly.

[0023] According to some embodiments of the present disclosure, the shell includes: a gas inlet shell body. The shell includes the base. The base is located at an end of the gas inlet shell body in the length direction of the shell and is in sealing connection with the gas inlet shell body. The gas inlet is formed in the base. The atomization chamber is defined by the gas inlet shell body and the base jointly. The shell further includes a gas outlet shell body. The gas outlet shell body is located at another end of the gas inlet shell body in the length direction of the shell and is in sealing connection with the gas inlet shell body. The gas suction port is formed in the gas outlet shell body. The oil storage chamber and the gas passage are both defined by the gas inlet shell body and the gas outlet shell body jointly.

[0024] According to some embodiments of the present disclosure, the gas inlet shell body is configured with the atomization core installation structure which is integrally formed with the gas inlet shell body. The atomization core is installed on the atomization core installation structure.

[0025] According to some embodiments of the present disclosure, the atomization core installation structure is a positioning plate. The positioning plate defines an installation groove by surrounding. The positioning plate defines the installation groove in the shell. The positioning plate at least forms two opposite side walls of the installation groove. The atomization core is installed in the installation groove.

[0026] According to some embodiments of the present disclosure, the positioning plate forms two opposite side walls of the installation groove in the width direction of the shell. Two side walls of the shell in the thickness direction form two opposite side walls of the installation groove in the thickness direction of the shell.

[0027] According to some embodiments of the present disclosure, the positioning plate includes: a limiting plate. The limiting plate stops the atomization core on a side of the oil storage chamber. The limiting plate is provided with a liquid through hole. The atomization core communicates with the oil storage chamber through the liquid through hole. The positioning plate further includes a side plate. The side plate is connected to the limiting plate and at least forms two opposite side walls of the installation groove. The side plate and the limiting plate jointly define the installation groove.

[0028] According to some embodiments of the present disclosure, the limiting plate extends along a circumferential direction of the atomization core into an annulus and defines the liquid through hole by surrounding. The side plate forms two opposite side walls of the installation groove in the width direction of the shell, or the side plate extends along the circumferential direction of the atomization core to surround the atomization core.

[0029] According to some embodiments of the present disclosure, the atomization core sealing member is arranged between the atomization core and an inner wall of the installation groove. The atomization core is in interference fit with the installation groove through the atomization core sealing member.

[0030] According to some embodiments of the present disclosure, a ventilation channel is arranged on the inner wall of the installation groove. The ventilation channel communicates with the atomization chamber and the oil storage chamber respectively. The atomization core sealing member has an elastic piece corresponding to the ventilation channel in position. In a case that a pressure of the atomization chamber is greater than a pressure of the oil storage chamber, the elastic piece is deformed under a pressure difference of the two to open the ventilation channel. In a case that the pressure of the atomization chamber is not greater than the pressure of the oil storage chamber, the elastic piece blocks the ventilation channel.

[0031] According to some embodiments of the present disclosure, the atomization core is configured with an avoidance notch. The avoidance notch provides a deformation space for the elastic piece.

[0032] According to some embodiments of the present disclosure, the ventilation channel is formed by a groove formed in an inner side wall and/or an inner bottom wall of the installation groove.

[0033] According to some embodiments of the present disclosure, the ventilation channel is multiple grooves formed at intervals along a circumferential direction of the atomization core sealing member. The elastic piece extends along the circumferential direction of the atomization core sealing member into an annulus.

[0034] According to some embodiments of the present disclosure, a length of the groove ranges from 0.2 mm to 0.6 mm; and/or a width of the groove ranges from 0.2 mm to 0.6 mm; and/or a depth of the groove is less than 0.4 mm.

[0035] According to some embodiments of the present disclosure, one of the gas inlet shell body and the gas outlet shell body is configured with a plug and another one is configured with a slot. The plug is inserted into the slot.

[0036] According to some embodiments of the present disclosure, the plug and the slot are both arranged around the gas passage.

[0037] According to some embodiments of the present disclosure, a cross section of the plug and a cross section of the slot are configured to be in non-circular shapes.

[0038] According to some embodiments of the present disclosure, a gas passage sealing member is arranged between a peripheral surface of the plug and an inner wall surface of the slot.

[0039] According to some embodiments of the present disclosure, the gas passage sealing member includes: a side wall. The side wall is arranged between the peripheral surface of the plug and the inner wall surface of the slot. The gas passage sealing member further includes an end edge. The end edge is connected to the side wall and arranged between an end surface of the plug and a bottom wall of the slot. The end edge defines a vent port for avoiding the gas passage by surrounding.

[0040] According to some embodiments of the present disclosure, the atomization device further includes: a communicating pipe. A portion of the communicating pipe is inserted into the gas passage of the gas inlet shell body. Another portion of the communicating pipe is inserted into the gas passage of the gas outlet shell body.

[0041] According to some embodiments of the present disclosure, the atomization device further includes: a gas inlet sealing member. The gas inlet sealing member is arranged between the communicating pipe and an inner wall of the gas passage of the gas inlet shell body. The atomization device further includes a gas outlet sealing member. The gas outlet sealing member is arranged between the communicating pipe and an inner wall of the gas passage of the gas outlet shell body.

[0042] According to some embodiments of the present disclosure, the gas inlet sealing member sleeves a periphery of an end of the communicating pipe. The gas outlet sealing member sleeves a periphery of another end of the communicating pipe. The gas inlet sealing member is configured with a gas inlet stopper stopping on an end surface of the end of the communicating pipe; and/or the gas outlet sealing member is configured with a gas outlet stopper stopping on an end surface of the another end of the communicating pipe.

[0043] According to some embodiments of the present disclosure, a peripheral surface of the gas inlet stopper is inclined gradually towards a central axis of the communicating pipe along a direction away from the communicating pipe; and/or a peripheral surface of the gas outlet stopper is inclined gradually towards the central axis of the communicating pipe along the direction away from the communicating pipe.

[0044] According to some embodiments of the present disclosure, one of the gas inlet shell body and the gas outlet shell body is configured with a sealing ring edge extending along a circumferential direction thereof. The sealing ring edge surrounds a peripheral surface of another one of the gas inlet shell body and the gas outlet shell body.

[0045] According to some embodiments of the present disclosure, the another one of the gas inlet shell body and the gas outlet shell body is configured with a sealing ring groove extending along a circumferential direction thereof. The sealing ring edge is inserted into the sealing ring groove.

[0046] According to some embodiments of the present disclosure, a shell sealing member is arranged between the peripheral surface of the another one of the gas inlet shell body and the gas outlet shell body and an inner peripheral surface of the sealing ring edge.

[0047] According to some embodiments of the present disclosure, the peripheral surface of the another one of the gas inlet shell body and the gas outlet shell body is configured with a sealing groove extending along a circumferential direction thereof. The shell sealing member is assembled into the sealing groove. Or, the inner peripheral surface of the sealing ring edge is configured with the sealing groove extending along a circumferential direction thereof. The shell sealing member is assembled into the sealing groove.

[0048] According to some embodiments of the present disclosure, a side of the shell sealing member facing away from the sealing groove is configured with a sealing rib extending along a circumferential direction thereof.

[0049] According to some embodiments of the present disclosure, the shell sealing member is in integral injection moulding with one of the gas inlet shell body and the gas outlet shell body.

[0050] According to some embodiments of the present disclosure, the gas inlet shell body is in sealing connection with the gas outlet shell body through ultrasonic welding.

[0051] According to some embodiments of the present disclosure, one of an end surface of the gas inlet shell body facing the gas outlet shell body and an end surface of the gas outlet shell body facing the gas inlet shell body is provided with a welding line. The welding line extends along a circumferential direction of the shell.

[0052] According to some embodiments of the present disclosure, a cross section of the welding line is triangular.

[0053] According to some embodiments of the present disclosure, the atomization device further includes: a liquid adsorbing body. The liquid adsorbing body is installed on the base and configured to adsorb a condensed to-be-atomized medium.

[0054] According to some embodiments of the present disclosure, the atomization device further includes: a gas inlet spreader plate. The gas inlet spreader plate is installed on the base and covers the gas inlet. The gas inlet spreader plate is provided with multiple spreading through holes.

[0055] According to some embodiments of the present disclosure, the atomization device further includes: a suction port cover. The suction port cover is installed on the shell. The suction port cover is provided with an opening communicating with the gas suction port. A portion of an inner wall of the gas passage is formed by the suction port cover.

[0056] According to some embodiments of the present disclosure, a surface of an end of the shell provided with the gas suction port is configured with a cover groove. The suction port cover is installed on the cover groove.

[0057] According to some embodiments of the present disclosure, the atomization core includes: a porous body. The porous body has a liquid adsorbing surface and an atomization surface. The liquid adsorbing surface communicates with the oil storage chamber. The atomization surface communicates with the atomization chamber. The porous body has multiple liquid adsorbing holes enabling the liquid adsorbing surface and the atomization surface to communicate. The atomization core further includes a heating body. The heating body is arranged on the atomization surface of the porous body.

[0058] According to some embodiments of the present disclosure, the heating body is connected with an abutting sheet. The abutting sheet is energized with the outside of the atomization device through a conductive member.

[0059] According to an embodiment of a second aspect of the present disclosure, an electronic cigarette is provided, and includes the atomization device according to the embodiment of the first aspect of the present disclosure.

[0060] The electronic cigarette according to the embodiment of the second aspect of the present disclosure has advantages of high comfort, good use experience and the like by using the atomization device according to the embodiment of the first aspect of the present disclosure.

[0061] The additional aspects and advantages of the present disclosure will be provided in the following description, some of which will become apparent from the following description or may be learned from practices of the present disclosure.

BRIEF DESCRIPTION OF THE DRAWINGS

[0062] The foregoing and/or additional aspects and advantages of the present disclosure will become apparent and comprehensible from the descriptions of the embodiments with reference to the following accompanying drawings, in which:

FIG. 1 is a sectional view of an atomization device according to a first optional embodiment of the present disclosure.

FIG. 2 is an exploded view of an atomization device according to a first optional embodiment of the present disclosure.

FIG. 3 is a sectional view of an atomization device according to a second optional embodiment of the present disclosure.

FIG. 4 is an exploded view of an atomization device according to a second optional embodiment of the present disclosure.

FIG. 5 is a sectional view of an atomization device according to a third optional embodiment of the present disclosure.

FIG. 6 is an exploded view of an atomization device according to a third optional embodiment of the present disclosure.

FIG. 7 is a sectional view of an atomization device according to a fourth optional embodiment of the present disclosure.

FIG. 8 is an exploded view of an atomization device according to a fourth optional embodiment of the present disclosure.

FIG. 9 is a sectional view of an atomization device according to a fifth optional embodiment of the present disclosure.

FIG. 10 is an exploded view of an atomization device according to a fifth optional embodiment of the present disclosure.

FIG. 11 is a sectional view of an atomization device according to a sixth optional embodiment of the present disclosure.

FIG. 12 is an exploded view of an atomization device according to a sixth optional embodiment of the present disclosure.

FIG. 13 is a sectional view of an atomization device according to a seventh optional embodiment of the present disclosure.

FIG. 14 is an exploded view of an atomization device according to a seventh optional embodiment of the present disclosure.

FIG. 15 is a sectional view of an atomization device according to an eighth optional embodiment of the present disclosure.

FIG. 16 is an exploded view of an atomization device according to an eighth optional embodiment of the present disclosure.

FIG. 17 is a schematic structural diagram of a gas outlet shell body of an atomization device according to an embodiment of the present disclosure.

FIG. 18 is a sectional view of a gas inlet shell body of an atomization device according to an embodiment of the present disclosure.

FIG. 19 is a schematic structural diagram of a gas inlet shell body of an atomization device according to an embodiment of the present disclosure.

FIG. 20 is a schematic structural diagram of an atomization core sealing member of an atomization device according to an embodiment of the present disclosure.

FIG. 21 is a schematic diagram of connection among a porous body, a heating body and an abutting sheet of an atomization device according to an embodiment of the present disclosure.

FIG. 22 is a schematic structural diagram of a gas inlet spreader plate of an atomization device according to an embodiment of the present disclosure.

FIG. 23 is a schematic structural diagram of a gas passage sealing member of an atomization device according to an embodiment of the present disclosure.

FIG. 24 is a schematic structural diagram of a gas outlet sealing member of an atomization device according to an embodiment of the present disclosure.

FIG. 25 is a schematic structural diagram of a gas inlet sealing member of an atomization device according to an embodiment of the present disclosure.

FIG. 26 is a schematic structural diagram of a gas outlet shell body of an atomization device according to another optional embodiment of the present disclosure.

FIG. 27 is a schematic structural diagram of a suction port cover of an atomization device according to another optional embodiment of the present disclosure.

DETAILED DESCRIPTION

[0063] Embodiments of the present disclosure are described below in detail. Examples of the embodiments are shown in accompanying drawings, and same or similar numerals throughout indicate same or similar elements or elements with same or similar functions. The embodiments described below with reference to the accompanying drawings are exemplary, and are merely intended to explain the present disclosure and cannot be construed as a limitation to the present disclosure.

[0064] In the description of the present disclosure, it needs to be understood that orientation or position relationships indicated by terms such as "center", "longitudinal", "transverse", "length", "width", "thickness", "upper", "lower", "front", "rear", "left", "right", "vertical", "horizontal", "top", "bottom", "inner", "outer", "clockwise", "counterclockwise", "axial", "radial", "circumferential" are based on orientation or position relationships shown in the accompanying drawings, and are used only for conveniently describing the present disclosure and simplifying description, rather than indicating or implying that the mentioned device or element must have a particular orientation or must be constructed and operated in a particular orientation. Therefore, such terms should not be construed as limiting of the present disclosure.

[0065] In the description of the present disclosure, "a number of' means two or more than two, and "several" means one or more.

[0066] An atomization device 1 according to the embodiments of the present disclosure is described below with reference to the accompanying drawings.

[0067] As shown in FIG. 1 to FIG. 27, the atomization device 1 according to the embodiments of the present disclosure includes a shell 100 and an atomization core 200.

[0068] The shell 100 has a length direction (a direction indicated by an arrow A in the figure), a width direction (a direction indicated by an arrow B in the figure) and a thickness direction (a direction indicated by an arrow C). The length direction A, the width direction B and the thickness direction C are perpendicular to one another, and a size relationship among the three is: a maximum size of the shell 100 along the thickness direction C is smaller than a maximum size of the shell 100 along the length direction A, and the maximum size of the shell 100 along the thickness direction C is smaller than a maximum size of the shell 100 along the width direction B. That is to say, the maximum size of the shell 100 along the thickness direction C is minimum. The shell 100 is in a tabular shape. The maximum size of the shell 100 along the length direction A and the maximum size of the shell 100 along the width direction B are determined based on actual situations. That is, the maximum size of the shell 100 along the length direction A may be greater than or equal to the maximum size of the shell 100 along the width direction B. The maximum size of the shell 100 along the length direction A may also be smaller than the maximum size of the shell 100 along the width direction B. When the atomization device 1 is used as a cartridge to be applied to an electronic cigarette, the length direction A is usually consistent with a length direction of a cigarette rod. That is, the length direction A is an extension direction from the cartridge to the cigarette rod.

[0069] An oil storage chamber 110, a gas passage 120 and an atomization chamber 130 communicating with the gas passage 120 are defined in the shell 100. The shell 100 is provided with a gas inlet 131 communicating with the atomization chamber 130 and a gas suction port 121 communicating with the gas passage 120. The atomization core 200 is arranged in the shell 100 and communicates with the oil storage chamber 110 and the atomization chamber 130 respectively. According to one embodiment of the present application, the atomization core 200 is configured to atomize a to-be-atomized medium in the oil storage chamber 110. The medium atomized by the atomization core 200 enters the gas passage 120 through the atomization chamber 130. The atomization core 200 is located between the oil storage chamber 110 and the atomization chamber 130.

[0070] Any two of the oil storage chamber 110, the atomization chamber 130, the atomization core 200 and the gas passage 120 are arranged along other directions of the shell 100 except for the thickness direction. In other words, any two of the oil storage chamber 110, the atomization chamber 130, the atomization core 200 and the gas passage 120 are not arranged in the thickness direction of the shell 100. That is, for any area of the shell, at most one of the oil storage chamber 110, the atomization chamber 130, the atomization core 200 and the gas passage 120 exists in the thickness direction of this area.

[0071] The following is an example to describe a working process of the atomization device 1 when used as a cartridge to be applied to an electronic cigarette.

[0072] After the atomization device 1 is combined with a cigarette rod, here it needs to be understood that the atomization device 1 and the cigarette rod are arranged to be of a split structure in some electronic cigarettes, and are detachably combined. The atomization device 1 and the cigarette rod are also arranged to be of an undetachable structure in some electronic cigarettes, which is not specifically limited here. A user inhales through a gas suction port 121, which is sensed by a pneumatic sensor (such as a transmitter) in the cigarette rod. The sensor sends a signal to form a conductive connection between a power supply in the cigarette rod and the atomization core 200. The atomization core 200 starts to work (such as heating), and a to-be-atomized medium (such as tobacco tar) in the oil storage chamber 110 is heated by the atomization core 200. Smoke (including but not limited to gasoloid, a suspension liquid, low-temperature vapor and a volatile gas) is formed in the atomization chamber 130 and enters the atomization chamber 130. An external gas enters the atomization chamber 130 from the gas inlet 131 to be mixed with the smoke, and then is consumed by the user from the gas suction port 121 through the gas passage 120.

[0073] According to the atomization device 1 of the embodiment of the present disclosure, the shell 100 is internally provided with the oil storage chamber 110, the gas passage 120 and the atomization chamber 130 communicating with the gas passage 120. The shell 100 is provided with the gas inlet 131 communicating with the atomization chamber 130 and the gas suction port 121 communicating with the gas passage 120. The atomization core 200 is arranged in the shell 100 and located between the oil storage chamber 110 and the atomization chamber 130. The to-be-atomized medium in the oil storage chamber 110 is atomized by the atomization core 200 and enters the gas passage 120 through the atomization chamber 130. In this way, when the user inhales from the gas suction port 121, the to-be-atomized medium in the oil storage chamber 110 may enter the atomization chamber 130 from the atomization core 200. The to-be-atomized medium is atomized into an atomization medium on a side of the atomization core 200 facing the atomization chamber 130. The atomization medium is mixed with air entering the gas inlet 131 and then enters an oral cavity of the user from the gas passage 120 and the gas suction port 121, which meets use demands of the user. When the user stops inhaling from the gas suction port 121, the to-be-atomized medium in the oil storage chamber 110 may stop entering the atomization chamber 130 from the atomization core 200, so as to avoid ineffective consumption of the to-be-atomized medium in the oil storage chamber 110, improve a utilization rate of the to-be-atomized medium, and prolong a service life of the atomization device 1.

[0074] Moreover, any two of the oil storage chamber 110, the atomization chamber 130, the atomization core 200 and the gas passage 120 are arranged along other directions of the shell 100 except for the thickness direction. In this way, two sides of the atomization core 200 in the thickness direction of the shell 100 may be directly fixed to an inner wall of the shell 100. Since the oil storage chamber 110, the atomization chamber 130 and the gas passage 120 are all spaces, volumes of the oil storage chamber 110, the atomization chamber 130 and the gas passage 120 can easily change with a size of a thickness of the shell 100, and thus a minimum thickness of the shell 100 may be determined only based on a size of the atomization core 200 in the thickness direction of the shell 100. In this way, the thickness of the shell 100 can be greatly reduced, which is conducive to the flattening arrangement of the atomization device 1, making the atomization device 1 lighter and thinner. In addition, when the user inhales from the gas suction port 121, two side surfaces of the shell 100 in the thickness direction are usually in contact with an upper lip and a lower lip of the human body respectively, and in a case that the thickness of the shell 100 is reduced, a size of the oral cavity of the user that needs to be opened can also be reduced, making it more labor-saving and comfortable to use.

[0075] In addition, when the atomization device 1 is applied to the electronic cigarette, the upper and lower lips of the user bite on the two sides of the shell 100 in the thickness direction. Since the shell 100 is flatter, it can be easy for the upper and lower lips to be closely attached to the shell 100, making it difficult to have gaps between the upper and lower lips and the shell 100. In this way, during use, on the one hand, when the user inhales, an effective airflow can be formed to trigger the sensor (such as a transmitter) in the cigarette rod, making the atomization core 200 work timely. On the other hand, during consuming, a situation that unnecessary external air is mixed with the smoke, resulting in a light taste can be avoided, so as to improve the use experience.

[0076] Therefore, the atomization device 1 according to the embodiment of the present disclosure has advantages of being conducive to flattening design, more suitable for electronic cigarettes to improve comfort and use experience and the like.

