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(54) ATOMIZER AND ATOMIZING DEVICE

(57) The present disclosure provides an atomizer and an atomizing device. The atomizer comprises a shell, a cover, an atomizing assembly, and a valve. The shell is provided with a liquid storage cavity for accommodating an aerosol atomizing substrate. The cover is arranged in the shell. The atomizing assembly is arranged in the cover for atomizing the aerosol atomizing substrate to generate an aerosol. The cover is provided with an air channel communicating the liquid storage cavity with an

external atmosphere and a fluid channel communicating the liquid storage cavity with the atomizing assembly. The air channel is provided with the valve for controlling a communication and a cutoff between the liquid storage cavity and the external atmosphere. A sectional area of a part of the air channel located upstream of the valve decreases in a direction towards a tail end of the air channel.

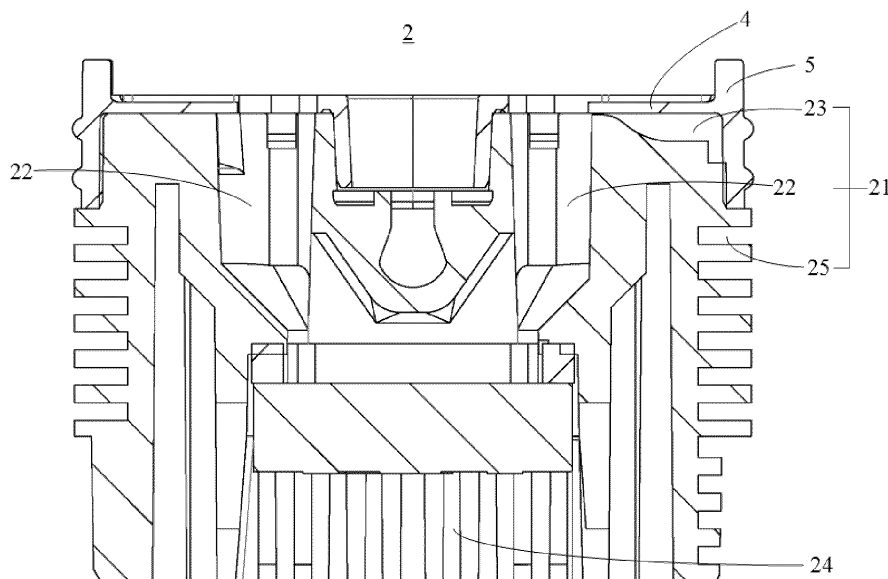


FIG. 8

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Description

FIELD

[0001] The disclosure relates to the field of atomization technology, and more specifically, relates to an atomizer and an atomizing device.

BACKGROUND

[0002] The atomizer can be used to atomize an aerosol atomizing substrate to generate an aerosol. The related atomizer is provided with an air channel for balancing the air pressure between a liquid storage cavity and external atmosphere, so as to ensure that the aerosol atomizing substrate in the liquid storage cavity can be stably supplied. The air channel is provided with a valve to control the communication and non-communication between the liquid storage cavity and the external atmosphere. When the user uses the atomizer, the airflow enters from the air channel and opens the valve, so that the liquid storage cavity is communicated with the external atmosphere for ventilation. When the user does not use the atomizer, the valve controls the communication between the liquid storage cavity and the external atmosphere to be closed, thereby reducing the aerosol atomizing substrate in the liquid storage cavity from leaking outward through the air channel.

[0003] However, in order to ensure the stability of the airflow entering from the air channel and opening the valve, the related valve has a high dependency on tolerance ranges such as the hardness, the thickness, the width, or the sectional area. However, the existing production process of the valve cannot meet the requirements of batch production, resulting in poor batch consistency of the products and the inability to achieve stable batch production.

SUMMARY

[0004] In view of this, the present disclosure provides an atomizer and an atomizing device to solve the technical problem of how to improve the stability of the airflow entering from the air channel and opening the valve.

[0005] The technical solution of the present disclosure is implemented as follows:

[0006] In an embodiment, the present disclosure provides an atomizer, including: a shell provided with a liquid storage cavity configured for accommodating an aerosol atomizing substrate; a cover arranged in the shell; an atomizing assembly arranged in the cover and configured for atomizing the aerosol atomizing substrate to generate an aerosol; and a valve; wherein, the cover is provided with an air channel communicating the liquid storage cavity with an external atmosphere and a fluid channel communicating the liquid storage cavity with the atomizing assembly, the air channel is provided with the valve configured to control a communication and a cutoff

between the liquid storage cavity and the external atmosphere, and a sectional area of a part of the air channel located upstream of the valve decreases in a direction towards a tail end of the air channel.

[0007] In some embodiments, the air channel includes a guide groove located at a tail end of an airflow, the guide groove is disposed at a top of the cover, the valve covers the guide groove, and a sectional area of the guide groove gradually decreases in the direction towards the tail end of the air channel.

[0008] In some embodiments, extension directions of two side walls of the guide groove present an oblique angle of 1° to 10° , and/or, a bottom wall of the guide groove is inclined towards the liquid storage cavity in the direction towards the tail end of the air channel.

[0009] In some embodiments, in the direction towards the tail end of the air channel, a slope of the bottom wall of the guide groove first increases and then decreases.

[0010] In some embodiments, a depth of the guide groove ranges from 0.01 mm to 0.5 mm, and/or, a width of the guide groove ranges from 0.1 mm to 1.0 mm.

[0011] In some embodiments, the atomizer further includes a cover seal disposed on an outer surface of the cover to seal the liquid storage cavity, a top wall of the cover seal adjacent to the liquid storage cavity is provided with a through hole communicating the liquid storage cavity with the fluid channel, and the air channel is provided between the cover seal and the cover.

[0012] In some embodiments, the cover seal includes: a surrounding portion surrounding a side wall of the cover to seal a gap between the side wall of the cover and the shell, the air channel being partly formed between the side wall of the cover and the surrounding portion; and a covering portion connected to one end of the surrounding portion and covering the top of the cover, wherein the covering portion is provided with the through hole, one end of the valve is connected to the surrounding portion, another end of the valve is a free end, the valve covers above the guide groove, and the another end of the valve is able to open and close the air channel under an action of a gas in the air channel.

[0013] In some embodiments, a sectional area of the valve gradually decreases in the direction towards the tail end of the air channel.

[0014] In some embodiments, an atomizing cavity is provided in the cover, the atomizing assembly includes: a heating element disposed in the atomizing cavity and configured to heat the aerosol atomizing substrate to generate the aerosol; and a heating element seal disposed at a top of the heating element to isolate the fluid channel from the atomizing cavity, wherein the atomizer is provided with an air outlet channel for the aerosol to flow out, and the atomizing cavity is in communication with the air outlet channel.

[0015] The embodiment of the present disclosure provides an atomizing device, including: the atomizer of any one of the above; and a power supply configured to supply power to the atomizer.

[0016] The embodiment of the present disclosure provides an atomizer, including the shell, the cover, the atomizing assembly, and the valve. The shell is provided with the liquid storage cavity for accommodating the aerosol atomizing substrate; the cover is arranged in the shell; the atomizing assembly is arranged in the cover for atomizing the aerosol atomizing substrate to generate the aerosol. The cover is provided with the air channel communicating the liquid storage cavity with the external atmosphere and the fluid channel communicating the liquid storage cavity with the atomizing assembly. The air channel is provided with the valve for controlling the communication and the cutoff between the liquid storage cavity and the external atmosphere. The sectional area of the part of the air channel located upstream of the valve decreases in the direction towards the tail end of the air channel. In the embodiment of the present disclosure, the sectional area of the part of the air channel located upstream of the valve decreases in the direction towards the tail end of the air channel, when the airflow enters from the air channel, the airflow first flows through the part of the air channel located upstream of the valve, since the sectional area of the air channel here is reduced, the flow velocity of the airflow increases, and then the airflow flows to the part of the air channel provided with the valve to impact the valve. By increasing the inlet speed of the airflow to impact the valve, a larger force can be effectively applied to the end of the valve, so that the valve can be opened more easily, and the liquid film formed by the aerosol atomizing substrate can be punctured to achieve the ventilation. Moreover, the force exerted by the airflow on the valve increases, so that the valve is easier to be opened under the impact of the airflow, and therefore, the range requirement for the hardness, the thickness, the width, or the sectional area of the valve can be reduced in actual production, thereby expanding the acceptable tolerance range for the product production, improving the ventilation stability of the valve, and improving the product performance consistency.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] Subject matter of the present disclosure will be described in even greater detail below based on the exemplary figures. All features described and/or illustrated herein can be used alone or combined in different combinations. The features and advantages of various embodiments will become apparent by reading the following detailed description with reference to the attached drawings, which illustrate the following:

