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(54) AEROSOL GENERATING DEVICE

(57) An aerosol generating device (10). The aerosol generating device (10) is provided with an accommodating space (11) for accommodating an aerosol generating substrate (20); the aerosol generating device (10) further comprises a heating body (13) and a sleeve (12); at least part of the heating body (13) extends into the accommodating space (11) so as to heat the aerosol generating substrate (20); and the sleeve (12) comprises a first sleeve body (126) and a second sleeve body (122), the first sleeve body (126) and the second sleeve body (122) are closed at two ends to form a vacuum space (121) surrounding the outside of the accommodating space (11), and the length of the vacuum space (121) is greater than the length of the heating body (13).

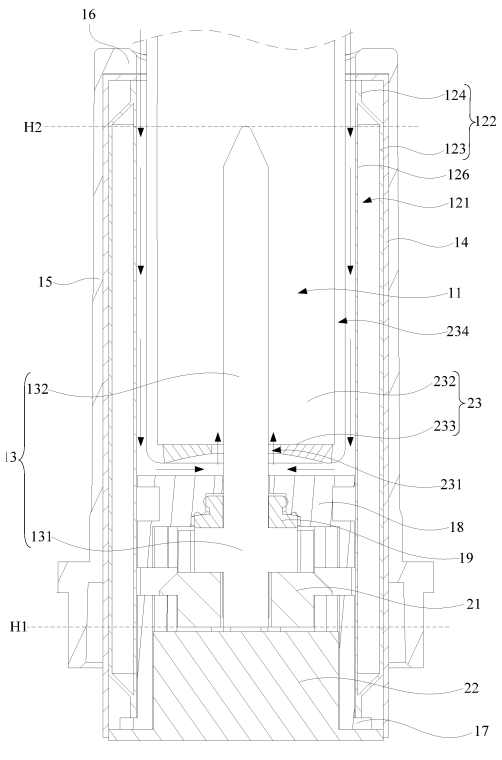

FIG. 7

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Description

TECHNICAL FIELD

[0001] The present application relates to the field of electronic atomizing technology, and in particular, to an aerosol generating device.

BACKGROUND

[0002] Aerosol generating device heats an aerosol-generating substrate through a heating, non-burning method to generate aerosols that can be inhaled by a user. This baking method can greatly reduce the harmful components in aerosols, compared with the method of directly burning the aerosol-generating substrate to generate aerosol, thus creating a broad market demand for aerosol generating devices. The aerosol generating device usually includes a heating body and a power supply assembly. The heating body can be inserted into an aerosol generating substrate. The power supply assembly supplies power to the heating body. The heating body converts electrical energy into thermal energy to heat and atomize the aerosol generating substrate to obtain aerosol.

[0003] Currently, less than 13% of the energy consumed by the heating body is used to heat the aerosol-generating substrate, and the remaining large amount of energy is transmitted to an outer tube around the heating body and eventually dissipated. In order to solve the problem of low energy utilization of aerosol generating devices, there are currently two main method: one is to use components with low thermal conductivity, but this method is limited by the type of material and the effect achieved is very limited; the other method is to improve the temperature field of the heating body, but this method will affect the inhalation taste of the aerosol due to the change in the temperature field of the heating body.

SUMMARY

[0004] Accordingly, it is necessary to provide an aerosol generating device.

[0005] The present application provides an aerosol generating device, which has an accommodating space configured to accommodate an aerosol generating substrate. The aerosol generating device further includes:

a heating body, at least a portion of the heating body extending into the accommodating space to heat the aerosol generating substrate; and

a sleeve comprising a first tube and a second tube. The first tube and the second tube are closed at both ends thereof to form a vacuum space surrounding an outside of the accommodating space; and a length of the vacuum space is greater than a length of the heating body.

[0006] In an embodiment, the sleeve further includes a third tube. The first tube, the second tube, and the third tube are respectively closed at both ends thereof to form a multi-layer vacuum space surrounding the outside of the accommodating space.

[0007] In an embodiment, sides of the first tube, the second tube, and the third tube away from the heating body are covered by heat insulation layers, respectively.

[0008] In an embodiment, a wall thickness of the first tube and a wall thickness of the second tube are less than 0.2 mm.

[0009] In an embodiment, the aerosol generating device further includes a first fixing member configured to fix the sleeve. The first fixing member abuts against a region of a side of the sleeve away from the heating body and corresponding to the vacuum space.

[0010] In an embodiment, the first fixing member acts on a middle portion of the sleeve corresponding to the vacuum space.

[0011] In an embodiment, the first fixing member is in indirect contact with the sleeve through a heat insulation member.

[0012] In an embodiment, gaps are formed between both ends of the first fixing member in the axial direction and both ends of the sleeve in the axial direction.

[0013] In an embodiment, the aerosol generating device further includes a second fixing member and a third fixing member. The second fixing member and the third fixing member fix the sleeve at both ends of the sleeve, respectively.

[0014] In an embodiment, the aerosol generating device further includes a support frame. The heating body is mounted on the support frame. A plurality of third fixing members are provided. The plurality of third fixing members are spaced apart and connected onto the support frame, and cooperatively act on the same end surface of the sleeve.

[0015] In an embodiment, the aerosol generating device further includes an extractor. The extractor encloses the accommodating space. The extractor is at least partially accommodated inside the sleeve. The sleeve is spaced apart from the extractor.

[0016] In an embodiment, the extractor is provided with a via hole. The heating body extends into the accommodating space through the via hole. A gap is formed between the heating body and an inner wall of the via hole.

[0017] In an embodiment, the aerosol generating device includes a support frame. The heating body is mounted on the support frame. The support frame is spaced apart from the extractor.

[0018] In an embodiment, the aerosol generating device includes an outer tube. The heating body and the sleeve are housed inside the outer tube.

[0019] In an embodiment, the outer tube includes two nested tubes. The two tubes are connected to each other at the edges. A vacuum cavity surrounding the sleeve is formed between the two tubes.

[0020] Details of one or more embodiments of the

present application are set forth in the accompanying drawings and the description below. Other features, objects, and advantages of the present application will become apparent from the description, drawings, and claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0021] To better describe and illustrate embodiments and/or examples of those contents disclosed herein, reference may be made to one or more of the accompanying drawings. The additional details or examples used to describe the drawings should not be construed as limiting the scope of any of the disclosed inventions, the embodiments and/or examples presently described, and the best modes currently understood of these contents.

FIG. 1 an isometric view of an aerosol generating device according to some embodiments.

FIG. 2 is a front view (a) and a right side view (b) of the aerosol generating device shown in FIG. 1.

FIG. 3 is a cross-sectional view of the aerosol generating device shown in FIG. 2 taken along a B-B direction.

FIG. 4 is a cross-sectional view of the aerosol generating device shown in FIG. 2 taken along an A-A direction.

FIG. 5 is an enlarged schematic view of a portion E in FIG. 3.

FIG. 6 is an enlarged schematic view of a portion F in FIG. 4.

FIG. 7 is a schematic view showing a mounting state of key components associated with a heating element and a sleeve in the portion F shown in FIG. 6.

FIG. 8 is a schematic view of a sleeve shown in FIG. 7.

FIG. 9 is a schematic view of a support frame and a third fixing member that are integrally formed shown in FIG. 7.

FIG. 10 is a schematic view of an extractor in FIG. 7.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0022] In order to make the above objects, features and advantages of the present application more obvious and easy to understand, the specific implementations of the present application will be described in detail below with reference to the accompanying drawings. In the following description, numerous specific details are set forth in order to provide a thorough understanding of the present application. However, the present application can be implemented in many other ways different from those described herein. Those skilled in the art can make similar improvements without violating the connotation of the present application. Therefore, the present application is not limited by the specific embodiments disclosed below.

[0023] In the description of this application, it needs to be understood that orientation or positional relationship indicated by the terms "center", "longitudinal", "transverse", "length", "width", "thickness", "upper", "lower", "front", "rear", "left", "right", "vertical", "horizontal", "top", "bottom", "Inside", "outside", "clockwise", "counterclockwise", "axial", "radial direction", "circumferential direction", etc. is based on the orientation or positional relationship shown in the drawings, are only for the convenience of describing the present application and simplifying the description, and do not indicate or imply the device or element referred to must have a specific orientation, be constructed and operated in a specific orientation and therefore are not to be construed as limitations on the application.

[0024] In addition, the terms "first" and "second" are used for descriptive purposes only and cannot be understood as indicating or implying relative importance or implicitly indicating the quantity of indicated technical features. Therefore, features defined by "first" and "second" may explicitly or implicitly include at least one of these features. In the description of this application, "a plurality" means at least two, such as two, three, etc., unless otherwise expressly and specifically limited.

[0025] In this application, unless otherwise clearly stated and defined, the terms "mounting", "coupling", "connecting", "fixing" and the like should be understood in a broad sense, For example, they can be a fixed connection or a detachable connection; or integrated into one; or a mechanical connection or an electrical connection; or a direct connection or an indirect connection through an intermediate medium; or an internal connection between two elements or an interactive relationship between two elements, unless otherwise specified restrictions. For those of ordinary skill in the art, the specific meanings of the above terms in this application can be understood according to specific circumstances.

[0026] In this application, unless otherwise expressly stated and defined, a first feature being "on" or "below" a second feature may mean that the first feature and the second feature are in direct contact, or the first feature and the second feature are in indirect contact through an intermediate medium. Furthermore, the first feature being "above", "over", and "on top of" the second feature may mean that the first feature is directly above or obliquely above the second feature, or simply means that the first feature is higher in level than the second feature. The first feature being "below", "under", and "beneath" the second feature may mean that the first feature is directly below or obliquely below the second feature, or simply means that the first feature is lower in level than the second feature.

