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(54) ELECTRONIC CIGARETTE

(57) An electronic cigarette includes an atomizer and an e-liquid tank. The atomizer includes an atomizing body and a heating element. The atomizing body include a first cavity. The heating element is disposed in the first cavity. The e-liquid tank includes a tank body; the tank body includes a second cavity for accommodating an e-liquid. The atomizer is detachably connected to the e-liquid tank.

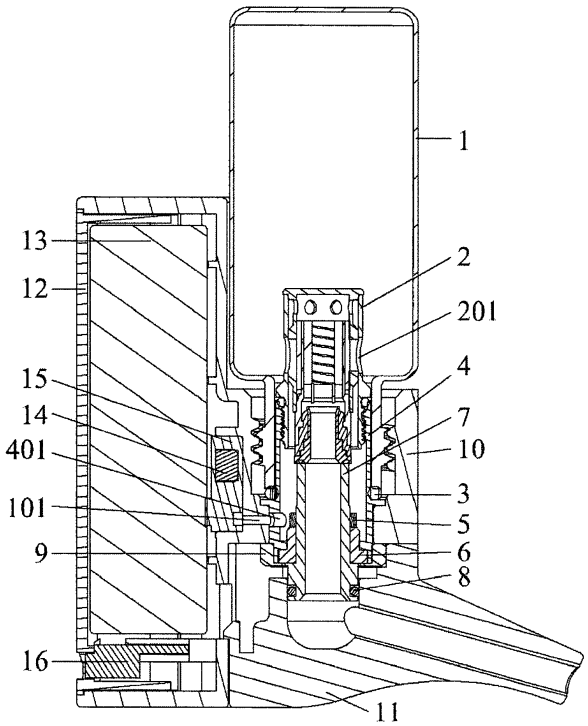

FIG. 3

EP 4 049 546 A1

Description

[0001] The disclosure relates to an electronic cigarette.

[0002] Existing e-liquid tanks and atomizers are often integrally formed in the electronic cigarettes, resulting in a complicated structure and high cost. The electronic cigarettes cannot be disassembled and the e-liquid tank must be filled with e-liquid before use, which is inconvenient to the user to refill the e-liquid tank.

[0003] The disclosure provides an atomizer comprising an atomizer and an e-liquid tank, wherein the atomizer comprises an atomizing body and a heating element; the atomizing body comprises a first cavity; the heating element is disposed in the first cavity; the e-liquid tank comprises a tank body; the tank body comprises a second cavity for accommodating an e-liquid; the atomizer is detachably connected to the e-liquid tank.

[0004] In a class of this embodiment, the electronic cigarette comprises a cartridge, and the atomizer and the e-liquid tank are detachably disposed on the cartridge.

[0005] In a class of this embodiment, the atomizing body comprises a first connection piece, and the tank body comprises a second connection piece.

[0006] In a class of this embodiment, the atomizing body is detachably connected to the cartridge through the first connection piece, and the tank body is detachably connected to the cartridge through the second connection piece; or the atomizing body is detachably connected to the tank body through the first connection piece, and the tank body is detachably connected to the cartridge through the second connection piece; or the atomizing body is detachably connected to the tank body through the second connection piece, and the atomizing body is detachably connected to the cartridge through the first connection piece.

[0007] In a class of this embodiment, the first connection piece and the second connection piece are independently a screw thread, an interference fit part, a snap fastener, a magnet, a sticking material, a pluggable member, or a combination thereof.

[0008] In a class of this embodiment, the atomizing body further comprises an outer wall and a protrusion extending radially outward from the outer wall; the atomizing body further comprises a first portion and a second portion separately disposed on both ends of the protrusion; the first portion comprises a side wall and at least one e-liquid inlet disposed through the side wall; the first portion is inserted into the e-liquid tank; and the first connection piece is disposed on the second portion.

[0009] In a class of this embodiment, the first connection piece and/or the protrusion is a first electrode comprising a conductive material; or the first electrode is disposed on the first connection piece and/or the protrusion; the second portion comprises an end port and a second electrode disposed on the end port.

[0010] In a class of this embodiment, the tank body further comprises a first storage body and a second storage body protruding axially outward from a bottom surface of the first storage body; a diameter of the second storage body is smaller than that of the first storage body; and the first storage body comprises a limiting wall radially formed on the bottom surface.

[0011] In a class of this embodiment, the second storage body comprises a bottom edge and an opening is disposed at the bottom edge to receive the atomizer; and the second connection piece is disposed on an edge of the opening.

[0012] In a class of this embodiment, an inner diameter of the second storage body is matched with an outer diameter of the protrusion; and when the e-liquid tank is positioned on the atomizer, the protrusion is nested into an inner wall of the second storage body.

