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(54) **AEROSOL GENERATING DEVICE**

(57) Provided is an aerosol generating device, including: a housing (1); a heating assembly (4) provided in the housing (1) and used for heating an aerosol generating product; a power supply (31) and a circuit board (32) which are both provided in the housing (1), where the circuit board (32) is electrically connected to the heating assembly (4) and the power supply (31), so as to control the power supply (31) to provide power for the heating assembly (4); and a rack (2), the circuit board (32) or the heating assembly (4) or the power supply (31) being fixed to the surface of the rack (2) and being spaced apart from the housing (1), wherein the rack (2) includes a plurality of separation structures (222) which abut against the housing (1) to form a plurality of independent heat insulation cavities (7).

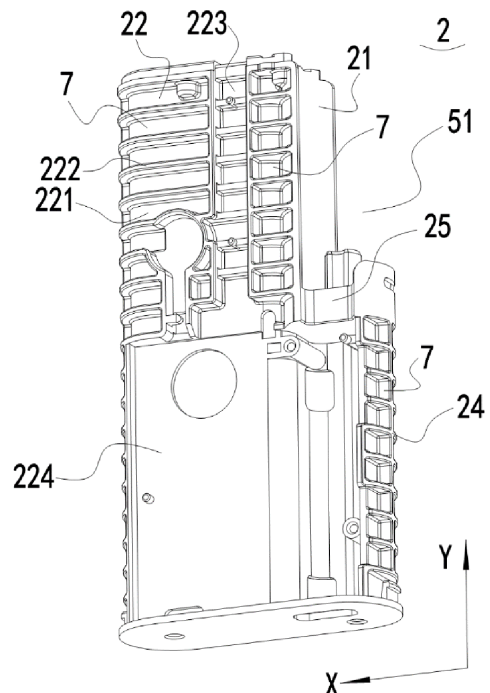


FIG. 5

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Description

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to Chinese Patent Application No. 202322809268.7, filed with the China National Intellectual Property Administration on October 18, 2023 and entitled "AEROSOL GENERATING DEVICE", which is incorporated herein by reference in its entirety.

TECHNICAL FIELD

[0002] Embodiments of this application relate to the field of heating non-burning aerosol generation technologies, and in particular, to an aerosol generating device.

BACKGROUND

[0003] During use of smoking articles (such as cigarettes and cigars), tobacco is burned to produce tobacco aerosol. People try to replace these tobacco-burning products by manufacturing products that release compounds without burning.

[0004] An example of such products is a heating device that releases a compound by heating rather than burning a material. For example, the material may be an aerosol generating product including tobacco or other non-tobacco products, and these non-tobacco products may or may not include nicotine.

[0005] A known heating device includes a housing and a heating assembly provided in the housing and used for heating a smoking article. During use, a user holds the housing. However, to facilitate holding and carrying by the user, the size of the heating device needs to be reduced to make the heating device miniaturized. However, the temperature at which the heating assembly heats the smoking article is usually higher than 200°C, and miniaturization causes a poor heat insulation effect between the housing and the heating assembly. Consequently, not only a large power consumption of the heating device is caused, but also the housing may possibly be hot to catch.

SUMMARY

[0006] This application provides an aerosol generating device, which can effectively reduce the power consumption and prevent the housing from getting hot to catch.

[0007] An embodiment of this application provides an aerosol generating device, including:

- a housing;
- a heating assembly, provided in the housing and used for heating an aerosol generating product;
- a power supply and a circuit board which are both provided in the housing, where the circuit board is electrically connected to the heating assembly and

the power supply, so as to control the power supply to provide power for the heating assembly; and a rack, the circuit board or the heating assembly or the power supply being fixed to a surface of the rack and being spaced apart from the housing, where the rack includes a plurality of separation structures which abut against the housing to form a plurality of independent heat insulation cavities.

[0008] According to the aerosol generating device, the rack includes a plurality of separation structures which abut against the housing to form a plurality of independent heat insulation cavities, and the circuit board or the heating assembly or the power supply is fixed to the surface of the rack and is spaced apart from the housing, so that the circuit board or the heating assembly or the power supply can be mounted on part of the surface of the rack, and the heat insulation cavities are provided in part of the surface. Therefore, the internal space of the housing can be fully used and the aerosol generating device can be miniaturized. In addition, the spaced-apart arrangement of the circuit board or the heating assembly or the power supply can block heat transfer to the housing, and the plurality of heat insulation cavities independent of each other can reduce cold and hot gas exchange. Therefore, the heat insulation effect is enhanced, the power consumption of the heating assembly can be reduced, and it is ensured that the hand of a user is not scalped when the user holds the housing.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] One or more embodiments are exemplarily described with reference to the corresponding figures in the accompanying drawings, and the exemplary 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 generating device according to an embodiment;

FIG. 2 is a schematic exploded view of an aerosol generating device according to an embodiment;

FIG. 3 is a schematic diagram of an inner portion of an aerosol generating device according to an embodiment;

FIG. 4 is a schematic diagram of a rack according to an embodiment;

FIG. 5 is a schematic diagram of a rack according to another embodiment; and

FIG. 6 is a schematic diagram of a rack according to

another embodiment.

[0010] In the drawings:

1. housing;
2. rack; 21. first side plate; 22. second side plate;
221. main body part; 222. separation structure; 223. first part; 224. second part; 23. third side plate; 24. fourth side plate; 25. supporting part; 26. top plate;
31. power supply; 32. circuit board;
4. heating assembly; 41. heating cavity; 42. heat insulation element;
51. first retaining space; 52. second retaining space;
6. upper cover; 61. insertion port;
7. heat insulation cavity.