[0077] According to some specific embodiments of the present disclosure, at most an atomization core sealing member 143 is arranged between two side walls of the shell 100 in the thickness direction and the atomization core 200. That is, no additional component may be arranged between the two side walls of the shell 100 in the thickness direction and the atomization core 200, or only the atomization core sealing member 143 is arranged between the two side walls of the shell 100 in the thickness direction and the atomization core 200. The atomization core sealing member 143 is configured to seal a gap between the atomization core 200 and the shell, to separate the oil storage chamber 110 and the atomization chamber 130. In this way, two side walls of the atomization core 200 in the thickness direction of the shell 100 may be fixed to the inner wall of the shell 100 directly or only through the atomization core sealing member 143. No additional component, such as a bracket, is arranged between the two side walls of the shell 100 in the thickness direction and the atomization core 200, thereby further reducing the size of the thickness of the atomization device 1, so as to further improve comfort and user experience. It may be understood that in this embodiment, the atomization core sealing member 143 may be of a composite structure, such as adopting a hard framework internally and being wrapped with a flexible member externally, both of which are in integral injection moulding. The atomization core sealing member 143 may also be made of a single material.

[0078] According to some specific embodiments of the present disclosure, as shown in FIG. 1 to FIG. 15, at least a portion of the gas passage 120 and the oil storage chamber 110 are arranged along the width direction of the shell 100. At least a portion of the gas passage 120 and the atomization chamber 130 are arranged along the length direction or the width direction of the shell 100. At least a portion of the gas passage 120 and the atomization core 200 are arranged along the width direction or the length direction of the shell 100. A size of the oil storage chamber 110 in the width direction of the shell 100 may exceed 1/2 of a width of the shell 100.

[0079] In this way, the gas passage 120 mainly occupies a space of the shell 100 in the width direction and/or the length direction, without affecting the thickness of the shell 100. A reliable communication between the gas passage 120 and the atomization chamber 130 can be ensured. In addition, avoidance can be provided for the large capacity design of the oil storage chamber 110, so as to increase an oil storage capacity and a contact area between the tobacco tar and the atomization core 200.

[0080] According to some specific embodiments of the present disclosure, as shown in FIG. 1 to FIG. 15, each of the atomization chamber 130 and the atomization core 200, and the oil storage chamber 110 are arranged along the length direction of the shell 100. In this way, according to the arrangement of the atomization chamber 130, the atomization core 200 and the oil storage chamber 110, a length of the shell 100 can be reasonably utilized, without occupying the space of the shell 100 in the width direction excessively. Therefore, the shell 100 is controlled to have an appropriate width to match a width of comfortable opening of the user's mouth during use.

[0081] In some embodiments of the present disclosure, the gas passage 120 includes a gas inlet section 122 and a gas outlet section 123. The gas inlet section 122 is located on a side of the shell 100 in the width direction and extends along the length direction of the shell 100. The gas inlet section 122 has a first end of the gas inlet section and a second end of the gas inlet section. The first end of the gas inlet section communicates with the atomization chamber 130. The gas outlet section 123 extends along the width direction of the shell 100. The gas outlet section 123 has a first end of the gas outlet section and a second end of the gas outlet section. The first end of the gas outlet section communicates with the second end of the gas inlet section. The second end of the gas outlet section 123 communicates with the gas suction port 121.

[0082] By configuring the gas inlet section 122 in the width direction of the shell 100, the space of the shell 100 in the thickness direction cannot be occupied. Therefore, the thickness of the shell 100 can be reduced. The size of the user's mouth that needs to be opened is smaller, and the comfort can be improved. In addition, since the width of the shell 100 is greater than the thickness of the shell 100, there is a larger space in the shell 100 in its width direction for arranging the atomization core 200 and the oil storage chamber 110. In this way, the contact area between the atomization core 200 and the to-be-atomized medium in the oil storage chamber 110 is larger. The to-be-atomized medium can enter the atomization chamber 130 more smoothly from the oil storage chamber 110 through the atomization core 200. Therefore, a situation of the to-be-atomized medium with poor flow, causing damage to the atomization core 200 can be avoided, which is conducive to prolonging a service life of the atomization core 200.

[0083] In addition, the gas outlet section 123 extends along the width direction of the shell 100. In this way, the gas suction port 121 is arranged more flexibly in the width direction of the shell 100. For example, it may be closer to a center of the shell 100 in the width direction and a center of the shell 100 in the thickness direction. This not only makes the shell 100 more beautiful, but also makes gas out of the gas suction port 121 flow in the oral cavity of the user more smoothly, which is not prone to being blocked by an inner wall of the oral cavity, a tongue and the like.

[0084] In some other embodiments of the present disclosure, as shown in FIG. 1 to FIG. 15, the gas passage 120 includes a gas inlet section 122 and a gas outlet section 123. The gas inlet section 122 is located on a side of the shell 100 in the width direction and extends along the length direction of the shell 100. The gas inlet section 122 has a first end of the gas inlet section and a second end of the gas inlet section. The first end of the gas inlet section communicates with the atomization chamber 130. The gas outlet section 123 is arranged obliquely relative to the length direction of the shell 100. The gas outlet section 123 has a first end of the gas outlet section and a second end of the gas outlet section. The first end of the gas outlet section communicates with the second end of the gas inlet section 122. The second end of the gas outlet section 123 communicates with the gas suction port 121.

[0085] By configuring the gas inlet section 122 in the width direction of the shell 100, the space of the shell 100 in the thickness direction cannot be occupied. Therefore, the thickness of the shell 100 can be reduced. The size of the user's mouth that needs to be opened is smaller, and the use comfort can be improved. In addition, since the width of the shell 100 is greater than the thickness of the shell 100, there is a larger space in the shell 100 in its width direction for arranging the atomization core 200 and the oil storage chamber 110. In this way, the contact area between the atomization core 200 and the to-be-atomized medium in the oil storage chamber 110 is larger. The to-be-atomized medium can enter the atomization chamber 130 more smoothly from the oil storage chamber 110 through the atomization core 200. Therefore, a situation of the to-be-atomized medium with poor flow, causing damage to the atomization core 200 can be avoided, which is conducive to prolonging a service life of the atomization core 200.

[0086] In addition, the gas outlet section 123 is arranged obliquely relative to the length direction of the shell 100. In this way, the gas suction port 121 is arranged more flexibly in the width direction of the shell 100. For example, it may be closer to a center of the shell 100 in the width direction and a center of the shell 100 in the thickness direction. This not only makes the shell 100 more beautiful, but also makes outlet-gas from the gas suction port 121 flow more smoothly in the oral cavity of the user, which is not prone to being blocked by an inner wall of the oral cavity and a tongue.

[0087] In addition, since an included angle between the gas outlet section 123 and the gas inlet section 122 may be an obtuse angle, the gas in the gas passage 120 flows more smoothly. Therefore, a situation that flowing of the atomized to-be-atomized medium is blocked at a corner between the gas outlet section 123 and the gas inlet section 122 can be avoided.

[0088] In some embodiments of the present disclosure, the gas inlet 131 is located on an end surface of an end of the shell 100 in the length direction, or the gas inlet 131 is located on a side wall of the shell 100 in the width direction and close to an end of the shell 100 in the length direction. The second end of the gas outlet section and the gas suction port 121 are located on an end surface of another end of the shell 100 in the length direction.

[0089] In some specific embodiments of the present disclosure, as shown in FIG. 17, the gas inlet 131 is located at a center of an end surface of an end of the shell 100 in the length direction. The another end of the gas outlet section 123 and the gas suction port 121 are located at a center of an end surface of another end of the shell 100 in the length direction. In other words, the gas inlet 131 and the gas suction port 121 are arranged at the two ends of the shell 100 in the length direction respectively. Therefore, spaces of the end surfaces of the shell 100 and a space of the shell 100 in the length direction can be fully utilized. The shell 100 can avoid oil and gas leakage in its width direction and thickness direction. In addition, the gas inlet 131 and the gas suction port 121 are located at centers of the end surfaces of the shell 100 respectively, which facilitates communication and uniformity of inlet-gas. Moreover, the outlet-gas from the gas suction port 121 flows smoothly in the oral cavity of the user, and the use comfort is high.

[0090] For example, in some atomization devices in related technologies, the gas inlet is bias arranged on a side opposite to the gas passage, and a gap between the atomization device and the cigarette rod is utilized for gas entering, thereby increasing a length of a gas entering path and gas entering resistance. In addition, the gas enters from a side of the atomization chamber, affecting the uniformity of inlet-gas in the atomization chamber.

[0091] According to the atomization device 1 of the embodiment of the present disclosure, in a case of ensuring the arrangement of the oil storage chamber 110, the atomization chamber 130, the atomization core 200 and the gas passage 120, and by arranging the gas passage 120 to be of a two-section structure, the gas passage 120 can have a reasonable length on the basis of facilitating the flattening design. In this way, a burnt taste caused by the gas passage 120 being too short can be avoided, and a light taste caused by the gas passage 120 being too long can also be avoided.

[0092] In some specific embodiments of the present disclosure, the shell 100 is internally provided with an atomization core installation structure 141. The atomization core 200 is installed on the atomization core installation structure 141. The atomization core installation structure 141 and the shell 100 may be split members, and the atomization core installation structure 141 may also be integrally formed with at least a portion of the shell 100, so as to simplify the structure and facilitate assembly.

[0093] In some specific embodiments of the present disclosure, the shell 100 is internally provided with a vent. The vent is a through hole arranged on the atomization core installation structure 141, or the vent is a vent channel formed between the atomization core installation structure 141 and an inner wall of the shell 100. The gas passage communicates with the atomization chamber 130 through the vent.

[0094] In some specific embodiments of the present disclosure, the atomization core 200 and the vent are staggered along the width direction.

[0095] In some specific embodiments of the present disclosure, in the width direction, the vent is closer to the inner wall of the shell 100 relative to the atomization core 130.

[0096] According to some specific embodiments of the present disclosure, the shell 100 includes a shell body and a base.

[0097] The shell body is an integrated member. The gas suction port 121, the oil storage chamber 110 and the gas passage 120 are arranged on the shell body. The base is located at an end of the shell body in the length direction of the shell 100 and is in sealing connection with the shell body. The gas inlet 131 is formed in the base. The atomization chamber 130 is defined by the shell body and the base jointly.

[0098] According to some other specific embodiments of the present disclosure, as shown in FIG. 2 to FIG. 16, the shell 100 includes a gas inlet shell body 140, a base 150 and a gas outlet shell body 160.

[0099] The base 150 is located at an end of the gas inlet shell body 140 in the length direction of the shell 100 and is in sealing connection with the gas inlet shell body 140. The gas inlet 131 is formed in the base 150. The atomization chamber 130 is defined by the gas inlet shell body 140 and the base 150 jointly. The gas outlet shell body 160 is located at another end of the gas inlet shell body 140 in the length direction of the shell 100 and is in sealing connection with the gas inlet shell body 140. The gas suction port 121 is formed in the gas outlet shell body 160. The oil storage chamber 110 and the gas passage 120 are both defined by the gas inlet shell body 140 and the gas outlet shell body 160 jointly.

[0100] The gas inlet shell body 140, the base 150 and the gas outlet shell body 160 may be made of elastic translucent materials or elastic transparent materials. The shell 100 is arranged in a split mode, which is conducive to processing the gas inlet shell body 140, the base 150 and the gas outlet shell body 160 and can reduce processing difficulty of the shell 100, so as to reduce a production cost of the shell 100 and increase a production speed of the shell 100. In addition, it is conducive to improving a processing accuracy of the atomization chamber 130, the oil storage chamber 110, the gas passage 120 and other structures located inside the shell 100.

[0101] Further, as shown in FIG. 2 to FIG. 16, the gas inlet shell body 140 is configured with the atomization core installation structure 141 which is integrally formed with the gas inlet shell body 140. The atomization core 200 is installed on the atomization core installation structure 141. As the shell 100 is of a split structure, two ends of the gas inlet shell body 140 may be opened. In this way, some assembly structures can be allowed to be directly processed on the gas inlet shell body 140, such as the atomization core installation structure 141. The atomization core installation structure 141 is directly formed on the gas inlet shell body 140. A connection strength between the gas inlet shell body 140 and the atomization core installation structure 141 is high. There will be no assembly error between the gas inlet shell body 140 and the atomization core installation structure 141, which improves a positioning accuracy between the gas inlet shell body 140 and the atomization core installation structure 141. Therefore, the atomization core 200 and the gas inlet shell body 140 have a stable relative position and high positioning accuracy therebetween, which can ensure a large contact area between the to-be-atomized medium and the atomization core 200. In addition, there is no need for arranging additional installation components, such as an upper bracket, a lower bracket and a sealing member between the upper and lower brackets in the related art, thus effectively simplifying the structure and an assembly process of the atomization device 1.

[0102] For example, the atomization core installation structure 141 is a positioning plate. The positioning plate defines an installation groove 142 in the shell 100 by surrounding. The positioning plate at least forms two opposite side walls of the installation groove 142. The atomization core 200 is installed in the installation groove 142. For example, the positioning plate forms two opposite side walls of the installation groove 142. Another two opposite side walls of the installation groove 142 are formed by portions of two opposite side walls of the shell 100 in the thickness direction.

[0103] In this way, a circumferential direction of the atomization core 200 is surrounded and positioned, which can better ensure the reliability of an installation position of the atomization core 200. The positioning plate has a simple structure and is easy to process.

[0104] For example, the positioning plate forms two opposite side walls of the installation groove 142 in the width direction of the shell 100. Two side walls of the shell 100 in the thickness direction form two opposite side walls of the installation groove 142 in the thickness direction of the shell 100. In this way, the arrangement of the positioning plate does not occupy a size of the shell 100 in the thickness direction, which can further be conducive to thinning design of the atomization device 1.

[0105] According to some specific embodiments of the present disclosure, as shown in FIG. 18 and FIG. 19, the positioning plate includes a limiting plate 1411 and a side plate 1412.

[0106] The limiting plate 1411 stops the atomization core 200 on a side of the oil storage chamber 110. The limiting plate 1411 is provided with a liquid through hole 1413. The atomization core 200 communicates with the oil storage chamber 110 through the liquid through hole 1413. The side plate 1412 is connected to the limiting plate 1411 and at least forms two opposite side walls of the installation groove 142. The side plate 1412 and the limiting plate 1411 jointly define the installation groove 142. In this way, the positioning plate may fix the atomization core 200 on a periphery of the atomization core 200, and the limiting plate 1411 can stop the atomization core 200 on a side of the oil storage chamber 110.

[0107] It may be understood that the atomization core 200 may be in interference fit with the installation groove 142 to improve the stability. The atomization core 200 may further be fixed on a side of the atomization chamber 130 by utilizing a conductive member 240 described in the following.

[0108] According to some specific embodiments of the present disclosure, the atomization core 200 is in interference fit with the limiting plate 1411 and/or the side plate 1412 of the positioning plate 141 through the atomization core sealing member 143.

[0109] Optionally, the limiting plate 1411 extends along a circumferential direction of the atomization core 200 into an annulus and defines the liquid through hole 1413 by surrounding, so as to form more stable stopping in the whole circumferential direction of the atomization core 200. The side plate 1412 forms two opposite side walls of the installation groove 142 in the width direction of the shell 100, or the side plate 1412 extends along the circumferential direction of the atomization core 200 to surround the atomization core 200.

[0110] In some specific examples of the present disclosure, as shown in FIG. 1 to FIG. 15 and FIG. 20, the atomization core sealing member 143 is arranged between the atomization core 200 and an inner wall of the installation groove 142. The atomization core 200 is in interference fit with the installation groove 142 through the atomization core sealing member 143. In this way, on the one hand, the connection strength between the atomization core 200 and the atomization core installation structure 141 can be improved, which prevents the atomization core 200 from being detached from the installation groove 142. On the other hand, the gap between the atomization core 200 and the inner wall of the installation groove 142 can be sealed, so that the to-be-atomized medium in the oil storage chamber 110 is prevented from flowing into the atomization chamber 130 from the gap between the atomization core 200 and the inner wall of the installation groove 142, so as to ensure effective atomization of the to-be-atomized medium.

[0111] For example, the atomization core sealing member 143 may have elasticity. The atomization core sealing member 143 may be made of a polyethylene material, a silica gel material or a rubber material.

[0112] Specifically, the inner wall of the installation groove 142 is provided with a ventilation channel 144. The ventilation channel 144 communicates with the atomization chamber 130 and the oil storage chamber 110 respectively. The atomization core sealing member 143 has an elastic piece 145 corresponding to the ventilation channel 144 in position. When a pressure of the atomization chamber 130 is greater than a pressure of oil storage chamber 110, the elastic piece 145 is deformed under a pressure difference of the two to open ventilation channel 144. When the pressure of the atomization chamber 130 is not greater that the pressure of the oil storage chamber 110, the elastic piece 145 blocks the ventilation channel 144.

[0113] For example, a cross section of the ventilation channel 144 may be one of a rectangle, a trapezoid and an arc.

[0114] When the to-be-atomized medium in the oil storage chamber 110 moves from the atomization core 200 into the atomization chamber 130, a negative-pressure state may be maintained in the oil storage chamber 110. In this case, the pressure of the oil storage chamber 110 is smaller than the pressure of the atomization chamber 130, and the gas in the atomization chamber 130 may push the elastic piece 145 to undergo elastic deformation, so that the gas in the atomization chamber 130 may flow into the oil storage chamber 110 through the ventilation channel 144. Therefore, the pressure of the oil storage chamber 110 and the pressure of the atomization chamber 130 are maintained in balance. In this way, the to-be-atomized medium in the oil storage chamber 110 can continuously move into the atomization chamber 130 through the atomization core 200, so that the atomization core 200 can obtain enough to-be-atomized medium to keep a generation effect of smoke.

[0115] When the to-be-atomized medium in the oil storage chamber 110 stops flowing to the atomization chamber 130, the pressure of the oil storage chamber 110 is the same as the pressure of the atomization chamber 130. The elastic piece 145 may cover the ventilation channel 144 under its own elastic restoring force to prevent the to-be-atomized medium in the oil storage chamber 110 from flowing to the atomization chamber 130 from the ventilation channel 144.

[0116] It needs to be noted that, due to the need for a certain force to push the elastic piece 145 to undergo elastic deformation, only when a pressure difference between the atomization chamber 130 and the oil storage chamber 110 can push the elastic piece 145 to undergo elastic deformation, the ventilation channel 144 can be opened. That is to say, through the settings of the material, the structure and the like of the elastic piece 145, the elastic piece 145 may be pushed to open the ventilation channel 144 while making the pressure of the atomization chamber 130 be greater than the pressure of the oil storage chamber 110, or the elastic piece 145 may be pushed to open the ventilation channel 144 only when the pressure difference between the atomization chamber 130 and the oil storage chamber 110 reaches a certain value.

[0117] In addition, as shown in FIG. 12, the atomization core 200 is configured with an avoidance notch 201. The avoidance notch 201 provides a deformation space for the elastic piece 145. The avoidance notch 201 may correspond to the ventilation channel 144 in position. In this way, the elastic piece 145 may not be stopped by the atomization core 200 during deformation, which is conducive to the deformation of the elastic piece 145 and providing an enough space for the deformation of the elastic piece 145, so as to ensure effectiveness of the ventilation channel 144 in maintaining pressure balance.

[0118] According to some specific embodiments of the present disclosure, as shown in FIG. 2 to FIG. 16 and FIG. 19, the ventilation channel 144 is formed by a groove formed in an inner side wall and/or an inner bottom wall of the installation groove 142. In other words, the ventilation channel 144 is the groove arranged on the inner side wall of the installation groove 142, or the ventilation channel 144 is the groove arranged on the inner bottom wall of the installation groove 142, or the ventilation channel 144 is formed by a combination of the groove of the inner side wall of the installation groove 142 and the groove of the inner bottom wall of the installation groove 142.

[0119] In this way, a specific arrangement mode of the ventilation channel 144 may be changed according to change of using scenarios, using modes and structures of the atomization device 1, so that structural diversity of the ventilation channel 144 can be improved to expand a range of application of the atomization device 1.

[0120] In some embodiments of the present disclosure, as shown in FIG. 18 and FIG. 20, the ventilation channels 144 are a number of grooves formed at intervals along a circumferential direction of the atomization core sealing member 143. The elastic piece 145 extends along the circumferential direction of the atomization core sealing member 143 into an annulus. In this way, a speed of supplementing gas from the atomization chamber 130 to the oil storage chamber 110 is higher, so as to ensure a rate of the to-be-atomized medium in the oil storage chamber 110 flowing out of the oil storage chamber 110. In addition, the multiple ventilation channels 144 are arranged. In this way, when one or several of the ventilation channels 144 is/are blocked, other ventilation channels 144 can still maintain a normal communication, which is conducive to improving the reliability of maintaining air pressure balance.

[0121] In addition, the elastic piece 145 is arranged to be annular, and the multiple ventilation channels 144 can be covered at the same time. In this way, only one elastic piece 145 is arranged, so as to achieve switching of the multiple ventilation channels 144. The quantity of parts is small, the structure is simple, and a sealing effect between the atomization chamber 130 and the oil storage chamber 110 is good.

