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(54) **AEROSOL PRODUCT, HEAT-NOT-BURN SYSTEM, AND MOLD**

(57) An aerosol article (120), a heat-not-burn system (100), and a mold (200) are provided. The heat-not-burn system (100) includes an aerosol article (120) and a heat-not-burn apparatus (110). The aerosol article (120) includes a protective layer, where the protective layer includes circumferentially arranged vertical fiber structures (200), the vertical fiber structures (200) extend in a length direction of the aerosol article (120), and a piercing position for a heating tooth (310) of the heat-not-burn

apparatus (110) to pierce is formed between every two vertical fiber structures (200); and an aerosol substrate, where the protective layer encloses to form an accommodating space, and the aerosol substrate fills the accommodating space (201). The aerosol article enables the heating tooth (310) to penetrate a cartridge protective layer and enter the aerosol article (120), thereby reducing a problem of insufficient heating, and improving inhalation experience of a user.

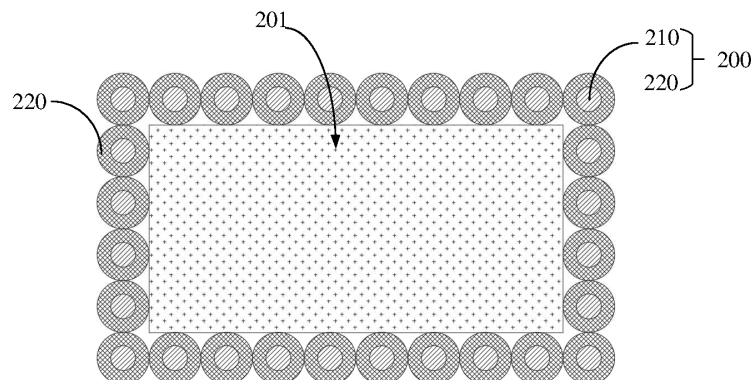


FIG. 5

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Description

[0001] This application claims priority to Chinese Patent Application No. 2023115144669, filed with the China National Intellectual Property Administration on November 14, 2023 and entitled "AEROSOL ARTICLE, HEAT-NOT-BURN SYSTEM, AND MOLD", which is incorporated herein by reference in its entirety.

TECHNICAL FIELD

[0002] This application relates to the field of heat-not-burn technologies, and in particular, to an aerosol article, a heat-not-burn system, and a mold.

BACKGROUND

[0003] A heat-not-burn (heat not burn) apparatus mainly heats an aerosol article at a temperature lower than a temperature that causes combustion, so that the aerosol article generates aerosol containing tobacco or non-tobacco components during heating for use by a consumer. When a heating element of the heat-not-burn apparatus is designed, it is necessary to fully consider a heating temperature balance point while minimizing energy waste. The heating element of the heat-not-burn apparatus is generally prepared by printing a metal circuit on ceramic. After the heat-not-burn apparatus is energized, heat generated by a Joule effect is used to heat a cartridge.

[0004] In a conventional aerosol article, a mouthpiece and a smoke generating section are generally wrapped together by using moisture-proof wrapping material. The heating element of the heat-not-burn apparatus pierces through a bottom center of the aerosol article, so that an aerosol substrate around the heating element is heated. However, this heating manner leads to a higher heating temperature of the aerosol substrate at a center part of the smoke generating section than that of the aerosol substrate at a peripheral part. Consequently, uniform heating of the aerosol substrate in the smoke generating section cannot be ensured.

SUMMARY

[0005] Embodiments of this application provide an aerosol article, a heat-not-burn system, and a mold. The aerosol article has a piercing position, so that a heating tooth can easily penetrate the aerosol article from a side surface, and pierce into the aerosol article, thereby facilitating uniform heating of an aerosol substrate and improving heating efficiency.

[0006] This application provides an aerosol article, configured to be used in conjunction with a heat-not-burn apparatus. The aerosol article includes:

a protective layer, where the protective layer includes circumferentially arranged vertical fiber struc-

tures, the vertical fiber structures extend in a length direction of the aerosol article, and a piercing position for a heating tooth of the heat-not-burn apparatus to pierce is formed between every two vertical fiber structures; and

an aerosol substrate, filling an accommodating space enclosed by the protective layer.

