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(54) **CARTRIDGE AND ELECTRONIC CIGARETTE**

(57) A cartridge and an electronic cigarette. The cartridge comprises an atomizer (11) comprising a support base (110) and an atomizing head (112) disposed in the support base (110); a liquid storage container (13) sleeved on the support base (110), an e-liquid cavity (130) being defined between the liquid storage container (13) and the support base (110); a liquid pump (15) for pumping the e-liquid in the e-liquid cavity (130) to the atomizing head (112); a constant-pressure member (17) connected to the support base (110) and allowing only outside air to flow into the e-liquid cavity (130) in one

direction. Due to the high starting speed of the liquid pump (15), when the liquid in the e-liquid cavity (130) decreases, the air pressure in the e-liquid cavity (130) decreases and suffocation is caused in the e-liquid cavity (130), resulting in an increase in the workload of the piezoelectric pump, thus causing damage to the piezoelectric pump. By means of the constant-pressure member (17), the air in the e-liquid cavity (130) can be quickly replenished, so that the air pressure in the e-liquid cavity (130) is balanced, thereby making the e-liquid pumped by the piezoelectric pump smoother.

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Description**TECHNICAL FIELD**

- 5 [0001] The disclosure relates to the technical field of electronic cigarette, and more particularly, relates to a cartridge and an electronic cigarette capable of automatically supplying liquid.

BACKGROUND

- 10 [0002] At present, the liquid supply mode of the electronic cigarette is to provide a liquid storage member, and then the liquid storage member can provide the e-liquid required for atomization to the atomizer by manual or by suction using a liquid absorbing member. At the same time, some e-cigarettes are equipped with liquid pumps to automatically pump e-liquid into the atomizer. However, due to the fast start-up speed of the liquid pump, when the e-liquid in the liquid storage chamber is reduced, the air pressure in the liquid storage chamber decreases to cause suffocation in the liquid storage chamber. As a result, the working load of the piezoelectric pump is increased, thereby causing damage to the piezoelectric pump.

SUMMARY

- 20 [0003] Based on the above, it is necessary to provide a cartridge that can ensure smoother pumping of e-liquid in response to the above-mentioned problems.

[0004] It is also necessary to provide an electronic cigarette with the cartridge.

[0005] A cartridge includes:

- 25 an atomizer including a supporting base and an atomizing head installed in the supporting base;
a liquid storage container installed on the supporting base, a liquid storage chamber being provided between the liquid storage container and the supporting base;
a liquid pump configured for pumping e-liquid in the liquid storage chamber to the atomizing head; and
a constant pressure member installed in the supporting base and only allowing external air to flow into the liquid storage chamber in one direction.

[0006] In one embodiment, the supporting base is provided with a constant pressure hole in communication with the external air and the liquid storage chamber, the constant pressure member is installed in the constant pressure hole.

- 35 [0007] In one embodiment, the supporting base includes an atomizing seat and an atomizing bracket installed on the atomizing seat, the atomizing seat is provided with an air inlet hole in communication with the external environment, a mounting hole communicating the air inlet hole and the liquid storage chamber is provided through the atomizing bracket, the air inlet hole and the mounting hole together serve as the constant pressure hole.

[0008] In one embodiment, the constant pressure member is a one-way valve or a waterproof breathable membrane.

- 40 [0009] In one embodiment, an outer periphery of the supporting base is provided with an assembling portion, the liquid pump is installed in the assembling portion.

[0010] In one embodiment, the supporting base includes an atomizing bracket, the atomizing head is installed in the atomizing bracket; the atomizing bracket includes a top portion facing the user's mouth, a bottom portion facing away from the top portion, and a side portion connected between the top portion and the bottom portion;

- 45 [0011] the assembling portion is formed on the side portion of the atomizing bracket, the liquid pump is installed into the assembling portion and is located in the flow path of the e-liquid to serve as a part of the fluid passage communicating the liquid storage chamber and the atomizing head.

[0012] In one embodiment, the liquid pump includes a pump body, the pump body is provided with a liquid suction port in communication with the liquid storage chamber and a liquid pumping port in communication with the atomizing head; a liquid outlet in communication with the atomizing head is provided inside the atomizing bracket; an included angle between a central axis of the fluid passage between the liquid pumping port and the liquid outlet and a central axis of the atomizer is α , and $0^\circ < \alpha \leq 90^\circ$.

- 50 [0013] In one embodiment, the liquid pump includes a pump body, the pump body is provided with a liquid suction port in communication with the liquid storage chamber and a liquid pumping port in communication with the atomizing head; the liquid suction port and the liquid pumping port are both located on the same side of the pump body facing the atomizing head.

[0014] An electronic cigarette includes the above cartridge and a battery device configured for providing electric driving for the cartridge.

[0015] In the cartridge and the electronic cigarette of the present disclosure, since the liquid pump has a fast starting

speed, when the e-liquid in the liquid storage chamber decreases, the air pressure in the liquid storage chamber decreases to cause suffocation in the liquid storage chamber, causing the working load of the piezoelectric pump to increase and accordingly causing damage to the piezoelectric pump. Through the arrangement of the constant pressure member, the air in the liquid storage chamber can be quickly replenished, so that the air pressure in the liquid storage chamber is

balanced, and the piezoelectric pump can pump the e-liquid more smoothly.

[0016] A cartridge includes:

an atomizer including a supporting base and an atomizing head installed in the supporting base;
a liquid storage container installed on the supporting base, a liquid storage chamber being provided between the liquid storage container and the supporting base;
a liquid pump configured for pumping e-liquid in the liquid storage chamber to the atomizing head, the liquid pump includes a liquid pumping port;
wherein the atomizing head includes a receiving part, the receiving part faces the liquid pumping port, and the receiving part is made of a hard material.

[0017] In one embodiment, the supporting base includes an atomizing bracket, the atomizing head is installed in the atomizing bracket; the atomizing bracket includes a top portion facing the user's mouth, a bottom portion facing away from the top portion, and a side portion connected between the top portion and the bottom portion;
the top portion is provided with a liquid inlet in communication with the liquid storage chamber, a liquid outlet in communication with the atomizing head is provided inside the atomizing bracket, the liquid pump is installed in the fluid passage between the liquid inlet and the liquid outlet.