[0027] It should be noted that when an element is referred to as being "mounted" or "disposed on" another element, it can be directly on the other element or an intermediate element may also be present. When an element is referred as to be "connected" to another element, it can be directly connected to the other element or there may also be an intermediate element present.

The terms "vertical", "horizontal", "upper", "lower", "left", "right" and similar expressions used herein are for illustrative purposes only and do not represent the only implementation.

[0028] As shown in FIG. 1, the present application claims an aerosol generating device 10. The aerosol generating device 10 generally extends into a rod-shaped structure. The extending direction of the aerosol generating device 10 is defined as an axial direction, and a direction perpendicular to the axial direction is defined as a radial direction. As shown in FIG. 1, a direction of a Z-axis is the axial direction; an X-axis and a Y-axis are both perpendicular to the Z-axis; and directions of the X-axis and the Y-axis are both radial directions of the aerosol generating device 10.

[0029] As shown in FIGS. 2 to 8, the aerosol generating device 10 has an accommodating space 11 configured to accommodate an aerosol generating substrate 20. The aerosol generating device 10 includes a heating body 13 and a sleeve 12. At least a portion of the heating body 13 extends into the accommodating space 11 to heat the aerosol generating substrate 20. The sleeve 12 encloses the outer periphery of the accommodating space 11. The sleeve 12 includes a first tube 126 and a second tube 122. The first tube 126 and the second tube 122 are closed at both ends thereof to form a vacuum space 121 surrounding the outside of the accommodating space 11. A length of the vacuum space 121 is greater than a length of the heating body 13.

[0030] It should be understood that after the aerosol generating substrate 20 is placed in the accommodation space 11, the heating body 13 can be inserted into an interior of the aerosol generating substrate 20. After the heating body 13 is energized and generates heat, the heating body 13 can heat and atomize the aerosol generating substrate 20 from the interior of the aerosol generating substrate 20, so as to obtain an aerosol.

[0031] In addition, the sleeve 12 encloses the outer periphery of the accommodation space 11, and the length of the vacuum space 121 is greater than the length of the heating body 13. Specifically, as shown in FIG. 7, the heating body 13 is located between a plane H1 and a plane H2 in the axial direction, such that the region between the plane H1 and the plane H2 needs to correspond to the vacuum space 121 in the radial direction. In this way, more heat can be confined in the space enclosed by the sleeve 12 by utilizing the thermal insulation effect of the vacuum space 121, and the heat generated by the entire heating body 13 is blocked from transferring in the radial direction. In this way, a large amount of heat generated by the heating body 13 may be concentrated inside the accommodating space 11 to heat the aerosol generating substrate 20, thereby implementing effective utilization of heat and improving energy utilization.

[0032] In addition, due to the heat insulation effect of the vacuum space 121 in the sleeve 12, the heat transferred to the outer periphery of the aerosol generating device 10 in the radial direction can be reduced, which will help to reduce the temperature of the outer periphery of the aerosol generating device 10, thus preventing the temperature of the outer periphery the aerosol generating device 10 from being too high and affecting the user experience.

[0033] In addition, compared with conventional components made of materials with low thermal conductivity (such as plastic materials), the sleeve 12 having the vacuum space 121 has a better thermal insulation effect and can improve energy utilization. In addition, compared with the conventional method of improving the temperature field of the heating body, the temperature field of the heating body 13 in this application is not changed and does not affect the inhalation taste of the aerosol, and the higher energy utilization rate can enable the aerosol generating substrate 20 to be heated and atomized more fully, which can help to achieve a better inhalation taste.

[0034] As shown in FIGS. 7 and 8, specifically, the second tube 122 includes a barrier portion 123 and two connecting portions 124. The two connecting portions 124 are connected to both ends of the barrier portion 123 in the axial direction, respectively. In the second tube 122, the connecting portion 124 is connected to an end of the first tube 126. A gap is formed between the barrier portion 123 and the first tube 126, and the vacuum space 121 is formed by evacuating the gap.

[0035] In some embodiments, the sleeve 12 can further include a third tube (not shown). The first tube 126, the second tube 122, and the third tube are respectively closed at both ends to form a multi-layer vacuum space 121 surrounding the outside of the accommodating space.

[0036] It should be understood that the third tube is located between the first tube 126 and the second tube 122, so that the vacuum space 121 is formed between the third tube and the first tube 126 and between the third tube and the second tube 122. In this way, the vacuum space 121 has multiple layers in the radial direction, which can better block the heat transfer in the radial direction. Furthermore, a plurality of third tubes may be provided between the first tube 126 and the second tube 122, so that a larger number of vacuum spaces 121 can be obtained in the radial direction.

[0037] In some embodiments, a plurality of sleeves 12 can also be provided. The plurality of sleeves 12 are nested in sequence. It should be understood that the plurality of sleeves 12 means that two or more sleeves 12. By providing the plurality of sleeves 12, the plurality of vacuum spaces 121 can also be constructed in the radial direction, so that the heat transfer in the radial direction can be better blocked.

[0038] Specifically, a wall thickness of the first tube 126 and a wall thickness of the second tube 122 are less than 0.2 mm. It should be understood that when the wall thickness is relatively large, the heat can be transferred along the first tube 126 and the second tube 122, such that the sleeve 12 cannot effectively insulate the heat. Therefore, the wall thickness of the first tube 126 and the wall thick-

ness of the second tube 122 are configured to be less than 0.2 mm, which can reduce the heat transferring along the sleeve 12, while making full use of the vacuum space 121 to achieve a better heat insulation effect.

[0039] Specifically, the space surrounded by the vacuum space 121 specifically refers to a receiving cavity 125 surrounded by a side of the first tube 126 away from the vacuum space 121. The accommodating space 11 and the heating body 13 are both located in the receiving cavity 125. It should be understood that since the sleeve 12 encloses the outer periphery of the accommodating space 11, the space enclosed by the sleeve 12 is the receiving cavity 125. The receiving cavity 125 is located inside the sleeve 12, such that the sleeve 12 has a tubular structure that is opened at both ends. The vacuum space 121 is located inside the solid portion of the sleeve 12, so that the sleeve 12 has a nested structure. Therefore, the vacuum space 121 surrounds the receiving cavity 125. In addition, the receiving cavity 125 extends through both ends of the sleeve 12 in the axial direction. The accommodating space 11 can extend from an opening at one end of the sleeve 12 into the receiving cavity 125, and the heating body 13 can be mounted in the receiving cavity 125 from an opening at the other end of the sleeve 12.

[0040] In order to further improve the heat insulation effect of the sleeve 12, the receiving cavity 125 can also extend through only one end of the sleeve 12 in the axial direction, so that the one end of the sleeve 12 is opened and the other end is closed. In this way, the heating body 13 can be mounted in the receiving cavity 125 and be adjacent to the closed end of the sleeve 12, and the accommodating space 11 can extend from the open end of the sleeve 12 into the receiving cavity 125.

[0041] In some embodiments, sides of the first tube 126, the second tube 122, and the third tube away from the heating body are covered by heat insulation layers, respectively. By providing the heat insulation layers, in addition to the heat insulation effect of the sleeve 12 itself, the heat transferring in the radial direction can be further blocked.

[0042] Specifically, the side of the second tube 122 away from the heating body 13 is entirely covered by the heat insulation layer 14. Specifically, the heat insulation layer 14 can be formed by coating aerogel on the second tube 122 to utilize the low thermal conductivity of the aerogel. In other embodiments, the heat insulation layer 14 can also be formed by forming a gap between more regions of the second tube 122 and other adjacent components, and utilizing the relatively low thermal conductivity of the air in the gap. Furthermore, the heat insulation layer 14 not only covers the region on the sleeve 12 corresponding to the vacuum space 121, but also covers the region at both ends of the sleeve 12 in the axial direction, thereby preventing the heat transferring of the entire sleeve 12 in the radial direction.

[0043] As shown in FIGS. 5 to 8, specifically, the aerosol generating device 10 includes a first fixing member 15. The first fixing member 15 fixes the sleeve 12 in a radial direction. Furthermore, the first fixing member 15 has a tubular structure, such that it can be sleeved around the periphery of the sleeve 12, and the sleeve 12 cannot move within the first fixing member 15 in the radial direction. Furthermore, by coating the second tube 122 with aerogel, the gap between the first fixing member 15 and the sleeve 12 can be filled while forming the heat insulation layer 14, so as to relatively fix the first fixing member 15 and the sleeve 12.

[0044] In some other embodiments, the first fixing member 15 abuts against the region of the sleeve 12 that is located on the side away from the heating body 13 and corresponds to the vacuum space 121. It should be understood that under the heat insulation effect of the vacuum space 121, heat can be transferred more to both ends of the sleeve 12 in the axial direction, so that the temperature of the region of the sleeve 12 corresponding to the vacuum space 121 is lower than that of both ends of the sleeve 12. By abutting the first fixing member 15 against the region of the sleeve 12 corresponding to the vacuum space 121, the first fixing member 15 can fix the sleeve 12 in the radial direction, and the heat transferring to the first fixing member 15 can be reduced.

[0045] Specifically, the heat can be transferred more to the connecting portion 124, and the temperature of the barrier portion 123 corresponding to the vacuum space 121 is relatively low, and the first fixing member 15 acts on the barrier portion 123. Specifically, a connecting protrusion protrudes from the barrier portion 123, and the first fixing member 15 abuts against the connecting protrusion. On this basis, a gap is formed between the barrier portion 123 and the first fixing member 15, and the gap can form the heat insulation layer 14.

