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(54) **ELECTRONIC VAPORIZATION DEVICE**

(57) An electronic vaporization device includes a vaporizer 100 ; a battery 200; and a controller (300). A first electrode 400 and a second electrode 500 that are separable are arranged between any two of the vaporizer, the battery, and the controller. The first and second electrodes may be arranged on a positioning element (610) and a fastener (620) which can be buckled to connect the electrodes and thereby implement normal working of the device. Alternatively the first and second electrodes are arranged in a groove on the shell of the device, and an insert 700 including a conductive material is configured to connect the first and second electrodes when the insert 700 is embedded in the groove.

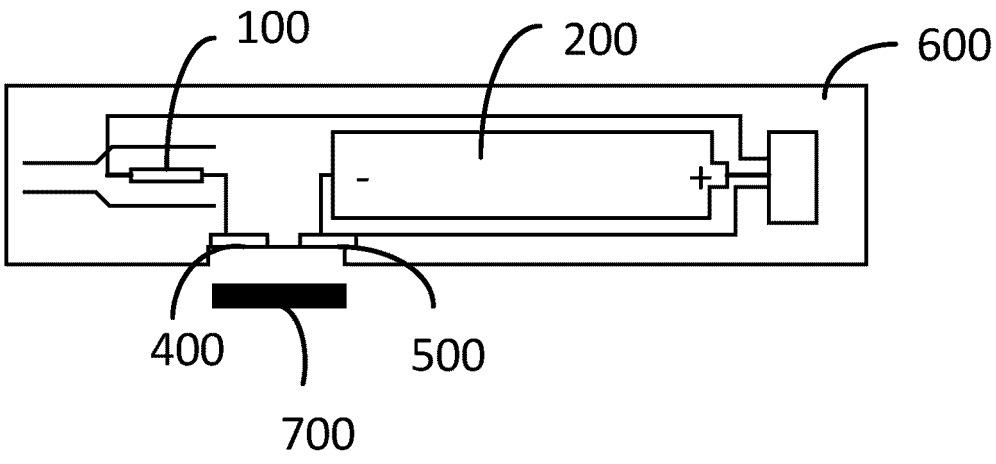

FIG. 11

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Description

TECHNICAL FIELD

[0001] This application relates to the technical field of vaporization devices, and in particular, to an electronic vaporization device.

BACKGROUND

[0002] An electronic vaporization device has become a relatively mature product in the market. The electronic vaporization device vaporizes a vaporization medium through a vaporizer to generate an aerosol. A user inhales the aerosol to obtain effective substances in an e-liquid.

[0003] The electronic vaporization device mainly includes a vaporizer, a battery, an airflow sensor, and a system circuit. Currently, after the electronic vaporization device is manufactured, the battery needs to keep supplying power to the system circuit, and the system circuit keeps supplying power to the airflow sensor. As a result, excessive power of the battery is consumed during long-term transportation and storage of the electronic vaporization device, severely affecting the durability of the electronic vaporization device.

SUMMARY

[0004] In an embodiment, the present invention provides an electronic vaporization device, including a vaporizer, a battery, and a controller, wherein a first electrode and a second electrode that are separable are arranged between any two of the vaporizer, the battery, and the controller.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] 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 module diagram of an electronic vaporization device according to an embodiment;
FIG. 2 is a schematic module diagram of an electronic vaporization device according to another embodiment;
FIG. 3 is a schematic module diagram of an electronic vaporization device according to another embodiment;
FIG. 4 is a schematic diagram of internal modules of a controller according to an embodiment;
FIG. 5 is a schematic diagram of flow directions of internal currents in an electronic vaporization device during charging according to an embodiment;
FIG. 6 is a schematic diagram of internal modules of a controller according to another embodiment;
FIG. 7 is a schematic structural diagram of an electronic vaporization device according to an embodiment;
FIG. 8 is an enlarged schematic structural diagram of positions of a first electrode and a second electrode when separated according to an embodiment;
FIG. 9 is an enlarged schematic structural diagram of positions of a first electrode and a second electrode when buckled according to an embodiment;
FIG. 10 is an enlarged schematic structural diagram of positions of a first electrode and a second electrode during charging according to an embodiment;
FIG. 11 is a schematic structural diagram of an electronic vaporization device according to another embodiment;
FIG. 12 is an enlarged schematic structural diagram of positions of a first electrode and a second electrode according to another embodiment; and
FIG. 13 is an enlarged schematic structural diagram of a first electrode and a second electrode when buckled with an insert according to another embodiment.

DETAILED DESCRIPTION

[0006] In an embodiment, the present invention provides an electronic vaporization device that can improve the durability of the electronic vaporization device.

[0007] In an embodiment, the present invention provides an electronic vaporization device. The electronic vaporization device includes a vaporizer, a battery, and a controller. A first electrode and a second electrode that are separable are further arranged between any two of the vaporizer, the battery, and the controller.

[0008] In an embodiment, a first end of the controller is connected to a first end of the vaporizer, a second end of the controller is connected to the positive electrode of the battery, a third end of the controller is connected to the negative electrode of the battery, and the negative electrode of the battery is further connected to a second end of the vaporizer.

[0009] In an embodiment, the second end of the vaporizer is connected to the negative electrode of the battery through the first electrode and the second electrode that are separable, and when the first electrode is connected to the positive electrode of an external power supply and the second electrode is connected to the negative electrode of the external power supply, the external power supply charges the battery through the controller.