[0018] In one embodiment, the liquid pump includes a pump body, the pump body is provided with a liquid pumping port and a liquid suction port; a liquid outlet in communication with the atomizing head is provided inside the supporting base; an included angle between a central axis of the fluid passage between the liquid pumping port and the liquid outlet and a central axis of the atomizer is α , and $0^\circ < \alpha \leq 90^\circ$.

[0019] In one embodiment, the included angle between the central axis of the fluid passage between the liquid pumping port and the liquid outlet and the central axis of the atomizer is 90° .

[0020] In one embodiment, an upper surface of the atomizing head is at least partially received in the liquid outlet, and the upper surface of the atomizing head serves as a liquid absorbing surface.

[0021] In one embodiment, the supporting base further includes an atomizing seat, an atomizing chamber is formed between the atomizing bracket and the atomizing seat, and the atomizing head is at least partially received in the atomizing chamber.

[0022] In one embodiment, the atomizing head is arranged at the bottom of the atomizing bracket, and a lower surface of the atomizing head serves as an atomizing surface.

[0023] In one embodiment, the atomizing head is a porous ceramic heating member.

[0024] An electronic cigarette includes the above cartridge and a battery device configured for providing electric driving for the cartridge.

[0025] In the cartridge and the electronic cigarette of the present discourse, the liquid pump has a fast starting speed, the liquid pump has a relatively strong pressure when pumping e-liquid, the receiving part is made of a hard material, so as to prevent the atomizing head from failing and causing liquid leakage when the e-liquid with a relatively strong pressure hits against the receiving part if it is made of a soft material.

[0026] A cartridge includes:

an atomizer including a supporting base and an atomizing head installed in the supporting base;
a liquid storage container installed on the supporting base, a liquid storage chamber being provided between the liquid storage container and the supporting base; and
a liquid pump configured for pumping e-liquid in the liquid storage chamber to the atomizing head;
wherein an outer periphery of the supporting base is provided with an assembling portion, and the liquid pump is installed in the assembling portion.

[0027] In one embodiment, the supporting base includes an atomizing bracket, the atomizing head is installed in the atomizing bracket; the atomizing bracket includes a top portion facing the user's mouth, a bottom portion facing away from the top portion, and a side portion connected between the top portion and the bottom portion;
the assembling portion is formed on the side portion of the atomizing bracket, the liquid pump is installed into the assembling portion and is located in the flow path of the e-liquid to serve as a part of the fluid passage communicating the liquid storage chamber and the atomizing head.

[0028] In one embodiment, the liquid pump includes a pump body, the pump body is provided with a liquid suction port in communication with the liquid storage chamber and a liquid pumping port in communication with the atomizing

head; a liquid outlet in communication with the atomizing head is provided inside the supporting base; an included angle between a central axis of the fluid passage between the liquid pumping port and the liquid outlet and a central axis of the atomizer is α , and $0^\circ < \alpha \leq 90^\circ$.

[0029] In one embodiment, the liquid pump includes a pump body, the pump body is provided with a liquid suction port in communication with the liquid storage chamber and a liquid pumping port in communication with the atomizing head; the liquid suction port and the liquid pumping port are both located on the same side of the pump body facing the atomizing head.

[0030] In one embodiment, the liquid pump is a piezoelectric pump.

[0031] In one embodiment, the supporting base includes an atomizing seat installed to the bottom portion of the atomizing bracket, the atomizing seat is provided with an air inlet hole in communication with the external environment, a mounting hole communicating the air inlet hole and the liquid storage chamber is provided through the atomizing bracket; the cartridge includes a constant pressure member, the constant pressure member is installed in the constant pressure hole and only allows external air to flow into the liquid storage chamber in one direction.

[0032] In one embodiment, the constant pressure member extends toward the top of the liquid storage chamber and into the air layer above the liquid storage chamber.

[0033] In one embodiment, the constant pressure member is a duckbill one-way valve.

[0034] In one embodiment, the atomizing head includes a liquid absorbing member and a heating member, the heating member is a porous ceramic heating member, and the liquid absorbing member is made of porous ceramic.

[0035] An electronic cigarette includes the above cartridge and a battery device configured for providing electric driving for the cartridge.

[0036] In the cartridge and the electronic cigarette of the present disclosure, the liquid transfer between the liquid storage chamber and the atomizing head is performed by the liquid pump. The liquid pump can automatically supply e-liquid according to the consumption of the atomizing head, thereby effectively preventing liquid leakage and dry burning. At the same time, the liquid pump is installed into the outer periphery of the supporting base through the assembling portion, so that the liquid pump can be directly installed from the outside of the supporting base, which is convenient for assembly and disassembly.

BRIEF DESCRIPTION OF THE DRAWINGS

[0037]

FIG. 1 is a schematic structural diagram of a cartridge of an electronic cigarette according to one embodiment of the present disclosure;

FIG. 2 is an exploded schematic diagram of the cartridge of the electronic cigarette shown in FIG. 1;

FIG. 3 is a bottom view of the cartridge of the electronic cigarette shown in FIG. 1;

FIG. 4 is a cross-sectional view of the cartridge shown in FIG. 3 along the A-A direction;

FIG. 5 is a front view of the cartridge of the electronic cigarette shown in FIG. 1;

FIG. 6 is a cross-sectional view of the cartridge shown in FIG. 5 along the B-B direction.

Electronic cigarette 100	Cartridge 10
Atomizer 11	Supporting base 110
Assembling portion 1101	Atomizing bracket 1103
Top portion 1103A	Bottom portion 1103B
Side portion 1103C	Liquid inlet 1104A
Liquid outlet 1104b	Atomizing seat 1105
Air inlet opening 1107	Air inlet hole 1109
Mounting hole 1110	Atomizing head 112
Atomizing electrode 114	Liquid pump electrode 116
Fixing member 118	Liquid storage container 13
Liquid storage chamber 130	Liquid pump 15
Pump body 150	Liquid suction port 1501

(continued)

Liquid pumping port 1503	Constant pressure member 17
Sealing ring 19	Liquid inlet sealing member 20
First opening 21	Second opening 23
Vent tube 132	Atomizing chamber 113
Smoking port 134	Communication hole 1112
Smoke outlet chamber 1114	Smoke guiding groove 1116
Third opening 25	Constant pressure hole 1108

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0038] In order to facilitate the understanding of the present disclosure, the present disclosure will be described in details with reference to the accompanying drawings. Preferred embodiments of the present disclosure are given in the accompanying drawings. However, the present disclosure can be realized in many different forms and is not limited to the embodiments described herein. On the contrary, the purpose of providing these embodiments is to make a more thorough and comprehensive understanding of the disclosed contents of the present disclosure.