[0013] In a class of this embodiment, the at least one e-liquid inlet is disposed in the first storage body.

[0014] In a class of this embodiment, the cartridge comprises an inner passage; an open end of the e-liquid tank and a first end of the atomizing body are separately extended into the inner passage; and a second end of the atomizing body is extended into the second cavity.

[0015] In a class of this embodiment, a connector is disposed in the inner passage; the atomizing body is detachably connected to the connector through the first connection piece; the protrusion abuts against one end of the connector or a seal is disposed therebetween; and the tank body is connected to the cartridge through the second connection piece; and the connector comprises a first conductive member electrically connected to the first electrode, or the connector comprises a conductive material.

[0016] In a class of this embodiment, the connector is in the shape of a cylinder and comprises at least one air inlet; an airway tube is nested in the connector; a first end of the airway tube is connected to a mouthpiece and a second end of the airway tube abuts against the atomizing body; and the cartridge comprises at least one through hole corresponding to the at least one air inlet; and the airway tube comprises a second conductive member electrically connected to the second electrode, or the airway tube comprises a conductive material; and an insulation ring is disposed between the airway tube and the connector.

[0017] In a class of this embodiment, the cartridge comprises a first main body and a second main body extending from one side of the first main body; a first space is formed over the second main body to accommodate the tank body; a second space is formed under the second main body to accommodate a mouthpiece; and a battery is disposed in the first main body.

[0018] The following advantages are associated with the atomizer, the e-liquid tank, and the electronic cigarette: the disclosure simplifies the combined structure of the e-liquid tank and the atomizer to allow convenient disassembly of the electronic cigarette; and it is not necessary to fill the e-liquid into the e-liquid tank before use, which is convenient to the user.

FIG. 1 is an exploded view of an electronic cigarette according to one embodiment of the disclosure;

FIG. 2 is a perspective view of an electronic cigarette according to one embodiment of the disclosure;

FIG. 3 is a cross-sectional view of an electronic cigarette according to one embodiment of the disclosure; and

FIG. 4 is a cross-sectional view including arrows showing the directions of airflow in an electronic cigarette according to one embodiment of the disclosure.

[0019] In the drawings, the following reference numbers are used: 1. Tank body; 2. Atomizing body; 3. Third seal; 4. Connector; 5. First riveting member; 6. Insulation ring; 7. Airway tube; 8. Fourth seal; 9. Second riveting member; 10. Cartridge; 11. Mouthpiece; 12. Battery cover; 13. Battery; 14. Pneumatic switch; 15. Silicon sleeve; 16. Control board; 100. First main body; 103. First storage body; 104. Second storage body; 105. Limiting wall; 200. Second main body; 201. E-liquid inlet; 202. First space; 203. Second space; 204. Protrusion; 205. First portion; 206. Second portion; and 401. Air inlet.

[0020] To further illustrate the disclosure, embodiments detailing an electronic cigarette are described below. It should be noted that the following embodiments are intended to describe and not to limit the disclosure.

[0021] Referring to FIG. 1, an electronic cigarette comprises a cartridge 10, an atomizer, and an e-liquid tank. The atomizer and the e-liquid tank are detachably disposed on the cartridge 10.

[0022] The atomizer comprises an atomizing body 2 comprising a first cavity. A heating element is disposed in the first cavity. The e-liquid tank comprises a tank body 1 comprising a second cavity for accommodating e-liquid.

[0023] The atomizing body 2 comprises a first connection piece; the atomizer is separated from the e-liquid tank by the first connection piece; thus, the atomizer and the e-liquid tank are independent of each other. The first connection piece includes, but is not limited to, a screw thread, an interference fit part, a snap fastener, a magnet, a sticking material, and a pluggable member. Preferably, the first connection piece is a screw thread which ensures stability and allows for convenient assembly and disassembly of the atomizer and the e-liquid tank.

[0024] The cartridge 10 comprises a first main body 100 and a second main body 200 extending from one side of the first main body 100. A first space 202 is formed over the second main body 200 to accommodate the tank body 1. A second space 203 is formed under the second main body 200 to accommodate a mouthpiece 11. The battery is disposed in the first main body 100. Such a structure facilitates the assembly and disassembly of the e-liquid tank and the atomizer.

[0025] The atomizing body 2 further comprises an outer wall and a protrusion 204 extending radially outward from the outer wall. The atomizing body 2 further comprises a first portion 205 and a second portion 206 separately disposed on both ends of the protrusion 204. The first portion 205 comprises a side wall and an e-liquid inlet 201 disposed through the side wall. The first portion 205 is extended into the second cavity. The first connection piece is disposed on the second portion 206. An e-liquid guide is disposed between the e-liquid inlet 201 and the heating element. The e-liquid guide includes, but is not limited to, an e-liquid guide cotton, an e-liquid guide thread, a capillary tube, a strip of linen cotton, and a strip of composite cotton. The e-liquid or herbal oil in the e-liquid tank is passed through the e-liquid guide to the heating element.

