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

(57) Provided in this application is a vaporizer and an electronic vaporization device. The vaporizer includes a liquid storage cavity; a vaporization assembly, in fluid communication with the liquid storage cavity to obtain a liquid substrate and heat the liquid substrate to generate an aerosol; a first sealing element, at least partially sealing the liquid storage cavity; a support, used for supporting the first sealing element to at least partially locate the first sealing element between the support and the liquid storage cavity, a first through hole being provided in the support; and a first air guiding element, at least partially extending in the first through hole, and defining first air channels together with the first through hole or by itself to provide first flow paths for air to enter the liquid storage cavity. According to the above vaporizer, by forming the first through hole in the support and defining the air channels for the outside air to enter the liquid storage cavity together with the first air guiding element at least partially arranged in the first through hole, when the negative pressure in the liquid storage cavity exceeds a certain threshold value, the air is replenished into the liquid storage cavity to relieve the negative pressure in the liquid storage cavity.

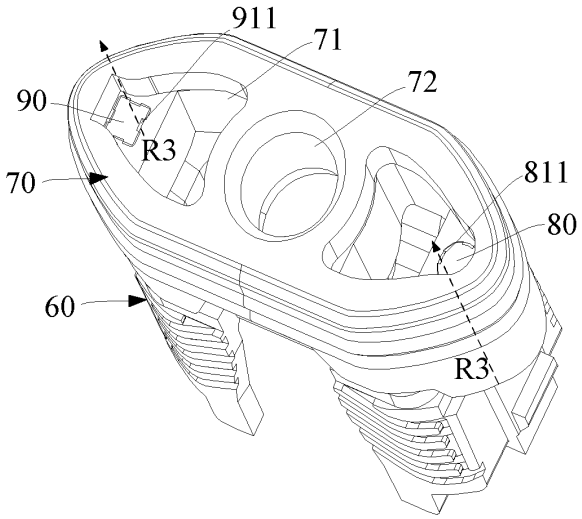


FIG. 10

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## Description

### CROSS-REFERENCE TO RELATED APPLICATIONS

**[0001]** This application claims the priority of the prior application No. 202120273292.1, filed to the China National Intellectual Property Administration on January 29, 2021 and entitled "vaporizer and electronic vaporization device", and claims the priority of the prior application No. 202121667103.5 filed to the China National Intellectual Property Administration on July 21, 2021 and entitled "vaporizer, electronic vaporization device and sealing element for vaporizer", the contents of which are incorporated herein by reference.

### TECHNICAL FIELD

**[0002]** Embodiments of this application relate to the technical field of electronic vaporization devices, and in particular, to a vaporizer and an electronic vaporization device.

### BACKGROUND

**[0003]** Tobacco products (e.g., cigarettes, cigars, etc.) burn tobacco in a using process to generate tobacco smoke. Attempts are made to replace these tobacco-burning products by manufacturing products that release compounds without burning.

**[0004]** An example of such products is a heating device that releases compounds by heating rather than burning materials. For example, the materials may be tobacco or other non-tobacco products, where the non-tobacco products may or may not contain nicotine. As another example, there are aerosol-providing products, e.g., so-called electronic vaporization devices. These devices usually contain vaporizable liquid, and the liquid is heated to be vaporized, so as to generate an inhalable aerosol.

**[0005]** A known electronic vaporization device stores and provides a liquid substrate through a liquid storage cavity, and sucks and transfers the liquid substrate to a heating element for heating and vaporization through a liquid guiding element. With consumption of liquid, the negative pressure in the liquid storage cavity will be gradually increased, making it difficult to suck and transfer the liquid substrate by the liquid guiding element.

### SUMMARY

**[0006]** Provided in an embodiment of this application is a vaporizer, configured to vaporize a liquid substrate to generate an aerosol, and including:

a liquid storage cavity used for storing the liquid substrate;

a vaporization assembly, in fluid communication with the liquid storage cavity to suck the liquid substrate and heat the liquid substrate to generate the aerosol;

a first sealing element, at least partially sealing the liquid storage cavity;

a support, used for supporting the first sealing element in such a way that the first sealing element is at least partially located between the support and the liquid storage cavity, a first through hole being provided in the support; and

a first air guiding element, at least partially extending in the first through hole, and defining first air channels together with the first through hole to provide first flow paths for air to enter the liquid storage cavity.

**[0007]** According to the above vaporizer, by forming the first through hole in the support and defining the air channels for the outside air to enter the liquid storage cavity together with the first air guiding element at least partially arranged in the first through hole, when the negative pressure in the liquid storage cavity exceeds a certain threshold value, the air is replenished into the liquid storage cavity to relieve the negative pressure in the liquid storage cavity.

**[0008]** In a preferred implementation, first grooves extending in an axial direction of the first through hole are provided in a surface of the first air guiding element, and the first air channels are defined between the first grooves and an inner wall of the first through hole.

**[0009]** In a preferred implementation, the first through hole is configured to extend in a longitudinal direction of the vaporizer.

**[0010]** In a preferred implementation, the first air guiding element is configured to be substantially in a column shape.

**[0011]** In a preferred implementation, the first air guiding element includes a first section and a second section in an axial direction; and the first section is close to the liquid storage cavity and has a cross-sectional area greater than that of the second section.

**[0012]** In a preferred implementation, the first air guiding element is flexible.

**[0013]** In a preferred implementation, the support includes a first portion adjacent to the liquid storage cavity in the longitudinal direction of the vaporizer, and a second portion facing away from the first portion, where

the first portion is configured to support the first sealing element;

the second portion is configured to at least partially accommodate and hold the vaporization assembly; and

the through hole is arranged to be located in the first portion.

**[0014]** In a preferred implementation, the first through hole is configured to avoid the second portion in the longitudinal direction of the vaporizer.

**[0015]** In a preferred implementation, the first sealing element is provided with first liquid guiding holes for the liquid substrate in the liquid storage cavity to flow towards

the vaporization assembly; and the first air channels are provided with air outlet ends close to the liquid storage cavity, and the air outlet ends are located in the first liquid guiding holes.

**[0016]** In a preferred implementation, the vaporizer further includes:

a vaporization chamber, providing a space for release of the aerosol, air inlet ends of the first air channels communicating with the vaporization chamber.

**[0017]** In a preferred implementation, the first air guiding element is formed by at least part of the first sealing element extending into the first through hole.

**[0018]** In a preferred implementation, the first groove has a depth of less than 2 mm.

**[0019]** Further provided in another embodiment of this application is a vaporizer, configured to vaporize a liquid substrate to generate an aerosol, including:

a liquid storage cavity used for storing the liquid substrate;

a porous body, including a liquid channel penetrating through the porous body in a length direction and being in fluid communication with the liquid storage cavity through the liquid channel to suck the liquid substrate;

a heating element, bonded to the porous body and used for heating at least part of the liquid substrate in the porous body to generate the aerosol;

a support, used for holding the porous body, the support being provided with a second through hole opposite to the liquid channel; and

a second air guiding element, at least partially extending in the second through hole, and defining second air channels together with the second through hole or by itself to provide second flow paths for air to enter the liquid storage cavity.

**[0020]** In a preferred implementation, the second through hole is configured to extend in a longitudinal direction perpendicular to the vaporizer.

**[0021]** In a preferred implementation, the second air guiding element is configured to be substantially in a column shape.

**[0022]** In a preferred implementation, second grooves extending in an axial direction of the second through hole are provided in a surface of the second air guiding element, and the second air channels are defined between the second grooves and an inner wall of the second through hole.

**[0023]** In a preferred implementation, the support includes a holding space, and the porous body is at least partially accommodated and held in the holding space; and

the second through hole is configured to extend between an inner surface of the holding space and an outer surface of the support.

**[0024]** In a preferred implementation, the support includes a first portion adjacent to the liquid storage cavity in the longitudinal direction of the vaporizer, and a second portion facing away from the first portion; where

the first portion is provided with a first liquid guiding channel in fluid communication with the liquid storage cavity, and a liquid channel of the porous body is in fluid communication with the liquid storage cavity through the first liquid guiding channel;

the second portion is configured to at least partially accommodate and hold the porous body; and

the second through hole is formed in the second portion.

**[0025]** In a preferred implementation, the vaporizer further includes:

a second sealing element, located between the support and the porous body and configured to wrap at least part of an outer surface of the porous body and avoid the second through hole.

**[0026]** Further provided in yet another embodiment of this application is an electronic vaporization device, including a vaporization device used for vaporizing a liquid substrate to generate an aerosol, and a power supply device supplying power to the vaporization device, the vaporization device including the vaporizer mentioned above.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0027]** One or more embodiments are exemplarily illustrated through the corresponding figures in the accompanying drawings, and the exemplary illustrations are not to be construed as limiting the embodiments. Elements in the accompanying drawings that have same reference numerals are represented as similar elements, and unless otherwise particularly stated, the figures in the accompanying drawings are not drawn to scale.

FIG. 1 is a schematic structural diagram of an electronic vaporization device provided by an embodiment.

FIG. 2 is a schematic structural diagram of an embodiment of the vaporizer in FIG. 1.

FIG. 3 is a schematic exploded view of the vaporizer in the embodiment in FIG. 2 from a perspective.

FIG. 4 is a schematic exploded view of the vaporizer in FIG. 3 from another perspective.

FIG. 5 is a schematic cross-sectional structure diagram of the vaporizer in FIG. 3 along a width direction.

FIG. 6 is a schematic structural diagram of a support in FIG. 3 from another perspective.

