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(71) Applicant: **Shenzhen First Union Technology Co., Ltd.**
Shenzhen, Guangdong 518000 (CN)

(72) Inventors:
• **LI, Xinjun**
Shenzhen, Guangdong 518000 (CN)
• **HU, Ruilong**
Shenzhen, Guangdong 518000 (CN)
• **XU, Zhongli**
Shenzhen, Guangdong 518000 (CN)
• **LI, Yonghai**
Shenzhen, Guangdong 518000 (CN)

(74) Representative: **Proi World Intellectual Property GmbH**
Obermattweg 12
6052 Hergiswil, Kanton Nidwalden (CH)

(54) **AEROSOL GENERATING DEVICE, METHOD AND SYSTEM**

(57) This application provides an aerosol-generation device, and a method and system thereof. The aerosol-generation device includes a housing, having an opening; a cavity, configured to receive or remove an aerosol-generation product through the opening; a heater, configured to heat at least a part of the aerosol-generation product received in the cavity to generate an aerosol for inhalation; a color detection apparatus, configured to emit light to the cavity and detect reflection of the light to generate a color signal; and a controller, configured to obtain the color signal generated by the color detection apparatus, and generate a control signal according to the color signal to control operation of the heater. This application detects the insertion or removal of the aerosol-generation product into or from the cavity through the color detection apparatus, and then controls operation of the heater, which has a lower cost, simplifies the operation of the aerosol-generation device, and improves user experience.

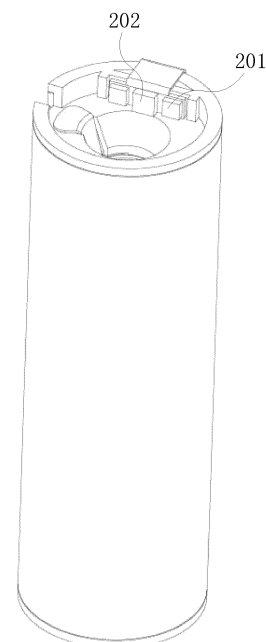


FIG. 4

Description

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to Chinese Patent Application No. 202010801561.7, filed with the China National Intellectual Property Administration on August 11, 2020 and entitled "AEROSOL-GENERATION DEVICE, AND METHOD AND SYSTEM THEREOF", which is incorporated herein by reference in its entirety.

TECHNICAL FIELD

[0002] Embodiments of this application relate to the field of cigarette device technologies, and in particular, to an aerosol-generation device, and a method and system thereof.

BACKGROUND

[0003] Tobacco products such as cigarettes and cigars burn tobacco during use to produce smoke. Attempts have been made to provide alternatives for these tobacco-burning products by manufacturing products that release compounds without being burnt. An example of the products is a so-called heat not burning product that releases a compound by heating rather than burning a tobacco.

[0004] To simplify a user's operation, existing cigarette devices generally install a sensor at a cigarette insertion port to detect whether there is a cigarette inserted, and then control a heater to start heating. However, the sensor cannot detect whether the cigarette is inserted in place, and if heating is started when the cigarette is not inserted in place, the cigarette is prone to not be effectively heated, thereby affecting inhalation experience. A solution is to add another sensor in a cigarette cavity to detect whether the cigarette is inserted in place. However, increasing the sensor leads to an increase in hardware cost of the cigarette device, which reduces competitiveness of the product.

SUMMARY

[0005] Embodiments of this application provide an aerosol-generation device, and a method and system thereof, aiming to resolve the problem of high hardware detection cost in existing cigarette devices.

[0006] According to an aspect of the embodiments of this application, an aerosol-generation device is provided, including:

- a housing, having an opening;
- a cavity, configured to receive or remove an aerosol-generation product through the opening;
- a heater, configured to heat at least a part of the aerosol-generation product received in the cavity to generate an aerosol for inhalation;

a color detection apparatus, configured to emit light to the cavity and detect reflection of the light to generate a color signal; and

a controller, configured to obtain the color signal generated by the color detection apparatus, and generate a control signal according to the color signal to control operation of the heater.

[0007] According to another aspect of the embodiments of this application, a method for controlling an aerosol-generation device is provided, including:

- obtaining a color signal generated by a color detection apparatus; and
- generating a control signal according to the color signal to control operation of a heater.

[0008] According to another aspect of the embodiments of this application, an aerosol-generation system is provided, including:

- an aerosol-generation product, where an outer surface of the aerosol-generation product has a first color and a second color; and
- the aerosol-generation device according to the first aspect.

[0009] The aerosol-generation device, and the method and system thereof provided in the embodiments of this application detect the insertion or removal of the aerosol-generation product into or from the cavity through the color detection apparatus, and then control operation of the heater, which has a lower cost, simplifies the operation of the aerosol-generation device, and improves user experience.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] One or more embodiments are exemplarily described with reference to the corresponding figures in the accompanying drawings, and the descriptions are not to be construed as limiting the embodiments. Elements in the accompanying drawings that have same reference numerals are represented as similar elements, and unless otherwise particularly stated, the figures in the accompanying drawings are not drawn to scale.

FIG. 1 is a schematic diagram of an aerosol-generation system according to an implementation of this application;

FIG. 2 is a schematic diagram of an aerosol-generation product according to an implementation of this application;

FIG. 3 is a schematic exploded view of an aerosol-generation device according to an implementation of this application;

FIG. 4 is a schematic diagram of some components in an aerosol-generation device according to an im-

plementation of this application;

FIG. 5 is a schematic cross-sectional view of FIG. 4; FIG. 6 is a schematic diagram of a heater in an aerosol-generation device according to an implementation of this application;

FIG. 7 is a schematic flowchart of a method for controlling an aerosol-generation device according to an implementation of this application; and

FIG. 8 is another schematic flowchart of a method for controlling an aerosol-generation device according to an implementation of this application.

DETAILED DESCRIPTION

[0011] For ease of understanding of this application, this application is described in further detail below with reference to the accompanying drawings and specific implementations. It should be noted that, when a component is expressed as "being fixed to" another component, the component may be directly on the another component, or one or more intermediate components may exist between the component and the another component. When an element is described as being "connected" to another element, the element may be directly connected to the another element, or one or more intermediate elements may exist therebetween. The terms "up", "down", "left", "right", "inside", "outside", and similar expressions used in this specification are merely used for an illustrative purpose.

[0012] Unless otherwise defined, meanings of all technical and scientific terms used in this specification are the same as those usually understood by a person skilled in the art to which this application belongs. Terms used in the specification of this application are merely intended to describe objectives of the specific implementations, and are not intended to limit this application. The term "and/or" used in this specification includes any or all combinations of one or more related listed items.

[0013] FIG. 1 is a schematic diagram of an aerosol-generation system according to an implementation of this application.