[0122] Optionally, a length of the groove ranges from 0.2 mm to 0.6 mm, and/or a width of the groove ranges from 0.2 mm to 0.6 mm, and/or a depth of the groove is smaller than 0.4 mm. In this way, a volume of the ventilation channel 144 is small, and the local structural strength of the ventilation channel 144 may not be reduced excessively while achieving gas flowing between the atomization chamber 130 and the oil storage chamber 110. The inner side wall of the installation groove 142 is not prone to being damaged, which can ensure a service life of the inner side wall of the installation groove 142.

[0123] In addition, due to the need of the elastic piece 145 for a certain period of time to restore to an initial state under its own elastic restoring force, there may be a possibility that the to-be-atomized medium enters the atomization chamber 130 from the ventilation channel 144. By setting the depth of the ventilation channel 144 to be small, the to-be-atomized medium may be prevented from flowing in the ventilation channel 144 by a surface tension of the inner wall of the ventilation channel 144, so as to block the to-be-atomized medium in the ventilation channel 144 and prevent it from leaking into the atomization chamber 130 from the ventilation channel 144.

[0124] The depth of the groove may be not smaller than 0.05 mm, so as to avoid unsmooth flowing in the ventilation channel 144 when the gas is supplemented into the oil storage chamber 110 from the atomization chamber 130, ensuring the rate of supplementing the gas into the oil storage chamber 110 from the atomization chamber 130.

[0125] According to some specific embodiments of the present disclosure, as shown in FIG. 2 and FIG. 16, one of the gas inlet shell body 140 and the gas outlet shell body 160 is configured with a plug 146 and another one is configured with a slot 161. The plug 146 is inserted into the slot 161. For example, the plug 146 and the slot 161 are both arranged around the gas passage 120. That is, the gas passage 120 penetrates through the plug 146 and a bottom wall of the slot 161.

[0126] A portion of the gas passage 120 is arranged on the gas inlet shell body 140, and another portion of the gas passage 120 is arranged on the gas outlet shell body 160. By arranging the plug 146 to be matched with the slot 161, it can ensure that when the gas inlet shell body 140 and the gas outlet shell body 160 are installed together, the plug 146 and the slot 161 seal the connection of the gas passage 120 in a circumferential direction of the gas passage 120. A situation that the gas passage 120 undergoes gas leakage at the connection between the gas inlet shell body 140 and the gas outlet shell body 160 is avoided, and leakproofness of the gas passage 120 is improved.

[0127] Optionally, a cross section of plug 146 and a cross section of the slot 161 are configured to be in non-circular shapes which adapt to each other. As when the gas inlet shell body 140 is connected with the gas outlet shell body 160, the plug 146 is inserted into the slot 161 firstly, the cross section of the plug 146 and the cross section of the slot 161 are both arranged to be in the non-circular shapes. The gas inlet shell body 140 and the gas outlet shell body 160 can be pre-positioned. Relative rotation between the gas inlet shell body 140 and the gas outlet shell body 160 with the plug 146 as a rotating shaft is avoided. Fixation of a relative position between the gas inlet shell body 140 and the gas outlet shell body 160 in a circumferential direction of the shell 100 is ensured, so as to facilitate subsequent installation between the gas inlet shell body 140 and the gas outlet shell body 160.

[0128] As shown in FIG. 1, FIG. 15 and FIG. 23, a gas passage sealing member 170 is arranged between a peripheral surface of the plug 146 and an inner wall surface of the slot 161. The gas passage sealing member 170 may have elasticity. The gas passage sealing member 170 may be made of a polyethylene material, a silica gel material or a rubber material.

[0129] In this way, the gas passage sealing member 170 can seal a gap between the plug 146 and the inner wall of the slot 161, so as to prevent the atomized to-be-atomized medium from leaking in the gas passage 120, further improving the leakproofness of the gas passage 120. In addition, the gas passage sealing member 170 can compensate a processing error of the plug 146, a processing error of the inner wall of the slot 161 and an assembly error between the plug 146 and the inner wall of the slot 161 through its own elasticity, improving installation reliability and leakproofness.

[0130] Specifically, as shown in FIG. 2, FIG. 16 and FIG. 23, the gas passage sealing member 170 includes a side wall 171 and an end edge 172. The side wall 171 is arranged between the peripheral surface of the plug 146 and the inner wall surface of the slot 161. The side wall 171 can seal the gap between the peripheral surface of the plug 146 and an inner peripheral wall of the slot 161, preventing the atomized to-be-atomized medium from leaking from a position between the peripheral surface of the plug 146 and the inner peripheral wall of the slot 161. In addition, the side wall 171 can compensate a processing error of the peripheral surface of the plug 146, a processing error of the inner peripheral wall of the slot 161 and an assembly error between the peripheral surface of the plug 146 and the inner peripheral wall of the slot 161, improving installation reliability.

[0131] In addition, the end edge 172 is connected to the side wall 171 and arranged between an end surface of the plug 146 and a bottom wall of the slot 161. The end edge 172 defines a vent port 173 for avoiding the gas passage 120 by surrounding. The end edge 172 can seal a gap between the end surface of the plug 146 and the bottom wall of the slot 161, preventing the atomized to-be-atomized medium from leaking from a position between the end surface of the plug 146 and the bottom wall of the slot 161. In addition, the end edge 172 can compensate a processing error of the end surface of the plug 146, a processing error of the bottom wall of the slot 161 and an assembly error between the end surface of the plug 146 and the bottom wall of the slot 161, improving installation reliability. The vent port 173 is arranged to ensure that the atomized to-be-atomized medium can flow in the gas passage 120.

[0132] In addition, in such arrangement of the gas passage sealing member 170, the gas passage sealing member 170 may be assembled on the plug 146 before assembling the gas inlet shell body 140 and the gas outlet shell body 160. Due to the joint positioning of the end edge 172 and the side wall 171, when the plug 146 is inserted into the slot 161, a stable position of the gas passage sealing member 170 on the plug 146 can be ensured, so as to improve assembly convenience.

[0133] According to some specific embodiments of the present disclosure, as shown in FIG. 5, FIG. 7, FIG. 6 and FIG. 8, the atomization device 1 further includes a communicating pipe 300. A portion of the communicating pipe 300 is inserted into the gas passage 120 of the gas inlet shell body 140. Another portion of the communicating pipe 300 is inserted into the gas passage 120 of the gas outlet shell body 160.

[0134] A peripheral surface of the communicating pipe 300 may be in contact with an inner peripheral surface of the gas passage 120 of the gas inlet shell body 140 and an inner peripheral surface of the gas passage 120 of the gas outlet shell body 160, so that the peripheral surface of the communicating pipe 300 may be sealed with the inner peripheral surface of the gas passage 120. The atomized to-be-atomized medium in the gas passage 120 of the gas inlet shell body 140 can flow into the gas passage 120 of the gas outlet shell body 160 through the communicating pipe 300, so as to prevent the atomized to-be-atomized medium from leaking at the connection between the gas inlet shell body 140 and the gas outlet shell body 160.

[0135] It may be understood that the communicating pipe 300 may be completely inserted into the gas passage 120, or partially inserted into the gas passage 120. That is, a portion of the gas passage 120 may be defined only by the communicating pipe 300.

[0136] In some embodiments of the present disclosure, as shown in FIG. 6, FIG. 8, FIG. 24 and FIG. 25, the atomization device 1 further includes a gas inlet sealing member 400 and a gas outlet sealing member 500. The gas inlet sealing member 400 is arranged between the communicating pipe 300 and an inner wall of the gas passage 120 of the gas inlet shell body 140. The gas outlet sealing member 500 is arranged between the communicating pipe 300 and an inner wall of the gas passage 120 of the gas outlet shell body 160. For example, the gas inlet sealing member 400 and the gas outlet sealing member 500 may have elasticity. The gas inlet sealing member 400 and the gas outlet sealing member 500 may be made of a polyethylene material, a silica gel material and a rubber material.

[0137] In this way, the gas inlet sealing member 400 can seal a gap between the communicating pipe 300 and the inner wall of the gas passage 120 of the gas inlet shell body 140. The gas outlet sealing member 500 can seal a gap between the communicating pipe 300 and the inner wall of the gas passage 120 of the gas outlet shell body 160, further preventing the atomized to-be-atomized medium from flowing to a position between the communicating pipe 300 and the inner wall of the gas passage 120, so as to prevent the to-be-atomized medium from leaking at a connection between the gas passage 120 of the gas inlet shell body 140 and the gas passage 120 of the gas outlet shell body 160. Double sealing of the gas passage 120 can be achieved through the communicating pipe 300, the gas inlet sealing member 400 and the gas outlet sealing member 500, greatly improving the leakproofness of the gas passage 120.

[0138] Furthermore, as shown in FIG. 6, FIG. 8. FIG. 24 and FIG. 25, the gas inlet sealing member 400 sleeves a periphery of an end of the communicating pipe 300. The gas outlet sealing member 500 sleeves a periphery of another end of the communicating pipe 300.

[0139] The gas inlet sealing member 400 is configured with a gas inlet stopper 410 stopping on an end surface of an end of the communicating pipe 300, and/or, the gas outlet sealing member 500 is configured with a gas outlet stopper 510 stopping on an end surface of another end of the communicating pipe 300.

[0140] By arranging the gas inlet stopper 410 on the end surface, relative positions of the gas inlet sealing member 400 and the ventilation channel 144 in an axial direction of the ventilation channel 144 can be determined. A situation that the gas inlet stopper 410 moves in the axial direction of the communicating pipe 300 and cannot seal the gap between the communicating pipe 300 and the inner wall of the gas passage 120 of the gas inlet shell body 140 is avoided. The sealing effectiveness of the gas inlet sealing member 400 on the communicating pipe 300 and the inner wall of the gas passage 120 of the gas inlet shell body 140 is ensured.

[0141] By arranging the gas outlet stopper 510 on the end surface, relative positions of the gas outlet sealing member 500 and the ventilation channel 144 in the axial direction of the ventilation channel 144 can be determined. A situation that the gas outlet stopper 510 moves in the axial direction of the communicating pipe 300 and cannot seal the gap between the communicating pipe 300 and the inner wall of the gas passage 120 of the gas outlet shell body 160 is avoided. The sealing effectiveness of the gas outlet sealing member 500 on the communicating pipe 300 and the inner wall of the gas passage 120 of the gas outlet shell body 160 is ensured.

[0142] In addition, during assembly, the gas inlet sealing member 400 and the gas outlet sealing member 500 may be assembled on the communicating pipe 300 firstly, and then the communicating pipe 300 with the gas inlet sealing member 400 and the gas outlet sealing member 500 is inserted into the gas passage 120 of the gas inlet shell body 140 and the gas passage 120 of the gas outlet shell body 160. By arranging the gas inlet stopper 410 and the gas outlet stopper 510, the stability of the gas inlet sealing member 400 and the gas outlet sealing member 500 on the communicating pipe 300 during insertion can be ensured, so as to ensure the sealing reliability and improve the assembly convenience.

[0143] In some embodiments of the present disclosure, as shown in FIG. 6, FIG. 8, FIG. 24 and FIG. 25, a peripheral surface of the gas inlet stopper 410 is inclined gradually towards a central axis of the communicating pipe 300 along a direction away from the communicating pipe 300, and/or, a peripheral surface of the gas outlet stopper 510 is inclined gradually towards the central axis of the communicating pipe 300 along the direction away from the communicating pipe 300.

[0144] In other words, a cross sectional area of the gas inlet stopper 410 is gradually reduced along the direction away from the communicating pipe 300. In this way, the gas inlet stopper 410 can play a role in guiding, which is easy for the gas inlet stopper 410 to insert into the gas passage 120 of the gas inlet shell body 140, so as to reduce the assembly difficulty and increase an assembly speed. A cross sectional area of the gas outlet stopper 510 is gradually reduced along the direction away from the communicating pipe 300. In this way, the gas outlet stopper 510 can play a role in guiding, which is easy for the gas outlet stopper 510 to insert into the gas passage 120 of the gas outlet shell body 160, so as to reduce the assembly difficulty and increase the assembly speed.

[0145] According to some specific embodiments of the present disclosure, as shown in FIG. 1 to FIG. 15, one of the gas inlet shell body 140 and the gas outlet shell body 160 is configured with a sealing ring edge 162 extending along a circumferential direction thereof. The sealing ring edge 162 surrounds a peripheral surface of another one of the gas inlet shell body 140 and the gas outlet shell body 160. The gas outlet shell body 160 being provided with the sealing ring edge 162 is taken as an example for description below (structures and principles of the gas inlet shell body 140 being provided with the sealing ring edge 162 and the gas outlet shell body 160 being provided with the sealing ring edge 162 are the same). The sealing ring edge 162 surrounds the peripheral surface of the gas inlet shell body 140 and may be in contact with the peripheral surface of the gas inlet shell body 140. An end of the sealing ring edge 162 facing away from the gas outlet shell body 160 is located between two ends of the gas inlet shell body 140.

[0146] In this way, a coincidence area between the gas inlet shell body 140 and the gas outlet shell body 160 in the axial direction of the shell 100 can be increased. The sealing ring edge 162 is close to the connection between the gas inlet shell body 140 and the gas outlet shell body 160, which can seal the connection between the gas inlet shell body 140 and the gas outlet shell body 160 to a certain extent, so as to improve overall leakproofness of the shell 100.

[0147] In some embodiments of the present disclosure, as shown in FIG. 1 to FIG. 3, and FIG. 9 to FIG. 18, the another one of the gas inlet shell body 140 and the gas outlet shell body 160 is configured with a sealing ring groove 147 extending along a circumferential direction thereof. The sealing ring edge 162 is inserted into the sealing ring groove 147.

[0148] The gas outlet shell body 160 being provided with the sealing ring edge 162 is taken as an example for description below (structures and principles of the gas inlet shell body 140 being provided with the sealing ring edge 162 and the gas outlet shell body 160 being provided with the sealing ring edge 162 are the same). The gas outlet shell body 160 is provided with the sealing ring edge 162, and the peripheral surface of the gas inlet shell body 140 is provided with the sealing ring groove 147. The sealing ring edge 162 is matched with the sealing ring groove 147, so that the connection leakproofness and connection strength of the gas inlet shell body 140 and the gas outlet shell body 160 can be further improved, so as to further improve the overall leakproofness of the shell 100.

[0149] In some other embodiments of the present disclosure, as shown in FIG. 1, FIG. 5 to FIG. 7, and FIG. 11 to FIG. 13, a shell sealing member 180 is arranged between the peripheral surface of the another one of the gas inlet shell body 140 and the gas outlet shell body 160 and an inner peripheral surface of the sealing ring edge 162. For example, the shell sealing member 180 have elasticity. The shell sealing member 180 may be made of a polyethylene material, a silica gel material and a rubber material.

[0150] The gas outlet shell body 160 being provided with the sealing ring edge 162 is taken as an example for description below (structures and principles of the gas inlet shell body 140 being provided with the sealing ring edge 162 and the gas outlet shell body 160 being provided with the sealing ring edge 162 are the same). The shell sealing member 180 can seal a gap between the peripheral surface of the gas inlet shell body 140 and the sealing ring edge 162, so as to prevent the to-be-atomized medium before and after atomization from leaking from a position between the gas inlet shell body 140 and the gas outlet shell body 160.

[0151] Of course, the above two implementations may be applied at the same time. That is, another one of the gas inlet shell body 140 and the gas outlet shell body 160 is configured with a sealing ring groove 147 extending along the circumferential direction thereof, and the shell sealing member 180 is arranged between the peripheral surface of the another one of the gas inlet shell body 140 and the gas outlet shell body 160 and the inner peripheral surface of the sealing ring edge 162.

[0152] Optionally, as shown in FIG. 1, FIG. 5 to FIG. 7, and FIG. 11 to FIG. 13, the peripheral surface of the another one of the gas inlet shell body 140 and the gas outlet shell body 160 is configured with a sealing groove 148 extending along the circumferential direction thereof. The shell sealing member 180 is assembled into the sealing groove 148, or the inner peripheral surface of the sealing ring edge 162 is configured with a sealing groove 148 extending along a circumferential direction thereof. The shell sealing member 180 is assembled into the sealing groove 148. The sealing groove 148 is formed to preposition the shell sealing member 180. On the one hand, disassembly and assembly difficulty is reduced. On the other hand, the stability of relative positions among the shell sealing member 180, the gas inlet shell body 140 and the gas outlet shell body 160 is improved, and the shell sealing member 180 is prevented from displacing during insertion and assembly of the gas inlet shell body 140 and the gas outlet shell body 160.

[0153] Further, as shown in FIG. 18, a side of the shell sealing member 180 facing away from the sealing groove 148 is configured with a sealing rib 181 extending along a circumferential direction thereof. The peripheral surface of the gas inlet shell body 140 being provided with the sealing groove 148 is taken as an example for description (principles of the peripheral surface of the gas outlet shell body 160 being provided with the sealing groove 148 and the inner peripheral surface of the sealing ring edge 162 being provided with the sealing groove 148 are the same).

[0154] By arranging the sealing rib 181, a size of the shell sealing member 180 extending out of the sealing groove 148 can be increased, so that the shell sealing member 180 can be closely attached to a bottom wall of the sealing groove 148 and the inner peripheral surface of the sealing ring edge 162. In this way, the reliable sealing of the shell sealing member 180 on the gap between the gas inlet shell body 140 and the sealing ring edge 162 can be ensured, avoiding leakage of the to-be-atomized medium before and after atomization.

[0155] The shell sealing member 180 is in integral injection moulding with one of the gas inlet shell body 140 and the gas outlet shell body 160. For example, the shell sealing member 180 is integrated with the gas inlet shell body 140 through bijection injection moulding, or the shell sealing member 180 is integrated with the gas outlet shell body 160 through bijection injection moulding. In this way, there are fewer processing steps and high connection strength, and the relative positions among the shell sealing member 180, the gas inlet shell body 140 and the gas outlet shell body 160 are more stable.

[0156] For example, the gas inlet shell body 140 is in sealing connection with the gas outlet shell body 160 through ultrasonic welding. In this way, the gas inlet shell body 140 is reliably connected with the gas outlet shell body 160, and the connection between the gas inlet shell body 140 and the gas outlet shell body 160 can be sealed, improving sealing performance of the shell 100. In other embodiments of the present disclosure, the gas inlet shell body 140 may also be connected with the gas outlet shell body 160 in a glue dispensing mode.

[0157] In some embodiments of the present disclosure, as shown in FIG. 1 to FIG. 15, one of an end surface of the gas inlet shell body 140 facing the gas outlet shell body 160 and an end surface of the gas outlet shell body 160 facing the gas inlet shell body 140 is provided with a welding line 190. The welding line 190 extends along a circumferential direction of the shell 100.

[0158] As the gas inlet shell body 140 is welded to the gas outlet shell body 160, a welded portion of at least one of the gas inlet shell body 140 and the gas outlet shell body 160 may be deformed. By arranging the welding line 190, welding deformation can be limited to occur on the welding line 190, without damaging structural performance of the rest portion of the gas inlet shell body 140 and the gas outlet shell body 160. The structural strength of the rest portion of the gas inlet shell body 140 and the gas outlet shell body 160 is ensured.

[0159] In some embodiments of the present disclosure, a cross section of the welding line 190 is triangular. In this way, a top end of the welding line 190 is easier to weld and deform, so as to quickly achieve the connection between the gas inlet shell body 140 and the gas outlet shell body 160. In addition, there is a large connection area and high connection strength between a top surface of the welding line 190 and the gas inlet shell body 140, as well as the gas outlet shell body 160, which cannot be damaged during carrying and assembling.

[0160] According to some specific embodiments of the present disclosure, as shown in FIG. 2 to FIG. 16, the atomization device 1 further includes a liquid adsorbing body 600. The liquid adsorbing body 600 is installed on the base 150. After the to-be-atomized medium is atomized in the atomization chamber 130, formed smoke has a high temperature and may be condensed again after encountering cold air from an external environment. The liquid adsorbing body 600 can adsorb the condensed to-be-atomized medium. In this way, the condensed to-be-atomized medium can be prevented from leaking from the gas inlet 131, improving use cleanliness of the atomization device 1. A structure connected with the atomization device 1 (such as a cigarette rod of an electronic cigarette) is also prevented from being corroded and blocked by the condensed to-be-atomized medium.

[0161] In some embodiments of the present disclosure, as shown in FIG. 2 to FIG. 16, and FIG. 22, the atomization device 1 further includes a gas inlet spreader plate 700. The gas inlet spreader plate 700 is installed on the base 150 and covers the gas inlet 131. The gas inlet spreader plate 700 is provided with a number of spreading through holes 710. The gas inlet spreader plate 700 can spread air entering from the gas inlet 131 to uniformly distribute the air in the atomization chamber 130, so as to ensure that the atomized to-be-atomized medium in the atomization chamber 130 is uniformly mixed with the air.