FIG. 7 is a schematic structural diagram of a vaporization assembly in FIG. 3 from another perspective.

FIG. 8 is a schematic structural diagram of a first air guiding element in FIG. 3 from another perspective.

FIG. 9 is a schematic structural diagram of a second air guiding element in FIG. 3 from another perspec-

tive.

FIG. 10 is a schematic diagram of the support and the air guiding elements in FIG. 3 defining an air channel.

FIG. 11 is a schematic diagram of a support and air guiding elements after assembly according to another embodiment.

FIG. 12 is a schematic cross-sectional view of the support and the air guiding elements in FIG. 11 after assembly.

FIG. 13 is a schematic exploded view of components in FIG. 11 before assembly.

FIG. 14 is a schematic exploded view of a support and a sealing element according to yet another embodiment.

FIG. 15 is a schematic exploded view of the support and the sealing element in FIG. 14 from another perspective.

FIG. 16 is a schematic exploded view of a support and a sealing element before assembly according to still another embodiment.

FIG. 17 is a schematic cross-sectional view of the support according to still another embodiment.

FIG. 18 is a schematic structural diagram of the sealing element according to still another embodiment.

FIG. 19 is a schematic cross-sectional view of the support and the sealing element in an assembled state according to still another embodiment.

## DETAILED DESCRIPTION

**[0028]** For ease of understanding of this application, this application is illustrated below in more detail in conjunction with accompanying drawings and specific implementations.

**[0029]** Provided in this application is an electronic vaporization device. Reference can be made to FIG. 1, the electronic vaporization device includes a vaporizer 100 storing a liquid substrate and vaporizing the liquid substrate to generate an aerosol, and a power supply assembly 200 supplying power to the vaporizer 100.

**[0030]** In an optional implementation, as shown in FIG. 1, the power supply assembly 200 includes a receiving cavity 270 provided at an end in a length direction and used for receiving and accommodating at least part of the vaporizer 100, and first electrical contacts 230 at least partially exposed on a surface of the receiving cavity 270 and used for being electrically connected with the vaporizer 100 to supply power to the vaporizer 100 when at least part of the vaporizer 100 is received and accommodated in the power supply assembly 200.

**[0031]** According to the preferred implementation shown in FIG. 1, second electrical contacts 21 are provided on an end of the vaporizer 100 opposite to the power supply assembly 200 in the length direction, so that when at least part of the vaporizer 100 is received in the receiving cavity 270, the second electrical contacts 21 make contact with and abut against the first electrical contacts 230 to conduct electricity.

**[0032]** A sealing piece 260 is provided in the power supply assembly 200, and at least part of an internal space of the power supply assembly 200 is separated by the sealing piece 260 to form the above receiving cavity 270. In the preferred implementation shown in FIG. 1, the sealing piece 260 is configured to extend in a cross section direction of the power supply assembly 200, and is preferably made of a flexible material such as silicone to prevent the liquid substrate seeping from the vaporizer 100 to the receiving cavity 270 from flowing towards components such as a controller 220 and a sensor 250 inside the power supply assembly 200.

**[0033]** In the preferred implementation shown in FIG. 1, the power supply assembly 200 further includes a battery cell 210 located at an other end facing away from the receiving cavity 270 in the length direction and used for supplying power; and the controller 220 provided between the battery cell 210 and the accommodating cavity, the controller 220 operably guiding a current between the battery cell 210 and the first electrical contacts 230.

**[0034]** During use, the power supply assembly 200 includes the sensor 250, which is used for sensing an inhalation airflow generated by a suction nozzle cap 20 of the vaporizer 100 during inhalation, so that the controller 220 controls the battery cell 210 to output the current to the vaporizer 100 according to a detection signal of the sensor 250.

**[0035]** Further, in the preferred implementation shown in FIG. 1, a charging interface 240 is provided in the other end of the power supply assembly 200 facing away from the receiving cavity 270, and used for supplying power to the battery cell 210.

**[0036]** FIGS. 2 to 5 are schematic structural diagrams of an embodiment of the vaporizer 100 in FIG. 1. The vaporizer 100 includes

a main housing 10. As shown in FIGS. 2 to 3, the main housing 10 is substantially in a flat cylinder shape, and certainly, a hollow interior of the main housing 10 is a necessary functional device used for storing and vaporizing the liquid substrate. The main housing 10 has a near end 110 and a far end 120 opposite to each other in the length direction. According to requirements for common use, the near end 110 is configured as an end for a user to inhale the aerosol, and a suction nozzle A for the user to inhale is provided at the near end 110. The far end 120 is used as an end bonded with the power supply assembly 200, and the far end 120 of the main housing 10 is an opening on which a detachable end cap 20 is mounted. The opening structure is used for mounting necessary functional components inside the main housing 10.

**[0037]** Further, in a specific implementation shown in FIGS. 2 to 4, the second electrical contacts 21 penetrate into the vaporizer 100 from a surface of the end cap 20, so that at least parts of the second electrical contacts 21 are exposed outside the vaporizer 100, so as to be able to make contact with the first electrical contacts 230 to

conduct electricity. At the same time, the end cap 20 is further provided with a first air inlet 23, which is used for allowing outside air to enter the vaporizer 100 during inhalation.

**[0038]** Certainly, further referring to FIG. 3, assembling grooves 22 for accommodating the second electrical contacts 21 are formed in the surface of the end cap 20, so that after assembly, the second electrical contacts 21 are flush with the surface of the end cap 20.

**[0039]** Further, referring to FIGS. 3 to 5, the main housing 10 is internally provided with a liquid storage cavity 12 used for storing the liquid substrate, and a vaporization assembly used for sucking the liquid substrate from the liquid storage cavity 12, and heating and vaporizing the liquid substrate. The vaporization assembly generally includes a capillary liquid guiding element for sucking the liquid substrate, and a heating element bonded to the liquid guiding element. The heating element heats at least part of the liquid substrate in the liquid guiding element to generate the aerosol during power on. In an optional implementation, the liquid guiding element includes flexible fibers such as cotton fibers, non-woven fabrics, glass fiber ropes, etc., or includes a porous material with a microporous structure, such as porous ceramics. The heating element can be bonded to the liquid guiding element through methods such as printing, deposition, sintering, or physical assembly, or wound on the liquid guiding element.

**[0040]** Further, in a preferred implementation shown in FIGS. 3 to 5, the vaporization assembly includes a porous body 30 used for sucking and transferring the liquid substrate, and a heating element 40 used for heating and vaporizing the liquid substrate sucked by the porous body 30. Specifically,

in a schematic cross-sectional structure diagram shown in FIG. 5, a vapor-gas transmission pipe 11 in an axial direction is provided in the main housing 10, and the liquid storage cavity 12 used for storing the liquid substrate is formed in a space between an outer wall of the vapor-gas transmission pipe 11 and an inner wall of the main housing 10. A first end of the vapor-gas transmission pipe 11 opposite to the near end 110 communicates with the suction nozzle A, and a second end opposite to the far end 120 is in airflow connection with a vaporization chamber 340 defined between the porous body 30 and the end cap 20, so as to transmit the aerosol generated by vaporizing the liquid substrate in the heating element 40 and released to the vaporization chamber 340 to the suction nozzle A for inhalation.

**[0041]** Referring to the structure of the porous body 30 shown in FIGS. 3, 4 and 5, the structure of the porous body 30 can configured to be, but not limited to, substantially in a blocky shape in the embodiment. According to a preferred design of this embodiment, the porous body 30 includes a vaporization surface 310 which has an arched shape and faces the end cap 20 in the axial direction of the main housing 10. During use, a side of the porous body 30 facing away from the vaporization surface 310 is in fluid communication with the liquid storage cavity 12, so as to be able to suck the liquid substrate, then the microporous structure inside the porous body 30 transfers the liquid substrate to the vaporization surface 310 to be heated and vaporized to form the aerosol, and the formed aerosol is released or escapes from the vaporization surface 310. It can be understood that in some other embodiments, the porous body can be arranged in such a way that the vaporization surface of the porous body faces away from the end cap in the axial direction of the main housing and thus faces towards the suction nozzle. On the structure of the porous body 30 shown in FIG. 3, the vaporization surface 310 extends in a cross section direction of the main housing 10.

**[0042]** Further, referring to FIGS. 4 to 7, the porous body 30 has the arched shape and is provided with a first side wall 31 and a second side wall 32 opposite to each other in a thickness direction, as well as a base part 34 between the first side wall 31 and the second side wall 32. The first side wall 31 and the second side wall 32 extend in a length direction to define a liquid channel 33 between the first side wall 31 and the second side wall 32, and the liquid channel 33 is in fluid communication with the liquid storage cavity 12 to suck the liquid substrate.

**[0043]** Further, referring to FIGS. 3 to 5, in order to assist in mounting and fixing the porous body 30 and sealing the liquid storage cavity 12, the main housing 10 is further internally provided with a flexible silicone sleeve 50, a support 60 and a flexible sealing element 70, which not only seals an opening of the liquid storage cavity 12, but also fixes and holds the porous body 30 inside.

**[0044]** In terms of a specific structure and shape, the flexible silicone sleeve 50 is substantially in a cylinder shape, is hollow inside for accommodating the porous body 30, and sleeves the porous body 30 in a tight-fit manner.