[0039] It should be noted that when an element is referred to as being "fixed to" another element, it may be directly on the other element or there may be a centered element. When an element is considered to be "connected" to another element, it can be directly connected to the other element or intervening elements may also be present.

[0040] Unless defined otherwise, all technical and scientific terms used herein have the same meaning as commonly understood by one of ordinary skill in the art to which this disclosure belongs. The terms used herein in the description of the present disclosure are only for the purpose of describing specific embodiments, and are not intended to limit the present disclosure. The term "and / or" as used herein includes any and all combinations of one or more of the associated listed items.

[0041] Please refer to FIG. 1, in an embodiment of the present disclosure, an electronic cigarette 100 includes a cartridge 10 and a battery device (not shown) for providing electric driving for the cartridge 10. Specifically, the e-liquid stored in the cartridge 10 can be heated by the electric driving of the battery device to generate smoke, and the smoke can be inhaled by the user.

[0042] Please refer to FIG. 2, the cartridge 10 includes an atomizer 11, a liquid storage container 13 and a liquid pump 15. Specifically, a liquid storage chamber 130 (as shown in FIG. 3) for storing e-liquid is formed in the liquid storage container 13, the liquid pump 15 is used to automatically pump the e-liquid in the liquid storage chamber 130 into the atomizer 11, and the e-liquid is heated by the battery device to form smoke for the user to inhale.

[0043] The atomizer 11 includes a supporting base 110 and an atomizing head 112. The supporting base 110 is configured to provide an installation foundation, and the outer periphery of the supporting base 110 is provided with an assembling portion 1101 in communication with the outside. The liquid pump 15 is detachably installed in the assembling portion 1101 and used for pumping e-liquid into the atomizing head 112. The liquid storage chamber 130 is defined between the liquid storage container 13 and the supporting base 110. The above-mentioned "outer periphery" refers to the outer surface of the supporting base 110 exposed to the external environment when it is not installed in the liquid storage container 13. The above-mentioned "assembling portion 1101" includes but is not limited to a notch, hole, groove, and the like.

[0044] Specifically, the supporting base 110 includes an atomizing bracket 1103 and an atomizing seat 1105. The atomizing bracket 1103 is installed on the atomizing seat 1105, and the atomizing head 112 is installed in the atomizing bracket 1103. It is understood that, in other embodiments not shown, the atomizing seat 1105 and the atomizing bracket 1103 are integrally formed.

[0045] The atomizing bracket 1103 includes a top portion 1103A facing the user's mouth, a bottom portion 1103B facing away from the top portion, and a side portion 1103C connected between the top portion 1103A and the bottom portion 1103B. The assembling portion 1101 is formed on the side portion 1103C of the atomizing bracket 1103. The liquid pump 15 is installed into the assembling portion 1101 from the side portion 1103C of the atomizing bracket 1103 and is located in the flow path of the e-liquid to serve as a part of the fluid passage communicating the liquid storage chamber 130 and the atomizing head 112. It is understood that, in other embodiments not shown, the assembling portion 1101 is formed on the top portion 1103A or the bottom portion 1103B of the atomizing bracket 1103. The liquid pump 15 is installed into the assembling portion 1101 from the top portion 1103A or from the bottom portion 1103B of the atomizing bracket 1103.

[0046] Specifically, the top portion 1103A of the atomizing bracket 1103 is provided with a liquid inlet 1104A in com-

munication with the liquid storage chamber 130. A liquid outlet 1104B (as shown in FIG. 3) in communication with the atomizing head 112 is provided inside the atomizing bracket 1103. The channel between the liquid inlet 1104A and the liquid outlet 1104B is the fluid passage for the flowing of the e-liquid. When the liquid pump 15 is installed in the fluid passage between the liquid inlet 1104A and the liquid outlet 1104B, it can serve as a part of the fluid passage and provide

a driving force for the flowing of the e-liquid at the same time.

[0047] In other words, the liquid pump 15 can be freely installed into the assembling portion 1101 from the side portion 1103C of the atomizing bracket 1103, which is easy to disassemble and assemble. At the same time, the liquid pump 15 serves as a part of the fluid passage, so that the e-liquid in the liquid storage chamber 130 can be automatically and timely supplied into the atomizing head 112, so as to avoid the occurrence of abnormal conditions such as dry burning of the atomizing head 112.

[0048] Specifically, an atomizing chamber 113 is formed between the atomizing bracket 1103 and the atomizing seat 1105, and the atomizing head 112 is at least partially received in the atomizing chamber 113. In this specific embodiment, the atomizing head 112 is arranged at the bottom portion 1103B of the atomizing bracket 1103, and the lower surface of the atomizing head 112 is used as the atomizing surface.

[0049] Please refer to FIG. 3 and FIG. 4, specifically, the liquid pump 15 includes a pump body 150, the pump body 150 is provided with a liquid suction port 1501 in communication with the liquid storage chamber 130 and a liquid pumping port 1503 in communication with the atomizing head 112. The liquid suction port 1501 and the liquid pumping port 1503 are both located on the same side of the pump body 50 facing the atomizing head 112. The included angle between the central axis of the fluid passage between the liquid pumping port 1503 and the liquid outlet 1104B and the central axis of the atomizer 11 is α , and $0^\circ < \alpha \leq 90^\circ$. Preferably, the included angle α between the central axis of the fluid passage between the liquid pumping port 1503 and the liquid outlet 1104B and the central axis of the atomizer 11 is 90° . That is to say, after the e-liquid in the liquid storage chamber 130 is pumped into the pump body 150 through the liquid suction port 1501 on the side facing the atomizing head 112, the e-liquid continues to be pumped out from the liquid pumping port 1503 on the side facing the atomizing head 112 and transferred to the atomizing head 112 (as shown by the arrow flow direction in FIG. 4). The pumping path from the liquid pumping port 1503 to the liquid outlet 1104B is simplified, which is beneficial to improve the response speed of the liquid pump 15 for pumping liquid. In this specific embodiment, the upper surface of the atomizing head 112 is at least partially received in the liquid outlet 1104B, and the upper surface of the atomizing head 112 serves as a liquid absorbing surface.

