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(54) **AEROSOL GENERATION APPARATUS AND CONTROL METHOD AND APPARATUS THEREFOR, AND COMPUTER STORAGE MEDIUM**

(57) An aerosol generation apparatus and a control method and apparatus therefor, and a computer storage medium. In response to a usage operation on an aerosol generation apparatus, a target working action which matches the usage operation is determined, so as to instruct the aerosol generation apparatus to execute the target working action. On the basis of operating parameters which are updated by means of executing the target working action, and by means of querying a table and other modes, an interactive action, which is capable of representing the updated operating para-

eters, is determined; and by means of executing the interactive action, a user learns about the operating parameters of the aerosol generation apparatus, for example, the remaining progress of vaping, an endurance time, whether heating is performed, etc., and on this basis, the user can formulate a plan for the subsequent use of the aerosol generation apparatus in advance, for example, when the remaining progress of vaping is insufficient, a new aerosol matrix (900) is prepared for replacement, charging is performed when the remaining electric quantity is low, etc.

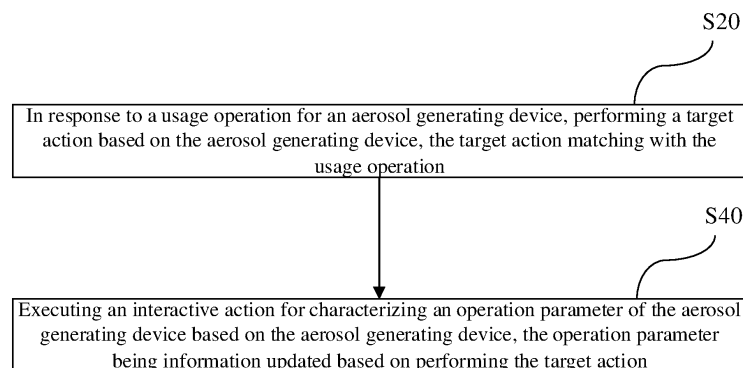


FIG. 3

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Description

RELATED APPLICATION

[0001] This application claims priority to Chinese patent application No. 202210380791X, filed on April 12, 2022, and entitled "AEROSOL GENERATING DEVICE AND CONTROL METHOD AND DEVICE THEREFOR, AND COMPUTER STORAGE MEDIUM", the content of which is hereby incorporated by reference.

TECHNICAL FIELD

[0002] The present application relates to the technical field of control for a heating device, and in particular to an aerosol generating device, a control method for an aerosol generating device, a control device for an aerosol generating device, and a computer storage medium.

BACKGROUND

[0003] A heating-not-burning device heats solid aerosol-forming substrate by using a heating element to form aerosol. The aerosol-forming substrate is disposable, and needs to be removed from the device and replaced after heating is completed.

SUMMARY

[0004] In a first aspect, an embodiment of the present invention provides a control method for an aerosol generating device, the method comprising:

in response to a usage operation for the aerosol generating device, performing a target working action based on the aerosol generating device, the target working action matching with the usage operation; and
executing an interactive action for characterizing an operation parameter of the aerosol generating device based on the aerosol generating device, where the operation parameter is information updated based on performing the target working action.

[0005] In one of the embodiments, the aerosol generating device comprises an upper cover and a main body; the main body has an accommodating cavity for aerosol-forming substrate; the upper cover has an anti-dust cover; the anti-dust cover, when being closed, covers an opening of the accommodating cavity completely; when the anti-dust cover is opened, the accommodating cavity is communicated with outside, so that the aerosol-forming substrate is placed into the accommodating cavity through the opening; the main body further comprises an indicator light assembly, a vibration module, a battery and a control circuit; and the indicator light assembly, the vibration module and the battery are all connected to the control circuit.

[0006] The usage operation comprises an operation of opening the anti-dust cover.

[0007] Performing the target working action based on the aerosol generating device in response to the usage operation for the aerosol generating device, comprises:

in response to the operation of opening the anti-dust cover, controlling the aerosol generating device to enter a non-sleep working mode.

[0008] Executing the interactive action for characterizing the operation parameter of the aerosol generating device based on the aerosol generating device, comprises at least one of following steps of:

based on the control circuit, controlling the indicator light assembly to work in a first state to indicate that a non-sleep working mode has been entered and/or to indicate a remaining power of the battery; and

based on the control circuit, controlling the vibration module to execute a first vibration action to indicate that the non-sleep working mode has been entered.

[0009] In one of the embodiments, the main body further comprises a heating element; the heating element is connected to the control circuit; the usage operation further comprises at least one of: an operation of starting preheating, an action of inhaling aerosol, an operation of viewing inhalation progress, an operation of interrupting heating, and an operation of pulling out the aerosol-forming substrate, each of which is performed after the aerosol generating device enters the non-sleep working mode.

[0010] A target working action, which matches with the operation of starting preheating, comprises controlling the heating element to perform preheating based on the control circuit.

[0011] A target working action, which matches with the action of inhaling aerosol, comprises controlling the heating element to heat the aerosol-forming substrate based on the control circuit.

[0012] A target working action, which matches with the operation of viewing inhalation progress, comprises calculating a remaining inhalation progress of the aerosol-forming substrate based on the control circuit.

5 **[0013]** A target working action, which matches with the operation of interrupting heating, comprises controlling the heating element to stop heating based on the control circuit.

[0014] A target working action, which matches with the operation of pulling out the aerosol-forming substrate, comprises controlling the heating element to stop heating based on the control circuit.

10 **[0015]** Executing the interactive action for characterizing the operation parameter of the aerosol generating device based on the aerosol generating device comprises:

performing at least one interactive action for characterizing the operation parameter of the aerosol generating device based on the control circuit, and the indicator light assembly and/or the vibration module.

[0016] In one of the embodiments, the main body further comprises a vibration sensor; the vibration sensor is connected to the control circuit; and the operation of viewing inhalation progress comprises vibrating the aerosol generating device for a preset number of times.

15 **[0017]** The method further comprises:
when the aerosol generating device enters the non-sleep working mode, obtaining vibration data detected by the vibration sensor, and determining whether there is the operation of viewing inhalation progress based on the vibration data of the vibration sensor.

20 **[0018]** Performing the at least one interactive action for characterizing the operation parameter of the aerosol generating device based on the control circuit and the indicator light assembly and/or the vibration module, comprises:
based on the calculated remaining inhalation progress, and based on the control circuit, controlling the vibration module to perform a vibration action that matches with the remaining inhalation progress.

[0019] In one of the embodiments, the main body further comprises a function button connected to the control circuit; the operation of starting preheating comprises pressing the function button for a first preset time period, and then releasing it.

25 **[0020]** Performing the at least one interactive action for characterizing the operation parameter of the aerosol generating device based on the control circuit and the indicator light assembly and/or the vibration module, comprises:

30 when the heating element is controlled to be in a preheating process, based on the control circuit, controlling the indicator light assembly to work in a second state to indicate that the preheating is in progress; and
when the heating element is controlled to stop preheating, controlling the vibration module to perform a second vibration action to indicate that the preheating is completed.

[0021] In one of the embodiments, the usage operation further comprises pressing the function button for a second preset time period, and the second preset time period is less than the first preset time period.

[0022] A target working action, which matches with pressing the function button for the second preset time period, comprises based on the control circuit, continuing to monitor a time period for which the function button is pressed.

[0023] Executing the interactive action for characterizing the operation parameter of the aerosol generating device based on the aerosol generating device comprises:

40 when the heating element is not heating, based on the control circuit, controlling the vibration module to perform a third vibration action to indicate that the preheating is about to be triggered.

[0024] In one of the embodiments, the action of inhaling aerosol comprises inserting the aerosol-forming substrate; and a target working action, which matches with the action of inhaling aerosol comprises: based on the control circuit, controlling the heating element to heat the aerosol-forming substrate, and detecting the number of times of inhalation and/or a remaining inhaling time.

45 **[0025]** Performing the at least one interactive action for characterizing the operation parameter of the aerosol generating device based on the control circuit and the indicator light assembly and/or the vibration module, further comprises at least one of following steps of:

50 controlling the indicator light assembly to operate in a third state during an inhalation process, to indicate that aerosol is being generated;

when it is detected that the number of times of inhalation reaches a first preset number of times or that the remaining inhaling time reaches a third preset time period, based on the control circuit, controlling the heating element to stop heating;

55 when it is detected that the number of times of inhalation reaches the first preset number of times or that the remaining inhaling time reaches the third preset time period, based on the control circuit, controlling the indicator light assembly to be turned off; and

when it is detected that the number of times of inhalation reaches a second preset number of times or that the

remaining inhaling time reaches a fourth preset time period, based on the control circuit, controlling the indicator light assembly to work in a fourth state, and/or controlling the vibration module to perform a third vibration action to indicate the remaining inhalation progress; wherein the second preset number of times is less than the first preset number of times, and the fourth preset time period is less than the third preset time period.

[0026] In one of the embodiments, performing the at least one interactive action for characterizing the operation parameter of the aerosol generating device based on the control circuit and the indicator light assembly and/or the vibration module, further comprises:

controlling the indicator light assembly to execute a first abnormality-reminding action based on the control circuit when an abnormal heating of the heating element is detected.

[0027] In one of the embodiments, the main body further comprises a vibration sensor; the vibration sensor is connected to the control circuit; and the operation of viewing inhalation progress comprises vibrating the aerosol generating device for a preset number of times.

[0028] The method further comprises:

when the heating member is heating the aerosol-forming substrate, obtaining vibration data detected by the vibration sensor, and determining whether there is the operation of viewing inhalation progress based on the vibration data of the vibration sensor.

[0029] Performing the at least one interactive action for characterizing the operation parameter of the aerosol generating device based on the control circuit and the indicator light assembly and/or the vibration module, comprises:

based on the calculated remaining inhalation progress, and based on the control circuit, controlling the vibration module to perform a vibration action that matches with the remaining inhalation progress.

[0030] In one of the embodiments, the main body further comprises a function button connected to the control circuit; and the operation of interrupting heating comprises pressing the function button for a fifth preset time period.

[0031] Performing the at least one interactive action for characterizing the operation parameter of the aerosol generating device based on the control circuit and the indicator light assembly and/or the vibration module, comprises at least one of following steps of:

controlling the indicator light assembly to be turned off based on the control circuit; and
controlling the vibration module to perform a fourth vibration action based on the control circuit.

[0032] In one of the embodiments, the upper cover is detachably connected to the main body; and the operation of pulling out aerosol-forming substrate comprises detaching the upper cover from the main body.

[0033] Performing the at least one interactive action for characterizing the operation parameter of the aerosol generating device based on the control circuit and the indicator light assembly and/or the vibration module, comprises:

when it is detected that the heating element stops working, controlling the indicator light assembly to be turned off.

[0034] In one of the embodiments, the usage operation comprises an operation of closing the anti-dust cover, and a target working action, which matches with the operation of closing the anti-dust cover, comprises controlling the aerosol generating device to enter a sleep working mode.

[0035] Executing the interactive action for characterizing the operation parameter of the aerosol generating device based on the aerosol generating device, comprises:

controlling the indicator light assembly to be turned off.

[0036] In one of the embodiments, the main body further comprises a charging interface; and the charging interface is connected to both the control circuit and the battery, and the charging interface is configured to be connected to an external power source.

[0037] The usage operation comprises connecting the charging interface to the external power source.

[0038] A target working action, which matches with connecting the charging interface to the external power source, comprises based on the control circuit, controlling the external power source to charge the battery.

[0039] Executing the interactive action for characterizing the operation parameter of the aerosol generating device based on the aerosol generating device, comprises:

based on the control circuit, controlling the indicator light assembly to operate in a fifth state to indicate the remaining power of the battery.

[0040] In one of the embodiments, the main body of the aerosol generating device comprises an indicator light assembly, a heating element, and a control circuit; the indicator light assembly and the heating element are both connected to the control circuit; and the usage operation further comprises an operation of viewing battery life performed when the heating element is not heating, and a target working action matching with the operation of viewing battery life is obtaining a remaining power.

[0041] Executing the interactive action for characterizing the operation parameter of the aerosol generating device based on the aerosol generating device, comprises at least one of:

based on the control circuit, controlling the indicator light assembly to work in a sixth state to indicate the remaining power of the battery; and
 if it is detected that the remaining power is less than a minimum power required for heating a piece of aerosol-forming substrate, based on the control circuit, controlling the indicator light assembly to execute a second abnormality-reminding action.

[0042] In one of the embodiments, the main body further comprises a function button and a vibration sensor which are connected to the control circuit.