**[0045]** The rigid support 60 holds the porous body 30 sleeved with the flexible silicone sleeve 50. In some embodiments, the rigid support 60 can be substantially in a ring shape with a lower end being an opening, and a holding space 64 is used for accommodating and holding the flexible silicone sleeve 50 and the porous body 30. On the one hand, the flexible silicone sleeve 50 can seal a gap between the porous body 30 and the support 60 to prevent the liquid substrate from seeping out from the gap between the porous body 30 and the support 60. On the other hand, the flexible silicone sleeve 50 is located between the porous body 30 and the support 60, which is advantageous for the porous body 30 to be stably accommodated in the support 60 to avoid loosening.

**[0046]** The flexible sealing element 70 is provided between the liquid storage cavity 12 and the support 60, and the shape of the flexible sealing element 70 is adapted to a cross section of an inner contour of the main housing 10, so as to seal the liquid storage cavity 12 and prevent the liquid substrate from leaking out from the liquid storage cavity 12. Further, to prevent shrinkage

and deformation of a flexible silicone base 53 made of a flexible material from affecting sealing tightness, the above support 60 is accommodated in the flexible sealing element 70 to support the flexible silicone base 53.

**[0047]** After mounting, to ensure smooth transferring of the liquid substrate and output of the aerosol, first liquid guiding holes 71 for the liquid substrate to flow through is provided on the flexible sealing element 70, second liquid guiding holes 61 are correspondingly provided on the support 60, and third liquid guiding holes 51 are provided on the flexible silicone sleeve 50. During use, the liquid substrate in the liquid storage cavity 12 sequentially passes through the first liquid guiding holes 71, the second liquid guiding holes 61 and the third liquid guiding holes 51, flows into the liquid channel 33 of the porous body 30 held in the flexible silicone sleeve 50, and then is sucked. As shown by arrow R1 in FIGS. 4 and 5, the liquid substrate is sucked and transferred to the vaporization surface 310 for vaporization, and then the generated aerosol will be released into the vaporization chamber 340 defined between the vaporization surface 310 and the end cap 20.

**[0048]** In the inhalation process, for an output structure of the aerosol, referring to FIGS. 3 to 6, a first insertion hole 72 for a lower end of the vapor-gas transmission pipe 11 to insert is provided in the flexible sealing element 70, a second insertion hole 62 is correspondingly provided in the support 60, and a first airflow channel 63 for the vaporization surface 310 and the second insertion hole 62 to be in airflow communication is provided on a side of the support 60 opposite to the main housing 10. After mounting, a complete inhalation airflow is shown by arrow R2 in FIG. 3. The outside air enters the vaporization chamber 340 via a first air inlet 23 in the end cap 20, carries the generated aerosol to flow from the first airflow channel 63 to the second insertion hole 62, and then is output to the vapor-gas transmission pipe 11 via the first insertion hole 72.

**[0049]** In a preferred implementation shown in FIG. 6, the support 60 includes a first portion 611 and a second portion 612 sequentially arranged in a longitudinal direction. The first portion 611 has a cross-sectional area greater than that of the second portion 612. In arrangement, the first portion 611 is close to the liquid storage cavity 12, and the second portion 612 is close to the end cap 20. During use, the flexible sealing element 70 is at least partially located between the first portion 611 and the inner wall of the main housing 10, and at least partially wraps the first portion 611 so as to be supported by the first portion 611. At the same time, the holding space 64 is defined by the internal space of the second portion 612. The second liquid guiding holes 61 penetrate from an end face of the first portion 611 close to the liquid storage cavity 12 to the second portion 612 to communicate with the holding space 64.

**[0050]** Further, referring to FIGS. 5 to 9, the vaporizer 100 further includes first air channels defined by the support 60 and the air guiding element to replenish air to the liquid storage cavity 12 to relieve or eliminate the negative pressure, as shown by arrow R3 in FIGS. 5 and 10.

**[0051]** Through holes 65 close to the two sides in the width direction are provided in the first portion 611 of the support 60. The through holes 65 penetrate through the first portion 611 in the longitudinal direction, and the through holes 65 avoid the second portion 612 in the longitudinal direction. Referring to FIG. 4, the two through holes 65 have different shapes, respectively. One of the two through holes 65 is configured to have a circular cross section, and the other one of the two through holes 65 is configured to have a square cross section. In some examples, the support 60 can also serve as a section of the main housing 10, or is machined together with the main housing 10 to be integrally formed, and the support 60 can be used for defining the liquid storage cavity 12.

**[0052]** The first air guiding element 80 is substantially in a circular column shape, and is assembled in the through hole 65 with the circular cross section, so as to define a gap between the first air guiding element 80 and the inner wall of the through hole 65 to form the corresponding first air channel for the air to enter the liquid storage cavity 12.

**[0053]** The second air guiding element 90 is substantially in a square column shape, and is assembled in the through hole 65 with the square cross section, so as to define a gap between the second air guiding element 90 and the inner wall of the through hole 65 to form the corresponding first air channel for the air to enter the liquid storage cavity 12.

**[0054]** In the embodiment, the first air guiding element 80 and/or the second air guiding element 90 is flexible and preferably made of a flexible material, such as flexible silicone or an elastic body. In terms of a variable shape and structure, the cross sections of the first air guiding element 80 and/or the second air guiding element 90 can further be configured into a star shape, a quincunx shape or a polygon shape. The corresponding through holes 65 can correspondingly have circular, square and polygonal cross sections, as long as the above first air channels for the air to flow through can be defined between the first air guiding element 80 and/or the second air guiding element 90 and the through holes 65 when the first air guiding element 80 and/or the second air guiding element 90 is assembled in the corresponding through hole 65.

**[0055]** In other optional embodiments, the first air guiding element 80 and/or the second air guiding element 90 can further be rigid and made of a common material, such as hard plastics. In some examples, the through holes 65 matched with the first air guiding element 80 and/or the second air guiding element 90 can also be formed in the flexible sealing piece 260.

**[0056]** Further, in a preferred implementation shown in FIG. 8, the first air guiding element 80 is provided with a first section 810 and a second section 820 sequentially arranged in an axial direction. The first section 810 has an outer diameter greater than that of the second section

820, and accordingly, during assembly, it is advantageous for the second section 820 as a pointed end to be inserted or assembled into the corresponding through hole 65. In the preferred implementation shown in FIG. 8, a length dl of the first section 810 extending in a longitudinal direction is about 3 mm to 5 mm, and 5 mm is adopted in FIG. 8. A length d2 of the second section 820 extending in a longitudinal direction is about 1 to 2 mm, and 1.6 mm is adopted in FIG. 8. Preferably, the length of the second section 820 is less than 1/2 the length of the first section 810.

**[0057]** A plurality of first grooves 811 surrounding the first section 810 are provided on an outer side wall of the first section 810. The first grooves 811 extend in a longitudinal direction, and after the first air guiding element 80 is assembled into the corresponding through hole 65, spaces defined between the first grooves 811 and the inner wall of the corresponding through hole form first air channels. In the preferred implementation shown in FIG. 8, the first grooves 811 have a depth of between 0.5 and 2 mm, and the depth of less than 2 mm can effectively avoid seepage of the liquid substrate caused by excessively large spaces. In FIG. 8, the first grooves 811 have a width of about 2 mm and a depth of about 0.5 mm.

**[0058]** In FIG. 9, the second air guiding element 90 also has a structure substantially approximate to that of the first air guiding element 80, and is provided with a third section 910 and a fourth section 920 with different cross sections. Second grooves 911 are provided surrounding the third section 910.

**[0059]** Or in other variant implementations, the first grooves 811 and/or the second grooves 911 are arranged on the inner wall of the corresponding through hole 65. When the columnar first air guiding element 80 and/or the second air guiding element 90 is assembled in the corresponding through hole 65, the above first air channels are formed between the first grooves 811 and/or the second grooves 911 on the inner walls of the trough holes 65 and the outer surfaces of the first air guiding element 80 and/or the second air guiding element 90. In other variant implementations, longitudinally penetrating through holes with suitable hole diameters are formed in the columnar first air guiding element 80 and/or the second air guiding element 90 to construct the above first air channels.

**[0060]** In an assembled state, referring to FIGS. 5 and 10, the through holes 65 are covered with first liquid guiding holes 71 of the flexible sealing element 70, so that air outlet ends of the first air channels defined between the through holes 65 and the first air guiding element 80/the second air guiding element 90 close to the liquid storage cavity 12 are exposed out of the first liquid guiding holes 71 to be in an open state. During use, air between the second portion 612 of the support 60 and the inner wall of the main housing 10 enters the first air channels as shown by arrow R3 in FIG. 10, and enters the first liquid guiding holes 71 via the air outlet ends until it finally enters the liquid storage cavity 12.

**[0061]** Further, referring to FIGS. 5 and 6, the air inlet ends of the first air channels defined between the through holes 65 and the first air guiding element 80/the second air guiding element 90 communicate with the gap between the support 60 and the inner wall of the main housing 10 for the air to enter. In more preferred implementations, the gap space between the support 60 and the inner wall of the main housing 10 communicates with the vaporization chamber 340 through capillary trenches 66 in the outer surface of the support 60 in FIG. 6, so that the gap space between the support 60 and the inner wall of the main housing 10 communicates with a space of the vaporization chamber 340.

**[0062]** FIGS. 11 to 13 show schematic diagrams of second air channels defined by through holes 65a in a second portion 612a of a rigid support 60a and a first air guiding element 80a/a second air guiding element 90a in another embodiment. Specifically,
the through holes 65a in the two sides in the width direction are provided in the second portion 612a of the rigid support 60a. The through holes 65a penetrate through a wall of the second portion 612a in the width direction.

