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(71) Applicant: **Shenzhen Merit Technology Co., Ltd.**
Shenzhen, Guangdong 518105 (CN)

(72) Inventors:
• **GUO, Conghui**
Shenzhen, Guangdong 518105 (CN)
• **LIANG, Feng**
Shenzhen, Guangdong 518105 (CN)

(74) Representative: **Herrero & Asociados, S.L.**
Edificio Aqua - Agustín de Foxá, 4-10
28036 Madrid (ES)

(54) **AEROSOL MATRIX STRUCTURE AND AEROSOL GENERATION DEVICE**

(57) Disclosed in the present invention are an aerosol matrix structure and an aerosol generation device. The aerosol matrix structure comprises a matrix section, an air passage section provided at one end of the matrix section, and a filter section provided on the end of the air passage section away from the matrix section; the matrix section comprises an aerosol generation matrix and a

heating body; the heating body is provided with a closed cavity; the aerosol generation matrix is provided in the closed cavity; and the material of the heating body comprises a ferromagnetic material having a Curie point, so as to heat and atomize the aerosol generation matrix by means of electromagnetic induction to form an aerosol.

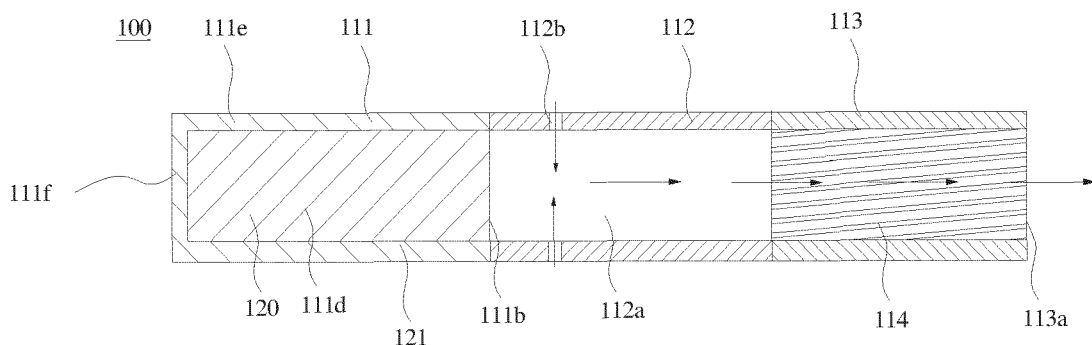


FIG. 1

Description

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] The present disclosure claims priority of Chinese Patent Application No. 202110802895.0, filed on July 15, 2021, the entire contents of which are hereby incorporated by reference in their entirety.

TECHNICAL FIELD

[0002] The present disclosure relates to the technical field of electronic atomization devices, and in particular to an aerosol substrate structure and an aerosol generation device.

BACKGROUND

[0003] A heat-not-burning (HNB) device is a combination of a heating device and an aerosol-generating substrate (treated plant leaf products). The external heating device heats the aerosol-generating substrate to a temperature at which the aerosol-generating substrate can produce aerosols but is not hot enough to be burned, such that the aerosol-generating substrate can produce the aerosols desired by the user without burning.

[0004] Conventionally, the heating device is arranged with a heating member, and when the aerosol-generating substrate is inserted into the heating device, the heating member generates heat to heat the aerosol-generating substrate. However, the heat loss in a process of transferring the heat generated by the heating member to the aerosol-generating substrate is severe, which affects the heating efficiency.

[0005] In addition, the aerosol-generating substrate is typically wrapped in paper material to form an aerosol substrate structure with two open ends. When the user pulls out the aerosol substrate structure after vaping, residues of the aerosol-generating substrate are easily left behind or adhered to the heating device, which may easily result in difficulties in cleaning the heating device and the appearance of miscellaneous smells and odors, seriously affecting the user's vaping experience. Moreover, during the vaping process, cold air from outside flows through the aerosol-generating substrate, causing the temperature of the aerosol-generating substrate to change drastically, such that the cracking reaction of the aerosol-generating substrate is unstable, and the consistency of the material composition of the generated aerosol is poor, which in turn affects the user's vaping taste.

SUMMARY OF THE DISCLOSURE

[0006] The present disclosure provides an aerosol substrate structure and an aerosol generation device, which solves the problems of serious heat loss in the heating process, the residue of the aerosol generating substrate being easily left in the heating device, the poor

consistency of the material composition of the generated aerosol, and a poor vaping taste of the user.

[0007] To solve the above technical problem, a first technical scheme adopted by the present disclosure is: an aerosol substrate structure, including:

[0008] a substrate segment, an airway segment arranged at an end of the substrate segment, and a filter segment arranged at an end of the airway segment away from the substrate segment;

10 [0009] wherein the substrate segment includes an aerosol-generating substrate and a heater; the heater defines a confined cavity, and the aerosol-generating substrate is received in the confined cavity; the material of the heater includes a ferromagnetic material having a Curie temperature, to form aerosol by atomizing the aerosol-generating substrate through electromagnetic induction heating.

[0010] In some embodiments, the material of at least a side of the heater toward the aerosol-generating substrate is the ferromagnetic material having a Curie temperature.

[0011] In some embodiments, the material of the heater is the ferromagnetic material having a Curie temperature.

25 [0012] In some embodiments, the ferromagnetic material is an iron-nickel alloy.

[0013] In some embodiments, the aerosol-generating substrate is in direct contact with an inner surface of the heater.

30 [0014] In some embodiments, the airway segment includes a drawing channel, and an end of the confined cavity has a first opening; the drawing channel is in communication with the confined cavity through the first opening; the drawing channel is in communication with an outside atmosphere to realize air intake during a vaping process, for vaping the aerosol generated in substrate segment.

[0015] In some embodiments, the heater is a tubular body including confined side walls; an end of the tubular body connected to the airway segment is an open end serving as the first opening, and the other end of the tubular body away from the airway segment is a confined end.

45 [0016] In some embodiments, an inner side wall of the airway segment is arranged with a support medium for supporting the airway segment; an interior of the support medium is hollow, and a space enclosed by inner surfaces of the support medium forms the drawing channel.

[0017] In some embodiments, the filter segment is in communication with the airway segment, and the filter segment is filled with a filter medium, for filtering the aerosol vaped from the airway segment.

55 [0018] In some embodiments, the material of the airway segment and/or the filter segment is a paper-based or foil-based material; the material of the support medium and/or the filter medium is acetate fiber.

[0019] To solve the above technical problem, a second technical scheme adopted by the present disclosure is:

an aerosol generation device, including: the aerosol substrate structure according to claim 1 and a heating device; the heating device includes a power supply assembly and an electromagnetic coil; wherein the power supply assembly is connected to the electromagnetic coil for supplying power to the electromagnetic coil; the electromagnetic coil is configured to generate a magnetic field when energized, for causing the heater in the aerosol substrate structure to be heated by electromagnetic induction and to atomize the aerosol-generating substrate.