[0026] The first connection piece and/or the protrusion 204 functions as a first electrode comprising a conductive material; or a first electrode is disposed on the first connection piece and/or the protrusion; the second portion 206 comprises an end port and a second electrode disposed on the end port. The first connection piece is a first electrode comprising a conductive material, or a conductive sheet, a conductive layer, or a conductive film is disposed on the conductive material to form the first electrode. Or, the protrusion 204 is a first electrode comprising a conductive material, or a conductive sheet, a conductive layer, or a conductive film is disposed on the protrusion to form the first electrode. Or, the second portion 206 and the first connection piece as a whole function as the first electrode comprising the conductive material, or a conductive sheet, a conductive layer, or a conductive film is disposed on the entire structure to form the first electrode. Or, the atomizing body 2, the first connection piece, and the protrusion as a whole function as the first electrode comprising the conductive material, or a conductive sheet, a conductive layer, or a conductive film is disposed on the entire structure to form the first electrode. A first seal is disposed between the first electrode and the second electrode to prevent the first electrode from contact with the second electrode. In a preferred embodiment, the atomizing body 2 comprises the conductive material and is used as the first electrode of the atomizer; the second electrode is disposed on the end portion of the second portion 206; a second seal is disposed between the atomizing body 2 and the second electrode.

[0027] In a preferred embodiment, the second portion 206 further comprises a periphery wall provided with a thread.

[0028] The tank body 1 comprises a second connection piece; the e-liquid tank is separated from the atomizer by the second connection piece; it means that the e-liquid tank and the atomizing are independent of each other. The second connection piece includes, but is not limited to, a screw thread, an interference fit part, a snap fastener, a magnet, a sticking material, and a pluggable member. Preferably, the second connection piece is a screw thread which ensures stability and allows for convenient assembly and disassembly of the atomizer and the e-

liquid tank.

[0029] The atomizing body 2 is detachably connected to the cartridge 10 through the first connection piece, and the tank body 1 is detachably connected to the cartridge 10 through the second connection piece; or the atomizing body 2 is detachably connected to the tank body 1 through the first connection piece, and the tank body 1 is detachably connected to the cartridge 10 through the second connection piece; or the atomizing body 2 is detachably connected to the tank body 1 through the second connection piece, and the atomizing body 2 is detachably connected to the cartridge 10 through the first connection piece.

[0030] The tank body 1 further comprises a first storage body 103 and a second storage body 104 protruding axially outward from a bottom surface of the first storage body 103. The diameter of the second storage body 104 is smaller than that of the first storage body 103. The first storage body 103 comprises a limiting wall 105 radially formed on the bottom surface. The limiting wall 105 abuts against the cartridge 10 to prevent the e-liquid tank from being inserted too deep in an inner passage of the cartridge 10.

[0031] The second storage body 104 comprises a bottom edge and an opening is disposed at the bottom edge to receive the atomizer. The second connection piece is disposed on an edge of the opening. In a preferred embodiment, the second storage body 104 comprises the opening and an outer circumference provided with a first male thread, and the atomizing body 2 is extended into the second cavity through the opening.

[0032] An inner diameter of the second storage body 104 is matched with an outer diameter of the protrusion 204. The protrusion 204 is nested into an inner wall of the second storage body 104 so as to prevent the e-liquid leaking out from the second cavity and limit changes in position during assembly and disassembly of the atomizing body 2 and the tank body 1. The e-liquid inlet 201 is inserted in the first storage body 103.

[0033] The inner passage of the cartridge 10 comprises a first female thread which is matched with the first male thread of the second storage body 103 to achieve a detachable connection.

[0034] The open end of the e-liquid tank and a first end of the atomizing body 2 are separately extended into the inner passage of the cartridge 10, and a second end of the atomizing body 2 is extended into the second cavity.

[0035] A connector 4 is disposed in the inner passage of the cartridge 10. The atomizing body 4 is detachably connected to the connector through the first connection piece. The protrusion 204 abuts against one end of the connector 4 or a seal is disposed therebetween. The tank body 1 is connected to the cartridge 10 through the second connection piece. The connector 4 comprises a corresponding member which is matched with the first connection piece to achieve a detachable connection; preferably, the corresponding member is a screw thread.