**[0063]** A substantially cylindrical first air guiding element 80a is assembled in one of the through holes 65a, and a substantially square second air guiding element 90a is assembled in the other one of the through holes 65a. Second air channels are defined between first grooves 811a in an outer wall of the first air guiding element 80a/second grooves 911a in an outer wall of the second air guiding element 90a and inner walls of the through holes 65a, respectively, as shown by arrow R4 in FIG. 12.

**[0064]** In order to be matched with the above defined second air channels, the through holes 65a are opposite to a liquid channel 33 penetrating through the length of a porous body 30a in a width direction. At the same time, third liquid guiding holes 51a on a flexible silicone sleeve 50a are at least partially located on a side wall in the width direction and are opposite to the liquid channel 33 and the through holes 65a to avoid the through holes 65a, thus ensuring that air outlet ends of the second air channels are not sheltered or sealed by the flexible silicone sleeve 50a.

**[0065]** In an optional implementation, air inlet ends of the second air channels close to an inner wall of the main housing 10 can be directly configured to communicate with an outside atmosphere. Or similar to the above first air channels, the air inlet ends of the second air channels are surrounded by a gap space between the second portion 612a of the rigid support 60a and the main housing 10, so that during use, air in the gap space between the second portion 612a of the rigid support 60a and the main housing 10 enters the air inlet ends of the second air channels. Similarly, the gap space between the second portion 612a of the rigid support 60a and the main housing 10 is in airflow communication with the vaporization chamber 340 through capillary trenches 66a in the outer side wall of the second portion 612a. Thus, in the imple-

mentation, the air inlet ends of the second air channels is kept in communication with the vaporization chamber 340, and air inside the vaporization chamber 340 enters the liquid storage cavity 12 via the second air channels to relieve or eliminate the negative pressure in the liquid storage cavity 12.

**[0066]** FIGS. 14 and 15 show schematic diagrams of defining first air channels in yet another embodiment. In the implementation, a first air guiding element 80b is formed by at least part of a flexible sealing element 70b. Specifically,

a support 60b is provided with longitudinally penetrating through holes 65b in a first portion 611b.

a flexible sealing element 70b is provided with a first air guiding element 80b at least partially extending in a corresponding first liquid guiding hole 71b in a longitudinal direction. After assembly and when the flexible sealing element 70b wraps the first portion 611b of the support 60b, the first air guiding element 80b stretches into the corresponding through hole 65b, so that the first air channels are defined between first grooves 811b in an outer side wall of the first air guiding element 80b and an inner wall of the corresponding through hole 65b.

**[0067]** As shown in FIGS. 14 and 15, the first air guiding element 80b is coupled to the flexible sealing element 70b through a connecting arm 74b. Certainly, in the preferred embodiment shown in the figures, the first air guiding element 80b and the connecting arm 74b on the flexible sealing element 70b are integrally made with the flexible sealing element 70b in a molded manner. For example, the first air guiding element 80b, the connecting arm 74b and the flexible sealing element 70b are made of a silicone material through a mold to form an integrated structure as shown in FIG. 14.

**[0068]** According to a similar implementation, a first air guiding element 80a or a second air guiding element 90a can also be made on a flexible silicone sleeve 50a in a molded manner.

**[0069]** Referring to another embodiment provided by FIGS. 16 to 19, a support 60 includes a first portion 610 and a second portion 620 sequentially arranged in a longitudinal direction. The first portion 610 is close to a liquid storage cavity 12, and the second portion 620 is close to an end cap 20. During use, the flexible sealing element 70 is at least partially located between the first portion 610 and the inner wall of the main housing 10, and at least partially wraps the first portion 610 so as to be supported by the first portion 610. At the same time, the holding space 64 is defined by the internal space of the second portion 620. The second liquid guiding holes 61 penetrate from an end face of the first portion 610 close to the liquid storage cavity 12 to the second portion 620 to communicate with the holding space 64.

**[0070]** A vaporizer 100 further includes first air channels defined by the support 60 and a first sealing element 50 to replenish air to the liquid storage cavity 12 to relieve or eliminate the negative pressure, as shown by arrow R3 in FIG. 19. The specific structure is as follows.

**[0071]** Through holes 65 close to the two sides in the width direction are provided in the second portion 620 of the support 60. The through holes 65 penetrate into second liquid guiding holes 61 in the longitudinal direction. The through holes 65 avoid a holding space 64 in the width direction.

**[0072]** The through holes 65 are located on a side of the support 60 facing away from the liquid storage cavity 12. Certainly, the holding space 64 is also located on the side of the support 60 facing away from the liquid storage cavity 12, so that the through holes 65 and the holding space 64 are staggered in the width direction. The second liquid guiding holes 61 are located on a side of the support 60 close to the liquid storage cavity 12, and projections of the second liquid guiding holes 61 in the axial direction at least partially cover the through holes 65.

**[0073]** Specifically, as shown in FIGS. 17 and 18, the second liquid guiding holes 61 have a cross-sectional area greater than that of third liquid guiding holes 51. After assembly, the second liquid guiding holes 61 are at least partially opposite to the through holes 65 in the longitudinal direction, thus allowing air to directly enter the second liquid guiding holes 61. At the same time, the second liquid guiding holes 61 are at least partially opposite to the third liquid guiding holes 51 in the longitudinal direction, so as to enable a liquid substrate in the second liquid guiding holes 61 to directly flow downwards into the third liquid guiding holes 51 under the action of gravity. The third liquid guiding holes 51 are at least partially located on a side wall of a main body portion 510 in the width direction and are opposite to a liquid channel 33 of a porous body 30.

**[0074]** Further, as shown in FIGS. 16 and 17, a plurality of air guiding grooves 651 extending in the axial direction are provided on inner walls of the through holes 65. The sealing element 50 includes the main body portion 510. During assembly, the porous body 30 is wrapped and surrounded by the main body portion 510 in the holding space 64 so as to provide a seal between the support 60 and the porous body 30. The third liquid guiding holes 51 are formed or located on the main body portion 510. The sealing element 50 further includes air guiding elements 80 connected with the main body portion 510, and the air guiding elements 80 are substantially in an elongate column shape. During assembly with the support 60, the air guiding elements 80 stretch or extend into the through holes 65, and tightly abut against the inner walls of the through holes 65, so that spaces of the air guiding grooves 651 form air channels. When the negative pressure in the liquid storage cavity 12 exceeds a certain threshold value, air in the vaporization chamber 340 or outside air enters the second liquid guiding holes 61 via the air guiding grooves 651 as shown by arrow R3 in FIG. 19, and then enters the liquid storage cavity 12 to relieve or partially eliminate the negative pressure in the liquid

storage cavity 12.

**[0075]** It should be noted that, preferred embodiments of this application are given in the description of this application and the accompanying drawings thereof. However, this application is not limited to the embodiments described in this description. Further, a person of ordinary skill in the art may make improvements or modifications according to the foregoing illustrations, and all the improvements and modifications shall fall within the protection scope of the appended claims of this application.

## Claims

1. A vaporizer, configured to vaporize a liquid substrate to generate an aerosol, and comprising:

   a liquid storage cavity used for storing the liquid substrate;
   a vaporization assembly, in fluid communication with the liquid storage cavity to obtain the liquid substrate and heat the liquid substrate to generate the aerosol;
   a first sealing element, at least partially sealing the liquid storage cavity;
   a support, used for supporting the first sealing element, a first through hole being provided in the support or the first sealing element; and
   a first air guiding element, at least partially extending in the first through hole, and defining first air channels together with the first through hole or by itself to provide first flow paths for air to enter the liquid storage cavity.

2. The vaporizer according to claim 1, wherein first grooves extending in an axial direction of the first through hole are provided in a surface of the first air guiding element, and the first air channels are defined between the first grooves and an inner wall of the first through hole.

3. The vaporizer according to claim 1, wherein the first through hole is configured to extend in a longitudinal direction of the vaporizer.

4. The vaporizer according to any of claims 1 to 3, wherein the first air guiding element is configured to be substantially in a column shape.

5. The vaporizer according to claim 4, wherein the first air guiding element comprises a first section and a second section in an axial direction; and the first section is close to the liquid storage cavity and has a cross-sectional area greater than that of the second section.

6. The vaporizer according to any of claims 1 to 3, wherein the first air guiding element is flexible.

7. The vaporizer according to any of claims 1 to 3, wherein the support comprises a first portion adjacent to the liquid storage cavity in the longitudinal direction of the vaporizer, and a second portion facing away from the first portion; wherein

   the first portion is configured to support the first sealing element;
   the second portion is configured to at least partially accommodate and hold the vaporization assembly; and
   the through hole is arranged to be located in the first portion.

8. The vaporizer according to claim 7, wherein the first through hole is configured to avoid the second portion in the longitudinal direction of the vaporizer.

9. The vaporizer according to claim 7, wherein the first sealing element is provided with first liquid guiding holes for the liquid substrate in the liquid storage cavity to flow towards the vaporization assembly; and the first air channels are provided with air outlet ends close to the liquid storage cavity, and the air outlet ends are located in the first liquid guiding holes.

10. The vaporizer according to any of claims 1 to 3, further comprising
    a vaporization chamber, providing a space for release of the aerosol, air inlet ends of the first air channels communicating with the vaporization chamber.

11. The vaporizer according to any of claims 1 to 3, wherein the first air guiding element is formed by at least part of the first sealing element extending into the first through hole.