[0046] Further, the first fixing member 15 acts on the middle portion of the sleeve 12 corresponding to the vacuum space 121. It should be understood that the middle portion of the vacuum space 121 is specifically understood as the middle portion of the vacuum space 121 in the axial direction. It should be understood that the temperature at both ends of the sleeve 12 in the axial direction is higher; and the farther away from the both ends, the lower the temperature will be. In this way, by enabling the first fixing member 15 to act on the middle portion of the vacuum space 121 in the axial direction, the heat transferring to the first fixing member 15 can be further reduced.

[0047] Specifically, the first fixing member 15 is a plastic fixing member. It should be understood that the first fixing member 15 is made of plastic material. In this case, the first fixing member 15 can have lower thermal conductivity, thereby reducing heat transfer in the radial direction.

[0048] Specifically, during the process of fixing the sleeve 12 by the first fixing member 15, the first fixing member 15 and the sleeve 12 are in indirect contact through a heat insulation member. It should be understood that by providing the heat insulation member be-

tween the first fixing member 15 and the sleeve 12, the heat transferring from the sleeve 12 to the first fixing member 15 can be blocked. Specifically, in the embodiment in which the second tube 122 is coated with aerogel to form the heat insulation layer 14, the first fixing member 15 and the sleeve 12 are indirectly connected to each other through the heat insulation layer 14. That is, the heat insulation layer 14 can realize the function of the heat insulation member. Specifically, in an embodiment in which a connecting bump protrudes from the barrier portion 123 and abuts against the first fixing member 15, the first fixing member 15 and the connecting bump can be in an indirect connection by coating an aerogel between the first fixing member 15 and the connecting bump, and thus the aerogel can realize the function of heat insulation member.

[0049] Furthermore, gaps are formed between both ends of the first fixing member 15 in the axial direction and both ends of the sleeve 12 in the axial direction, respectively, which can reduce the heat transferring from both ends of the sleeve 12 to the first fixing member 15. It should be understood that the both ends of the first fixing member 15 in the axial direction and the two connecting portions 124 at the both ends of the sleeve 12 in the axial direction are spaced apart to form the gap, and the relatively low thermal conductivity of the air in the gap can be utilized to form a heat insulation structure, thereby reducing the radial transfer of the heat of both ends of the sleeve 12.

[0050] Continuing to refer to FIGS. 5 to 8, specifically, the aerosol generating device 10 includes a second fixing member 16 and a third fixing member 17. The second fixing member 16 and the third fixing member 17 fix the sleeve 12 at both ends of the sleeve 12, respectively. It should be understood that the second fixing member 16 and the third fixing member 17 are connected to two end surfaces of the sleeve 12, respectively, and the second fixing member 16 and the third fixing member 17 cooperatively fix the sleeve 12 in the axial direction.

[0051] Furthermore, the second fixing member 16 has an annular disk-shaped structure so as to completely cover one end surface of the sleeve 12. Specifically, the second fixing member 16 covers the end of the sleeve 12 through which the accommodating space 11 extends into the receiving cavity 125. Specifically, the second fixing member 16 is a plastic fixing member, which can reduce heat transfer from the sleeve 12 to the second fixing member 16. Specifically, the second fixing member 16 and the sleeve 12 are in indirect contact through a heat insulation member, so as to reduce the heat transferring from the sleeve 12 to the second fixing member 16. Further, the heat insulation member may be aerogel coated on the end surface of the sleeve 12. Specifically, the first fixing member 15 extends in the axial direction and is integrally formed with the second fixing member 16, which can reduce the mounting complexity of the first fixing member 15 and the second fixing member 16.

[0052] Furthermore, the third fixing member 17 is a plastic fixing member, which can reduce the heat transferring from the sleeve 12 to the third fixing member 17. Specifically, the third fixing member 17 and the sleeve 12 are in indirect contact through a heat insulation member, so as to reduce the heat transferring from the sleeve 12 to the third fixing member 17. Further, the heat insulation member may be an aerogel coated on the end surface of the sleeve 12.

[0053] As shown in FIGS. 5 to 9, specifically, the aerosol generating device 10 includes a support frame 18. The heating body 13 is mounted on the support frame 18. A plurality of third fixing members 17 are provided. The plurality of third fixing members 17 are connected onto the support frame 18, and spaced apart, act on the same end surface of the sleeve 12 at intervals. It should be understood that the support frame 18 is located in the receiving cavity 125 to provide support for the heating body 13. In addition, the third fixing members 17 are connected to the support frame 18 and extend out of the receiving cavity 125, and are bent radially toward the sleeve 12 so as to be able to abut against the end surface of the sleeve 12 in the axial direction. The plurality of third fixing members 17 are arranged at intervals, so that a notch can be formed between two adjacent third fixing members 17, thereby reducing the contact area with the end surface of the sleeve 12, and reducing the mutual heat transferring between the sleeve 12 and the third fixing members 17.

[0054] Further, the plurality of third fixing members 17 and the support frame 18 are integrally formed. Since the support frame 18 provides support for the heating body 13, the support frame 18 and the third fixing member 17 can be made of plastic material. The low thermal conductivity of the plastic material can be used to reduce the transfer of the heat generated by the heating body 13 to the sleeve 12 through the support frame 18 and the third fixing member 17, allowing more energy to be used to heat the aerosol generating substrate 20. It should be noted that in other embodiments, the third fixing member 17 and the supporting frame 18 can also be independent from each other.

[0055] Specifically, the support frame 18 has a hollow structure. The heating body 13 includes a wiring end 131 and a heating end 132. The wiring end 131 can be housed inside the support frame 18. The heating end 132 extends out of the support frame 18 and is inserted into the aerosol generating substrate 20. Further, the aerosol generating device 10 includes a sealing gasket 19. The sealing gasket 19 is housed inside the support frame 18 and sealed between the wiring end 131 and the support frame 18. The sealing gasket 19 can seal a through hole 181 of the support frame 18 through which the heating body 13 extends, so as to prevent dust or fluid from entering the interior of the support frame 18.

[0056] Further, the aerosol generating device 10 includes a first base 21. The first base 21 is housed in the support frame 18 to abut against the terminal 131, thereby providing stable support for the terminal 131.

[0057] Furthermore, in order to facilitate the heating body 13, the sealing gasket 19, and the first base 21 being mounted in the support frame 18, the end of the support frame 18 away from the through hole 181 is provided with an opening. The aerosol generating device 10 includes a second base 22. The second base 22 is housed in the support frame 18 and blocks the opening of the support frame 18. Specifically, the sealing gasket 19 is made of silicone material, and the support frame 18, the first base 21, and the second base 22 are all made of plastic material. Various components cooperate with each other to block the heat transferring of the terminal 131 of the heating body 13 at the support frame 18 to the opening in the radial direction and the axial direction, thus enabling the heat to be conducted to the heating end 132 as much as possible, thereby increasing proportion of energy used to heat the aerosol generating substrate 20 and thus improving the energy utilization rate. Specifically, the second base 22 extends from the interior of the support frame 18 to the exterior of the support frame 18, and is bent along with the bending of the third fixing member 17, so as to act on the sleeve 12 in the axial direction together with the third fixing member 17.

[0058] As shown in FIGS. 5 to 10, specifically, the aerosol generating device 10 includes an extractor 23. The extractor 23 encloses the accommodating space 11. The extractor 23 is partially housed inside the sleeve 12, and partially located outside the sleeve 12. The sleeve 12 is spaced apart from the extractor 23. It will be appreciated that the extractor 23 provides space for receiving the aerosol generating substrate 20. The extractor 23 is partially located inside the receiving cavity 125, and partially located outside the receiving cavity 125, so that when the aerosol generating substrate 20 is a cigarette, it can help to heat and atomize the aerosol generating substrate 20 located in the sleeve 12 at high temperature. The aerosol generating substrate 20 located outside the sleeve 12 has a lower temperature, so that the user can easily inhale the aerosol generating substrate 20.

[0059] In other embodiments, the extractor 23 can also be entirely located in the sleeve 12. Specifically, the sleeve 12 and the extractor 23 are spaced apart, that is, a gap is formed between an outer wall of the extractor 23 and an inner wall of the sleeve 12 enclosing the receiving cavity 125, which can help to further block the heat transferring from the extractor 23 to the sleeve 12.

[0060] Specifically, the extractor 23 is provided with a via hole 231. The heating body 13 extends into the accommodating space 11 through the via hole 231. A gap is formed between the heating body 13 and the inner wall of the via hole 231. The extractor 23 includes a peripheral side wall 232 and a bottom wall 233 connected to the peripheral side wall 232. The peripheral side wall 232 and the bottom wall 233 enclose a barrel-shaped structure with one end opened and the other end closed. The via hole 231 is located on the bottom wall 233. After the aerosol generating substrate 20 is placed in the accommodating space 11, the aerosol generating substrate 20 can abut against the bottom wall 233, and can be limited by the bottom wall 233. Furthermore, the heating body 13 extends into the accommodating space 11 through the via hole 231, and can be inserted into the aerosol generating substrate 20 in the accommodating space 11. Furthermore, the heating body 13 is not in contact with an inner wall of the via hole 231, which can effectively reduce the heat transferring from the heating body 13 to the extractor 23, thereby allowing larger proportion of heat to be used for heating the aerosol generating substrate 20.