[0036] In a preferred embodiment, the connector 4 is in the shape of a cylinder and comprises an inner wall provided with a second female thread. The atomizing body 2 comprises a second male thread matched with the second female thread. The protrusion 204 abuts against one end of the connector 4.

[0037] The connector 4 comprises a first conductive member electrically connected to the first electrode, or the connector 4 comprises a conductive material. In a preferred embodiment, the atomizing body 4 is the first electrode comprising the conductive material; the connector 4 comprises the conductive material and is electrically connected to the first electrode. The connector 4 is configured to conduct electricity between the first electrode and an electrode of a power supply such as a battery.

[0038] In a preferred embodiment, the connector 4 comprises the conductive material and is electrically connected to the atomizing body 2 by a screw thread.

[0039] The connector 4 comprises at least one air inlet and an airway tube 7 is nested in the connector 4. A first end of the airway tube 7 is connected to the mouthpiece 11 and a second end of the airway tube 7 abuts against the atomizing body 2. The cartridge 10 comprises at least one through hole corresponding to the at least one air inlet. The airway tube 7 comprises a conductive material and is electrically connected to the second electrode disposed on the end port of the second portion 206. An insulation ring 6 is disposed between the airway tube 7 and the connector 4. Note that the term "first electrode" and "second electrode" as used herein refer to a positive electrode and a negative electrode of the atomizer.

[0040] The following description and example illustrate a preferred embodiment of the disclosure in detail. Referring to FIGS. 3, an electronic cigarette comprises the tank body 1, the atomizing body 2, a third seal 3, the connector 4, a first riveting member 5, the insulation ring 6, the airway tube 7, a fourth seal 8, a second riveting member 9, the cartridge 10, the mouthpiece 11, a battery cover 12, a battery 13, a pneumatic switch 14, a silicon sleeve 15, and a control board 16. The atomizing body 2 comprises the second male thread and the connector 4 comprises the inner wall provided with the second female thread matched with the second male thread. The second male thread is screwed to the second female thread so as to electrically connect the connector 4 to the atomizer for atomization of the e-liquid, which allows convenient assembly and disassembly of the atomizer. The first riveting member 5 is disposed on an outer wall of the airway tube 7. The insulation ring 6 is disposed between the airway tube 7 and the connector 7 to avoid short circuit. The airway tube 7 is inserted into the connector 4 through the insulation ring 6 so as to make electrical contact with the second electrode. The second riveting member 9 is embedded in the inner passage of the cartridge 10. The connector 4 is disposed in the inner passage of the cartridge 10 and is secured to the second riveting member 9. The third seal 3 is disposed on an outer wall of the connector 4 to seal the opening of the

second storage body 104, thereby preventing the e-liquid leaking out from the second cavity. The outer wall of the atomizing body 2 comprises at least one e-liquid inlet 201 inserted into the second cavity. The e-liquid in the second cavity flows into the atomizing body 2 through the at least one e-liquid inlet 201.

[0041] The inner passage of the cartridge 10 comprises the first female thread. The tank body 1 is disposed on the connector comprises the first male thread. The first male thread is screwed to the first female thread to achieve a detachable connection. The mouthpiece 11 is disposed under the inner passage of the cartridge 11 and is secured to the outer wall of the airway tube 7 for smoking. The fourth seal 8 is disposed on the outer wall of the airway tube 7 to seal an inner passage of the airway tube 7. The connector 4 comprises the at least one air inlet 401. An outer wall of the cartridge 10 comprises the at least one through hole 101 communicating with the at least one corresponding air inlet 401.

[0042] The control board 16 is disposed in the cartridge 10 so as to connect to a charging plug for battery charging. The pneumatic switch 14 is secured within the silicone sleeve 15 and the silicone sleeve 15 is secured within the cartridge 10. The battery 13 is disposed in the cartridge 10. A positive electrode and a negative electrode are separately connected to the control board 16. The control board 16 is connected to the pneumatic switch 14 to supply power and the battery cover 12 is disposed on the cartridge 10 to provide protection for the battery 13.

[0043] FIG. 4 is a cross-sectional view including arrows showing the directions of airflow in an electronic cigarette. When a user smokes the electronic cigarette, the external air flows into the at least one air inlet 401 through the through hole 101, causing the heating element in the atomizing body 2 to work. The e-liquid in the tank body 1 is heated by the heating element to produce the smoke that flows from the atomizer, into the airway tube 7, and through the mouthpiece 11, to be inhaled by a user.

Claims

1. An electronic cigarette comprising an atomizer and an e-liquid tank, wherein the atomizer comprises an atomizing body and a heating element; the atomizing body comprises a first cavity; the heating element is disposed in the first cavity; the e-liquid tank comprises a tank body; the tank body comprises a second cavity for accommodating an e-liquid; the atomizer is detachably connected to the e-liquid tank.

