



(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
02.12.2020 Bulletin 2020/49

(51) Int Cl.:
A24F 47/00 ^(2020.01)

(21) Application number: **19888239.1**

(86) International application number:
PCT/CN2019/082566

(22) Date of filing: **12.04.2019**

(87) International publication number:
WO 2020/206702 (15.10.2020 Gazette 2020/42)

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(71) Applicant: **Shenzhen Smoore Technology Limited**
Shenzhen, Guangdong 518102 (CN)

(72) Inventor: **LI, Kui**
Shenzhen, Guangdong 518102 (CN)

(74) Representative: **Westphal, Mussnug & Partner**
Patentanwälte mbB
Werinherstrasse 79
81541 München (DE)

(54) **ENERGY-SAVING CONTROL METHOD AND DEVICE FOR ELECTRONIC ATOMIZATION DEVICE, AND ELECTRONIC ATOMIZATION DEVICE**

(57) The present invention relates to a method and a device for energy-saving control of an electronic atomizing device, and an electronic atomizing device. The electronic atomizing device includes a cartridge and a power supply device. The electronic atomizing device further includes a detection module connected with the power supply device and configured to detect whether the cartridge is inserted into the power supply device; if the detection module detects that the cartridge is inserted into the power supply device, an additional function module of the electronic atomizing device is activated; and if

the detection module does not detect that the cartridge is inserted into the power supply device, the additional function module is maintained in a power saving state. By implementing the present invention, during storage and transportation, the cartridge and the power supply module are placed separately, and the additional function module does not need to be in an active state to avoid power consumption, so that the new product still has power for a consumer to experience when the consumer get it, thereby improving user experience.

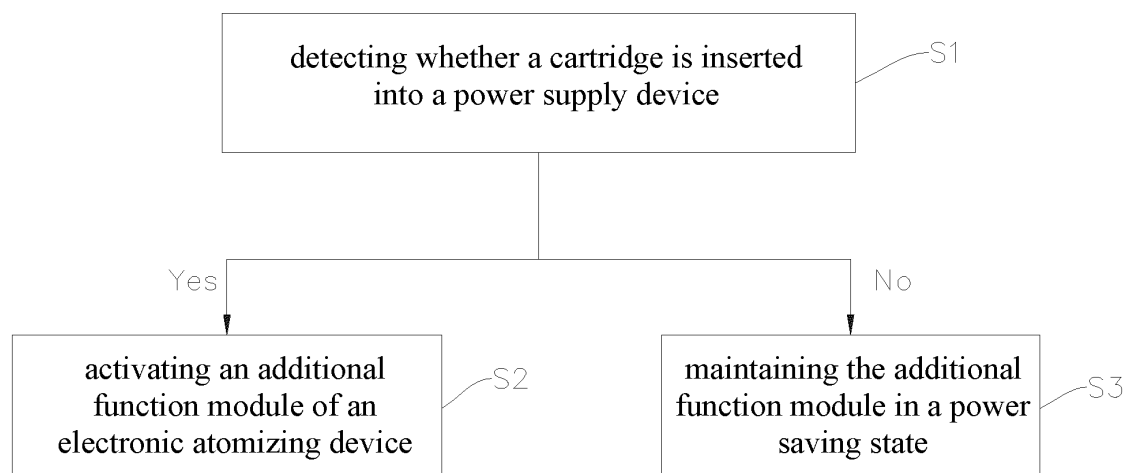


FIG. 1

Description

Technical Field

[0001] The present invention relates to the field of electronic atomizing devices, and specifically to a method and a device for energy-saving control of an electronic atomizing device, and an electronic atomizing device.

BACKGROUND

[0002] Conventionally, an electronic atomizing device generally includes a cartridge and a power supply device. The cartridge includes a storage chamber for storing an atomizable medium and an atomizing element for heating and atomizing the atomizable medium. The power supply device generally includes control modules such as a battery and a PCB board. With the rise of the Internet of Things, electronic devices are becoming more and more intelligent and diversified, and some power supply devices are provided with Bluetooth modules or motion sensing modules, etc., to facilitate multi-angle monitoring and interaction of electronic atomization devices and improve user experience.

[0003] However, since the Bluetooth module or the motion sensing module has been in a state of monitoring whether there is a Bluetooth signal or an action behavior, that is, the Bluetooth module or the motion sensing module has been in a standby power consumption state. Besides, the new electronic atomizing device will generally be in a warehouse for a long time before shipment, the battery is often exhausted when the electronic atomizing device reaches the consumer, as a result, the consumer cannot experience the product at the first time, resulting in a poor user experience.