FIG. 1 is a schematic structural diagram of an atomizer in an embodiment of the present disclosure;

FIG. 2 is a sectional view of the atomizer in one direction in an embodiment of the present disclosure;

FIG. 3 is a schematic structural diagram of a cover in

an embodiment of the present disclosure;

FIG. 4 is a schematic structural diagram of a cover seal in an embodiment of the present disclosure;

FIG. 5 is a top view of the cover in an embodiment of the present disclosure;

FIG. 6 is a sectional view of the cover in an embodiment of the present disclosure;

FIG. 7 is a top view of the cover and the cover seal in an embodiment of the present disclosure;

FIG. 8 is a sectional view of the cover and the cover seal in an embodiment of the present disclosure;

FIG. 9 is a sectional view of the atomizer in another direction in an embodiment of the present disclosure;

FIG. 10 is a schematic structural diagram of an atomizing device in an embodiment of the present disclosure; and

FIG. 11 is a schematic diagram of the atomizing device in an embodiment of the present disclosure.

List of numerals:

[0018] 10, atomizer; 1, shell; 11, liquid storage cavity; 12, suction nozzle; 2, cover; 21, air channel; 22, fluid channel; 23, guide groove; 24, atomizing cavity; 25, groove; 3, atomizing assembly; 31, heating element; 32, heating element seal; 33, heating wire; 4, valve; 5, cover seal; 51, through hole; 52, surrounding portion; 53, covering portion; 6, air outlet channel; 7, atomizing device; 71, power supply.

DETAILED DESCRIPTION

[0019] In order to have a better understanding of the objectives, the technical solutions, and the advantages of the present disclosure, the present disclosure will be further described in detail below in conjunction with the accompanying drawings and embodiments. It should be understood that the specific embodiments described herein are only intended to explain the present disclosure and are not intended to limit the present disclosure.

[0020] In the case of no contradiction, the various specific technical features described in the specific embodiments can be combined in any suitable manner, such as forming different embodiments and technical solutions through a combination of different specific technical features. In order to avoid unnecessary repetition, various possible combinations of specific technical features in the present disclosure will not be described separately.

[0021] In the following description, the terms such as "first, second,..." are merely intended to distinguish be-

tween different objects, but do not indicate that the objects have similarities or connections. It should be understood that the described orientations such as "above", "below", "outside", "inside", "left", and "right" indicate the directions shown in the specific corresponding schematic diagrams, which may be or may not be the directions in a normal use state.

[0022] It should be noted that, the terms "include", "comprise", or any other variation thereof are intended to cover non-exclusive inclusion, such that a process, a method, an item, or a device that includes a series of elements not only includes those elements, but also includes other elements that are not explicitly listed, or also includes elements inherent to such a process, a method, an item, or a device. In the absence of further limitations, the element defined by the statement "includes a..." does not exclude the existence of an additional identical element in the process, the method, the item, or the device that includes that element. The term "a plurality of" means greater than or equal to two.

[0023] An embodiment of the disclosure provides an atomizer and an atomizing device. The atomizing device includes the atomizer, which is configured to atomize an aerosol atomizing substrate into an aerosol. The atomizer can be applied to various atomization scenarios, such as medical cosmetology, nicotine delivery, daily life or other atomization scenarios. The aerosol atomizing substrate may be a medical powder, a fragrance, a nicotine preparation, or an aerosol substrate that can produce a special odor. A person skilled in the art can understand that there are a plurality of application scenarios of the atomizer, and the application scenario of the atomizer is not limited in the embodiments of the present disclosure.

[0024] As shown in FIG. 1 and FIG. 2, an embodiment of the present disclosure provides an atomizer 10, which includes a shell 1, a cover 2, an atomizing assembly 3, and a valve 4. Wherein, the shell 1 is provided with a liquid storage cavity 11 for accommodating the aerosol atomizing substrate, a suction nozzle 12 is provided at the top of the shell 1 in the length direction of the atomizer 10, and a user can draw the aerosol generated after atomization through the suction nozzle 12. The cover 2 is arranged in the shell 1. The atomizing assembly 3 is arranged in the cover 2 and configured to atomize the aerosol atomizing substrate to generate the aerosol, and the user can draw the aerosol generated by the atomizing assembly 3 of the atomizer 10 through the suction nozzle 12. For example, the atomizing assembly 3 may include a heating element configured for heating and atomizing the aerosol atomizing substrate to generate the aerosol, and/or, an atomizing nozzle configured for atomizing the aerosol atomizing substrate to form atomized droplet particles and spraying them outwards. The atomizing nozzle may be, for example, a gas-liquid two-phase flow atomizing nozzle, an airflow channel and a fluid channel are provided inside the nozzle, the gas and the aerosol atomizing substrate enter the nozzle, and the gas impacts the aerosol atomizing substrate to atomize the aerosol atomizing sub-

strate, to form atomized droplet particles and spray them into a cavity outside the atomizing nozzle for the user to suck.

[0025] As shown in FIG. 2 and FIG. 3, the cover 2 is provided with an air channel 21 communicating the liquid storage cavity 11 with an external atmosphere, and a fluid channel 22 communicating the liquid storage cavity 11 with the atomizing assembly 3. When the aerosol atomizing substrate in the liquid storage cavity 11 enters the atomizing assembly 3 through the fluid channel 22 for atomization, a negative pressure will be formed in the liquid storage cavity 11 due to liquid outflow, and at this time, the external airflow can enter the liquid storage cavity 11 through the air channel 21 for ventilation to reduce the negative pressure, so that the pressure balance between the liquid storage cavity 11 and the external atmosphere is maintained, and the aerosol atomizing substrate in the liquid storage cavity 11 can smoothly enter the atomizing assembly 3.

[0026] As shown in FIG. 4 to FIG. 6, the valve 4 is disposed at the air channel 21 to control the communication and the closure of the liquid storage cavity 11 and the external atmosphere. When the negative pressure in the liquid storage cavity 11 is relatively small, the valve 4 closes the air channel 21 under the gravity of the aerosol atomizing substrate in the liquid storage cavity 11 to control the communication of the liquid storage cavity 11 and the external atmosphere to be closed, thereby reducing the leakage of the aerosol atomizing substrate in the liquid storage cavity 11 through the air channel 21. When the valve 4 controls the liquid storage cavity 11 and the external atmosphere to be communicated, the external airflow can enter the liquid storage cavity 11 through the air channel 21 for ventilation to reduce the negative pressure and maintain the pressure balance between the liquid storage cavity 11 and the external atmosphere. For example, the valve 4 can be made of a flexible material, so that the valve 4 can be deformed under the action of an external force, for example, the valve 4 can be blown open by the impact action of the airflow, so that the liquid storage cavity 11 is communicated with the external atmosphere. When there is no airflow passing through the air channel 21, the valve 4 is lapped above the air channel 21, so that the communication between the liquid storage cavity 11 and the external atmosphere is closed.

[0027] As shown in FIG. 5, the air channel 21 has two ends, and if combined with the ventilation function, since the ventilation is directional, the inlet end is the initial end of the air channel 21, and the outlet end is the tail end of the air channel 21. In the direction towards the tail end of the air channel 21, the sectional area of the part of the air channel 21 located upstream of the valve 4 decreases. It can be understood that, the magnitude of the reduction in the sectional area of the air channel 21 may be uniform or uneven, as long as the overall sectional areas of the air channel 21 present a decreasing trend, where the upstream refers to being closer to the source of the airflow.