2. The electronic cigarette of claim 1, wherein the electronic cigarette comprises a cartridge, and the atomizer and the e-liquid tank are detachably disposed on the cartridge.

3. The electronic cigarette of claim 1, wherein the atomizing body comprises a first connection piece, and the tank body comprises a second connection piece.

4. The electronic cigarette of claim 3, wherein the atomizing body is detachably connected to the cartridge through the first connection piece, and the tank body is detachably connected to the cartridge through the second connection piece; or the atomizing body is detachably connected to the tank body through the first connection piece, and the tank body is detachably connected to the cartridge through the second connection piece; or the atomizing body is detachably connected to the tank body through the second connection piece, and the atomizing body is detachably connected to the cartridge through the first connection piece.

5. The electronic cigarette of claim 3, wherein the first connection piece and the second connection piece are independently a screw thread, an interference fit part, a snap fastener, a magnet, a sticking material, a pluggable member, or a combination thereof.

6. The electronic cigarette of claim 3, wherein the atomizing body further comprises an outer wall and a protrusion extending radially outward from the outer wall; the atomizing body further comprises a first portion and a second portion separately disposed on both ends of the protrusion; the first portion comprises a side wall and at least one e-liquid inlet disposed through the side wall; the first portion is inserted into the e-liquid tank; and the first connection piece is disposed on the second portion.

7. The electronic cigarette of claim 6, wherein the first connection piece and/or the protrusion is a first electrode comprising a conductive material; or the first electrode is disposed on the first connection piece and/or the protrusion; the second portion comprises an end port and a second electrode disposed on the end port.

8. The electronic cigarette of claim 7, wherein the tank body further comprises a first storage body and a second storage body protruding axially outward from a bottom surface of the first storage body; a diameter of the second storage body is smaller than that of the first storage body; and the first storage body comprises a limiting wall radially formed on the bottom surface.

9. The electronic cigarette of claim 8, wherein the second storage body comprises a bottom edge and an opening is disposed at the bottom edge to receive the atomizer; and the second connection piece is disposed on an edge of the opening.

10. The electronic cigarette of claim 8, wherein an inner

diameter of the second storage body is matched with an outer diameter of the protrusion; and when the e-liquid tank is positioned on the atomizer, the protrusion is nested into an inner wall of the second storage body.

11. The electronic cigarette of claim 8, wherein the at least one e-liquid inlet is disposed in the first storage body.

12. The electronic cigarette of claim 9, wherein the cartridge comprises an inner passage; an open end of the e-liquid tank and a first end of the atomizing body are separately extended into the inner passage; and a second end of the atomizing body is extended into the second cavity.

13. The electronic cigarette of claim 12, wherein:

a connector is disposed in the inner passage; the atomizing body is detachably connected to the connector through the first connection piece; the protrusion abuts against one end of the connector or a seal is disposed therebetween; and the tank body is connected to the cartridge through the second connection piece; and
the connector comprises a first conductive member electrically connected to the first electrode, or the connector comprises a conductive material.

14. The electronic cigarette of claim 13, wherein:

the connector is in the shape of a cylinder and comprises at least one air inlet; an airway tube is nested in the connector; a first end of the airway tube is connected to a mouthpiece and a second end of the airway tube abuts against the atomizing body; and the cartridge comprises at least one through hole corresponding to the at least one air inlet; and
the airway tube comprises a second conductive member electrically connected to the second electrode, or the airway tube comprises a conductive material; and
an insulation ring is disposed between the airway tube and the connector.

15. The electronic cigarette of claim 2, wherein the cartridge comprises a first main body and a second main body extending from one side of the first main body; a first space is formed over the second main body to accommodate the tank body; a second space is formed under the second main body to accommodate a mouthpiece; and a battery is disposed in the first main body.