[0020] For the provided aerosol substrate structure and aerosol generation device, the aerosol substrate structure accommodates the aerosol-generating substrate through the heater; the material of the heater includes a ferromagnetic material having a Curie temperature, so as to heat the ferromagnetic material having a Curie temperature in the heater by electromagnetic induction to heat the aerosol-generating substrate so as to heat and atomize the aerosol-generating substrate to form the aerosol. Because the aerosol substrate structure can directly heat the aerosol-generating substrate through the heater to receive the aerosol-generating substrate, without the need for heat conduction through other mediums, thereby effectively reducing heat loss in the conduction process.

[0021] In addition, the aerosol substrate structure accommodates the aerosol-generating substrate through the confined cavity in the heater, which can keep the aerosol-generating substrate in a confined state, so as to enable the residue of the aerosol-generating substrate to be taken out along with the aerosol substrate structure after the vaping is completed, avoiding being left behind or adhered to in the heating device, and preventing the problem of difficulty in cleaning the heating device, and the emergence of miscellaneous tastes and odors. In addition, during the vaping process, the air flow does not pass through the aerosol-generating substrate in the substrate segment, the cracking reaction of the aerosol-generating substrate will not be affected by the cold air, and the cracking reaction is stable, which is conducive to the consistency of the material composition of the generated aerosol, which in turn is conducive to the enhancement of the user's vaping taste.

BRIEF DESCRIPTION OF THE DRAWINGS

[0022] In order to more clearly illustrate the technical solutions in the embodiments of the present disclosure, the accompanying drawings to be used in the description of the embodiments will be briefly introduced below, and it will be obvious that the accompanying drawings in the following description are only some of the embodiments of the present disclosure, and that for those skilled in the art, other accompanying drawings can be obtained based on these drawings without putting forth creative labor.

FIG. 1 is a cross-sectional view of an aerosol substrate structure according to a first implementation

of the present disclosure.

FIG. 2 is a cross-sectional view of an aerosol substrate structure according to a second implementation of the present disclosure.

FIG. 3 is a cross-sectional view of an aerosol substrate structure according to a third implementation of the present disclosure.

FIG. 4 is a cross-sectional view of an aerosol substrate structure according to a fourth implementation of the present disclosure.

FIG. 5 is a cross-sectional view of an aerosol substrate structure according to a fifth implementation of the present disclosure.

FIG. 6 is a cross-sectional view of an aerosol generation device according to some embodiments of the present disclosure.

DETAILED DESCRIPTION

[0023] The technical solutions in the embodiments of the present disclosure will be described clearly and completely in the following in conjunction with the accompanying drawings, and it is obvious that the described embodiments are only a part of the embodiments of the present disclosure, and not all of the embodiments. Based on the embodiments in the present disclosure, all other embodiments obtained by those skilled in the art without making creative labor fall within the scope of the present disclosure.

[0024] In the following description, specific details such as particular system structures, interfaces, techniques, etc. are presented for the purpose of illustration and not for the purpose of limitation, in order to provide a thorough understanding of the present disclosure.

[0025] The terms "first", "second", and "third" in the present disclosure are intended for descriptive purposes only and are not to be construed as indicating or implying relative importance or implicitly specifying the number of technical features indicated. Thus, a feature defined with "first", "second", "third" may expressly or implicitly include at least one of the features. In the description of the present disclosure, "plurality" means at least two, e.g., two, three, etc., unless otherwise expressly and specifically limited. All directional indications (e.g. up, down, left, right, forward, back) in the embodiments of the present disclosure are intended only to explain the relative positional relationships, movements, etc. between components in a particular attitude (as shown in the drawings). When the particular attitude changes, the directional indications also change accordingly. The terms "including" and "having" in the embodiments of the present disclosure, and any variations thereof, are intended to cover non-exclusive inclusion. For example, a process, method, system, product, or apparatus including a series of steps or units is not limited to the listed steps or units, but optionally further includes steps or units that are not listed, or optionally includes other steps or components that are inherent to the process, method, product, or ap-

paratus.

[0026] Reference to "embodiments" herein implies that particular features, structures, or characteristics described in conjunction with the embodiments may be included in at least one embodiment of the present disclosure. The occurrence of the described phrases at various points in the specification does not necessarily all refer to the same embodiments, nor are they independent or alternative embodiments that are mutually exclusive of other embodiments. It is understood by those skilled in the art, both explicitly and implicitly, that the embodiments described herein may be combined with other embodiments.

[0027] The present disclosure is described in detail below in connection with the accompanying drawings and embodiments.

[0028] Referring to FIG. 1, FIG. 1 is a cross-sectional view of an aerosol substrate structure 100 according to a first implementation of the present disclosure. In the embodiments, an aerosol substrate structure 100 is provided, including a substrate segment 111, an airway segment 112, and a filter segment 113 that are connected in sequence.

[0029] The substrate segment 111 includes an aerosol-generating substrate 120 and a heater 121. The heater 121 defines a confined cavity 111d, and the confined cavity 111d is configured to receive the aerosol-generating substrate 120. That is, the aerosol-generating substrate 120 is arranged within the confined cavity 111d of the heater 121, and an end of the confined cavity 111d has a first opening 111b. Specifically, side walls of the heater 121 are annularly enclosed to form a tubular body, and an end of the tubular body connected to the airway segment 112 is an open end. In the embodiments, the open end serves as the first opening 111b. It should be noted that when the open end serves as the first opening 111b, the diameter of the first opening 111b is the same as the diameter of the confined cavity 111d. Of course, in other embodiments, the diameter of the first opening 111b may be less than the diameter of the confined cavity 111d.

[0030] The airway segment 112 is configured to vape aerosol formed within the substrate segment 111. The airway segment 112 is disposed at an end of the substrate segment 111 having the first opening 111b, and an interior of the airway segment 112 includes a drawing channel 112a. The drawing channel 112a is in communication with the confined cavity 111d of the substrate segment 111 through the first opening 111b.

[0031] The filter segment 113 is in communication with an end of the drawing channel 112a of the airway segment 112 that is back away from the substrate segment 111, to allow the aerosol within the drawing channel 112a to enter the filter segment 113 such that the filter segment 113 can filter the aerosol being vaped by the airway segment 112. Specifically, the filter segment 113 may be disposed on a side of the airway segment 112 away from the substrate segment 111, and the filter segment 113

may be filled with a filter medium 114. The filter medium 114 can filter tars, suspended particles, etc. within the aerosol, so as to filter the aerosol vaped from the airway segment 112 by the filter medium 114, thereby reducing undesired substances in the aerosol inhaled by the user. The material of the filter medium 114 may be acetate. Further, an end of the filter segment 113 that is back away from the airway segment 112 has a second opening 113a, causing an interior of the filter segment 113 to be in communication with an outside atmosphere. In this way, the user can inhale the aerosol from the end of the filter mouth segment 113 having the second opening 113a.