DETAILED DESCRIPTION

[0011] The technical solutions in the embodiments of this application are clearly and completely described below with reference to the accompanying drawings in the embodiments of this application. Clearly, the described embodiments are merely some rather than all of the embodiments of this application. All other embodiments obtained by a person of ordinary skill in the art based on the embodiments of this application without creative efforts shall fall within the protection scope of this application.

[0012] The terms "first", "second", and "third" in this application are merely intended for a purpose of description, and shall not be understood as indicating or implying relative significance or implicitly indicating the number or order of indicated technical features. All directional indications (such as up, down, left, right, front, and rear) in the embodiments of this application are only used for explaining relative position relationships, or movement situations, or the like between components in a posture (as shown in the accompanying drawings). If the posture changes, the directional indications correspondingly change. In addition, terms "comprise", "include", and any variations thereof are intended to indicate non-exclusive inclusion. For example, a process, method, system, product, or device that includes a series of steps or units is not limited to the listed steps or units, and instead, further optionally includes a step or unit that is not listed, or further optionally includes another step or unit that is intrinsic to the process, method, product, or device.

[0013] "Embodiment" mentioned herein means that features, structures, or characteristics described with reference to the embodiment may be included in at least one embodiment of this application. The phrase appearing at various locations in the specification unnecessarily indicates a same embodiment or an independent or alternative embodiment exclusive to another embodiment. A person skilled in the art explicitly or implicitly understands that the embodiments described in this specification may be combined with other embodiments.

[0014] It should be noted that, when an element is

referred to as "being fixed to" another element, the element may be directly on the another element, or there may be an intermediate element. When an element is considered to be "connected to" another element, the element may be directly connected to the another element, or one or more intervening elements may exist simultaneously. The terms "perpendicular", "horizontal", "left", and "right", and similar expressions used herein are only for the purpose of description but not indicate a unique implementation.

[0015] Referring to FIG. 1, an embodiment of this application provides an aerosol generating device. The aerosol generating device can interact with an aerosol generating product, so that the aerosol generating product generates an aerosol.

[0016] As used in this specification, the term "aerosol generating product" refers to a product including an aerosol forming substrate. When being heated, the aerosol forming substrate releases a volatile compound that can form the aerosol. In an embodiment, the aerosol generating product may be removably coupled to the aerosol generating device. The product may be disposable or reusable.

[0017] The aerosol forming substrate may be a solid aerosol forming substrate. The solid aerosol forming substrate may include a tobacco-containing material. The tobacco-containing material includes a volatile tobacco aroma compound released from the aerosol forming substrate during heating. The solid aerosol forming substrate may include a non-tobacco-containing material. The solid aerosol forming substrate may include a tobacco-containing material and a non-tobacco-containing material.

[0018] The aerosol forming substrate may be a liquid aerosol forming substrate. The liquid aerosol forming substrate may include a liquid containing a tobacco substance containing a volatile tobacco flavor ingredient, and may alternatively be a liquid containing a non-tobacco substance. The liquid aerosol forming substrate may include water, a medicinal solution, a solvent, ethanol, a plant extract, a flavoring agent, an aromatic agent, a vitamin mixture, or the like. The flavoring agent may include an areca nut extract, menthol, peppermint, spearmint oil, various fruity aroma ingredients, and the like, but is not limited thereto. The aromatic agent may include ingredients that can provide various scents or flavors to the user. The vitamin mixture may be a mixture in which at least one of vitamin A, vitamin B, vitamin C, and vitamin E is mixed, but is not limited thereto.

[0019] Referring to FIG. 1 to FIG. 4, the aerosol generating device includes a housing 1, a power supply assembly, and a heating assembly 4. The housing 1 is provided with a first retaining space 51 and a second retaining space 52, the heating assembly 4 is provided in the first retaining space 51, and the power supply 31 in the power supply assembly is provided in the second retaining space 52. The heating assembly 4 is used for heating the aerosol generating product, so that the aerosol form-

ing substrate generates an aerosol, and the power supply assembly is electrically connected to the heating assembly 4, to provide power for the heating assembly 4.

[0020] The power supply assembly may include a power supply 31, and the power supply 31 may be any suitable battery. In an embodiment, the battery is a lithium-ion battery. Alternatively, the battery may be a nickel metal hydride battery, a nickel-cadmium battery, or a lithium-based battery, such as a lithium cobalt, lithium iron phosphate, lithium titanate, or lithium polymer battery. The power supply assembly may include a circuit board 32 and one or more control circuits disposed on the circuit board 32. The control circuit may control output of the battery, for example, enable the battery to output an alternating current or to output a direct current, or enable the power supply 31 to output a current or a voltage in a form of a pulse.

[0021] The control circuit may be provided with one or more controllers. The controller may control an overall operation of the aerosol generating device. In details, the controller not only controls operations of the power supply 31 and a heating element 21, but also controls operations of other elements in the aerosol generating device. In addition, the controller may determine, by checking a state of an element of the aerosol generating device, whether the aerosol generating device may perform an operation. 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 that stores a program executable in the microprocessor. In addition, a person skilled in the art should understand that the controller may include another type of hardware.

[0022] In an embodiment, referring to FIG. 2 and FIG. 3, a longitudinal-extending heating cavity 41 is formed in the heating assembly 4. At least part of the aerosol generating product, for example, the aerosol forming substrate may be received in the heating cavity 41. The heating assembly 4 includes a heating element. At least part of heat released by the heating element can enable the aerosol forming substrate to generate an aerosol. The heating element may include at least one of a resistive material, an infrared material, and an electromagnetic material.