12. The vaporizer according to any of claims 1 to 3, wherein the first groove has a depth of less than 2 mm.

13. The vaporizer according to claim 1, wherein the support comprises

    a first surface, at least partially defining a liquid guiding channel, the vaporization assembly being in fluid communication with the liquid storage cavity through the liquid guiding channel; and
    a second surface, facing away from the liquid storage cavity, the through hole extending between the first surface and the second surface.

14. The vaporizer according to claim 1, wherein the first sealing element is provided with a wall used for defining a hollow capable of at least partially accommodating the vaporization assembly, and the air

guiding element extends from the wall and is located outside the hollow.

**15.** A vaporizer, configured to vaporize a liquid substrate to generate an aerosol, and comprising

a liquid storage cavity used for storing the liquid substrate;
a porous body, comprising a liquid channel penetrating through the porous body in a length direction and being in fluid communication with the liquid storage cavity through the liquid channel to suck the liquid substrate;
a heating element, bonded to the porous body and used for heating at least part of the liquid substrate in the porous body to generate the aerosol;
a support, used for holding the porous body, the support being provided with a second through hole opposite to the liquid channel; and
a second air guiding element, at least partially extending in the second through hole, and defining second air channels together with the second through hole or by itself to provide second flow paths for air to enter the liquid storage cavity.

**16.** The vaporizer according to claim 15, wherein the second through hole is configured to extend in a longitudinal direction perpendicular to the vaporizer.

**17.** The vaporizer according to claim 15, wherein the second air guiding element is configured to be substantially in a column shape.

**18.** The vaporizer according to claim 15, wherein second grooves extending in an axial direction of the second through hole are provided in a surface of the second air guiding element, and the second air channels are defined between the second grooves and an inner wall of the second through hole.

**19.** The vaporizer according to claim 15, wherein the support comprises a holding space, and the porous body is at least partially accommodated and held in the holding space; and
the second through hole is configured to extend between an inner surface of the holding space and an outer surface of the support.

**20.** The vaporizer according to claim 15, wherein the support comprises a first portion adjacent to the liquid storage cavity in the longitudinal direction of the vaporizer, and a second portion facing away from the first portion; wherein

the first portion is provided with a first liquid guiding channel in fluid communication with the liquid storage cavity, and a liquid channel of the porous body is in fluid communication with the liquid storage cavity through the first liquid guiding channel;
the second portion is configured to at least partially accommodate and hold the porous body; and
the second through hole is formed in the second portion.

**21.** The vaporizer according to claim 15, further comprising
a second sealing element, located between the support and the porous body and configured to wrap at least part of an outer surface of the porous body and avoid the second through hole.

**22.** An electronic vaporization device, comprising a vaporization device used for vaporizing a liquid substrate to generate an aerosol, and a power supply device supplying power to the vaporization device, the vaporization device comprising the vaporizer according to any of claims 1 to 21.

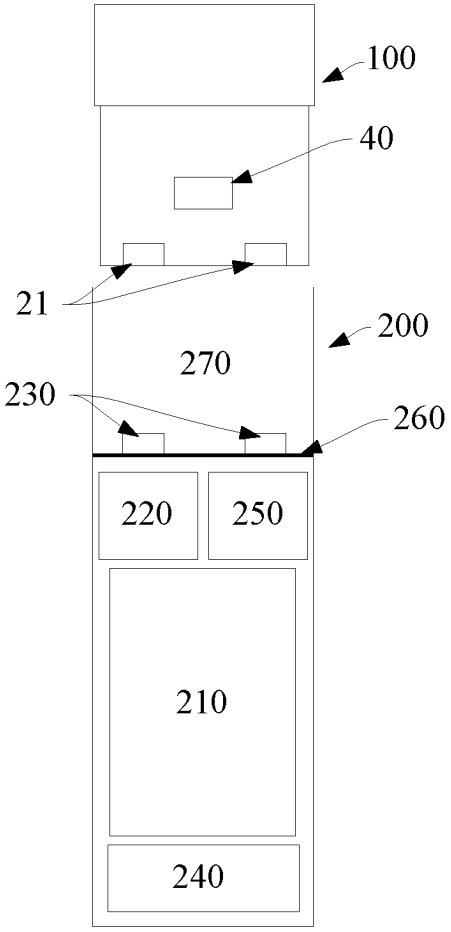



FIG. 1

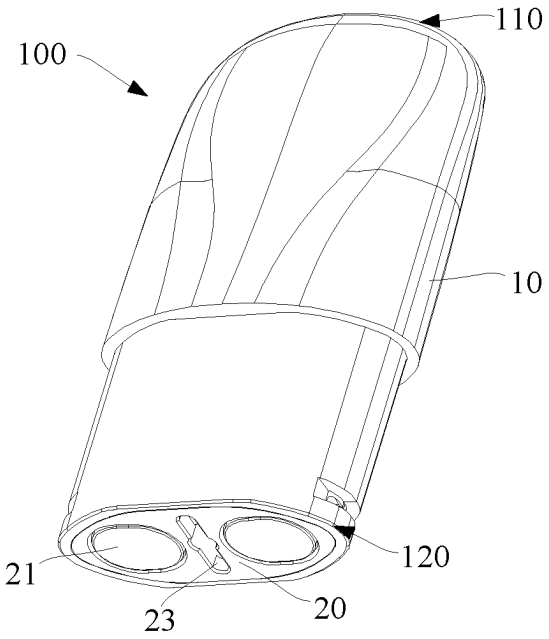
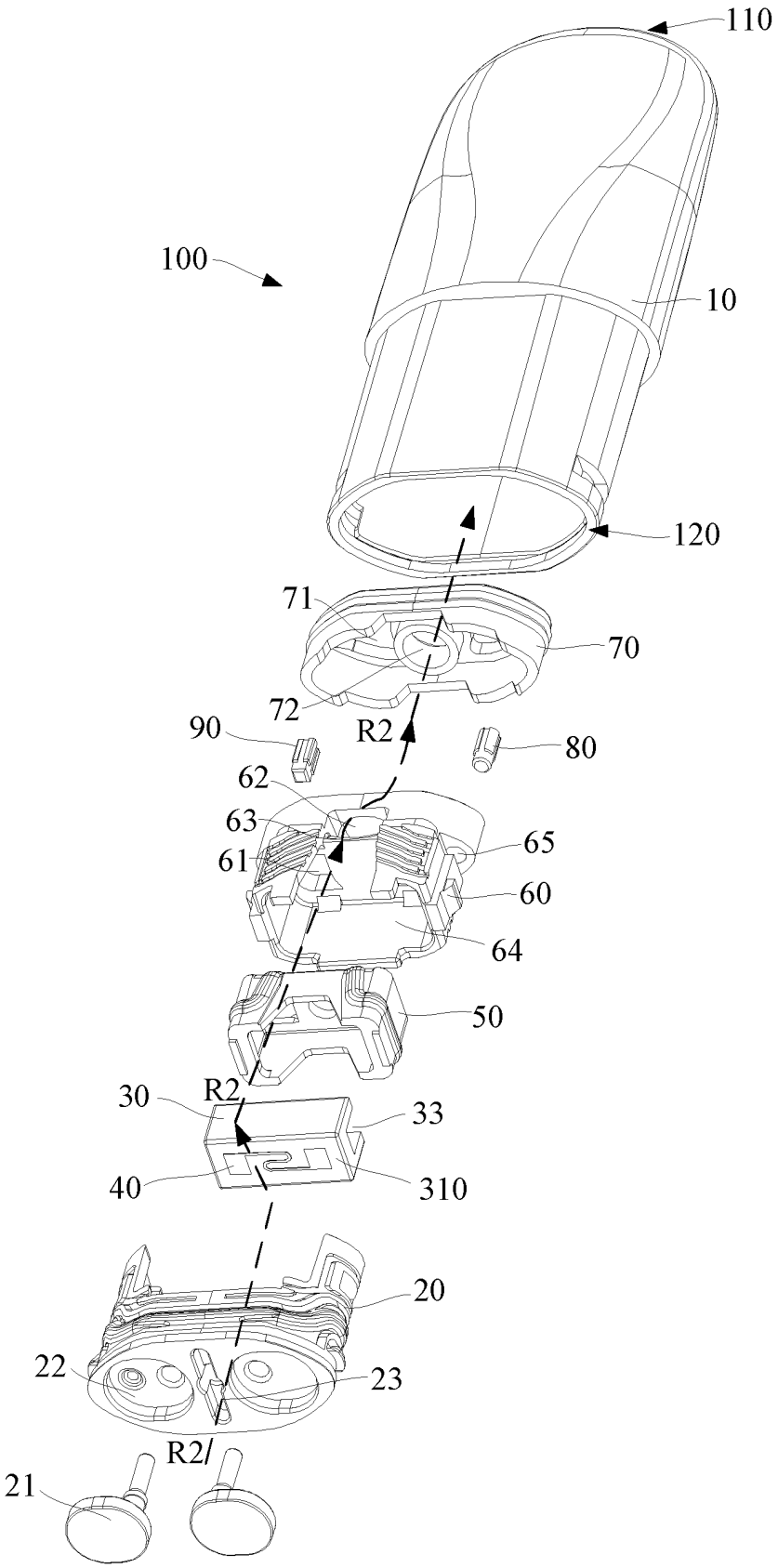



FIG. 2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R2
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22
23
R2
21