[0032] The material of the airway segment 112 and the filter segment 113 may be a paper-based or foil-based material. The material of the heater 121 may include a ferromagnetic material having a Curie temperature, and the ferromagnetic material may be, for example, an iron-nickel alloy. The ferromagnetic material having a Curie temperature on the heater 121 may be heated by electromagnetic induction to heat and atomize the aerosol-generating substrate 120 within the heater 121 to form the aerosol. Specifically, an electromagnetic coil may be wound in a peripheral circumferential direction of the substrate segment 111 to generate a magnetic field when the electromagnetic coil is energized, thereby heating the ferromagnetic material having a Curie temperature on the heater 121.

[0033] The material of the heater 121 including the ferromagnetic material having a Curie temperature may specifically mean: the material of the heater 121 may be only the ferromagnetic material having a Curie temperature, and the heater 121 all serves as a heating member to heat the aerosol-generating substrate 120. Of course, the material of the heater 121 may otherwise include the ferromagnetic material having a Curie temperature and other materials other than the ferromagnetic material having a Curie temperature, and the other materials and the ferromagnetic material having a Curie temperature are only physically combined, i.e., the ferromagnetic material does not react chemically with the other materials.

[0034] Compared to the related art in which a heating member is arranged in a heating device, and heat generated by the heating member conducts the heat to the aerosol-generating substrate 120 through a series of mediums, such as air and paper material wrapped around the aerosol-generating substrate 120, the embodiments of the present disclosure set the aerosol-generating substrate 120 in the heater 121 made of the ferromagnetic material having a Curie temperature, and the heater 121 can directly act as a heating member to generate heat by electromagnetic induction to heat the aerosol-generating substrate 120 inside the heater 121. The heat is transferred directly from the heater 121 to the aerosol-generating substrate 120, thereby saving the medium for heat transfer and thus reducing heat loss during conduction.

[0035] In addition, the heater 121 being heated is spe-

cifically implemented by the ferromagnetic material having a Curie temperature, and the ferromagnetic material having a Curie temperature is ferromagnetic when the temperature thereof is below the Curie temperature. Therefore, the ferromagnetic material can continuously generate heat by electromagnetic induction under an action of oscillating coils, thereby realizing heating and baking the aerosol-generating substrate 120. However, after the temperature of the ferromagnetic material exceeds the Curie temperature, the ferromagnetic material is converted from ferromagnetic to paramagnetic, i.e., the heater 121 is no longer magnetic, and the heater 121 ceases to carry out electromagnetic induction heating on the aerosol-generating substrate 120, so as to enable the heater 121 to automatically stop heating when the heating temperature exceeds the Curie temperature, thereby accurately controlling the temperature of the aerosol-generating substrate 120 within a certain temperature range, and preventing problems such as scorching of the aerosol-generating substrate 120 caused by the heating temperature of the aerosol-generating substrate 120 being too high. In this way, the temperature of the aerosol-generating substrate 120 may be accurately controlled, which in turn eliminates the need for a separate temperature measurement component in the heating device and effectively reduces production costs.

[0036] Furthermore, compared to a solution where the aerosol-generating substrate 120 is externally wrapped with a paper material, the use of the heater 121 to wrap the aerosol-generating substrate 120 in the present embodiment further prevents the presence of baked-paper flavor in the vaping process, thereby improving the vaping taste of the user.

[0037] In some embodiments, the material of at least a side of the heater 121 toward the aerosol-generating substrate 120 is the ferromagnetic material having a Curie temperature. For example, the substrate segment 111 may be of a double-layer structure, where the material of an outer wall of the heater 121 is an insulating material and the material of an inner wall of the heater 121 is the ferromagnetic material having a Curie temperature. As a result, the heater 121 is closer to the aerosol-generating substrate 120, and there is less heat loss during heat transfer.

[0038] In some embodiments, as shown in FIG. 1, when the heater 121 receives the aerosol-generating substrate 120, the aerosol-generating substrate 120 may be in direct contact with an inner surface of the heater 121, such that the heat generated by the heater 121 can be directly transferred to the aerosol-generating substrate 120. If there is a gap between the aerosol-generating substrate 120 and the inner surface of the heater 121, the heat is required to be transferred from the heater 121 to the aerosol-generating substrate 120 through an air medium. Therefore, for the technical design proposed by the present disclosure, the aerosol-generating substrate 120 is in direct contact with the inner surface of the heater 121, such that the heat is not required to be

transferred in an air medium, which further reduces the heat loss in the heat transfer process.

[0039] In some embodiments, the shape of each of the heater 121, the airway segment 112, and the filter segment 113 may be hollow tubular or cylindrical. In other embodiments, the shape of each of the substrate segment 111, the airway segment 112, and the filter segment 113 may be other shapes. Further, the shapes of the substrate segment 111, the airway segment 112, and the filter segment 113 may be the same and may each be cylindrical.

[0040] In some embodiments, the inner diameters of the heater 121, the airway segment 112, and the filter segment 113 may be the same, and the outer diameters of the heater 121, the airway segment 112, and the filter segment 113 may be the same, such that the side walls of the substrate segment 111, the side walls of the airway segment 112, and the side walls of the filter segment 113 can sequentially abut against each other.

[0041] In the embodiments, as shown in FIG. 1, the arrows in FIG. 1 indicate the flow direction of the airflow. The confined cavity 111d of the substrate segment 111 may include only the first opening 111b, i.e., the confined cavity 111d has sealed ends other than the first opening 111b, such that airflow cannot enter from the substrate segment 111.

[0042] Specifically, in the embodiments, the airway segment 112 defines a first air inlet hole 112b, and the number of the first air inlet holes 112b is at least one. The first air inlet hole 112b can connect the outside atmosphere to the drawing channel 112a, enabling an airflow to enter the drawing channel 112a from the first air inlet hole 112b, thereby carrying the aerosol generated in the substrate segment 111, entering the interior of the filter segment 113 through the drawing channel 112a, and flowing out of the second opening 113a of the filter segment 113. In this way, the vaping process of the user is realized.

[0043] The aerosol substrate structure 100 may keep the aerosol-generating substrate 120 in a confined state when the aerosol-generating substrate 120 is received in the heater 121, by forming the substrate segment 111 into the confined cavity 111d to receive the aerosol-generating substrate 120 through the confined cavity 111d, thereby preventing the aerosol-generating substrate 120 from falling out of the aerosol substrate structure 100 during the vaping process or after vaping is completed. In addition, it is possible to enable the residue of the aerosol-generating substrate 120 to be removed along with the aerosol substrate structure 100 after the vaping is completed, thereby preventing the problem of the residue being left behind or adhering to the heating device, thus facilitating the cleaning of the heating device.

[0044] In addition, during the vaping process, the airflow does not pass through the aerosol-generating substrate 120 within the substrate segment 111, such that the cracking reaction of the aerosol-generating substrate 120 is not affected by cold air. In this way, the cracking

reaction is stable, which is conducive to the consistency of the material composition of the generated aerosol, and thus conducive to the enhancement of the user's vaping taste.