[0043] The operation of viewing battery life comprises:

pressing the function button for a sixth preset time period or vibrating the aerosol generating device.

[0044] The method further comprises:

when the aerosol generating device is in a non-sleep working mode, determining whether there is the operation of viewing battery life, based on vibration data of the vibration sensor.

[0045] In one of the embodiments, after controlling the aerosol generating device to enter the non-sleep working mode in response to the operation of opening the anti-dust cover, the method further comprises:

if no operation other than the operation of opening the anti-dust cover is detected within a preset waiting time, the aerosol generating device is controlled to enter a sleep working mode; or
 in response to detaching the upper cover from the main body, controlling the aerosol generating device to enter the sleep working mode.

[0046] In a second aspect, the present application provides a control device for an aerosol generating device, including:

a usage operation responding module, configured to perform a target working action based on the aerosol generating device in response to a usage operation for the aerosol generating device, wherein the target working action matches with the usage operation; and

a response-execution feedback module, configured to execute an interactive action for characterizing an operation parameter of the aerosol generating device based on the aerosol generating device, wherein the operation parameter is information updated based on performing the target working action.

[0047] In a third aspect, the present application provides an aerosol generating device including a memory and a processor. The memory stores a computer program, and the processor, when executing the computer program, performs steps of the method above.

[0048] In one of the embodiments, the aerosol generating device comprises an upper cover and a main body.

[0049] The main body has an accommodating cavity for aerosol-forming substrate; the upper cover has an anti-dust cover; the anti-dust cover, when being closed, covers an opening of the accommodating cavity completely; and when the anti-dust cover is opened, the accommodating cavity is communicated with outside, so that the aerosol-forming substrate is placed into the accommodating cavity through the opening.

[0050] The main body further comprises a function button, a vibration sensor, a Hall sensor, a charging interface, a battery and a control circuit, wherein the function button, the vibration sensor, the Hall sensor, the charging interface and the battery are all connected to the control circuit.

[0051] The anti-dust cover is provided with a first magnetic member that matches with the Hall sensor, and output signals of the Hall sensor are different when the anti-dust cover is opened and when the anti-dust cover is closed.

[0052] The control circuit detects an operation of opening the anti-dust cover and an operation of closing the anti-dust cover according to the output signals of the Hall sensor.

[0053] The control circuit comprises a memory and a processor; the memory stores a computer program; the processor, when executing the computer program, performs steps of the method above.

[0054] In one of the embodiments, the vibration sensor is an acceleration sensor.

[0055] In a fourth aspect, a computer-readable storage medium is provided and has a computer program stored thereon. The computer program, when executed by the computer processor, performs steps of the method above.

[0056] The details of one or more embodiments of the present application are set forth in the following drawings and description. Other features, objectives, and advantages of the present application will become apparent from the description, drawings, and claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0057] In order to more clearly describe the solutions in the embodiments of the present application or in the traditional technology, the accompanying drawings to be used in the description of the embodiments or the traditional technology will

be described briefly. Obviously, the drawings described hereinafter are only some embodiments of the present application. For those ordinary skilled in the art, other drawings can also be obtained based on the following drawings without creative effort.

FIG. 1a is a schematic view showing an overall structure of an aerosol generating device from a visual angle;
 FIG. 1b is a schematic view showing an overall structure of the aerosol generating device from another visual angle;
 FIG. 1c is a schematic view showing a structure of the aerosol generating device according to an embodiment, with an upper cover and a main body assembled together and an anti-dust cover being opened;
 FIG. 1d is a schematic view showing a structure of the aerosol generating device according to an embodiment, with the upper cover and the main body assembled together and the anti-dust cover being closed;
 FIG. 1e is a schematic view showing a structure of the aerosol generating device according to an embodiment, with the upper cover being detached from the main body and the anti-dust cover being closed;
 FIG. 1f is a schematic view showing a structure of an aerosol generating device according to an embodiment, with the upper cover being detached from the main body and the anti-dust cover being opened;
 FIG. 2 is a schematic view showing an electrical structure of the aerosol generating device according to an embodiment;
 FIG. 3 is a schematic flow chart of a control method for an aerosol generating device according to an embodiment;
 FIG. 4 is a schematic flow chart of the control method for the aerosol generating device according to another embodiment;
 FIG. 5 is a schematic flow chart showing partial process of a control method for the aerosol generating device according to an embodiment;
 FIG. 6 is a block diagram showing a structure of a control device for an aerosol generating device according an embodiment;
 FIG. 7 is a schematic view showing an inner structure of a control component of an aerosol generating device according to an embodiment.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0058] In order to facilitate understanding of the present application, the present application will be described more fully hereinafter with reference to the relevant drawings. Embodiments of the present application are provided in the drawings. However, the present application may be implemented in many different forms and is not limited to the embodiments described herein. On the contrary, the purpose of providing these embodiments is to make the disclosure of the present application more thorough and comprehensive.

[0059] Unless otherwise defined, all technical and scientific terms used herein have the same meaning as those commonly understood by those ordinary skilled in the art. The terms used herein in the description of this application are only for the purpose of describing specific embodiments, but are not intended to limit this application.

[0060] It can be understood that the terms "first", "second", etc., used in the present disclosure may be used to describe various elements, but these elements are not limited by these terms. These terms are only used to distinguish an element from another element.

[0061] Spatially relation terms such as "below", "under", "lower", "beneath", "above", "on", etc., may be used herein to describe the relationships of an element or a feature with other elements or features shown in the drawings. It should be understood that the terms of spatial relations are intended to include other different orientations of a device in use or operation in addition to the orientations shown in the drawings. For example, if the devices in the drawings are placed upside down, the element or feature which was "below other elements" or "under" or "beneath" will be oriented as being "above" the other elements or features. Thus, the exemplary terms "under" and "beneath" each may cover the meanings of "above" and "below". In addition, the device may also include additional orientations (e.g., rotating 90 degrees or at other orientations), and the spatial relation terms used herein may be correspondingly interpreted.

[0062] It should be noted that when an element is considered to be "connected" to another element, it may be directly connected to the other element, or connected to the other element through an intermediate element. In addition, the "connection" in the following embodiments should be understood as "electrical connection", "communication connection", etc., if there is transmission of electrical signals or data between the connected objects.

[0063] When used herein, the singular forms "a", "an", and "said/the" may also include plural forms, unless the context clearly indicates otherwise. It should also be understood that the term "include/comprise" or "have" etc., specifies the presence of stated features, wholes, steps, operations, components, parts or combinations thereof, but do not exclude the possibility of the presence of one or more of other features, wholes, steps, operations, components, parts or combinations thereof.

[0064] Since a heat-not-burn appliance is usually small in size, it cannot be equipped with a relatively large display screen to display the operating parameters of the appliance. As a result, it is difficult for a user to know all aspects of

operating parameters of the appliance while using the heat-not-burn appliance, and the user is unable to arrange a subsequent usage plan.

[0065] To solve this problem, by taking an aerosol generating device shown in FIG. 1 as an example, the present application provides a control method for the aerosol generating device. As shown in FIGS. 3-5, the method includes following steps.

[0066] In step S20, in response to a usage operation for an aerosol generating device, a target working action is performed based on the aerosol generating device. The target working action matches with the usage operation, and the usage operation for the aerosol generating device may include an operation of starting preheating, an action of inhaling aerosol, an operation of viewing inhalation progress, an operation of interrupting heating, an operation of pulling out aerosol-forming substrate, connecting a charging interface to an external power source, or an operation of viewing battery life. The target working action refers to the user's intentions to control a working state of the aerosol generating device and to view the working state of the aerosol generating device, which are characterized by the usage operation performed by the user when using the aerosol generating device. Determining a target working action that matches with the usage operation based on the usage operation may be achieved by querying a pre-stored mapping table. For example, the usage operation for the aerosol generating device may be first identified by a sensor carried on the aerosol generating device, and then a mapping table is queried to determine the target working action that matches with the usage operation.

[0067] In step S40, an interactive action for characterizing the operation parameter of the aerosol generating device is executed based on the aerosol generating device. The operation parameter is information updated based on performing the target working action. The operation parameter of the aerosol generating device may be obtained by executing the target working action, and based on the obtained operation parameter, the operation parameter is fed back to the user based on performing the interactive action, so that the operation parameter of the aerosol generating device can be informed to the user.

[0068] In this embodiment, by responding to the usage operation for the aerosol generating device, the target working action matching with the usage operation is determined to instruct the aerosol generating device to execute the target working action. The most concerned by the user is the result generated by the target working action executed based on the user's usage operation, and the present application determines, based on the operating parameter updated by executing the target working action, the interactive action that can characterize the updated operating parameters by querying a table, etc., and then executes the interactive action, so that the operating parameter of the aerosol generating device can be informed to the user, such as a remaining inhalation progress, a battery life, and whether it is heating, etc. Based on this, the user may make a subsequent use plan for the aerosol generating device in advance, for example, when the remaining inhalation progress is insufficient, the user prepares a new aerosol-forming substrate 900 for replacement, and plan to charge the device when the remaining power is insufficient.

[0069] In an embodiment, as shown in FIGS. 1-2, the aerosol generating device includes an upper cover 100 and a main body 200. The main body 200 has an accommodating cavity for aerosol-forming substrate, and the upper cover 100 has an anti-dust cover 120. When the anti-dust cover 120 is closed, it covers an opening of the accommodating cavity completely, and when the anti-dust cover 120 is opened, the accommodating cavity is communicated with the outside, so that the aerosol-forming substrate may be placed into the accommodating cavity through the opening. The main body 200 further includes an indicator light assembly 230, a vibration module 260, a battery 270 and a control circuit 290. The indicator light assembly 230, the vibration module 260 and the battery 270 are all connected to the control circuit 290. The usage operation includes an operation of opening the anti-dust cover 120.

[0070] In an embodiment, step S20 of performing the target working action based on the aerosol generating device in response to the usage operation for the aerosol generating device, includes:

in response to an operation of opening the anti-dust cover 120, controlling the aerosol generating device to enter a non-sleep working mode.

[0071] By detecting the operation of opening the anti-dust cover 120, the aerosol generating device is controlled to enter the non-sleep working mode. In this working mode, the vibration sensor 280 may be awakened, and the vibration data detected by the vibration sensor 280 are obtained, thus allowing viewing the remaining inhalation progress which is obtained based on a vibration detection, and allowing viewing the remaining power in a non-heating state. In the non-sleep working mode, the heating function of the aerosol generating device is allowed to be used.

[0072] Correspondingly, step S40 of executing the interactive action for characterizing the operation parameter of the aerosol generating device based on the aerosol generating device, as shown in FIG. 4, includes at least one of the following steps.

[0073] In step S41, based on the control circuit, the indicator light assembly is controlled to work in a first state to indicate that the non-sleep working mode has been entered and/or to indicate the remaining power of the battery.

[0074] The indicator light assembly 230 may have a plurality of lights including, for example, a multi-color LED light and a light bar, to show a plurality of states to represent different working conditions of the aerosol generating device. For example, the first state may be that the white light starts to gradually light up for 1 second, and then quickly flashes for 2 seconds, and the control circuit 290 controls the LED light in the indicator light assembly 230 to emit light of different colors

according to the detected battery power, to indicate the remaining power. For example, when the remaining power is detected to be 50% to 100%, based on the control circuit 290, the LED light is controlled to emit white light to indicate that the remaining power is sufficient. When the remaining power is detected to be 20% to 50%, based on the control circuit 290, the LED light is controlled to emit yellow-green light. When the remaining power is detected to be less than 20%, based on the control circuit 290, the LED light is controlled to emit orange light to indicate that the power is insufficient and the battery needs to be charged.

[0075] In step S42, based on the control circuit, the vibration module is controlled to execute a first vibration action to indicate that the non-sleep working mode has been entered.

[0076] The aerosol generating device is usually used in a hand-held manner, when the operation of opening the anti-dust cover is detected, the aerosol generating device is controlled to enter the non-sleep working mode, and at the same time, the vibration module may be controlled to perform the first vibration action to prompt the user that the aerosol generating device has been awakened, and that operations of heating the aerosol-forming substrate and inhaling aerosol, etc. may be performed. The vibration module may be a vibration motor connected to the control circuit. The first vibration action may be a light vibration of 0.5 second. Of course, the time illustrated in the embodiments of the present application is only used to help those skilled in the art to understand the implementation process of the solution, but not intended to limit the actual protection scope of the present application.