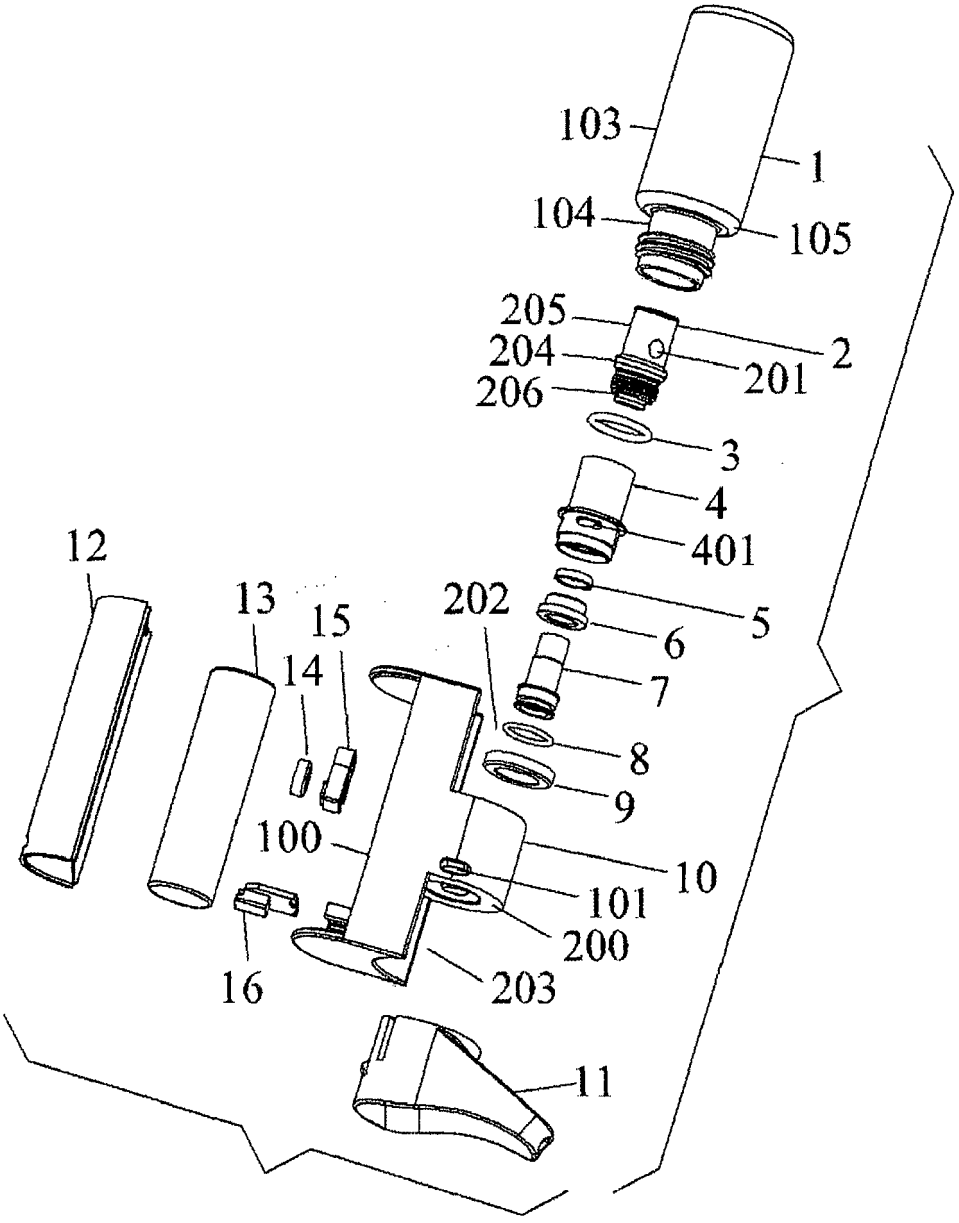
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FIG. 1