[0050] In this specific embodiment, due to the small size of the atomizer 11, the liquid pump 15 usually adopts a piezoelectric pump. Specifically, the piezoelectric pump is generally flat, and its basic principle is to use the inverse piezoelectric effect of the piezoelectric ceramic to deform the piezoelectric vibrator, and the volume of the pump cavity formed between the piezoelectric ceramic and the housing of the pump changes to achieve fluid output.

[0051] When the central axis of the fluid passage between the liquid pumping port 1503 and the liquid outlet 1104B and the central axis of the atomizer 11 are at an angle of 90° , the pipeline from the liquid pumping port 1503 to the liquid outlet 1104B is straight, and the pumping liquid has a fast response speed. On the other hand, the pipeline from the liquid pumping port 1503 to the liquid outlet 1104B is straight, which facilitates the simplification of the pipeline, prevents the pipeline from being blocked, and reduces the difficulty of pipeline design.

[0052] The atomizing head 112 includes a receiving part (not shown), the receiving part faces the liquid pumping port 1503, and the receiving part corresponds to the liquid outlet 1104B. The receiving part may be a heating member (not shown) or a liquid absorbing member (not shown). In this embodiment, considering that the liquid pump 15 has a relatively strong pressure when pumping e-liquid, the receiving part is made of a hard material, so as to prevent the atomizing head from failing and causing liquid leakage when the e-liquid with a relatively strong pressure hits against the receiving part if it is made of a soft material. Specifically, the atomizing head is a porous ceramic heating member, and the porous ceramic heating member is made of a hard material.

[0053] Please refer to FIG. 2 again, furthermore, the atomizer 11 further includes an atomizing electrode 114 and a liquid pump electrode 116. The atomizing electrode 114 is installed on the atomizing seat 1105 and at least partly extends into the atomizing bracket 1103 to be electrically connected to the atomizing head 112 installed in the atomizing bracket 1103, so that the atomizing head 112 and the battery device form an electric circuit for atomizing.

[0054] Similarly, the liquid pump electrode 116 is installed on the atomizing seat 1105, and one end of the liquid pump electrode 116 away from the atomizing seat 1105 extends into the atomizing bracket 1103, so as to be fixed to the atomizing bracket 1103 by a fixing member 118 and be electrically connected to the liquid pump 15 installed in the assembling portion 1101. It is understood that, in other embodiments not shown, the liquid pump electrode 116 is installed on the atomizing seat 1105, and one end of the liquid pump electrode 116 away from the atomizing seat 1105 extends into the atomizing bracket 1103, so as to be directly electrically connected to the liquid pump 15 installed in the assembling portion 1101.

[0055] In use, the e-liquid in the liquid storage chamber 130 is driven by the liquid pump 15 to be pumped into the fluid passage from the liquid inlet 1104A, sucked into the pump body 150 through the liquid suction port 1501, then pumped out through the liquid pumping port 1503, and finally flows out from the liquid outlet 1104B to the atomizing head 12 for

heating and atomizing by the atomizing head 12.

[0056] Please refer to FIG. 2, FIG. 5 and FIG. 6 together, furthermore, the atomizing seat 1105 is provided with an air inlet opening 1107, and the air inlet opening 1107 is in communication with the external air and the atomizing chamber 113. The cartridge 10 further includes a vent tube 132, and the smoke generated in the atomizing chamber 113 is delivered to the user's mouth through the inner cavity of the vent tube 132. In this embodiment, the atomizing seat 1105 is provided with the air inlet opening 1107 at a position aligned with the atomizing head 112. A smoking port 134 is provided in one end of the liquid storage container 13 facing the user's mouth. The middle of the liquid storage container 13 is provided with the vent tube 132 aligned with the atomizing head 12. The inner cavity of the vent tube 132 is in communication with the smoking port 134. A communication hole 1112 is provided in the top portion 1103A of the atomizing bracket 1103, the lower end of the vent tube 132 is inserted into the communication hole 1112, and the inner cavity of the vent tube 132 is in communication with the communication hole 1112. A smoke outlet chamber 1114 is formed inside the atomizing bracket 1103. The communication hole 1112 is in communication with the smoke outlet chamber 1114. The side portion 1103C of the atomizing bracket 1103 is provided with a smoke guiding groove 1116. The smoke guiding groove 1116 communicates the atomizing chamber 113 and the smoke outlet chamber 1114. In other words, the air inlet opening 1107 is arranged below the atomizing head 112, and the vent tube 132 is arranged above the atomizing head 112. In this way, under the user's suction action, the external cold air flows through the air inlet opening 1107, the atomizing chamber 113, the smoke guiding groove 1116, the smoke outlet chamber 1114, the communication hole 1112 and the inner cavity of the ventilation tube 132 in sequence, and finally through the smoking port 134 to reach the mouth of the user (as shown by the arrow flow direction in FIG. 6). It is understood that, in other embodiments not shown, the liquid storage container 13 and the vent tube 132 are two independent parts or integrally formed.

[0057] The supporting base 110 is provided with a constant pressure hole 1108 in communication with the external air and the liquid storage chamber 130. Correspondingly, the cartridge 10 includes a constant pressure member 17, which is installed in the constant pressure hole 1108 and only allows external air to flow into the liquid storage chamber 130 in one direction. Specifically, the atomizing seat 1105 is provided with an air inlet hole 1109 in communication with the external environment, a mounting hole 10 communicating the air inlet hole 1109 and the liquid storage chamber 130 is provided through the atomizing bracket 1103. The air inlet hole 1109 and the mounting hole 10 together serve as the constant pressure hole 1108. The constant pressure member 17 can be a one-way valve or a waterproof breathable membrane, etc. In this embodiment, the constant pressure member 17 is a one-way valve, which is installed in the mounting hole 1110 and forms a one-way air flow channel that only allows external air to flow into the liquid storage chamber 130 in one direction.

[0058] In this specific embodiment, since the piezoelectric pump (i.e., the liquid pump 15) has a fast starting speed, when the e-liquid in the liquid storage chamber 130 decreases, the air pressure in the liquid storage chamber 130 decreases to cause suffocation in the liquid storage chamber 130, causing the working load of the piezoelectric pump to increase and accordingly causing damage to the piezoelectric pump. Through the arrangement of the constant pressure member 17, the air in the liquid storage chamber 13 can be quickly replenished, so that the air pressure in the liquid storage chamber 13 is balanced, and the piezoelectric pump can pump the e-liquid more smoothly.