SUMMARY

[0004] A technical problem to be solved by the present invention is to provide a method and a device for energy-saving control of an electronic atomizing device, and an electronic atomizing device, in view of the above defects of the prior art.

[0005] A technical solution adopted by the present invention to solve the technical problem is to construct a method for energy-saving control of an electronic atomizing device, wherein the electronic atomizing device includes a cartridge and a power supply device, and the method includes the following steps:

detecting whether the cartridge is inserted into the power supply device;
if yes, activating an additional function module of the electronic atomizing device; and
if no, maintaining the additional function module in a power saving state.

[0006] Further, in the method for energy-saving control

of the electronic atomizing device according to the present invention, the detecting whether the cartridge is inserted into the power supply device includes:
detecting whether the cartridge is inserted into the power supply device and electrically connected.

[0007] Further, in the method for energy-saving control of the electronic atomizing device according to the present invention, the additional function module is a Bluetooth module;

the activating the additional function module of the electronic atomizing device includes: activating the Bluetooth module of the electronic atomizing device to enable the Bluetooth module to enter a Bluetooth signal detection and transmission state; and

the maintaining the additional function module in the power saving state includes: maintaining the Bluetooth module in the power saving state.

[0008] Further, in the method for energy-saving control of the electronic atomizing device according to the present invention, the additional function module is a motion sensor;

the activating the additional function module of the electronic atomizing device includes: activating the motion sensor of the electronic atomizing device to enable the motion sensor to enter a motion detection state; and
the maintaining the additional function module in the power saving state includes: maintaining the motion sensor in the power saving state.

[0009] Further, in the method for energy-saving control of the electronic atomizing device according to the present invention, the maintaining the additional function module in the power saving state includes:

the power supply device stopping supplying power to the additional function module; or
the additional function module entering a sleep mode.

[0010] In addition, a device for energy-saving control of an electronic atomizing device is further provided according to the present invention. The electronic atomizing device includes a cartridge and a power supply device, and the electronic atomizing device further includes a detection module connected with the power supply device and configured to detect whether the cartridge is inserted into the power supply device;
if the detection module detects that the cartridge is inserted into the power supply device, an additional function module of the electronic atomizing device is activated; and if the detection module does not detect that the cartridge is inserted into the power supply device, the additional function module is maintained in a power saving state.

[0011] Further, in the device for energy-saving control of the electronic atomizing device according to the present invention, the detection module detects a detection current or a detection voltage of a pin in the power supply device for connecting the cartridge, and deter-

mines whether the cartridge is inserted into the power supply device and electrically connected according to the detection current or the detection voltage.

[0012] Further, in the device for energy-saving control of the electronic atomizing device according to the present invention, the additional function module is a Bluetooth module;

if the detection module detects that cartridge is inserted into the power supply device, the Bluetooth module is activated; and if the detection module does not detect that the cartridge is inserted into the power supply device, the Bluetooth module is maintained in a power saving state.

[0013] Further, in the device for energy-saving control of the electronic atomizing device according to the present invention, the additional function module is a motion sensor;

if the detection module detects that the cartridge is inserted into the power supply device, the motion sensor is activated; and if the detection module does not detect that the cartridge is inserted into the power supply device, the motion sensor is maintained in a power saving state.

[0014] In addition, an electronic atomizing device is further provided by the present invention, wherein the electronic atomizing device uses the above method for energy-saving control of the electronic atomizing device; or the electronic atomizing device includes the above device for energy-saving control of the electronic atomizing device.

[0015] The implementation of the method and the device for energy-saving control of an electronic atomizing device and the electronic atomizing device according to the present invention has the following beneficial effects: the electronic atomizing device includes a cartridge and a power supply device, and the electronic atomizing device further includes a detection module connected to the power supply device and configured to detect whether the cartridge is inserted into the power supply device; if the detection module detects that the cartridge is inserted into the power supply device, an additional function module of the electronic atomizing device is activated; and if the detection module does not detect that the cartridge is inserted into the power supply device, the additional function module is maintained in a power saving state. By implementing the present invention, during storage and transportation, the cartridge and the power supply module are placed separately, and the additional function module does not need to be in an active state to avoid power consumption, so that the new product still has power for a consumer to experience when the consumer get it, thereby improving the user experience.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] The present invention will now be further described with reference to the accompanying drawings and embodiments, in the drawings:

FIG. 1 is a flow chart of a method for energy-saving control of an electronic atomizing device according to an embodiment;

FIG. 2 is a schematic structural diagram of a device for energy-saving control of an electronic atomizing device according to an embodiment; and

FIG. 3 is a schematic structural diagram of an electronic atomizing device according to an embodiment.