[0023] The resistive material refers to a material capable of generating Joule heat when being electrically conducted. A suitable resistive material includes, but is not limited to, a semiconductor such as a doped ceramic, a conductive ceramic (for example, molybdenum disilicide), carbon, graphite, a metal, a metal alloy, and a composite material made of a ceramic material and a metal material. This type of composite material may include a doped or non-doped ceramic. An example of a suitable doped ceramic includes doped silicon carbide. Examples of a suitable metal include titanium, zirconium, tantalum, and platinum-group metals. Examples of a suitable metal alloy include stainless steel, constantan, a nickel-containing alloy, a cobalt-containing alloy, a

chromium-containing alloy, an aluminum-containing alloy, a titanium-containing alloy, a zirconium-containing alloy, a hafnium-containing alloy, a niobium-containing alloy, a molybdenum-containing alloy, a tantalum-containing alloy, a tungsten-containing alloy, a tin-containing alloy, a gallium-containing alloy, a manganese-containing alloy, an iron-containing alloy, a nickel-iron-cobalt-based super alloy, stainless steel, an iron-aluminum-based alloy, and an iron-manganese-aluminum-based alloy.

[0024] The infrared material refers to a material capable of radiating infrared rays when excited or when being electrically conducted. A suitable infrared material can generate infrared rays of 0.75 μm to 1000 μm , optionally, infrared rays of 1.5 μm to 400 μm , and optionally, infrared rays of 8 μm to 15 μm .

[0025] The electromagnetic material is a material capable of generating an eddy current and/or magnetic hysteresis in a changing magnetic field, so as to generate heat in the changing magnetic field. The electromagnetic material may include a metal or carbon. In an embodiment, the electromagnetic material may include a ferro magnetic material, for example, ferrite, ferro magnetic steel, or stainless steel. In an embodiment, the electromagnetic material includes a nickel iron alloy. In an embodiment, a sensor includes 400 series stainless steel. The 400 series stainless steel includes, for example, 410 grade or 420 grade or 430 grade stainless steel.

[0026] When the heating element includes the electromagnetic material, the aerosol generating device may further include a magnetic field generator. The magnetic field generator is electrically connected to a power supply assembly, and the power supply assembly provides a current for generating a changing magnetic field to the magnetic field generator. The magnetic field generator may include one or more induction coils that generate a changing magnetic field, and the one or more induction coils may surround a sensing material.

[0027] It should be noted that, in some embodiments, the heating element is a constituent part of the aerosol generating product. In some embodiments provided in this application, the heating element is a constituent part of the heating assembly of the aerosol generating device.

[0028] Referring to FIG. 2 and FIG. 3, the heating assembly 4 may further include a heat insulation element 42. The heat insulation element 42 is disposed on the periphery of the heating element and is disposed around the heating cavity 41. The heat insulation element 42 can prevent heat generated by the heating element from being transferred to a housing 1, which helps to reduce the power consumption of the heating element and increase the temperature rise speed of the heating element, can further prevent the temperature of the surface of the housing 1 from being excessively high, and can prevent a user from being scalded.

[0029] The heat insulation element 42 may be made of a heat insulation material. The heat insulation material means that the heat conduction of a material at 23°C and

50% of relative humidity is less than 100 W/(m·K), and preferably less than 40 W/(m·K) or less than 10 W/(m·K). For example, the heat insulation material may be made of at least one of a PAEK type material, a PI type material, or a PBI type material. The PAEK type material includes a PEEK, a PEKK, a PEKEKK, or a PEK material. For example, the heat insulation material may include an aerosol or a felt.

[0030] The heat insulation element 42 may include an evacuated pipe having an interlayer in a wall, the interlayer may be filled with air or a heat insulation material, and the interlayer may be a negative pressure layer.

[0031] Referring to FIG. 1 and FIG. 2, the aerosol generating device further includes an upper cover 6, an insertion port 61 for inserting an aerosol generating product into the heating cavity is provided on the upper cover 6, and the upper cover 6 is joined to the housing 1.

[0032] Referring to FIG. 2, the aerosol generating device further includes a rack 2. The rack 2 can abut against the upper cover 6 upwards. The rack 2 is provided in the housing 1. The rack 2 is used for holding the heating assembly 4 and the power supply assembly. At least part of the rack 2 may be made of a heat insulation material.

[0033] More specifically, the circuit board 32 or the heating assembly 4 or the power supply 31 is fixed to the surface of the rack 2, and the rack 2 abuts against the housing 1. In an embodiment, referring to FIG. 4 and FIG. 5, part of boundaries of the first retaining space 51 is defined by the rack 2, part of boundaries of the first retaining space 51 is defined by the housing 1, part of boundaries of the second retaining space 52 is defined by the rack 2, and part of boundaries of the second retaining space 52 is defined by the housing 1, so that an internal structural structure of the aerosol generating device is compact, and the space between the rack 2 and the housing 1 can be fully used.

[0034] The circuit board 32 or the heating assembly 4 or the power supply 31 and the housing 1 are independent of each other, so that an excessively high temperature of the housing 1 can be prevented while a miniaturization design requirement on the aerosol generating device is satisfied.