The valve 4 may be arranged at the tail end of the air channel 21 or in the middle of the air channel 21. However, the airflow first flows through the part of the air channel 21 located upstream of the valve 4, and then flows to the part of the air channel 21 provided with the valve 4. Thus, when the airflow enters from the air channel 21, as it flows towards the tail end of the air channel 21, the flow velocity of the airflow passing through the air channel 21 with the reduced sectional area will increase, that is, the flow velocity of the airflow passing through the air channel 21 located upstream of the valve 4 will increase, and then the airflow flows to the air channel 21 provided with the valve 4 at a higher speed to impact the valve 4.

[0028] By using the lift formula $L=C_1 \cdot P v^2 \cdot S$, it can be inferred that the aerodynamic velocity and the generated force are in a square relationship, and a larger force can be applied to the end of the valve 4 more effectively by increasing the air inlet speed, making it easier to puncture the liquid film formed by the aerosol atomizing substrate to achieve the ventilation. The increase in force reduces the range requirement for the hardness, the thickness, the width, or the sectional area of the valve 4. For example, the thickness of the related valve 4 needs to be $0.2+0.02$ mm in order to allow normal ventilation, while the thickness of the valve 4 using the solution described in the embodiment of the present disclosure can be $0.25+0.1/0.05$ mm, thereby expanding the acceptable tolerance range for the production of the valve 4, improving the ventilation stability of the valve 4, and improving the product performance consistency.

[0029] In the embodiment of the present disclosure, in the direction towards the tail end of the air channel, the sectional area of the part of the air channel located upstream of the valve decreases. When the airflow enters from the air channel, the airflow first flows through the part of the air channel located upstream of the valve, and since the sectional area of the air channel here is reduced, the flow velocity increases, and then the airflow flows to the part of the air channel provided with the valve to impact the valve. By increasing the inlet speed of the airflow to impact the valve, a larger force can be effectively applied to the end of the valve, so that the valve can be opened more easily, and the liquid film formed by the aerosol atomizing substrate can be punctured to achieve the ventilation. Moreover, the force exerted by the airflow on the valve increases, so that the valve is easier to be opened under the impact of the airflow, and therefore, the range requirement for the hardness, the thickness, the width, or the sectional area of the valve can be reduced in actual production, thereby expanding the acceptable tolerance range for the product production, improving the ventilation stability of the valve 4, and improving the product performance consistency.

[0030] In some embodiments, as shown in FIG. 3 and FIG. 5, the air channel 21 includes a guide groove 23 located at the tail end of the airflow, and the air channel 21 further includes other parts, such as a groove 25 formed

by a side wall of the cover 2. The groove 25 communicates the guide groove 23 with the external atmosphere, that is, the groove 25 is arranged close to the initial end of the airflow to be communicated with the external atmosphere. The guide groove 23 is arranged close to the tail end of the airflow to be communicated with the liquid storage cavity 11. The groove 25 may be set with an equal cross-section area or with a reduced sectional area. The guide groove 23 is disposed at the top of the cover 2, and the valve 4 covers the guide groove 23. As shown in FIG. 2, the top of the cover 2 is close to the liquid storage cavity 11, so that the guide groove 23 is disposed close to the liquid storage cavity 11, and when the airflow flows in the guide groove 23, the ventilation with the liquid storage cavity 11 will be more direct and convenient. The sectional area of the guide groove 23 gradually decreases in the direction towards the tail end of the air channel 21, that is, the magnitude of the reduction in the sectional area of the guide groove 23 is uniform.

[0031] The air channel in the embodiment of the present disclosure includes the guide groove located at the tail end of the airflow, and the sectional area of the guide groove gradually decreases in the direction towards the tail end of the air channel, that is, the magnitude of the reduction in the sectional area of the guide groove is uniform. When the airflow flows in the guide groove, the flow velocity can be increased uniformly, so that the flow velocity of the airflow is steadily increased, thereby effectively reducing the energy loss of the airflow and enabling the valve to be opened more stably.

[0032] In some embodiments, as shown in FIG. 3 and FIG. 5, the extension directions of two side walls of the guide groove 23 present an oblique angle of 1° to 10° , where the oblique angle is θ as shown in FIG. 5. Since the extension directions of the two side walls of the guide groove 23 present a certain oblique angle, the closer to the tail end of the airflow, the closer the two side walls of the guide groove 23 are, thereby reducing the sectional area of the guide groove 23 close to the tail end of the airflow in the horizontal direction. As shown in FIG. 3, the side wall of the guide groove 23 close to the groove 25 is inclined towards the groove 25, so that the airflow in the groove 25 can flow into the guide groove 23 under the guidance of the inclined side wall, making the airflow flow smoother; and/or, as shown in FIG. 6, in the direction towards the tail end of the air channel 21, the bottom wall of the guide groove 23 is in a smooth transition and tilts towards the liquid storage cavity 11, and it can be understood that the bottom wall of the guide groove 23 may extend in a straight line or in a smooth transition curve, and at least part of the bottom wall of the guide groove 23 has a certain slope, so that it can tilt towards the liquid storage cavity 11, thereby reducing the sectional area of the guide groove 23 close to the tail end of the airflow in the vertical direction.

[0033] In the embodiments of the present disclosure, the oblique angle of the extension directions of the two

side walls of the guide groove is relatively small in the direction towards the tail end of the airflow, and/or, the bottom wall of the guide groove is inclined towards the direction of the liquid storage cavity in the direction towards the tail end of the air channel. Therefore, when the airflow flows to the tail end of the airflow in the guide groove, the airflow tends to be in a point or a smaller plane, in other words, a large amount of airflow is compressed and accelerated to the tail end, so that the force formed by the airflow is easier to open the valve, and puncture the liquid film formed by the aerosol atomizing substrate to achieve the ventilation between the external atmosphere and the liquid storage cavity.

[0034] In some embodiments, as shown in FIG. 3 and FIG. 6, in the direction towards the tail end of the air channel 21, the slope of the bottom wall of the guide groove 23 varies, and the slope of the bottom wall of the guide groove 23 first increases and then decreases. It can be understood that, when the airflow in the groove 25 just enters the guide groove 23, the slope of the bottom wall of the guide groove 23 is relatively small, so that the airflow in the groove 25 can enter the guide groove 23 smoothly. As the airflow flows towards the tail end of the air channel 21, the slope of the bottom wall of the guide groove 23 first increases, so that the sectional area of the guide groove 23 is reduced in the vertical direction, and the airflow is compressed and accelerated. As shown in FIG. 7 and FIG. 8, the slope of the bottom wall of the guide groove 23 then decreases, so that the airflow can impact the valve 4 located at the tail end of the airflow at a relatively high speed and flow smoothly into the liquid storage cavity 11. Moreover, the slope of the bottom wall of the guide groove 23 at the tail end of the airflow is relatively small, so that when the valve 4 is located above the guide groove 23, it can be stably lapped above the guide groove 23, thus separating the guide groove 23 from the liquid storage cavity 11 when the atomizer 10 is not in use.

[0035] In the embodiment of the present disclosure, in the direction towards the tail end of the air channel, the slope of the bottom wall of the guide groove first increases and then decreases, that is, the slope of the bottom wall of the guide groove presents a "small, large, small" manner, so that the airflow in the groove can enter the guide groove smoothly and is accelerated in the part with a larger slope, and when flowing to the tail end of the airflow, the slope of the bottom wall of the guide groove is relatively small, so that the airflow impacts the valve located at the tail end of the airflow at a relatively high speed and can flow smoothly into the liquid storage cavity. In addition, the valve can be stably lapped above the guide groove, thereby separating the guide groove from the liquid storage cavity to reduce the liquid leakage in the liquid storage cavity when the atomizer is not in use.

[0036] In some embodiments, as shown in FIG. 5 and FIG. 6, the sectional area of the guide groove 23 decreases in the direction towards the tail end of the air channel 21, so that the depth of the guide groove 23 is

variable, and the depth of the guide groove 23 ranges from 0.01 mm to 0.5 mm; and/or, the width of the guide groove 23 is variable, and the width of the guide groove 23 ranges from 0.1 mm to 1.0 mm. In the embodiments of the present disclosure, the depth of the guide groove is variable, and/or, the width of the guide groove is variable, and the depth range and the width range of the guide groove are respectively defined, so that the sectional area of the tail end of the guide groove is relatively small, so that the force of the airflow is not dissipated, the force is concentrated at the end of the valve, the ventilation position is fixed, and the product consistency is improved.