[0045] Since the formed aerosol has a substitution effect on the gas in the confined cavity 111d, the oxygen content in the substrate segment 111 will decrease with the heating process, in which case the aerosol-generating substrate 120 will not undergo a combustion phenomenon even if the heating temperature is elevated. Therefore, the heating temperature of the aerosol-generating substrate 120 can be further increased to fully release the flavor components in the aerosol-generating substrate 120 and enhance the vaping taste of the user.

[0046] In some embodiments, as shown in FIG. 1, the heater 121 includes an annular side wall 111e and a bottom wall 111f; the bottom wall 111f is disposed at an end of the annular side wall 111e away from the airway segment 112, and is enclosed with the annular side wall 111e to define the confined cavity 111d. The annular side wall 111e and the bottom wall 111f may be hermetically sealed by tightly fitting such that the heater 121 is confined at the end away from the airway segment 112. The annular side wall 111e and the bottom wall 111f may be integrally molded, i.e., the heater 121 is integrally molded, and the confined cavity 111d is integrally molded to make the end of the substrate segment 111 away from the airway segment 112 confined. Compared to the annular side wall 111e and the bottom wall 111f being hermetically sealed, the confined cavity 111d being integrally molded may make the interior of the substrate segment 111 better sealed; and in a case of handling, moving, unsealing, and other external forces, the bottom wall 111f is not easy to be loosened and fall off, so as to prevent the aerosol-generated substrate 120 from falling out and making it difficult to clean the heating device. In addition, the above scheme may prevent problems of poor consistency of the generated aerosol caused by the airflow entering the substrate segment 111.

[0047] In the first implementation, as shown in FIG. 1, the materials of the annular side wall 111e and the bottom wall 111f of the substrate segment 111 may be both ferromagnetic materials having a Curie temperature, and the annular side wall 111e and the bottom wall 111f are integrally molded. When the aerosol substrate structure 100 is used, the aerosol is inhaled with airflow entering through multiple the first air inlet holes 112b.

[0048] In the first implementation, the substrate segment 111 is a confined structure, and the airflow does not pass through the substrate segment 111. Therefore, the outflow of the aerosol generated within the substrate segment 111 is more difficult compared to a structure of the substrate segment 111 with both open ends, and the airflow is unable to bring out the aerosol or brings out the aerosol in a small amount, which affects the vaping experience of the user.

[0049] In view of the fact that the greater the number of the first air inlet holes 112b, the lower the temperature

of the airflow within the aerosol substrate structure 100, and the lower the vaping resistance, and the amount of aerosol inhaled shows a tendency to increase and then decrease with the increase in the number of the first air inlet holes 112b, the specific number of the first air inlet holes 112b may be set according to actual situations. Specifically, the number of the first air inlet holes 112b is taken to be a plurality, and the plurality of first air outlet holes are spaced apart along a circumferential direction of the airway segment 112. Preferably, the plurality of first air outlet holes are evenly spaced apart along the circumferential direction of the airway segment 112, so as to make the air intake in the various radial directions of the airway segment 112 more uniform.

[0050] Specifically, the shape of each first air inlet hole 112b may be round, oval, rhombus, and square, etc., which can be selected according to the manufacturing process and cost of the aerosol substrate structure 100.

[0051] Specifically, the greater the aperture of the first air inlet hole 112b, the lower the temperature of the airflow within the aerosol substrate structure 100, the greater the amount of the aerosol inhaled by the user, and the lower the vaping resistance. Therefore, the size of the aperture of the first air inlet hole 112b may be selected and set according to actual situations. Of course, considering the support effect of the airway segment 112, the number of the first air inlet holes 112b and the size of the aperture may be made to be designed in combination with the diameter of the airway segment 112, so as to avoid problems of blocking the drawing channel 112a caused by the airway segment 112 being easily deformed and collapsed due to the excessively large aperture area. In some embodiments, the size of the aperture of the first air inlet hole 112b may be 0.2mm-1mm.

[0052] In some embodiments, a straight-line distance between the first air inlet hole 112b and the first opening 111b may be 2mm-14mm to shorten the straight-line distance between the first air inlet hole 112b and the first opening 111b, thereby enabling the user to inhale a larger amount of aerosol when the temperature of the airflow within the aerosol substrate structure 100 is higher.

[0053] In some embodiments, the first air inlet hole 112b may be disposed at an end of the airway segment 112 close to the substrate segment 111, and of course, the first air inlet hole 112b may be disposed at other locations of the airway segment 112. The opening position may be designed according to the structure of the aerosol generation device 200 (referring to FIG. 6 below), and it should be noted that the opening position should be designed so as to avoid the aerosol generation device 200 blocking the first air inlet hole 112b, for ensuring the air intake of the aerosol substrate structure 100.

[0054] In some embodiments, the number of the first air outlet holes is 4-10, the shapes of the first air outlet holes are each circular, the diameter of each circular first air inlet hole 112b is 0.6mm-0.8mm, a linear distant from each first air inlet hole 12b to the first opening 111b is in a range of 4mm-10m, and the first air inlet holes 12b are

evenly spaced apart along the circumferential direction of the airway segment 112. This design of the first air outlet holes enables a more adequate amount of aerosol to be inhaled, a moderate vaping resistance, and a moderate temperature of the airflow, which results in a superior vaping experience of the user.

[0055] As can be seen from the above analysis, when the substrate segment 111 is a confined structure, the heating temperature of the aerosol-generating substrate 120 is higher than that for a non-confined structure, and the opening position of the first air inlet hole 112b is usually closer to the substrate segment 111, resulting in that the temperature of the aerosol inhaled by the user is usually high, which may give the user a poor vaping experience.

[0056] In view of this, in some embodiments, referring to FIG. 2, FIG. 2 is a cross-sectional view of an aerosol substrate structure 100 according to a second implementation of the present disclosure. Considering the problem that the temperature of the aerosol inhaled by the user is high, in addition to the first air inlet holes 112b defined on the side wall of the airway segment 112, a number of second air inlet holes 112c are further defined. The second air inlet holes 112c are provided to cool the aerosol entering the drawing channel 112a by introducing cold outside air during the vaping process.

[0057] In some embodiments, as shown in FIG. 2, the first air inlet holes 112b are disposed at an end of the airway segment 112 near the substrate segment 111, and the second air inlet holes 112c are disposed at an end of the airway segment 112 away from the substrate segment 111. The aperture of the second air inlet hole 112c is less than the aperture of the first air inlet hole 112b, so as to allow a majority of the airflow to enter through the first air inlet holes 112b and drive the aerosol generated by the substrate segment 111 through the drawing channel 112a and the filter segment 113 for the user to inhale, thereby realizing the vaping process of the aerosol. A small portion of the airflow enters through the second air inlet holes 112c because the aperture of the second air inlet hole 112c is less, and the amount of airflow that enters through the second air inlet hole 112c is small, which will not produce an obvious dilution effect on the aerosol while can appropriately reduce the temperature of the aerosol that enters the filter segment 113, so as to enable the user to vape the aerosol with a moderate temperature, satisfying the user's vaping experience.