[0035] More specifically, referring to FIG. 4 and FIG. 5, the rack 2 includes a separation structure 222. The separation structure 222 abuts against the housing 1. The separation structure 222 enables a plurality of independent heat insulation cavities 7 to be formed between the rack 2 and the housing 1. The heat insulation cavities 7 may be filled with air, thereby having a heat insulation effect and capable of preventing heat from being transferred to the housing 1. Based on this, referring to FIG. 4 and FIG. 5, part of the surface of the rack 2 is provided with heat insulation cavities 7, and part of the surface of the rack 2 is fixed to the circuit board 32 or the heating assembly 4 or the power supply 31. The separation structure 222 can prevent a gas from flowing freely between two adjacent heat insulation cavities 7, so that these heat insulation cavities 7 are independent of each

other, which helps to reduce cold and hot gas exchange between these heat insulation cavities 7, thereby helping to increase the heat insulation effect and reduce the energy consumption of the heating assembly 4.

[0036] In an embodiment, referring to FIG. 4 and FIG. 5, the rack 2 includes a first side plate 21 and a second side plate 22. The first side plate 21 is disposed between the first retaining space 51 and the second retaining space 52, so that the first retaining space 51 and the second retaining space 52 are independent of each other, and can prevent, to some extent, heat on the heating assembly 4 from being transferred to the second retaining space 52. The second side plate 22 defines part of boundaries of the second retaining space 52.

[0037] To satisfy the miniaturization design requirement on the aerosol generating device, the second side plate 22 may directly abut against an inner wall of the housing 1. However, in a conventional case, the second side plate 22 directly abutting against the housing 1 is beneficial to transfer of heat on the heating assembly 4 to the housing 1, causing a relatively high temperature on the surface of the housing 1 corresponding to the power supply assembly, and causing a relatively large energy consumption of the heating assembly 4.

[0038] A user usually holds the housing 1 corresponding to the power supply assembly when using the aerosol generating device. To reduce the temperature at which the user holds and improve the safety and the user experience, referring to FIG. 5, a separation structure 222 is provided on the second side plate 22, so that the second side plate 22 directly abuts against the housing 1 and a plurality of independent heat insulation cavities 7 are arranged between the second side plate 22 and the housing 1. These plurality of independent heat insulation cavities 7 have an insulation function and can prevent heat on the heating assembly 4 from being transferred to the housing 1 corresponding to the power supply assembly. Moreover, the plurality of heat insulation cavities 7 are independent of each other and can reduce cold and hot gas exchange between the second side plate 22 and the housing 1, so that the heat insulation effect is enhanced, the power consumption of the heating assembly 4 can be reduced, and it is ensured that the user is not scalped when holding the housing 1.

[0039] In an example, referring to FIG. 5, a plurality of heat insulation cavities 7 between the second side plate 22 and the housing 1 are sequentially distributed in a longitudinal direction Y. In an example, referring to FIG. 5, a plurality of heat insulation cavities 7 between the second side plate 22 and the housing 1 are sequentially distributed in a transverse direction X. In an example, referring to FIG. 5, a plurality of heat insulation cavities 7 between the second side plate 22 and the housing 1 are arranged in an array.

[0040] In an example, referring to FIG. 5, an area or a volume of at least part of the heat insulation cavities 7 adjacent to the first retaining space 51 or the first side plate 21 is smaller than an area or a volume of at least part

of the heat insulation cavities 7 relatively far away from the first retaining space 51 or the first side plate 21. In this way, it is beneficial to prevent heat from being transferred in a direction away from the first side plate 21.

[0041] In an example, referring to FIG. 4 and FIG. 5, one side of the first side plate 21 defines part of boundaries of the first retaining space 51, and the other side opposite to the first side plate 21 defines part of boundaries of the second retaining space 52, so that the aerosol generating device can be further miniaturized, and under an effect of the heat insulation cavities 7 between the second side plate 22 and the housing 1, it can be ensured that the housing 1 corresponding to the power supply assembly has a suitable temperature during further miniaturization.

[0042] In an example, referring to FIG. 4 and FIG. 5, the first side plate 21 and the second side plate 22 are integrally injection-formed.

[0043] In an embodiment, referring to FIG. 5, the second side plate 22 includes a main body part 221 and a separation structure 222. The separation structure 222 extends from the main body part 221 toward the housing 1. A plurality of separation structures 222 are provided in a cross manner, thereby separating a space between the second side plate 22 and the housing 1 into a plurality of independent heat insulation cavities 7. In other embodiments, an inner wall of the housing 1 has a plurality of convex ribbings extending toward the second side plate 22, and the plurality of convex ribbings are arranged in a cross manner, or the plurality of convex ribbings are arranged in a cross manner with the plurality of separation structures 222 on the second side plate 22, thereby separating the space between the second side plate 22 and the housing 1 into a plurality of heat insulation cavities.

[0044] In an embodiment, the second retaining space 52 is distributed longitudinally below the first retaining space 51, so that at least part of the power supply assembly is disposed below the heating assembly 4, and the second side plate 22 is located below the heating assembly 4.

[0045] In an embodiment, referring to FIG. 4 and FIG. 5, the second retaining space 52 is distributed on a transverse side of the first retaining space 51, and at least part of the second retaining space 52 may correspond to the first retaining space 51 in a transverse direction. The insertion port 61 on the upper cover 6 corresponds to the heating cavity 41 of the heating assembly 4, and a user can clearly distinguish a relative position of the second retaining space 52 through the insertion port 61, so as to select a direction in which the housing 1 is held.