FIG. 3

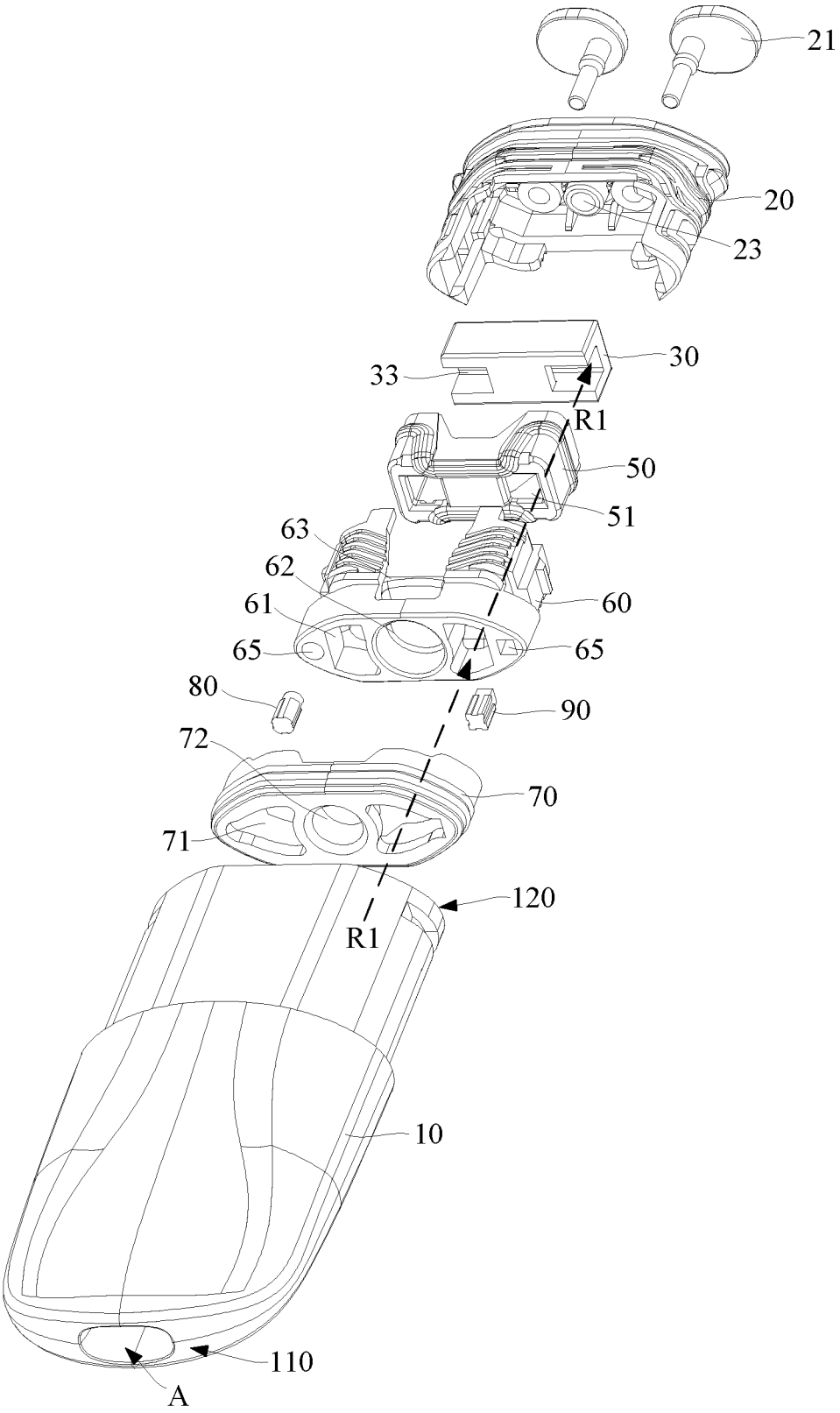
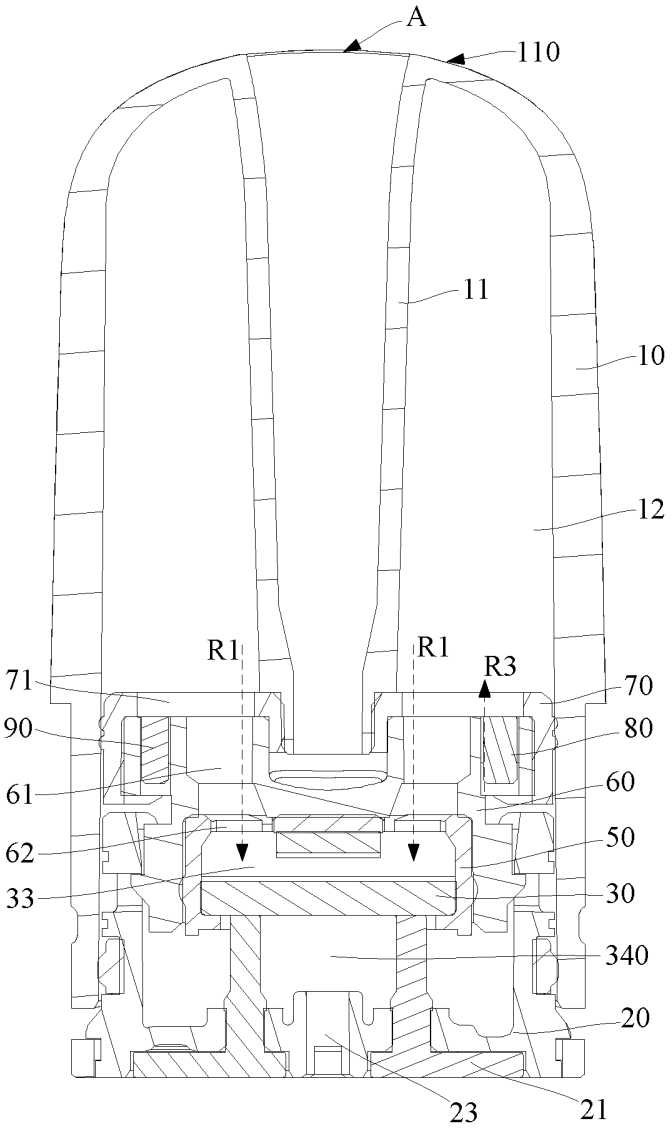



FIG. 4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R1
R1
R3
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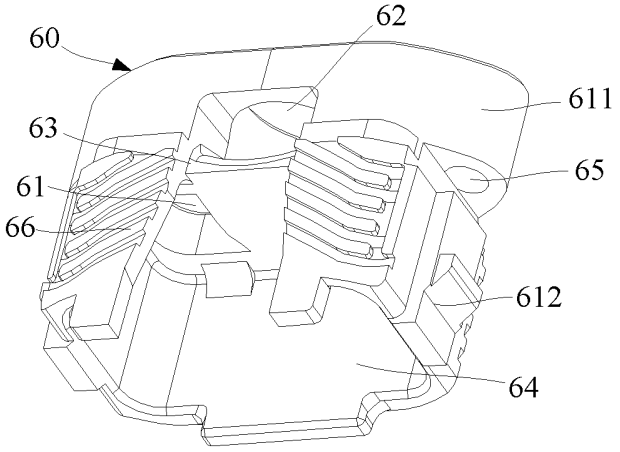
FIG. 5


62
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611
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65
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66
612
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FIG. 6