[0162] According to some specific embodiments of the present disclosure, as shown in FIG. 9, FIG. 10, FIG. 26 and FIG. 27, the atomization device 1 further includes a suction port cover 800. The suction port cover 800 is installed on the shell 100. The suction port cover 800 is provided with an opening 810 communicating with the gas suction port 121. A portion of an inner wall of the gas passage 120 is formed by the suction port cover 800.

[0163] As a portion of the gas passage 120 may be configured to be a structure extending obliquely relative to the length direction of the shell 100, that is, the overall gas passage 120 may not extend along the length direction of the shell 100, by arranging the suction port cover 800 and forming a portion of the inner wall of the gas passage 120 by the suction port cover 800, the gas passage 120 may be composed of two structures: the shell 100 and the suction port cover 800. The demolding difficulty and production costs of the gas passage 120 are reduced. The production efficiency is improved. The suction port cover 800 is arranged, which may further facilitate the design of different molds and color schemes.

[0164] Optionally, as shown in FIG. 9. FIG. 10, FIG. 26, and FIG. 27, a surface of the shell 100 provided with the gas suction port 121 is configured with a cover groove 820. The suction port cover 800 is installed on the cover groove 820. In this way, a contact area between the shell 100 and the suction port cover 800 is larger. An outer surface of the suction port cover 800 and an outer surface of the shell 100 may be located on the same arc surface. That is, the suction port cover 800 may not protrude from the outer surface of the shell 100, avoiding a situation that the suction port cover 800 is collided to be detached from the shell 100.

[0165] Specifically, as shown in FIG. 1 to FIG. 15, and FIG. 21, the atomization core 200 includes a porous body 210 and a heating body 220. The porous body 210 has a liquid adsorbing surface 211 and an atomization surface 212. The liquid adsorbing surface 211 communicates with the oil storage chamber 110. The atomization surface 212 communicates with the atomization chamber 130. The porous body 210 has a number of liquid adsorbing holes enabling the liquid adsorbing surface 211 and the atomization surface 212 to communicate. The heating body 220 is arranged on the atomization surface 212 of the porous body 210. For example, the porous body 210 may be made of a ceramic material.

[0166] The to-be-atomized medium in the oil storage chamber 110 may flow to the atomization surface 212 through the liquid adsorbing surface 211 and the multiple liquid adsorbing holes. The to-be-atomized medium is heated by the heating body 220 on the atomization surface 212 to be gasified, so as to form gasoloid. The gasoloid is mixed with air and then is discharged from the gas suction port 121 through the gas passage 120.

[0167] In this way, the to-be-atomized medium in the oil storage chamber 110 can be transferred to the atomization chamber 130 and can be heated, which is easy to form the gasoloid that can be inhaled by the human body, meeting use demands of users.

[0168] In some embodiments of the present disclosure, as shown in FIG. 1 to FIG. 15, and FIG. 21, the heating body 220 is connected with an abutting sheet 230. The abutting sheet 230 is energized with the outside of the atomization device 1 through a conductive member 240 arranged on the base 150. The conductive member 240 may be conductive pin. In this way, whether the heating body 220 emits heat may be controlled by whether the outside is energized, which can effectively control a moment for the atomization device 1 to generate the gasoloid, so as to prevent the to-be-atomized medium from being atomized when the user does not use the atomization device 1. Therefore, controllability of the atomization device 1 is higher.

[0169] The gas inlet spreader plate 700 may be fixed to the base 150. The gas inlet spreader plate 700 is provided with a through hole that allows the conductive member 240 to penetrate through. A portion of the conductive member 240 is exposed from the base 150, so as to be electrically connected with an external power supply component (such as a power supply in the cigarette rod).

[0170] An electronic cigarette according to an embodiment of the present disclosure is described below with reference to the accompanying drawings. The electronic cigarette includes the atomization device 1 according to the above embodiments of the present disclosure.

[0171] The electronic cigarette according to the embodiment of the present disclosure has advantages of high comfort, good use experience and the like by using the atomization device 1 according to the above embodiments of the present disclosure.

[0172] Other compositions and operations of the atomization device 1 and the electronic cigarette having the same according to the embodiments of the present disclosure are known to those of ordinary skill in the art, and will not be described herein in detail.

[0173] In the description of this specification, referring to the description of terms "a specific embodiment", "a specific example" and the like means that the specific characteristics, structures, materials or features described with reference to this embodiment or example are included in at least one embodiment or example of the present disclosure. In this specification, the schematic expressions of the above terms do not necessarily refer to the same embodiments or examples.

[0174] Although the embodiments of the present disclosure have been shown and described, those of ordinary skill in the art may understand that: various changes, modifications, replacements and variations may be made to these embodiments without departing from the principles and objectives of the present disclosure, and the scope of the present disclosure is as defined by the claims and their equivalents.

[0175] Descriptions of reference numerals:

Atomization device 1,
shell 100, oil storage chamber 110,
gas passage 120, gas suction port 121, gas inlet section 122, gas outlet section 123,
atomization chamber 130, gas inlet 131,
gas inlet shell body 140, atomization core installation structure 141, limiting plate 1411, side plate 1412, liquid through hole 1413, installation groove 142, atomization core sealing member 143, ventilation channel 144, elastic piece 145, plug 146, sealing ring groove 147, sealing groove 148,
base 150,
gas outlet shell body 160, slot 161, sealing ring edge 162,
gas passage sealing member 170, side wall 171, end edge 172, vent port 173,
shell sealing member 180, sealing rib 181, welding line 190,
atomization core 200, avoidance notch 201, porous body 210, liquid adsorbing surface 211, atomization surface 212, heating body 220, abutting sheet 230, conductive member 240,
communicating pipe 300, gas inlet sealing member 400, gas inlet stopper 410,
gas outlet sealing member 500, gas outlet stopper 510, liquid adsorbing body 600,
gas inlet spreader plate 700, spreading through hole 710, suction port cover 800, opening 810, and cover groove 820.

Claims

1. An atomization device (1), comprising:

    a shell (100), the shell (100) having a length direction, a width direction and a thickness direction, being internally provided with an oil storage chamber (110), a gas passage (120) and an atomization chamber (130) communicating with the gas passage (120), and being provided with a gas inlet (131) communicating with the atomization chamber (130) and a gas suction port (121) communicating with the gas passage (120); and
    an atomization core (200), the atomization core (200) being arranged in the shell (100) and communicating with the oil storage chamber (110) and the atomization chamber (130) respectively, and being configured to atomize a to-be-atomized medium in the oil storage chamber (110),
    wherein, any two of the oil storage chamber (110), the atomization chamber (130), the atomization core (200) and the gas passage (120) are arranged along other directions of the shell (100) except for the thickness direction.

2. The atomization device (1) according to claim 1, wherein, at most an atomization core sealing member (143) is arranged between two side walls of the shell (100) in the thickness direction and the atomization core (200).

3. The atomization device (1) according to claim 1 or 2, wherein, at least a portion of the gas passage (120) and the oil storage chamber (110) are arranged along the width direction of the shell (100);

at least a portion of the gas passage (120) and the atomization chamber (130) are arranged along the length direction or the width direction of the shell (100); and

at least a portion of the gas passage (120) and the atomization core (200) are arranged along the width direction or the length direction of the shell (100).

4. The atomization device (1) according to any one of claims 1 to 3, wherein, each of the atomization chamber (130) and the atomization core (200), and the oil storage chamber (110) are arranged along the length direction of the shell (100).

5. The atomization device (1) according to any one of claims 1 to 4, wherein, the gas passage (120) comprises:

a gas inlet section (122), the gas inlet section (122) being located on a side of the shell (100) in the width direction and extending along the length direction of the shell (100), and having a first end of the gas inlet section and a second end of the gas inlet section, and the first end of the gas inlet section communicating with the atomization chamber (130); and

a gas outlet section (123), the gas outlet section (123) being obliquely arranged relative to the length direction of the shell (100), and having a first end of the gas outlet section and a second end of the gas outlet section, the first end of the gas outlet section communicating with the second end of the gas inlet section, and the second end of the gas outlet section communicating with the gas suction port (121).

6. The atomization device (1) according to any one of claims 1 to 5, wherein, the gas passage (120) comprises:

a gas inlet section (122), the gas inlet section (122) being located on a side of the shell (100) in the width direction and extending along the length direction of the shell (100), and having a first end of the gas inlet section and a second end of the gas inlet section, and the first end of the gas inlet section communicating with the atomization chamber (130); and

the gas outlet section (123), the gas outlet section (123) extending along the width direction of the shell (100), and having a first end of the gas outlet section and a second end of the gas inlet section, the first end of the gas outlet section communicating with the second end of the gas inlet section, and the second end of the gas outlet section communicating with the gas suction port (121).

7. The atomization device (1) according to claim 5 or 6, wherein,

the gas inlet (131) is located on an end surface of an end of the shell (100) in the length direction, or the gas inlet (131) is located on a side wall of the shell (100) in the width direction and close to an end of the shell (100) in the length direction; and

the second end of the gas outlet section and the gas suction port (121) are located at a center of an end surface of another end of the shell (100) in the length direction.

8. The atomization device (1) according to claim 5 or 6, wherein,

the gas inlet (131) is located at a center of an end surface of an end of the shell (100) in the length direction; and

the second end of the gas outlet section and the gas suction port (121) are located at a center of an end surface of another end of the shell (100) in the length direction.

9. The atomization device (1) according to any one of claims 1 to 8, wherein,
the shell (100) is internally provided with an atomization core installation structure (141), and the atomization core (200) is installed on the atomization core installation structure (141).

10. The atomization device (1) according to claim 9, wherein,

the shell (100) is internally provided with a vent, the vent being a through hole formed in a separator, or the vent being a vent channel formed between the separator and an inner wall of the shell (100); and

the gas passage (120) communicates with the atomization chamber (130) through the vent.

11. The atomization device (1) according to claim 10, wherein, the atomization core (200) and the vent are staggered along the width direction.

12. The atomization device (1) according to claim 11, wherein, in the width direction, the vent is closer to the inner wall of the shell (100) relative to the atomization core (200).

13. The atomization device (1) according to claim 12, wherein, the atomization core installation structure (141) is integrally formed with at least a portion of the shell (100).

14. The atomization device (1) according to any one of claims 1 to 13, wherein, the shell (100) comprises:

a shell body, the gas suction port (121), the oil storage chamber (110) and the gas passage (120) being arranged on the shell body; and
a base (150), the base (150) being located at an end of the shell body in the length direction of the shell (100) and being in sealing connection with the shell body, the gas inlet (131) being formed in the base (150), and the atomization chamber (130) being defined by the shell body and the base (150) jointly.

15. The atomization device (1) according to any one of claims 1 to 14, wherein, the shell (100) comprises:

a gas inlet shell body (140);
the base (150), the base (150) being located at an end of the gas inlet shell body (140) in the length direction of the shell (100) and being in sealing connection with the gas inlet shell body (140), the gas inlet (131) being formed in the base (150), and the atomization chamber (130) being defined by the gas inlet shell body (140) and the base (150) jointly; and
a gas outlet shell body (160), the gas outlet shell body (160) being located at another end of the gas inlet shell body (140) in the length direction of the shell (100) and being in sealing connection with the gas inlet shell body (140), the gas suction port (121) being formed in the gas outlet shell body (160), and the oil storage chamber (110) and the gas passage (120) being both defined by the gas inlet shell body (140) and the gas outlet shell body (160) jointly.

16. The atomization device (1) according to claim 15, wherein, the gas inlet shell body (140) is configured with an atomization core installation structure (141) which is integrally formed with the gas inlet shell body (140), and the atomization core (200) is installed on the atomization core installation structure (141).

17. The atomization device (1) according to claim 16, wherein, the atomization core installation structure (141) is a positioning plate, the positioning plate defines an installation groove (142) in the shell (100), and at least forms two opposite side walls of the installation groove (142), and the atomization core (200) is installed in the installation groove (142).

18. The atomization device (1) according to claim 17, wherein, the positioning plate forms two opposite side walls of the installation groove (142) in the width direction of the shell (100), and two side walls of the shell (100) in the thickness direction form two opposite side walls of the installation groove (142) in the thickness direction of the shell (100).

19. The atomization device (1) according to claim 17 or 18, wherein, the positioning plate comprises:

a limiting plate (1411), the limiting plate (1411) stopping the atomization core (200) on a side of the oil storage chamber (110), the limiting plate (1411) being provided with a liquid through hole (1413), and the atomization core (200) communicating with the oil storage chamber (110) through the liquid through hole (1413); and
a side plate (1412), the side plate (1412) being connected to the limiting plate (1411) and at least forming two opposite side walls of the installation groove (142), and the side plate (1412) and the limiting plate (1411) jointly defining the installation groove (142).

20. The atomization device (1) according to claim 19, wherein,

the limiting plate (1411) extends along a circumferential direction of the atomization core (200) into an annulus and defines the liquid through hole (1413) by surrounding; and
the side plate (1412) forms two opposite side walls of the installation groove (142) in the width direction of the shell (100), or the side plate (1412) extends along the circumferential direction of the atomization core (200) to surround the atomization core (200).

21. The atomization device (1) according to any one of claims 17 to 20, wherein, an atomization core sealing member (143) is arranged between the atomization core (200) and an inner wall of the installation groove (142), and the atomization core (200) is in interference fit with the installation groove (142) through the atomization core sealing member (143).

22. The atomization device (1) according to claim 21, wherein, a ventilation channel (144) is arranged on the inner wall of the installation groove (142), and communicates with the atomization chamber (130) and the oil storage chamber (110) respectively, and the atomization core sealing member (143) has an elastic piece (145) corresponding to the ventilation channel (144) in position,
wherein, in a case that a pressure of the atomization chamber (130) is greater than a pressure of the oil storage chamber (110), the elastic piece (145) is deformed under a pressure difference of the two to open the ventilation channel (144), and in a case that the pressure of the atomization chamber (130) is not greater than the pressure of the oil storage chamber (110), the elastic piece (145) blocks the ventilation channel (144).

23. The atomization device (1) according to claim 22, wherein, the atomization core (200) is configured with an avoidance notch (201), and the avoidance notch (201) provides a deformation space for the elastic piece (145).

24. The atomization device (1) according to claim 22 or 23, wherein, the ventilation channel (144) is formed by a groove formed in an inner side wall and/or an inner bottom wall of the installation groove (142).

25. The atomization device (1) according to any one of claims 22 to 24, wherein, the ventilation channel (144) is a plurality of grooves formed at intervals along a circumferential direction of the atomization core sealing member (143), and the elastic piece (145) extends along the circumferential direction of the atomization core sealing member (143) into an annulus.

26. The atomization device (1) according to any one of claims 22 to 25, wherein, a length of the groove ranges from 0.2 mm to 0.6 mm; and/or

a width of the groove ranges from 0.2 mm to 0.6 mm; and/or
a depth of the groove is less than 0.4 mm.

27. The atomization device (1) according to any one of claims 15 to 26, wherein, one of the gas inlet shell body (140) and the gas outlet shell body (160) is configured with a plug (146) and another one is configured with a slot (161), and the plug (146) is inserted into the slot (161).

28. The atomization device (1) according to claim 27, wherein, the plug (146) and the slot (161) are both arranged around the gas passage (120).

29. The atomization device (1) according to claim 27 or 28, wherein, a cross section of the plug (146) and a cross section of the slot (161) are configured to be in non-circular shapes.

30. The atomization device (1) according to any one of claims 27 to 29, wherein, a gas passage sealing member (170) is arranged between a peripheral surface of the plug (146) and an inner wall surface of the slot (161).

31. The atomization device (1) according to claim 30, wherein, the gas passage sealing member (170) comprises:

a side wall (171), the side wall (171) being arranged between the peripheral surface of the plug (146) and the inner wall surface of the slot (161); and
an end edge (172), the end edge (172) being connected to the side wall (171) and arranged between an end surface of the plug (146) and a bottom wall of the slot (161), and the end edge (172) defining a vent port (173) for avoiding the gas passage (120) by surrounding.

32. The atomization device (1) according to any one of claims 15 to 31, further comprising:
a communicating pipe (300), a portion of the communicating pipe (300) being inserted into the gas passage of the gas inlet shell body (140), and another portion of the communicating pipe (300) being inserted into the gas passage of the gas outlet shell body (160).

33. The atomization device (1) according to claim 32, further comprising:

a gas inlet sealing member (400), the gas inlet sealing member (400) being arranged between the communicating pipe (300) and an inner wall of the gas passage of the gas inlet shell body (140); and
a gas outlet sealing member (500), the gas outlet sealing member (500) being arranged between the communicating pipe (300) and an inner wall of the gas passage of the gas outlet shell body (160).

34. The atomization device (1) according to claim 33, wherein, the gas inlet sealing member (400) sleeves a periphery of an end of the communicating pipe (300), and the gas outlet sealing member (500) sleeves a periphery of another end of the communicating pipe (300);

the gas inlet sealing member (400) is configured with a gas inlet stopper (410) stopping on an end surface of the end of the communicating pipe (300); and/or
the gas outlet sealing member (500) is configured with a gas outlet stopper (510) stopping on an end surface of the another end of the communicating pipe (300).

35. The atomization device (1) according to claim 34, wherein, a peripheral surface of the gas inlet stopper (410) is inclined gradually towards a central axis of the communicating pipe (300) along a direction away from the communicating pipe (300); and/or
a peripheral surface of the gas outlet stopper (510) is inclined gradually towards the central axis of the communicating pipe (300) along the direction away from the communicating pipe (300).

36. The atomization device (1) according to any one of claims 15 to 35, wherein, one of the gas inlet shell body (140) and the gas outlet shell body (160) is configured with a sealing ring edge (162) extending along a circumferential direction thereof, and the sealing ring edge (162) surrounds a peripheral surface of another one of the gas inlet shell body (140) and the gas outlet shell body (160).

37. The atomization device (1) according to claim 36, wherein, the another one of the gas inlet shell body (140) and the gas outlet shell body (160) is configured with a sealing ring groove (147) extending along a circumferential direction thereof, and the sealing ring edge (162) is inserted into the sealing ring groove (147).

38. The atomization device (1) according to claim 37, wherein, a shell sealing member (180) is arranged between the peripheral surface of the another one of the gas inlet shell body (140) and the gas outlet shell body (160) and an inner peripheral surface of the sealing ring edge (162).

39. The atomization device (1) according to claim 38, wherein, the peripheral surface of the another one of the gas inlet shell body (140) and the gas outlet shell body (160) is configured with a sealing groove (148) extending along a circumferential direction thereof, and the shell sealing member (180) is assembled into the sealing groove (148); or
the inner peripheral surface of the sealing ring edge (162) is configured with the sealing groove (148) extending along a circumferential direction thereof, and the shell sealing member (180) is assembled into the sealing groove (148).

40. The atomization device (1) according to claim 39, wherein, a side of the shell sealing member (180) facing away from the sealing groove (148) is configured with a sealing rib (181) extending along a circumferential direction thereof.

41. The atomization device according to any one of claims 38 to 40, wherein, the shell sealing member (180) is in integral injection moulding with one of the gas inlet shell body (140) and the gas outlet shell body (160).

42. The atomization device (1) according to any one of claims 15 to 41, wherein, the gas inlet shell body (140) is in sealing connection with the gas outlet shell body (160) through ultrasonic welding.

43. The atomization device (1) according to claim 42, wherein, one of an end surface of the gas inlet shell body (140) facing the gas outlet shell body (160) and an end surface of the gas outlet shell body (160) facing the gas inlet shell body (140) is provided with a welding line (190), and the welding line (190) extends along a circumferential direction of the shell (100).

44. The atomization device (1) according to claim 43, wherein, a cross section of the welding line (190) is triangular.

45. The atomization device (1) according to any one of claims 15 to 44, further comprising:
a liquid adsorbing body (600), the liquid adsorbing body (600) being installed on the base (150) and configured to adsorb a condensed to-be-atomized medium.

46. The atomization device (1) according to any one of claims 15 to 45, further comprising:
a gas inlet spreader plate (700), the gas inlet spreader plate (700) being installed on the base (150) and covering the gas inlet (131), and the gas inlet spreader plate (700) being provided with a plurality of spreading through holes (710).

47. The atomization device (1) according to any one of claims 1 to 46, further comprising:
a suction port cover (800), the suction port cover (800) being installed on the shell (100) and provided with an opening (810) communicating with the gas suction port (121), and a portion of an inner wall of the gas passage (120) being formed by the suction port cover (800).

48. The atomization device (1) according to claim 47, wherein, a surface of an end of the shell (100) provided with the gas suction port (121) is configured with a cover groove (820), and the suction port cover (800) is installed in the cover groove (820).