[0037] In some embodiments, as shown in FIG. 2 and FIG. 4, the atomizer 10 further includes a cover seal 5 disposed on the outer surface of the cover 2 to seal the liquid storage cavity 11. The cover seal 5 may be made of a material with better sealing performance, such as silicone. The top wall of the cover seal 5 adjacent to the liquid storage cavity 11 is provided with a through hole 51 to communicate the liquid storage cavity 11 with the fluid channel 22, so that the aerosol atomizing substrate in the liquid storage cavity 11 can enter the fluid channel 22 through the through hole 51. The air channel 21 is disposed between the cover seal 5 and the cover 2 and communicates the external atmosphere with the liquid storage cavity 11, and the cover seal 5 does not seal the inlet end and the outlet end of the air channel 21. The air channel 21 is provided with the valve 4, and the valve 4 may be an independent component, or may be a part of the cover seal 5. The atomizer in the embodiment of the present disclosure further includes the cover seal disposed on the outer surface of the cover to seal the liquid storage cavity, thereby reducing the leakage of the aerosol atomizing substrate in the liquid storage cavity through a gap between the cover and the shell, and improving the user experience.

[0038] In some embodiments, as shown in FIG. 4 and FIG. 7, the cover seal 5 includes a surrounding portion 52 and a covering portion 53. Wherein, the surrounding portion 52 is arranged around a side wall of the cover 2 to seal a gap between the side wall of the cover 2 and the shell 1, thereby reducing the leakage of the aerosol atomizing substrate in the liquid storage cavity 11 through the gap between the side wall of the cover 2 and the shell 1. A part of the air channel 21 (the groove 25) is formed between the side wall of the cover 2 and the surrounding portion 52. The covering portion 53 is connected to one end of the surrounding portion 52 and covers the top of the cover 2. The guide groove 23 is arranged at the top of the cover 2, the covering portion 53 is provided with the through hole 51, and the guide groove 23 is communicated with the liquid storage cavity 11 through the through hole 51. One end of the valve 4 is connected to the surrounding portion 52, and the other end of the valve 4 is a free end. The valve 4 covers above the guide groove 23, and the other end (the free end) of the valve 4 can open and close the air channel 21 under the action of the

airflow in the air channel 21. When the airflow flows in the guide groove 23, as the flow velocity of the airflow increases, the force exerted by the airflow on the valve 4 increases, so that the valve 4 is opened under the impact of the airflow for ventilation. When the atomizer 10 is not in use, there is no airflow flowing in the guide groove 23, the valve 4 covers above the guide groove 23 to close the air channel 21, thereby reducing the leakage of the aerosol atomizing substrate in the liquid storage cavity 11 when the atomizer 10 is not in use.

[0039] The cover seal in the embodiment of the present disclosure includes the surrounding portion and the covering portion, the surrounding portion is arranged around the side wall of the cover, and the covering portion covers the top of the cover, thereby reducing the leakage of the aerosol atomizing substrate in the liquid storage cavity through the gap between the side wall of the cover and the shell and the gap of the cover itself. One end of the valve is connected to the surrounding portion, so that the valve and the surrounding portion can be integrated as a whole during actual design and production, thereby facilitating actual production and installation. The valve serves as a part of the cover seal, so that the cover seal not only plays a role in sealing the liquid storage cavity, but also serves as a the valve for opening and closing the air channel, and the functions are diversified.

[0040] In some embodiments, as shown in FIG. 5 and FIG. 7, the sectional area of the valve 4 gradually decreases in the direction towards the tail end of the air channel 21. That is to say, as the sectional area of the guide groove 23 gradually decreases, the sectional area of the valve 4 gradually decreases correspondingly. In the embodiment of the present disclosure, the sectional area of the valve gradually decreases in the direction towards the tail end of the air channel, so that the force required for the airflow to open the valve is smaller, making it easier for the airflow to impact and open the valve, thereby achieving the ventilation between the external atmosphere and the liquid storage cavity.

[0041] In some embodiments, as shown in FIG. 2 and FIG. 9, the cross sections shown in FIG. 2 and FIG. 9 are two cross sections perpendicular to each other of the atomizer, and the arrow directions shown in FIG. 2 and FIG. 9 refer to the airflow flow direction and the liquid flow direction of atomizer 10. The cover 2 is provided with an atomizing cavity 24 therein. The atomizing assembly 3 includes a heating element 31 and a heating element seal 32. Wherein, the aerosol atomizing substrate in the liquid storage cavity 11 flows to the heating element 31 through the fluid channel 22. For example, the heating element 31 may be a porous ceramic heating element, which can absorb and store the aerosol atomizing substrate. The heating element 31 is disposed in the atomizing cavity 24 and is configured to heat the aerosol atomizing substrate to generate the aerosol. The heating element seal 32 is disposed at the top of the heating element 31 to isolate the fluid channel 22 from the atomizing cavity 24, so that when the aerosol atomizing substrate in the liquid sto-

rage cavity 11 flows to the heating element 31 through the fluid channel 22, it is not easy to directly leak into the atomizing cavity 24. The heating element seal 32 may be made of a material with good sealing performance, such as silicone. The atomizing cavity 24 is not in direct communication with the fluid channel 22, but is indirectly communicated with the fluid channel 22 through the heating element 31. The heating element 31 absorbs and stores the aerosol atomizing substrate flowing from the fluid channel 22, heats and atomizes the aerosol atomizing substrate into the aerosol, and then emits the aerosol into the atomizing cavity 24. A heating wire 33 of the heating element 31 is distributed on the side of the heating element 31 away from the fluid channel 22, that is, distributed at the bottom of the heating element 31, so that a liquid absorbing surface and a heating surface of the heating element 31 can be separated to a certain extent, and most of the aerosol atomizing substrate is atomized on the bottom side of the heating element 31 and dispersed into the atomizing cavity 24, and the atomization effect is good. The atomizer 10 is further provided with an air outlet channel 6 through which the aerosol flows out, and the atomizing cavity 24 is in communication with the air outlet channel 6. The aerosol is emitted into the atomizing cavity 24 and then flows out through the air outlet channel 6 for the user to absorb.

[0042] The atomizing assembly in the embodiment of the present disclosure includes the heating element and the heating element seal. The aerosol atomizing substrate is heated and atomized into the aerosol through the heating element. Since no combustion is needed, the generation of harmful substances such as tar and suspended particles is reduced to a certain extent. The heating element seal isolates the fluid channel from the atomizing cavity. The aerosol atomizing substrate flowing into the fluid channel needs to be heated and atomized by the heating element to form the aerosol, and then the aerosol is dispersed into the atomizing cavity to achieve gas-liquid separation, so that the aerosol is more delicate and the user experience is better when the user sucks.

[0043] As shown in FIG. 10 and FIG. 11, an atomizing device 7 is provided in an embodiment of the present disclosure, including the atomizer 10 and a power supply 71. Wherein, the power supply 71 is configured to supply power to the atomizer 10. For example, the power supply 71 is electrically connected to the heating element 31 of the atomizer 10, so that when the power supply 71 is turned on, the heating element 31 of the atomizer 10 is energized to generate heat, so as to heat and atomize the aerosol atomizing substrate to generate the aerosol. The atomizing device in the embodiment of the present disclosure includes the atomizer and the power supply configured to supply power to the atomizer, and the turning on and off of the atomizer can be controlled by controlling the power supply. For example, the power supply may be a visual button for the user, so that the

user can control the turning on and off of the atomizer by controlling the button, thereby facilitating the use of the user.

[0044] The above descriptions are merely preferred embodiments of the present disclosure and are not intended to limit the protection scope of the present disclosure.

[0045] While the disclosure has been illustrated and described in detail in the drawings and foregoing description, such illustration and description are to be considered illustrative or exemplary and not restrictive. It will be understood that changes and modifications may be made by those of ordinary skill within the scope of the following claims. In particular, the present disclosure covers further embodiments with any combination of features from different embodiments described above and below. Additionally, statements made herein characterizing the disclosure refer to an embodiment of the disclosure and not necessarily all embodiments.