[0007] In a possible embodiment, the vertical fiber structure includes a skeleton layer and a bonding layer, the bonding layer is located on a periphery of the skeleton layer and wraps the skeleton layer, and the piercing position is formed between adjacent bonding layers.

[0008] In a possible embodiment, at least one bonding layer wraps a plurality of skeleton layers.

[0009] In a possible embodiment, a melting point of the skeleton layer is higher than that of the bonding layer, the skeleton layer is one of polyethylene terephthalate and PP, and the bonding layer is one of polyamide 6, PE, and polyethylene terephthalate.

[0010] In a possible embodiment, a cross section of the aerosol article in the length direction of the aerosol article is rectangular.

[0011] This application provides a heat-not-burn system, including the aerosol article described in any one of the foregoing embodiments and a heat-not-burn apparatus.

[0012] In a possible embodiment, the heat-not-burn apparatus includes an upper cover and a lower cover, an upper heating groove is disposed on the upper cover, a lower heating groove is disposed on the lower cover, and a plurality of heating teeth are respectively disposed in each of the upper heating groove and the lower heating groove. When the upper heating groove and the lower heating groove are aligned and closed together, the heating teeth of the upper heating groove and the lower heating groove are inserted into the piercing position of the aerosol article and located inside the aerosol article, so as to heat the aerosol substrate.

[0013] In a possible embodiment, the heating teeth on the upper cover are arranged at intervals in an extension direction of the upper heating groove, and the heating teeth on the lower cover are arranged at intervals in an extension direction of the lower heating groove; and/or

a plurality of rows of heating teeth are disposed in the upper heating groove, and the plurality of rows of heating teeth are disposed side by side in a width direction of the upper heating groove; and/or

a plurality of rows of heating teeth are disposed in the lower heating groove, and the plurality of rows of heating teeth are disposed side by side in a width direction of the lower heating groove.

[0014] In a possible embodiment, when the upper heating groove and the lower heating groove are aligned

and closed together, the heating teeth of the upper heating groove and the heating teeth of the lower heating groove are staggered in the extension direction of the upper heating groove.

[0015] This application provides a mold, including an inner mold and an outer mold, where a rectangular annular cavity is formed between the inner mold and the outer mold, the cavity is used to place a fiber structure raw material, and both the inner mold and the outer mold are capable of heating the fiber structure raw material in the cavity, so as to form the fiber structure raw material into a vertical fiber structure.

[0016] In a possible embodiment, at least one of the inner mold and the outer mold is made of Teflon or stainless steel material.

[0017] The vertical fiber structures on an outer layer of the aerosol article in the embodiments of this application extend in the length direction of the aerosol article, and a piercing position for a heating tooth of the heat-not-burn apparatus to pierce is formed between every two vertical fiber structures, so that the heating tooth can easily penetrate the aerosol article from the side surface, and pierce into the aerosol article, thereby facilitating uniform heating of the aerosol substrate and helping improve heating efficiency.

BRIEF DESCRIPTION OF DRAWINGS

[0018]

FIG. 1 is a schematic structural diagram of a heat-not-burn system in an unfolded state according to an embodiment of this application;

FIG. 2 is a partial schematic structural diagram of the heat-not-burn system shown in FIG. 1;

FIG. 3 is an exploded schematic diagram of the heat-not-burn system shown in FIG. 1;

FIG. 4 is a schematic diagram of a state in which a heating tooth in a heat-not-burn apparatus shown in FIG. 1 or FIG. 2 pierces an aerosol article;

FIG. 5 is a cross-sectional schematic structural diagram of an aerosol article of the heat-not-burn system shown in FIG. 2;

FIG. 6 is a schematic structural diagram of an upper cover of a heat-not-burn apparatus of the heat-not-burn system shown in FIG. 1 from an angle;

FIG. 7 is a cross-sectional schematic structural diagram of an upper cover of a heat-not-burn apparatus of the heat-not-burn system shown in FIG. 1 from another angle;

FIG. 8 is a perspective structural diagram of an upper

cover of a heat-not-burn apparatus of the heat-not-burn system shown in FIG. 1;

FIG. 9 is a schematic structural diagram of a lower cover of a heat-not-burn apparatus of the heat-not-burn system shown in FIG. 1 from an angle;

FIG. 10 is a cross-sectional schematic structural diagram of a lower cover of a heat-not-burn apparatus of the heat-not-burn system shown in FIG. 1 from another angle;

FIG. 11 is a perspective structural diagram of a lower cover of a heat-not-burn apparatus of the heat-not-burn system shown in FIG. 1; and

FIG. 12 is a cross-sectional schematic diagram of a mold according to an embodiment of this application.