[0061] Specifically, in the embodiment in which the aerosol generating device 10 includes the support frame 18, the support frame 18 is spaced apart from the extractor 23. It should be understood that the support frame 18 is provided adjacent to the bottom wall 233 of the extractor 23 and is spaced apart from the extractor 23 in the axial direction in the receiving cavity 125. In this way, the heat transferring between the extractor 23 and the support frame 18 can be blocked. Specifically, in the embodiment in which the extractor 23 is provided with the via hole 231, the support frame 18 is spaced apart from the extractor 23, which also helps to enable the gap between the sleeve 12 and the extractor 23, the gap between the support frame 18 and the extractor 23, and the via hole 231 to be in communication in sequence to form a channel for the gas flow into the aerosol generating substrate 20 for the user to inhale. In this way, the cold gas flow can preferentially enter the gap between the sleeve 12 and the extractor 23 to absorb the heat therebetween, which plays the role of cooling and heat insulation. Meanwhile, when the temperature of the cold gas flow rises, the gas flow enters the aerosol generating substrate 20 along the through hole 231, which also helps to heat the aerosol generating substrate 20, improving energy utilization efficiency.

[0062] As shown in FIGS. 1 to 3, specifically, the aerosol generating device 10 includes an outer tube 24. The heating body 13 and the sleeve 12 are both housed inside the outer tube 24. It should be understood that the outer tube 24 serves as an exterior structural component of the aerosol generating device 10 and may be in direct contact with the user. By placing the sleeve 12 inside the outer tube 24, under the heat insulation effect of the sleeve 12, the heat transferred to the outer tube 24 in the radial direction can be effectively reduced, so that the temperature of the outer tube 24 is low, which provides users with a better user experience.

[0063] In other embodiments, the outer tube 24 includes two nested tubes (not shown). The two tubes are connected to each other at the edges, and a vacuum cavity is formed between the two tubes. The vacuum cavity surrounds the sleeve 12. The entirety of the sleeve 12 is located within the space surrounded by the vacuum cavity. It should be understood that the outer tube 24 has a similar structure to the sleeve 12, so that the outer tube 24 has the vacuum cavity formed therein to provide heat insulation. In this way, the outer tube 24 and the sleeve

12 cooperate with each other to achieve a better heat insulation effect. In other embodiments, the sleeve 12 can also be used directly as the outer tube 24, in this case, the heating body 13 and the accommodating space 11 are still located in the receiving cavity 125 enclosed by the sleeve 12.

[0064] Specifically, the aerosol generating device 10 includes a power supply assembly 25 mounted inside the outer tube 24. The power supply assembly 25 is connected to the heating body 13 to supply power to the heating body 13, so that the heating body 13 converts electrical energy into heat to heat and atomize the aerosol generating substrate 20.

[0065] Specifically, in this embodiment, the outer tube 24 includes a first tube 241 and a second tube 242 detachably connected to the first tube 241. The first tube 241 and the second tube 242 are cooperatively connected to each other in the axial direction, and together enclose the space used for housing various functional components. Specifically, the power supply assembly 25 is mounted in the second tube 242. The heating body 13, the sleeve 12, and the accommodating space 11 are mainly located inside the first tube 241 in the axial direction.

[0066] As shown in FIGS. 1, 5 to 7, specifically, when the first fixing member 15 and the second fixing member 16 are integrally formed, the end of the first fixing member 15 away from the second fixing member 16 is clamped between the first tube 241 and the second tube 242, so that the first fixing member 15 is stably locked inside the outer tube 24 in both the radial and axial directions, and the first fixing member 15 fixes the sleeve 12 in the radial direction, thus indirectly causing the second fixing member 16 to fix the sleeve 12 in the axial direction.

[0067] Specifically, the aerosol generating device 10 includes a support base 26. The support base 26 is fixed inside the second tube 242. The third fixing member 17 abuts against the support base 26. The support base 26 provides axial support for the third fixing member 17. Specifically, the second base 22 is provided on the support base 26. The support base 26 indirectly supports the third fixing member 17 by supporting the second base 22, thereby fixing the sleeve 12 in the axial direction. Furthermore, the first fixing member 15 is connected to the support base 26, and the support base 26 can also support the whole structure formed by the first fixing member 15 and the second fixing member 16 in the vertical direction.

[0068] As shown in FIGS. 1, 6, 7 and 10, specifically, the portion of the extractor 23 located outside the sleeve 12 is fixedly connected to the outer tube 24. The outer tube 24 is provided with a through opening 243 at a portion corresponding to the accommodating space 11; and the aerosol generating substrate 20 extends into the accommodating space 11 through the through opening 243. The extractor 23 is provided with a through groove 234 in communication with the through opening 243. The through groove 234 extends in the axial direction, and is in communication with the gap between the sleeve 12 and the extractor 23, so that the external airflow can enter the through groove 234 and the gap between the sleeve 12 and the extractor 23 via the through opening 243.

[0069] As shown in FIGS. 5 to 7, specifically, the heat insulation layer 14 formed by coating the aerogel on the outermost periphery of the sleeve 12 extends in the axial direction. The portion of the second base 22 bending along with the third fixing member 17 extends beyond the third fixing member 17 in the radial direction and abuts against the heat insulation layer 14 to achieve sealing, thereby blocking the communication between the receiving cavity 125 and the internal space of the second tube 242 at one end of the receiving cavity 125. The first fixing member 15 achieves sealing at the connection portion between the first tube 241 and the second tube 242, so that the whole structure formed by the first fixing member 15 and the second fixing member 16 faces the side wherein the first tube 241 is located, and is separated from the second tube 242. In this way, a gap between the whole structure and the first tube 241 is only in communication with the receiving cavity 125 in the sleeve 12, so that dust, fluid, etc. in the receiving cavity 125 can be prevented from entering the second tube 242 and adversely affecting the power supply assembly 25.

[0070] In the aerosol generating device 10 according to the present application, by blocking the heat generated by the entire heating body 13 in the radial direction, a large amount of heat generated by the heating body 13 can be concentrated in the accommodating space 11 to heat the aerosol generating substrate 20, thereby achieving effective use of heat and increasing energy utilization by more than 8%. In addition, it also helps to reduce the heat transferring to the outer periphery of the aerosol generating device 10 in the radial direction, thereby helping to reduce the temperature of the outer periphery of the aerosol generating device 10 and preventing the temperature of the outer periphery of the aerosol generating device 10 from being too high and affecting the user experience. The design scheme of this application can reduce the temperature of the outer periphery by more than 5°C.

[0071] The technical features of the above-mentioned embodiments can 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.

[0072] 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 application. It should be understood by those of ordinary skill in the art that various modifications and improvements can be made without departing from the concept of the present application, and all fall within the pro-

tection scope of the present application. Therefore, the patent protection of the present application shall be defined by the appended claims.

Claims

1. An aerosol generating device having an accommodating space configured to accommodate an aerosol generating substrate, the aerosol generating device further comprising:

   a heating body, at least a portion of the heating body extending into the accommodating space to heat the aerosol generating substrate; and
   a sleeve comprising a first tube and a second tube, wherein the first tube and the second tube are closed at both ends thereof to form a vacuum space surrounding an outside of the accommodating space; and the length of the vacuum space is greater than the length of the heating body.

2. The aerosol generating device according to claim 1, wherein the sleeve further comprises a third tube; and the first tube, the second tube, and the third tube are respectively closed at both ends thereof to form a multi-layer vacuum space surrounding the outside of the accommodating space.

3. The aerosol generating device according to claim 2, wherein sides of the first tube, the second tube, and the third tube away from the heating body are covered by heat insulation layers, respectively.

4. The aerosol generating device according to claim 1, wherein the wall thickness of the first tube and the wall thickness of the second tube are less than 0.2 mm.

5. The aerosol generating device according to claim 1, further comprising a first fixing member configured to fix the sleeve, wherein the first fixing member abuts against a region of a side of the sleeve away from the heating body and corresponding to the vacuum space.

6. The aerosol generating device according to claim 5, wherein the first fixing member acts on a middle portion of the sleeve corresponding to the vacuum space.

7. The aerosol generating device according to claim 5, wherein the first fixing member is in indirect contact with the sleeve through a heat insulation member.

8. The aerosol generating device according to claim 5, wherein gaps are formed between both ends of the first fixing member in the axial direction and both ends of the sleeve in the axial direction.

9. The aerosol generating device according to claim 1, further comprising a second fixing member and a third fixing member; wherein the second fixing member and the third fixing member fix the sleeve at both ends of the sleeve, respectively.

10. The aerosol generating device according to claim 9, further comprising a support frame, wherein the heating body is mounted on the support frame; a plurality of third fixing members are provided; the plurality of third fixing members are spaced apart and connected onto the support frame, and cooperatively act on the same end surface of the sleeve.

11. The aerosol generating device according to claim 1, further comprising an extractor enclosing the accommodating space; wherein the extractor is at least partially accommodated inside the sleeve; and the sleeve is spaced apart from the extractor.

12. The aerosol generating device according to claim 11, wherein the extractor is provided with a via hole; the heating body extends into the accommodating space through the via hole; and a gap is formed between the heating body and the inner wall of the via hole.

13. The aerosol generating device according to claim 11, further comprising a support frame, wherein the heating body is mounted on the support frame; and the support frame and the extractor are spaced apart.

14. The aerosol generating device according to claim 1, further comprising an outer tube, wherein the heating body and the sleeve are housed inside the outer tube.

15. The aerosol generating device according to claim 14, wherein the outer tube comprises two nested tubes; the two tubes are connected to each other at the edges; and a vacuum cavity surrounding the sleeve is formed between the two tubes.