DESCRIPTION OF THE EMBODIMENTS

[0017] In order to render a more apparent understanding of technical features, objects, and effects of the present invention, specific embodiments thereof will be described in detail with reference to the accompanying drawings.

Embodiment

[0018] Referring to FIG. 1, a method for energy-saving control of an electronic atomizing device is provided by this embodiment. The electronic atomizing device includes a cartridge and a power supply device. The method includes the following steps:

S1, detecting whether the cartridge is inserted into the power supply device.

[0019] Specifically, the detecting whether the cartridge is inserted into the power supply device includes: detecting whether the cartridge is inserted into the power supply device and electrically connected. In the electronic atomizing device, the power supply device includes circuits such as a battery and a PCB board. The cartridge needs to be connected with the power supply device, so that the power supply device can supply power to the atomizing device, and the cartridge can atomize liquid. There are many types of mounting positions for mounting the cartridge in the electronic atomizing device, this embodiment is not specifically limited herein, as long as the cartridge can be mounted via the mounting position.

[0020] Further, the detection module in the electronic atomizing device detects a detection current or a detection voltage of a pin which is in the power supply device and is used for connecting the cartridge, and determines whether the cartridge is inserted into the power supply device and electrically connected according to the detection current or the detection voltage. For example, a preset current value is set, when the detection current is larger than the preset current value, it indicates that the cartridge is inserted into the power supply device and electrically connected; and when the detection current is not larger than the preset current value, it indicates that the cartridge is not inserted into the power supply or not electrically connected.

[0021] Alternatively, a mechanical switch can be used to detect whether the cartridge is inserted into the power supply device, and the mechanical switch can be arranged in the mounting position of the cartridge. When the cartridge is inserted into the power supply device, the

mechanical switch is triggered. When the mechanical switch is turned on, a control signal is generated and sent to the power supply device. Then the power supply device starts to supply power to the additional function module.

[0022] S2, if the cartridge is detected to be inserted into the power supply device, activating an additional function module of the electronic atomizing device.

[0023] Specifically, the additional function module in this embodiment refers to not be a basic component of the electronic atomizing device, that is, the electronic atomizing device can still work when lacking the additional function module. The additional function modules can enable the electronic atomizing device to be more intelligent and diversified to improve the user experience. If the cartridge is detected to be inserted into the power supply device, an activation instruction is generated, and the power supply device activates the additional function module according to the activation instruction. For example, when the detection current is larger than the preset current value, the activation instruction is generated; or when the detection current is not larger than the preset current value, the activation instruction is generated; or when a high level is detected, the activation instruction is generated.

[0024] Alternatively, the additional function module in the electronic device in this embodiment is a Bluetooth module; the activating the additional function module of the electronic atomizing device includes: activating the Bluetooth module of the electronic atomizing device to enable the Bluetooth module to enter a Bluetooth signal detection and transmission state; and the maintaining the additional function module in the power saving state includes: maintaining the Bluetooth module in the power saving state.

[0025] Alternatively, the additional function module in the electronic atomizing device in this embodiment is a motion sensor; the activating the additional function module of the electronic atomizing device includes: activating the motion sensor of the electronic atomizing device to enable the motion sensor to enter a motion detection state; and the maintaining the additional function module in the power saving state includes: maintaining the motion sensor in the power saving state.

[0026] When the additional function module of the electronic atomizing device is activated, it is in a working state. When the additional function module is in the working state, if detecting that the cartridge is disconnected from the power supply device or that the cartridge is pulled out of the power supply device, the additional function module enters a power saving state.

[0027] S3, if the cartridge is not detected to be inserted into the power supply device, maintaining the additional function module in a power saving state. Further, the maintaining the additional function module in the power saving state includes: the power supply device stopping supplying power to the additional function module; or the additional function module entering a sleep mode.

[0028] By implementing the present invention, in proc-

esses of storage and transportation, the cartridge and the power supply module are placed separately, and the additional function module does not need to be in an active state to avoid power consumption, so that the new product still has power for a consumer to experience when the consumer get it, thereby improving user experience.