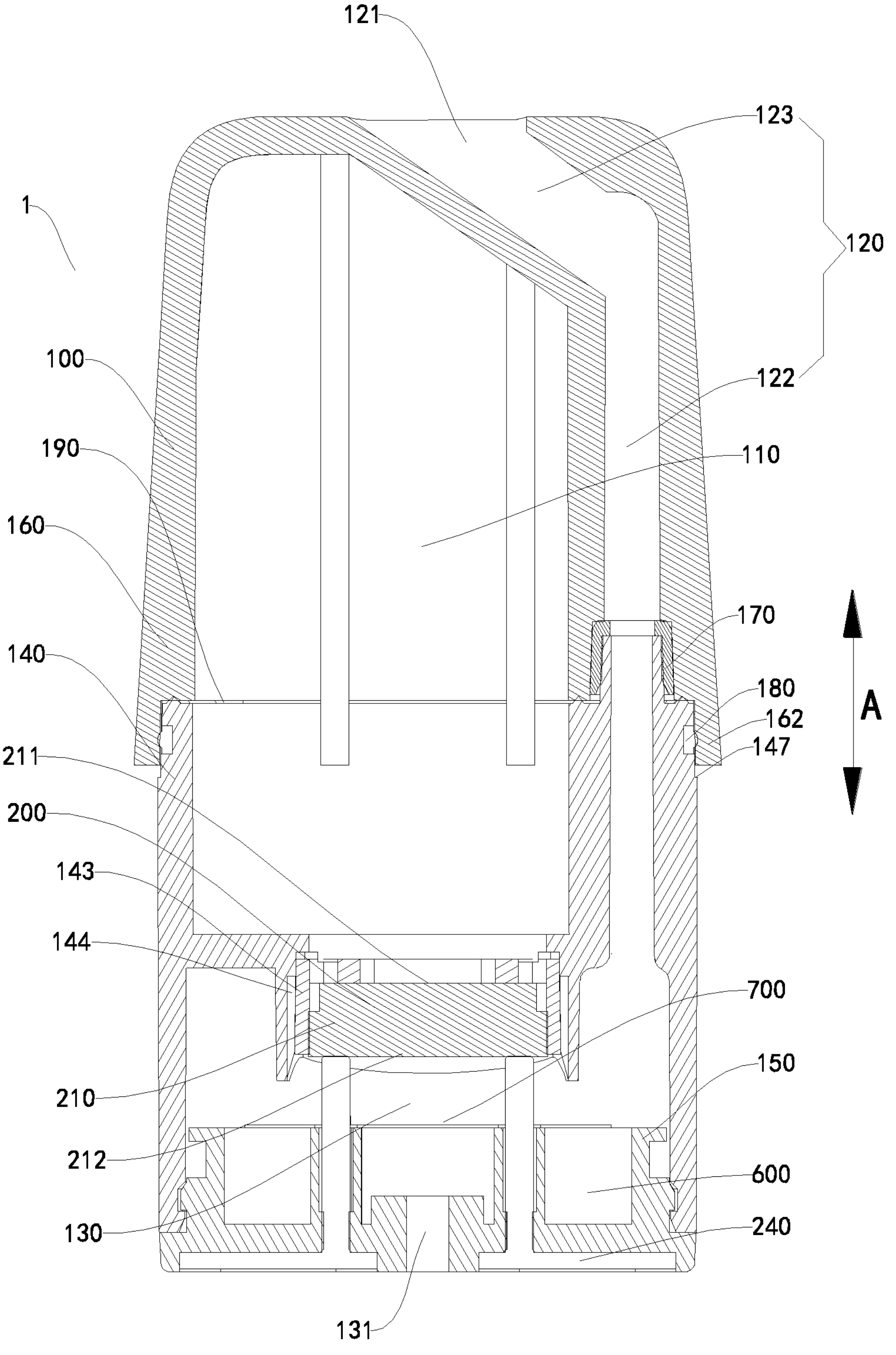
49. The atomization device (1) according to any one of claims 1 to 48, wherein, the atomization core (200) comprises:

a porous body (210), the porous body (210) having a liquid adsorbing surface (211) and an atomization surface (212), the liquid adsorbing surface (211) communicating with the oil storage chamber (110), the atomization surface (212) communicating with the atomization chamber (130), and the porous body (210) having a plurality of liquid adsorbing holes enabling the liquid adsorbing surface (211) and the atomization surface (212) to communicate; and
a heating body (220), the heating body (220) being arranged on the atomization surface (212) of the porous body (210).

50. The atomization device (1) according to claim 49, wherein, the heating body is connected with an abutting sheet (230), and the abutting sheet (230) is energized with the outside of the atomization device

(1) through a conductive member (240).

51. An electronic cigarette, comprising an atomization device (1) according to any one of claims 1 to 50.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147
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200
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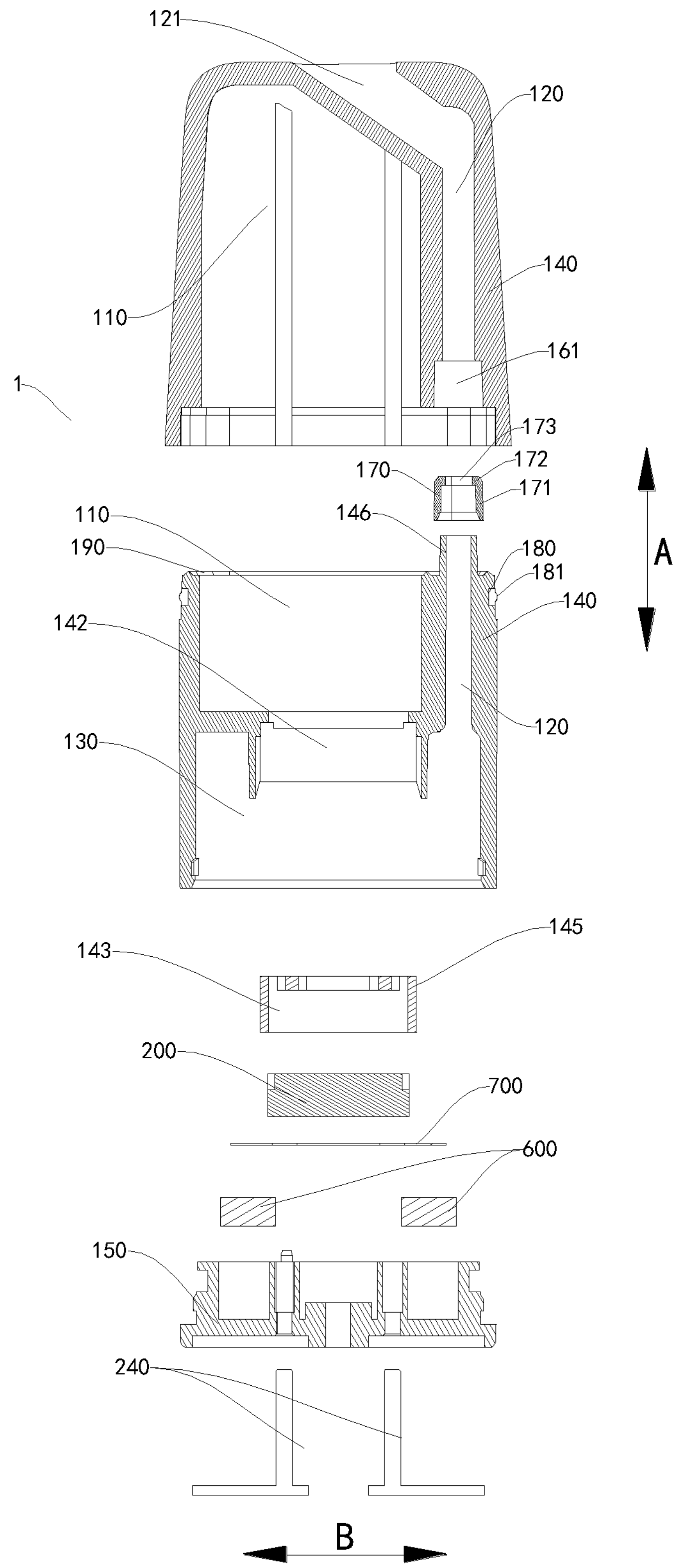
700
210
150
212
600
130
240
131

FIG. 1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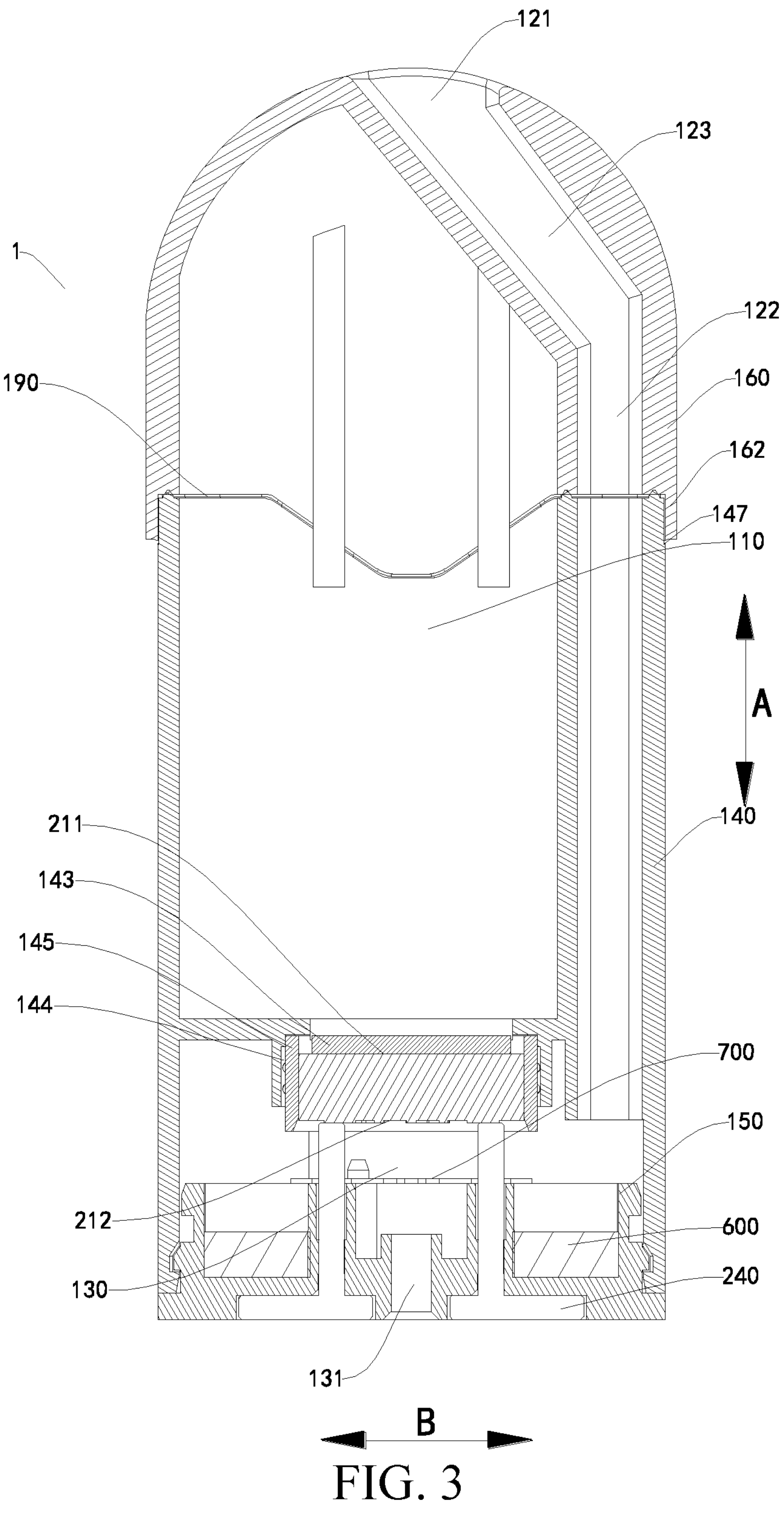
143
145
200
700
600
150
240
B

FIG. 2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600
130
240
131
B

FIG. 3

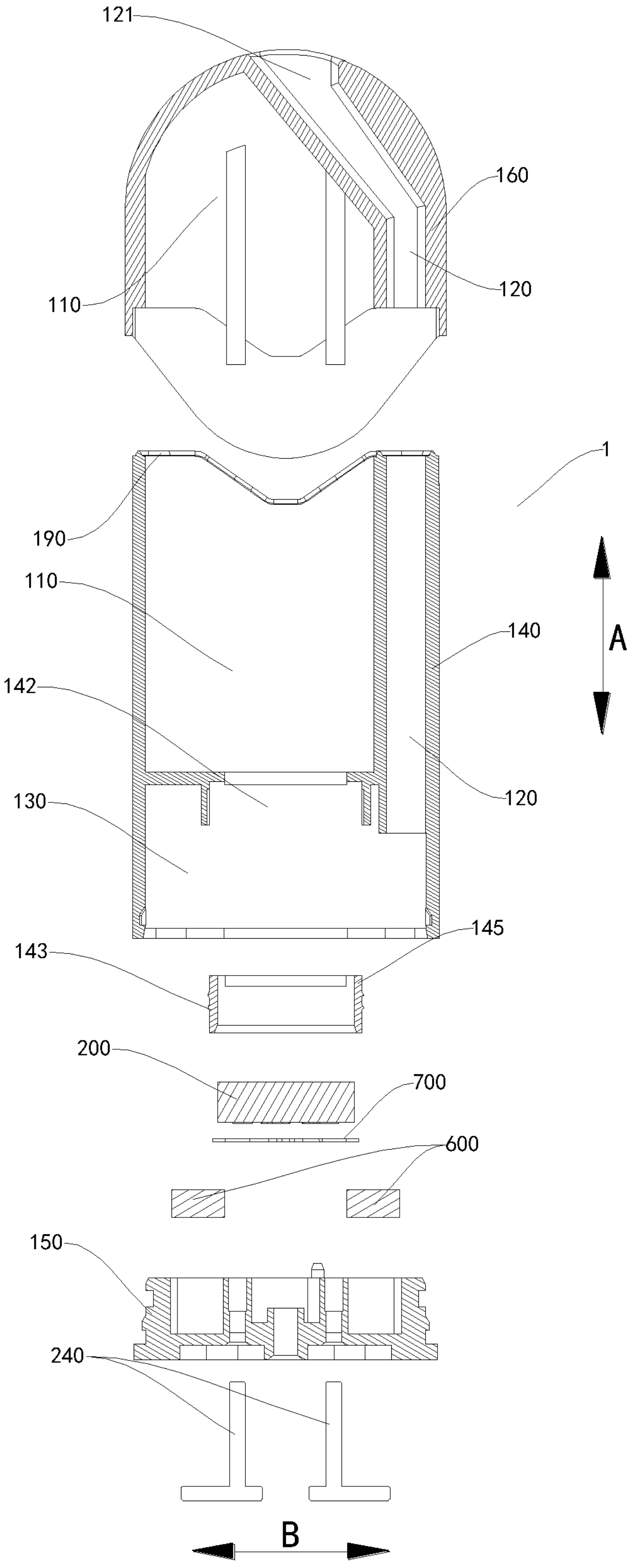
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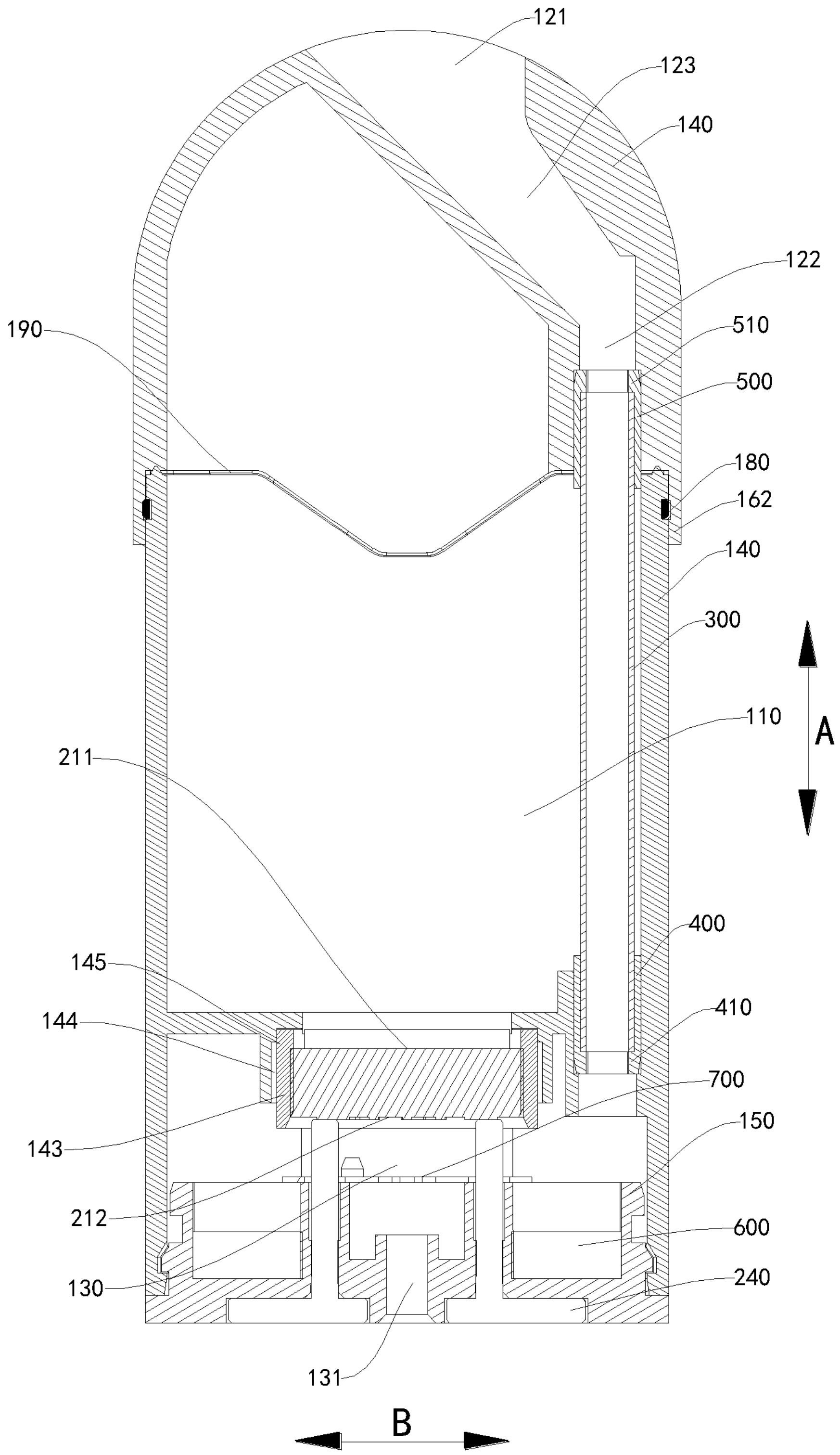
FIG. 4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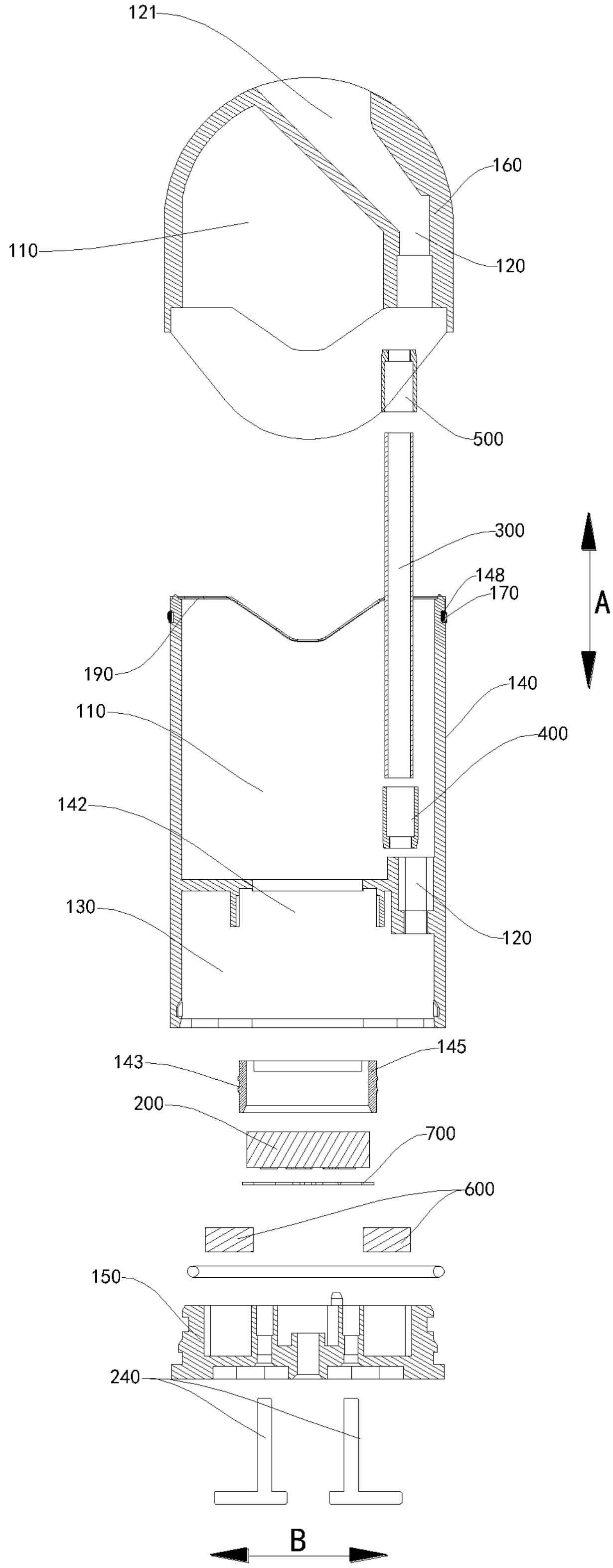
240
131
B