[0059] During use, under the user's suction action, the external cold air flows to the atomizing head 112 through the air inlet opening 1107, so as to be mixed with the smoke generated by the heating of the atomizing head 112, and then passes through the gap between the atomizing bracket 1103 and the liquid storage container 13 and the vent tube 132 sequentially to reach the mouth of the user. At the same time, the external cold air also enters the liquid storage chamber 130 through the air inlet hole 1109 and the constant pressure member 17, so as to prevent the air pressure in the liquid storage chamber 130 from being reduced during the atomization process and avoid the phenomenon of suffocation.

[0060] Further, the one-way valve extends toward the top of the liquid storage chamber 130 and into the air layer above the liquid storage chamber 130, so that the air flowing through the one-way valve can quickly reach the air layer of the liquid storage chamber 130 to improve the response speed. Preferably, the one-way valve is a duckbill one-way valve.

[0061] In addition, the cartridge 10 further includes sealing rings 19, the sealing rings 19 are respectively sealed and arranged between the atomizing seat 1105 and the liquid storage container 13, and between the atomizing head 112 and the atomizing bracket 1103, so as to prevent the cartridge 10 from leaking of the e-liquid.

[0062] At the same time, the cartridge 10 further includes a liquid inlet sealing member 20, and the liquid inlet sealing member 20 is sealed and arranged on the top portion 1103A of the atomizing bracket 1103. Correspondingly, the liquid inlet sealing member 20 is provided with a first opening 21, a second opening 23 and a third opening 25 which are arranged at intervals. Specifically, the first opening 21 is in communication with the liquid storage chamber 130 and the inlet of the fluid passage to ensure that the e-liquid in the liquid storage chamber 130 can be pumped to the atomizing head 12 under the action of the liquid pump 15. The second opening 23 is in communication with the liquid storage chamber 130 and the mounting hole 1110 to ensure that the external air entering the constant pressure member 17 can be passed into the liquid storage chamber 130, to ensure the balance of the air pressure in the liquid storage chamber

130. The third opening 25 corresponds to the position of the communication hole 1112 to ensure air flowing between the communication hole 1112 and the inner cavity of the vent tube 132.

[0063] In the cartridge 10 of the present application, the liquid transfer between the liquid storage chamber 130 and the atomizing head 112 is performed by the liquid pump 15. The liquid pump 15 can automatically supply e-liquid according to the consumption of the atomizing head 112, thereby effectively preventing liquid leakage and dry burning. At the same time, the liquid pump 15 is installed into the outer periphery of the supporting base 110 through the assembling portion 1101, so that the liquid pump 15 can be directly installed from the outside of the supporting base 110, which is convenient for assembly and disassembly. At the same time, the constant pressure member 17 can quickly replenish the air in the liquid storage chamber 130, so that the air pressure in the liquid storage chamber 130 is balanced, and the liquid is pumped smoothly.

[0064] The electronic cigarette 100 provided in the first embodiment of the present disclosure has all the technical features of the above-mentioned cartridge 10, so it has the same technical effects as the above-mentioned cartridge 10.

[0065] The above-mentioned embodiments merely represent several implementations of the present application, and the descriptions thereof are more specific and detailed, but they shall not be understood as a limitation on the scope of the present application. It should be noted that, for those of ordinary skill in the art, variations and improvements may still be made without departing from the concept of the present application, and all of which shall fall into the protection scope of the present application. Therefore, the scope of protection of the present application shall be subject to the appended claims.

Claims

1. A cartridge comprising:

an atomizer comprising a supporting base and an atomizing head installed in the supporting base;
a liquid storage container installed on the supporting base, a liquid storage chamber being provided between the liquid storage container and the supporting base;
a liquid pump configured for pumping e-liquid in the liquid storage chamber to the atomizing head; and
a constant pressure member installed in the supporting base and only allowing external air to flow into the liquid storage chamber in one direction.

2. The cartridge according to claim 1, wherein the supporting base is provided with a constant pressure hole in communication with the external air and the liquid storage chamber, the constant pressure member is installed in the constant pressure hole.

3. The cartridge according to claim 2, wherein the supporting base comprises an atomizing seat and an atomizing bracket installed on the atomizing seat, the atomizing seat is provided with an air inlet hole in communication with the external environment, a mounting hole communicating the air inlet hole and the liquid storage chamber is provided through the atomizing bracket, the air inlet hole and the mounting hole together serve as the constant pressure hole.

4. The cartridge according to claim 1, wherein the constant pressure member is a one-way valve or a waterproof breathable membrane.

5. The cartridge according to claim 1, wherein an outer periphery of the supporting base is provided with an assembling portion, the liquid pump is installed in the assembling portion.

6. The cartridge according to claim 5, wherein the supporting base comprises an atomizing bracket, the atomizing head is installed in the atomizing bracket; the atomizing bracket comprises a top portion facing the user's mouth, a bottom portion facing away from the top portion, and a side portion connected between the top portion and the bottom portion;
the assembling portion is formed on the side portion of the atomizing bracket, the liquid pump is installed into the assembling portion and is located in the flow path of the e-liquid to serve as a part of the fluid passage communicating the liquid storage chamber and the atomizing head.

7. The cartridge according to claim 1, wherein the liquid pump comprises a pump body, the pump body is provided with a liquid suction port in communication with the liquid storage chamber and a liquid pumping port in communication with the atomizing head; a liquid outlet in communication with the atomizing head is provided inside the atomizing bracket; an included angle between a central axis of the fluid passage between the liquid pumping port and the

liquid outlet and a central axis of the atomizer is α , and $0^\circ < \alpha \leq 90^\circ$.

8. The cartridge according to claim 1, wherein the liquid pump comprises a pump body, the pump body is provided with a liquid suction port in communication with the liquid storage chamber and a liquid pumping port in communication with the atomizing head; the liquid suction port and the liquid pumping port are both located on the same side of the pump body facing the atomizing head.

9. An electronic cigarette comprising the cartridge according to any one of claims 1 to 8 and a battery device configured for providing electric driving for the cartridge.

10. A cartridge comprising:

an atomizer comprising a supporting base and an atomizing head installed in the supporting base;
a liquid storage container installed on the supporting base, a liquid storage chamber being provided between the liquid storage container and the supporting base;
a liquid pump configured for pumping e-liquid in the liquid storage chamber to the atomizing head, the liquid pump comprises a liquid pumping port;
wherein the atomizing head comprises a receiving part, the receiving part faces the liquid pumping port, and the receiving part is made of a hard material.