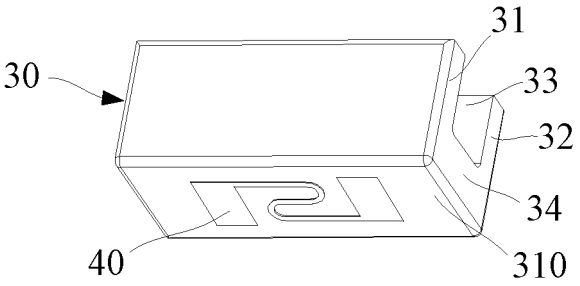



FIG. 7

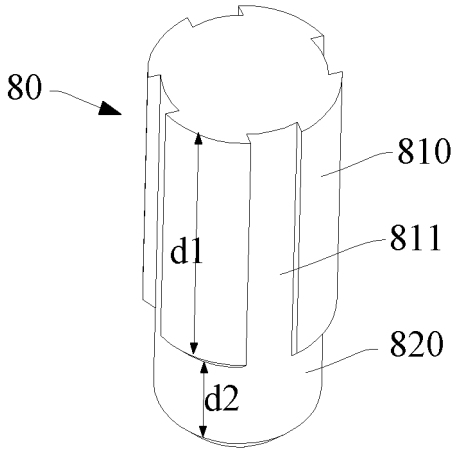



FIG. 8

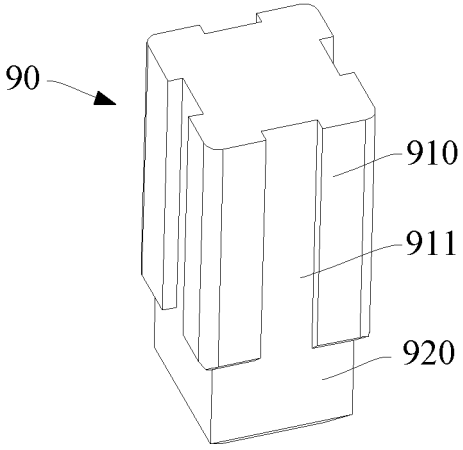



FIG. 9

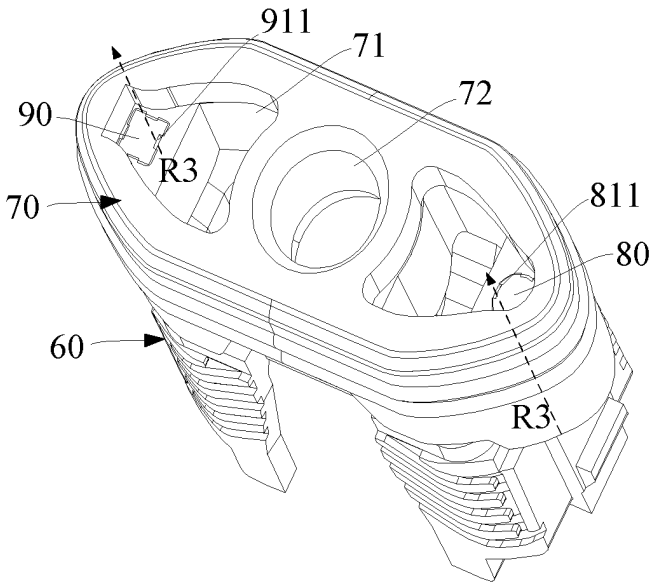



FIG. 10

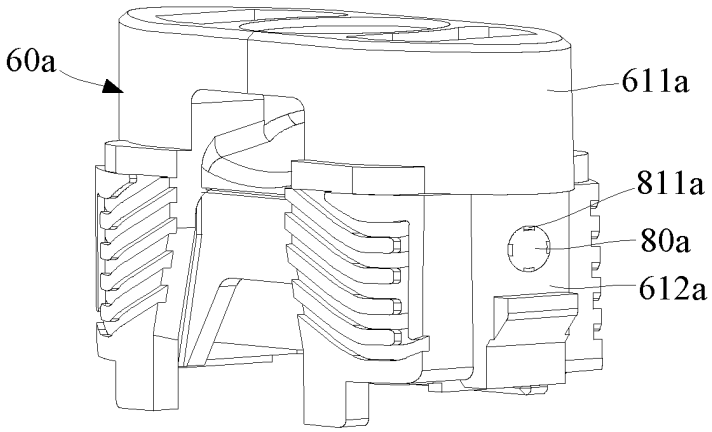



FIG. 11

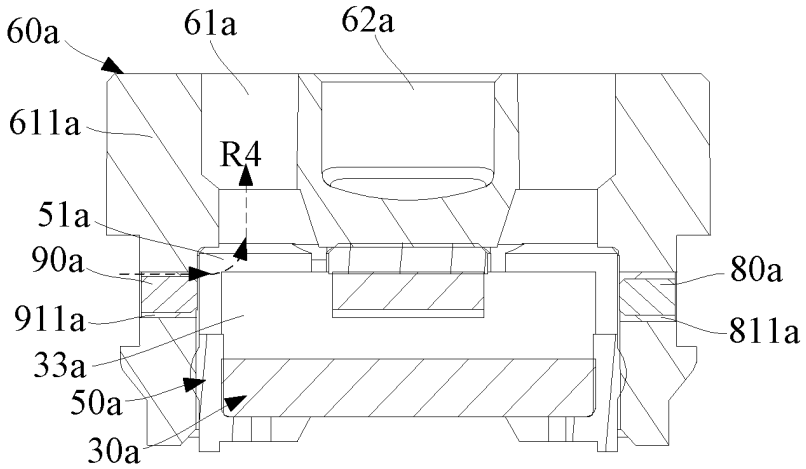



FIG. 12

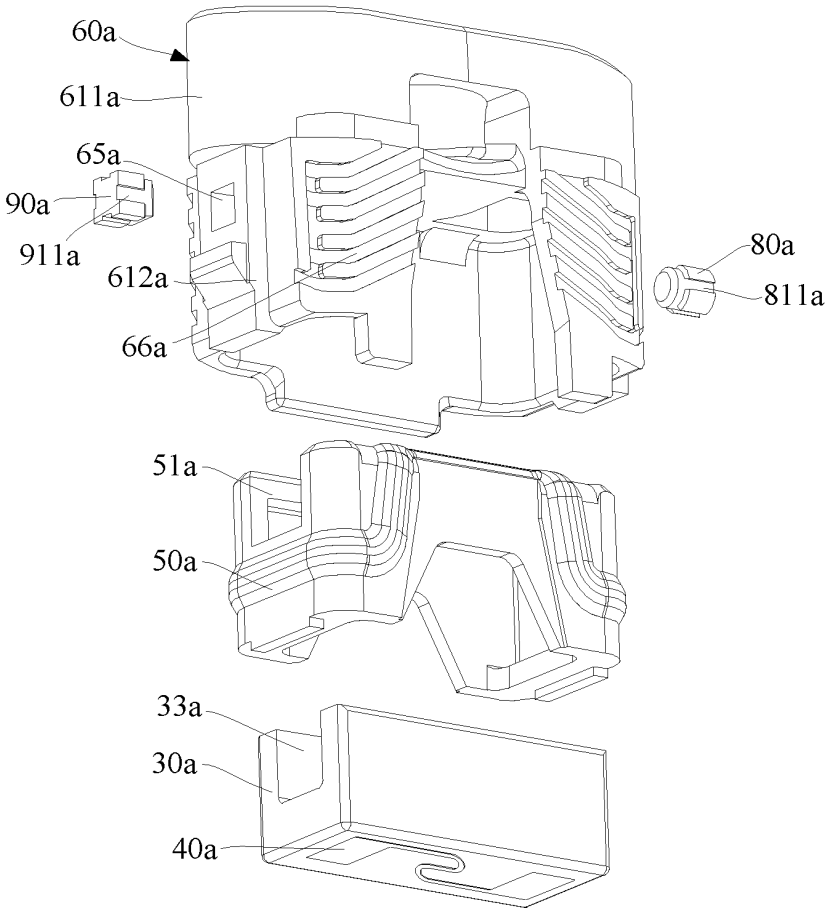
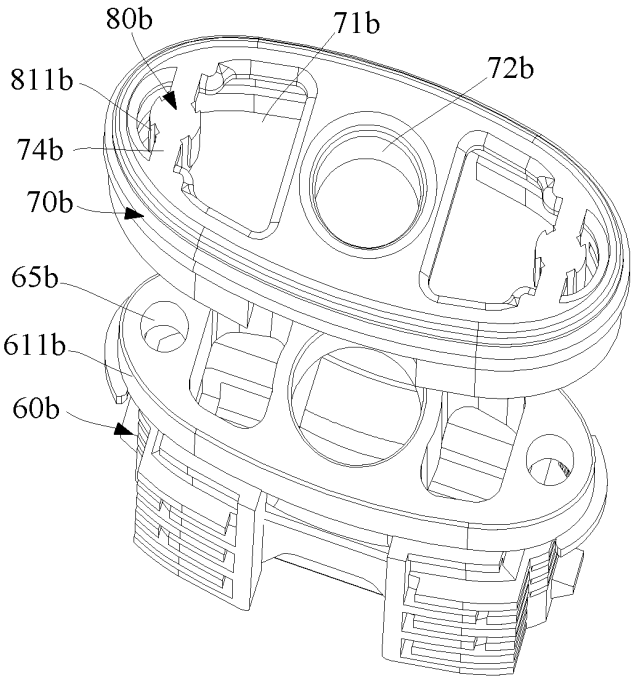

60a
611a
65a
90a
911a
612a
66a
80a
811a
51a
50a
33a
30a
40a

FIG. 13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74b
70b
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611b
60b

FIG. 14

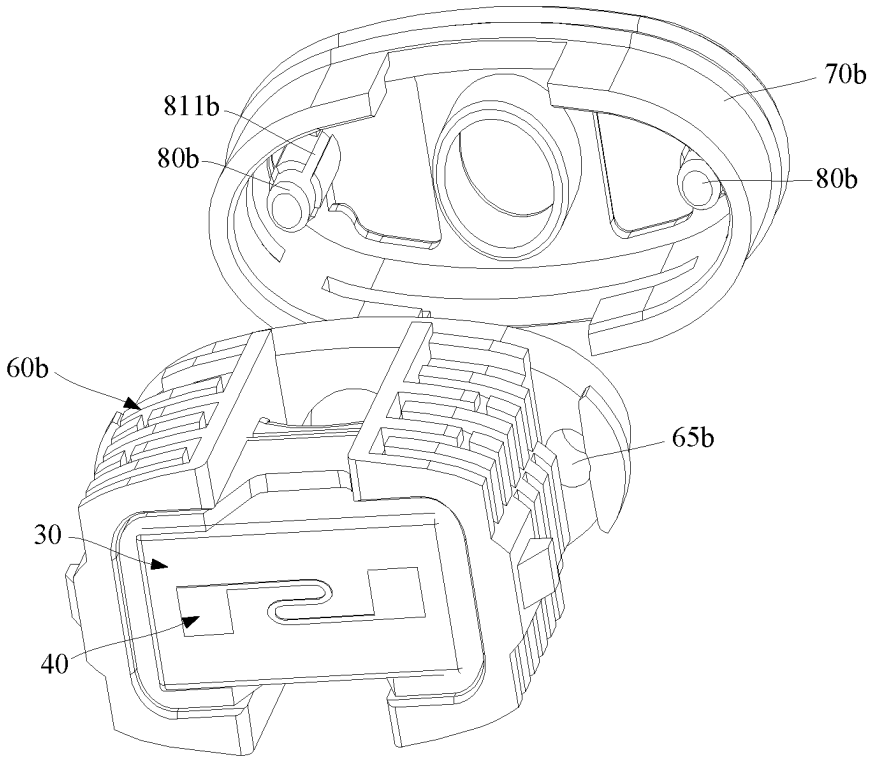
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FIG. 15