FIG. 5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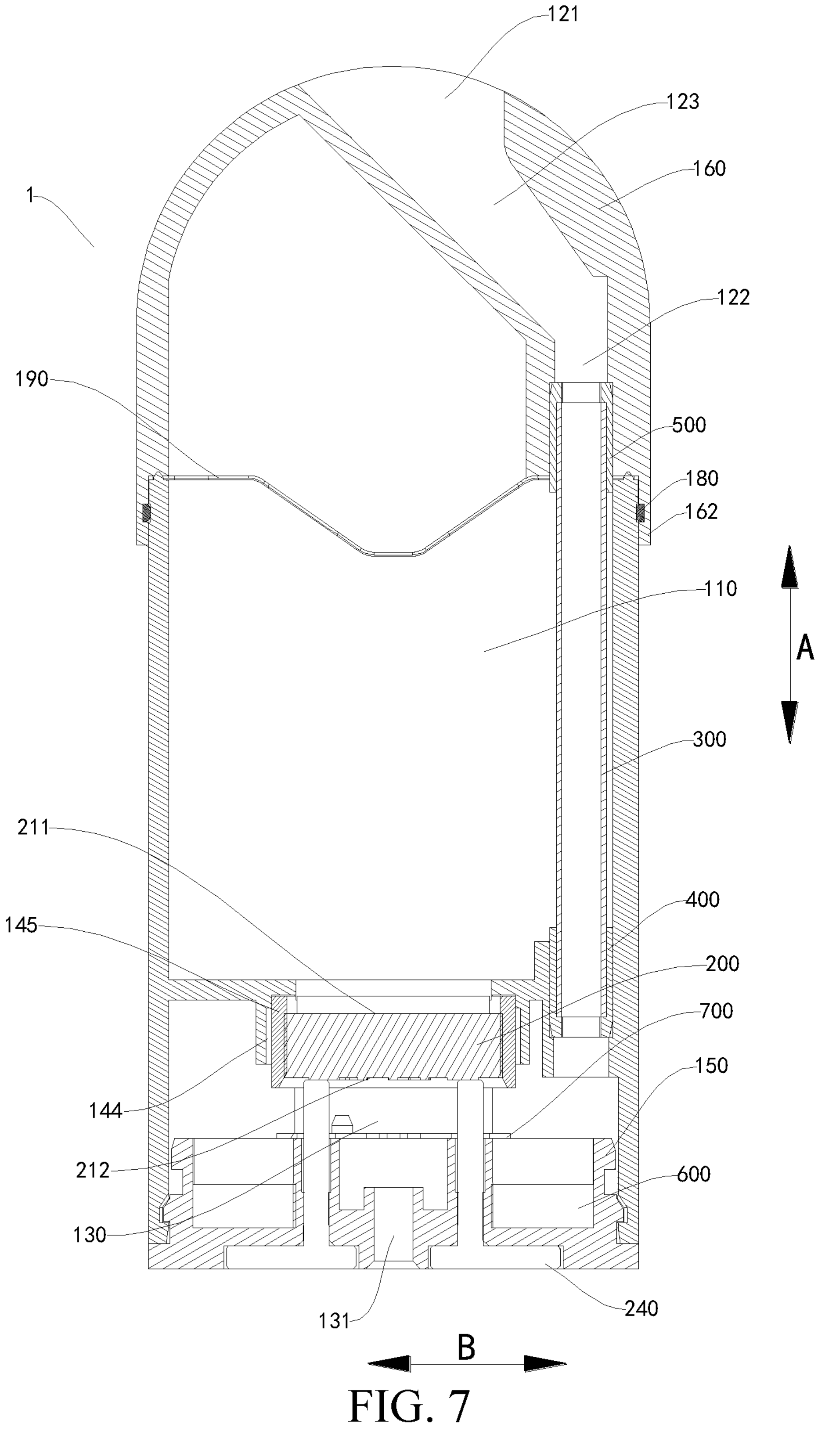
240
B

FIG. 6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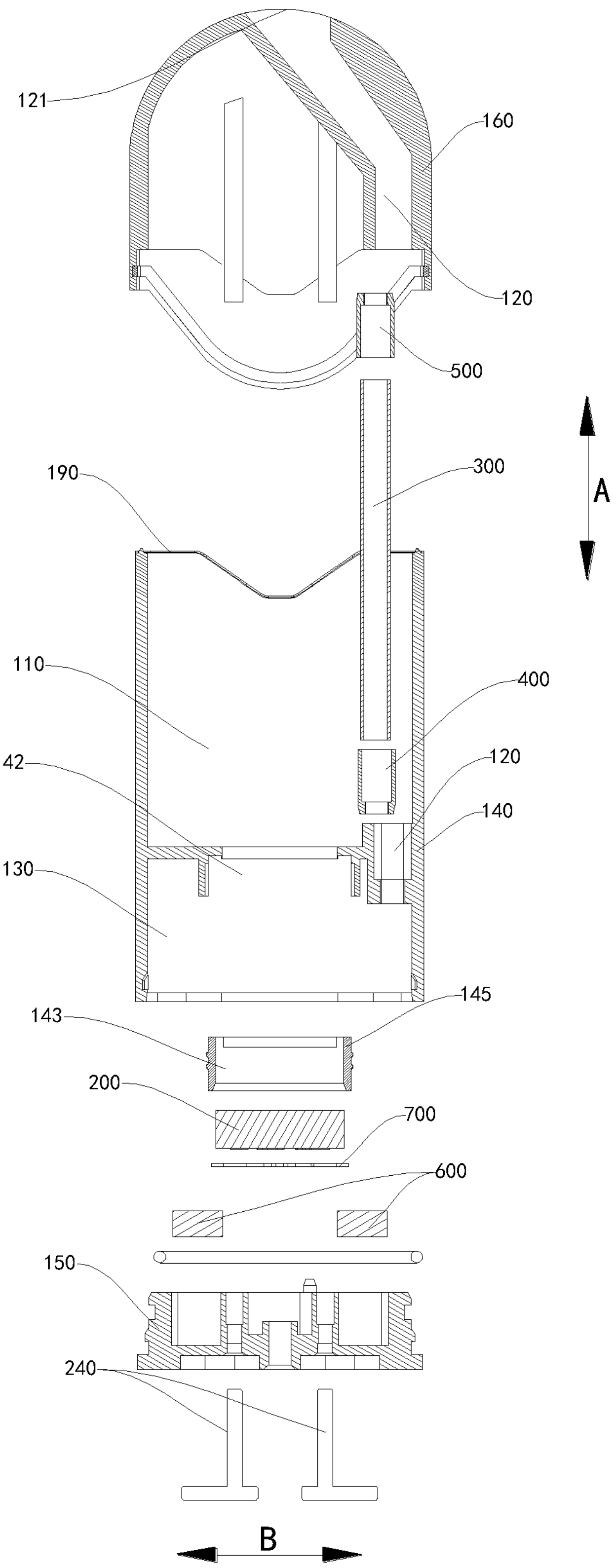
130
131
240
B

FIG. 7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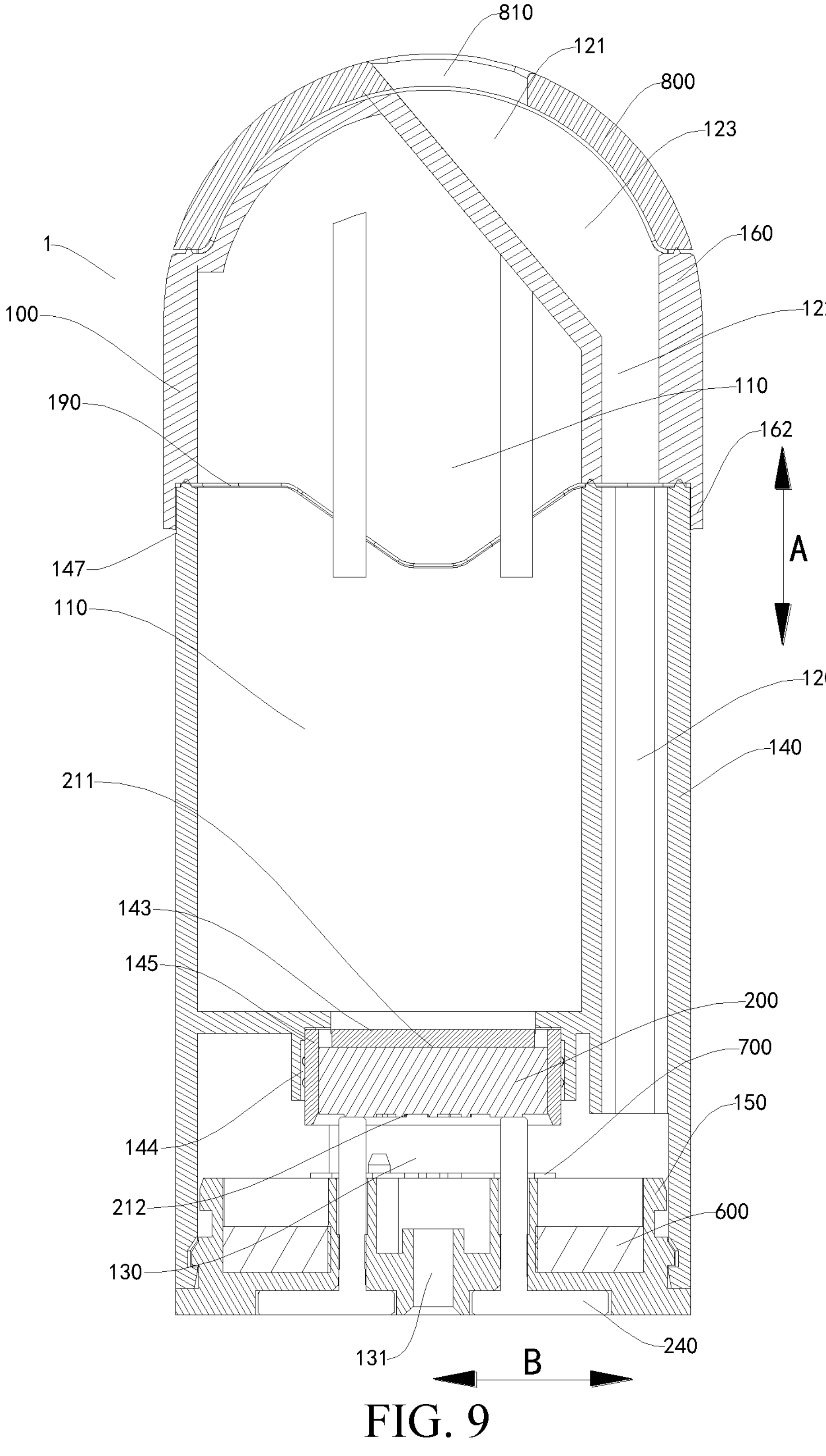
B

FIG. 8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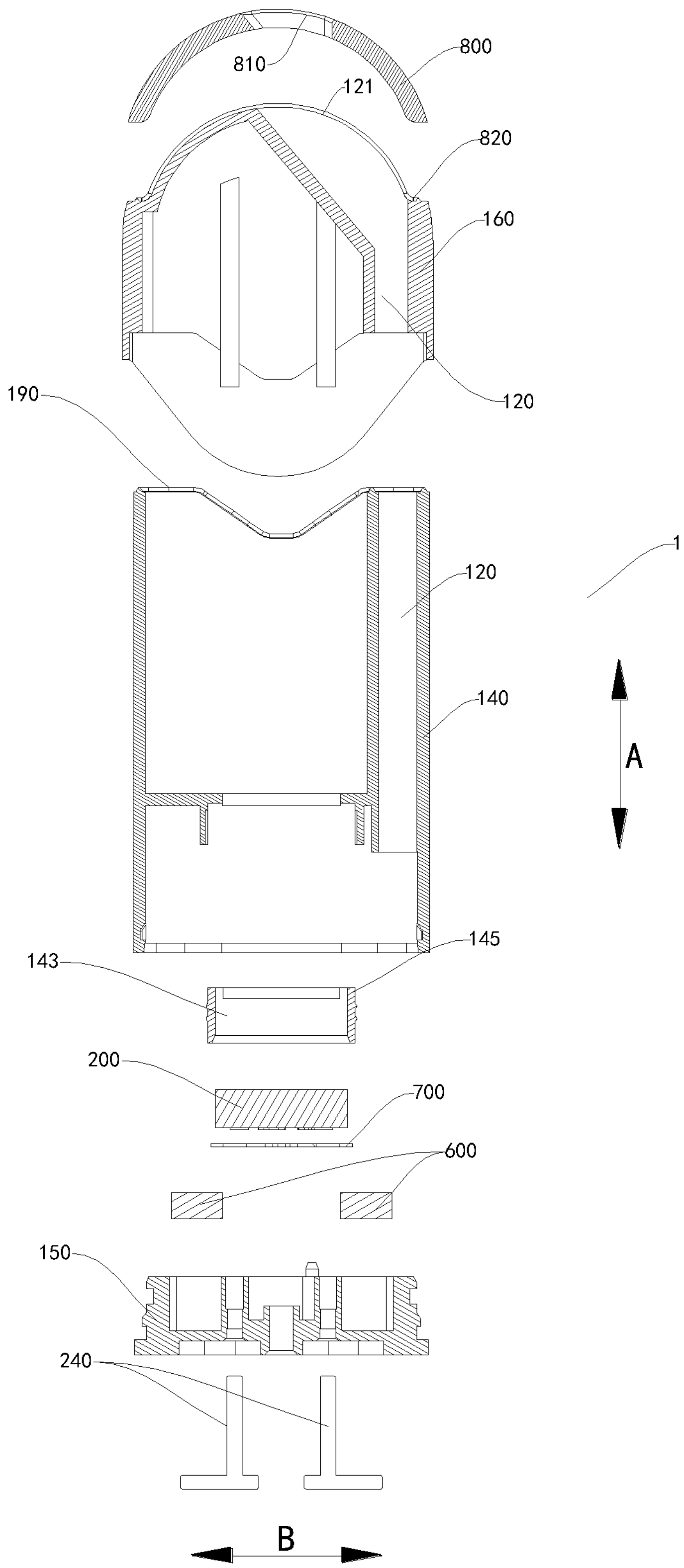
131
240
B

FIG. 9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150
240
B

FIG. 10

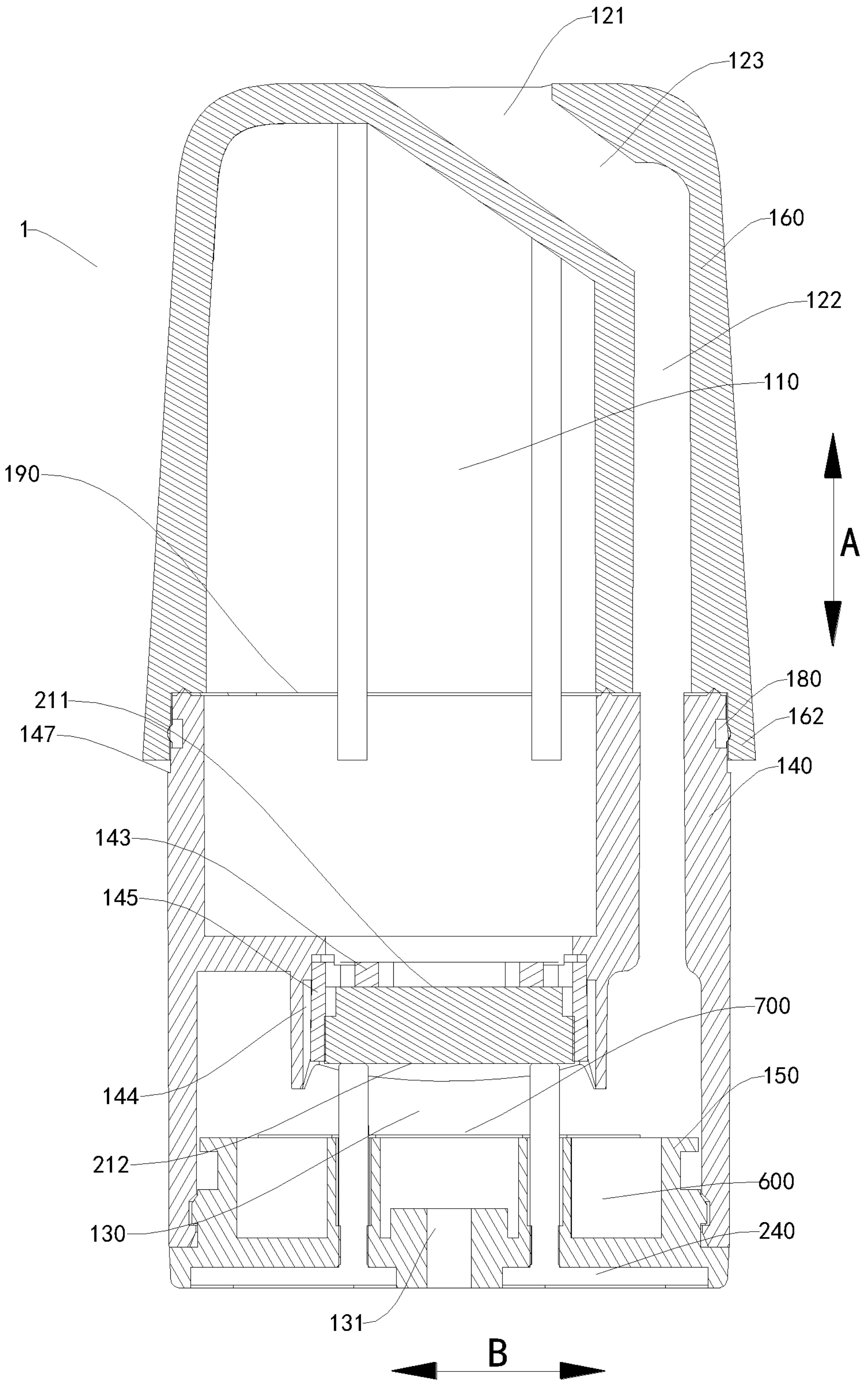
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FIG. 11

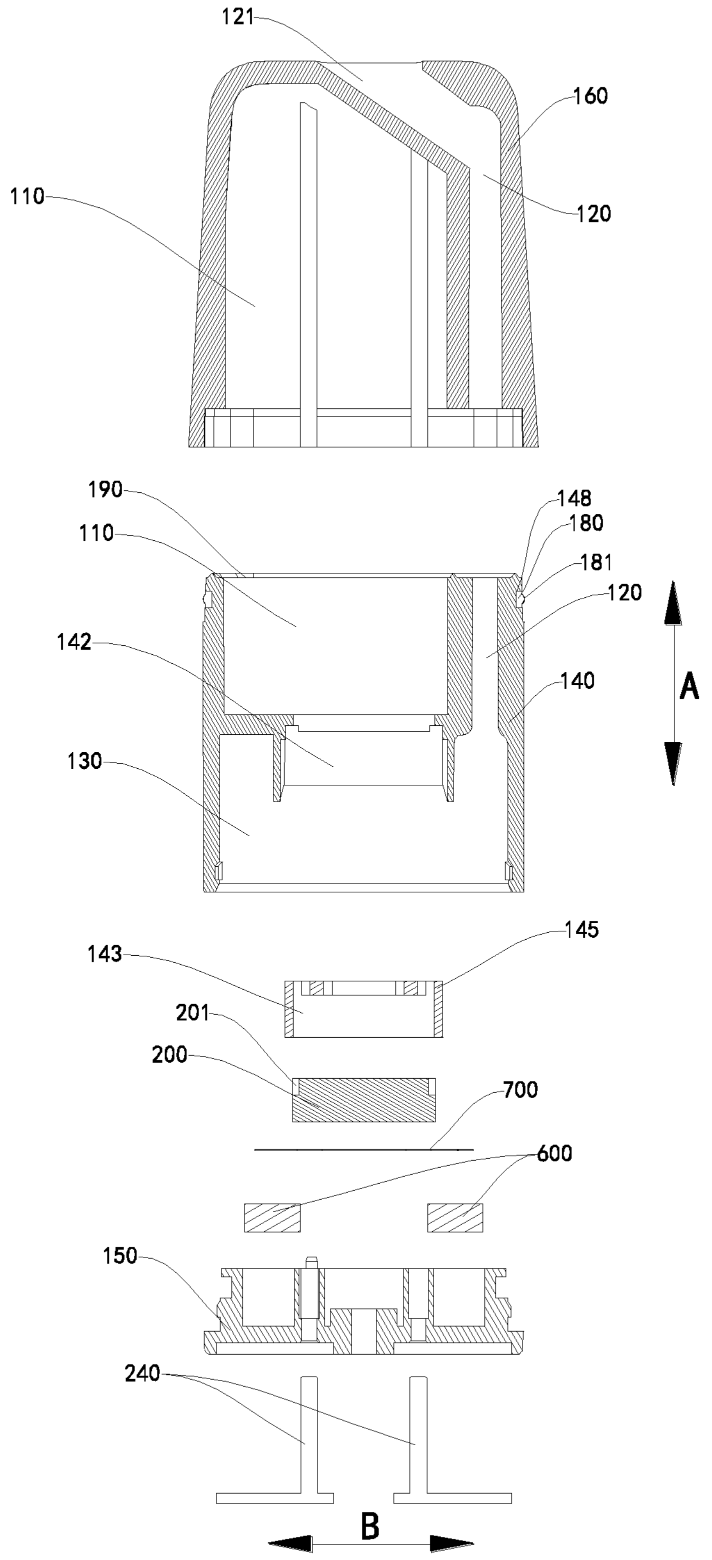
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FIG. 12