Reference numerals:

[0019] 100: heat-not-burn system; 110: heat-not-burn apparatus; 111: upper cover; 112: lower cover; 1111: upper heating groove; 1121: lower heating groove; 113: rotating shaft; 114: magnet A; 115: magnet B; 120: aerosol article; 130: mouthpiece; 140: channel; 150: accommodating cavity; 210: skeleton layer; 220: bonding layer; 200: vertical fiber structure; 201: accommodating space; 310: heating tooth; 311: tooth portion; 312: end portion; 320: base; 330: power supply module; 340: control module; 350: connecting conducting wire; 360: PCB bridge board; 410: power supply groove; 420: conductive column; 430: charging column; 500: mold; 510: inner mold; 520: outer mold.

DESCRIPTION OF EMBODIMENTS

[0020] The following clearly and completely describes the technical solutions in the implementations of the present disclosure with reference to the accompanying drawings in the implementations of the present disclosure. Apparently, the described implementations are merely some but not all of the implementations of the present disclosure. Based on the implementations of the present disclosure, all other implementations obtained by a person of ordinary skill in the art without creative efforts fall within the protection scope of the present disclosure.

[0021] It should be noted that when a component is referred to as being "fastened to" another component, the component may be directly on the another component, or there may be an intermediate component. When a component is considered to be "connected" to another component, the component may be directly connected to the another component, or there may be an intermediate component. The terms "vertical", "horizontal", "left", "right" and similar expressions are used herein for illustrative purposes only.

[0022] It should be noted that the concepts such as "first" and "second" mentioned in the present disclosure are merely used to distinguish between different apparatuses, modules, or units, and are not used to limit a sequence or an interdependence of functions performed by these apparatuses, modules, or units.

[0023] The following describes the embodiments of this application with reference to the accompanying drawings.

[0024] Referring to FIG. 1, FIG. 1 is an exploded schematic diagram of a heat-not-burn system 100 according to an embodiment of this application. The heat-not-burn system 100 includes a heat-not-burn apparatus 110 and an aerosol article 120. The aerosol article 120 may be inserted into the heat-not-burn apparatus 110, and is heated by the heat-not-burn apparatus 110 to generate aerosol, where the aerosol article 120 is a consumable and can be replaced after use.

[0025] Referring to FIG. 2 and FIG. 3, FIG. 2 is a partial schematic structural diagram of the heat-not-burn system 100 shown in FIG. 1, and FIG. 3 is an exploded schematic diagram of the heat-not-burn system 100 shown in FIG. 1. The heat-not-burn system 100 includes the aerosol article 120 and the heat-not-burn apparatus 110.

[0026] In a possible embodiment, the heat-not-burn apparatus 110 includes an upper cover 111 and a lower cover 112, an upper heating groove 1111 is disposed on the upper cover 111, a lower heating groove 1121 is disposed on the lower cover 112, and a plurality of heating teeth 310 are respectively disposed in each of the upper heating groove 1111 and the lower heating groove 1121. When the upper heating groove 1111 and the lower heating groove 1121 are aligned and closed together, the heating teeth 310 of the upper heating groove 1111 and the lower heating groove 1121 are inserted into a piercing position on a side surface of the aerosol article 120 and located inside the aerosol article 120, so as to heat an aerosol substrate.

[0027] Compared with a conventional manner in which a heating element pierces through a bottom center of an aerosol article to perform heating, the aerosol article 120 in this application has a piercing position on an outer peripheral surface of the aerosol article 120. The heating tooth 310 of the heat-not-burn apparatus 110 may pierce into the aerosol article 120 from the side surface, so that uniform heating of the aerosol article 120 can be implemented by setting positions and a quantity of the heating teeth 310.

[0028] In this embodiment, "a plurality of" may refer to two or more, which is not repeatedly described in subsequent embodiments.