[0046] The terms used in the claims should be construed to have the broadest reasonable interpretation consistent with the foregoing description. For example, the use of the article "a" or "the" in introducing an element should not be interpreted as being exclusive of a plurality of elements. Likewise, the recitation of "or" should be interpreted as being inclusive, such that the recitation of "A or B" is not exclusive of "A and B," unless it is clear from the context or the foregoing description that only one of A and B is intended. Further, the recitation of "at least one of A, B and C" should be interpreted as one or more of a group of elements consisting of A, B and C, and should not be interpreted as requiring at least one of each of the listed elements A, B and C, regardless of whether A, B and C are related as categories or otherwise. Moreover, the recitation of "A, B and/or C" or "at least one of A, B or C" should be interpreted as including any singular entity from the listed elements, e.g., A, any subset from the listed elements, e.g., A and B, or the entire list of elements A, B and C.

Claims

1. An atomizer, comprising:

a shell provided with a liquid storage cavity configured for accommodating an aerosol atomizing substrate;
a cover arranged in the shell;
an atomizing assembly arranged in the cover and configured to atomize the aerosol atomizing substrate to generate an aerosol; and
a valve,
wherein the cover is provided with an air channel communicating the liquid storage cavity with an external atmosphere and a fluid channel communicating the liquid storage cavity with the atomizing assembly,

wherein the air channel is provided with the valve for controlling a communication and a cut-off between the liquid storage cavity and the external atmosphere, and

wherein a sectional area of a part of the air channel located upstream of the valve decreases in a direction towards a tail end of the air channel.

2. The atomizer of claim 1, wherein the air channel comprises a guide groove located at a tail end of an airflow and disposed at a top of the cover,

wherein the valve covers the guide groove, and wherein a sectional area of the guide groove gradually decreases in the direction towards the tail end of the air channel.

3. The atomizer of claim 2, wherein extension directions of two side walls of the guide groove present an oblique angle.

4. The atomizer of claim 3, wherein the oblique angle ranges from 1 ° to 10 °.

5. The atomizer of claim 3, wherein the air channel comprises a groove formed on a side wall of the cover and communicating the guide groove with the external atmosphere, and wherein a side wall of the guide groove close to the groove is inclined towards the groove.

6. The atomizer of claim 2, wherein a bottom wall of the guide groove is inclined towards the liquid storage cavity in the direction towards the tail end of the air channel.

7. The atomizer of claim 6, wherein in the direction towards the tail end of the air channel, a slope of the bottom wall of the guide groove first increases and then decreases.

8. The atomizer of claim 2, wherein a depth of the guide groove ranges from 0.01 mm to 0.5 mm.

9. The atomizer of claim 2, wherein a width of the guide groove ranges from 0.1 mm to 1.0 mm.

10. The atomizer of claim 2, further comprising:

a cover seal disposed on an outer surface of the cover to seal the liquid storage cavity, wherein a top wall of the cover seal adjacent to the liquid storage cavity is provided with a through hole communicating the liquid storage cavity with the fluid channel, and wherein the air channel is provided between the cover seal and the cover.

11. The atomizer of claim 10, wherein the cover seal comprises:

a surrounding portion surrounding a side wall of the cover to seal a gap between the side wall of the cover and the shell, the air channel being partly formed between the side wall of the cover and the surrounding portion; and
 a covering portion connected to one end of the surrounding portion and covering the top of the cover,
 wherein the covering portion is provided with the through hole,
 wherein one end of the valve is connected to the surrounding portion, and another end of the valve is a free end,
 wherein the valve covers above the guide groove, and
 wherein the another end of the valve is able to open and close the air channel under an action of a gas in the air channel.

12. The atomizer of claim 11, wherein a sectional area of the valve gradually decreases in the direction towards the tail end of the air channel.

13. The atomizer of claim 11, wherein the valve is integrally formed with the cover seal.

14. The atomizer of claim 1, wherein an atomizing cavity is provided in the cover,
 wherein the atomizing assembly comprises:

a heating element disposed in the atomizing cavity and configured to heat the aerosol atomizing substrate to generate the aerosol; and
 a heating element seal disposed at a top of the heating element to isolate the fluid channel from the atomizing cavity,
 wherein the atomizer is provided with an air outlet channel for the aerosol to flow out, and the atomizing cavity is in communication with the air outlet channel.

15. An atomizing device, comprising:

the atomizer of any one of claims 1 to 14; and
 a power supply configured to supply power to the atomizer.