Embodiment

[0029] Referring to FIG. 2, a device for energy-saving control of an electronic atomizing device is provided by this embodiment. The electronic atomizing device includes a cartridge and a power supply device. There are many types of mounting positions for mounting the cartridge in the electronic atomizing device, this embodiment is not specifically limited here, as long as the cartridge can be mounted via the mounting position. The electronic atomizing device further includes a detection module connected with the power supply device and used to detect whether the cartridge is inserted into the power supply device. If the detection module detects that the cartridge is inserted into the power supply device, an additional function module of the electronic atomizing device is activated; and if the detection module does not detect that the cartridge is inserted into the power supply device, the additional function module is maintained in a power saving state. Alternatively, the maintaining the additional function module in the power saving state includes: the power supply device stopping supplying power to the additional function module; or the additional function module entering a sleep mode. Alternatively, the additional function module includes but is not limited to a Bluetooth module or a motion sensor, etc. The additional function module in this embodiment refers to not to be a basic component of the electronic atomizing device, that is, the electronic atomizing device can still work when lacking the additional function module. The additional function modules can enable the electronic atomizing device to be more intelligent and diversified to improve the user experience.

[0030] Further, in the device for energy-saving control of the electronic atomizing device according to this embodiment, the detection module detects a detection current or a detection voltage of a pin in the power supply device for connecting the cartridge, and determines whether the cartridge is inserted into the power supply device and electrically connected according to the detection current or the detection voltage. For example, a preset current value is set, when the detection current is larger than the preset current value, it indicates that the cartridge is inserted into the power supply device and electrically connected; and when the detection current is not larger than the preset current value, it indicates that the cartridge is not inserted into the power supply or not electrically connected.

[0031] Alternatively, in the device for energy-saving control of the electronic atomizing device according to

this embodiment, the additional function module is a Bluetooth module. If the detection module detects that the cartridge is inserted into the power supply device, the Bluetooth is activated; and if the detection module does not detect that the cartridge is inserted into the power supply device, the Bluetooth is maintained in a power saving state. Alternatively, the maintaining the Bluetooth module in the power saving state includes: the power supply device stopping supplying power to the Bluetooth module; or the Bluetooth module entering a sleep mode.

[0032] Further, in the device for energy-saving control of the electronic atomizing device according to this embodiment, the additional function module is a motion sensor. If the detection module detects that the cartridge is inserted into the power supply device, the motion sensor is activated; and if the detection module does not detect that the cartridge is inserted into the power supply device, the motion sensor is maintained in a power saving state. Alternatively, the maintaining the motion sensor in the power saving state includes: the power supply device stopping supplying power to the motion sensor; or the motion sensor entering a sleep mode.

[0033] By implementing this embodiment, in processes of storage and transportation, the cartridge and the power supply module are placed separately, and the additional function module does not need to be in an active state to avoid power consumption, so that the product still has power for a consumer to experience when the consumer get it, thereby improving user experience.

Embodiment

[0034] An electronic atomizing device is provided by this embodiment, and the electronic atomizing device uses the above method for energy-saving control of the electronic atomizing device.

Embodiment

[0035] Referring to FIG. 3, an electronic atomizing device is provided by this embodiment, and the electronic atomizing device includes the above device for energy-saving control of an electronic atomizing device.

[0036] The embodiments of the present description are described herein in a progressive manner, with an emphasis placed on explaining the difference between each embodiment and the other embodiments. The same or similar parts among the embodiments can be referred to each other. For the device disclosed in the embodiments, the corresponding descriptions are relatively simple because the apparatus correspond to the methods disclosed in the embodiments. The relevant portions may be referred to the description of the method parts.

[0037] As further be appreciated by those skilled in the art, the units and algorithmic steps in the examples described according to the embodiments disclosed herein can be implemented in forms of an electronic hardware, computer software or the combination of the both. To

illustrate the interchangeability of the hardware and the software clearly, the components and the steps in the examples are described generally according to functions in the above description. Whether hardware or software is used to implement the functions depending on a specific application and design constraints for the technical solution. For each specific application, different methods may be used by those skilled in the art to implement the described function, and such implementation should not be considered to depart from the scope of this invention.

[0038] The steps of the method or algorithm described according to the embodiments disclosed herein can be implemented in forms of hardware, a software module executed by a processor or the combination of the both. The software module may be stored in a Random Access Memory (RAM), a memory, a Read-Only Memory (ROM), an electrically programmable ROM, an electrically erasable programmable ROM, a register, a hardware disk, a movable magnetic disk, CD-ROM or any other forms of storage medium well known in the art.