[0010] In an embodiment, the controller includes:
a charge module, a control module, a first switch, a second switch, and a switch control module, where a first end of the first switch is respectively connected to the

first end of the vaporizer and a first end of the charge module, a first end of the second switch is connected to the positive electrode of the battery, a second end of the first switch is connected to a second end of the second switch, a first end of the switch control module is connected to a third end of the first switch, a second end of the switch control module is connected to a third end of the second switch, a third end of the switch control module is connected to a second end of the charge module, and a fourth end of the switch control module is connected to a second end of the control module.

[0011] In an embodiment, the first switch and the second switch are MOS transistors.

[0012] In an embodiment, the first electrode and the second electrode are annular structures or sheet-shaped structures.

[0013] In an embodiment, the electronic vaporization device further includes an insulating shell, where the insulating shell includes a positioning element and a fastener, the first electrode is arranged on the positioning element, the second electrode is arranged on the fastener, and the first electrode and the second electrode are connected when the positioning element is buckled with the fastener. In an embodiment, the electronic vaporization device further includes: an insert including a conductive material, where the insert connects the first electrode and the second electrode.

[0014] In an embodiment, the insert is a sheet-shaped structure, and the first electrode and the second electrode are connected through the insert when the insert is embedded in a shell of the electronic vaporization device.

[0015] In an embodiment, the insert includes an insulator and a conductor embedded in the insulator, a shell of the electronic vaporization device includes a groove for the insert to be embedded in, and the first electrode and the second electrode are separately arranged in the groove.

[0016] In an embodiment, the first electrode and the second electrode are sheet-shaped or crescent-shaped. The electronic vaporization device includes: a vaporizer, a battery, and a controller. A first electrode and a second electrode that are separable are further arranged between any two of the vaporizer, the battery, and the controller. The circuit can be disconnected between the battery, and the vaporizer or the controller via a separable first electrode and a second electrode, thereby the circuit between the battery and the vaporizer or the controller, or the circuit between the vaporizer and the controller being disconnected. In this way, during a transportation process and storage process, the power consumption of an electronic vaporization device battery can be reduced. This prolongs a service life of an electronic vaporization device after it was purchased by a user. In addition, a vaporizer will not work when an electronic vaporization device senses an atmospheric pressure change in the process of transportation and storage, reducing risks in the transportation and storage process.

[0017] In order to make the objectives, technical solutions, and advantages of this application clearer, the following further describes this application in detail with reference to the accompanying drawings and embodiments. It should be understood that the specific embodiments described herein are merely used for explaining this application, but are not used for limiting this application.

[0018] Unless otherwise defined, meanings of all technical and scientific terms used in this specification are the same as those generally understood by a person skilled in the art to which this application belongs. In this specification, terms used in this specification of this application are merely intended to describe objectives of the specific embodiments, but are not intended to limit this application.

[0019] It will be understood that "connected" in the following embodiments is to be interpreted as "electrically connected", "communicatively connected", etc. if electrical signals or data is transferred between the connected circuits, modules, units, etc.

[0020] In an embodiment, an electronic vaporization device is provided. The electronic vaporization device may be configured to vaporize a liquid substrate. The electronic vaporization device may be applied to different fields such as medical vaporization and electronic vaporization, etc. The electronic vaporization device is configured to store and vaporize a to-be-vaporized substrate to generate an aerosol. In this embodiment, the electronic vaporization device is configured to vaporize a to-be-vaporized substrate to generate an aerosol for a user to inhale. In other embodiments, the electronic vaporization device may also be applied to hair spray equipment to vaporize hair spray for hair styling; or applied to medical equipment for treating diseases of upper and lower respiratory systems to vaporize medical drugs.

[0021] Specifically, the electronic vaporization device includes: a vaporizer 100, a battery 200, and a controller 300. A first electrode 400 and a second electrode 500 that are separable are further arranged between any two of the vaporizer 100, the battery 200, and the controller 300. Generally, a first end of the controller 300 is connected to a first end of the vaporizer 100, a second end of the controller 300 is connected to the positive electrode of the battery 200, a third end of the controller 300 is connected to the negative electrode of the battery 200, and the negative electrode of the battery 200 is further connected to a second end of the vaporizer 100. During specific implementation, other modules or circuit structures may be further connected between the controller 300 and the vaporizer 100, between the controller 300 and the battery 200, and between the battery 200 and the vaporizer 100, which is not limited herein.

[0022] Specific manners in which the first electrode 400 and the second electrode 500 that are separable are further arranged between any two of the vaporizer 100, the battery 200, and the controller 300 may include the following manners.

[0023] Manner 1: As shown in FIG. 1, the first electrode 400 and the second electrode 500 are located between the vaporizer 100 and the battery 200. By separating the first electrode 400 and the second electrode 500, the vaporizer 100 is powered off during transportation or storage. Therefore, even if the controller 300 senses an atmospheric pressure change through an airflow sensor, because the vaporizer 100 is powered off, the vaporizer 100 does not work or generate heat, which saves power of the battery 200, and can avoid a fire risk caused by continuous heating, thereby improving security during transportation and storage.

[0024] Manner 2: As shown in FIG. 2, the first electrode 400 and the second electrode 500 are located between the vaporizer 100 and the controller 300. By separating the first electrode 400 and the second electrode 500, the vaporizer 100 is powered off during transportation or storage. Therefore, even if the controller 300 senses an atmospheric pressure change through an airflow sensor, the vaporizer 100 does not work (or does not receive instructions from the controller 300) or generate heat, which saves power of the battery 200, and can avoid a fire risk caused by continuous heating, thereby improving security during transportation and storage.

[0025] Manner 3: As shown in FIG. 3, the first electrode 400 and the second electrode 500 are located between the battery 200 and the controller 300. By separating the first electrode 400 and the second electrode 500, the power supply of the battery 200 to the controller 300 and the vaporizer 100 is disconnected. Therefore, the battery 200 dose not supply power until a user uses the device, thereby improving security during transportation and storage.