[0058] In some embodiment, the second air inlet holes 112c are spaced apart along the circumferential direction of the airway segment 112. In some embodiments, the first air outlet holes and the second air inlet holes 112c are evenly spaced along the circumferential direction of the airway segment 112, so as to provide a more uniform air intake in each radial direction of the airway segment 112.

[0059] In some embodiments, as shown in FIG. 2, the airway segment 112 includes multiple second air inlet

hole sets 112d disposed at the end of the airway segment 112 away from the substrate segment 111. Each second air inlet hole set 112d include multiple second air inlet holes 112c. The multiple second air inlet hole sets 112d are spaced apart along an axial direction of the airway segment 112, and the multiple second air inlet holes 112c in each second air inlet hole set 112d are spaced apart along the circumferential direction of the airway segment 112. By providing the multiple second air inlet hole sets 112d, the temperature of the airflow in the airway segment 112 may be reduced to a greater extent, thereby improving the vaping experience of the user.

[0060] In a second implementation, as shown in FIG. 2, multiple first air inlet holes 112b and two second air inlet hole sets 112d are arranged on the side wall of the airway segment 112, and each of the two second air inlet hole sets 112d includes multiple second air inlet holes 112c. The multiple first air inlet holes 112b are uniformly disposed along the circumferential direction at a side of the airway segment 112 close to the substrate segment 111, and the two second air inlet hole sets 112d are disposed on a side of the airway segment 112 close to the filter segment 113; the multiple second air inlet holes 112c in each second air inlet hole set 112d are uniformly spaced along the circumferential direction of the airway segment 112.

[0061] In some embodiments, referring to FIGS. 3 and 4, FIG. 3 is a cross-sectional view of an aerosol substrate structure 100 according to a third implementation of the present disclosure, and FIG. 4 is a cross-sectional view of an aerosol substrate structure 100 according to a fourth implementation of the present disclosure. A cooling medium 112e may further be arranged within the airway segment 112 for cooling the aerosol entering the airway segment 112 to improve the vaping experience of the user. The material of the cooling medium 112e may be polylactic acid or acetate.

[0062] In some embodiments, referring to FIG. 3, the cooling medium 112e is disposed on an inner side wall of the airway segment 112 along an axial direction of the airway segment 112 and avoids the position of the first air inlet hole 112b. The cooling medium 112e may be arranged on a portion of the inner side wall of the airway segment 112 or on the entire inner side wall of the airway segment 112. In other embodiments, the cooling medium 112e may be arranged in a side wall of the airway segment 112, or the cooling medium 112e may be arranged on an outer side wall of the airway segment 112.

[0063] In a third implementation, as shown in FIG. 3, the cooling medium 112e runs through the airway segment 112 in the axial direction of the airway segment 112, i.e., the cooling medium 112e extends from the first opening 111b to a position where the airway segment 112 is connected to the filter segment 113. The cooling medium 112e is arranged on the entire inner side wall of the airway segment 112 and avoids the position of the first air inlet hole 112b. The cooling medium 112e has a hollow cavity, and a space enclosed by an inner surface

of the cooling medium 112e forms the drawing channel 112a. During the vaping process, when the airflow flows through the drawing channel 112a, the cooling medium 112e can cool the airflow from all directions.

[0064] In some embodiments, the airflow can travel within the cooling medium 112e, and the aerosol within the airway segment 112 can flow through the cooling medium 112e, such that the cooling medium 112e is able to uniformly cool the aerosol within the airway segment 112. In a fourth implementation, as shown in FIG. 4, the cooling medium 112e is filled in the drawing channel 112a and is disposed at an end of the airway segment 112 away from airway substrate segment 111. After entering the drawing channel 112a from the first air inlet hole 112b, the airflow carries the aerosol generated by the substrate segment 111 to flow through the cooling medium 112e, and the cooling medium 112e can uniformly cool the aerosol so as to make the temperature of the aerosol inhaled by the user more moderate, which improves the user's vaping experience.

[0065] In some embodiments, the filter segment 113 may be filled with another cooling medium 112e in addition to the filter medium 114, thereby cooling the aerosol flowing through the filter segment 113.

[0066] In some embodiments, the side wall of the airway segment 112 may include the cooling medium 112e to cool the airflow within the drawing channel 112a. The above methods for cooling the airflow within the drawing channel 112a may be used in combination and are not limited to each being used separately.

[0067] In some embodiments, as shown in FIG. 5, FIG. 5 is a cross-sectional view of an aerosol substrate structure 100 according to a fifth implementation of the present disclosure. The inner side wall of the airway segment 112 may further be arranged with a support medium 112f for supporting the airway segment 112, for preventing the vaping process of the aerosol substrate structure 100 from being affected caused by the airway segment 112 deforming, collapsing, or even blocking the drawing channel 112a.

[0068] In some embodiments, as shown in FIG. 5, the support medium 112f is arranged on the inner side wall of the airway segment 112 along the axial direction of the airway segment 112 and avoids the position of the first air inlet hole 112b. The support medium 112f may be arranged on a portion of the inner side wall of the airway segment 112 or on the entire inner side wall of the airway segment 112.

[0069] In a fifth implementation, as shown in FIG. 5, the support medium 112f runs through the airway segment 112 along the axial direction of the airway segment 112, i.e., the support medium 112f extends from the first opening 111b to a position where the airway segment 112 is connected to the filter segment 113. The support medium 112f is arranged on the entire inner side wall of the airway segment 112 and avoids the position of the first air inlet hole 112b. An interior of the support medium 112f is hollow, i.e., the support medium 112f has a hollow

cavity, and a space enclosed by an inner surface of the support medium 112f forms the drawing channel 112a. In the fifth implementation, the material of the airway segment 112 is a paper material, the support medium 112f is acetate fiber, and the support medium 112f can effectively prevent deformation and collapse of the paper material. The acetate fiber in the sixth implementation, in addition to being the support medium 112f, may further be used as the cooling medium 112e to cool down the airflow in the drawing channel 112a.

[0070] The present disclosure also provides an aerosol generation device 200, referring to FIG. 6, FIG. 6 is a cross-sectional view of an aerosol generation device 200 according to some embodiments of the present disclosure. The aerosol generation device 200 is configured for heating and baking the aerosol substrate structure 100 and generating aerosol to be inhaled by a user.

[0071] The aerosol generation device 200 includes a heating device 210 and the aerosol substrate structure 100. The heating device 210 includes a power supply assembly 211 and a heating assembly 212, and the power supply assembly 211 is connected to the heating assembly 212 for supplying power to the heating assembly 212. The heating assembly 212, when energized, can heat the aerosol-generating substrate 120 in the aerosol substrate structure 100 to form aerosol.

[0072] The aerosol substrate structure 100 in the aerosol generation device 200 may refer to the structure and function of the aerosol substrate structure 100 covered in any of the embodiments above, and may realize the same or similar technical effects, which will not be repeated herein.

[0073] The power supply assembly 211 includes a battery (not shown) and a controller (not shown), which is electrically connected to both the battery and the heating assembly 212. The battery is configured to provide power to the heating assembly 212 to heat the aerosol substrate structure 100. The controller is configured to control the start and stop of the heating of the heating assembly 212, and can control parameters such as power and temperature of the heating.