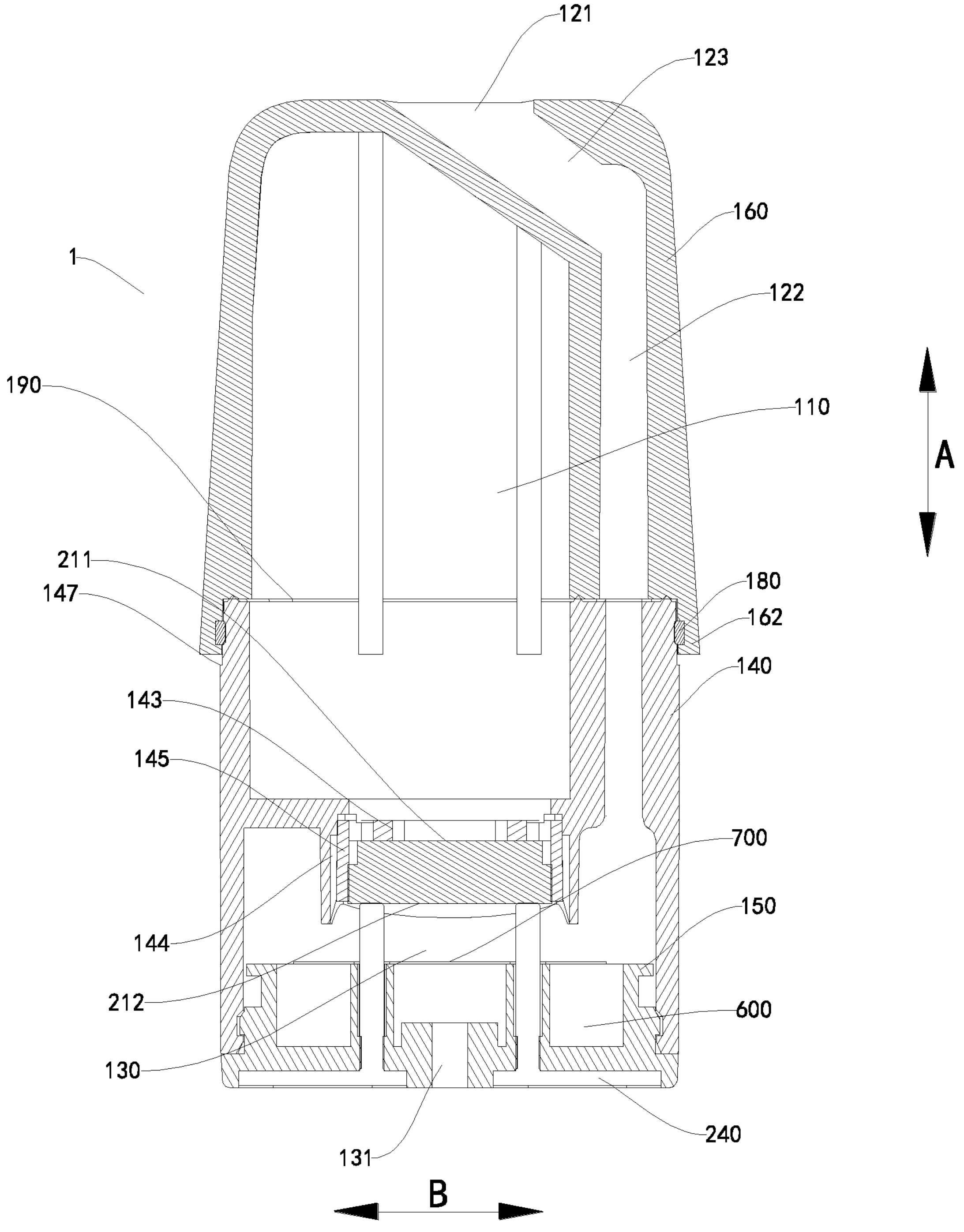
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FIG. 13

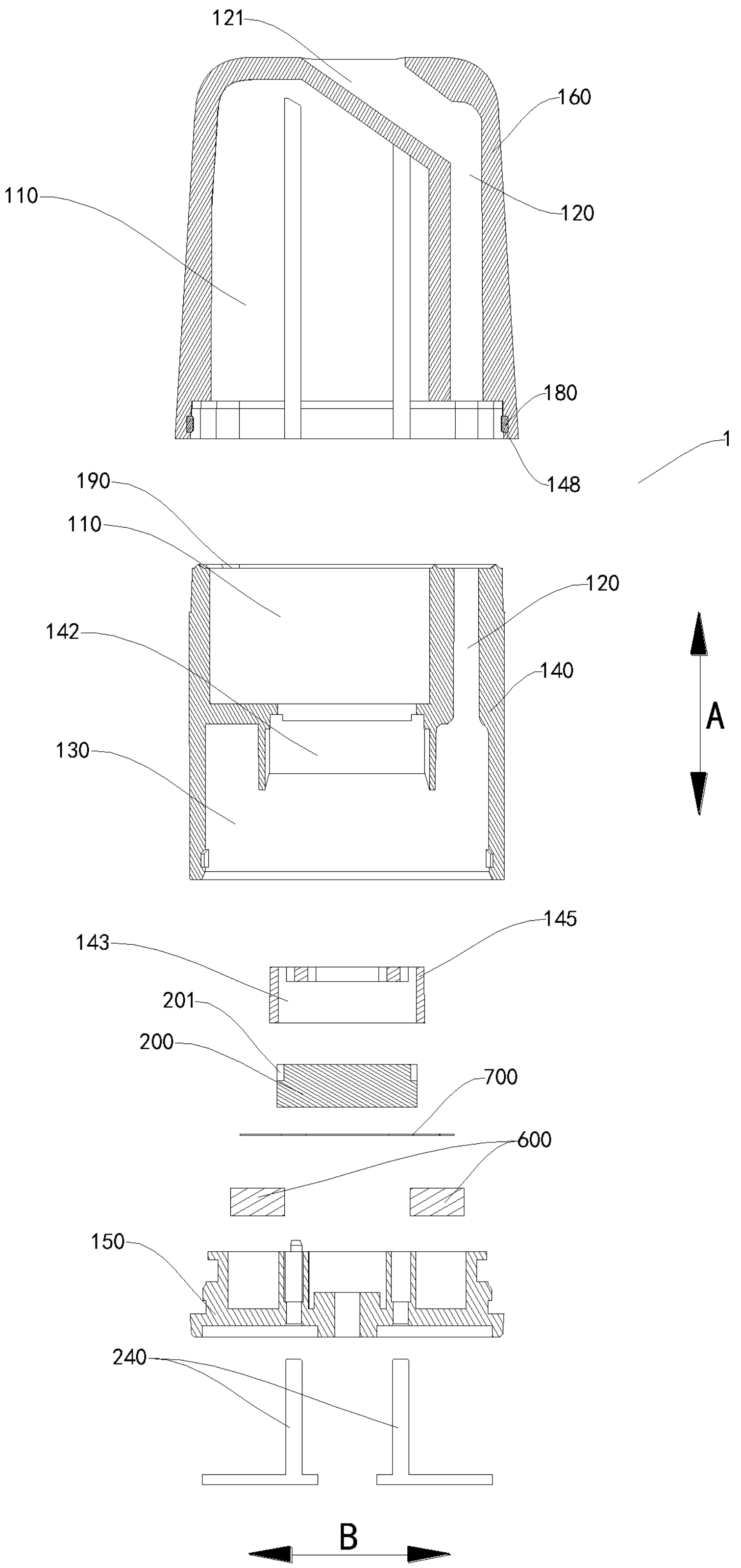
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FIG. 14

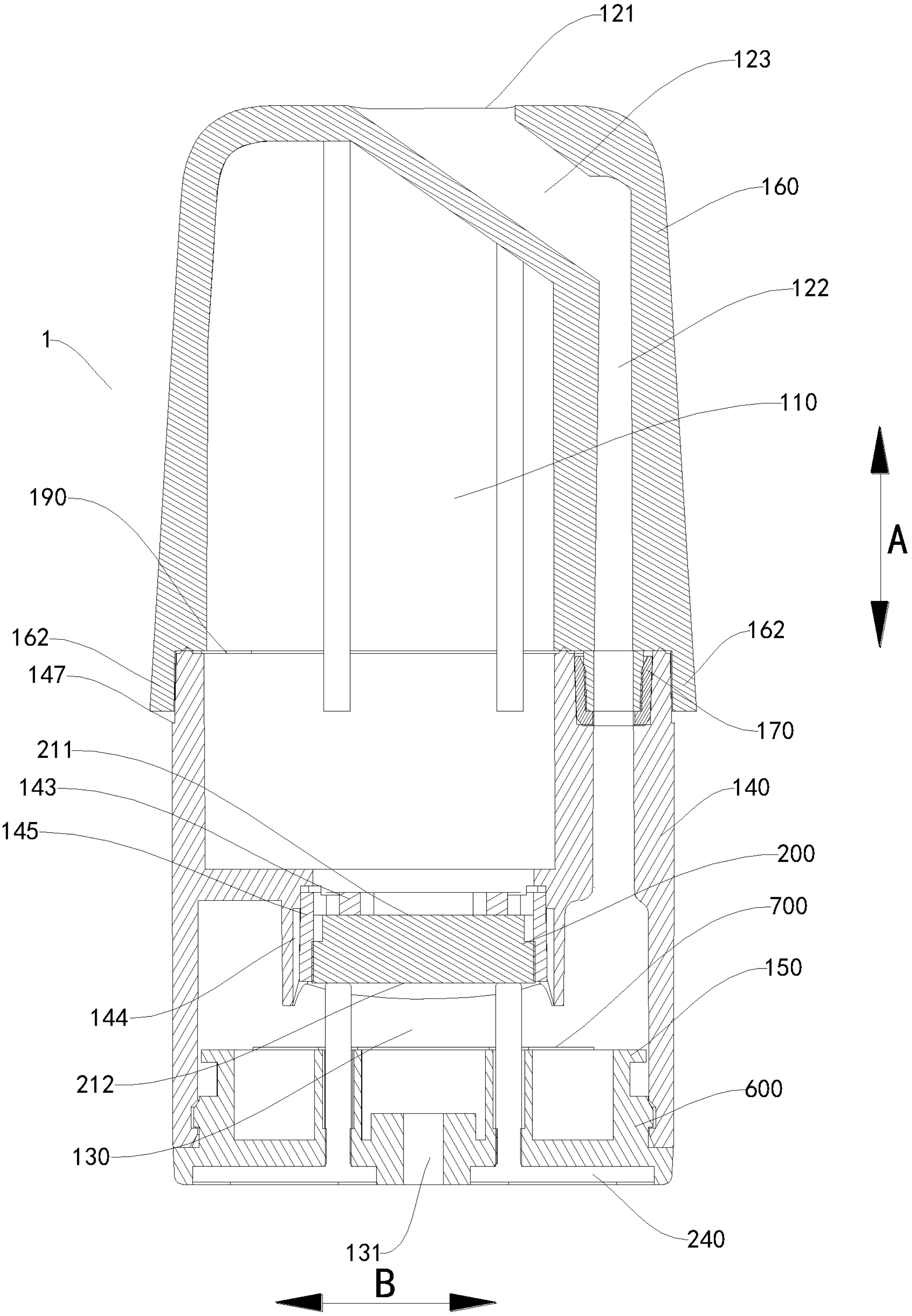
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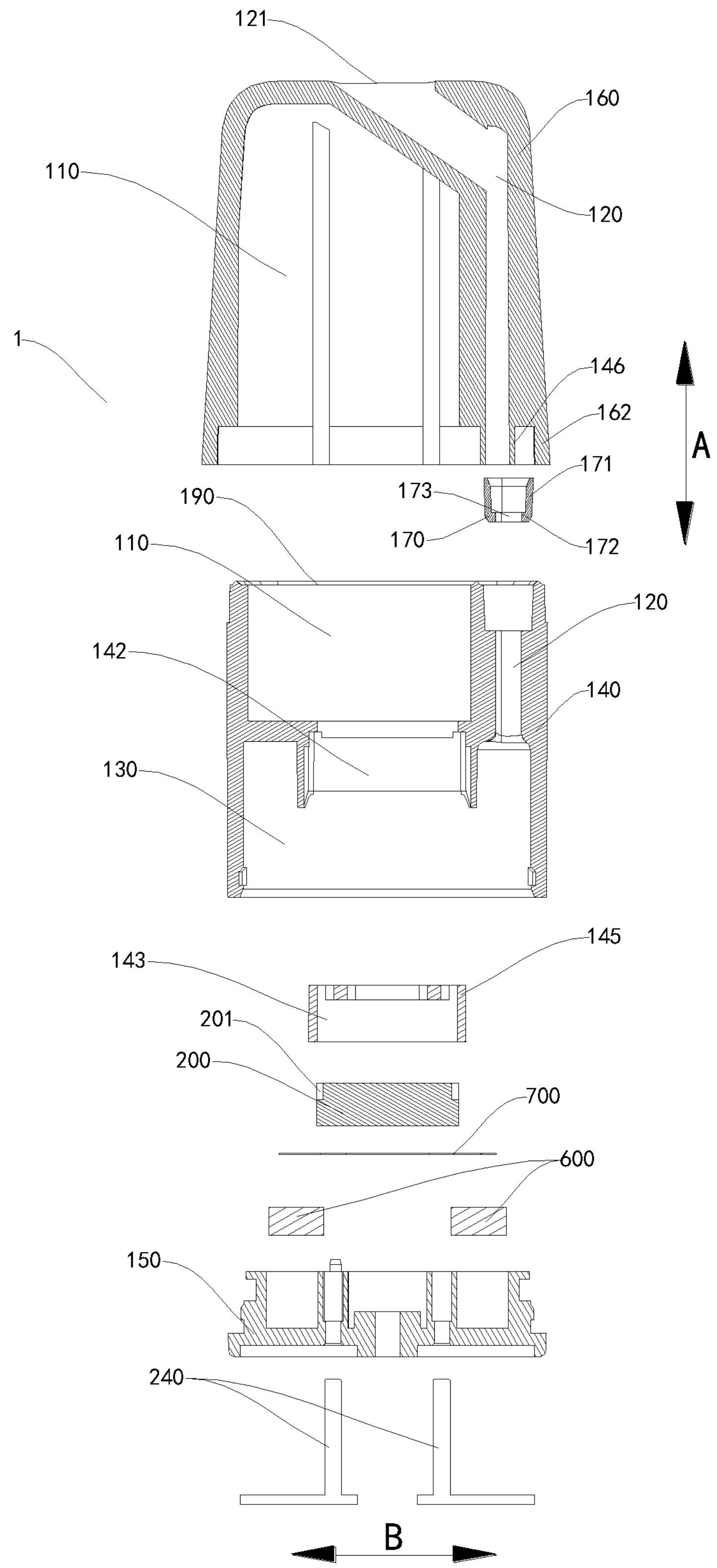
FIG. 15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240
B

FIG. 16

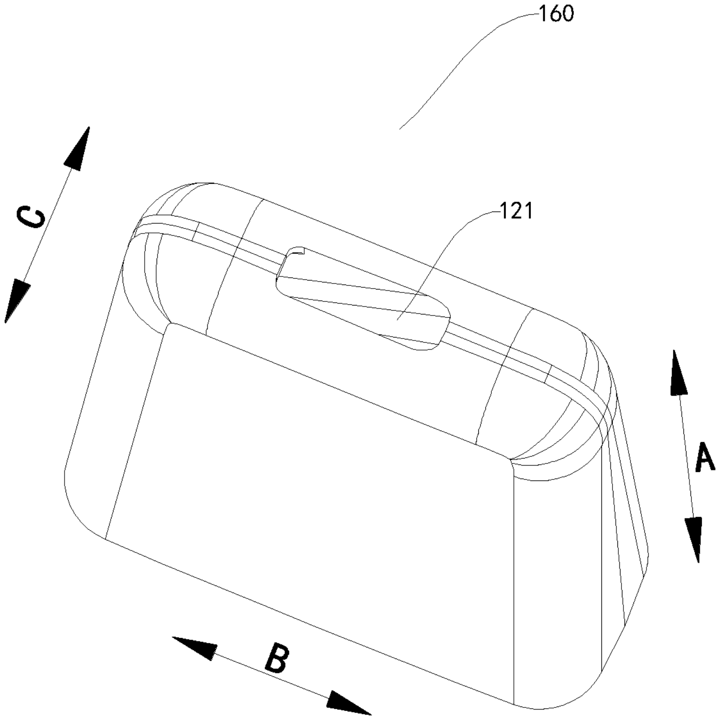
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FIG. 17

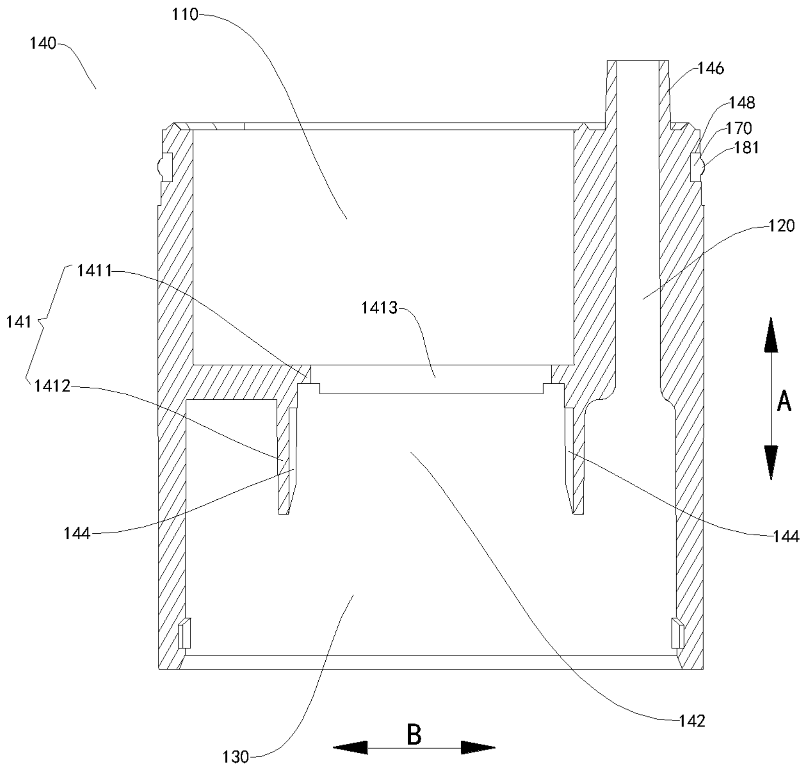
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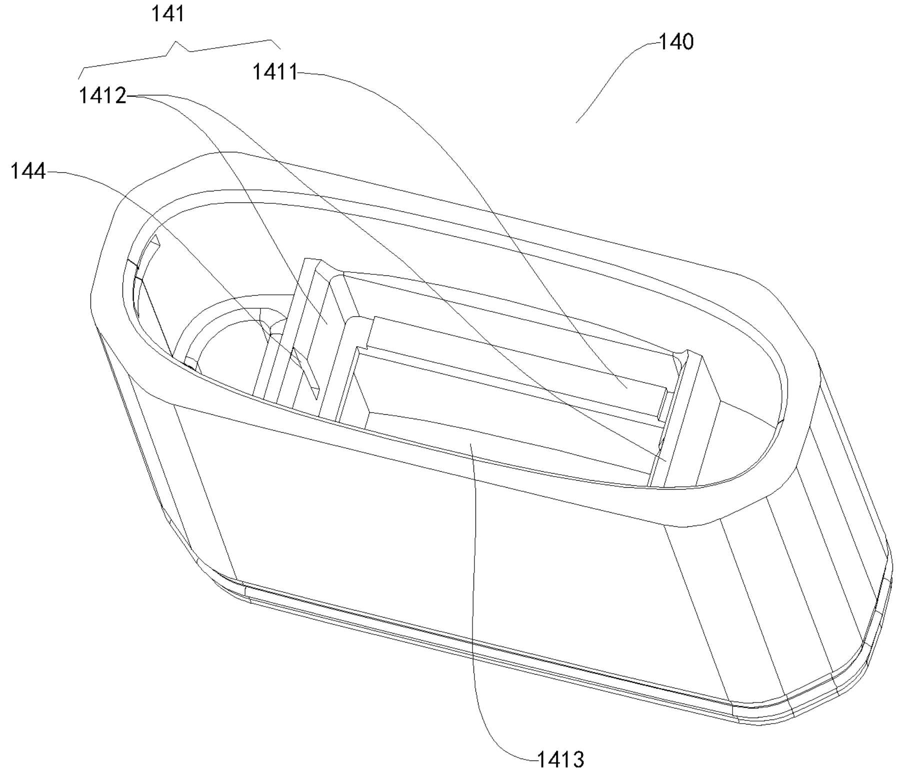
FIG. 18