FIG. 1

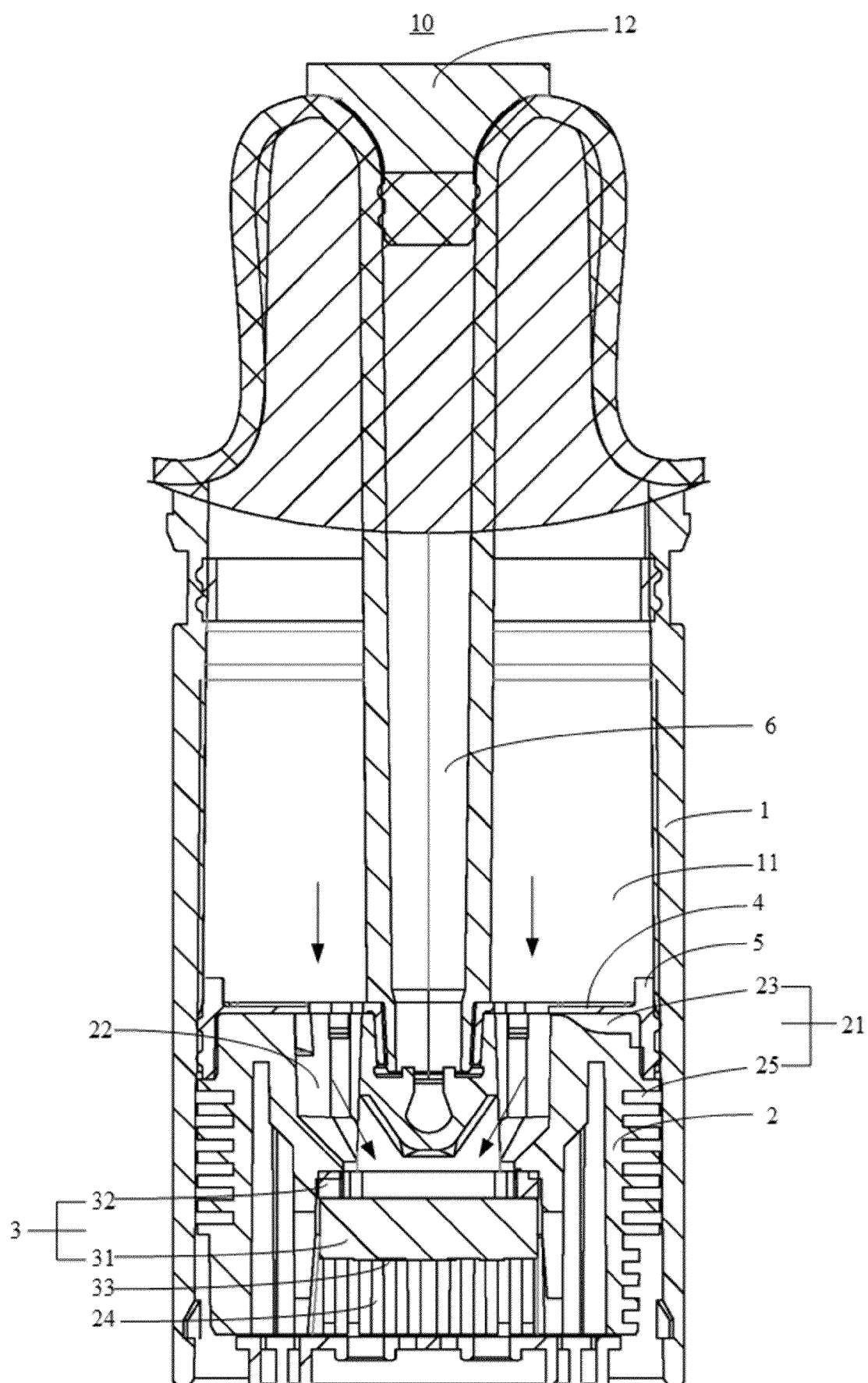


FIG. 2

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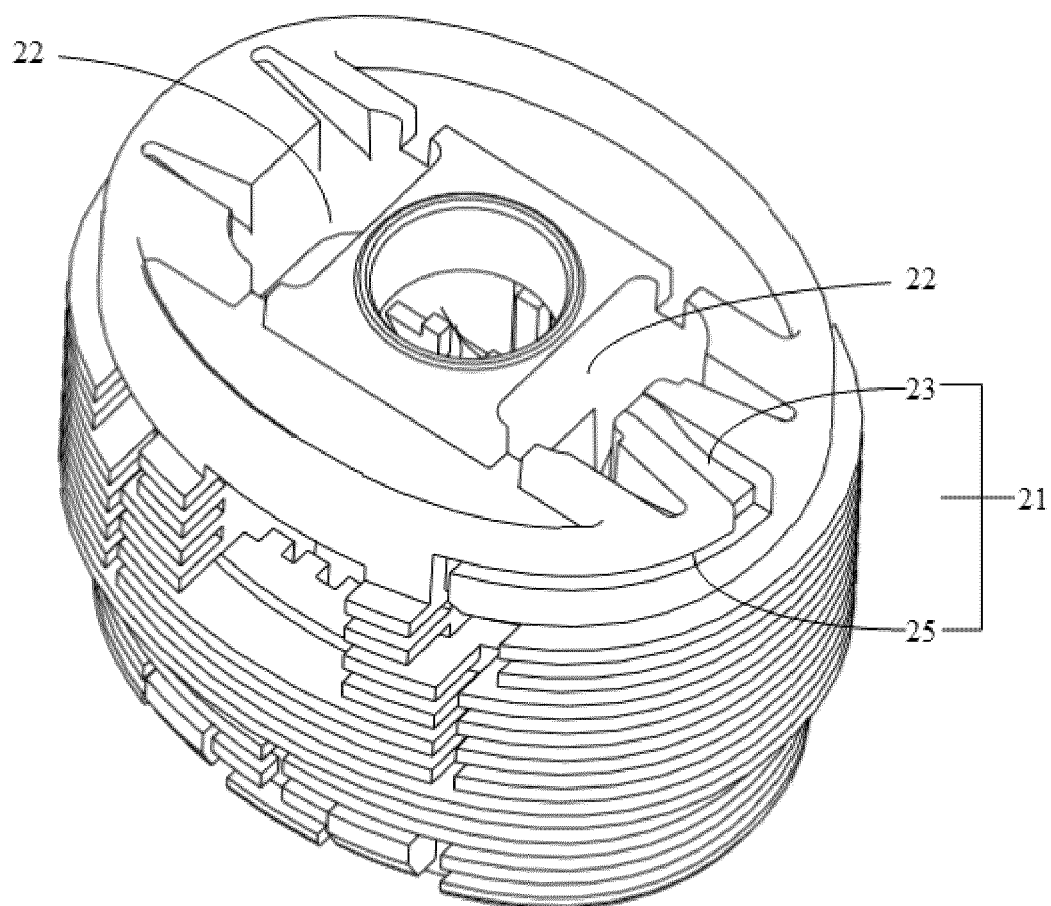