[0046] In an example, referring to FIG. 4 and FIG. 5, the rack 2 further includes a third side plate 23 defining part of boundaries of the second retaining space 52, and the third side plate 23 is located on a side of the second side plate 22 in the transverse direction and is arranged opposite to the first side plate 21. To satisfy the miniatur-

ization design requirement on the aerosol generating device, the third side plate 23 may directly abut against an inner wall of the housing 1. The third side plate 23 may correspond to a palm or a thumb of a user when the user holds the aerosol generating device. To this end, the third side plate 23 is provided with a separation structure 222, and a plurality of independent heat insulation cavities 7 are formed between the third side plate 23 and the housing 1, so as to prevent heat generated by the heating assembly 4 from being transferred to the housing 1 disposed on the periphery of the third side plate 23.

[0047] In an example, referring to FIG. 4 and FIG. 6, the second retaining space 52 extends in the longitudinal direction. The length of the second retaining space 52 in the longitudinal direction is greater than the length of the heating assembly 4 in the longitudinal direction, or the length of the second retaining space 52 in the longitudinal direction is roughly equal to the length of the aerosol generating device for generating an aerosol in the longitudinal direction. Therefore, the power supply 31 having a stronger power storage capability can be accommodated, helping increase the duration of the power supply assembly.

[0048] In an example, referring to FIG. 2 and FIG. 5, the second side plate 22 includes a first part 223 and a second part 224 located below the first part 223 in the longitudinal direction, and the first part 223 is located on a side of the heating assembly 4 in the transverse direction, so that the first part 223 and the second part 224 both define part of boundaries of the second retaining space 52, and the second part 224 is located obliquely below the heating assembly 4. The power supply 31 is provided in the second retaining space 52, the circuit board 32 is joined to the second part 224, and the second part 224 is located between the power supply 31 and the circuit board 32. That is, the power supply 31 and the circuit board 32 are located on two opposite sides of the second side plate 22. Therefore, the circuit board 32 does not occupy the second retaining space 52, so that the second retaining space 52 can accommodate the power supply 31 having a stronger power storage capability. The first part 223 is provided with a separation structure 222. At least part of the heat insulation cavities 7 between the second side plate 22 and the housing 1 is formed between the first part 223 and the housing 1, so that after the second side plate 22 joins the circuit board 32, a good heat insulation effect can still be achieved for the heating assembly 3. In addition, on a longitudinal upper portion of the circuit board 32, a plurality of independent heat insulation cavities 7 are provided, so as to hinder transfer of heat to the circuit board 32.

[0049] The third side plate 23 extends longitudinally, part of the third side plate 23 corresponds to the first part 223, and remaining part of the third side plate 23 corresponds to the second part 224, so as to be located on a same side of the first part 223 and the second part 224 in the transverse direction. By enabling the circuit board 32 to be provided with a plurality of independent heat in-

sulation cavities 7 on a transverse side thereof, heat can be prevented from being transferred to the circuit board 32. The third side plate 23 defines part of boundaries of the second retaining space, so that the power supply 31 is provided with a plurality of independent heat insulation cavities 7 on a transverse side thereof, so as to hinder transfer of heat to the housing 1 through the power supply 31.

[0050] In an example, referring to FIG. 4 and FIG. 5, the rack 2 further includes a fourth side plate 24 arranged opposite to the third side plate 23 and a supporting part 25 supporting the heating assembly 4. The first side plate 21 and the fourth side plate 24 are disposed on two opposite sides of the supporting part 25, and directions in which the fourth side plate 24 and the first side plate 21 extend from the supporting part 25 in the longitudinal direction are opposite. Therefore, the fourth side plate 24 is disposed corresponding to the second part 224 of the second side plate 22, and is located below the first retaining space 51.

[0051] To satisfy a miniaturization design requirement on the aerosol generating device, the fourth side plate 24 may be provided with a separation structure 222, so that the fourth side plate 24 can directly abut against the inner wall of the housing 1, and a plurality of independent heat insulation cavities 7 are formed between the fourth side plate 24 and the housing 1. One side of the circuit board 32 may abut against the third side plate 23, and the other opposite side of the circuit board 32 may abut against the fourth side plate 24, so that the circuit board 32 has a plurality of independent heat insulation cavities 7 on two opposite sides in the transverse direction, so as to hinder transfer of heat to the circuit board 32.

[0052] By performing ergonomic size design on the size of the aerosol generating device, when a user holds the aerosol generating device, the part of the third side plate 23 corresponding to the second part 224 corresponds to a hand of the user, the part of the third side plate 23 corresponding to the first part 223 corresponds to the thumb of the user, or the first part 223 corresponds to the thumb of the user, and the fourth side plate 24 corresponds to the remaining four fingers of the user. Therefore, the user can hold the housing 1 of the aerosol generating device comfortably, further the holding temperature is ensured to be suitable, and in addition, the energy consumption can be reduced.

[0053] In an embodiment, referring to FIG. 3 and FIG. 4, the rack 2 further includes a top plate 26 abutting against the upper cover 6, the top plate 26 defines part of boundaries of the second retaining space 52, and a plurality of independent heat insulation cavities 7 are formed between the top plate 26 and the upper cover 6. Therefore, an excessively high temperature of the upper cover 6 can be effectively prevented, and the power consumption can also be further reduced. In the embodiment shown in FIG. 4, a plurality of heat insulation cavities 7 formed between the top plate 26 and the upper cover 6 are sequentially arranged in the transverse direc-

tion.

[0054] It should be noted that, the rack 2 may be integrally injection-formed, and the top plate 26, the first side plate 21, the second side plate 22, the third side plate 23, the fourth side plate 24, and the supporting part 25 may be integrally injection-formed.