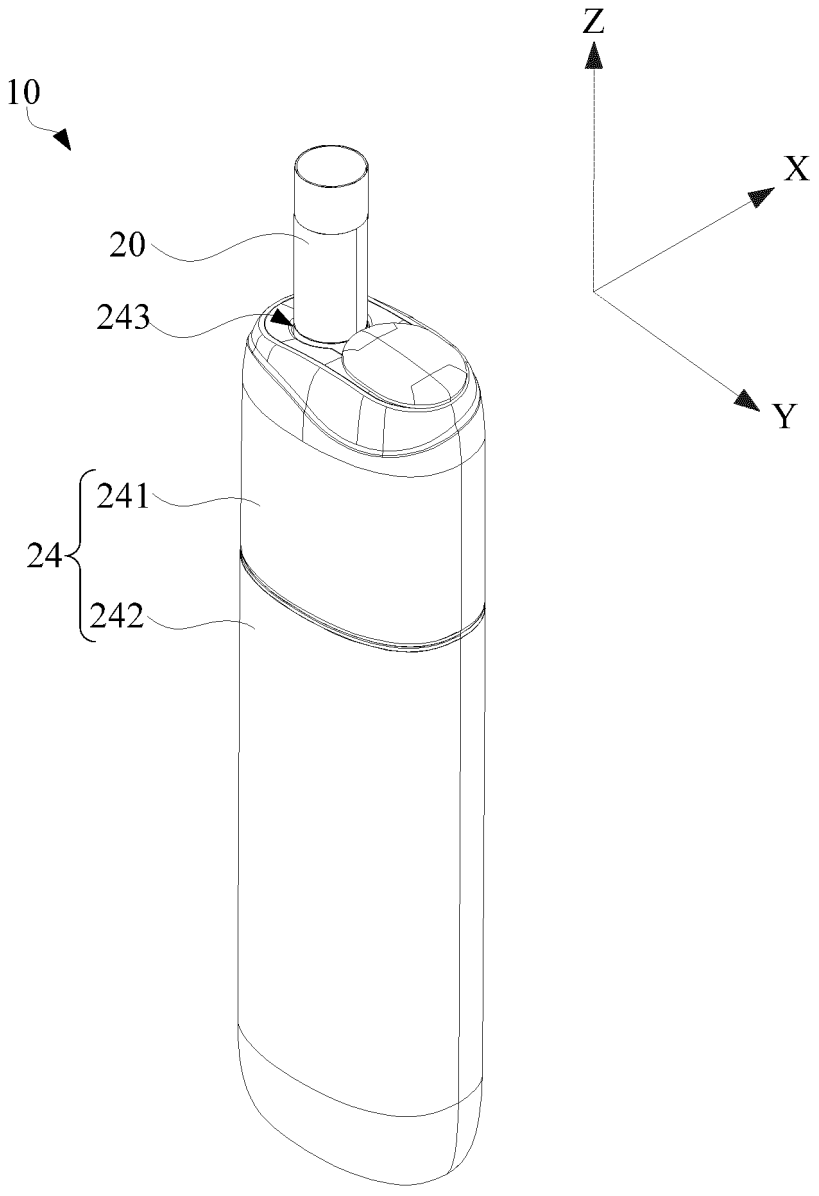

FIG. 1

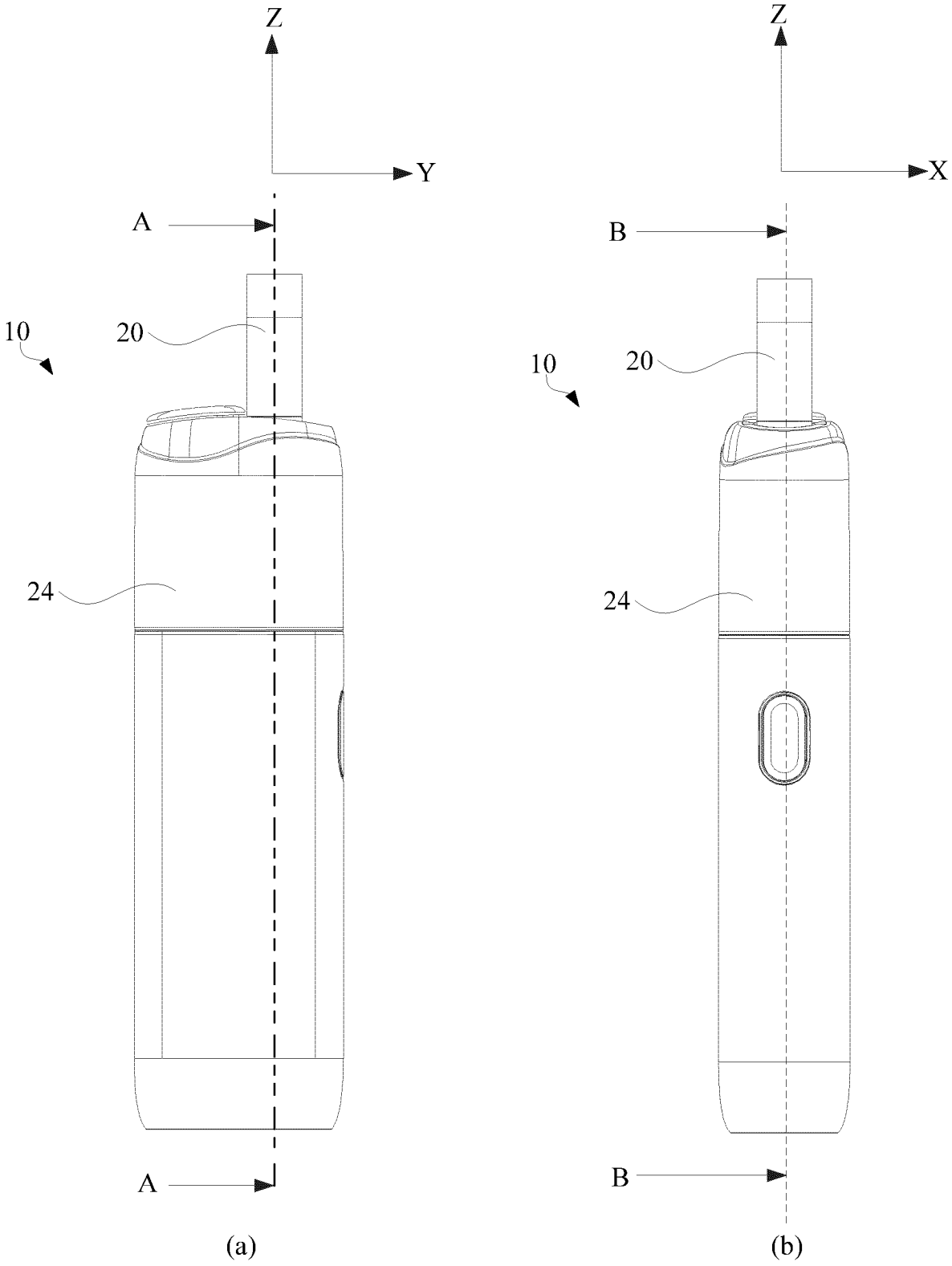

FIG. 2

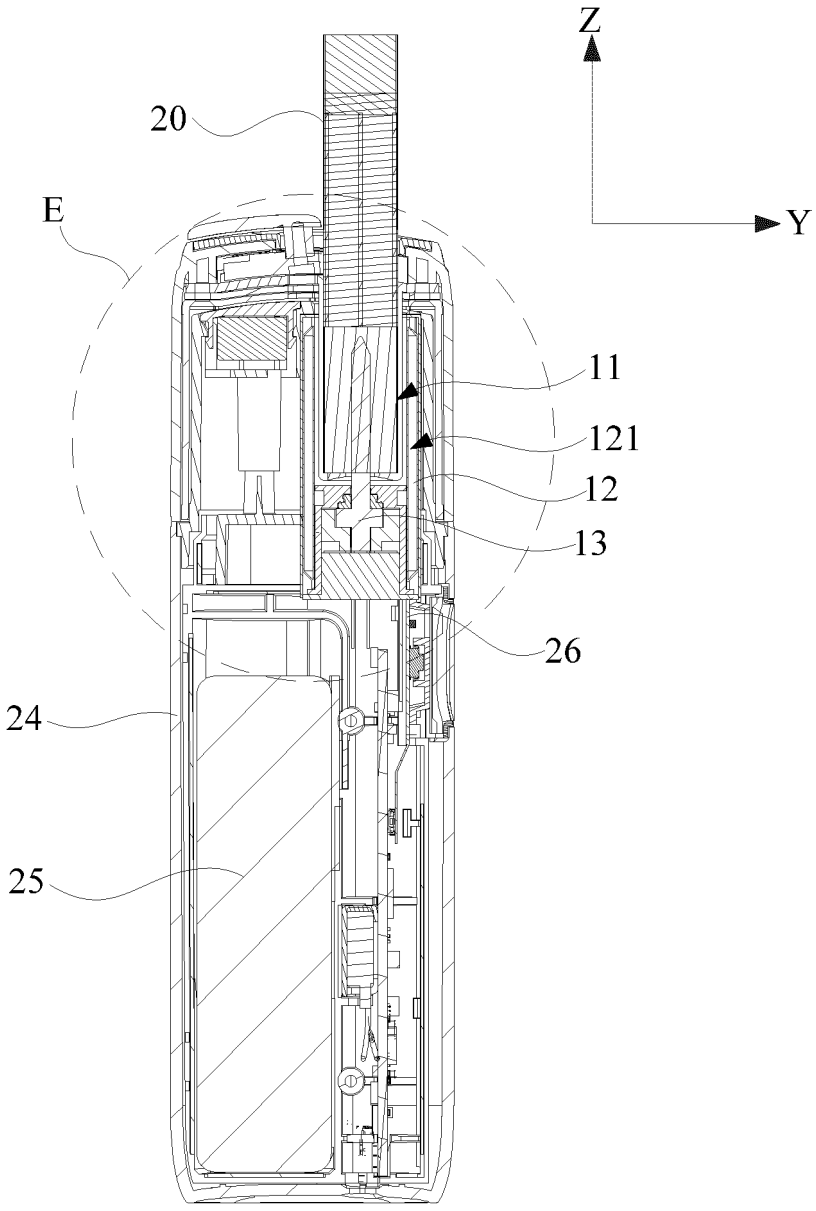