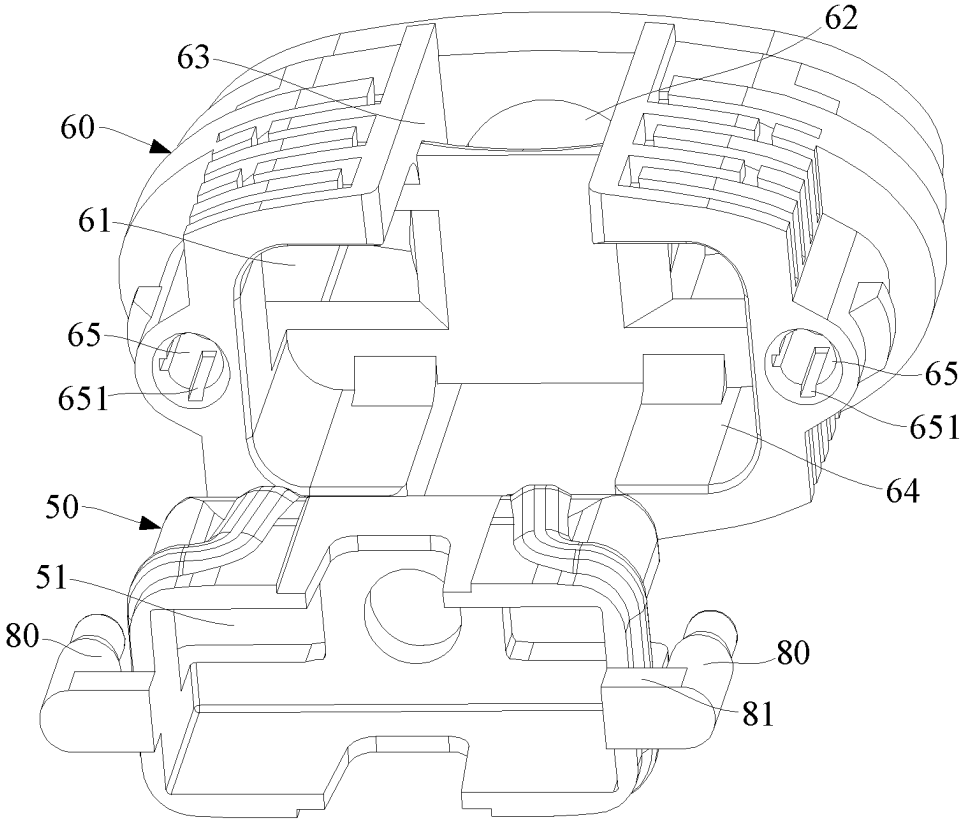
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FIG. 16

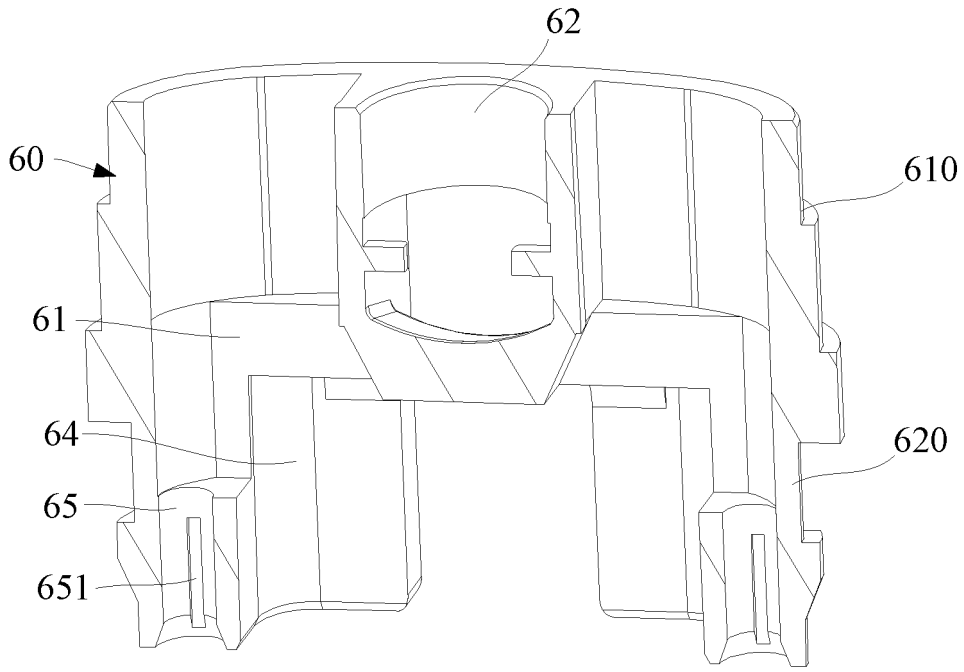


FIG. 17

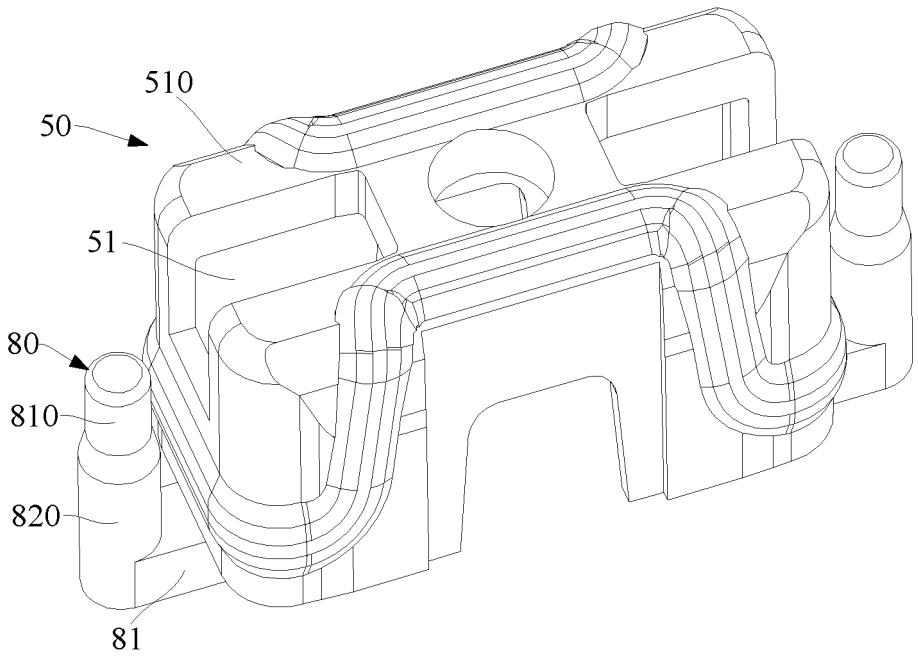


FIG. 18

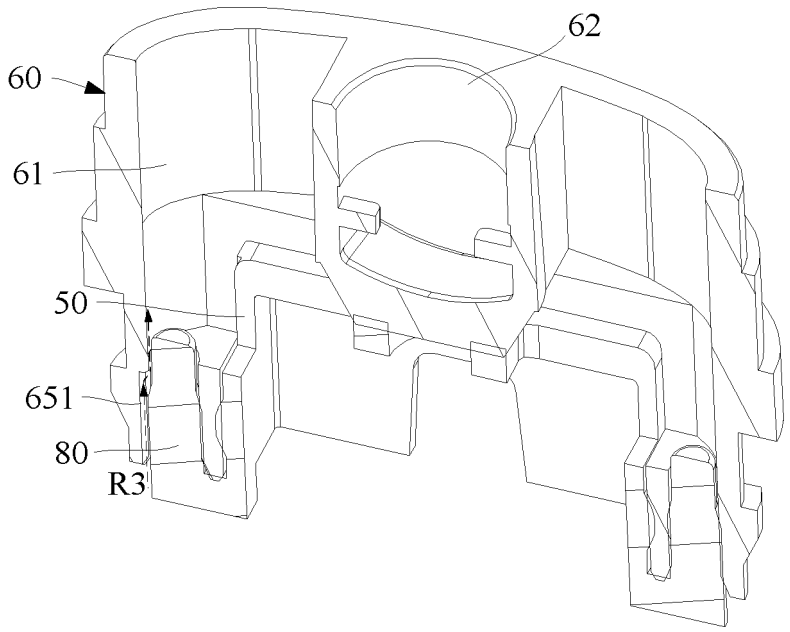


FIG. 19

## INTERNATIONAL SEARCH REPORT

International application No.
**PCT/CN2022/073024**

**A. CLASSIFICATION OF SUBJECT MATTER**

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

A24F40

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

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

CNABS; CNTXT; VEN; USTXT; EPTXT; WOTXT: 雾化, 气溶胶, 导气, 空气, 补, 负压, 压力, 进气, 柱, 槽aerosol, cigarette, atomiz+, airflow, air, supply+, constant, pressure, column, shaft, slot

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

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"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 |
|---|---|
| **16 March 2022** | **08 April 2022** |
| Name and mailing address of the ISA/CN<br>**China National Intellectual Property Administration (ISA/CN)**<br>**No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088, China**<br>Facsimile No. **(86-10)62019451** | Authorized officer<br>Telephone No. |

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

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2022/073024

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

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**Information on patent family members**

International application No.
**PCT/CN2022/073024**

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