[0026] In the electronic vaporization device, the circuit can be disconnected between the battery, and the vaporizer or the controller via a separable first electrode and a second electrode, thereby the circuit between the battery and the vaporizer or the controller, or the circuit between the vaporizer and the controller being disconnected. In this way, during a transportation process and storage process, the power consumption of the electronic vaporization device battery can be reduced. This prolongs a service life of the electronic vaporization device after it was purchased by a user. In addition, a vaporizer will not work when the electronic vaporization device senses an atmospheric pressure change in the process of transportation and storage, reducing risks in the transportation and storage process.

[0027] In an embodiment, in order to further improve the durability of the electronic vaporization device and implement the charging function of the electronic vaporization device, as shown in FIG. 1, the other end of the vaporizer 100 is connected to the negative electrode of the battery 200 through the first electrode 400 and the second electrode 500 that are separable. When the first electrode 400 and the second electrode 500 are separated, the first electrode 400 may be connected to the positive electrode of an external power supply, the second electrode 500 may be connected to the negative electrode of the external power supply, and the external power supply charges the battery through the controller 300.

[0028] Specifically, as an embodiment, an internal structure of the controller 300 may be shown in FIG. 4, and the controller 300 may include: a charge module 310, a control module 320, a first switch 330, a second switch 340, and a switch control module 350. A first end of the first switch 330 is respectively connected to the first end of the vaporizer 100 and a first end of the charge module 310. A first end of the second switch 340 is connected to the positive electrode of the battery 200. A second end of the first switch 330 is connected to a second end of the second switch 340. A first end of the switch control module 350 is connected to a third end of the first switch 330, a second end of the switch control module 350 is connected to a third end of the second switch 340, a third end of the switch control module 350 is connected to a second end of the charge module 310, and a fourth end of the switch control module 350 is connected to a second end of the control module 320. The control module 320 is also connected to an airflow sensor, configured to sense an atmospheric pressure change or an atmospheric pressure change inside an electronic vaporization device. The control module 320 senses the atmospheric pressure change or an atmospheric pressure change through the airflow sensor, turns off the first switch 330 and the second switch 340 through the switch control module 350, outputs the power of the battery 200 to the vaporizer 100, and further makes the vaporizer 100 work. When the external power supply is connected, the charge module 310 turns on the first switch 330 and turns off the second switch 340 through the switch control module 350. In this way, the external power supply charges the battery and the current directions are shown in FIG. 5.

[0029] As an embodiment, the first switch 330 and the second switch 340 may both be MOS transistors. As shown in FIG. 6, the first switch 330 is a first MOS transistor, and the second switch 330 is a second MOS transistor. A source of the first MOS transistor 330 is respectively connected to the first end of the vaporizer 100 and the first end of the charge module 310, a source of the second MOS transistor 340 is connected to the positive electrode of the battery 200, and a drain of the first MOS transistor 330 is connected to a drain of the second MOS transistor 340. The switch control module 350 may be a MOS control module. A first end of the MOS control module is connected to a gate of the first MOS transistor 330, a second end of the MOS control module 350 is connected to a gate of the second MOS transistor 340, a third end of the MOS control module 350 is connected to the second end of the charge module 310, and a fourth end of the MOS control module 350 is connected to the second end of the control module 320.

[0030] In an embodiment, the first electrode 330 and the second electrode 340 are annular structures or sheet-shaped structures.

[0031] In an embodiment, as shown in FIG. 7 to FIG. 9, the electronic vaporization device further includes: an insulating shell 600, where the insulating shell 600 includes a positioning element 610 and a fastener 620. The first electrode 400 is arranged on the positioning element 610, and the second electrode 500 is arranged on the fastener 620. When the electronic vaporization device is used, the positioning element 610 and the fastener 620 are buckled when a pressure is applied to the electronic vaporization device. As shown in FIG. 9, when the positioning element 610 is buckled with the fastener 620, the first electrode 400 and the second electrode 500 are connected, and the functional modules in the electronic vaporization device are powered on, to implement normal work.

[0032] As shown in FIG. 10, during charging, the positive electrode of the external power supply is connected to the first electrode 400, and the negative electrode of the external power supply is connected to the second electrode 500. In this way, the external power supply and the electronic vaporization device are in a charging state, and the internal current directions are shown in FIG. 5. In an embodiment, the electronic vaporization device further includes: an insert 700 including a conductive material, where the insert 700 is configured to connect the first electrode 400 and the second electrode 500. As shown in FIG. 11, a groove is provided on a shell of the electronic vaporization device, and the first electrode 400 and the second electrode are separately arranged in the groove. During use, the user may embed the insert 700 in the groove to connect the first electrode 400 and the second electrode 500. During specific implementation, the groove on the shell of the electronic vaporization device may be omitted. For example, the insert 700 may be mounted above the first electrode 400 and the second electrode 500 in a manner such as absorption or buckling, to connect the first electrode 400 and the second electrode 500 through the insert 700. The first electrode 400 and the second electrode 500 are sheet-shaped, crescent-shaped, or annular structures.

[0033] In an embodiment, the insert may have a sheet-shaped structure.

[0034] In an embodiment, as shown in FIG. 12, the insert 700 includes an insulator 710 and a conductor 720 embedded in the insulator 710. A shell of the electronic vaporization device includes a groove 630 for the insert 700 to be embedded in, and the first electrode 400 and the second electrode 500 are separately arranged in the groove 630.