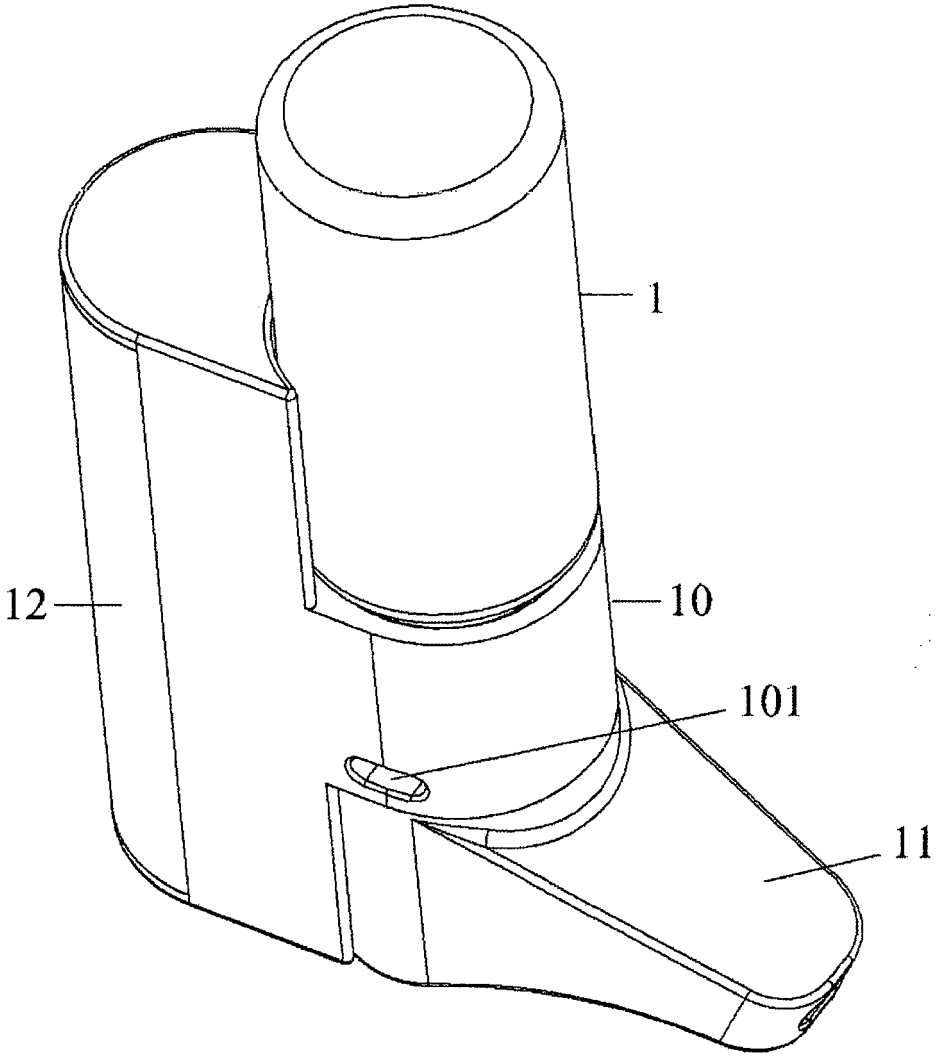

FIG. 2

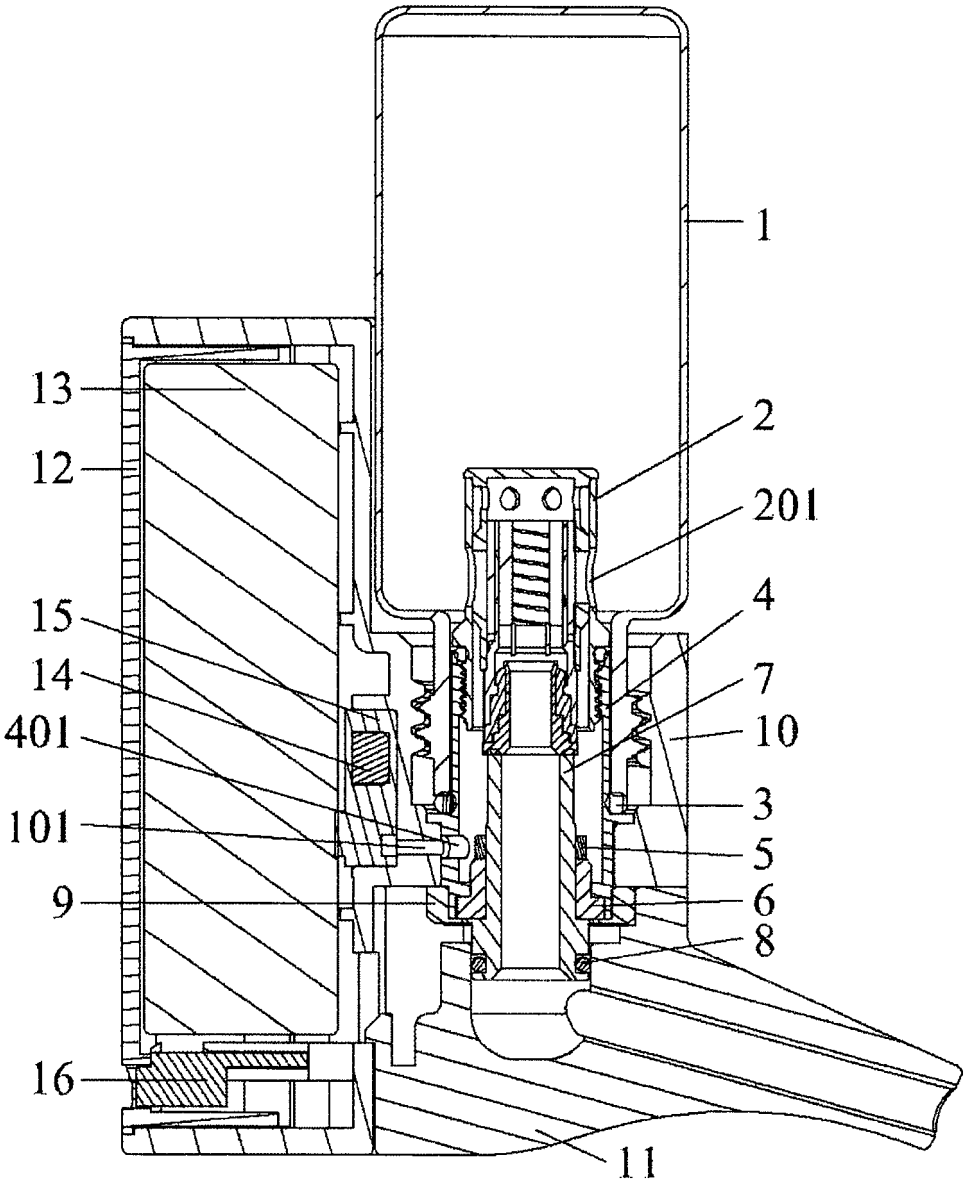

FIG. 3

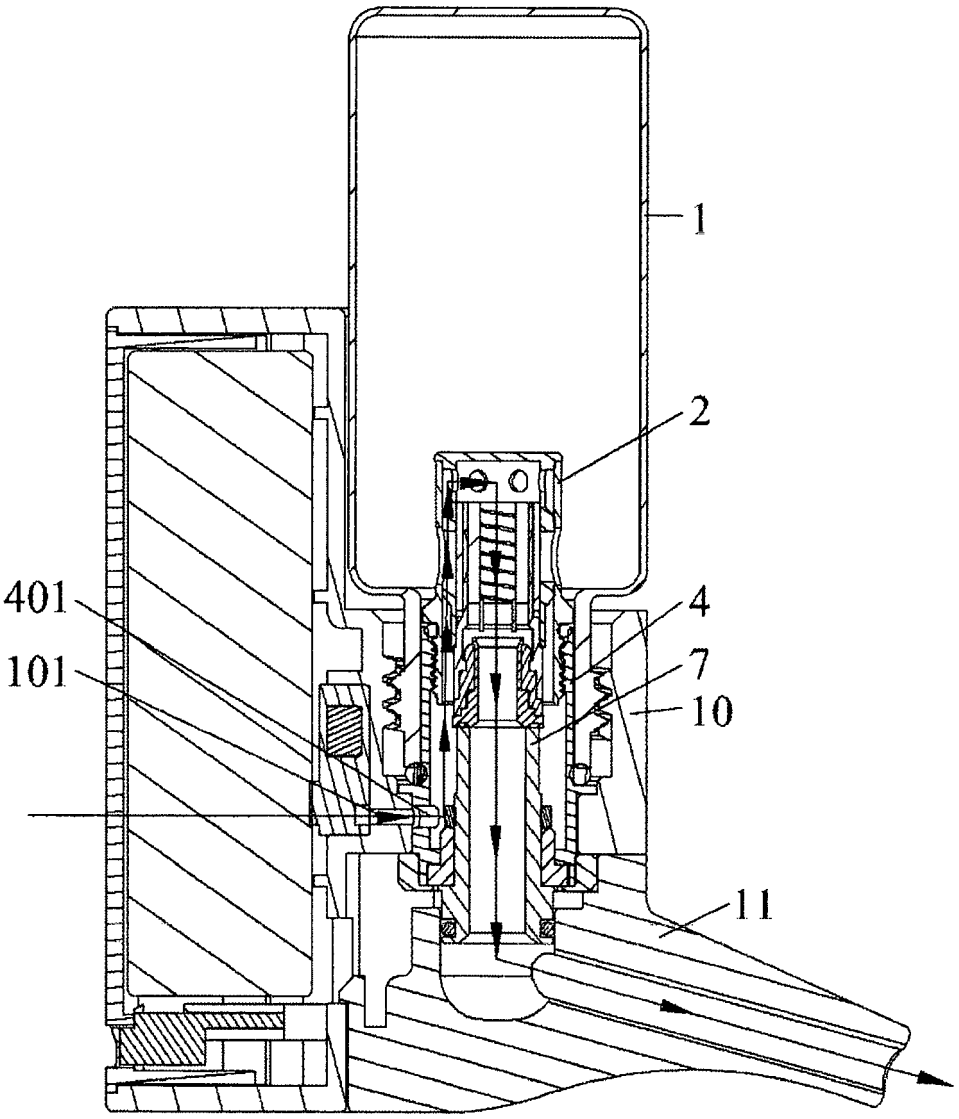

FIG. 4

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EUROPEAN SEARCH REPORT

Application Number
EP 21 00 0269

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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TECHNICAL FIELDS SEARCHED (IPC)

A24F

1 The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	10 March 2022	Juvenelle, Cyril

CATEGORY OF CITED DOCUMENTS

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