[0077] After the aerosol generating device is started, the user's common operations are heating the aerosol-forming substrate 900 and inhaling aerosol. Accordingly, in an embodiment, the main body 200 further includes a heating element 240. The heating element 240 (as shown in FIGS. 1b-1e and FIG. 2) is connected to the control circuit 290. In this embodiment, the heating element 240 is pin-shaped or sheet-shaped, and is configured to be inserted into the interior of the aerosol-forming substrate 900 for heating. In other embodiments, the heating element 240 may be in a shape of a hollow cylindrical tube surrounding the outer side of the aerosol-forming substrate 900 for heating. The usage operation further includes at least one of the operation of starting preheating, the action of inhaling aerosol, the operation of viewing inhalation progress, the operation of interrupting heating, and the operation of pulling out aerosol-forming substrate, each of which is performed after the aerosol generating device enters the non-sleep working mode. The target working actions corresponding to various usage operations are illustrated in the following embodiments. Step S40 of executing the interactive action for characterizing the operation parameter of the aerosol generating device based on the aerosol generating device, as shown in FIG. 4, includes the following step.

[0078] In step S43, at least one interactive action for characterizing the operation parameter of the aerosol generating device is performed based on the control circuit and the indicator light assembly and/or the vibration module. At least one of the indicator light assembly 230 and the vibration module 260 is controlled by the control circuit 290 to execute the at least one interactive action for characterizing the operation parameter of the aerosol generating device.

[0079] In an embodiment, the target working action, which matches with the operation of starting preheating, includes controlling the heating element 240 to perform preheating, based on the control circuit 290. When the operation of starting preheating is detected in the non-sleep working mode, the heating element 240 is controlled based on the control circuit 290 to work for a period of time to preheat the aerosol-forming substrate for providing a better inhaling taste.

[0080] In one of the embodiments, as shown in FIG. 1a and FIG. 2, the main body 200 further includes a function button 250 connected to the control circuit 290. The operation of starting preheating includes pressing the function button 250 for a first preset time period, and then releasing it. The first preset time period may be a relatively short time, for example, 1.5 seconds, thus preventing the user from waiting too long.

[0081] Step S43 of performing at least one interactive action for characterizing the operation parameter of the aerosol generating device, based on the control circuit and the indicator light assembly and/or the vibration module, as shown in FIG. 5, includes following steps.

[0082] In step S431, when the heating element is controlled to be in the preheating process, based on the control circuit, the indicator light assembly is controlled to work in a second state to indicate that the preheating is in progress. The second state may be that the control circuit controls the indicator light assembly to emit white light and flash in a breathing manner.

[0083] In step S432, when the heating element is controlled to stop preheating, the vibration module is controlled to perform a second vibration action to indicate that the preheating is completed. The second vibration action may be vibrating twice and each vibration lasting for 0.6 seconds. The specific second vibration action may be configured in advance.

[0084] In an embodiment, a sensor for detecting insertion of aerosol-forming substrate, such as a pressure sensor, may be arranged at the bottom of the accommodating cavity and is connected to the control circuit.

[0085] The method further includes:

detecting an output signal of the sensor for detecting insertion of aerosol-forming substrate in the non-sleep working mode;

if it is determined that the aerosol-forming substrate is inserted into the receiving cavity according to the output signal of the sensor for detecting insertion of aerosol-forming substrate, and if the operation of starting preheating is

detected, the heating element is controlled to perform preheating based on the control circuit.

[0086] In one of the embodiments, the usage operation further includes pressing the function button for a second preset time period. The second preset time period is shorter than the first preset time period. For example, the second preset time period may be configured to be 1 second.

[0087] The target working action, which matches with pressing the function button for the second preset time period, includes continuing to monitor the time period for which the function button is pressed, based on the control circuit.

[0088] In this embodiment, Step S40 of executing the interactive action for characterizing the operation parameter of the aerosol generating device based on the aerosol generating device includes the following step.

[0089] When the heating element stop heating, the vibration module is controlled based on the control circuit to perform a third vibration action to indicate that preheating is about to be triggered. In order to avoid heating caused by a user's misoperation, an indication may be provided just before the preheating function is about to start. When the function button is pressed for the second preset time period,, for which the function button is pressed is continued to be monitored, and the vibration module is controlled to perform a third vibration action to prompt the user that, the preheating function will start when the function button is continuously pressed for the first preset time period. If the user would not like to have the aerosol-forming substrate to be heated, the user may release the function button after receiving the prompt. The third vibration action may be a vibration lasting for 0.5 seconds that prompts the user that the preheating is about to start. By setting the first preset time period to be equal to a sum of the second preset time period and a duration the third vibration action lasts, the user may be informed that the preheating is about to successfully start when the third vibration action ends.

[0090] In an embodiment, the target working action, which matches with the action of inhaling aerosol, includes controlling the heating element to heat the aerosol-forming substrate, based on the control circuit. The action of inhaling aerosol may be the insertion of the aerosol-forming substrate, or may be the completion of preheating based on the inserted aerosol-forming substrate. Specifically, when it is detected that the preheating is completed in the non-sleep working mode, the heating element is controlled based on the control circuit to heat the aerosol-forming substrate, thus continuously generating aerosol for the user to inhale.

[0091] In one of the embodiments, the action of inhaling aerosol includes inserting the aerosol-forming substrate. The target working action matching with the action of inhaling aerosol includes: based on a control circuit, controlling the heating element to heat the aerosol-forming substrate, and detecting the number of times of inhalation and/or the remaining inhaling time.

[0092] Step S43 of performing the at least one interactive action for characterizing the operation parameter of the aerosol generating device based on the control circuit and the indicator light assembly and/or the vibration module, further includes the following step.

[0093] The indicator light assembly is controlled to operate in a third state during the inhalation process, thus indicating that the aerosol is being generated and the user may inhale the aerosol. For example, the third state may be that the white LED light in the indicator light assembly is controlled to emit light, and that the light bar in the indicator light assembly is controlled to flash in a breathing manner.

[0094] When it is detected that the number of times of inhalation reaches a first preset number of times or the remaining inhaling time reaches a third preset time period, it means that the inhalation is finished. In this case, to prevent the heating element from burning, the heating element may be controlled based on the control circuit to stop heating.

[0095] Those skilled in the art may understand that the number of times of inhalation is also referred to as the number of puffs in the art.

[0096] Similarly, in order to better prompt the user that the inhalation is finished, when it is detected that the number of times of inhalation reaches the first preset number of times or that the remaining inhaling time reaches the third preset time period, it indicates that the inhalation is finished, and the indicator light assembly may be controlled to be turned off based on the control circuit.

[0097] During the inhaling process, the user is more concerned about the remaining inhalation progress. Accordingly, in an embodiment, the interactive action further includes: when it is detected that the number of times of inhalation reaches a second preset number of times or that the remaining inhaling time reaches a fourth preset time period, then based on the control circuit, the indicator light assembly is controlled to work in a fourth state, and/or the vibration module is controlled to perform a third vibration action to indicate the remaining inhalation progress. The second preset number of times is less than the first preset number of times, and the fourth preset time period is less than the third preset time period. The second preset number of times may be set to be twice, and is determined based on the first preset number of times. For example, when the first preset number of times is 14 times, then the second preset number of times may be configured to be 12 times. The fourth preset time period may also be determined based on the third preset time period. For example, when the third preset time period is configured to be 5 minutes, the fourth preset time period may be configured to be, for example, 4.5 minutes, which is less than the third preset time period, that is, a prompt is triggered when the remaining inhaling time is 30 seconds.

[0098] The fourth state may be that, based on the control circuit, the white light in the indicator light assembly is controlled

to flash. The third vibration action may be vibrating once as a reminder.

[0099] The abnormality of the heating element needs to be concerned during the heating process, and thus the interactive action further includes controlling the indicator light assembly to execute a first abnormality-reminding action based on the control circuit when an abnormal heating of the heating element is detected.

[0100] The first abnormality-reminding action may be that the red light in the indicator light assembly is controlled by the control circuit to flash for 3 times quickly.

[0101] In an embodiment, the target working action matching with the operation of viewing inhalation progress includes calculating the remaining inhalation progress of the aerosol-forming substrate based on the control circuit. When the operation of viewing inhalation progress is detected, the remaining inhalation progress is calculated, so that an interactive action is executed based on the calculated result to remind the user of the current remaining inhalation progress.

[0102] Specifically, the main body further includes a vibration sensor. The vibration sensor is connected to the control circuit, and the operation of viewing inhalation progress includes vibrating the aerosol generating device for a preset number of times.

[0103] The method further includes:

when the aerosol generating device enters a non-sleep working mode, obtaining vibration data detected by the vibration sensor, and determining whether there is the operation of viewing inhalation progress based on the vibration data of the vibration sensor.

[0104] Performing the at least one interactive action for characterizing the operation parameter of the aerosol generating device, based on the control circuit and the indicator light assembly and/or the vibration module, further includes:

based on the calculated remaining inhalation progress, and based on the control circuit, controlling the vibration module to perform a vibration action that matches with the remaining inhalation progress.

[0105] The vibration action that matches with the remaining inhalation progress may be determined based on the mapping relationships between the remaining inhalation progresses and the respective vibration actions in the following table:

The number of times of inhalation / Remaining inhaling time	Vibration Module Triggering Mode	The fourth Vibration Action	Characterized Level of the remaining inhalation progress
The remaining inhaling time is 70% to 100%.	Passive	Vibrate three times briefly	Level 4
The remaining inhaling time is 30% to 70%.	Passive	Vibrate twice briefly	Level 3
The remaining inhaling time is less than 30%.	Passive	Vibrate once briefly	Level 2
The remaining number of times of inhalation is twice, or the remaining inhaling time is 30 seconds.	Passive	Vibrate once	Level 1

[0106] The smaller the level number is, the shorter the remaining inhaling time is.

[0107] During the inhaling process, the user may have a need to interrupt the inhalation. Accordingly, in an embodiment, the target working action matching with the operation of interrupting heating includes controlling the heating element to stop heating based on the control circuit, thereby avoiding a waste of the aerosol-forming substrate 900 and a waste of energy of the battery 270 in the main body 200.

[0108] Specifically, the main body 200 further includes a function button 250 connected to the control circuit 290. The operation of interrupting heating includes pressing the function button 250 for a fifth preset time period. The fifth preset time period may be a time period, for example, 2.5 seconds, different from other preset time periods.

[0109] To remind the user that the heating has been interrupted, step S43 of performing at least one interactive action for characterizing the operation parameter of the aerosol generating device based on the control circuit 290 and the indicator light assembly 230 and/or the vibration module 260, further includes the following step.

[0110] The indicator light assembly 230 is controlled to be turned off based on the control circuit 290, and by controlling the whole indicator light assembly 230 to be all turned off, the user is reminded that the heating has been interrupted.

[0111] The vibration module 260 is controlled to perform a fourth vibration action based on the control circuit 290. The fourth vibration action may be vibrating once. The user may accurately know the current state of the aerosol generating device by combining the duration the vibration action lasts and the previous working state of the aerosol generating device.

[0112] In an embodiment, the target working action matching with the operation of pulling out aerosol-forming substrate includes controlling the heating element 240 to stop heating based on the control circuit 290. To avoid burning, when the operation of pulling out aerosol-forming substrate is detected, the control circuit 290 controls the heating element to stop heating. The target working action matching with the operation of pulling out aerosol-forming substrate includes controlling the aerosol generating device to enter a sleep mode. In the sleep mode, the heating element 240 is prohibited from heating and the vibration sensor 280 is prohibited from working, which can be achieved by disconnecting the battery 270 to stop supplying power to the heating element 240 and to the vibration sensor 280.

[0113] In an embodiment, the upper cover 100 is detachably connected to the main body 200. To pull out the aerosol-forming substrate, the upper cover 100 needs to be opened to pull or pour the aerosol-forming substrate out of the receiving cavity, and thus the operation of pulling out aerosol-forming substrate includes detaching the upper cover 100 from the main body 200.

[0114] Performing at least one interactive action for characterizing the operation parameter of the aerosol generating device based on the control circuit 290, and the indicator light assembly 230 and/or the vibration module 260, includes: when it is detected that the heating element 240 stops working, controlling the indicator light assembly 230 to be turned off.

[0115] In one of the embodiments, the usage operation includes an operation of closing the anti-dust cover 120, and the target working action matching with the operation of closing the anti-dust cover 120 includes controlling the aerosol generating device to enter a sleep mode. The sleep mode aims at saving energy, and in this mode, the user does not inhale aerosol, and has no need of viewing the remaining power and viewing the inhalation progress which are needed during the inhalation process. Accordingly, in an embodiment, the method further includes: in the sleep mode, based on the control circuit 290, prohibiting the heating element 240 from working.