11. The cartridge according to claim 10, wherein the supporting base comprises an atomizing bracket, the atomizing head is installed in the atomizing bracket; the atomizing bracket comprises a top portion facing the user's mouth, a bottom portion facing away from the top portion, and a side portion connected between the top portion and the bottom portion;

the top portion is provided with a liquid inlet in communication with the liquid storage chamber, a liquid outlet in communication with the atomizing head is provided inside the atomizing bracket, the liquid pump is installed in the fluid passage between the liquid inlet and the liquid outlet.

12. The cartridge according to claim 11, wherein the liquid pump comprises a pump body, the pump body is provided with a liquid pumping port and a liquid suction port; a liquid outlet in communication with the atomizing head is provided inside the supporting base; an included angle between a central axis of the fluid passage between the liquid pumping port and the liquid outlet and a central axis of the atomizer is α , and $0^\circ < \alpha \leq 90^\circ$.

13. The cartridge according to claim 12, wherein the included angle between the central axis of the fluid passage between the liquid pumping port and the liquid outlet and the central axis of the atomizer is 90° .

14. The cartridge according to claim 11, wherein an upper surface of the atomizing head is at least partially received in the liquid outlet, and the upper surface of the atomizing head serves as a liquid absorbing surface.

15. The cartridge according to claim 14, wherein the supporting base further comprises an atomizing seat, an atomizing chamber is formed between the atomizing bracket and the atomizing seat, and the atomizing head is at least partially received in the atomizing chamber.

16. The cartridge according to claim 15, wherein the atomizing head is arranged at the bottom of the atomizing bracket, and a lower surface of the atomizing head serves as an atomizing surface.

17. The cartridge according to any one of claims 10 to 16, wherein the atomizing head is a porous ceramic heating member.

18. An electronic cigarette comprising the cartridge according to any one of claims 10 to 17 and a battery device configured for providing electric driving for the cartridge.

19. A cartridge comprising:

an atomizer comprising a supporting base and an atomizing head installed in the supporting base;
a liquid storage container installed on the supporting base, a liquid storage chamber being provided between the liquid storage container and the supporting base; and
a liquid pump configured for pumping e-liquid in the liquid storage chamber to the atomizing head;

wherein an outer periphery of the supporting base is provided with an assembling portion, and the liquid pump is installed in the assembling portion.

20. The cartridge according to claim 19, wherein the supporting base comprises an atomizing bracket, the atomizing head is installed in the atomizing bracket; the atomizing bracket comprises a top portion facing the user's mouth, a bottom portion facing away from the top portion, and a side portion connected between the top portion and the bottom portion;
the assembling portion is formed on the side portion of the atomizing bracket, the liquid pump is installed into the assembling portion and is located in the flow path of the e-liquid to serve as a part of the fluid passage communicating the liquid storage chamber and the atomizing head.
21. The cartridge according to any one of claims 19 to 20, wherein the liquid pump comprises a pump body, the pump body is provided with a liquid suction port in communication with the liquid storage chamber and a liquid pumping port in communication with the atomizing head; an included angle between a central axis of the fluid passage between the liquid pumping port and the liquid outlet and a central axis of the atomizer is α , and $0^\circ < \alpha \leq 90^\circ$.
22. The cartridge according to any one of claims 19 to 20, wherein the liquid pump comprises a pump body, the pump body is provided with a liquid suction port in communication with the liquid storage chamber and a liquid pumping port in communication with the atomizing head; the liquid suction port and the liquid pumping port are both located on the same side of the pump body facing the atomizing head.
23. The cartridge according to claim 22, wherein the liquid pump is a piezoelectric pump.
24. The cartridge according to claim 20, wherein the supporting base comprises an atomizing seat installed to the bottom portion of the atomizing bracket, the atomizing seat is provided with an air inlet hole in communication with the external environment, a mounting hole communicating the air inlet hole and the liquid storage chamber is provided through the atomizing bracket;
the cartridge comprises a constant pressure member, the constant pressure member is installed in the constant pressure hole and only allows external air to flow into the liquid storage chamber in one direction.
25. The cartridge according to claim 24, wherein the constant pressure member extends toward the top of the liquid storage chamber and into the air layer above the liquid storage chamber.
26. The cartridge according to claim 24, wherein the constant pressure member is a duckbill one-way valve.
27. The cartridge according to claim 19, wherein the atomizing head comprises a liquid absorbing member and a heating member, the heating member is a porous ceramic heating member, and the liquid absorbing member is made of porous ceramic.
28. An electronic cigarette comprising the cartridge according to any one of claims 19 to 27 and a battery device configured for providing electric driving for the cartridge.

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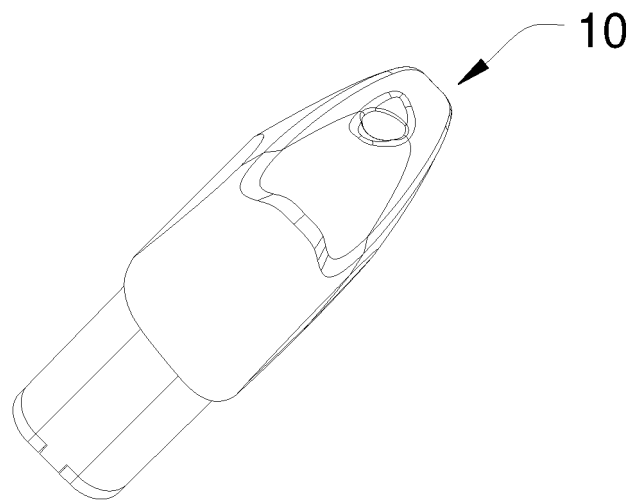