[0039] The above embodiments are only for explaining the technical concept and features of the present invention, and the purpose thereof is to enable those familiar with the technology to understand the contents of the present invention and implement them accordingly, and cannot limit the protection scope of the present invention. All changes and modifications made within the scope of the claims of the present invention shall fall within the scope of the claims of the present invention.

Claims

1. A method for energy-saving control of an electronic atomizing device, wherein the electronic atomizing device comprises a cartridge and a power supply device, and the method comprises:

detecting whether the cartridge is inserted into the power supply device;
if yes, activating an additional function module of the electronic atomizing device; and
if no, maintaining the additional function module in a power saving state.

2. The method for energy-saving control of the electronic atomizing device according to claim 1, wherein said detecting whether the cartridge is inserted into the power supply device comprises:

detecting whether the cartridge is inserted into the power supply device and electrically connected.

3. The method for energy-saving control of the electronic atomizing device according to claim 1, wherein the additional function module is a Bluetooth module; said activating the additional function module of the electronic atomizing device comprises: activating the Bluetooth module of the electronic atomizing de-

vice to enable the Bluetooth module to enter a Bluetooth signal detection and transmission state; and said maintaining the additional function module in the power saving state comprises: maintaining the Bluetooth module in the power saving state.

4. The method for energy-saving control of the electronic atomizing device according to claim 1, wherein the additional function module is a motion sensor; said activating the additional function module of the electronic atomizing device comprises: activating the motion sensor of the electronic atomizing device to enable the motion sensor to enter a motion detection state; and said maintaining the additional function module in the power saving state comprises: maintaining the motion sensor in the power saving state.
5. The method for energy-saving control of the electronic atomizing device according to claim 1, wherein said maintaining the additional function module in the power saving state comprises:

the power supply device stopping supplying power to the additional function module; or the additional function module entering a sleep mode.

6. A device for energy-saving control of an electronic atomizing device, wherein the electronic atomizing device comprises a cartridge and a power supply device, and the electronic atomizing device further comprises a detection module connected with the power supply device and configured to detect whether the cartridge is inserted into the power supply device; if the detection module detects that the cartridge is inserted into the power supply device, an additional function module of the electronic atomizing device is activated; and if the detection module does not detect that the cartridge is inserted into the power supply device, the additional function module is maintained in a power saving state.
7. The device for energy-saving control of the electronic atomizing device according to claim 6, wherein the detection module detects a detection current or a detection voltage of a pin in the power supply device for connecting the cartridge, and determines whether the cartridge is inserted into the power supply device and electrically connected according to the detection current or the detection voltage.
8. The device for energy-saving control of the electronic atomizing device according to claim 6, wherein the additional function module is a Bluetooth module; if the detection module detects that the cartridge is inserted into the power supply device, the Bluetooth

module is activated; and if the detection module does not detect that the cartridge is inserted into the power supply device, the Bluetooth module is maintained in the power saving state.

9. The device for energy-saving control of the electronic atomizing device according to claim 6, wherein the additional function module is a motion sensor; if the detection module detects that the cartridge is inserted into the power supply device, the motion sensor is activated; and if the detection module does not detect that the cartridge is inserted into the power supply device, the motion sensor is maintained in the power saving state.
10. An electronic atomizing device, wherein the electronic atomizing device uses the method for energy-saving control of the electronic atomizing device according to any one of claims 1 to 5; or the electronic atomizing device comprises the device for energy-saving control of the electronic atomizing device according to any one of claims 6 to 9.