[0014] As shown in FIG. 1, the aerosol-generation system includes an aerosol-generation product 100 and an aerosol-generation device 200. The aerosol-generation device 200 has a cavity for receiving or removing the aerosol-generation product 100. The aerosol-generation product 100 can be inserted into or pulled out from the cavity through an opening A of the aerosol-generation device 200. The aerosol-generation device 200 is configured to heat at least a part of the aerosol-generation product 100 inserted into the cavity to generate an aerosol for inhalation.

[0015] FIG. 2 is a schematic diagram of an aerosol-generation product according to an implementation of this application.

[0016] As shown in FIG. 2, the aerosol-generation product 100 includes a filter segment 101 and a tobacco segment 102.

[0017] The tobacco segment 102 includes an aerosol-generation substrate. The aerosol-generation substrate is a substrate that can release a volatile compound that can form an aerosol, and the volatile compound can be released by heating the aerosol-generation substrate.

[0018] The aerosol-generation substrate may be a solid aerosol-generation substrate. Alternatively, the aerosol-generation substrate may include solid and liquid components. The aerosol-generation substrate may include a tobacco-containing material, which includes volatile tobacco flavor compounds that are released from the substrate when heated. Alternatively, the aerosol-generation substrate may include a non-tobacco material. The aerosol-generation substrate may further include an aerosol-generation article. Appropriate examples of the aerosol-generation article are glycerol and propylene glycol.

[0019] The aerosol generated by heating the tobacco segment 102 is delivered to the user through the filter segment 101, and the filter segment 101 may be a cellulose acetate filter. The filter segment 101 can be sprayed with a flavoring liquid to provide flavor, or, insert separated fibers coated with the flavoring liquid into the filter segment 101, to improve the persistence of flavor delivered to the user. The filter segment 101 may further have a spherical or cylindrical capsule, and the capsule may contain flavoring substance content.

[0020] Only components of the aerosol-generation product 100 relevant to this embodiment are shown in FIG. 2. Correspondingly, a person skilled in the art related to this embodiment should understand that the aerosol-generation product 100 may further include common components other than those shown in FIG. 2. For example, a cooling segment is configured to cool the aerosol generated by heating the tobacco segment 102, so that the user can inhale an aerosol cooled to an appropriate temperature.

[0021] An outer surface of the filter segment 101 at a junction with the tobacco segment 102 has a label C1. The color of the label C1 may be a single color, for example: red, blue, green, or the like, or may further be a mixed color. The color of the label C1 may represent a flavor (not limited to this type) of different aerosol-generation products 100, for example: red represents a mint-flavored aerosol-generation product, blue represents a coffee-flavored aerosol-generation product, green represents a mango-flavored aerosol-generation product, and the like. The color of the label C1 is different from the color of the outer surface of the tobacco segment 102, so as to facilitate the detection and identification by the color detection apparatus.

[0022] FIG. 3 is a schematic exploded view of an aerosol-generation device according to an implementation of this application.

[0023] As shown in FIG. 3, the aerosol-generation device 200 includes a housing 6 and a heater 1, and the heater 1 is arranged in the housing 6.

[0024] The housing 6 includes an outer housing 61, a

fixing housing 62, a base 63, and a bottom cover 64. Both the fixing housing 62 and the base 63 are fixed in the outer housing 61, where the base 63 is configured to fix a substrate 11, the base 63 is arranged in the fixing housing 62, and the bottom cover 64 is arranged at one end of the outer housing 61 and covers the outer housing 61.

[0025] Specifically, the base 63 includes a base 631 sleeved at an upper end of the substrate 11 and a base 632 sleeved at a lower end of the substrate 11. Both the base 631 and the base 632 are arranged in the fixing housing 62. The bottom cover 64 is convexly provided with an air inlet tube 641. One end of the base 632 away from the base 631 is connected to the air inlet tube 641. The base 631, the heater 1, the base 632, and the air inlet tube 641 are arranged coaxially, and the heater 1 can be sealed with the base 631 and the base 632 through a sealing member, the base 632 and the air inlet tube 641 can also be sealed, and the air inlet tube 641 is communicated with external air so that the user can smoothly take in air when inhaling.

[0026] The aerosol-generation device 200 further includes a control circuit board 3 and a battery 7. The fixing housing 62 includes a front housing 621 and a rear housing 622. The rear housing 622 is provided with an opening A, and the front housing 621 is fixedly connected to the rear housing 622. Both the control circuit board 3 and the battery 7 are arranged in the fixing housing 62, and the battery 7 is electrically connected to the control circuit board 3. A button 4 is convexly arranged on the outer housing 61. The control circuit board 3 is further connected to a charging interface 31, the charging interface 31 is exposed on the bottom cap 64, and the user may charge or upgrade the aerosol-generation device 200 through the charging interface 31, to ensure continuous use of the aerosol-generation device 200.

[0027] The battery 7 provides power for operating the aerosol-generation device 200. For example, the battery 7 can provide power to heat the heater 1, and can provide power required to operate the controller. The battery 7 may be, but is not limited to, a lithium iron phosphate (LiFePO₄) battery. For example, the battery 7 may be a lithium cobaltate (LiCoO₂) battery or a lithium titanate battery. The battery 7 may be a rechargeable battery or a disposable battery.

[0028] The aerosol-generation device 200 further includes a thermal insulation tube 5, the thermal insulation tube 5 is arranged in the fixing housing 62, and the thermal insulation tube 5 is arranged on a periphery of the substrate 11. The thermal insulation tube 5 can prevent a large amount of heat from being transferred to the outer housing 61, causing the user to feel hot. The thermal insulation tube includes thermal insulation materials, and the thermal insulation materials may be thermal insulation glue, aerogel, aerogel felt, asbestos, aluminum silicate, calcium silicate, diatomite, zirconia, and the like. The thermal insulation tube may further be a vacuum thermal insulation tube. An infrared reflective coating may further be formed in the thermal insulation tube 5 to

improve heating efficiency.

[0029] The aerosol-generation device 200 further includes a temperature sensor 2, such as an NTC temperature sensor, which is configured to detect a real-time temperature of the heater 1 and transmit the detected real-time temperature to the control circuit board 3, and the control circuit board 3 adjusts a magnitude of a current flowing through the heater 1 according to the real-time temperature.

[0030] Specifically, when the NTC temperature sensor detects that the real-time temperature of the heater 1 is relatively low, for example, the NTC temperature sensor detects that the temperature of the heater 1 is less than 150°C, the control circuit board 3 controls the battery 7 to output a relatively high voltage to the heater 1, thereby increasing heating power of the aerosol-generation substrate, and reducing waiting time for the user to take a first puff.

[0031] When the NTC temperature sensor detects that the temperature of the heater 1 ranges from 150°C to 200°C, the control circuit board 3 controls the battery 7 to output a normal voltage to the heater 1.