FIG. 3

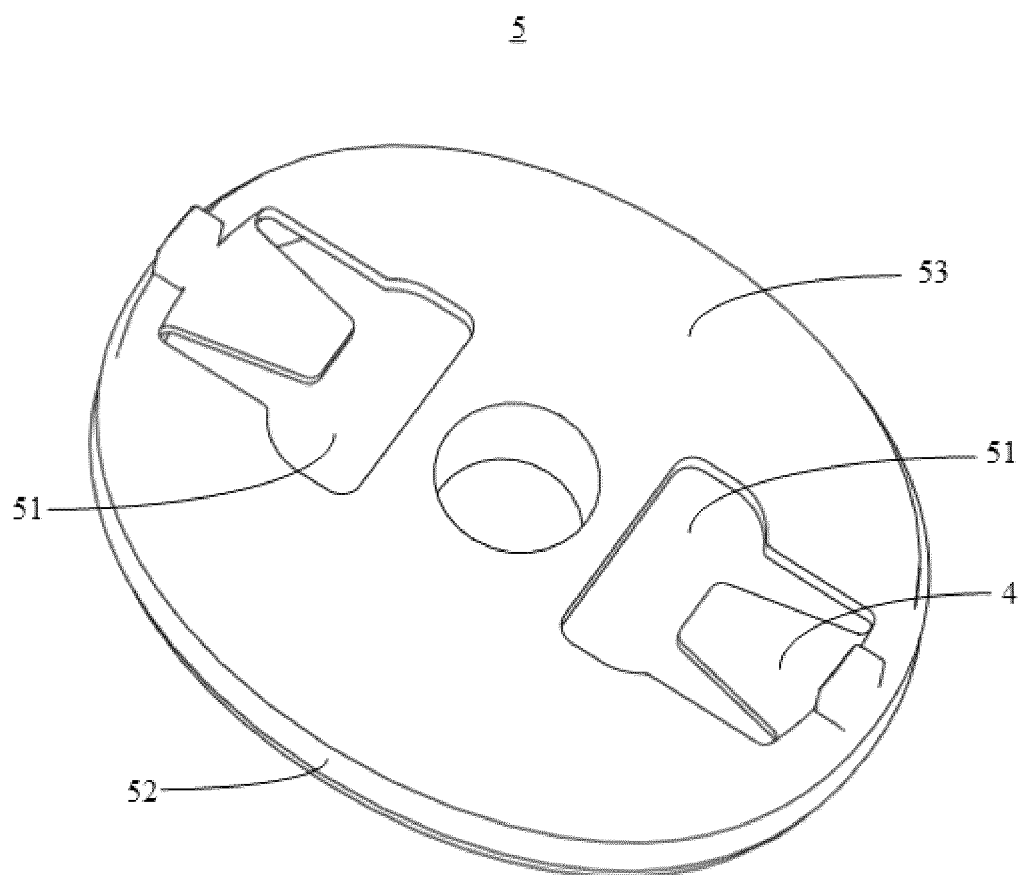


FIG. 4

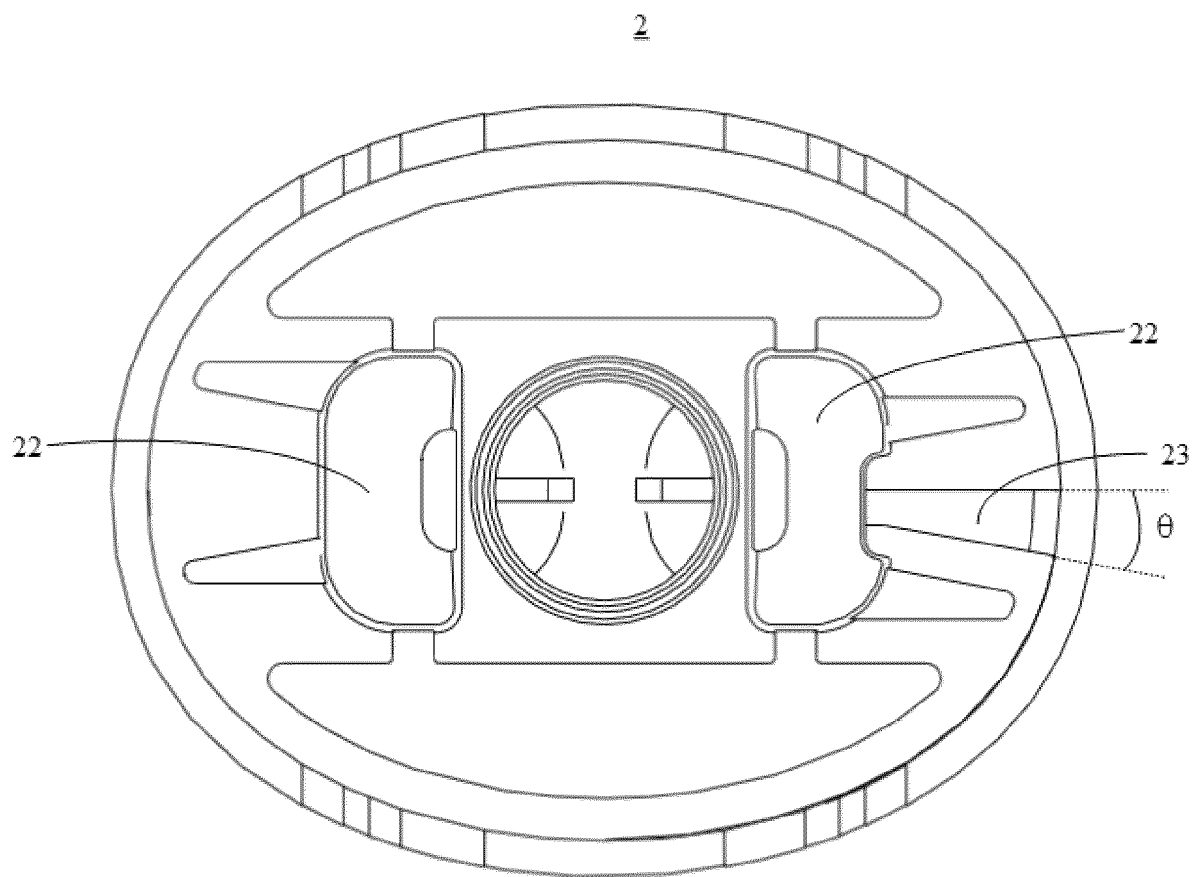


FIG. 5

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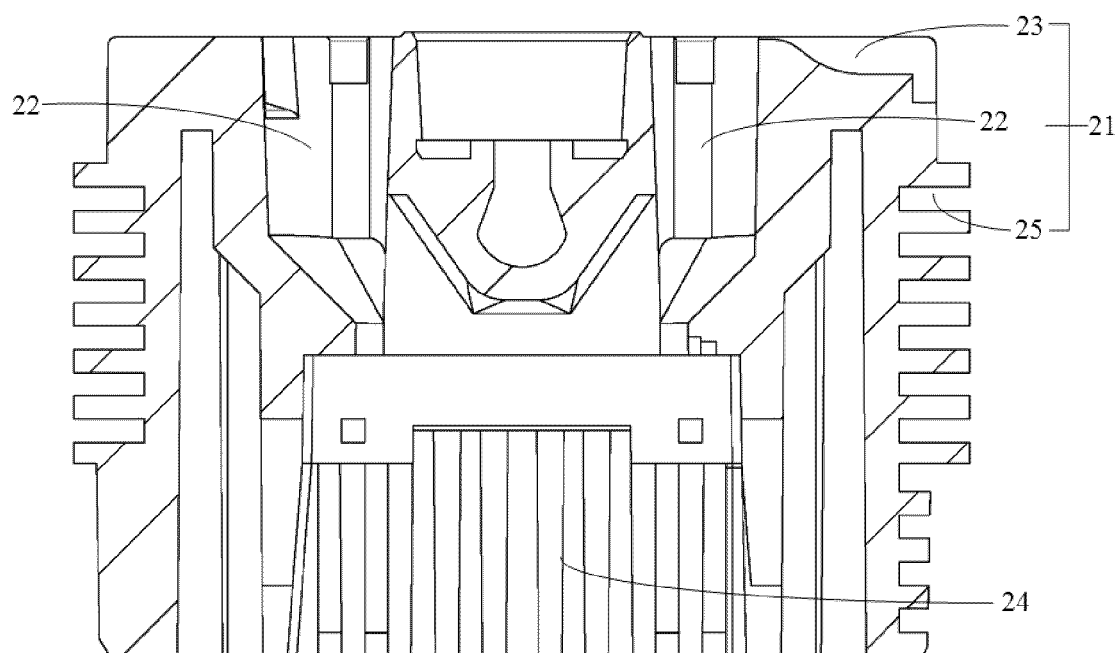