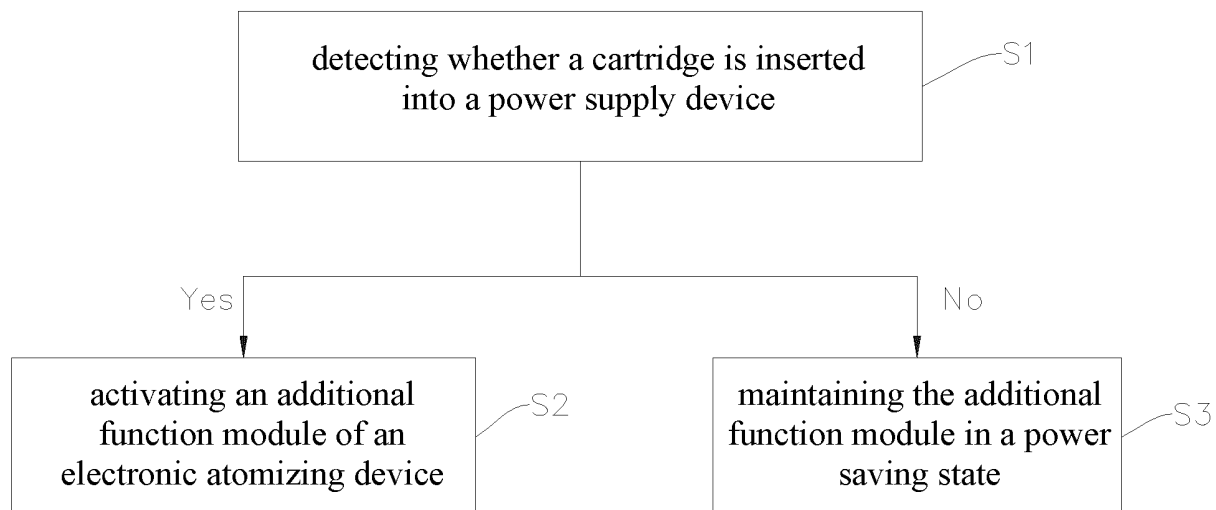


FIG. 1

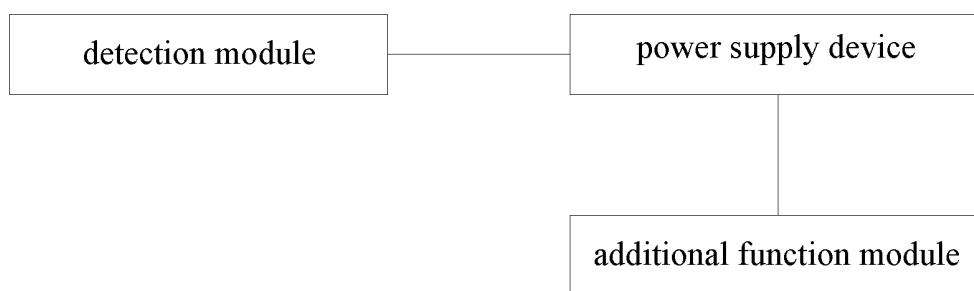


FIG. 2

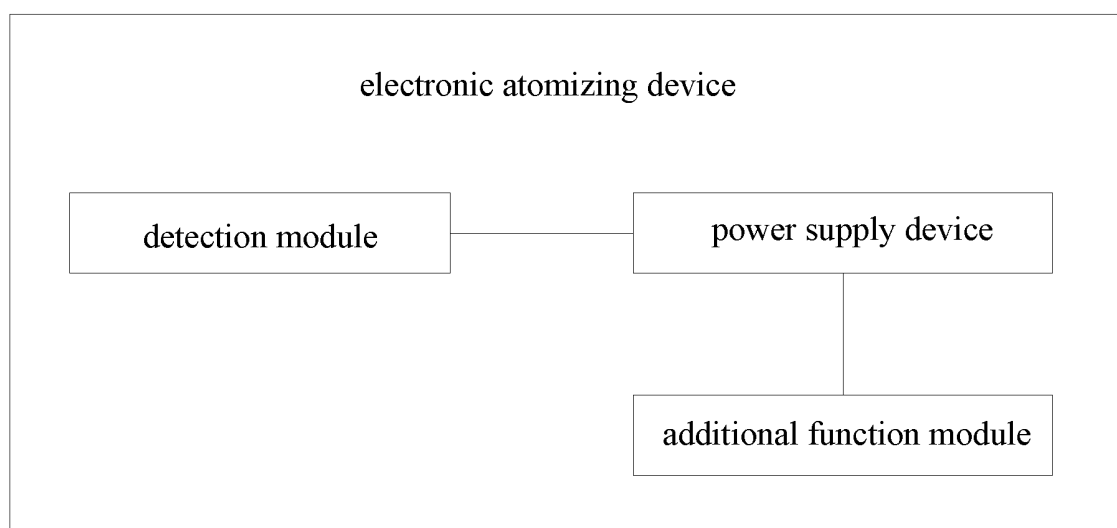


FIG. 3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2019/082566

A. CLASSIFICATION OF SUBJECT MATTER A24F 47/00(2020.01)i According to International Patent Classification (IPC) or to both national classification and IPC																					
B. FIELDS SEARCHED																					
Minimum documentation searched (classification system followed by classification symbols) A24F47 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched																					
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) CNABS&CNTXT&CNKI: 电子烟, 烟弹, 雾化, 节能, 省电, 节电, 休眠, 激活 VEN: electronic cigarette, cartridge, atomization, activate, sleep, energy saving, power saving																					
C. DOCUMENTS CONSIDERED TO BE RELEVANT																					
<table border="1"> <thead> <tr> <th>Category*</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>X</td> <td>CN 104394723 A (NICOVENTURES HOLDINGS LIMITED) 04 March 2015 (2015-03-04) description, paragraphs 3-20, and figures 1-3</td> <td>1-10</td> </tr> <tr> <td>X</td> <td>CN 108143006 A (SHENZHEN KANGHONGWEI TECHNOLOGY CO., LTD.) 12 June 2018 (2018-06-12) description, paragraphs 46-71, and figures 1-2 and 9-10</td> <td>1-10</td> </tr> <tr> <td>X</td> <td>CN 107411177 A (NICOVENTURES HOLDINGS LIMITED) 01 December 2017 (2017-12-01) description, paragraphs 20-45</td> <td>1-10</td> </tr> <tr> <td>X</td> <td>US 2018310619 A1 (XU, Y.J.) 01 November 2018 (2018-11-01) description, paragraphs 16-27</td> <td>1-10</td> </tr> <tr> <td>A</td> <td>CN 108827372 A (SHENZHEN SMOORE TECHNOLOGY LIMITED) 16 November 2018 (2018-11-16) entire document</td> <td>1-10</td> </tr> <tr> <td>A</td> <td>CN 109283867 A (SHENZHEN FIRSTUNION TECHNOLOGY CO., LTD.) 29 January 2019 (2019-01-29) entire document</td> <td>1-10</td> </tr> </tbody> </table>	Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	X	CN 104394723 A (NICOVENTURES HOLDINGS LIMITED) 04 March 2015 (2015-03-04) description, paragraphs 3-20, and figures 1-3	1-10	X	CN 108143006 A (SHENZHEN KANGHONGWEI TECHNOLOGY CO., LTD.) 12 June 2018 (2018-06-12) description, paragraphs 46-71, and