[0032] When the NTC temperature sensor detects that the temperature of the heater 1 ranges from 200°C to 250°C, the control circuit board 3 controls the battery 7 to output a relatively low voltage to the heater 1.

[0033] When the NTC temperature sensor detects that the temperature of the heater 1 is 250°C or above, the control circuit board 3 controls the battery 7 to stop outputting a voltage to the heater 1.

[0034] FIG. 4 is a schematic diagram of some components in an aerosol-generation device according to an implementation of this application. FIG. 5 is a schematic cross-sectional view of some components in an aerosol-generation device according to an implementation of this application. FIG. 6 is a schematic diagram of a heater in an aerosol-generation device according to an implementation of this application.

[0035] As shown in FIG. 4 to FIG. 6, the aerosol-generation device 200 further includes a heater 1 and a color detection apparatus. The color detection apparatus includes a light source 201 and a color sensor 202.

[0036] The heater 1 is configured to heat at least a part of an aerosol-generation product 100 received in a cavity of the aerosol-generation device 200 to generate an aerosol for inhalation.

[0037] The heater 1 may use a central heating method (a periphery of a heating body is in direct contact with the aerosol-generation substrate) and a peripheral heating method (a cylindrical heating body wraps the aerosol-generation substrate). The heater can further heat the aerosol-generation substrate through one or more of the following methods: heat conduction, electromagnetic induction, chemical reaction, infrared action, resonance, photoelectric conversion, and photothermal conversion to generate an aerosol for inhalation.

[0038] A description is made below by using an example in which the heater 1 is an infrared heater.

[0039] As shown in FIG. 6, the heater 1 includes a substrate 11, an infrared electrothermal coating 12, and a conductive element 13.

[0040] The substrate 11 may be in a shape of a cylinder, a prism, or another column, preferably a cylinder. The substrate 11 is hollow inside, and the hollow part at least forms a part of the cavity of the aerosol-generation device 200. A base 631 at an upper end of the substrate 11 is provided with a through hole corresponding to the hollow part, and the aerosol-generation product 100 can be removed from or inserted into the hollow part by sequentially passing through the opening A and the through hole.

[0041] The infrared electrothermal coating 12 is formed on an outer surface of the substrate. The infrared electrothermal coating 12 receives electric power of the battery 7 through the conductive element 13 to generate heat, and transfers the generated heat to the aerosol-generation product inserted into the cavity at least in a manner of infrared radiation.

[0042] The conductive element 13 includes a first electrode 131 and a second electrode 132 arranged on the substrate 11, and both the first electrode 131 and the second electrode 132 are electrically connected to the infrared electrothermal coating 12. The first electrode 131 and the second electrode 132 may be an annular conductive coating coated on the outer surface of the substrate 11 near upper and lower ends. The conductive coating is a metallic coating, a conductive tape, or the like, and the metallic coating may include silver, gold, palladium, platinum, copper, nickel, molybdenum, tungsten, niobium or alloy materials of the foregoing metals.

[0043] As shown in FIG. 4 to FIG. 5, a light source 201 and a color sensor 202 are arranged in a through hole of a base 631. When an aerosol-generation product 100 is inserted into a cavity of an aerosol-generation device 200 in place, the color sensor 202 is positioned to correspond to a label C1 of the aerosol-generation product 100. The light source 201 is configured to emit light to the cavity of the aerosol-generation device 200, that is, into the through hole of the base 631; and the color sensor 202 is configured to detect reflection of the light to generate a color signal.

[0044] In this example, the light source 201 may be an LED light. The color sensor 202 may include a color filter and a photoelectric converter, and the color in the reflection of the light is detected through the color filter and a photoelectric detector, and a corresponding color signal is generated. The photoelectric detector includes, but is not limited to, a photodiode, a photoresistor, a phototransistor, and the like. It should be noted that, the configuration of the color sensor 202 is not limited to this case. The light source 201 and the color sensor 202 can be arranged independently, or it is also feasible to integrate the two together.

[0045] The aerosol-generation device 200 further includes a controller, and the controller can control an overall operation of the aerosol-generation device 200. In de-

tail, the controller not only controls operations of the battery 7 and the heater 1, but also controls operations of other elements in the aerosol-generation device 200. In addition, the controller can determine whether the aerosol-generation device 200 is operable by checking states of the elements of the aerosol-generation device 200. In this example, the controller obtains a color signal generated by the color sensor 202, and generates a control signal according to the color signal to control operation of the heater 1.

[0046] The controller includes at least one processor. The processor may include a logic gate array, or may include a combination of a general-purpose microprocessor and a memory for storing an executable program in a microprocessor. In addition, a person skilled in the art should understand that the controller may include hardware of another type.

[0047] In an example, the aerosol-generation device 200 further includes:

an input module, configured to receive a start instruction inputted by a user to generate a start signal; and a micro controller, configured to receive the start signal, and control the light source 201 and the color sensor 202 to start according to the start signal.

[0048] In this example, the input module may be the button 4 shown in FIG. 3, but is not limited to this case.

[0049] With reference to FIG. 1 to FIG. 6, in an example, the controller is further configured to generate a product inserted-in-place signal in a case that a second color signal and a first color signal generated by the color sensor 202 are sequentially obtained within a first preset time; and control the heater 1 to start heating according to the product inserted-in-place signal.

[0050] Specifically, when an aerosol-generation product 100 is inserted into a hollow part of a substrate 11 sequentially through an opening A and a through hole of a base 631, light emitted by a light source 201 irradiates the aerosol-generation product 100, a color sensor 202 sequentially detects the color of an outer surface of a tobacco segment 102 and the color of a label C1, and generates a corresponding second color signal and first color signal. When the controller obtains the second color signal and the first color signal, it can be determined that the aerosol-generation product 100 is inserted into a cavity of the aerosol-generation device 200 in place, so that the product inserted-in-place signal is generated, and then the heater 1 is controlled to automatically start heating according to the product inserted-in-place signal. Further, the controller is further configured to:

determine a type of the aerosol-generation product 100 received in the cavity according to the first color signal; determine corresponding temperature configuration information according to the type of the aerosol-generation product 100; and control power supplied to the heater 1 according to the temperature configuration information.

[0051] Specifically, the color of the label C1 may rep-

represent a flavor of different aerosol-generation products 100, for example: red represents a mint-flavored aerosol-generation product, blue represents a coffee-flavored aerosol-generation product, green represents a mango-flavored aerosol-generation product, and the like. When the first color signal is obtained through the color sensor 202, a corresponding heating curve may be selected from pre-stored heating curves, that is, temperature configuration information, and then the heater 1 is controlled to heat according to the heating curve, so that the user can obtain a best taste.

[0052] Further, the controller is further configured to: generate a product pull-out signal in a case that the second color signal and a third color signal generated by the color sensor 202 are sequentially obtained within a second preset time; and control the heater 1 to stop heating according to the product pull-out signal.