FIG. 6

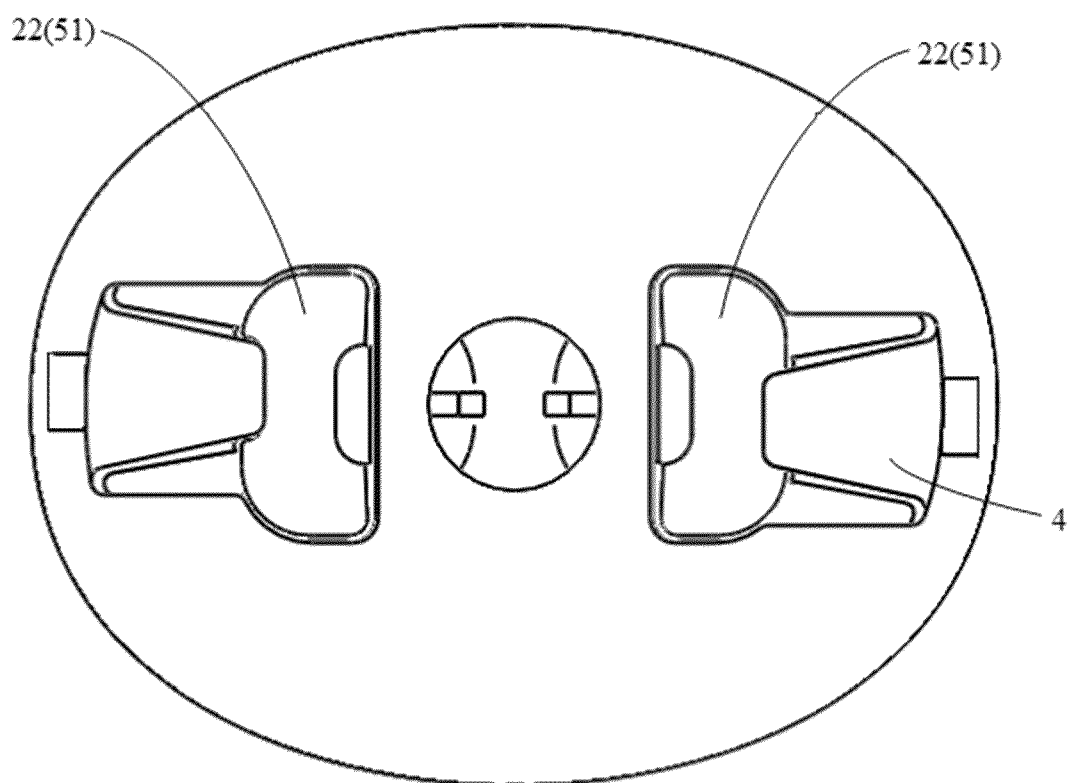


FIG. 7

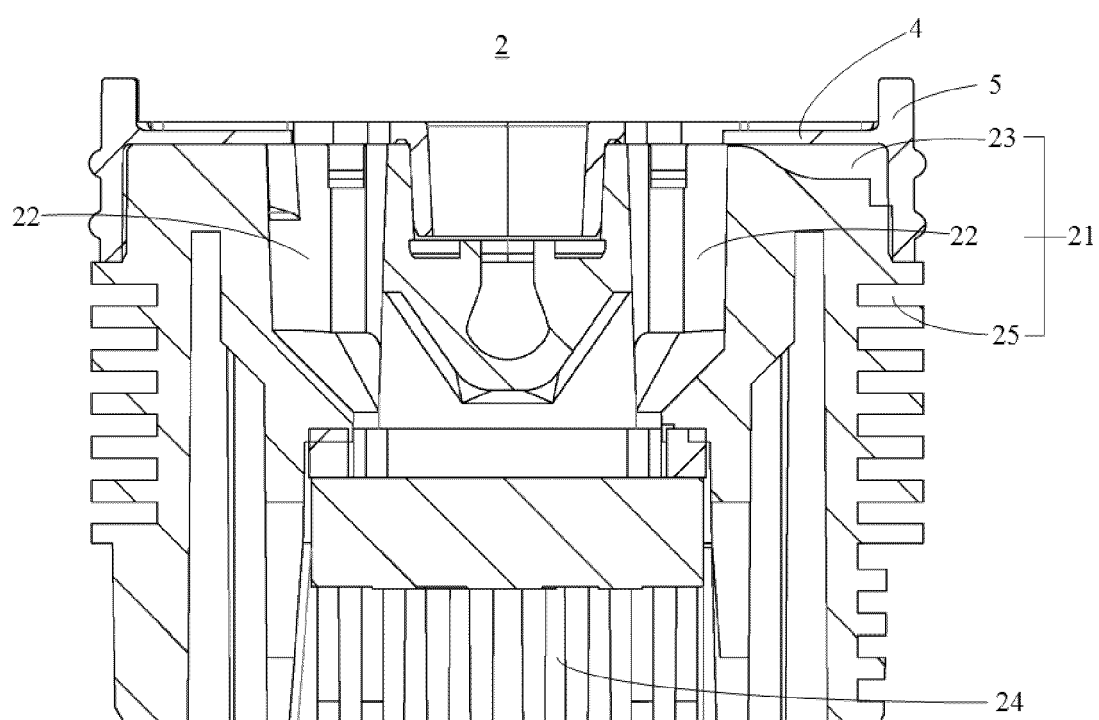


FIG. 8

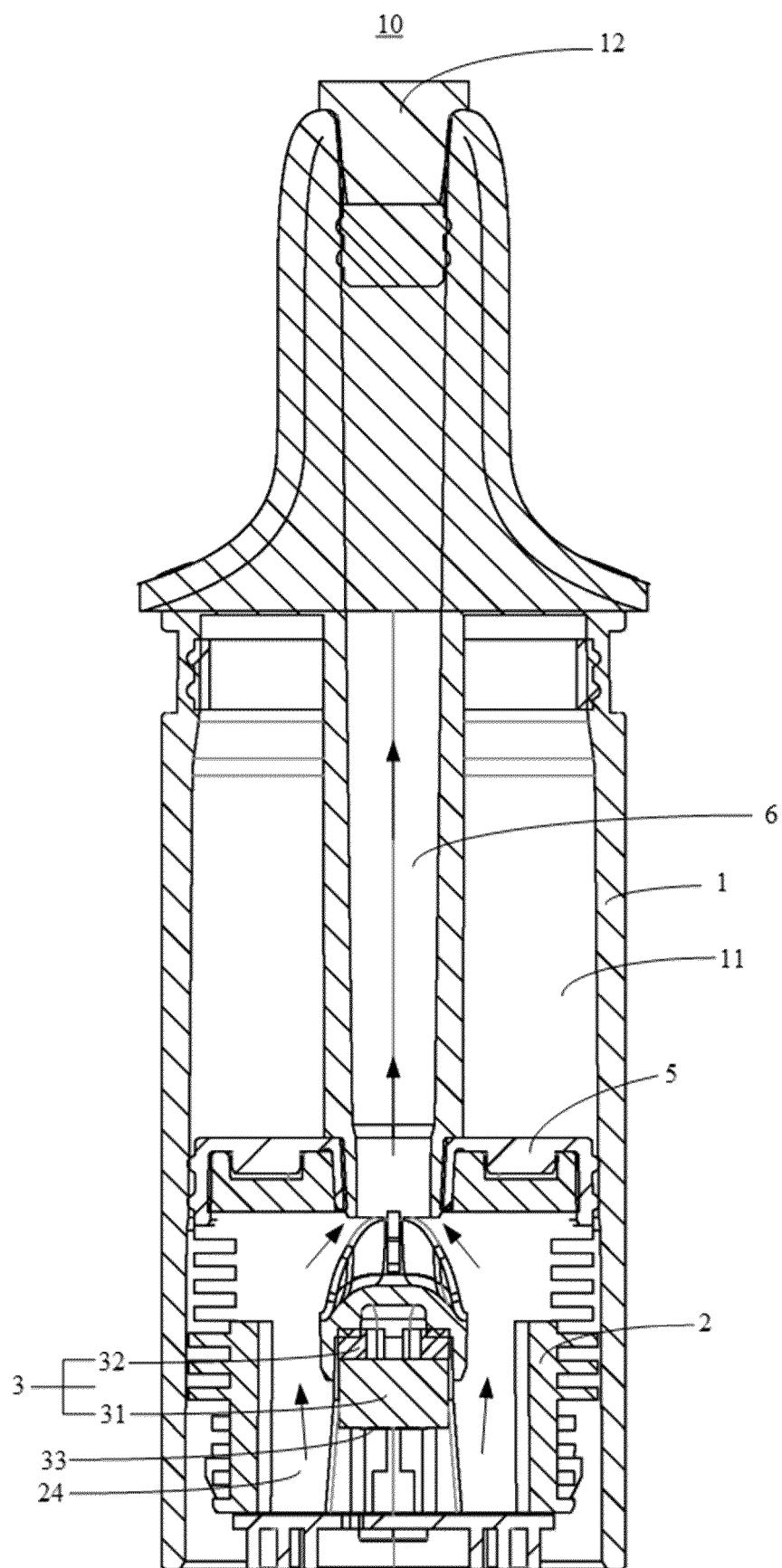


FIG. 9

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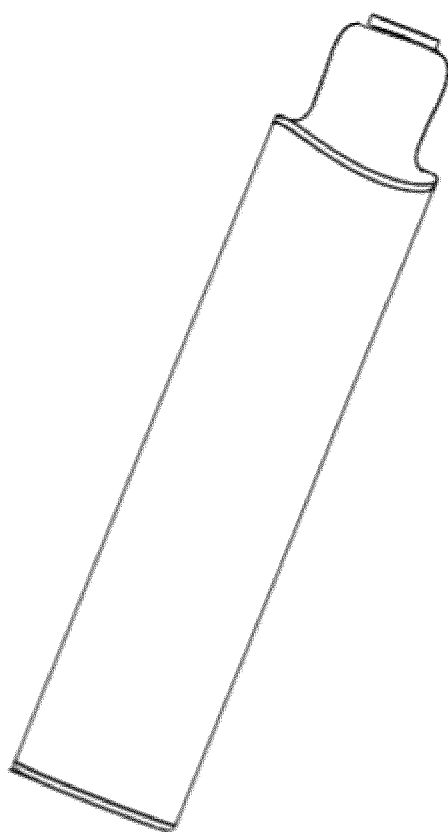


FIG. 10

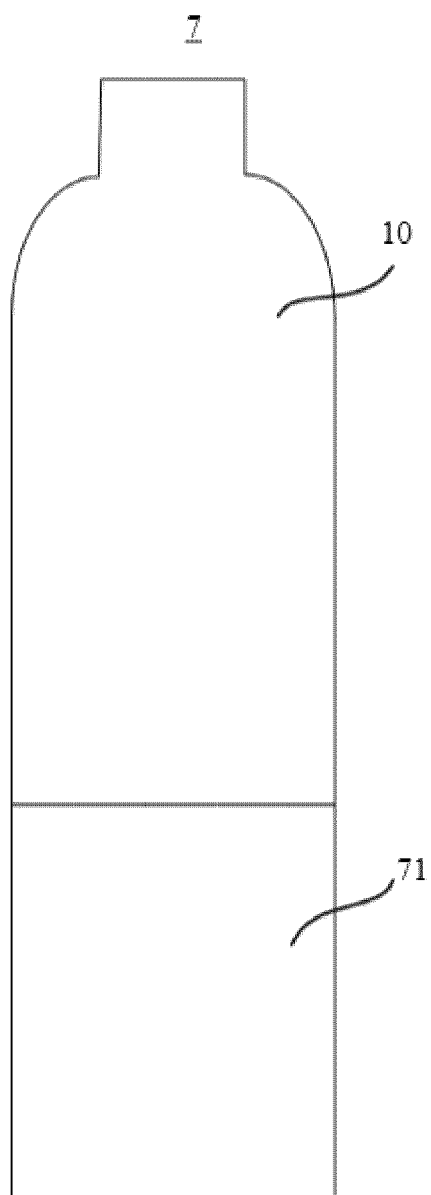


FIG. 11



EUROPEAN SEARCH REPORT

Application Number

EP 24 19 1630

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Y	* page 6 - page 13; figures 1-9 *	14	
A	-----	2-13	
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Y	CN 215 381 464 U (BYD PREC MANUFACTURE CO LIMITED) 4 January 2022 (2022-01-04) * paragraph [0048] - paragraph [0079]; figures 1-8 *	14	TECHNICAL FIELDS SEARCHED (IPC) A24F A61M

The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 19 December 2024	Examiner Dartis, Daniel
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
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