[0116] For similar reasons, in the sleep mode, since the user does not inhale aerosol, viewing the remaining power and viewing the inhalation progress based on the detection of vibration sensor 280 are unnecessary. Accordingly, in an embodiment, the method further includes: in the sleep mode, based on control circuit 290, prohibiting the vibration sensor 280 from working.

[0117] After the aerosol generating device enters the sleep mode, performing the interactive action for characterizing the operation parameter of the aerosol generating device based on the aerosol generating device, includes: controlling the indicator light assembly 230 to be turned off.

[0118] In an embodiment, the main body 200 further includes a charging interface 291. The charging interface 291 is connected to both the control circuit 290 and the battery 270, and the charging interface 291 is configured to be connected to the external power source 400. The charging interface 291 may be selected as a Type-C protocol interface.

[0119] The usage operation includes connecting the charging interface 291 to the external power source 400. Connecting the charging interface 291 to the external power source 400 may be performed by connecting a power adapter to a USB data cable and then inserting the USB data cable into the charging interface 291 arranged at the bottom of the aerosol generating device.

[0120] The target working action matching with connecting the charging interface 291 to the external power source 400 includes controlling the external power source 400 to charge the battery 270 based on the control circuit 290. When it is detected that a power source is connected, the control circuit 290 controls the battery 270 to be charged, and a charging and controlling action may be performed based on a preset power management strategy.

[0121] Step S40 of executing the interactive action for characterizing the operation parameter of the aerosol generating device based on the aerosol generating device, includes the following step.

[0122] Based on the control circuit 290, the indicator light assembly 230 is controlled to operate in a fifth state to indicate the remaining power of the battery 270.

[0123] The fifth state may be that the control circuit 290 controls the LED light bulbs in the light bar of the indicator light assembly 230 to gradually light up from bottom to top (the top refers to the side where the opening of the accommodating cavity is located) and this effect is cycled.

[0124] The fifth state may also be determined based on the following table:

Remaining power	The fifth state	Characterized Level of the remaining power
The remaining power is 50% to 100%.	Slowly flash in a breathing manner, emitting white light.	Level 3
The remaining power is 20% to 50%.	Flash in a fluctuation manner, emitting yellow-green light.	Level 2
The remaining power is less than 20%.	Flash in a fluctuation manner, emitting orange light.	Level 1

(continued)

Remaining power	The fifth state	Characterized Level of the remaining power
Fully charged	Light up for 20 seconds and then be turned off.	Level 4

[0125] The larger the level number of the remaining power is, the more remaining power is.

[0126] In an embodiment, the main body 200 of the aerosol generating device includes the indicator light assembly 230, the heating element 240, and the control circuit 290. The indicator light assembly 230 and the heating element 240 are both connected to the control circuit 290. The usage operation further includes an operation of viewing battery life performed when the heating element 240 is not heating, and the target working action matching with the operation of viewing battery life is obtaining the remaining power.

[0127] Step S40 of executing the interactive action for characterizing the operation parameter of the aerosol generating device based on the aerosol generating device, as shown in FIG. 4, includes at least one of the following steps.

[0128] In step S44, based on the control circuit, the indicator light assembly is controlled to work in a sixth state to indicate the remaining power of the battery. The sixth state may be that the light bar in the indicator light assembly lights up for 3 seconds to indicate the remaining power.

[0129] In addition to the indication of the remaining power performed by the light bar lighting up for 3 seconds, the remaining powers may be distinguished based on different colors of the light bar. The sixth state may be determined by querying the following table:

Remaining power	The sixth state	Characterized Level of the remaining power
The remaining power is 50% to 100%.	Light up for 3 seconds, emitting white light	Level 3
The remaining power is 20% to 50%.	Light up for 3 seconds, emitting yellow-green light	Level 2
The remaining power is less than 20%.	Light up for 3 seconds, emitting orange light	Level 1

[0130] In step S45, if it is detected that the remaining power is less than the minimum power required for heating a piece of aerosol-forming substrate, the indicator light assembly is controlled based on the control circuit to execute a second abnormality-reminding action. In the non-heating state, if the remaining power is insufficient to heat a piece of aerosol-forming substrate, it means that there will be an abnormal heating interruption during the usage by the user. At this time, there is a need to remind the user of charging in advance to facilitate a subsequent usage. The second abnormality-reminding action may be controlling the indicator light assembly to light up for a long time and emit red light based on the control circuit.

[0131] In one of the embodiments, the main body 200 further includes the function button 250 and the vibration sensor 280 which are connected to the control circuit 290.

[0132] The operation of viewing battery life includes: pressing the function button 250 for a sixth preset time period or vibrating the aerosol generating device. The sixth preset time period may be configured to be between 0.5 and 1 second.

[0133] The method further includes following steps.

[0134] When the aerosol generating device is in the non-sleep working mode, it is determined whether there is an operation of viewing battery life based on the vibration data of the vibration sensor 280.

[0135] In the non-sleep working mode, the vibration data of the vibration sensor 280, such as an acceleration sensor, are processed based on the control circuit to determine whether there is an operation of viewing battery life. If it is determined based on the vibration data that there is the operation of viewing battery life, the remaining power is obtained, and based on the obtained remaining power, a corresponding interactive action is performed to remind the user of the remaining power of the aerosol generating device. For the determination solution for the interactive action corresponding to the operation of viewing battery life, the embodiments above may be referred.

[0136] In one of the embodiments, after the step of controlling the aerosol generating device to enter the non-sleep working mode in response to the operation of opening the anti-dust cover 120, the method further comprises:

if no operation other than the operation of opening the anti-dust cover 120 is detected within a preset waiting time, the aerosol generating device is controlled to enter a sleep working mode; or
in response to detaching the upper cover 100 from the main body 200, the aerosol generating device is controlled to

enter a sleep working mode.

[0137] For consideration of energy saving and safety, when the anti-dust cover 120 is in the open state, if there is no operation for the device within the preset waiting time (e.g., 3 minutes), the aerosol generating device will also be controlled to enter the sleep working mode. At this time, the anti-dust cover 120 needs to be closed and then opened again to trigger the aerosol generating device to enter the non-sleep working mode.

[0138] When the anti-dust cover 120 is opened, if it is detected that the upper cover 100 is detached from the main body 200, it means that the user intends to pull out the aerosol-forming substrate. Then the aerosol generating device is controlled to enter the sleep working mode, the heating element 240 is prohibited from continuing to heat, and the vibration sensor 280 is also prohibited from working.

[0139] In the sleep mode, based on the control circuit, the heating element 240 is prohibited from heating and the vibration sensor 280 is prohibited from working, thus saving energy. In the sleep mode, the target working action and the interactive action are executed in response to only the operation of the function button 250 being pressed for the sixth preset time period.

[0140] If the temperature of a chip, such as the control circuit, is too high, the service life of the device will be seriously affected. Accordingly, in one of the embodiments, the main body 200 further includes a temperature sensor 292. The method further includes the following step.

[0141] If it is determined that the temperature of the main body 200 is higher than a preset temperature according to the temperature data detected by the temperature sensor 292, the indicator light assembly 230 is controlled to perform a third abnormality-reminding action based on the control circuit 290. The third abnormality-reminding action may be performed by controlling the indicator light assembly 230 to emit red light and quickly flash twice at intervals based on the control circuit 290, which is different from the reminder performed when the heating element 240 is abnormal.

[0142] In one of the embodiments, the usage operation further includes an operation of forcing sleep or an operation of forcing wakeup.

[0143] The target working action matching with the operation of forcing sleep includes controlling the aerosol generating device to enter a sleep working mode. The operation of forcing sleep may be pressing the function button for 4 times in succession when the aerosol generating device is in the non-sleep working mode.

[0144] The target working action matching with the operation of forcing wakeup includes controlling the aerosol generating device to exit the sleep working mode and enter the non-sleep working mode, and obtaining the vibration data detected by the vibration sensor 280 based on the control circuit. The operation of forcing wakeup may be pressing the function button 250 for 4 times in succession when the aerosol generating device is in the sleep working mode.

[0145] When there is a logical conflict in the target working actions determined in response to the usage operations, the priorities of executing the usage operations are as follows.

[0146] The priorities of the operation of forcing sleep and the operation of forcing wakeup are higher than the priority of detaching the upper cover from the main body when the anti-dust cover is opened, and the priority of detaching the upper cover from the main body when the anti-dust cover is opened is higher than the priority of closing the anti-dust cover, and the priority of closing the anti-dust cover is higher than the priorities of other usage operations, which exclude the operation of opening the anti-dust cover, and which are not detected within the preset waiting time when the anti-dust cover is opened.

[0147] It should be understood that although the steps in the flowcharts involved in the above embodiments are shown in sequence as indicated by the arrows, these steps are not necessarily executed in the order indicated by the arrows. Unless explicitly stated in this article, there is no strict order restriction on the execution of these steps, and these steps may be executed in other orders. Moreover, at least some of the steps in the flowcharts involved in the above embodiments may include multiple steps or multiple stages. These steps or stages are not necessarily executed at the same time, but may be executed at different times. The execution order of these steps or stages is not necessarily sequential, but may be performed in turn or alternately with other steps or at least part of the steps or stages in other steps.

[0148] Based on the same concepts of the method embodiments, the embodiments of the present application further provide a control device for the aerosol generating device. As shown in FIG. 6, the device includes a usage operation responding module 20 and a response-execution feedback module 40.

[0149] The usage operation responding module 20 is configured to, in response to the usage operation for the aerosol generating device, perform a target working action based on the aerosol generating device. The target working action matches with the usage operation.

[0150] The response-execution feedback module 40 is configured to execute an interactive action for characterizing the operation parameter of the aerosol generating device based on the aerosol generating device, and the operation parameter is information updated based on performing the target working action.

[0151] For the specific limitations of the control device for the aerosol generating device, please refer to the limitations of the control method for the aerosol generating device above, which will not be described repeatedly herein. Various modules in the control device for the aerosol generating device may be implemented in whole or in part by software,

hardware and a combination thereof. The above-mentioned modules may be embedded in or independent of the processor in the aerosol generating device in the form of hardware, or may be stored in the memory in the aerosol generating device in the form of software, so that the processor can call and execute operations corresponding to the above modules. It should be noted that the division of the modules in the embodiment of the present application is illustrative and is only a logical function division, and there may be other division manners in actual implementation.

[0152] In an embodiment, an aerosol generating device is provided, and an internal structure thereof may be shown in FIG. 7. The aerosol generating device includes a processor and a memory connected via a system bus. The processor of the aerosol generating device is used to provide computing and control capabilities. The memory of the aerosol generating device includes a non-volatile storage medium and an internal memory. The non-volatile storage medium stores an operating system, a computer program, and a database. The internal memory provides an environment for the operation of the operating system and the computer program in the non-volatile storage medium. The database of the aerosol generating device is used to store data such as predefined target working actions and interactive actions. The computer program, when executed by the processor, performs the control method for the aerosol generating device.

[0153] Those skilled in the art should understand that the structure shown in the block diagram of FIG. 7 is merely partial structure related to the solutions of the present application, and does not constitute a limitation on the aerosol generating device to which the solutions of the present application is applied. The specific aerosol generating device may include more or fewer components than those shown in the figure, or may combine some of the components, or may have a different arrangement of the components.

[0154] The present application provides an aerosol generating device, including a memory and a processor. The memory stores a computer program. The processor, when executing the computer program, implements the steps of any one of the control methods for the aerosol generating device in the embodiments above.

[0155] In one of the embodiments, as shown in FIGS. 1-2, the aerosol generating device includes an upper cover 100 and a main body 200.

[0156] The main body 200 has an accommodating cavity for aerosol-forming substrate, and the upper cover 100 has an anti-dust cover 120. When the anti-dust cover 120 is closed, it covers the opening of the accommodating cavity completely, and when the anti-dust cover 120 is opened, the accommodating cavity is communicated with the outside, so that the aerosol-forming substrate may be placed into the accommodating cavity through the opening.

[0157] The main body 200 further includes a function button 250, a vibration sensor 280, a Hall sensor 210, a charging interface 291, a battery 270 and a control circuit 290. The function button 250, the vibration sensor 280, the Hall sensor 210, the charging interface 291 and the battery 270 are all connected to the control circuit 290.

[0158] The anti-dust cover 120 is provided with a first magnetic member 110 that matches with the Hall sensor 210, and output signals of the Hall sensor 210 are different when the anti-dust cover 120 is opened and when the anti-dust cover 120 is closed.