[0074] In some embodiments, as shown in FIG. 6, the material of the heating member 121 in the substrate segment 111 of the aerosol substrate structure 100 in the aerosol generation device 200 includes a ferromagnetic material having a Curie temperature. The heating member 121 is an electromagnetic coil 212a, and the power supply assembly 211 is connected to the electromagnetic coil 212a for supplying power to the electromagnetic coil 212a. The electromagnetic coil 212a is configured to generate a magnetic field when energized to cause the heating member 121 in the aerosol substrate structure 100 to form aerosol by atomizing the aerosol-generating substrate 120 through electromagnetic induction heating.

[0075] In the aerosol generation device 200, compared to the related art in which the heating member 121 is arranged in the heating device 210, and heat generated by the heating member conducts the heat to the aerosol-

generating substrate 120 through a series of mediums, such as air and paper material wrapped around the aerosol-generating substrate 120, the embodiments of the present disclosure set the aerosol-generating substrate 120 in the heater 121 made of the ferromagnetic material having a Curie temperature, and the heater 121 can directly act as a heating member to generate heat by electromagnetic induction to heat the aerosol-generating substrate 120 inside the heater 121. The heat is transferred directly from the heater 121 to the aerosol-generating substrate 120, thereby saving the medium for heat transfer and thus reducing heat loss during conduction.

[0076] In addition, the heater 121 being heated is specifically implemented by the ferromagnetic material having a Curie temperature, and the ferromagnetic material having a Curie temperature is ferromagnetic when the temperature thereof is below the Curie temperature. Therefore, the ferromagnetic material can continuously generate heat by electromagnetic induction under an action of oscillating coils, thereby realizing heating and baking the aerosol-generating substrate 120. However, after the temperature of the ferromagnetic material exceeds the Curie temperature, the ferromagnetic material is converted from ferromagnetic to paramagnetic, i.e., the heater 121 is no longer magnetic, and the heater 121 ceases to carry out electromagnetic induction heating on the aerosol-generating substrate 120, so as to enable the heater 121 to automatically stop heating when the heating temperature exceeds the Curie temperature, thereby accurately controlling the temperature of the aerosol-generating substrate 120 within a certain temperature range, and preventing problems such as scorching of the aerosol-generating substrate 120 caused by the heating temperature of the aerosol-generating substrate 120 being too high. In this way, the temperature of the aerosol-generating substrate 120 may be accurately controlled, which in turn eliminates the need for a separate temperature measurement component in the heating device and effectively reduces production costs.

[0077] In the embodiments, the substrate segment 111 of the aerosol substrate structure 100 in the aerosol generation device 200 defines a sealed cavity 111d, and the aerosol-generating substrate 120 is disposed in the sealed cavity 111d. The aerosol-generating substrate 120 may be in direct contact with an inner surface of the confined cavity 111d.

[0078] By defining the confined cavity 111d in the substrate segment 111 of the aerosol substrate structure 100 in the aerosol generation device 200, the aerosol-generating substrate 120 received in the confined cavity 111d can be kept in a confined state, such that the aerosol-generating substrate 120 will not fall out of the aerosol substrate structure 100 and into the heating device 210 during the use of the aerosol substrate structure 100. After vaping is completed, the residue of the aerosol-generating substrate 120 can be removed along with the aerosol substrate structure 100 and will not be left behind or adhered to the heating device 210, facilitating the

cleaning of the heating device 210.

[0079] In addition, during the vaping process, the air-flow does not pass through the aerosol-generating substrate 120 within the substrate segment 111, such that the cracking reaction of the aerosol-generating substrate 120 is not affected by cold air. In this way, the cracking reaction is stable, which is conducive to the consistency of the material composition of the generated aerosol, and thus conducive to the enhancement of the user's vaping taste.

[0080] Since the formed aerosol has a substitution effect on the gas in the confined cavity 111d, the oxygen content in the substrate segment 111 will decrease with the heating process, in which case the aerosol-generating substrate 120 will not undergo a combustion phenomenon even if the heating temperature is elevated. Therefore, the heating temperature of the aerosol-generating substrate 120 can be further increased to fully release the flavor components in the aerosol-generating substrate 120 and enhance the vaping taste of the user.

[0081] The above is only some embodiments of the present disclosure, and is not intended to limit the scope of the present disclosure. Any equivalent structure or equivalent process transformation utilizing the contents of the specification and the accompanying drawings of the present disclosure, or directly or indirectly utilized in other related technical fields, are all similarly included in the scope of the present disclosure.

Claims

1. An aerosol substrate structure, comprising:

a substrate segment, an airway segment arranged at one end of the substrate segment, and a filter segment arranged at the end of the airway segment away from the substrate segment; wherein the substrate segment comprises a heater defining a confined cavity and an aerosol-generating substrate received in the confined cavity; the material of the heater comprises a ferromagnetic material having a Curie temperature, to form aerosol by atomizing the aerosol-generating substrate through electromagnetic induction heating.

2. The aerosol substrate structure according to claim 1, wherein the material of at least the side of the heater toward the aerosol-generating substrate is the ferromagnetic material having a Curie temperature.

3. The aerosol substrate structure according to claim 2, wherein the material of the heater is the ferromagnetic material having a Curie temperature.

4. The aerosol substrate structure according to claim

3, wherein the ferromagnetic material is an iron-nickel alloy.

5. The aerosol substrate structure according to claims 1, wherein the aerosol-generating substrate is in direct contact with the inner surface of the heater. 5
6. The aerosol substrate structure according to claim 1, wherein the airway segment comprises a drawing channel communicated with a first opening defined at one end of the confined cavity ; wherein the drawing channel is in communication with the atmosphere to realize air intake during a vaping process, for vaping the aerosol generated in substrate segment. 10
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7. The aerosol substrate structure according to claim 6, wherein the heater is tubular comprising confined side walls; an end of the heater connected to the airway segment is an open end serving as the first opening, and the end of the heater away from the airway segment is a confined end. 20
8. The aerosol substrate structure according to claim 6, wherein the inner side wall of the airway segment is arranged with a support medium supporting the airway segment; the interior of the support medium is hollow, and the space enclosed by inner surfaces of the support medium forms the drawing channel. 25
9. The aerosol substrate structure according to claim 8, wherein the filter segment is in communication with the airway segment, and the filter segment is filled with a filter medium, for filtering the aerosol vaped from the airway segment. 30
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10. The aerosol substrate structure according to claim 9, wherein the material of the airway segment and/or the filter segment is a paper-based or foil-based material; the material of the support medium and/or the filter medium is acetate fiber. 40
11. An aerosol generation device, comprising:
 - the aerosol substrate structure according to claim 1; and 45
 - a heating device, comprising a power supply assembly and an electromagnetic coil; wherein the power supply assembly is connected to the electromagnetic coil for supplying power to the electromagnetic coil; the electromagnetic coil is configured to generate a magnetic field when energized, for causing the heater in the aerosol substrate structure to be heated by electromagnetic induction and to atomize the aerosol-generating substrate. 50
55