[0029] A cavity formed by aligning and bringing together the upper heating groove 1111 and the lower heating groove 1121 is an accommodating cavity 150. The heating tooth 310 includes a tooth portion 311 and an end portion 312. The end portion 312 is fastened in the upper heating groove 1111 and the lower heating groove

1121, that is, on a cavity wall of the accommodating cavity 150. The plurality of end portions 312 included in the heating tooth 310 are arranged in a length direction of the aerosol article.

[0030] The aerosol article 120 is detachably accommodated in the accommodating cavity 150.

[0031] The aerosol article 120 includes a protective layer. The protective layer includes a plurality of connected vertical fiber structures 200. The vertical fiber structure 200 includes a skeleton layer 210 and a bonding layer 220, and the bonding layer 220 is located on a periphery of the skeleton layer 210 and surrounds the skeleton layer 210. The vertical fiber structure 200 extends in the length direction of the aerosol article, and a length direction of the vertical fiber structure 200 is parallel to the length direction of the aerosol article.

[0032] The heat-not-burn apparatus 110 may be a cylindrical chamber, a rectangular chamber, or another variant chamber, which is not limited herein. The accommodating cavity 150 is configured to accommodate the aerosol article or another aerosol generating substance. As shown in FIG. 3, the aerosol article 120 can be detached from the accommodating cavity 150.

[0033] The accommodating cavity 150 may be a rectangular cavity, or may be a cavity of another shape, and the accommodating cavity 150 extends in the length direction of the aerosol article. For example, both the upper heating groove 1111 and the lower heating groove 1121 have a rectangular outline, and the aerosol article is rectangular. The rectangular accommodating cavity 150 can more conveniently locate the aerosol article to avoid rolling of the aerosol article, so that the heating tooth 310 can be accurately aligned with the corresponding piercing position and pierce the aerosol article.

[0034] The length direction of the aerosol article may be an extension or arrangement direction of the two end portions 312 included in the heating tooth 310 in FIG. 1 or FIG. 3, and may alternatively be understood as a direction in which the heat-not-burn system 100 extends. When the heat-not-burn system 100 includes the aerosol article 120, the length direction of the aerosol article is consistent with an extension direction of the upper heating groove and an extension direction of the lower heating groove.

[0035] Referring to FIG. 4, FIG. 4 is a schematic diagram of a scenario in which a heating tooth 310 in a heat-not-burn apparatus 110 in the heat-not-burn system 100 shown in FIG. 1 or FIG. 2 pierces the aerosol article 120. As shown in the figure, the tooth portion 311 protrudes from the end portion 312.

[0036] The heating tooth 310 is of a strip-shaped structure, the end portions 312 at two ends are fastened to a base 320, and the tooth portion 311 in the middle protrudes from the end portions 312 to form a tip.

[0037] It can be learned that in this embodiment, a plurality of staggered heating teeth 310 are directly arranged in the upper heating groove 1111 and the lower heating groove 1121, and the tooth portions 311 protrude

upward and have tips. The length direction of the aerosol article corresponding to the foregoing structure of the heating tooth 310 of the heat-not-burn system 100 is parallel to the length direction of the aerosol article corresponding to the vertical fiber structure 200 of the aerosol article 120, so that the plurality of heating teeth 310 within the cavity wall of the accommodating cavity 150 can easily penetrate the aerosol article 120. The heating teeth 310 may pierce the aerosol article 120 when the upper heating groove 1111 and the lower heating groove 1121 are aligned and closed together, and the staggered heating teeth pierce different parts of the aerosol article 120 from the side, so that an interior of the aerosol article 120 can be better heated.

[0038] With reference to FIG. 1, FIG. 3, FIG. 4, and FIG. 5, this embodiment provides an aerosol article 120, configured to be used in conjunction with a heat-not-burn apparatus 110. The aerosol article 120 includes:

a protective layer, where the protective layer includes circumferentially arranged vertical fiber structures 200, the vertical fiber structures 200 extend in the length direction of the aerosol article, and a piercing position for the heating tooth 310 of the heat-not-burn apparatus 110 to pierce is formed between every two vertical fiber structures 200; and

an aerosol substrate, filling an accommodating space 201 enclosed by the protective layer.

[0039] Each vertical fiber structure 200 is closely attached to the left and right vertical fiber structures 200 to be circumferentially arranged from a perspective in the length direction of the aerosol article, forming an aerosol article 120 with a hollow interior shape.