[0159] The control circuit detects the operation of opening the anti-dust cover 120 and the operation of closing the anti-dust cover 120 according to the output signals of the Hall sensor 210.

[0160] The control circuit includes a memory and a processor. The memory stores a computer program. The processor, when executing the computer program, performs the steps of the above methods.

[0161] In one of the embodiments, the vibration sensor is an acceleration sensor. The acceleration sensor may be received in the main body 200. The acceleration sensor may be activated or deactivated based on the detections of the Hall sensor 210.

[0162] In one of the embodiments, the aerosol generating device further includes a second magnetic member 130 arranged in the upper cover 100 and a third magnetic member 220 arranged in the main body 200. When the upper cover 100 is assembled with the main body 200 for use, the second magnetic member 130 and the third magnetic member 220 are attracted to each other, thus improving stability.

[0163] In one of the embodiments, the anti-dust cover 120 is slidably connected to the body of the upper cover 100. The anti-dust cover 120 is slidable along the length direction of the end surface of the upper cover 100.

[0164] In one of the embodiments, the upper cover 100 is slidably connected to the main body 200, and the upper cover 100 may be detached from the main body 200 by lifting the upper cover 100 in a direction opposite to the insertion direction of the aerosol-forming substrate.

[0165] It should be understood that, based on the output signals of the Hall sensor 210, the control circuit 290 may identify four following states as shown in FIGS. 1c-1f:

the upper cover 100 is assembled with the main body 200 for use, and the anti-dust cover 120 is opened;
the upper cover 100 is assembled with the main body 200 for use, and the anti-dust cover 120 is closed;
the upper cover 100 is detached from the main body 200, and the anti-dust cover 120 is opened; and
the upper cover 100 is detached from the main body 200, and the anti-dust cover 120 is closed.

[0166] Based on the detections of other sensors, such as the state recognition vibration sensor 280, steps of the

methods in the above method embodiments may be executed to achieve corresponding beneficial effects.

[0167] It should be noted that, the above aerosol generating device, when executing the above steps of the method, has the structural features described in the above method embodiments, which will not be described repeatedly herein, so as to execute the steps of the above method.

[0168] In an embodiment, a computer-readable storage medium is provided, and has a computer program stored thereon. The computer program, when executed by a processor, performs all steps of the control methods for the aerosol-forming substrate, and achieves corresponding beneficial effects.

[0169] It should be understood by those ordinary skilled in the art that all or part of the processes of the above-mentioned method embodiments may be implemented by the relevant hardware according to instructions of a computer program, and the computer program may be stored in a non-volatile computer-readable storage medium. The computer program, when executed, may include the processes of the above-mentioned method embodiments. Any reference to the memory, the storage, the database, or other medium used in the embodiments provided in the present application may include at least one of the non-volatile memory and the volatile memory. The non-volatile memory may include read-only memory (ROM), magnetic tape, floppy disk, flash memory, or optical memory, etc. The volatile memory may include random access memory (RAM) or external cache memory. As illustration but not limitation, the RAM may be in various forms, such as static random-access memory (SRAM) or dynamic random access memory (DRAM).

[0170] In the description of this specification, the terms "one embodiment", "some embodiments", "ideal embodiments", etc., mean that the specific features, structures, materials or features, described in conjunction with the embodiment or example, are included in at least one embodiment or example of the present application. In this specification, the illustrative description of the above terms does not necessarily refer to the same embodiment or example.

[0171] The technical features of the above-mentioned embodiments may be combined arbitrarily. In order to make the description concise, not all possible combinations of the technical features are described in the embodiments. However, as long as there is no contradiction in the combination of these technical features, the combinations should be considered as in the scope of the present application.

[0172] The above-described embodiments are only several implementations of the present application, and the descriptions are relatively specific and detailed, but they should not be construed as limiting the scope of the present patent application. It should be understood by those of ordinary skill in the art that various modifications and improvements may be made without departing from the concept of the present application, and they all fall within the protection scope of the present application. Therefore, the patent protection of the present application shall be defined by the appended claims.

Claims

1. A control method for an aerosol generating device, **characterized by** comprising:

in response to a usage operation for the aerosol generating device, performing a target working action based on the aerosol generating device, the target working action matching with the usage operation; and
executing an interactive action for characterizing an operation parameter of the aerosol generating device based on the aerosol generating device, wherein the operation parameter is information updated based on performing the target working action.

2. The method according to claim 1, wherein:

the aerosol generating device comprises an upper cover and a main body; the main body has an accommodating cavity for aerosol-forming substrate; the upper cover has an anti-dust cover; the anti-dust cover, when being closed, covers an opening of the accommodating cavity completely; when the anti-dust cover is opened, the accommodating cavity is communicated with outside, so that the aerosol-forming substrate is placed into the accommodating cavity through the opening; the main body further comprises an indicator light assembly, a vibration module, a battery and a control circuit; and the indicator light assembly, the vibration module and the battery are all connected to the control circuit;
the usage operation comprises an operation of opening the anti-dust cover;
performing the target working action based on the aerosol generating device in response to the usage operation for the aerosol generating device, comprises: in response to the operation of opening the anti-dust cover, controlling the aerosol generating device to enter a non-sleep working mode; and
executing the interactive action for characterizing the operation parameter of the aerosol generating device based on the aerosol generating device, comprises at least one of following steps of:

based on the control circuit, controlling the indicator light assembly to work in a first state to indicate that a non-sleep working mode has been entered and/or to indicate a remaining power of the battery; and
based on the control circuit, controlling the vibration module to execute a first vibration action to indicate that the non-sleep working mode has been entered.

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3. The method according to claim 2, wherein the main body further comprises a heating element; the heating element is connected to the control circuit; the usage operation further comprises at least one of: an operation of starting preheating, an action of inhaling aerosol, an operation of viewing inhalation progress, an operation of interrupting heating, and an operation of pulling out the aerosol-forming substrate, each of which is performed after the aerosol generating device enters the non-sleep working mode;
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a target working action, which matches with the operation of starting preheating, comprises controlling the heating element to perform preheating based on the control circuit;
a target working action, which matches with the action of inhaling aerosol, comprises controlling the heating element to heat the aerosol-forming substrate based on the control circuit;
15 a target working action, which matches with the operation of viewing inhalation progress, comprises calculating a remaining inhalation progress of the aerosol-forming substrate based on the control circuit;
a target working action, which matches with the operation of interrupting heating, comprises controlling the heating element to stop heating based on the control circuit;
20 a target working action, which matches with the operation of pulling out the aerosol-forming substrate, comprises controlling the heating element to stop heating based on the control circuit; and
executing the interactive action for characterizing the operation parameter of the aerosol generating device based on the aerosol generating device comprises: performing at least one interactive action for characterizing the operation parameter of the aerosol generating device based on the control circuit, and the indicator light assembly and/or the vibration module.
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4. The method according to claim 3, wherein the main body further comprises a vibration sensor; the vibration sensor is connected to the control circuit; and the operation of viewing inhalation progress comprises vibrating the aerosol generating device for a preset number of times;
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the method further comprises: when the aerosol generating device enters the non-sleep working mode, obtaining vibration data detected by the vibration sensor, and determining whether there is the operation of viewing inhalation progress based on the vibration data of the vibration sensor; and
performing the at least one interactive action for characterizing the operation parameter of the aerosol generating device based on the control circuit and the indicator light assembly and/or the vibration module, comprises: based on the calculated remaining inhalation progress, and based on the control circuit, controlling the vibration module to perform a vibration action that matches with the remaining inhalation progress.
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5. The method according to claim 3, wherein the main body further comprises a function button connected to the control circuit; the operation of starting preheating comprises pressing the function button for a first preset time period, and then releasing it; and
40 performing the at least one interactive action for characterizing the operation parameter of the aerosol generating device based on the control circuit and the indicator light assembly and/or the vibration module, comprises:

45 when the heating element is controlled to be in a preheating process, based on the control circuit, controlling the indicator light assembly to work in a second state to indicate that the preheating is in progress; and
when the heating element is controlled to stop preheating, controlling the vibration module to perform a second vibration action to indicate that the preheating is completed.

- 50 6. The method according to claim 5, wherein the usage operation further comprises pressing the function button for a second preset time period, and the second preset time period is less than the first preset time period;

a target working action, which matches with pressing the function button for the second preset time period, comprises based on the control circuit, continuing to monitor a time period for which the function button is pressed;
55 and
executing the interactive action for characterizing the operation parameter of the aerosol generating device based on the aerosol generating device comprises: when the heating element is not heating, based on the control circuit, controlling the vibration module to perform a third vibration action to indicate that the preheating is about to

be triggered.

7. The method according to claim 3, wherein the action of inhaling aerosol comprises inserting the aerosol-forming substrate; a target working action, which matches with the action of inhaling aerosol comprises: based on the control circuit, controlling the heating element to heat the aerosol-forming substrate, and detecting the number of times of inhalation and/or a remaining inhaling time; and performing the at least one interactive action for characterizing the operation parameter of the aerosol generating device based on the control circuit and the indicator light assembly and/or the vibration module, further comprises at least one of following steps of:

controlling the indicator light assembly to operate in a third state during an inhalation process to indicate that aerosol is being generated;
when it is detected that the number of times of inhalation reaches a first preset number of times or that the remaining inhaling time reaches a third preset time period, based on the control circuit, controlling the heating element to stop heating;
when it is detected that the number of times of inhalation reaches the first preset number of times or that the remaining inhaling time reaches the third preset time period, based on the control circuit, controlling the indicator light assembly to be turned off; and
when it is detected that the number of times of inhalation reaches a second preset number of times or that the remaining inhaling time reaches a fourth preset time period, based on the control circuit, controlling the indicator light assembly to work in a fourth state, and/or controlling the vibration module to perform a third vibration action, to indicate the remaining inhalation progress, wherein the second preset number of times is less than the first preset number of times, and the fourth preset time period is less than the third preset time period.

8. The method according to claim 7, wherein performing the at least one interactive action for characterizing the operation parameter of the aerosol generating device based on the control circuit and the indicator light assembly and/or the vibration module, further comprises: controlling the indicator light assembly to execute a first abnormality-reminding action based on the control circuit when an abnormal heating of the heating element is detected.

9. The method according to claim 3, wherein the main body further comprises a function button connected to the control circuit; the operation of interrupting heating comprises pressing the function button for a fifth preset time period; and performing the at least one interactive action for characterizing the operation parameter of the aerosol generating device based on the control circuit, and the indicator light assembly and/or the vibration module, comprises at least one of following steps of: controlling the indicator light assembly to be turned off based on the control circuit, and controlling the vibration module to perform a fourth vibration action based on the control circuit.

10. The method according to claim 3, wherein the upper cover is detachably connected to the main body; the operation of pulling out aerosol-forming substrate comprises detaching the upper cover from the main body; and performing the at least one interactive action for characterizing the operation parameter of the aerosol generating device based on the control circuit, and the indicator light assembly and/or the vibration module, comprises: when it is detected that the heating element stops working, controlling the indicator light assembly to be turned off.

11. The method according to claim 2, wherein the usage operation comprises an operation of closing the anti-dust cover, and a target working action, which matches with the operation of closing the anti-dust cover, comprises controlling the aerosol generating device to enter a sleep working mode; and executing the interactive action for characterizing the operation parameter of the aerosol generating device based on the aerosol generating device, comprises: controlling the indicator light assembly to be turned off.

12. The method according to claim 2, wherein the main body further comprises a charging interface; the charging interface is connected to both the control circuit and the battery, and the charging interface is configured to be connected to an external power source;

the usage operation comprises connecting the charging interface to the external power source;
a target working action, which matches with connecting the charging interface to the external power source, comprises, based on the control circuit, controlling the external power source to charge the battery; and
executing the interactive action for characterizing the operation parameter of the aerosol generating device based on the aerosol generating device, comprises: based on the control circuit, controlling the indicator light assembly to operate in a fifth state to indicate the remaining power of the battery.

13. The method according to any one of claims 1 to 12, wherein the main body of the aerosol generating device comprises an indicator light assembly, a heating element, and a control circuit; the indicator light assembly and the heating element are both connected to the control circuit; the usage operation further comprises an operation of viewing battery life performed when the heating element is not heating, and a target working action matching with the operation of viewing battery life is obtaining a remaining power; and
 5 executing the interactive action for characterizing the operation parameter of the aerosol generating device based on the aerosol generating device, comprises at least one of:

10 based on the control circuit, controlling the indicator light assembly to work in a sixth state to indicate the remaining power of the battery; and
 if it is detected that the remaining power is less than a minimum power required for heating a piece of aerosol-forming substrate, based on the control circuit, controlling the indicator light assembly to execute a second abnormality-reminding action.