[0055] It should be noted that, in the plurality of heat insulation cavities 7 between the housing 1 and the rack 2, at least two heat insulation cavities 7 may have different areas or volumes or shapes, and at least two heat insulation cavities 7 may have a same area or volume or shape.

[0056] In an example, referring to FIG. 2 and FIG. 5, the circuit board 32 is fixed to the surface of the rack 2, and an extension length of the separation structure 222 on the second side plate 22 from the main body part 221 to the housing 1 is greater than a thickness of the circuit board 21, or the second part 224 is recessed relative to the first part 223, so that after the circuit board 32 is fixed to the second part 224, there is an interval between the circuit board 32 and the housing 1, and the interval may be filled with air, thereby forming an air heat insulation layer.

[0057] In an example, referring to FIG. 3 and FIG. 4, the power supply 31 is fixed to the surface of the rack 2, and a recess depth of the second retaining space 52 is greater than a thickness of the power supply 31, so that after the power supply 31 is fixed in the second retaining space 52, there is an interval between the power supply and the housing 1, and the interval may be filled with air, thereby forming an air heat insulation layer.

[0058] In an example, referring to FIG. 3 and FIG. 5, the heating assembly 4 is fixed to the supporting part 25. The fourth side plate 24 and the first side plate 21 are located on two opposite sides of the supporting part 25. The separation structure 222 on the fourth side plate 24 abuts against the housing 1. The separation structure 222 on the second side plate 22 abuts against the housing 1, so that there is an interval between the surface of the heating assembly 4 and the housing 1. The interval may be filled with air, thereby forming an air heat insulation layer.

[0059] According to the aerosol generating device, the rack includes a plurality of separation structures which abut against the housing to form a plurality of independent heat insulation cavities, and the circuit board or the heating assembly or the power supply is fixed to the surface of the rack and is spaced apart from the housing, so that the circuit board or the heating assembly or the power supply can be mounted on part of the surface of the rack, and the heat insulation cavities are provided in part of the surface. Therefore, the internal space of the housing can be fully used and the aerosol generating device can be miniaturized. In addition, the spaced-apart arrangement of the circuit board or the heating assembly or the power supply can block heat transfer to the housing, and the plurality of heat insulation cavities independent of each other can reduce cold and hot gas exchange. Therefore, the heat insulation effect is enhanced, the power consumption of the heating assembly

can be reduced, and it is ensured that the hand of a user is not scalped when the user holds the housing.

[0060] It should be noted that the preferred embodiments of this application are provided in the specification and the accompanying drawings of this application, but are not limited to the embodiments described in this specification. Further, a person of ordinary skill in the art may make improvements or modifications according to the foregoing descriptions, and all of the improvements and modifications shall fall within the protection scope of the appended claims of this application.

Claims

1. An aerosol generating device, comprising:

a housing;
a heating assembly, provided in the housing and used for heating an aerosol generating product;
a power supply and a circuit board which are both provided in the housing, wherein the circuit board is electrically connected to the heating assembly and the power supply, so as to control the power supply to provide power for the heating assembly; and
a rack, the circuit board or the heating assembly or the power supply being fixed to a surface of the rack and being spaced apart from the housing, wherein the rack comprises a plurality of separation structures which abut against the housing to form a plurality of independent heat insulation cavities.

2. The aerosol generating device according to claim 1, wherein the plurality of heat insulation cavities satisfy at least one of the following conditions:

the plurality of heat insulation cavities are sequentially distributed in a longitudinal direction; the plurality of heat insulation cavities are sequentially distributed in a transverse direction; or the plurality of the heat insulation cavities are arranged in an array.

3. The aerosol generating device according to claim 1, wherein a first retaining space and a second retaining space are formed between the housing and the rack, the heating assembly is provided in the first retaining space, and the power supply is provided in the second retaining space; and the rack comprises a second side plate and a first side plate located between the first retaining space and the second retaining space, and the power supply and the circuit board are fixed at two opposite sides of the second side plate.

4. The aerosol generating device according to claim 3, wherein at least part of the separation structures is formed on the second side plate.

5. The aerosol generating device according to claim 3, wherein an area or a volume of at least part of the heat insulation cavities adjacent to the heating assembly is smaller than an area or a volume of at least part of the heat insulation cavities relatively far away from the heating assembly.

6. The aerosol generating device according to claim 3, wherein the second side plate is located at a side of the first side plate in the transverse direction, and the second side plate defines part of boundaries of the second retaining space;

the rack further comprises a third side plate defining part of boundaries of the second retaining space, and the third side plate is arranged opposite to the first side plate; and part of the separation structures is formed on the third side plate.

7. The aerosol generating device according to claim 6, wherein the second side plate comprises a first part and a second part located below the first part in the longitudinal direction, and the first part is located at a side of the heating assembly in the transverse direction;

at least part of the circuit board is fixed to the second part, and the third side plate extends longitudinally and is located at sides of the first part and the second part in the transverse direction; and the plurality of the heat insulation cavities are provided on both a longitudinal upper side and a transverse side of the circuit board.

8. The aerosol generating device according to claim 6, wherein the rack further comprises a fourth side plate arranged opposite to the third side plate and a supporting part for supporting the heating assembly, the first side plate and the fourth side plate are disposed on two opposite sides of the supporting part, and directions in which the fourth side plate and the first side plate extend from the supporting part in the longitudinal direction are opposite; and part of the separation structures is formed on the fourth side plate.