[0040] The aerosol substrate may include tobacco particles, the filled aerosol substrate may be tobacco or non-tobacco, such as a plant flavor-producing substance, and the aerosol substrate may be another material, which is not limited herein. A shape of the aerosol substrate may be a particle, a filament, a strip, a sheet, or the like, which is not limited herein.

[0041] It can be learned that in this embodiment, the protective layer is formed by circumferentially arranging the vertical fiber structures 200, and an extension direction is the length direction of the aerosol article. The piercing position is formed between the vertical fiber structures 200, which is more conducive to uniform piercing of the heating teeth 310 into the aerosol article 120, so that the aerosol substrate is uniformly heated.

[0042] In an optional embodiment, the vertical fiber structure 200 includes a skeleton layer 210 and a bonding layer 220, the bonding layer 220 is located on a periphery of the skeleton layer 210 and wraps the skeleton layer 210, and the piercing position is formed between adjacent bonding layers 220.

[0043] A plane formed by parallel arrangement of the skeleton layers 210 is referred to as a skeleton layer, and

a part formed by the bonding layers 220 wrapping the skeleton layers 210 is referred to as a bonding layer. The bonding layers 220 are arranged in a circumferential direction of the bonding layer.

[0044] It can be learned that in this embodiment, an original integral protective layer structure of the aerosol article 120 is changed to a protective layer structure formed by bonding a plurality of fibers in parallel, so that the heating tooth 310 can penetrate a cartridge protective layer and enter the aerosol article 120, thereby reducing a problem of insufficient heating, and improving inhalation experience of a user. It can be learned that in this embodiment, the protective layer of the aerosol article 120 is formed by bonding the vertical skeleton layer 210 and the bonding layer 220 wrapped around the skeleton layer 210, so that while maintaining the rigid characteristics, the heating teeth 310 can penetrate the aerosol article 120 to enable the aerosol substrate inside the aerosol article 120 to be uniformly heated.

[0045] In an optional embodiment, at least one bonding layer 220 wraps a plurality of skeleton layers 210.

[0046] There may be a plurality of bonding layers 220, which are fused into a whole after melting in a heating mold to be wrapped around a periphery of the skeleton layer 210.

[0047] The bonding layers 220 are bonded in the length direction of the aerosol article after melting.

[0048] It can be learned that in this embodiment, the bonding layer 220 wraps the skeleton layer 210 to fasten and bond with the skeleton layer 210, thereby forming the protective layer of the aerosol article 120. In addition, the bonding layers are bonded in the length direction of the aerosol article, which can be more conducive to piercing of the heating tooth 310.

[0049] In an optional embodiment, a melting point of the skeleton layer 210 is higher than that of the bonding layer 220, the skeleton layer 210 is one of polyethylene terephthalate and PP, and the bonding layer 220 is one of polyamide 6, PE, and polyethylene terephthalate.

[0050] The foregoing material PP is polypropylene (Polypropylene, PP), and PE is polyethylene (Polyethylene, PE). There are two types of polyethylene terephthalate (Polyethylene terephthalate, PET), one is high-melting-point polyethylene terephthalate, and the other is low-melting-point polyethylene terephthalate.

[0051] In an optional embodiment, the fiber material of the skeleton layer 210 may be high-melting-point polyethylene terephthalate, and the bonding layer 220 may be low-melting-point polyethylene terephthalate. In a process of preparing the aerosol article 120, the purpose that the bonding layer 220 melts first, and the skeleton layer 210 does not melt can also be achieved.

[0052] In another optional embodiment, the fiber material of the skeleton layer 210 may be polypropylene, and the bonding layer 220 may be polyethylene. A melting point of polyethylene is lower than that of polypropylene. In a process of preparing the aerosol article 120, the purpose that polyethylene of the bonding layer 220 melts

first, and polypropylene of the skeleton layer 210 does not melt can also be achieved.

[0053] In addition, a hardness of the skeleton layer 210 is greater than a hardness at a bonded position of the bonding layers 220 after heating and melting. When the tooth portion 311 of the heating tooth 310 pierces the aerosol article 120, the tooth portion 311 first punctures and penetrates the bonded position of the bonding layers 220 after heating and melting. A stress at the bonded position of the bonding layers 220 after heating and melting is greater than that at an unbonded position of the bonding layers 220, and also greater than that of the skeleton layer 210. The bonding layers 220 are bonded in the length direction of the aerosol article after melting.