[0053] Specifically, after the heater 1 is controlled to automatically start heating, if the user pulls the aerosol-generation product 100 out of the cavity of the aerosol-generation device 200, the color sensor 202 sequentially detects the color of an outer surface of a tobacco segment 102 and the color of an inner wall of the cavity, and generates a corresponding second color signal and third color signal. When the controller sequentially obtains the second color signal and the third color signal, it can be determined that the aerosol-generation product 100 is removed from the cavity of the aerosol-generation device 200, so that the product pull-out signal is generated and the heater 1 is controlled to stop heating.

[0054] Further, the controller is further configured to: generate a product non-inserted-in-place signal in a case that only the second color signal generated by the color sensor 202 is obtained within a second preset time; and control the heater to stop heating and record a completed heating time of the heater according to the product non-inserted-in-place signal.

[0055] Specifically, after the heater 1 is controlled to automatically start heating, if the aerosol-generation product 100 is accidentally moved, the aerosol-generation product 100 is not inserted into the cavity of the aerosol-generation device 200 in place. In this case, the color sensor 202 can only detect the color of the outer surface of the tobacco segment 102, and generate a corresponding second color signal. When the controller obtains the second color signal, it can be determined that the aerosol-generation product 100 is not inserted in place, so that the product non-inserted-in-place signal is generated, and the heater 1 is controlled to stop heating and a completed heating time of the heater 1 is recorded.

[0056] Further, the controller is further configured to:

generate first prompt information after the heater 1 is controlled to stop heating; and
the aerosol-generation device 200 further includes: a first prompt module, configured to obtain the first prompt information and prompt the user that there is an abnormality in a position of the aerosol-gener-

ation product 100.

[0057] Specifically, after the heater 1 starts heating, if the aerosol-generation product 100 is accidentally moved, the heater 1 is caused to stop heating. In this case, the user can be reminded of the abnormality of the position of the aerosol-generation product 100 through vibration, light, sound, or the like, so as to facilitate the user to reinsert the aerosol-generation product 100 into the cavity in place.

[0058] Further, the controller is further configured to: generate a product reinserted-in-place signal in a case that the second color signal and the first color signal generated by the color sensor 202 are sequentially obtained within a third preset time; calculate a remaining heating time of the heater according to the completed heating time of the heater; and control the heater 1 to perform heating according to the product reinserted-in-place signal and the remaining heating time of the heater.

[0059] Specifically, after the heater 1 starts heating, if the aerosol-generation product 100 is accidentally moved, the heater 1 is caused to stop heating. If the user reinserts the aerosol-generation product 100 into the cavity in place, the aerosol-generation product 100 can continue to be heated without the user starting the heating, which further simplifies the operation of the aerosol-generation device 200 and improves the user experience.

[0060] Further, the controller is further configured to: control the heater 1 to be in an off state in a case that only the second color signal generated by the color sensor 202 is obtained within the first preset time or in a case that the second color signal and a fourth color signal generated by the color sensor 202 are sequentially obtained within the first preset time.

[0061] Specifically, in a case that only the second color signal generated by the color sensor 202 is obtained within the first preset time, it can be determined that the aerosol-generation product 100 is not inserted in place. In this case, there is no need to control the heater 1 to start heating, that is, to control the heater 1 to be in the off state. Alternatively, when the second color signal and the fourth color signal generated by the color sensor 202 are sequentially obtained within the first preset time, it can be determined that an aerosol-generation product that does not match the aerosol-generation device 200 is inserted. In this case, there is also no need to control the heater 1 to start heating, that is, to control the heater 1 to be in the off state. A fourth color is different from the color of the foregoing label C1, and also different from the color of the outer surface of the tobacco segment 102 and the color of the inner wall of the cavity.

[0062] It should be noted that, the first preset time, second preset time and third preset time above may be empirical values, which have been set when the aerosol-generation device 200 leaves the factory; or set by the user.

[0063] Further, the controller is further configured to:

generate second prompt information in a case that only the second color signal generated by the color sensor 202 is obtained within the first preset time or in a case that the second color signal and the fourth color signal generated by the color sensor 202 are sequentially obtained within the first preset time; and the aerosol-generation device 200 further includes: a second prompt module, configured to receive the second prompt information and prompt the user that there is an abnormality.

[0064] FIG. 7 is a schematic flowchart of a method for controlling an aerosol-generation device according to an implementation of this application. The method includes:

Step S11: Obtain a color signal generated by a color detection apparatus.

Step S12: Generate a control signal according to the color signal to control operation of a heater.

[0065] An overall control process of the aerosol-generation device 200 is described below with reference to FIG. 8.

[0066] Step S21: Insert a cigarette.

[0067] Step S22: Detect whether the cigarette is inserted.

[0068] Specifically, when the cigarette is inserted, a color sensor 202 detects a color of an outer surface of a tobacco segment 102 and generates a corresponding second color signal, which can determine that the cigarette is inserted.

[0069] Step S23: Continue to insert the cigarette.

[0070] Step S25: Detect whether the cigarette is inserted in place.

[0071] Specifically, when the cigarette is inserted into a cavity in place, the color sensor 202 sequentially detects the color of the outer surface of the tobacco segment 102 and a color of a label C1, and generates a corresponding second color signal and first color signal.

[0072] Step S26: When the cigarette is inserted into the cavity in place, a controller controls a heater to start heating.

[0073] Step S261 and Step S27: The heating of the cigarette is completed and the cigarette is pulled out, and the heating ends.

[0074] Step S262, Step S263, and Step S27: The cigarette is abnormally out of an insertion position, and the controller controls the heater to stop heating. In this case, if the cigarette is pulled out, the heating ends.

[0075] It should be noted that, the specification of this application and the accompanying drawings thereof illustrate preferred embodiments of this application. However, this application can be implemented in various different forms, and is not limited to the embodiments described in this application. These embodiments are not intended to be an additional limitation on the content of this application, and are described for the purpose of providing a more thorough and comprehensive understand-

ing of the content disclosed in this application. Moreover, the above technical features can further be combined to form various embodiments not listed above, and all such embodiments shall be construed as falling within the scope of this application. Further, a person of ordinary skill in the art may make improvements or variations according to the above descriptions, and such improvements and variations shall all fall within the protection scope of the appended claims of this application.

Claims

1. An aerosol-generation device, comprising:

a housing, having an opening;
a cavity, configured to receive or remove an aerosol-generation product through the opening;
a heater, configured to heat at least a part of the aerosol-generation product received in the cavity to generate an aerosol for inhalation;
a color detection apparatus, configured to emit light to the cavity and detect reflection of the light to generate a color signal; and
a controller, configured to obtain the color signal generated by the color detection apparatus, and generate a control signal according to the color signal to control operation of the heater.