9. The aerosol generating device according to claim 3, wherein the heating assembly comprises a heating cavity, the aerosol generating device further comprises an upper cover, on which an insertion port through which the aerosol generating product is inserted into the heating cavity is provided; and

the rack further comprises a top plate abutting against the upper cover, the top plate defines part of boundaries of the second retaining space, and a plurality of independent heat insulation cavities are formed between the top plate and the upper cover. 5

10. The aerosol generating device according to claim 9, wherein the plurality of heat insulation cavities formed between the top plate and the upper cover are sequentially arranged in the transverse direction. 10

11. The aerosol generating device according to claim 1, wherein the heating assembly comprises a heating cavity, a heating element, and a heat insulation element, the heating cavity is used for receiving at least part of the aerosol generating product, and the heat insulation element is arranged around the heating cavity and the heating element. 15

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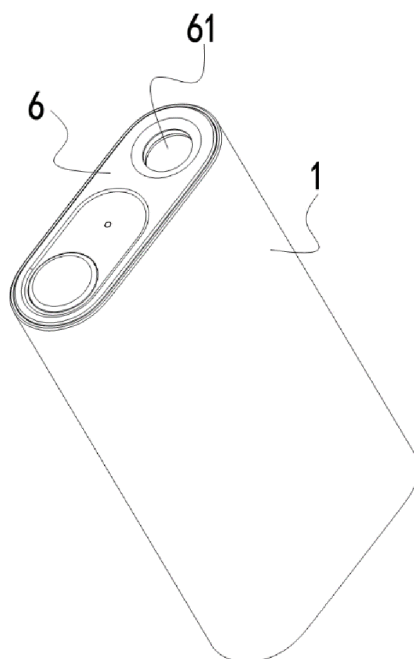