[0054] A stress at a bonded position between the bonding layer 220 of each vertical fiber structure 200 and an adjacent bonding layer 220 is the greatest. When the heating tooth 310 pierces, the bonded position breaks first, expanding outward and pressing against the surroundings, so that the heating tooth 310 can penetrate the aerosol article 120. After penetration, the heating tooth 310 is fastened in the bonded position of the bonding layers 220.

[0055] In an optional embodiment, a cross section of the aerosol article 120 in the length direction of the aerosol article is rectangular.

[0056] The shape of the aerosol article 120 is a rectangular cavity formed by circumferentially arranged skeleton layers 210 and bonding layers 220. The cross section in the length direction of the aerosol article is rectangular, and the cross section in a direction perpendicular to the length direction of the aerosol article can be square or rectangular, which is not limited herein.

[0057] A shape of the accommodating cavity 150 for accommodating the aerosol article 120 is the same as the shape of the aerosol article 120, so that the aerosol article 120 can be exactly accommodated.

[0058] It can be learned that in this embodiment, the aerosol article 120 may be attached to the accommodating cavity 150 of the heat-not-burn apparatus 110, so that the heating tooth 310 can better pierce into the aerosol article 120 to heat the interior of the aerosol article 120.

[0059] It should be noted that the purposes of FIG. 1 to FIG. 5 are to describe a connection relationship between the heat-not-burn apparatus 110 and the aerosol article 120 by using an example, and are not a specific limitation on a connection position, a specific structure, and a quantity of the devices. A structure shown in this embodiment of this application does not constitute a specific limitation on the heat-not-burn system 100.

[0060] In some other embodiments of this application, the heat-not-burn system 100 may include more or fewer components than those shown in FIG. 2 to FIG. 5, or combine some components, or split some components, or have different component arrangements. The components shown in FIG. 2 to FIG. 5 may be implemented by hardware, software, or a combination of software and hardware.

[0061] It can be learned that in this embodiment, a hardness of the bonding layer 220 is less than that of the skeleton layer 210, and a melting point of the bonding layer 220 is lower than that of the skeleton layer 210, so that in a preparation process, the bonding layers 220 melt and are bonded in a cooling process to form the aerosol article 120. The hardness at the bonded position of the bonding layer 220 is less than that at other positions, so that the heating tooth 310 can penetrate the aerosol article 120 from the bonded position without damaging the skeleton layer 210. In this way, the heating tooth 310 can easily penetrate the aerosol article 120, and a structure of the aerosol article 120 cannot be destroyed.

[0062] In an optional embodiment, referring to FIG. 3, FIG. 6, and FIG. 9, the heating teeth 310 on the upper cover 111 are arranged at intervals in an extension direction of the upper heating groove, and the heating teeth 310 on the lower cover 112 are arranged at intervals in an extension direction of the lower heating groove; and/or, a plurality of rows of heating teeth 310 are disposed in the upper heating groove 1111, and the plurality of rows of heating teeth 310 are disposed side by side in a width direction of the upper heating groove; and/or, a plurality of rows of heating teeth 310 are disposed in the lower heating groove 1121, and the plurality of rows of heating teeth 310 are disposed side by side in a width direction of the lower heating groove.

[0063] The base 320 is connected to the heating tooth 310. The heating tooth 310 is installed on the base 320. The bases 320 on the upper cover 111 are arranged at intervals in the extension direction of the upper heating groove, and the bases 320 on the lower cover 112 are arranged at intervals in the extension direction of the lower heating groove.

[0064] The width direction of the upper heating groove is parallel to the width direction of the lower heating groove.