2. The aerosol-generation device according to claim 1, wherein the controller is further configured to: generate a product inserted-in-place signal in a case that a second color signal and a first color signal generated by the color detection apparatus are sequentially obtained within a first preset time; and control the heater to start heating according to the product inserted-in-place signal.

3. The aerosol-generation device according to claim 2, wherein the controller is further configured to: determine a type of the aerosol-generation product received in the cavity according to the first color signal; determine corresponding temperature configuration information according to the type of the aerosol-generation product; and control power supplied to the heater according to the temperature configuration information.

4. The aerosol-generation device according to claim 2, wherein the controller is further configured to: generate a product pull-out signal in a case that the second color signal and a third color signal generated by the color detection apparatus are sequentially obtained within a second preset time; and control the heater to stop heating according to the product pull-out signal.

5. The aerosol-generation device according to claim 2,

wherein the controller is further configured to:
generate a product non-inserted-in-place signal in a case that only the second color signal generated by the color detection apparatus is obtained within a second preset time; and control the heater to stop heating and record a completed heating time of the heater according to the product non-inserted-in-place signal.

6. The aerosol-generation device according to claim 5, wherein the controller is further configured to:
generate a product reinserted-in-place signal in a case that the second color signal and the first color signal generated by the color detection apparatus are sequentially obtained within a third preset time; calculate a remaining heating time of the heater according to the completed heating time of the heater; and control the heater to perform heating according to the product reinserted-in-place signal and the remaining heating time of the heater.

7. The aerosol-generation device according to claim 1, wherein the controller is further configured to:
control the heater to be in an off state in a case that only a second color signal generated by the color detection apparatus is obtained within a first preset time or in a case that a second color signal and a fourth color signal generated by the color detection apparatus are sequentially obtained within a first preset time.

8. The aerosol-generation device according to claim 7, wherein the controller is further configured to:

generate prompt information in a case that only the second color signal generated by the color detection apparatus is obtained within the first preset time or in a case that the second color signal and the fourth color signal generated by the color detection apparatus are sequentially obtained within the first preset time; and the aerosol-generation device further comprises:
a prompt module, configured to receive the prompt information and prompt a user that there is an abnormality.

9. The aerosol-generation device according to claim 1, wherein the aerosol-generation device further comprises:

an input module, configured to receive a start instruction inputted by a user to generate a start signal; and
a micro controller, configured to receive the start signal, and control the color detection apparatus to start according to the start signal.

10. A method for controlling an aerosol-generation device, comprising:

obtaining a color signal generated by a color detection apparatus; and
generating a control signal according to the color signal to control operation of a heater.

11. An aerosol-generation system, comprising:

an aerosol-generation product, wherein an outer surface of the aerosol-generation product has a first color and a second color; and
the aerosol-generation device according to any one of claims 1 to 9.