FIG. 3

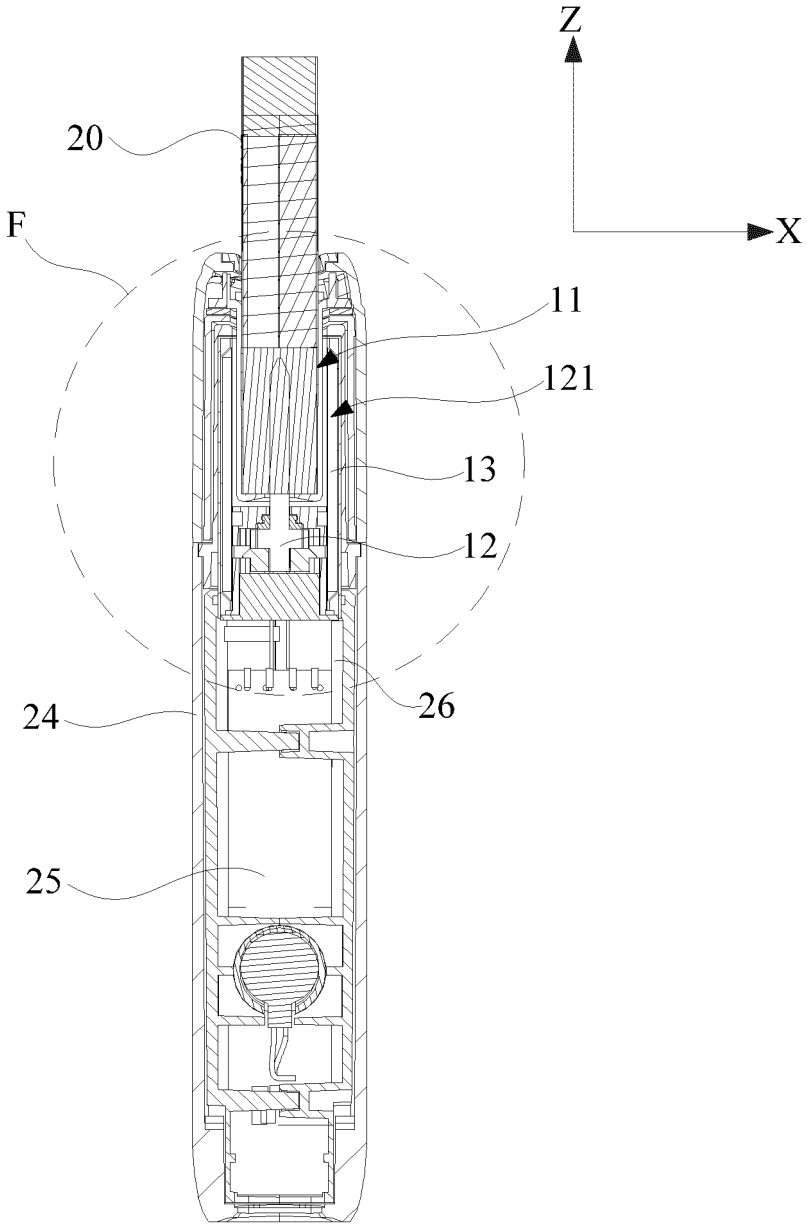

FIG. 4

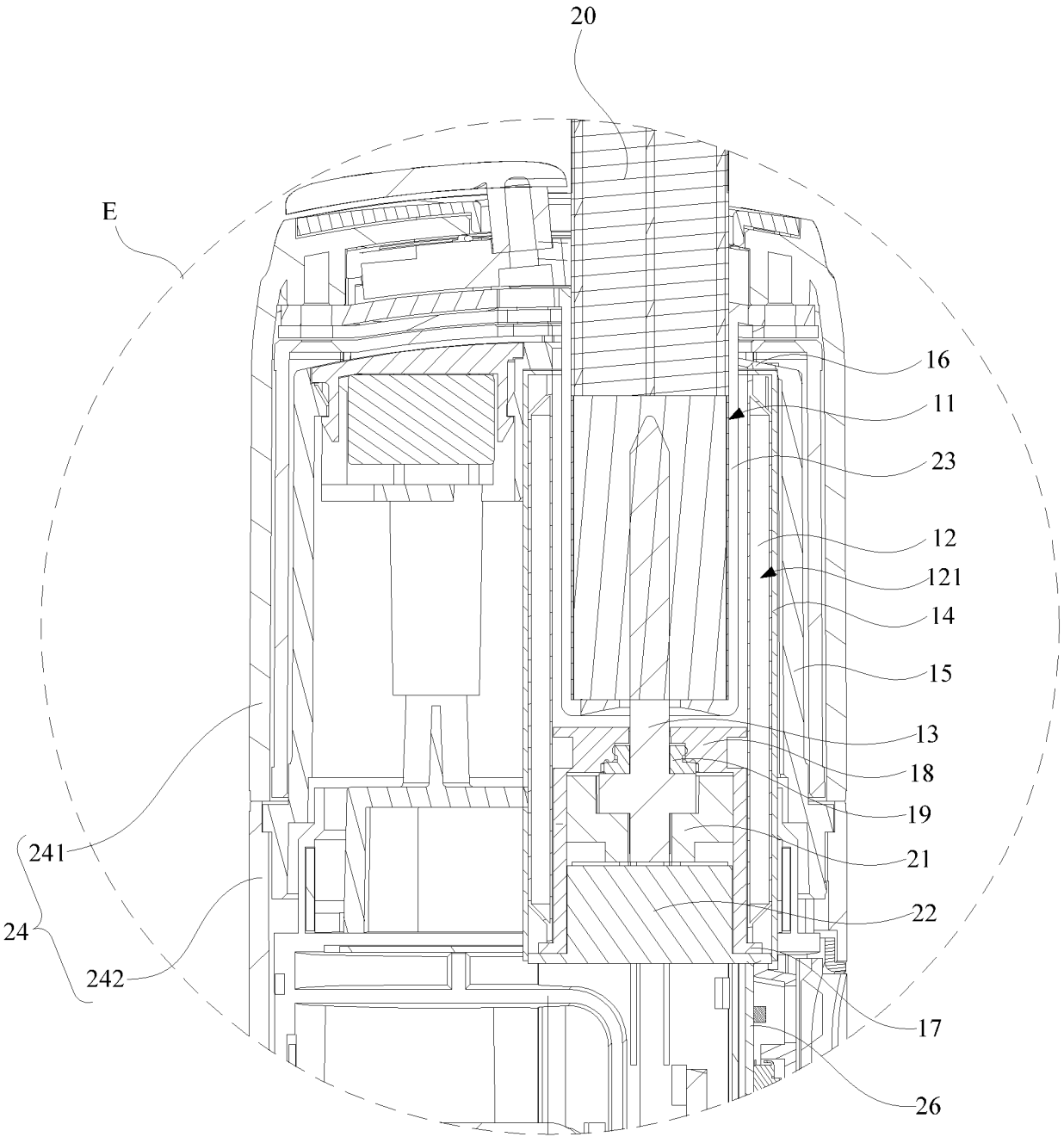

FIG. 5