14. The method according to claim 13, wherein the main body further comprises a function button and a vibration sensor which are connected to the control circuit;

20 the operation of viewing battery life comprises: pressing the function button for a sixth preset time period or vibrating the aerosol generating device; and
 the method further comprises: when the aerosol generating device is in a non-sleep working mode, determining whether there is the operation of viewing battery life based on vibration data of the vibration sensor.

15. The method according to claim 2, wherein after controlling the aerosol generating device to enter the non-sleep working mode in response to the operation of opening the anti-dust cover, the method further comprises:

25 if no operation other than the operation of opening the anti-dust cover is detected within a preset waiting time, the aerosol generating device is controlled to enter a sleep working mode; or
 in response to detaching the upper cover from the main body, controlling the aerosol generating device to enter the sleep working mode.

16. A control device for an aerosol generating device, **characterized by** comprising:

35 a usage operation responding module configured to perform a target working action based on the aerosol generating device in response to a usage operation for the aerosol generating device, wherein the target working action matches with the usage operation; and
 a response-execution feedback module configured to execute an interactive action for characterizing an operation parameter of the aerosol generating device based on the aerosol generating device, wherein the operation parameter is information updated based on performing the target working action.

17. An aerosol generating device, comprising a memory and a processor, wherein the memory stores a computer program, and the processor, when executing the computer program, performs steps of the method according to any one of claims 1 to 14.

18. The device according to claim 17, comprising an upper cover and a main body;

45 wherein the main body has an accommodating cavity for aerosol-forming substrate; the upper cover has an anti-dust cover; the anti-dust cover, when being closed, covers an opening of the accommodating cavity completely; when the anti-dust cover is opened, the accommodating cavity is communicated with outside, so that the aerosol-forming substrate is placed into the accommodating cavity through the opening;
 50 the main body further comprises a function button, a vibration sensor, a Hall sensor, a charging interface, a battery and a control circuit, wherein the function button, the vibration sensor, the Hall sensor, the charging interface and the battery are all connected to the control circuit;
 the anti-dust cover is provided with a first magnetic member that matches with the Hall sensor, and output signals of the Hall sensor are different when the anti-dust cover is opened and when the anti-dust cover is closed;
 55 the control circuit detects an operation of opening the anti-dust cover and an operation of closing the anti-dust cover according to the output signals of the Hall sensor; and
 the control circuit comprises a memory and a processor; the memory stores a computer program;

the processor, when executing the computer program, performs steps of the method according to any one of claims 1 to 15.

19. The device according to claim 18, wherein the vibration sensor is an acceleration sensor.

20. A computer-readable storage medium, having a computer program stored thereon, wherein the computer program, when executed by the computer processor, performs steps of the method according to any one of claims 1 to 15.