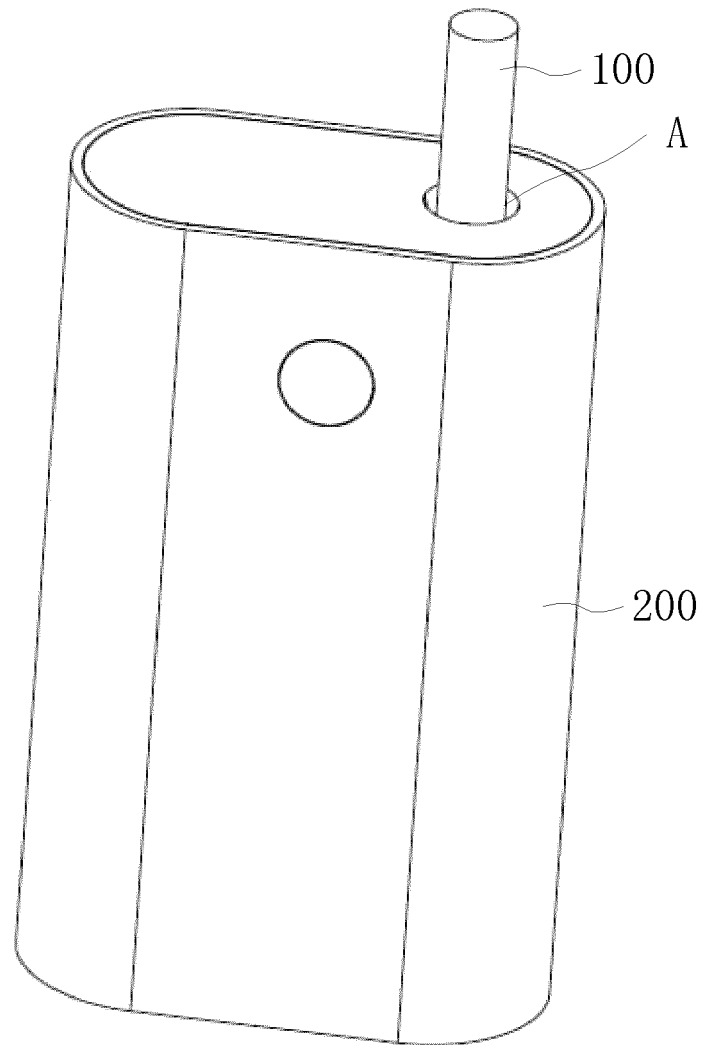


FIG. 1

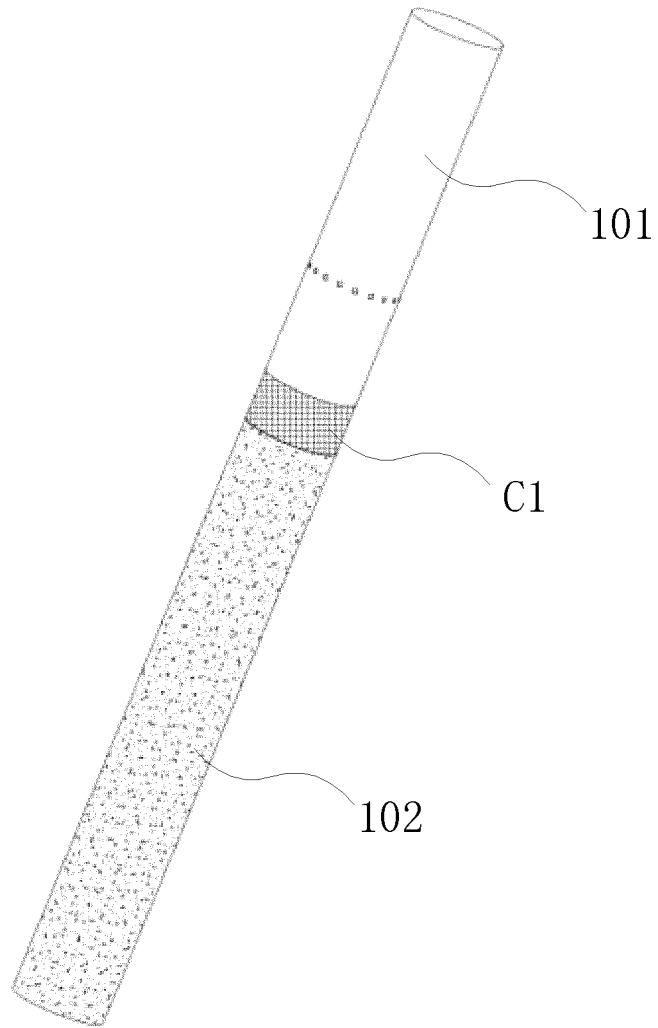


FIG. 2

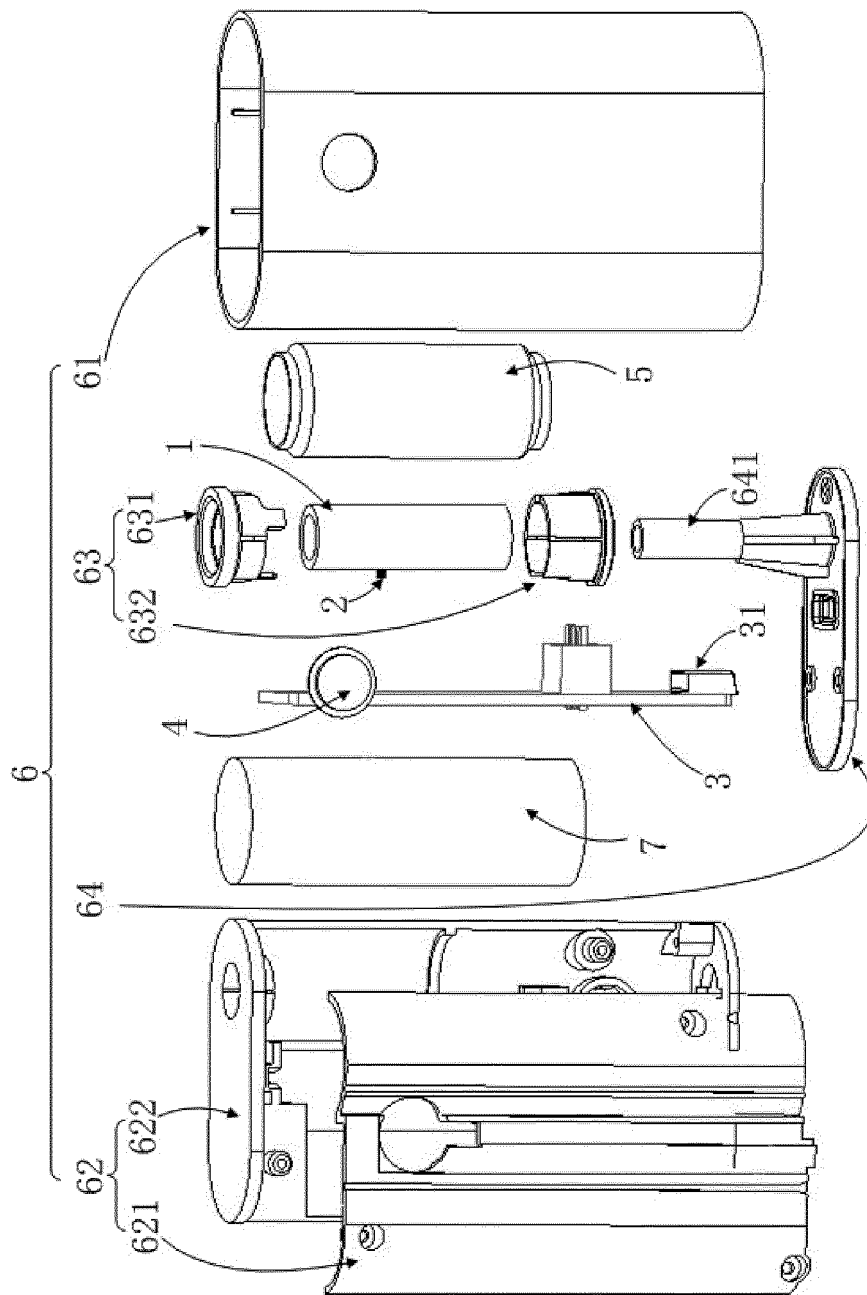


FIG. 3

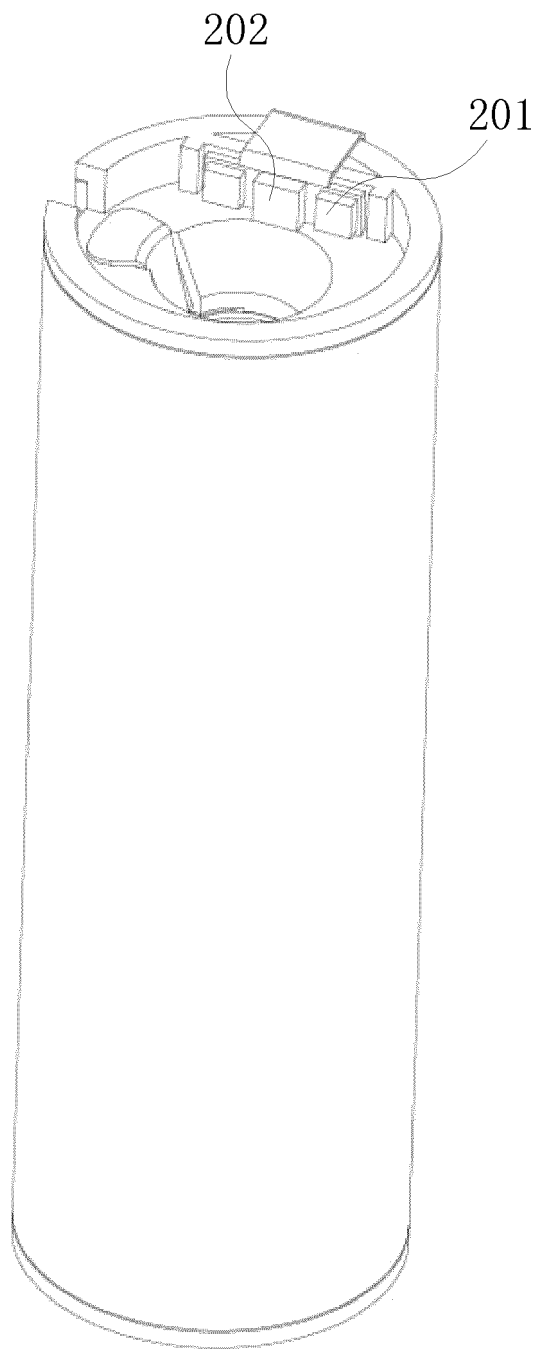


FIG. 4

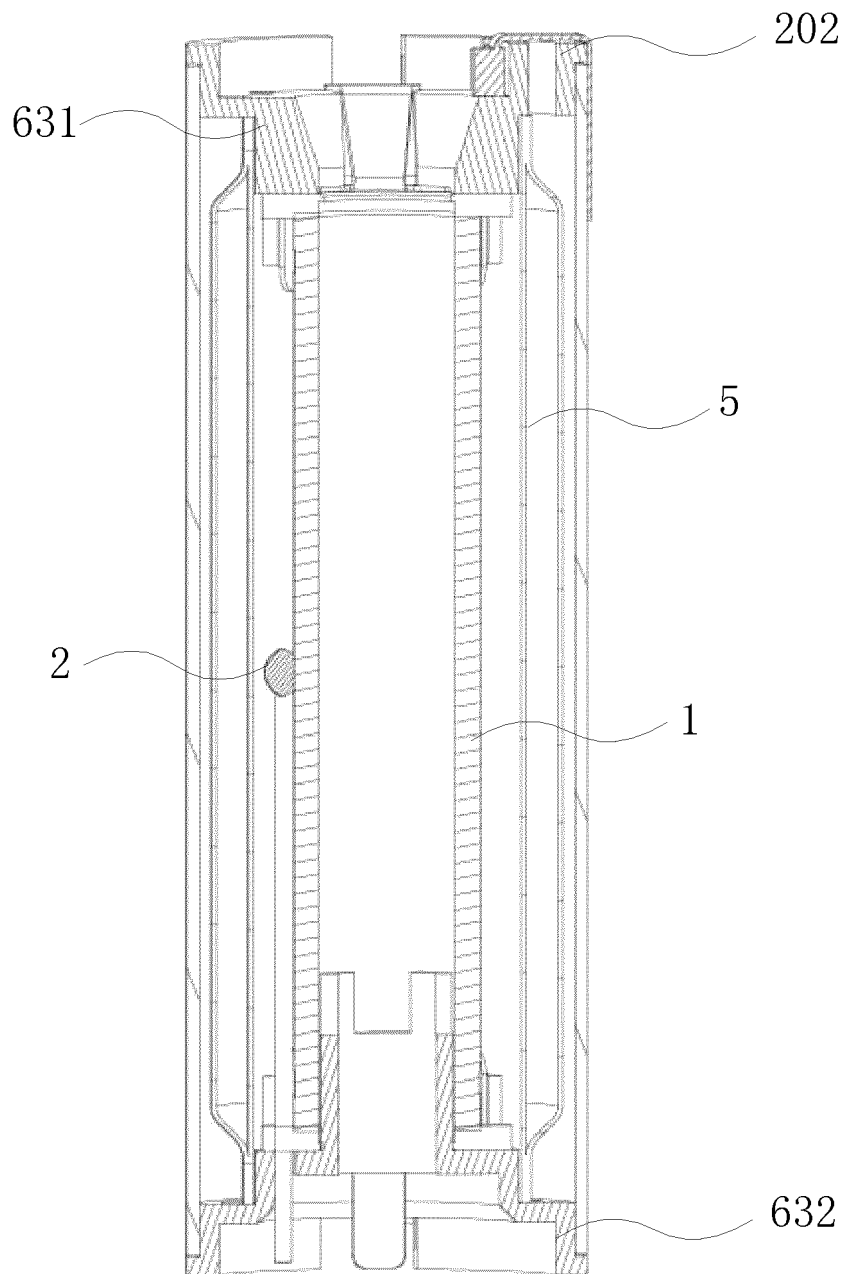


FIG. 5

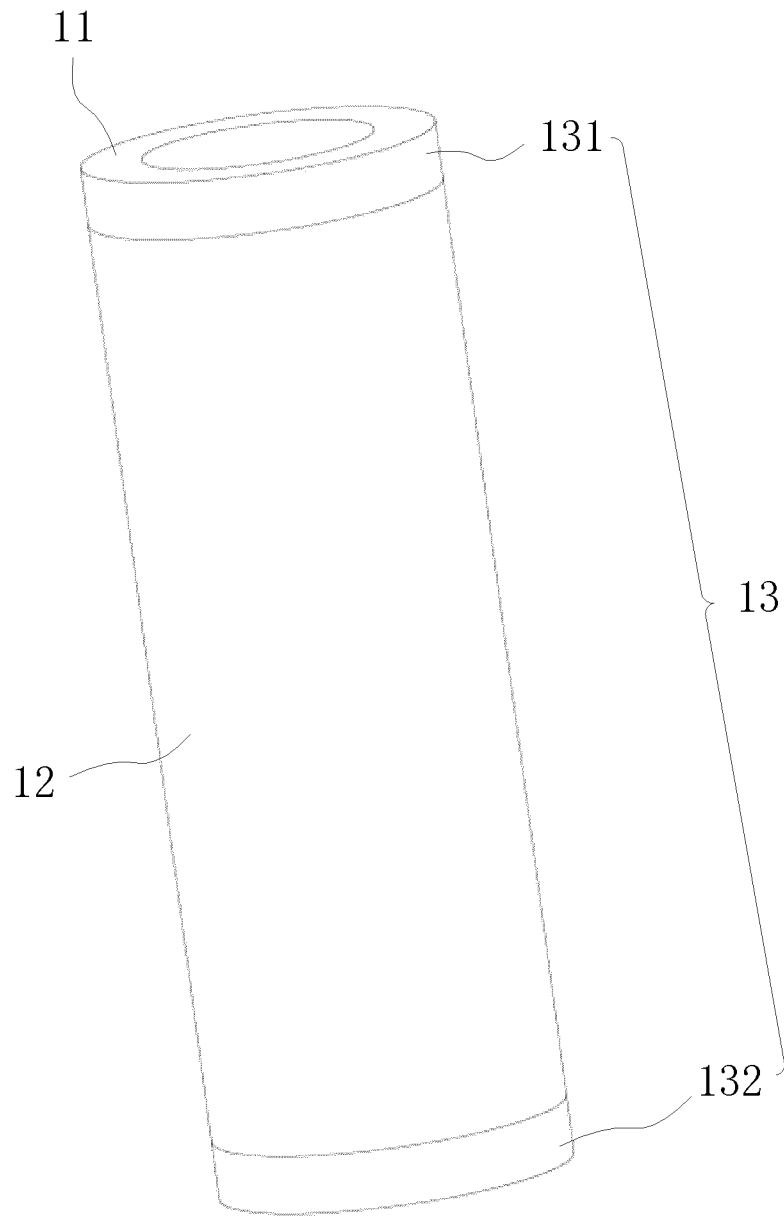


FIG. 6

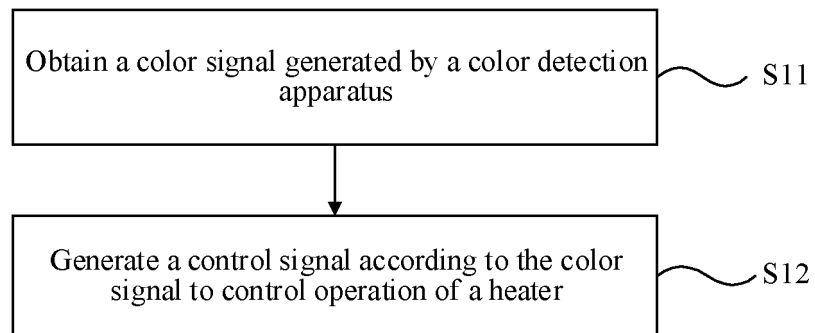


FIG. 7

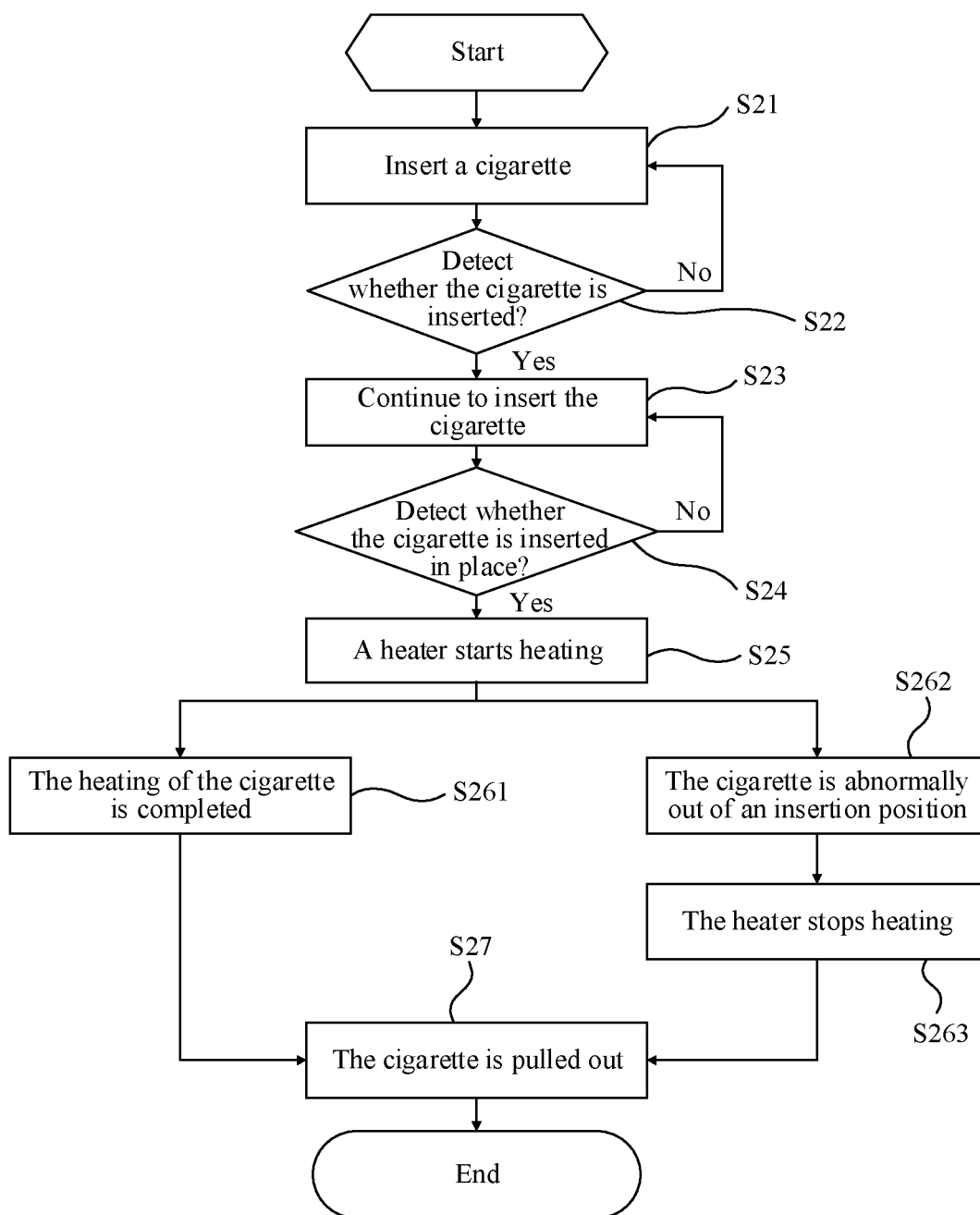


FIG. 8

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2021/112105

A. CLASSIFICATION OF SUBJECT MATTER

A24F 40/40(2020.01)i; A24F 40/57(2020.01)i; A24F 40/51(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)

A24F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CNABS, CNTXT: 插入, 装入, 颜色, 正确, 到位, 对位 VEN: insert, install, color, colour, in place, correct

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 112867405 A (KTANDG CORPORATION) 28 May 2021 (2021-05-28) claims 1-15 and figures 1-12	1-11