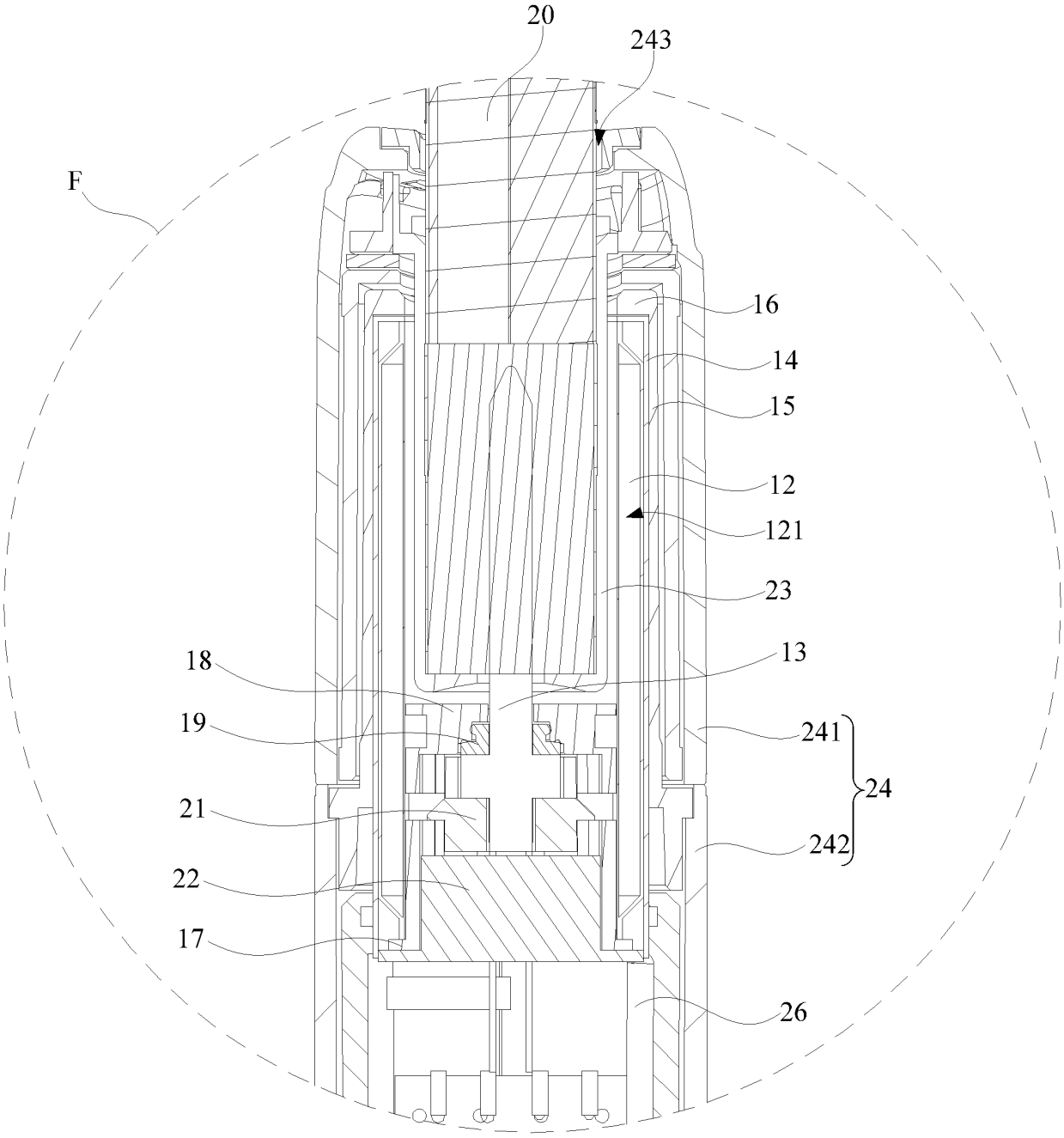

FIG. 6

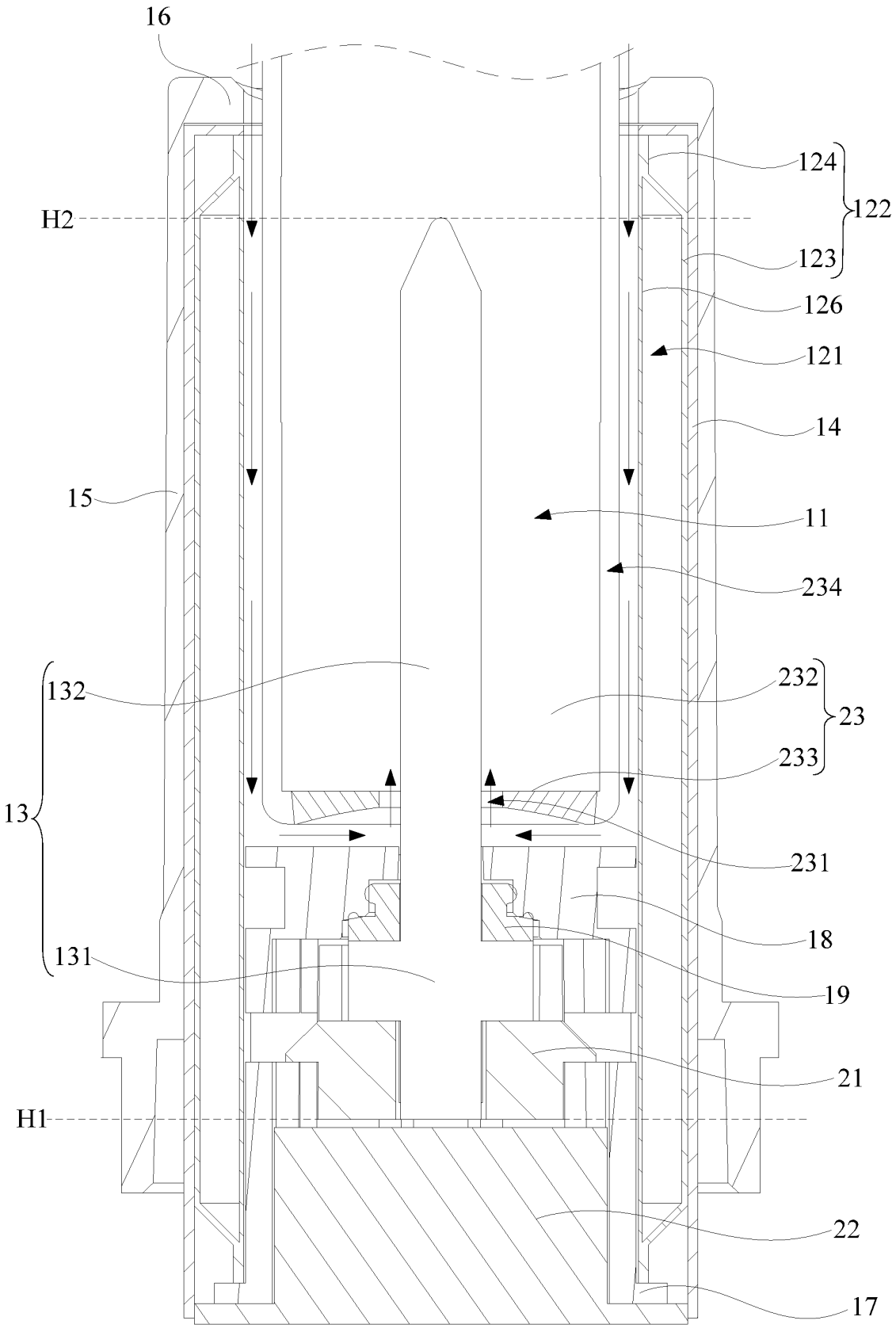
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FIG. 7