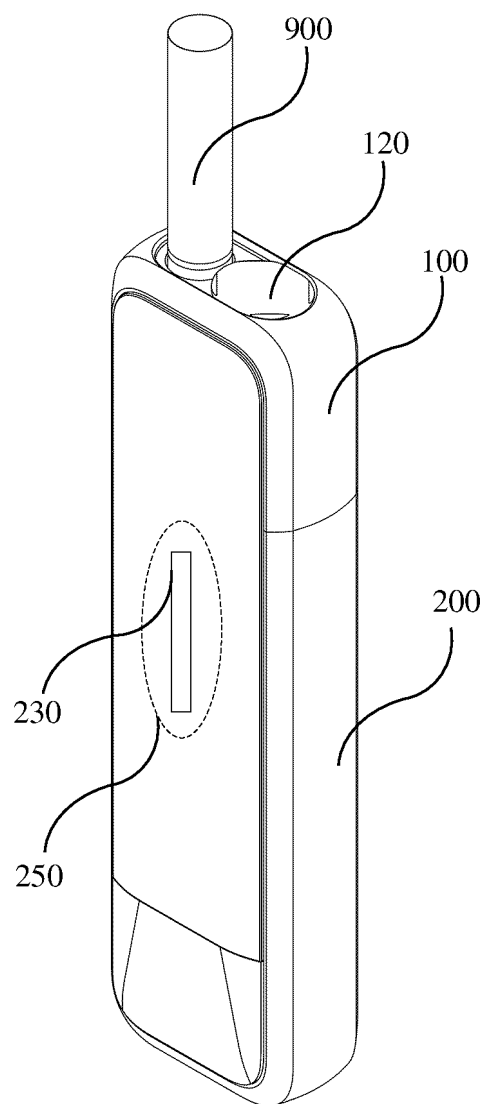


FIG. 1a

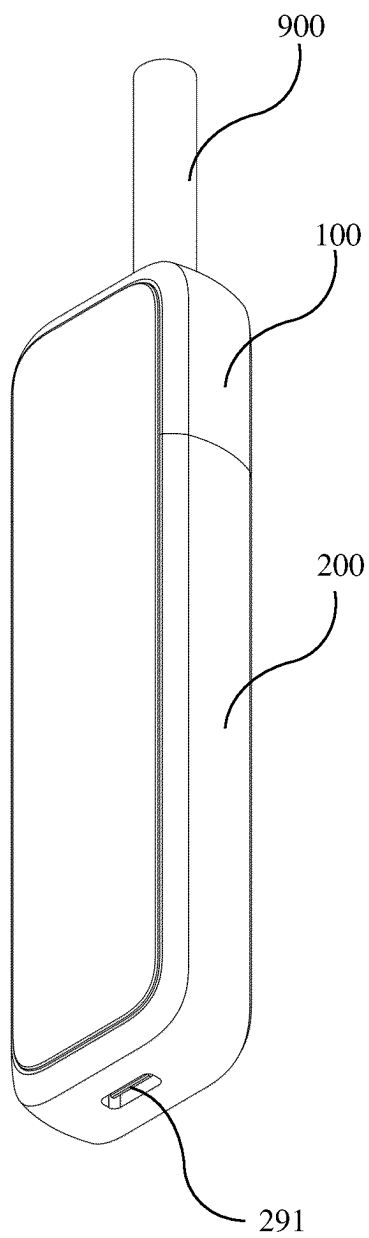


FIG. 1b

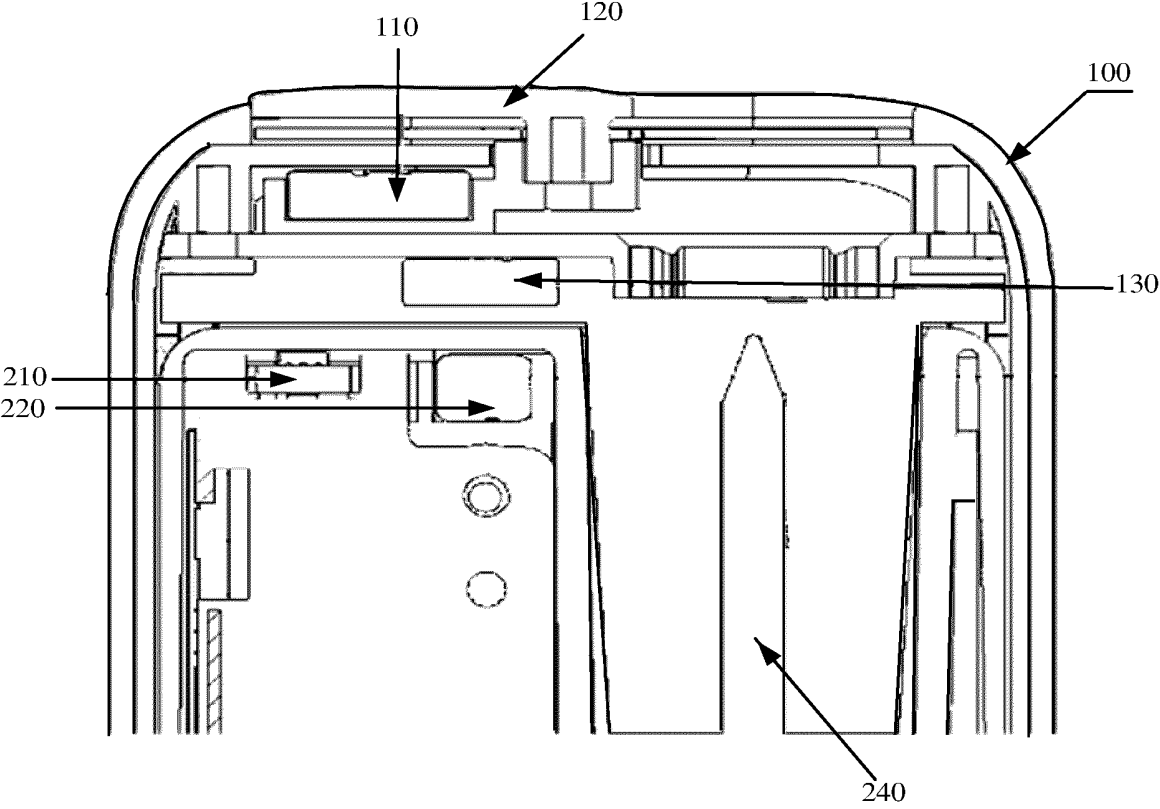


FIG. 1c

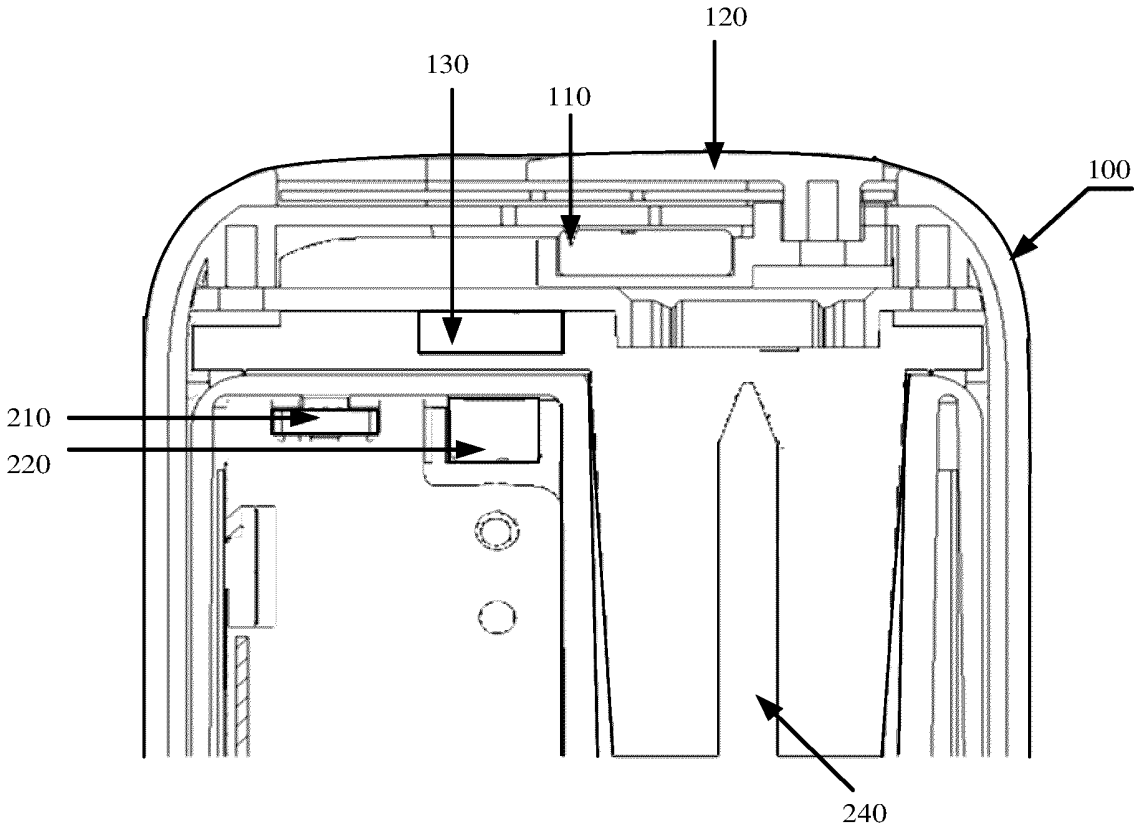


FIG. 1d

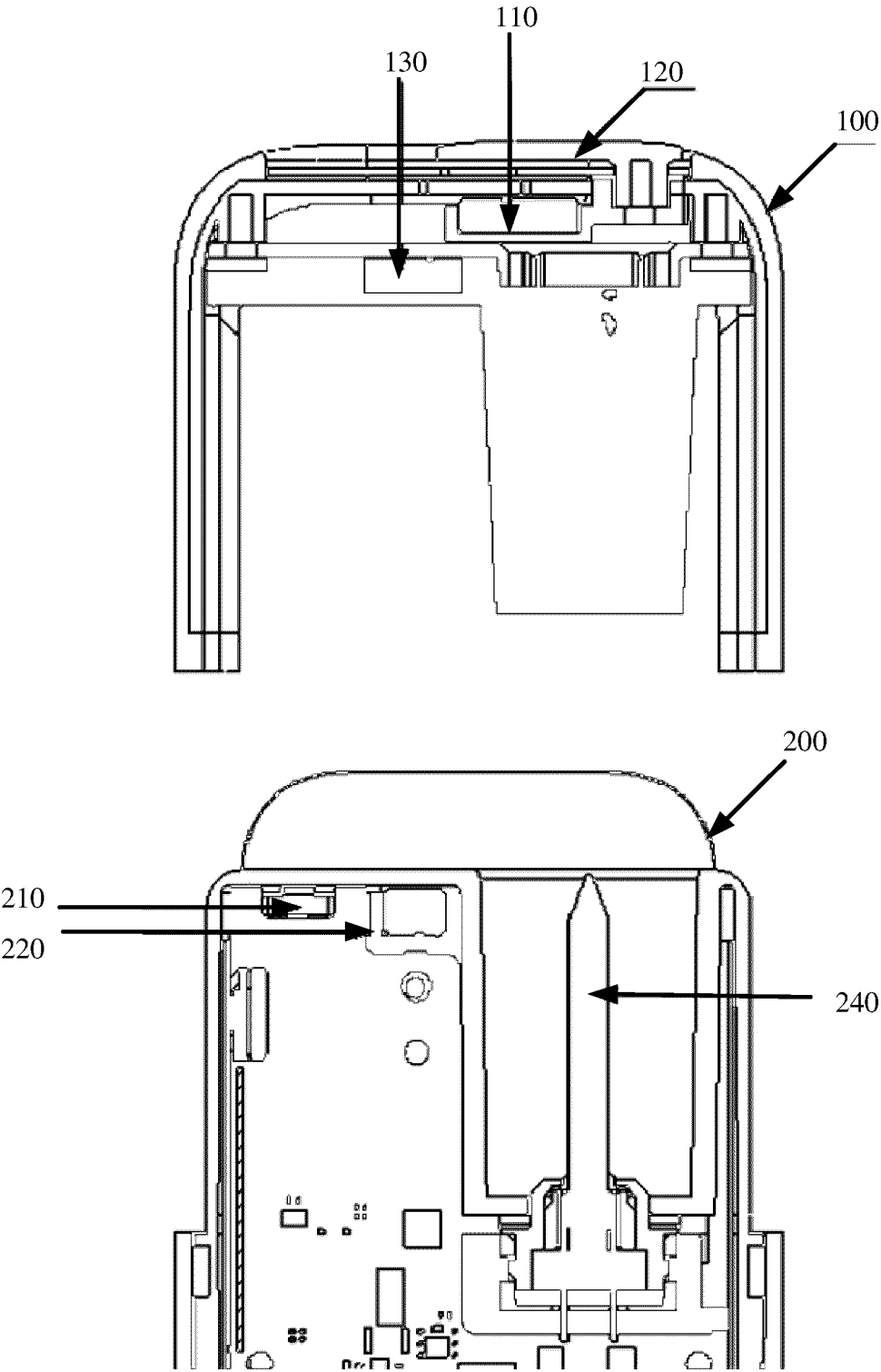


FIG. 1e

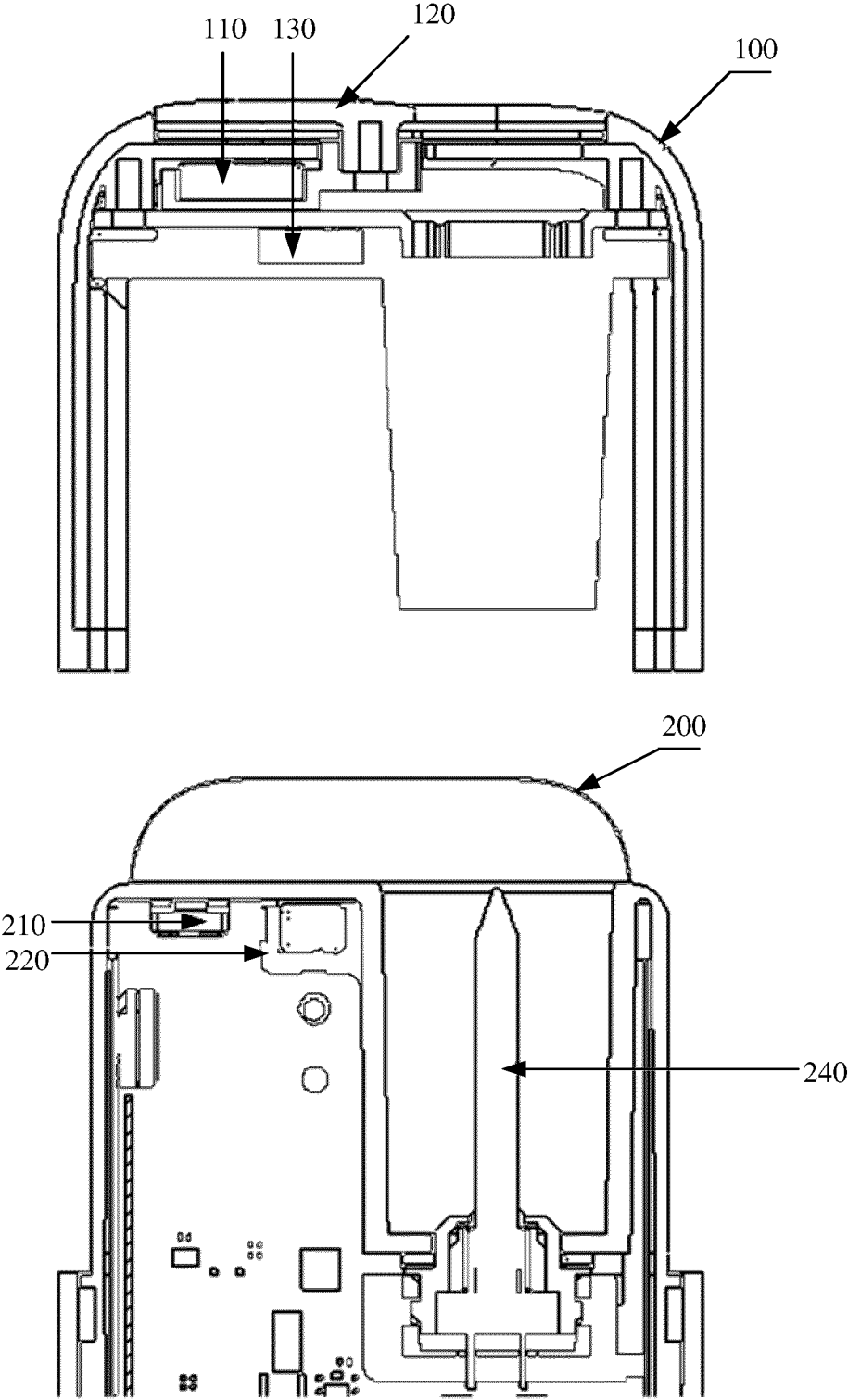


FIG. 1f

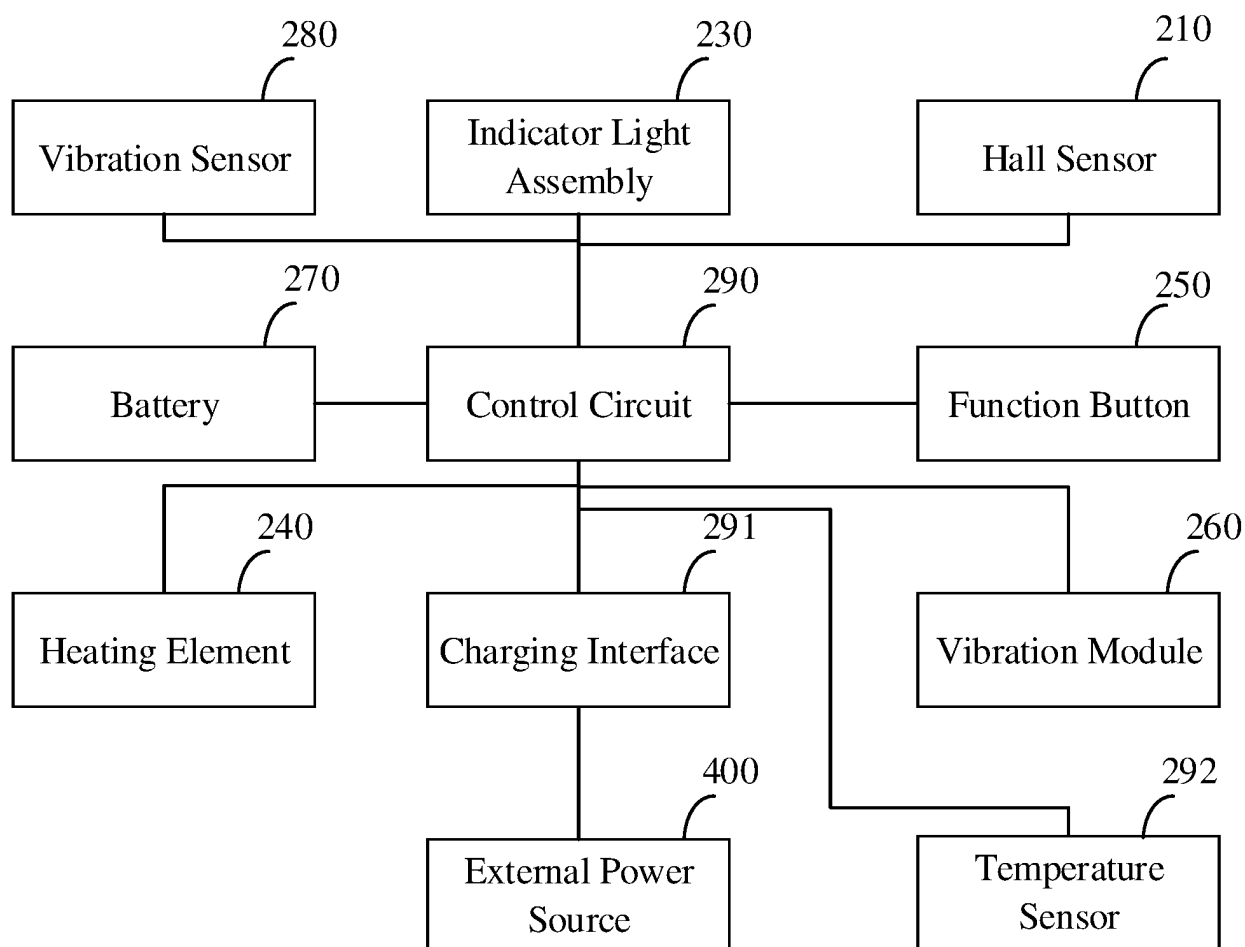


FIG. 2

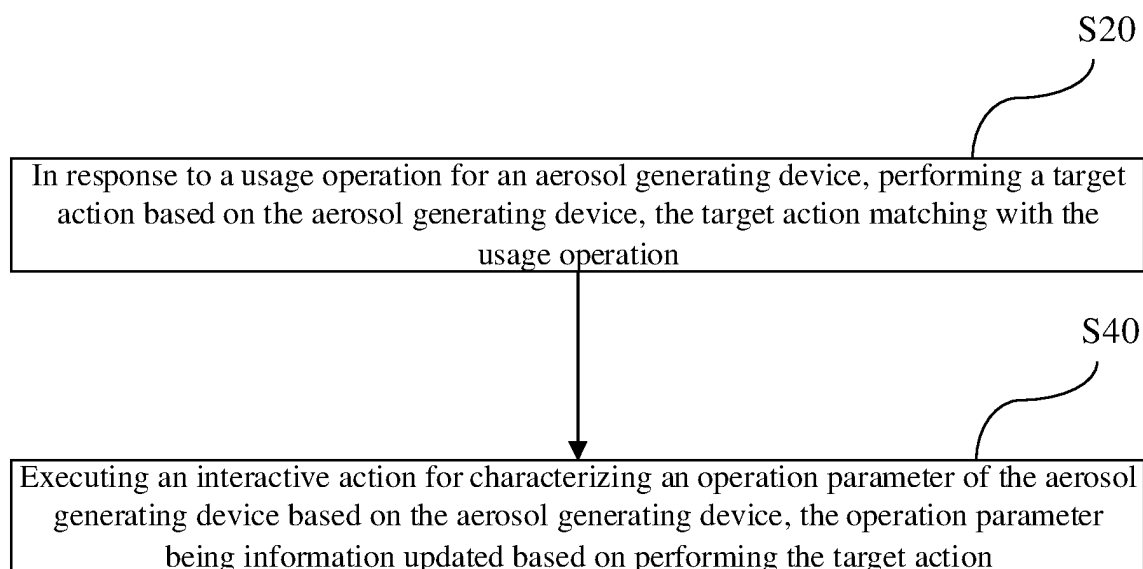


FIG. 3

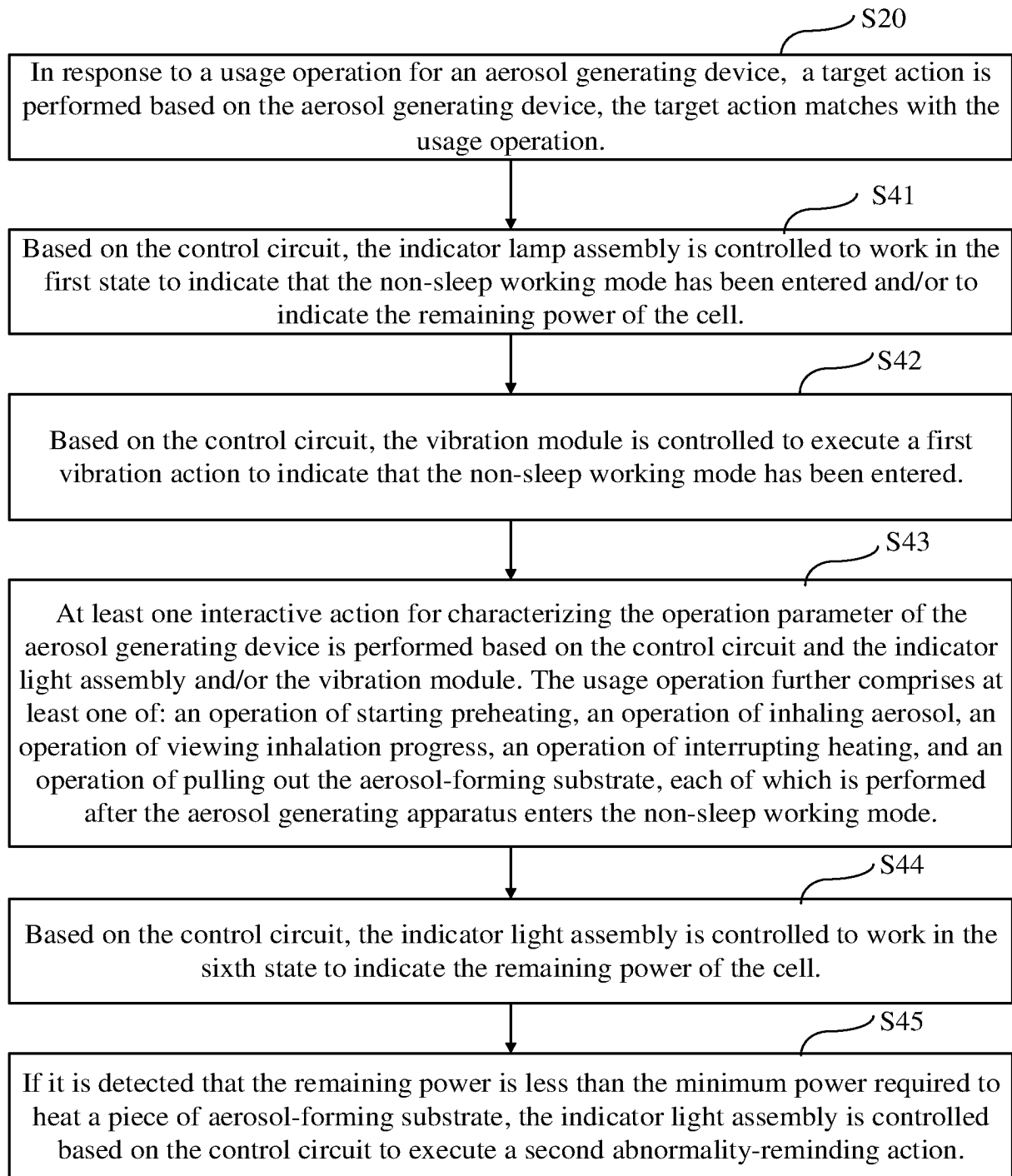


FIG. 4

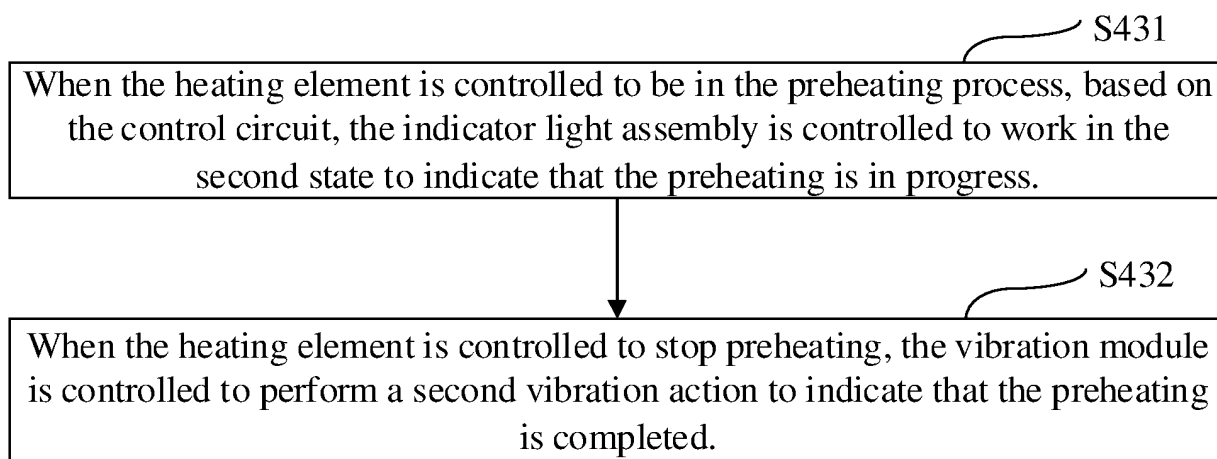


FIG. 5

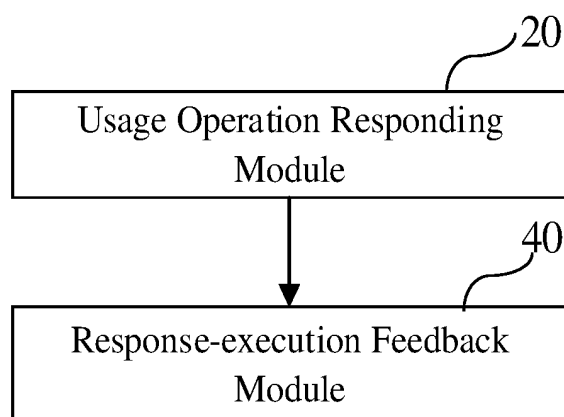


FIG. 6

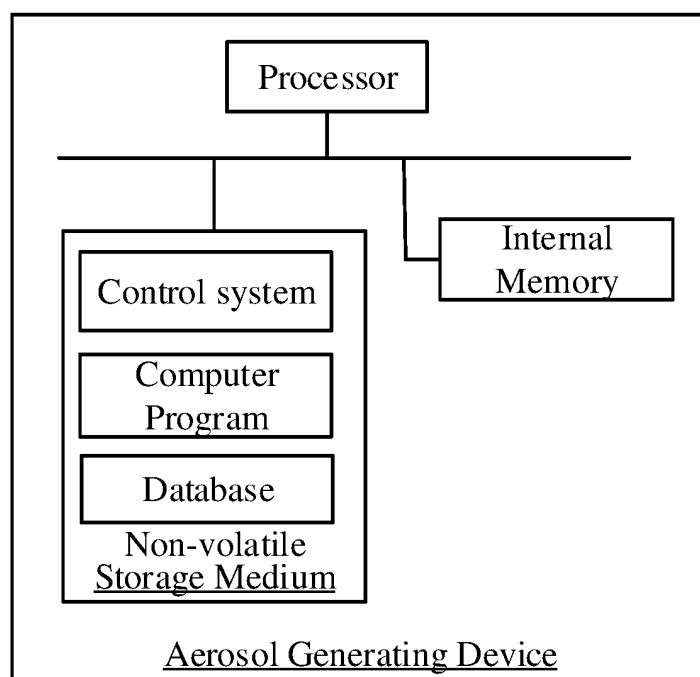


FIG. 7

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2023/076091

A. CLASSIFICATION OF SUBJECT MATTER

A24F40/50(2020.01)i; A24F40/40(2020.01)i; A24F40/51(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)

IPC:A24F 40, A24F 47

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)

CNTXT, ENTXTC, ENTXT, VEN: 震动, 振动, 抖动, 摇晃, 摇动, 灯, 色, 光, 提示, 显示, 信息, 状态, 指示, 表示, 控制, 孔, 盖, 封闭, 开, 开启, 运行, 使用, 休眠, 工作, vibrat+, shake, light, colo?r, information, status, cover, close, open, run, work

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 114617297 A (SHENZHEN MAISHI TECHNOLOGY CO., LTD.) 14 June 2022 (2022-06-14) claims 1-19	1-20
X	CN 109393565 A (CHANGZHOU PAITENG ELECTRONIC TECHNOLOGY SERVICE CO., LTD.) 01 March 2019 (2019-03-01) description, paragraphs 42-47, 63-112, and 137-140, and figures 1-4	1, 16-17, 20
Y	CN 109393565 A (CHANGZHOU PAITENG ELECTRONIC TECHNOLOGY SERVICE CO., LTD.) 01 March 2019 (2019-03-01) description, paragraphs 42-47, 63-112, and 137-140, and figures 1-4	2-15, 18-19
Y	CN 111713754 A (KT&G CORP.) 29 September 2020 (2020-09-29) description, paragraphs 78-127, and figures 4-8	2-15, 18-19
X	CN 110301683 A (SHENZHEN OUKE ELECTRONIC TECHNOLOGY CO., LTD.) 08 October 2019 (2019-10-08) description, paragraphs 53-108, and figures 1-5	1-20

☒ Further documents are listed in the continuation of Box C.
 ☒ See patent family annex.

* Special categories of cited documents:	"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