FIG. 1

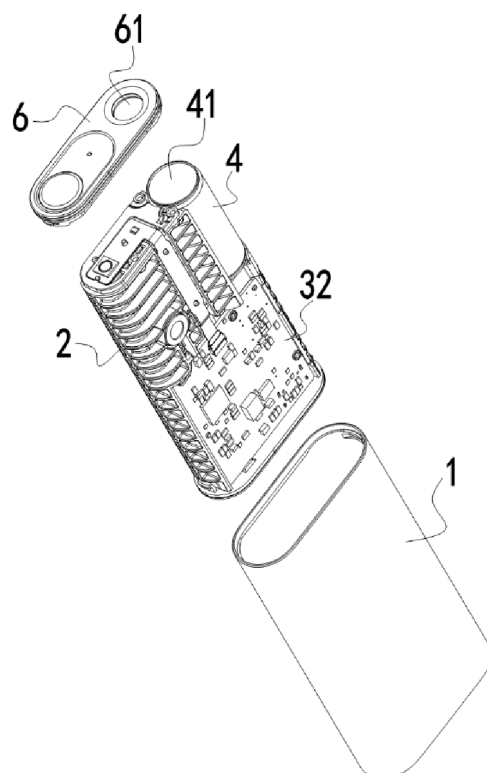


FIG. 2

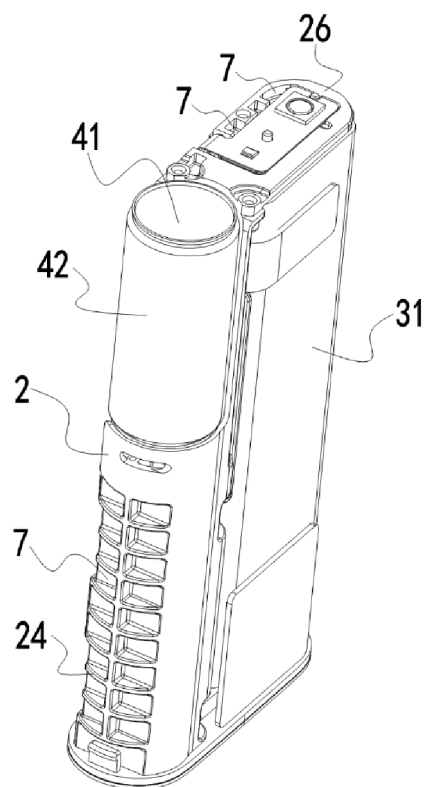


FIG. 3

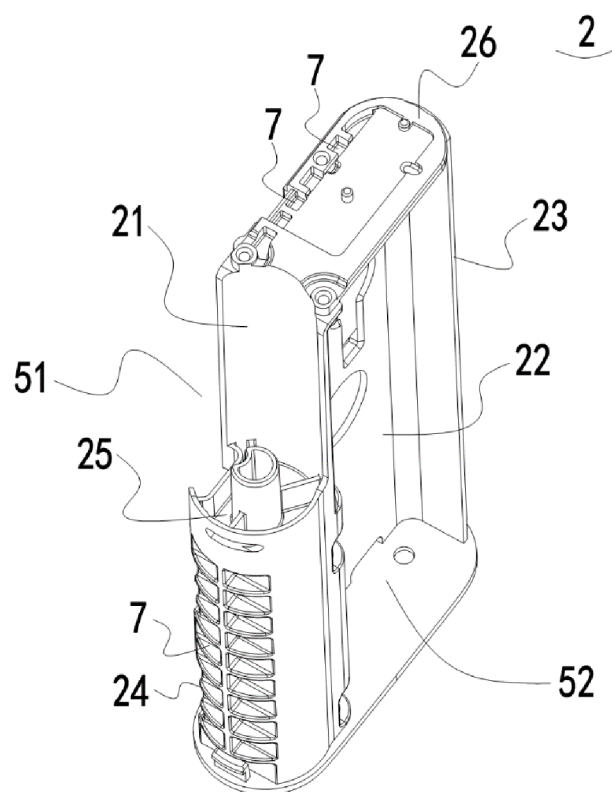


FIG. 4

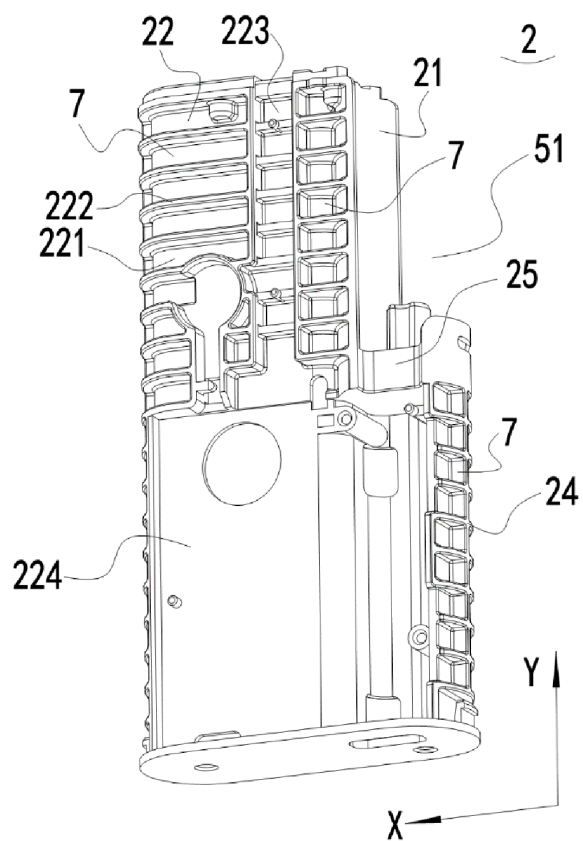


FIG. 5

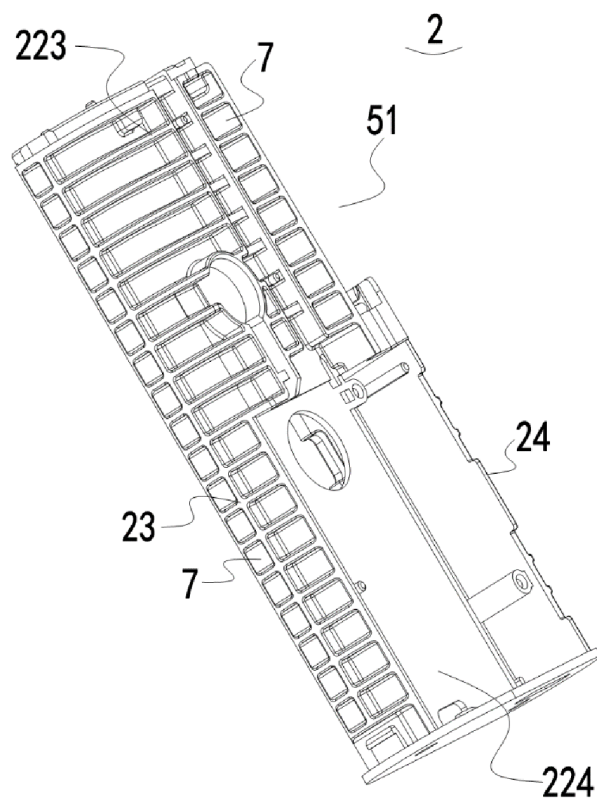


FIG. 6

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2024/124778

A. CLASSIFICATION OF SUBJECT MATTER

A24F40/46(2020.01)i; A24F40/20(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: A24F40/-, A24F47/-

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

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

CNTXT: CNABS; WPABS; VEN; WEB OF KNOWLEDGE: 电子烟, 气溶胶, 外壳, 加热组件, 电源, 电池, 电路板, 支架, 分隔, 隔热腔, electric cigar+, ECig, Aerosol, Housing, Heating Component, Power Supply, Battery, Circuit Board, Support, Separator, Insulated Cavity

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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X	WO 2019161633 A1 (LENG CHAOYANG) 29 August 2019 (2019-08-29) description, pages 1-10, and figures 1-16	1-11
X	CN 216961502 U (ALD GROUP LIMITED) 15 July 2022 (2022-07-15) description, paragraphs 1-64, and figures 1-5	1-11
X	CN 210094683 U (SHENZHEN FIRST UNION TECHNOLOGY CO., LTD.) 21 February 2020 (2020-02-21) description, paragraphs 1-53, and figures 1-9	1-11
A	CN 110693095 A (HANGZHOU SHANGGE SEMICONDUCTOR CO., LTD.) 17 January 2020 (2020-01-17) entire document	1-11
A	US 2017196268 A1 (REEVELL TONY) 13 July 2017 (2017-07-13) entire document	1-11

☒ 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

14 January 2025

Date of mailing of the international search report

20 January 2025

Name and mailing address of the ISA/CN

China National Intellectual Property Administration (ISA/
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Beijing 100088

Authorized officer

Telephone No.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2024/124778

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C. DOCUMENTS CONSIDERED TO BE RELEVANT		
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A	WO 2019200957 A1 (SHENZHEN HANGSEN STAR TECHNOLOGY CO., LTD.) 24 October 2019 (2019-10-24) entire document	1-11

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CN2024/124778

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				JP	7181413	B2	30 November 2022		
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				EP	3845082	A4	29 June 2022		
				EP	3845082	B1	27 December 2023		
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