FIG. 1

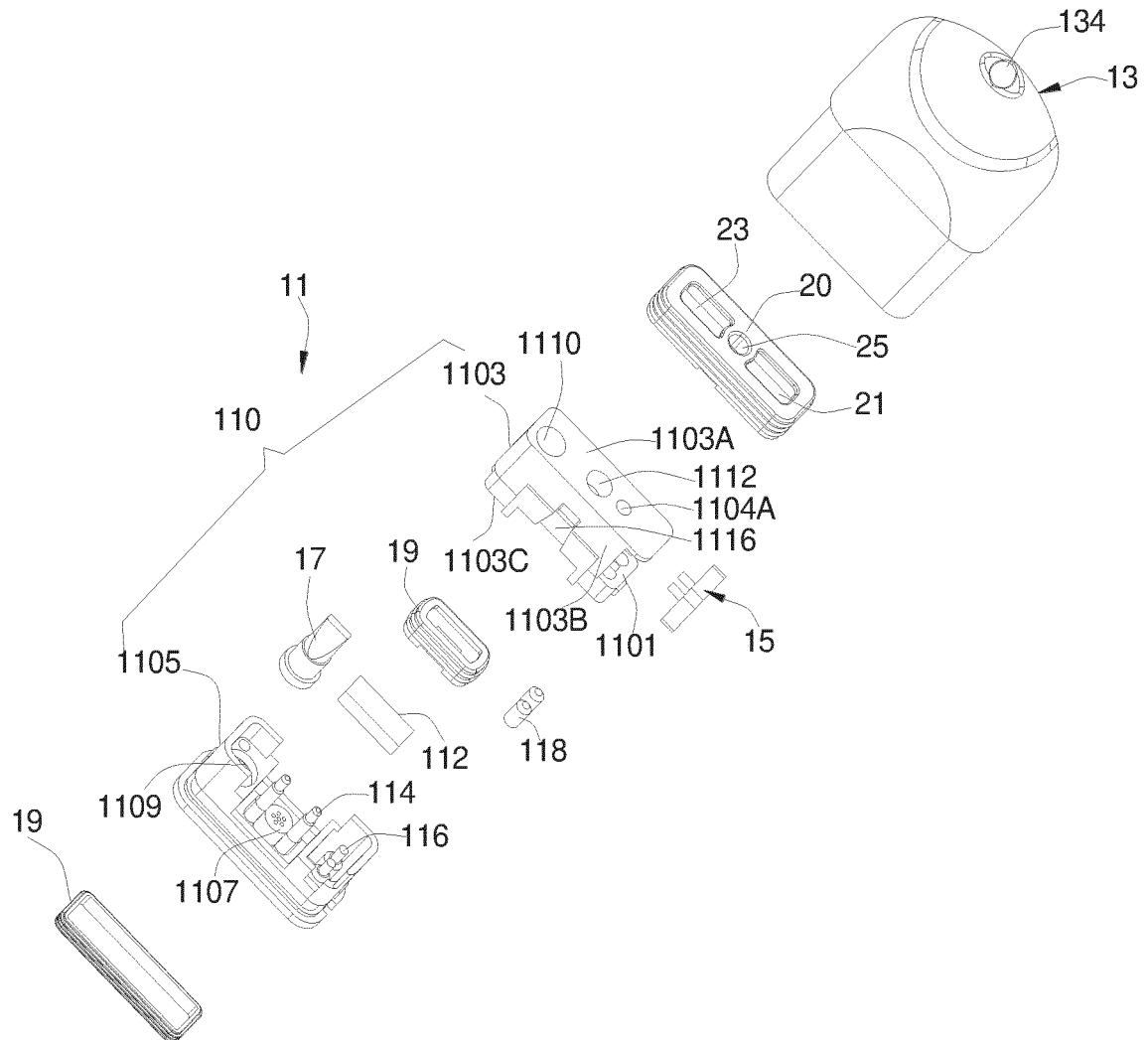


FIG. 2

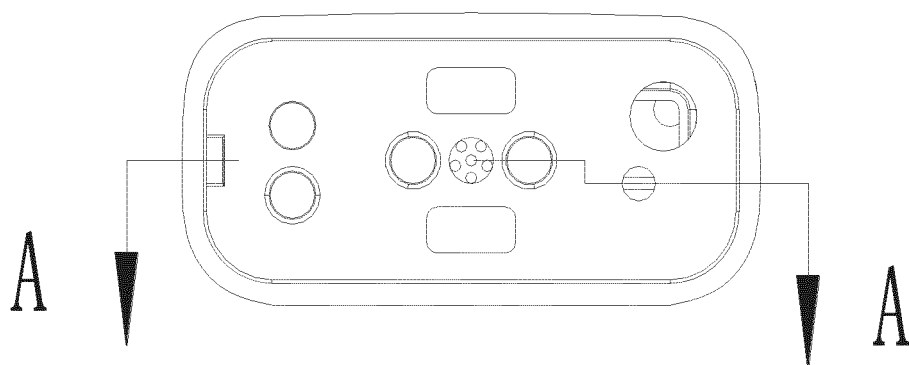
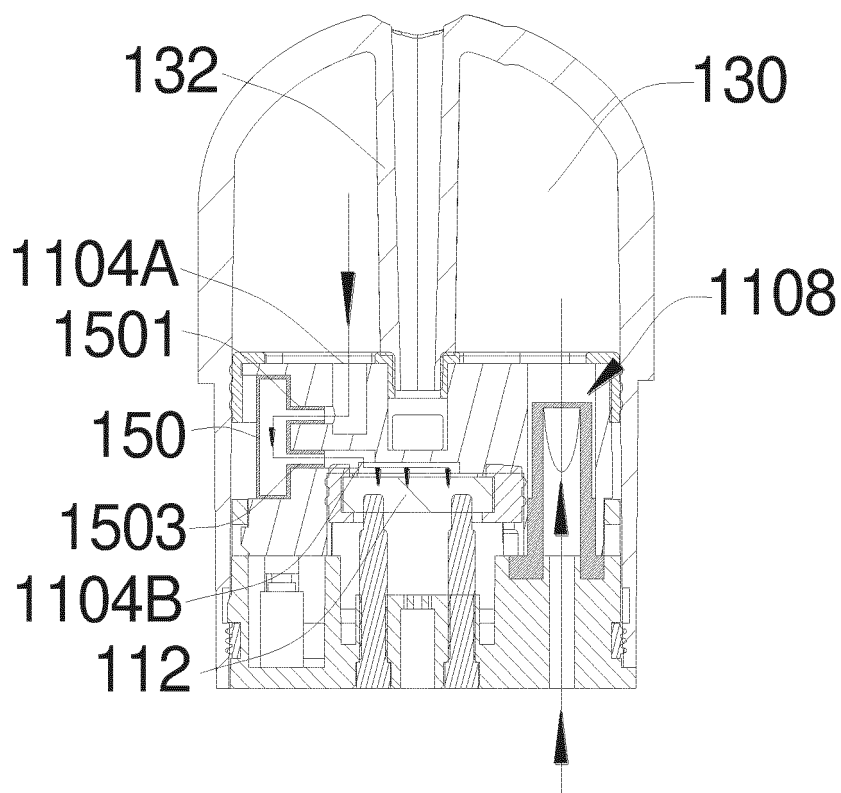