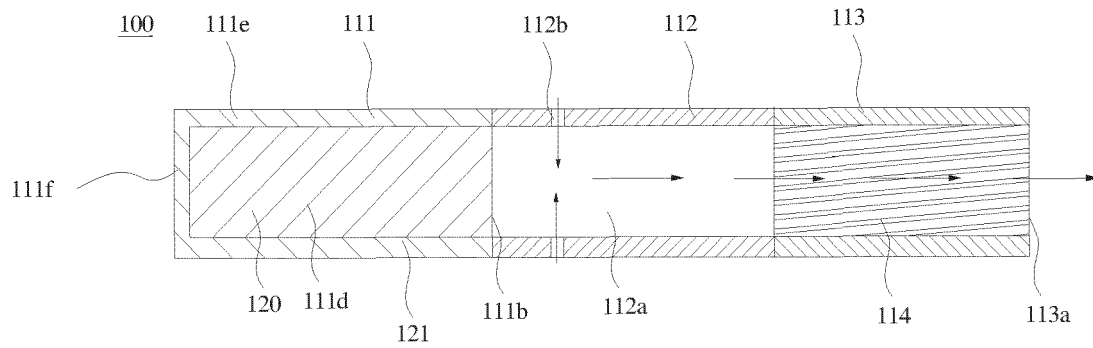


FIG. 1

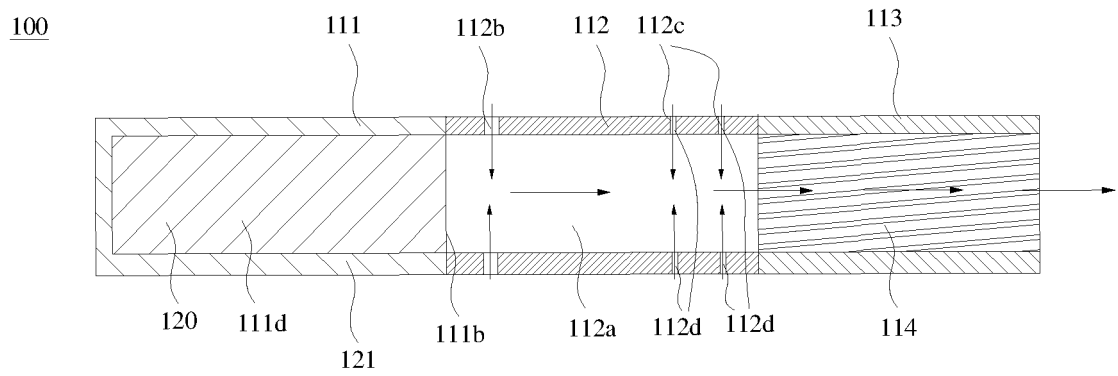


FIG. 2

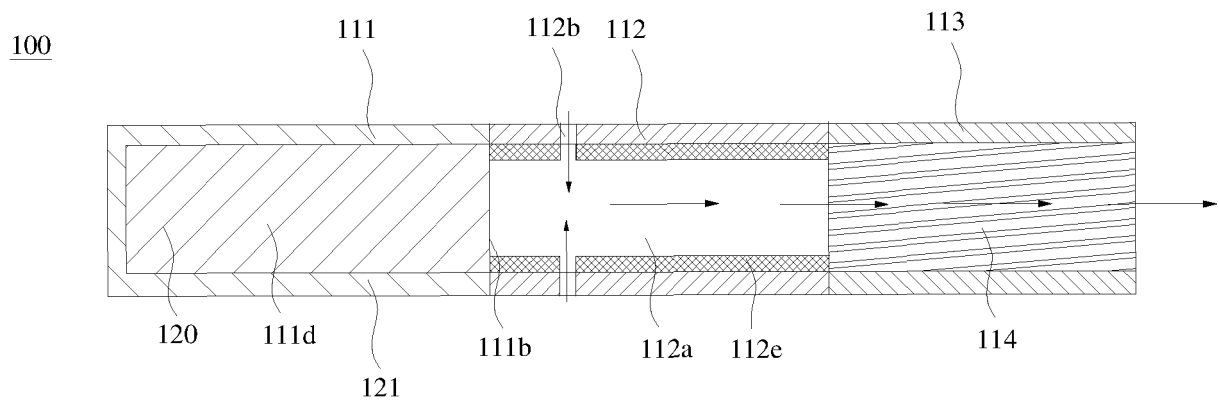


FIG. 3

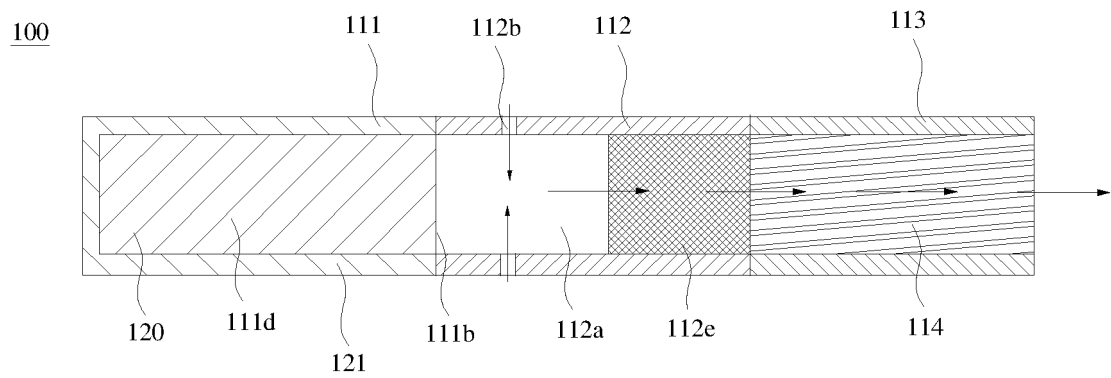


FIG. 4

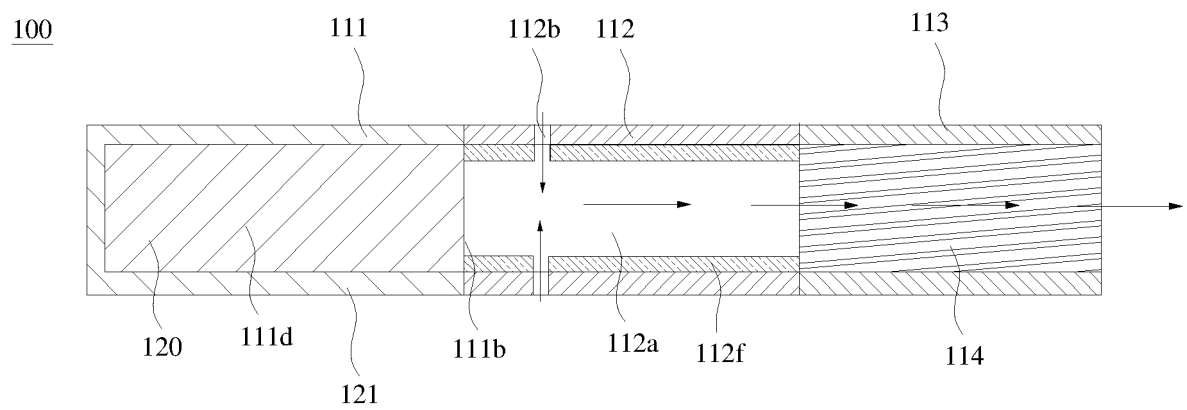


FIG. 5

200

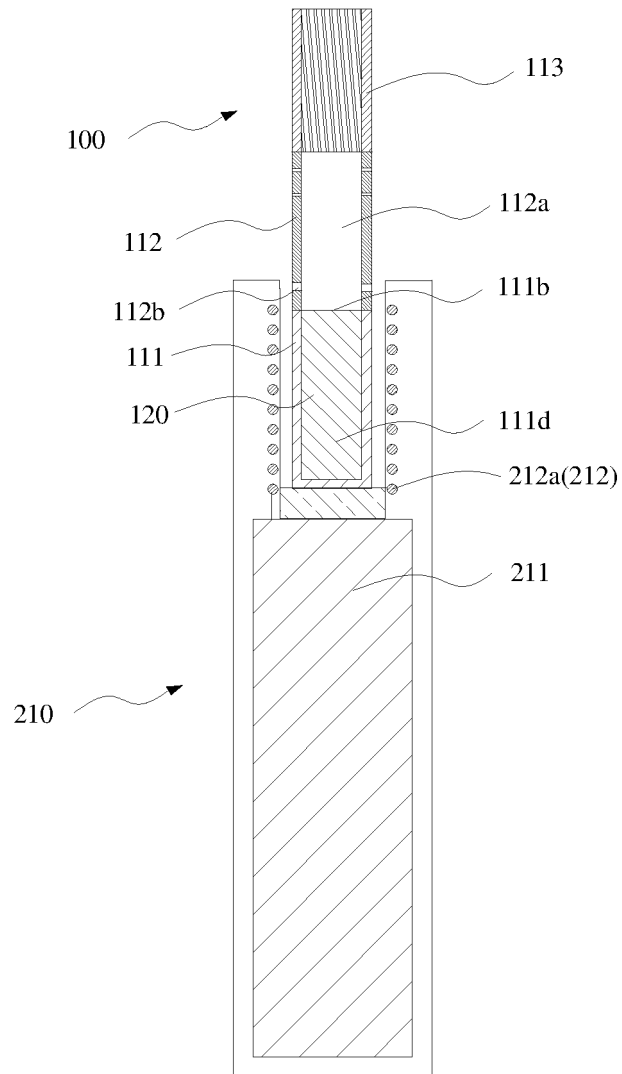


FIG. 6

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2022/097724

5	A. CLASSIFICATION OF SUBJECT MATTER		
	A24F 40/40(2020.01)i; A24F 40/46(2020.01)i; A24F 40/485(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		
10	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		
15	Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) CNTXT; CNKI; CNABS; WPABSC; ENTXTC; VEN; ENTXT: 深圳麦时科技, 气溶胶, 基质, 加热, 居里点温度, 线圈, 密封, 封闭, aerosol, matrix, heat+, curie point temperature, coil, closed		
	C. DOCUMENTS CONSIDERED TO BE RELEVANT		
20	Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
	PX	CN 113598419 A (SHENZHEN MAISHI TECHNOLOGY CO., LTD.) 05 November 2021 (2021-11-05) claims 1-11	1-11
25	PX	CN 113598418 A (SHENZHEN MAISHI TECHNOLOGY CO., LTD.) 05 November 2021 (2021-11-05) description, paragraphs [0040]-[0093], and figures 1-6	1-11
	PX	CN 114052296 A (SHENZHEN MAISHI TECHNOLOGY CO., LTD.) 18 February 2022 (2022-02-18) description, paragraphs [0046]-[0077], and figures 1, 2 and 17	1-11
30	X	CN 108601407 A (PHILIP MORRIS PRODUCTS S.A.) 28 September 2018 (2018-09-28) description, paragraphs [0040]-[0042] and [0088]-[0096], and figures 1 and 2	1-11
	A	CN 110944530 A (PHILIP MORRIS PRODUCTS S.A.) 31 March 2020 (2020-03-31) entire document	1-11
35	A	CN 109567275 A (CHINA TOBACCO ANHUI INDUSTRIAL CO., LTD.) 05 April 2019 (2019-04-05) entire document	1-11
40	☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.		
45	* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family	
50	Date of the actual completion of the international search 04 August 2022		Date of mailing of the international search report 24 August 2022