figures 1-2 and 9-10	1-10	X	CN 107411177 A (NICOVENTURES HOLDINGS LIMITED) 01 December 2017 (2017-12-01) description, paragraphs 20-45	1-10	X	US 2018310619 A1 (XU, Y.J.) 01 November 2018 (2018-11-01) description, paragraphs 16-27	1-10	A	CN 108827372 A (SHENZHEN SMOORE TECHNOLOGY LIMITED) 16 November 2018 (2018-11-16) entire document	1-10	A	CN 109283867 A (SHENZHEN FIRSTUNION TECHNOLOGY CO., LTD.) 29 January 2019 (2019-01-29) entire document	1-10
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.																			
X	CN 104394723 A (NICOVENTURES HOLDINGS LIMITED) 04 March 2015 (2015-03-04) description, paragraphs 3-20, and figures 1-3	1-10																			
X	CN 108143006 A (SHENZHEN KANGHONGWEI TECHNOLOGY CO., LTD.) 12 June 2018 (2018-06-12) description, paragraphs 46-71, and figures 1-2 and 9-10	1-10																			
X	CN 107411177 A (NICOVENTURES HOLDINGS LIMITED) 01 December 2017 (2017-12-01) description, paragraphs 20-45	1-10																			
X	US 2018310619 A1 (XU, Y.J.) 01 November 2018 (2018-11-01) description, paragraphs 16-27	1-10																			
A	CN 108827372 A (SHENZHEN SMOORE TECHNOLOGY LIMITED) 16 November 2018 (2018-11-16) entire document	1-10																			
A	CN 109283867 A (SHENZHEN FIRSTUNION TECHNOLOGY CO., LTD.) 29 January 2019 (2019-01-29) entire document	1-10																			
☒ Further documents are listed in the continuation of Box C. ☒ See patent family annex.																					
<table border="0"> <tr> <td style="vertical-align: top;"> * 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 </td> <td style="vertical-align: top;"> “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 </td> </tr> </table>	* 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																			
* 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																				
Date of the actual completion of the international search 09 January 2020	Date of mailing of the international search report 16 January 2020																				
Name and mailing address of the ISA/CN China National Intellectual Property Administration No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088 China Facsimile No. (86-10)62019451	Authorized officer Telephone No.																				