[0035] Further, a limiting structure may be further arranged in the groove 630, so that the insert 700 can be firmly clamped in the groove 630 after being embedded in the groove 630, as shown in FIG. 13. During specific implementation, elastic positioning balls may be further arranged on both sides of the insert 700, and holes are arranged at the corresponding positions of the groove 630 for the elastic positioning balls to be clamped in. Alternatively, holes are arranged on both sides of the insert 700, and elastic positioning balls are arranged at the corresponding positions of the groove 630.

[0036] Similarly, during charging, the positive electrode of the external power supply may be connected to the first electrode 400, and the negative electrode of the external power supply is connected to the second electrode 500. In this way, the external power supply and the electronic vaporization device are in a charging state, and the internal current directions are shown in FIG. 5.

[0037] The technical features in the foregoing embodiments may be randomly combined. For concise description, not all possible combinations of the technical features in the embodiment are described. However, provided that combinations of the technical features do not conflict with each other, the combinations of the technical features are considered as falling within the scope recorded in this specification.

Claims

1. An electronic vaporization device, comprising:

   a vaporizer (100);
   a battery (200); and
   a controller (300),
   wherein a first electrode (400) and a second electrode (500) that are separable are arranged between any two of the vaporizer (100), the battery (200), and the controller (300).

2. The electronic vaporization device of claim 1, wherein a first end of the controller (300) is connected to a first end of the vaporizer (100), a second end of the controller (300) is connected to the positive electrode of the battery (200), a third end of the controller (300) is connected to the negative electrode of the battery (200), and the negative electrode of the battery (200) is connected to a second end of the vaporizer (100).

3. The electronic vaporization device of claim 2, wherein the second end of the vaporizer (100) is connected to the negative electrode of the battery (200) through the first electrode (400) and the second electrode (500), and
   wherein, when the first electrode (400) is connected to the positive electrode of an external power supply and the second electrode (500) is connected to the negative electrode of the external power supply, the external power supply is configured to charge the battery through the controller (300).

4. The electronic vaporization device of claim 3, wherein the controller (300) comprises:

   a charge module (310),
   a control module (320),

a first switch (330),
a second switch (340), and
a switch control module (350),
wherein a first end of the first switch (330) is respectively connected to the first end of the vaporizer (100) and a first end of the charge module (310), a first end of the second switch (340) is connected to the positive electrode of the battery (200), a second end of the first switch (330) is connected to a second end of the second switch (340), a first end of the switch control module (350) is connected to a third end of the first switch (330), a second end of the switch control module (350) is connected to a third end of the second switch (340), a third end of the switch control module (350) is connected to a second end of the charge module (310), and a fourth end of the switch control module (350) is connected to a second end of the control module (320).

5. The electronic vaporization device of claim 3, wherein the first electrode (400) and the second electrode (500) comprise annular structures or sheet-shaped structures.

6. The electronic vaporization device of claim 1, further comprising:

an insulating shell (600) comprising:

a positioning element (610), and
a fastener (620),

wherein the first electrode (400) is arranged on the positioning element (610), the second electrode (500) is arranged on the fastener (620), and the first electrode (400) and the second electrode (500) are connected when the positioning element (610) is buckled with the fastener (620).

7. The electronic vaporization device of claim 1, further comprising:

an insert (700) comprising a conductive material,
wherein the insert (700) connects the first electrode (400) and the second electrode (500).

8. The electronic vaporization device of claim 7, wherein the insert (700) comprises a sheet-shaped structure, and
wherein the first electrode (400) and the second electrode (500) are connected through the insert (700) when the insert (700) is embedded in a shell of the electronic vaporization device.

9. The electronic vaporization device of claim 7, wherein the insert (700) comprises an insulator (710) and a conductor (720) embedded in the insulator (710),

wherein the shell of the electronic vaporization device comprises a groove (630) in which the insert (700) is embeddable, and
wherein the first electrode (400) and the second electrode (500) are separately arranged in the groove (630).

10. The electronic vaporization device according to any of claims 7 to 9, wherein the first electrode (400) and the second electrode (500) are sheet-shaped or crescent-shaped.

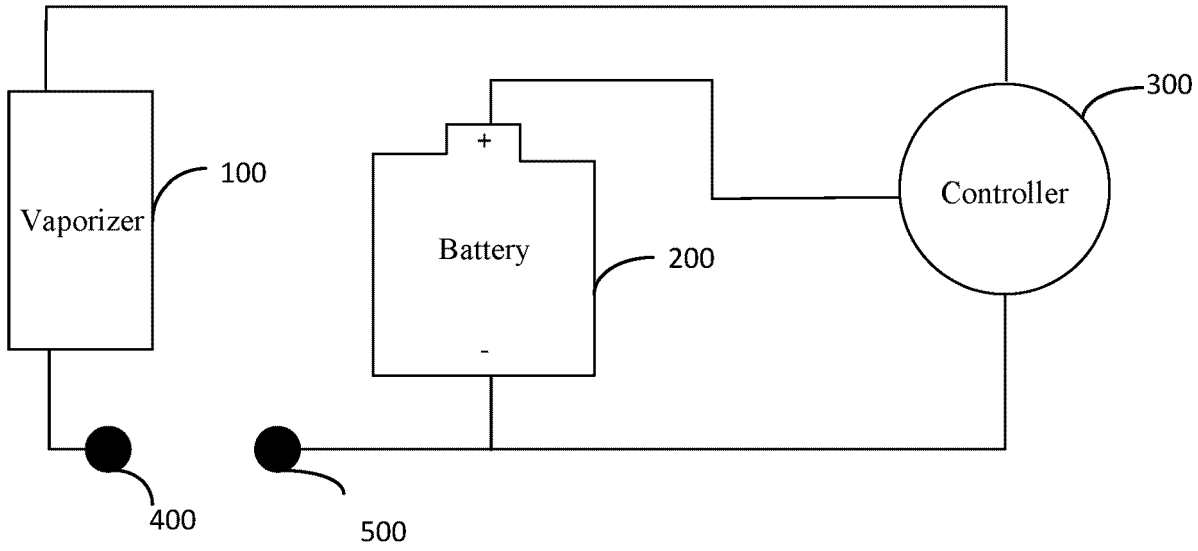
Vaporizer
100
+
Battery
-
200
Controller
300
400
500