PX	CN 212520805 U (SHENZHEN MEGMEET CONTROL TECHNOLOGY CO., LTD.) 12 February 2021 (2021-02-12) claims 1-10, and figures 1-4	1-11
PA	CN 111802705 A (SHENZHEN ZHONGXIN CHUANGZHAN SCIENCE AND TECHNOLOGY CO., LTD.) 23 October 2020 (2020-10-23) entire document	1-11
X	CN 111200945 A (BRITISH AMERICAN TOBACCO (INVESTMENTS) LIMITED) 26 May 2020 (2020-05-26) claims 1-21, description paragraph 64 and figures 1-14	1-11
X	CN 210130349 U (HI-P (SHANGHAI) DOMESTIC APPLIANCE PRODUCTS CO., LTD.) 10 March 2020 (2020-03-10) description, paragraphs 26-30 and figures 1-7	1-11
A	CN 106418702 A (SHENZHEN FIRST UNION TECHNOLOGY CO., LTD.) 22 February 2017 (2017-02-22) entire document	1-11



Further documents are listed in the continuation of Box C.



See patent family annex.

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Date of the actual completion of the international search

18 September 2021

Date of mailing of the international search report

25 October 2021

Name and mailing address of the ISA/CN

China National Intellectual Property Administration (ISA/
CN)
No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing
100088
China

Authorized officer

Facsimile No. (86-10)62019451

Telephone No.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2021/112105

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CN2021/112105

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WO 2020074929 A1	16 April 2020	CA 3116153 A1 CN 112888326 A AU 2019358592 A2 AU 2019358592 A1	16 April 2020 01 June 2021 03 June 2021 27 May 2021

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REFERENCES CITED IN THE DESCRIPTION

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