55	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 Facsimile No. (86-10)62019451		Authorized officer Telephone No.

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CN2022/097724

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN 113598419 A	05 November 2021	CN 216019099 U	15 March 2022
CN 113598418 A	05 November 2021	CN 216019100 U	15 March 2022
CN 114052296 A	18 February 2022	None	
CN 108601407 A	28 September 2018	CA 3016678 A1	14 September 2017
		WO 2017153443 A1	14 September 2017
		TW 201731399 A	16 September 2017
		AR 107825 A1	06 June 2018
		AU 2017229309 A1	07 June 2018
		SG 11201807567 A1	30 October 2018
		KR 20180118767 A	31 October 2018
		MX 2018010499 A1	29 November 2018
		IN 201817037131 A	14 December 2018
		VN 60748 A	25 December 2018
		EP 3426071 A1	16 January 2019
		ID 201900463 A	18 January 2019
		BR 112018067767 A2	12 February 2019
		US 2019075845 A1	14 March 2019
		JP 2019512235 W	16 May 2019
		PH 12018501910 A1	17 June 2019
		HK 40000253 A0	07 February 2020
		EP 3426071 B1	26 February 2020
		RU 2018135295 A	09 April 2020
		ZA 201803157 A	24 June 2020
		ES 2783974 T3	21 September 2020
		TW 715737 B1	11 January 2021
		US 11083213 B2	10 August 2021
		MX 385682 B	26 August 2021
		IL 261546 A	30 September 2021
		JP 6949043 B2	13 October 2021
		US 2021321664 A1	21 October 2021
		CN 108601407 B	17 December 2021
		AU 2017229309 B2	23 December 2021
		JP 2022008456 A	13 January 2022
		CN 113925200 A	14 January 2022
		RU 2721092 C2	15 May 2020
CN 110944530 A	31 March 2020	WO 2019030301 A1	14 February 2019
		BR 112020001283 A2	28 July 2020
		US 2020214350 A1	09 July 2020
		KR 20200035009 A	01 April 2020
		EP 3664639 A1	17 June 2020
		EP 3664639 B1	26 May 2021
		RU 2769393 C2	31 March 2022
		JP 2020529213 W	08 October 2020
		US 11324259 B2	10 May 2022
CN 109567275 A	05 April 2019	None	

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

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- CN 202110802895 [0001]