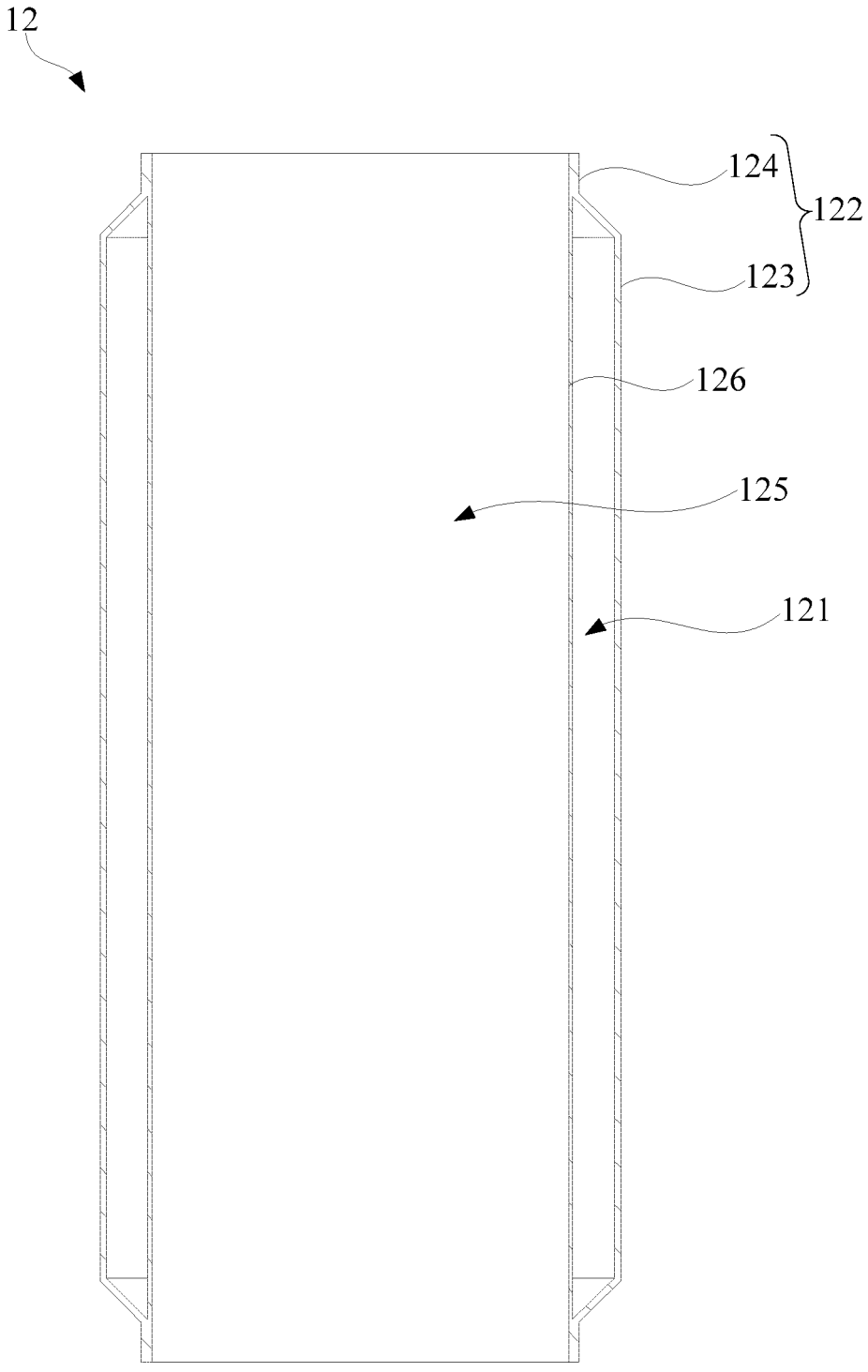

FIG. 8

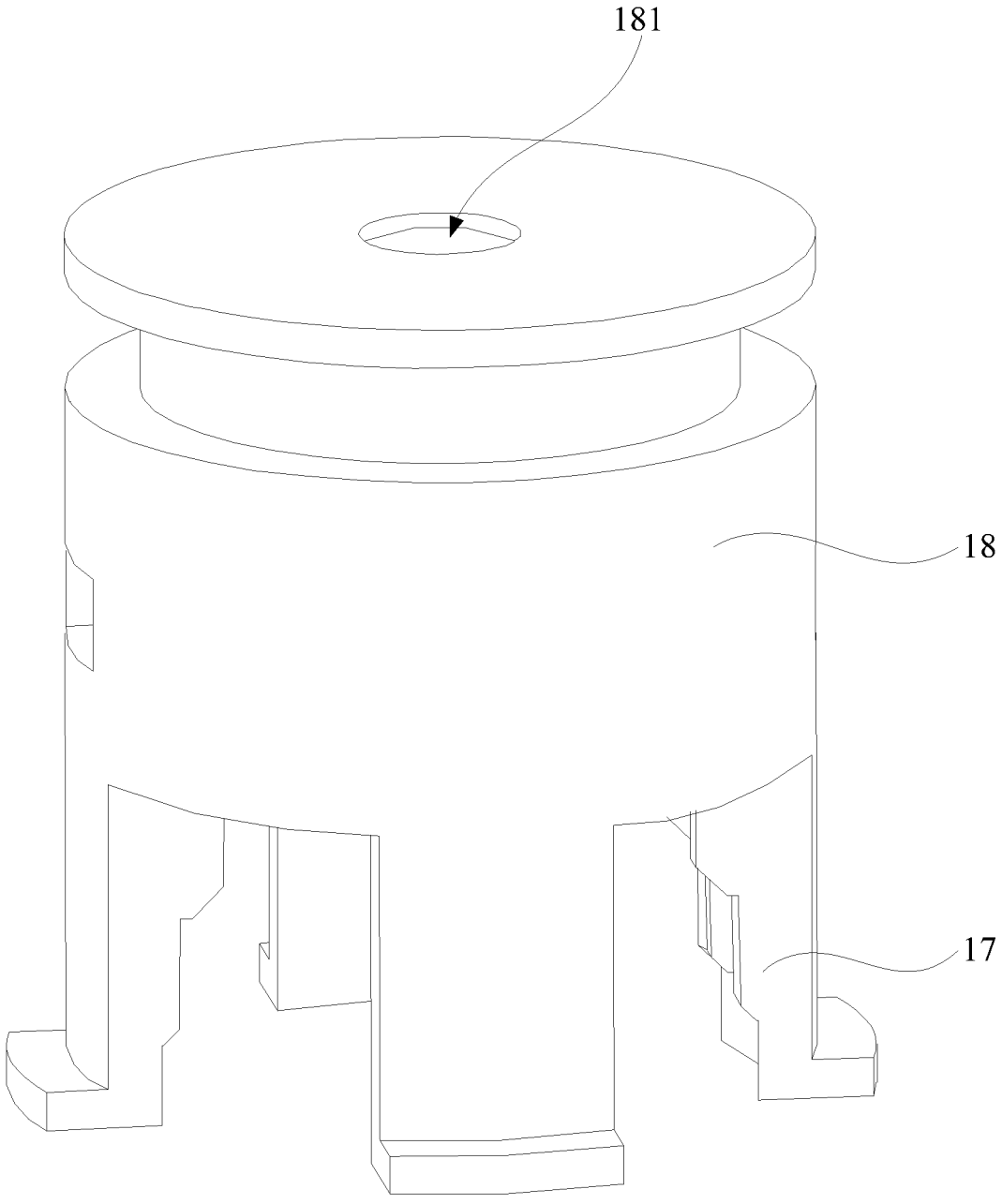

FIG. 9

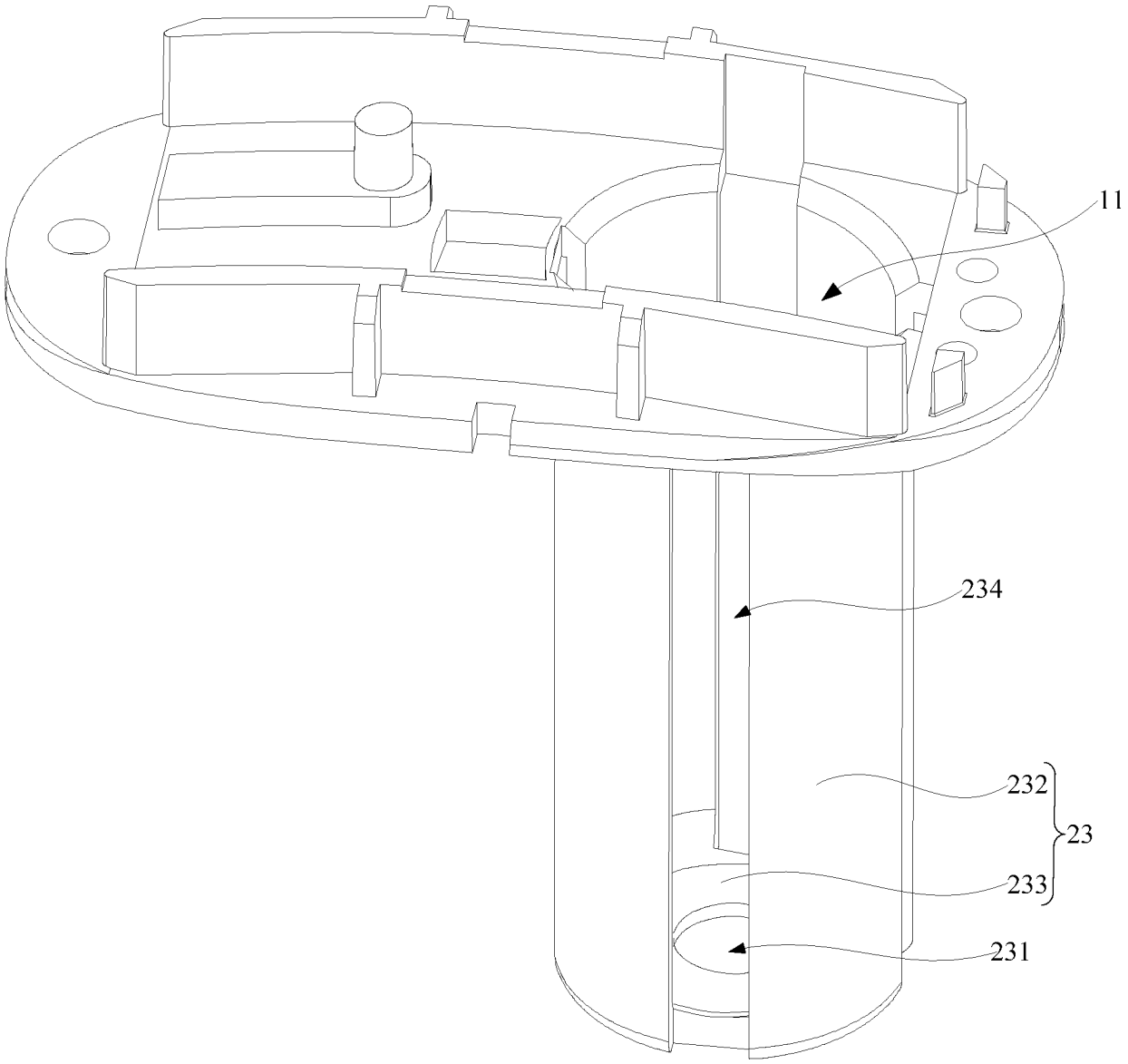

FIG. 10

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2022/111943

A. CLASSIFICATION OF SUBJECT MATTER

A24F 40/40(2020.01)i; A24F 40/46(2020.01)i; A24F 47/00(2020.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

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)

CNTXT; ENTXTC; ENTXT; VEN; CNKI; JPTXT: 麦时, 加热非燃烧, 加热不燃烧, 真空, 发热, 电热, 加热, 绝热, 散热, 气凝胶, 气溶胶, thermal+, insulat+, chamber+, cavity, aerosol, pip+, heat+, vacuum

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 216147240 U (SHENZHEN MAISHI TECHNOLOGY CO., LTD.) 01 April 2022 (2022-04-01) claims 1-10, description, paragraphs [0033]-[0065], and figures 1-10	1-15
X	CN 209898300 U (POWERTHINK TECHNOLOGY CO., LTD.) 07 January 2020 (2020-01-07) description, paragraphs [0028]-[0035], and figures 1-8	1-15
X	CN 113171733 A (ALD GROUP LIMITED) 27 July 2021 (2021-07-27) description, paragraphs [0025]-[0036], and figures 1-3	1-4, 11-13
A	CN 208457454 U (CHINA TOBACCO HUNAN INDUSTRIAL CO., LTD.) 01 February 2019 (2019-02-01) entire document	1-15
A	CN 211832831 U (CHINA TOBACCO ZHEJIANG INDUSTRIAL CO., LTD.) 03 November 2020 (2020-11-03) entire document	1-15
A	CN 108433191 A (SHENZHEN L-RIDER TECHNOLOGY CO., LTD.) 24 August 2018 (2018-08-24) entire document	1-15

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

* Special categories of cited documents:
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"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
30 September 2022	**01 November 2022**
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.

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

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2022/111943

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN 216147240 U	01 April 2022	None	
CN 209898300 U	07 January 2020	None	
CN 113171733 A	27 July 2021	WO 2022116559 A1	09 June 2022
CN 208457454 U	01 February 2019	CN 110617383 A	27 December 2019
CN 211832831 U	03 November 2020	None	
CN 108433191 A	24 August 2018	CN 208176006 U	04 December 2018

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