FIG. 3



A-A

FIG. 4

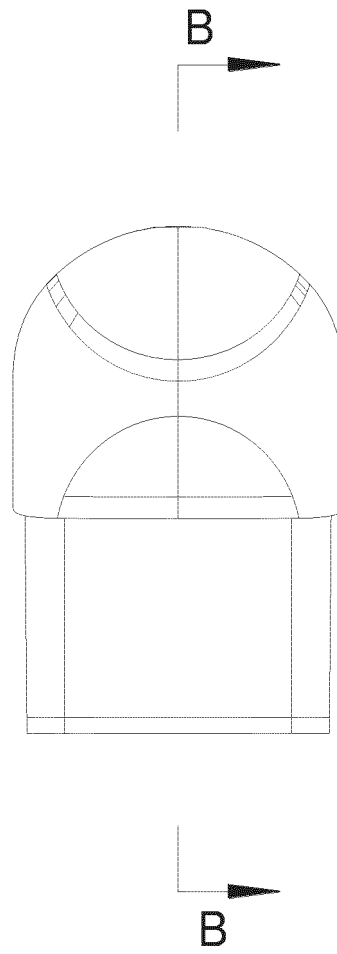


FIG. 5

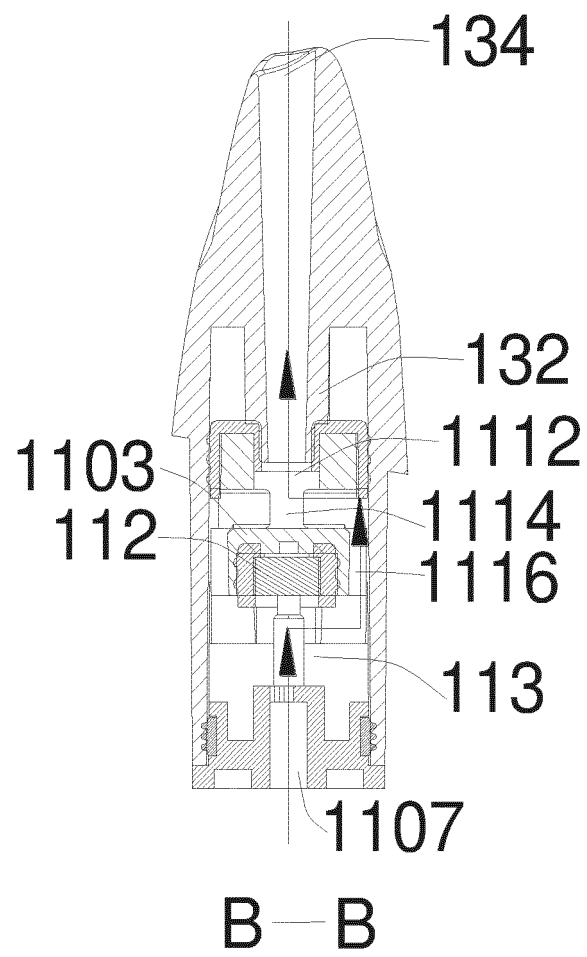


FIG. 6

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2020/078125

5	A. CLASSIFICATION OF SUBJECT MATTER		
	A24F 47/00(2020.01)i		
	According to International Patent Classification (IPC) or to both national classification and IPC		
10	B. FIELDS SEARCHED		
	Minimum documentation searched (classification system followed by classification symbols)		
	A24F 47, A61M 11, A61M 15		
	Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
15	Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
	CNKI, CNTXT, VEN: 电子烟, 雾化, 加热, 储液, 烟液, 烟油, 泵, 阀, electronic, electrical, cigar+, smoking, tobacco, atomiz+, vapor+, heat+, liquid, oil, storage, reservoir, pump, valve		
20	C. DOCUMENTS CONSIDERED TO BE RELEVANT		
	Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
	PX	CN 210124322 U (CHANGZHOU PAITENG ELECTRONIC TECHNOLOGY SERVICE CO., LTD.) 06 March 2020 (2020-03-06) entire document	1-28
25	PX	CN 210017880 U (CHANGZHOU PAITENG ELECTRONIC TECHNOLOGY SERVICE CO., LTD.) 07 February 2020 (2020-02-07) entire document	1-28
	PX	CN 210017879 U (CHANGZHOU PAITENG ELECTRONIC TECHNOLOGY SERVICE CO., LTD.) 07 February 2020 (2020-02-07) entire document	1-28
30	Y	CN 207626550 U (CHANGZHOU PAITENG ELECTRONIC TECHNOLOGY SERVICE CO., LTD.) 20 July 2018 (2018-07-20) description, paragraphs 5-14, and figures 1 and 2	1-28
	Y	CN 108289510 A (PHILIP MORRIS PRODUCTS S.A.) 17 July 2018 (2018-07-17) description, paragraphs 8, 9, and 38-51, and figures 1-4	1-28
35	Y	CN 108041686 A (LI, Zhiyong) 18 May 2018 (2018-05-18) description, paragraph 29, and figure 2	1-28
	☒ Further documents are listed in the continuation of Box C. ☒ See patent family annex.		
40	* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
45	Date of the actual completion of the international search 31 May 2020		
	Date of mailing of the international search report 08 June 2020		
50	Name and mailing address of the ISA/CN China National Intellectual Property Administration (ISA/CN) No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088 China		
55	Authorized officer Facsimile No. (86-10)62019451 Telephone No.		

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2020/078125

C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 207692971 U (CHINA TOBACCO YUNNAN INDUSTRIAL CO., LTD.) 07 August 2018 (2018-08-07) entire document	1-28
A	WO 2018177826 A1 (JT INTERNATIONAL S.A.) 04 October 2018 (2018-10-04) entire document	1-28

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CN2020/078125

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN 210124322 U	06 March 2020	None	
CN 210017880 U	07 February 2020	None	
CN 210017879 U	07 February 2020	None	
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		KR 20180091831 A	16 August 2018
		US 2017172210 A1	22 June 2017
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		CA 3005654 A1	29 June 2017
		WO 2017108268 A1	29 June 2017
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CN 207692971 U	07 August 2018	None	
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		EP 3585192 A1	01 January 2020
		US 2020046029 A1	13 February 2020

Form PCT/ISA/210 (patent family annex) (January 2015)