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

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2019/082566

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 106163305 A (SIS RESOURCES, LTD.) 23 November 2016 (2016-11-23) entire document	1-10
A	CN 105077592 A (BEIJING SIGMACHIP CO., LTD.) 25 November 2015 (2015-11-25) entire document	1-10

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

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CN2019/082566

Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)			Publication date (day/month/year)
CN	104394723	A	04 March 2015	KR	20180004328	A	10 January 2018
				GB	2502053	B	24 September 2014
				ES	2650365	T3	18 January 2018
				EP	2849587	B1	01 November 2017
				HU	E037942	T2	28 September 2018
				GB	2502053	A	20 November 2013
				AU	2013261794	A1	30 October 2014
				KR	101768085	B1	14 August 2017
				EP	2849588	B1	02 May 2018
				GB	201208349	D0	27 June 2012
				US	2018153223	A1	07 June 2018
				CN	104486956	A	01 April 2015
				KR	20150020206	A	25 February 2015
				US	10398180	B2	03 September 2019
				BR	112014028220	A2	27 June 2017
				CN	104486956	B	06 August 2019
				HK	1204877	A1	11 December 2015
				WO	2013171215	A1	21 November 2013
				US	9918497	B2	20 March 2018
				RU	2672955	C1	21 November 2018
				HK	1204881	A1	11 December 2015
				CA	2871546	A1	21 November 2013
				AU	2013261787	B2	29 October 2015
				JP	5852289	B2	03 February 2016
				JP	2015522253	A	06 August 2015
				CA	2871546	C	02 January 2018
				CN	104394723	B	27 October 2017
				EP	2849587	A1	25 March 2015
				EP	3305105	A1	11 April 2018
				CA	2871550	A1	21 November 2013
				CN	109602088	A	12 April 2019
				PL	2849588	T3	28 September 2018
				RU	2014150419	A	10 July 2016
				NZ	700988	A	31 March 2016
				US	2015128965	A1	14 May 2015
				EP	2849588	A1	25 March 2015
				PL	2849587	T3	30 April 2018
				US	2015114408	A1	30 April 2015
				NZ	700993	A	31 March 2016
				RU	2617355	C2	24 April 2017
				RU	2014150420	A	10 July 2016
				WO	2013171208	A1	21 November 2013
				KR	20150020205	A	25 February 2015
				JP	5869180	B2	24 February 2016
				AU	2013261787	A1	30 October 2014
				AU	2013261794	B2	05 November 2015
				US	9497999	B2	22 November 2016
				RU	2603121	C2	20 November 2016
				JP	2015519054	A	09 July 2015
CN	108143006	A	12 June 2018	WO	2019137560	A1	18 July 2019

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

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CN2019/082566

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN 107411177 A	01 December 2017	JP 2015517312 A EP 2849590 B1 US 2015136153 A1 WO 2013171221 A1 GB 201208352 D0 CA 2872764 A1 CA 2872764 C CN 104427892 A AU 2013261801 B2 KR 101755591 B1 KR 20150018577 A CN 104427892 B HK 1204878 A1 EP 2849590 A1 US 10477893 B2 PL 2849590 T3 AU 2013261801 A1 RU 2592163 C1 JP 5869181 B2 GB 2502055 A BR 112014028311 A2 EP 3357356 A1	22 June 2015 02 May 2018 21 May 2015 21 November 2013 27 June 2012 21 November 2013 21 November 2017 18 March 2015 21 July 2016 07 July 2017 23 February 2015 15 September 2017 11 December 2015 25 March 2015 19 November 2019 31 August 2018 27 November 2014 20 July 2016 24 February 2016 20 November 2013 27 June 2017 08 August 2018
US 2018310619 A1	01 November 2018	US 10285446 B2	14 May 2019
CN 108827372 A	16 November 2018	None	
CN 109283867 A	29 January 2019	EP 3572775 A2	27 November 2019
CN 106163305 A	23 November 2016	IL 245819 D0 WO 2015110924 A3 WO 2015110924 A2 US 2018263295 A1 US 9980514 B2 US 2015208731 A1 EP 3099191 A2 UA 118042 C2 EA 201691523 A1	31 July 2016 17 December 2015 30 July 2015 20 September 2018 29 May 2018 30 July 2015 07 December 2016 12 November 2018 30 December 2016
CN 105077592 A	25 November 2015	US 2017000192 A1 US 10159281 B2 CN 105077592 B	05 January 2017 25 December 2018 15 March 2019

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