FIG. 1

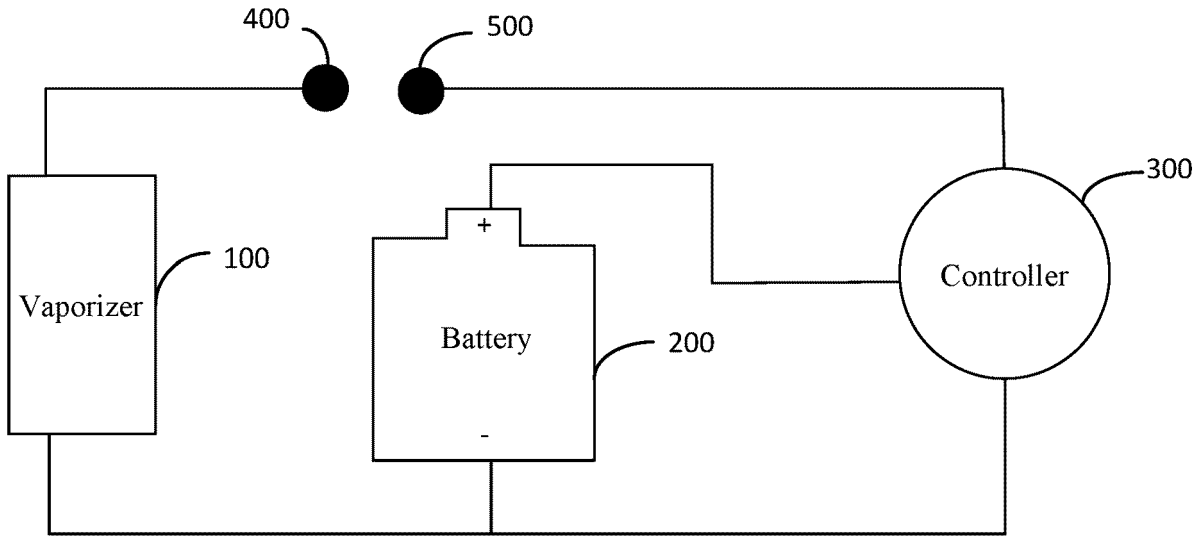
400
500
Vaporizer
100
+
Battery
-
200
Controller
300

FIG. 2

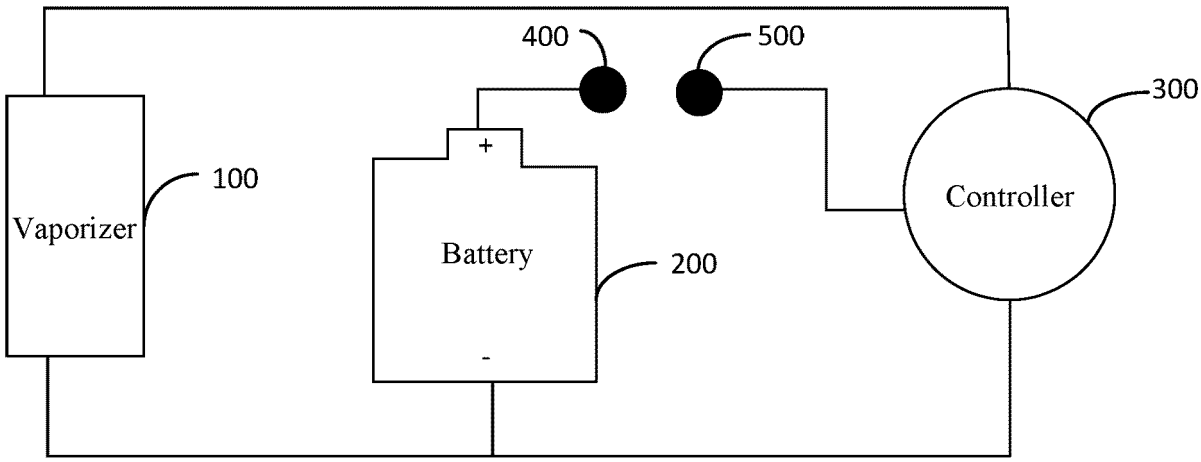
400
500
300
Vaporizer
100
+
Battery
200
-
Controller