"A" document defining the general state of the art which is not considered to be of particular relevance	"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
"D" document cited by the applicant in the international application	"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
"E" earlier application or patent but published on or after the international filing date	"&" document member of the same patent family
"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	

Date of the actual completion of the international search 07 June 2023	Date of mailing of the international search report 08 June 2023
Name and mailing address of the ISA/CN China National Intellectual Property Administration (ISA/CN) China No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088	Authorized officer Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2023/076091

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Y	CN 111938211 A (CHANGZHOU PAITENG ELECTRONIC TECHNOLOGY SERVICE CO., LTD.) 17 November 2020 (2020-11-17) description, paragraphs 40-71, and figures 1-2	2-15, 18-19
X	CN 113576043 A (SHENZHEN GEEKVAPE TECHNOLOGY CO., LTD.) 02 November 2021 (2021-11-02) description, paragraphs 40-85, and figures 1-4	1, 16-17, 20
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X	CN 113826963 A (CHINA TOBACCO GUANGDONG INDUSTRIAL CO., LTD.) 24 December 2021 (2021-12-24) description, paragraphs 81-159, and figures 1-5	1, 16-17, 20
Y	CN 113826963 A (CHINA TOBACCO GUANGDONG INDUSTRIAL CO., LTD.) 24 December 2021 (2021-12-24) description, paragraphs 81-159, and figures 1-5	2-15, 18-19
A	KR 20200126588 A (KT&G CORP.) 09 November 2020 (2020-11-09) entire document	1-20

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CN2023/076091

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CN 113576043 A	02 November 2021	None	
CN 113826963 A	24 December 2021	None	
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Form PCT/ISA/210 (patent family annex) (July 2022)

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