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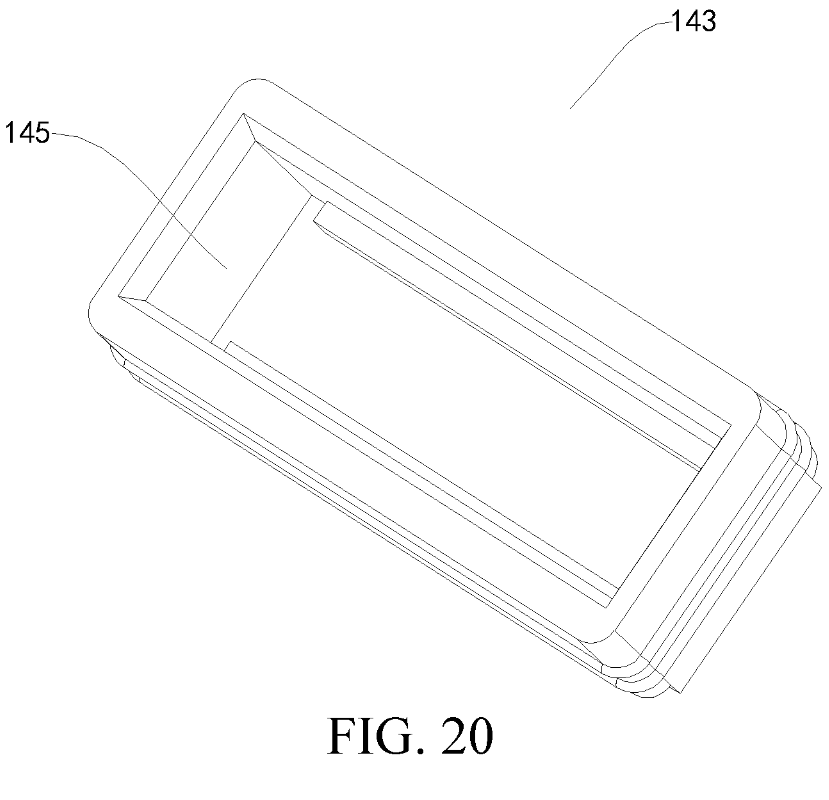

FIG. 20

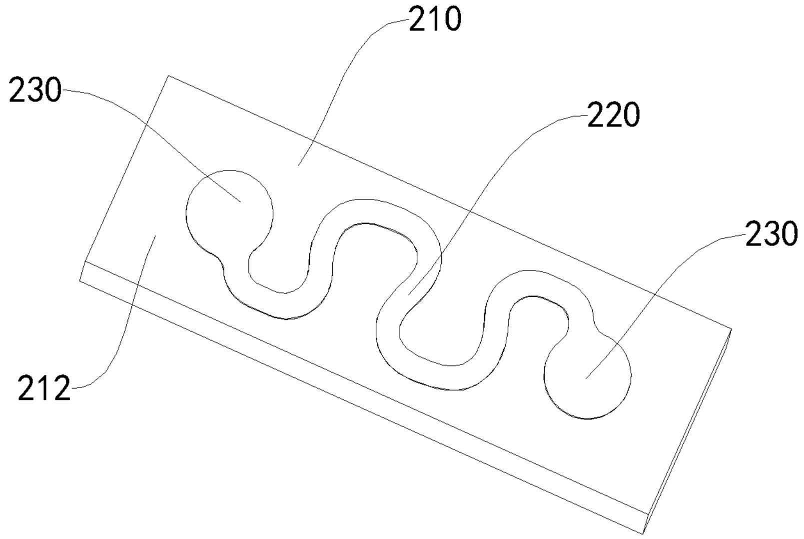

FIG. 21

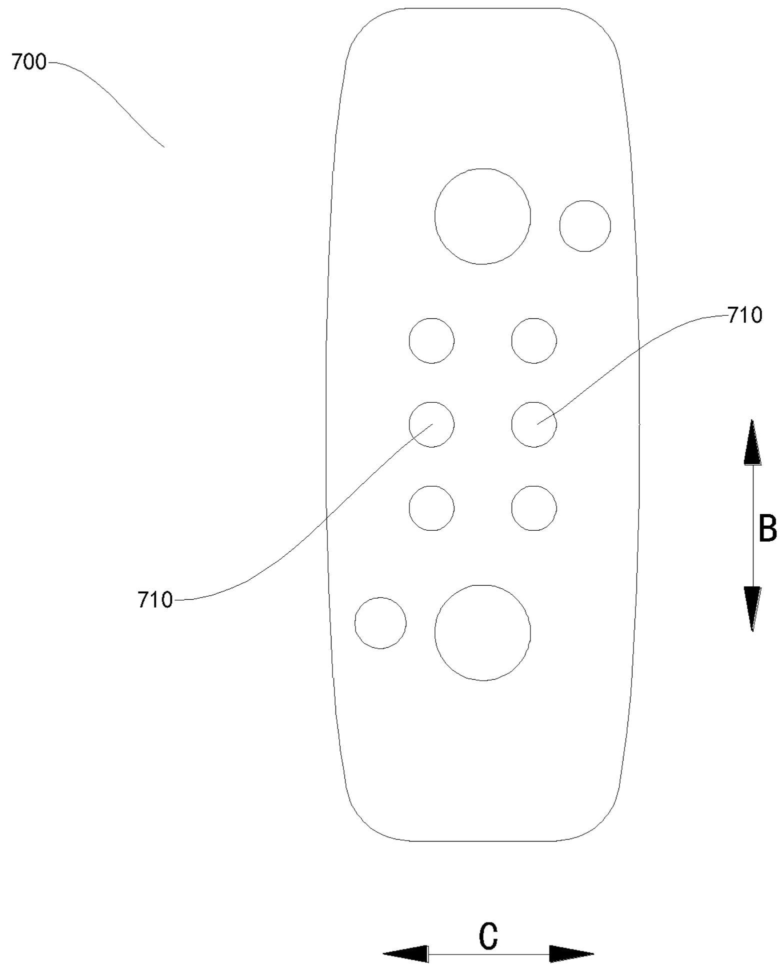

FIG. 22

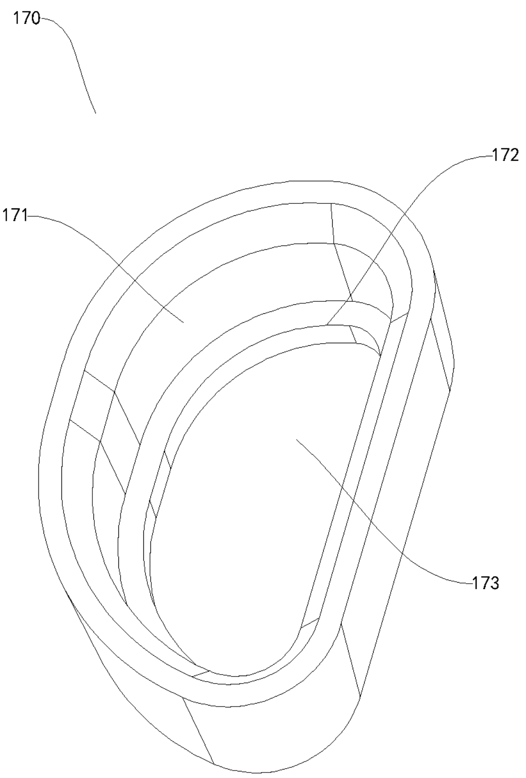

FIG. 23

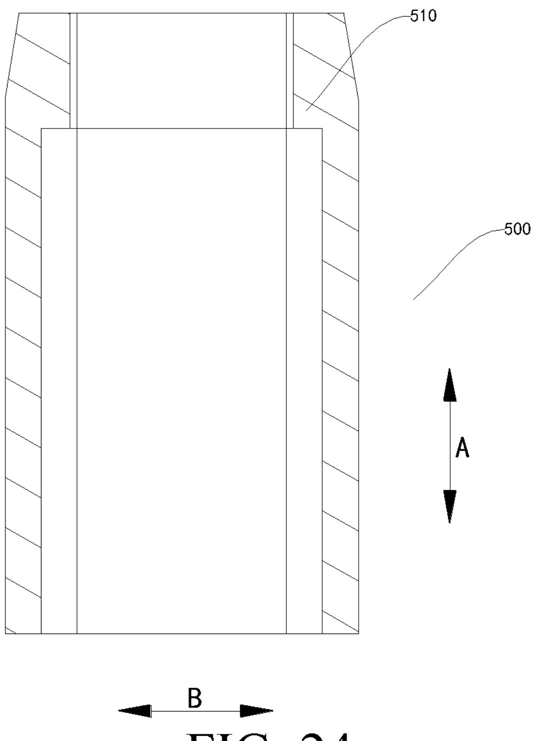

FIG. 24

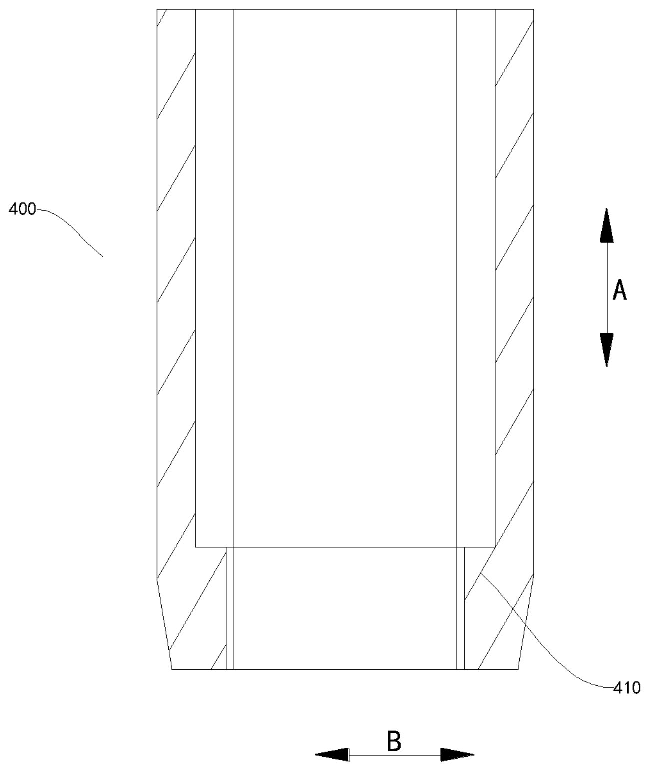

FIG. 25

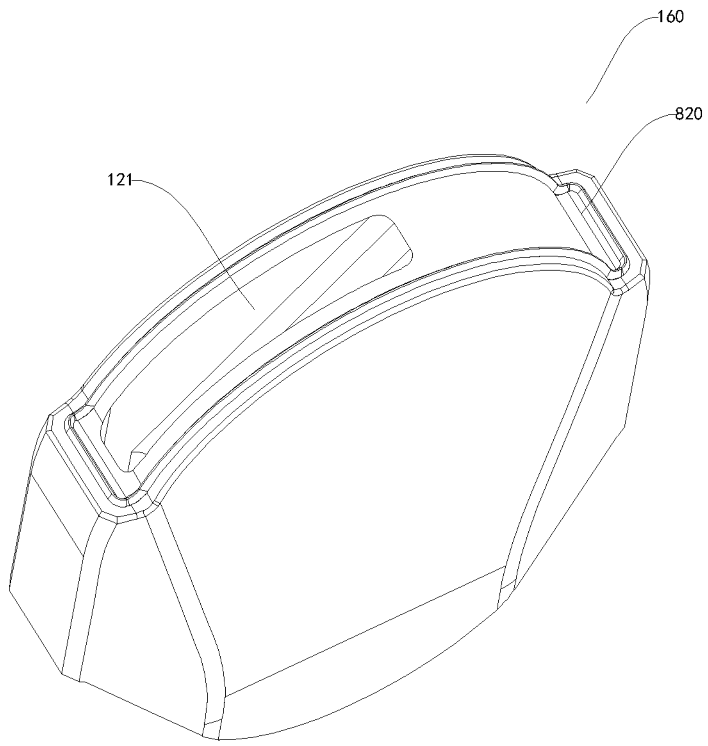

FIG. 26

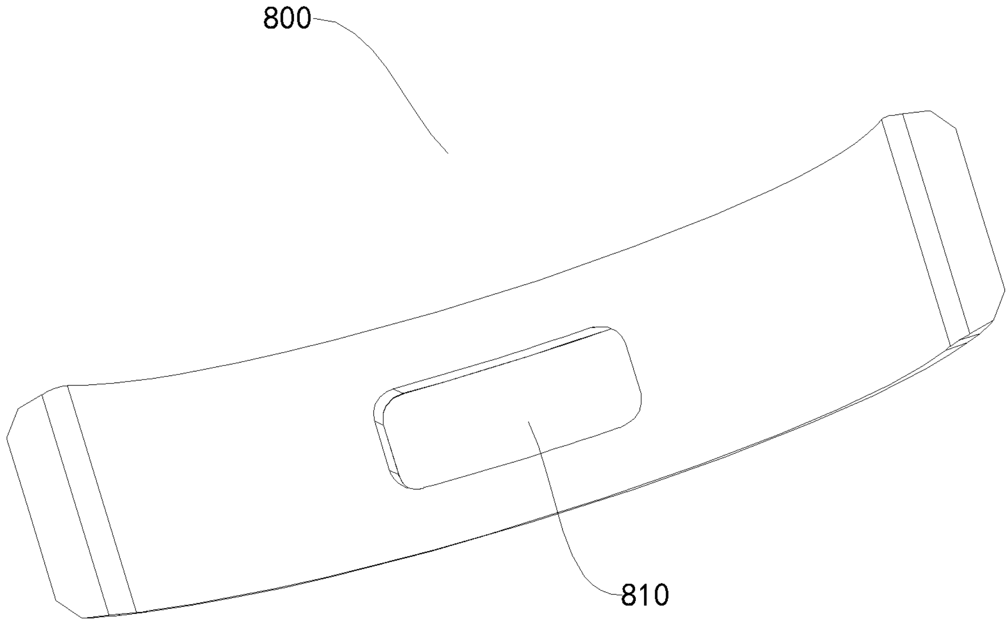

FIG. 27

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2022/137964

A. CLASSIFICATION OF SUBJECT MATTER

A24F40/40(2020.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC:A24F

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

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

CNTXT, ENTXTC, WPABSC, DWPI: 雾化, 薄, 扁平, 拆卸, 焊, 厚度, 装配, 组装, 密封, 一体成型, 漏, thickness, flat, seal, disassembly, assembly, integral

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 216961503 U (BYD PRECISION MANUFACTURE CO., LTD.) 15 July 2022 (2022-07-15) description, paragraphs 107-201, and figures 1-27	1-51
X	CN 113142662 A (SHENZHEN SMOORE TECHNOLOGY LIMITED) 23 July 2021 (2021-07-23) description, paragraphs 52-78, and figures 1-12	1-14, 49, 51
Y	CN 113142662 A (SHENZHEN SMOORE TECHNOLOGY LIMITED) 23 July 2021 (2021-07-23) description, paragraphs 52-78, and figures 1-12	15-48, 50
Y	CN 213549686 U (SHENZHEN SMISS TECHNOLOGY CO., LTD.) 29 June 2021 (2021-06-29) description, paragraphs 37-48, and figures 1-10	15-48, 50
Y	CN 112716052 A (SHENZHEN POOLAN TECHNOLOGY CO., LTD.) 30 April 2021 (2021-04-30) description, paragraphs 35-80, and figures 1-9	15-48, 50

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

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

Date of the actual completion of the international search	Date of mailing of the international search report
9.20230209	**15 February 2023**

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

Form PCT/ISA/210 (second sheet) (July 2022)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2022/137964

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	CN 210248376 U (SHENZHEN WOODY VAPES TECHNOLOGY CO., LTD.) 07 April 2020 (2020-04-07) description, paragraphs 31-37, and figures 1-3	15-48, 50
A	CN 113197356 A (SHENZHEN HUACHENGDA PRECISION INDUSTRY CO., LTD.) 03 August 2021 (2021-08-03) entire document	1-51
A	CN 111011937 A (SHENZHEN HANGSEN STAR TECHNOLOGY CO., LTD.) 17 April 2020 (2020-04-17) entire document	1-51
A	CN 113558301 A (CHINA TOBACCO (TIANJIN) TECHNOLOGY CO., LTD.) 29 October 2021 (2021-10-29) entire document	1-51
A	CN 113693289 A (SHENZHEN SMOORE TECHNOLOGY LIMITED) 26 November 2021 (2021-11-26) entire document	1-51
A	CN 212697680 U (SHENZHEN AISUO TECHNOLOGY RESEARCH CO., LTD.) 16 March 2021 (2021-03-16) entire document	1-51
A	CN 211794341 U (BOULDER (SHENZHEN) TECHNOLOGIES, INC.) 30 October 2020 (2020-10-30) entire document	1-51
A	CN 111134364 A (SHENZHEN KANGHONGWEI TECHNOLOGY CO., LTD.) 12 May 2020 (2020-05-12) entire document	1-51
A	CN 210538921 U (SHENZHEN YOUME NETWORK TECHNOLOGY CO., LTD.) 19 May 2020 (2020-05-19) entire document	1-51
A	CN 211048396 U (SHENZHEN FIRST UNION TECHNOLOGY CO., LTD.) 21 July 2020 (2020-07-21) entire document	1-51
A	CN 211832825 U (SHENZHEN THUNDERSTONE TECHNOLOGY CO., LTD.) 03 November 2020 (2020-11-03) entire document	1-51
A	CN 214229831 U (DONGGUAN ALPHA ELECTRONIC TECHNOLOGY CO., LTD.) 21 September 2021 (2021-09-21) entire document	1-51
A	US 2018303166 A1 (JOYETECH EUROPE HOLDING GMBH) 25 October 2018 (2018-10-25) entire document	1-51

Form PCT/ISA/210 (second sheet) (July 2022)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2022/137964

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN 216961503 U	15 July 2022	None	
CN 113142662 A	23 July 2021	WO 2022213499 A1	13 October 2022
CN 213549686 U	29 June 2021	None	
CN 112716052 A	30 April 2021	CN 211608220 U	02 October 2020
CN 210248376 U	07 April 2020	None	
CN 113197356 A	03 August 2021	None	
CN 111011937 A	17 April 2020	None	
CN 113558301 A	29 October 2021	None	
CN 113693289 A	26 November 2021	None	
CN 212697680 U	16 March 2021	None	
CN 211794341 U	30 October 2020	None	
CN 111134364 A	12 May 2020	WO 2021143336 A1	22 July 2021
CN 210538921 U	19 May 2020	None	
CN 211048396 U	21 July 2020	None	
CN 211832825 U	03 November 2020	None	
CN 214229831 U	21 September 2021	None	
US 2018303166 A1	25 October 2018	WO 2017211137 A1	14 December 2017
		EP 3469930 A1	17 April 2019
		EP 3469930 A4	04 March 2020
		EP 3469930 B1	09 June 2021
		US 11103660 B2	31 August 2021

Form PCT/ISA/210 (patent family annex) (July 2022)

REFERENCES CITED IN THE DESCRIPTION

Patent documents cited in the description

- CN 202111557607 **[0001]**