FIG. 3

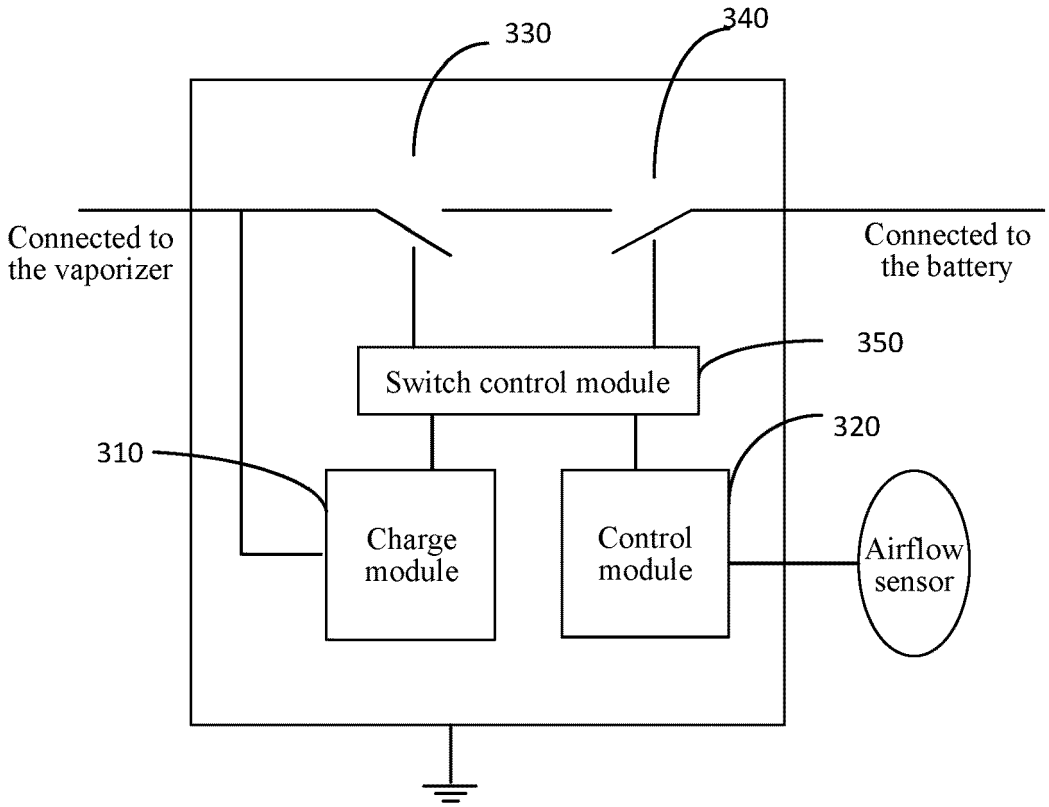
330
340
Connected to the vaporizer
Connected to the battery
Switch control module
350
320
310
Charge module
Control module
Airflow sensor

FIG. 4

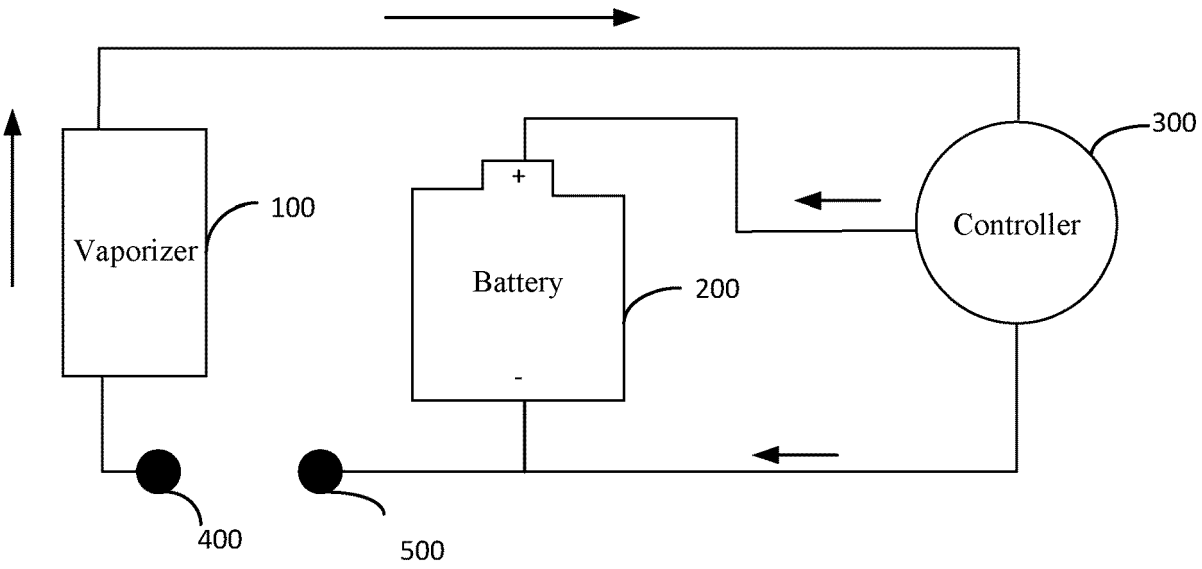
Vaporizer
100
+
Battery
200
-
Controller
300
400
500

FIG. 5

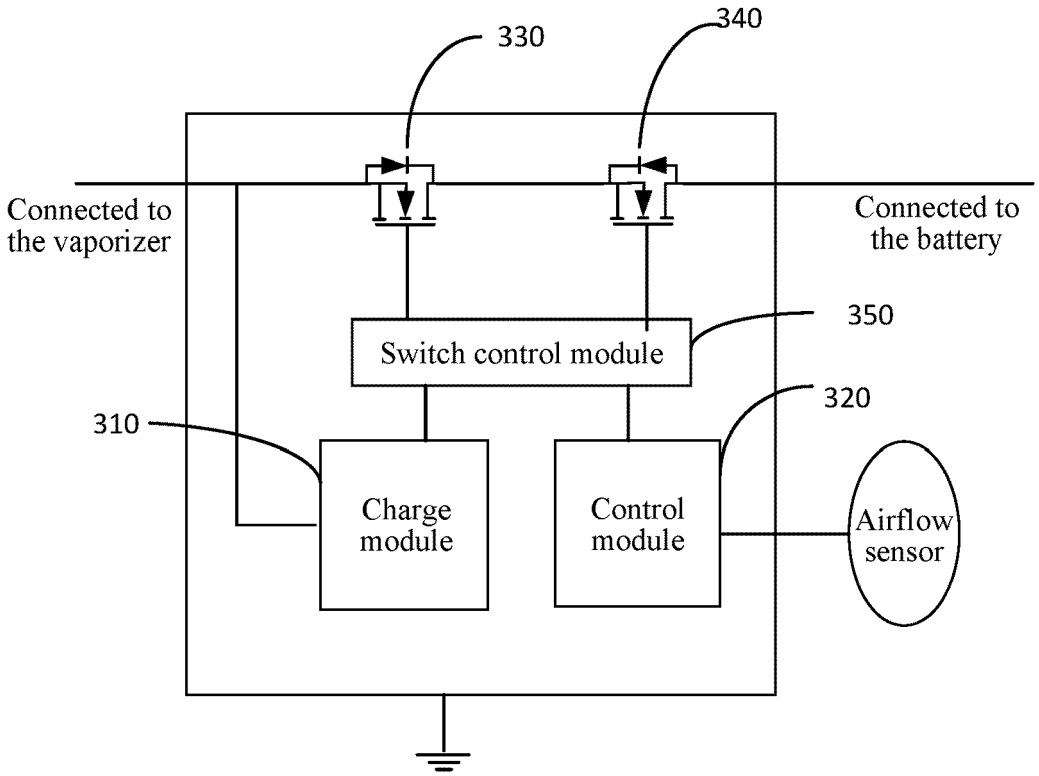
330
340
Connected to the vaporizer
Connected to the battery
Switch control module
350
310
320
Charge module
Control module
Airflow sensor

FIG. 6

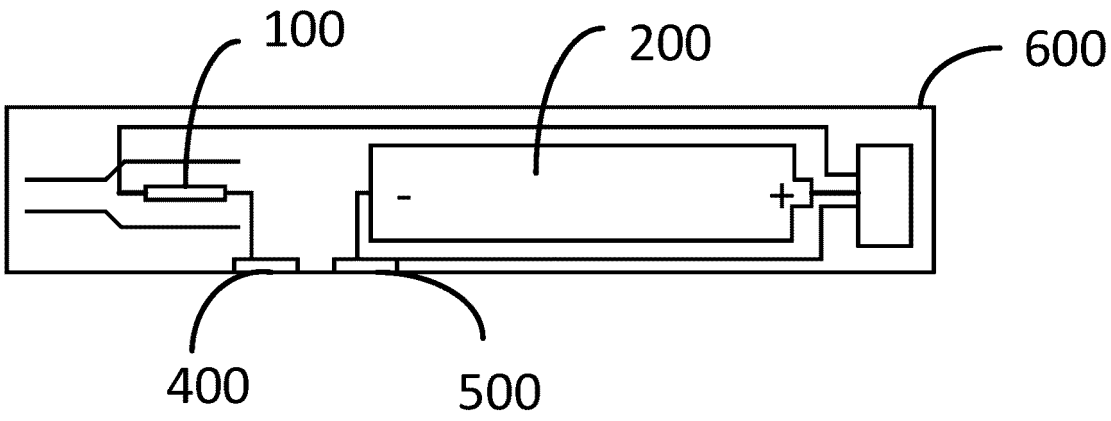

FIG. 7

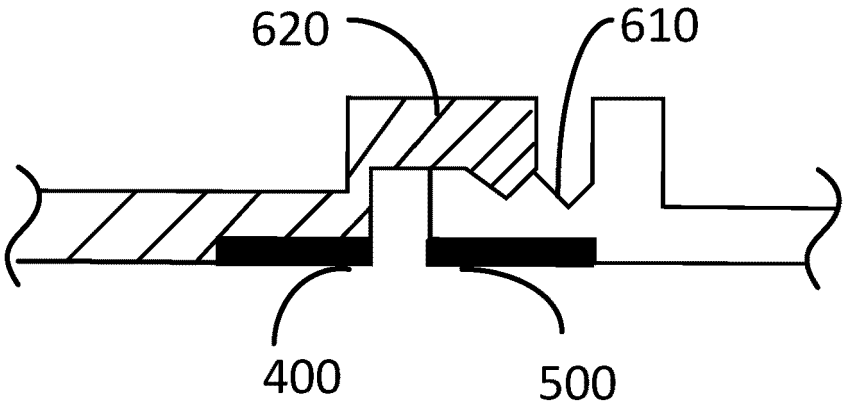

FIG. 8

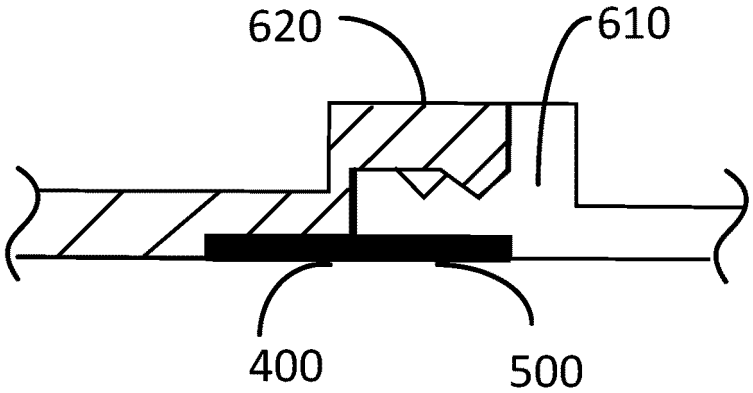

FIG. 9

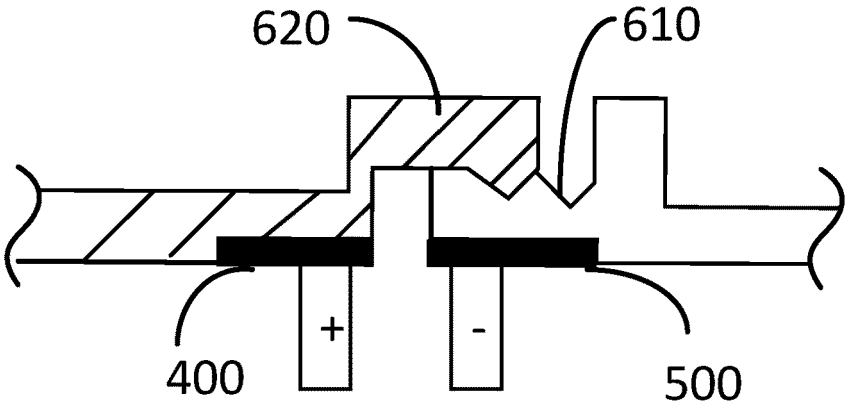

FIG. 10

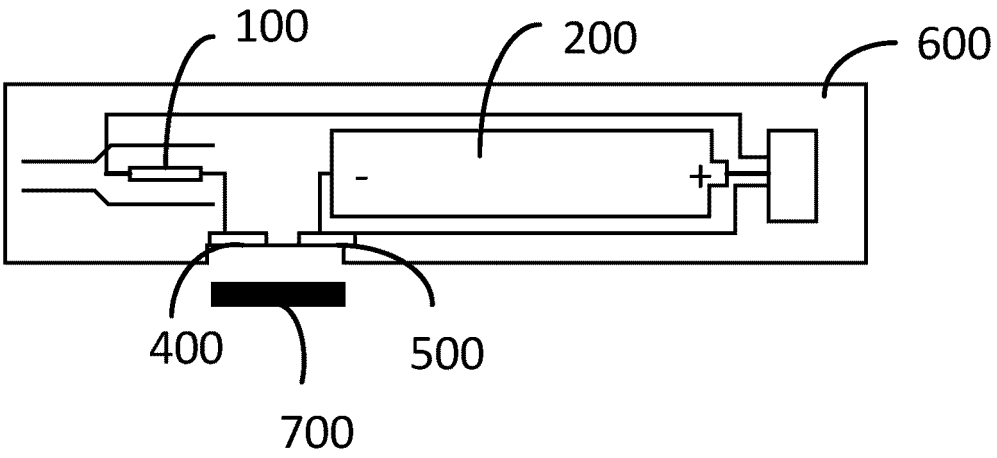

FIG. 11

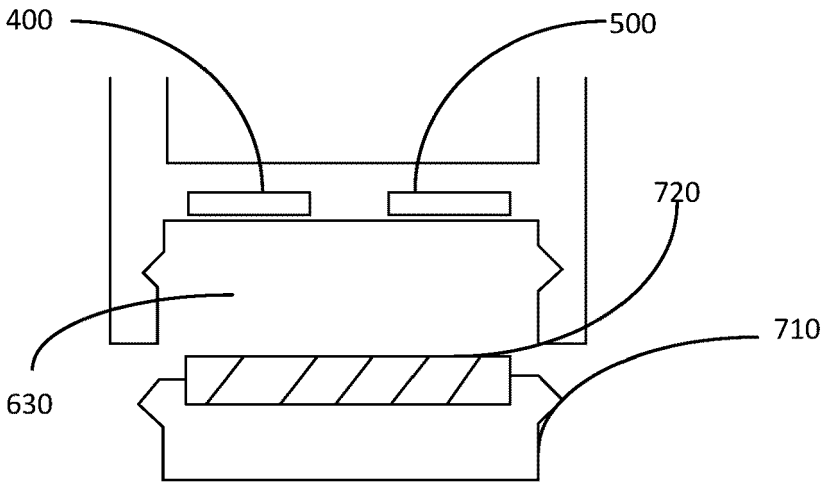

FIG. 12

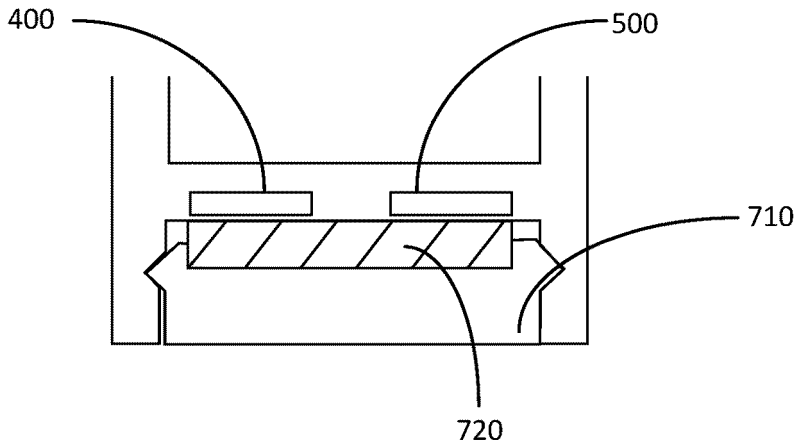

FIG. 13

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 23 17 8878

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 2021/210899 A1 (KT & G CORP [KR]) 21 October 2021 (2021-10-21) * paragraph [0037] - paragraph [0119]; figures 1-6 *	1-10	INV. A24F40/40 A24F40/50 H01H27/00
X	US 2013/306084 A1 (FLICK JEAN-MARC [CH]) 21 November 2013 (2013-11-21) * paragraph [0056] - paragraph [0059]; figures 1,2 *	1-10	ADD. H01H1/14 H01H9/08
A	CN 203 607 468 U (LIU QIUMING) 21 May 2014 (2014-05-21) * abstract; figures 1,2 *	1-10	

TECHNICAL FIELDS SEARCHED (IPC)

A24F
H01H
A61M

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	15 November 2023	Dobbs, Harvey

CATEGORY OF CITED DOCUMENTS

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