[0065] "And/or" indicates that the two cases may exist at the same time, or may exist separately. For example, a plurality of rows of heating teeth 310 may be arranged side by side in the upper heating groove 1111 in the width direction of the upper heating groove, or a plurality of rows of heating teeth 310 may not be disposed side by side in the width direction of the upper heating groove. A plurality of rows of heating teeth 310 may be arranged side by side in the lower heating groove 1121 in the width direction of the lower heating groove, or a plurality of rows of heating teeth 310 may not be arranged side by side in the width direction of the lower heating groove. A plurality of rows of heating teeth 310 may be arranged side by side only in the upper heating groove 1111 in the width direction of the upper heating groove, or a plurality of rows of heating teeth 310 may be arranged side by side only in the lower heating groove 1121 in the width direction of the lower heating groove. That is, a quantity of the heating teeth 310 disposed in the upper heating groove 1111 and a quantity of the heating teeth 310 disposed in the lower heating groove 1121 may not be equal, and a quantity of

rows of the heating teeth 310 may not be equal. There is a case in which a plurality of rows of heating teeth 310 are disposed in the upper heating groove 1111 and only one row of heating teeth 310 is disposed in the lower heating groove 1121, and there is also a case in which one row of heating teeth 310 is disposed in the upper heating groove 1111 and a plurality of rows of heating teeth 310 are disposed in the lower heating groove 1121. The foregoing descriptions such as "a plurality of rows" are not a limitation on the quantity. "A plurality of rows" indicates two or more rows, which is not limited herein.

[0066] A quantity of heating teeth 310 in each row may be different, and a specific quantity is not limited.

[0067] It can be learned that in this embodiment of this application, the heating teeth 310 are arranged at intervals in the extension directions of the upper heating groove and the lower heating groove, and a plurality of rows of heating teeth 310 may be disposed in the width directions of the upper heating groove and the lower heating groove, or only one row of heating teeth 310 may be disposed, which is conducive to insertion of the heating teeth into the aerosol article and uniform heating of the aerosol substrate.

[0068] In an optional embodiment, when the upper heating groove 1111 and the lower heating groove 1121 are aligned and closed together, the heating teeth 310 of the upper heating groove 1111 and the heating teeth 310 of the lower heating groove 1121 are staggered in the extension direction of the upper heating groove.

[0069] The extension direction of the upper heating groove is parallel to the extension direction of the lower heating groove.

[0070] Arrangement positions of the heating teeth 310 of the upper heating groove 1111 and the heating teeth 310 of the lower heating groove 1121 in the extension direction of the upper heating groove do not correspond, and the position of the tooth portion 311 of the heating tooth 310 of the upper heating groove 1111 corresponds to a position between two bases 320 of two heating teeth 310 of the lower heating groove 1121.

[0071] It can be learned that in this embodiment of this application, after the upper cover 111 and the lower cover 112 are aligned and closed together and the heating teeth 310 of the upper heating groove 1111 and the heating teeth 310 of the lower heating groove 1121 pierce the aerosol article, the upper and lower heating teeth 310 are staggered from each other, which is more conducive to uniform heating of the aerosol substrate.

[0072] With reference to FIG. 6, FIG. 7, and FIG. 8, FIG. 6 is a schematic structural diagram of an upper cover 111 of a heat-not-burn apparatus 110 of the heat-not-burn system 100 shown in FIG. 1 from an angle, FIG. 7 is a cross-sectional schematic structural diagram of an upper cover 111 of a heat-not-burn apparatus 110 of the heat-not-burn system 100 shown in FIG. 1 from another angle, and FIG. 8 is a perspective structural diagram of an upper cover 111 of a heat-not-burn apparatus 110 of the heat-not-burn system 100 shown in FIG. 1.

[0073] In the upper cover 111, the heating teeth 310 are distributed and fastened on a groove wall of the upper heating groove 1111. The heating tooth 310 may be made of conductive material such as nickel-chromium alloy, ferrochromium aluminum alloy, and stainless steel. A shape of the heating tooth 310 is a strip-shaped sheet that can pierce the aerosol article 120. The heating teeth 310 are vertically arranged in the length direction of the aerosol article, and are horizontally staggered in the width direction of the upper heating groove, to be uniformly arranged in the accommodating cavity 150. The base 320 used to fasten the heating tooth 310 is made of low-resistance material such as copper alloy, silver palladium alloy, and pure gold with excellent conductivity. The base 320 is fastened to the groove wall of each of the upper heating groove 1111 and the lower heating groove 1121, and is welded and fastened to the end portion 312 of the heating tooth 310. A middle portion of the heating tooth 310 protrudes from the end portions 312 at two ends to form a tooth portion 311, to be inserted into the aerosol article 120.

[0074] A quantity of the heating teeth 310 is not limited, the end portion 312 of the heating tooth 310 is fixedly connected to the base 320, and the base 320 is fixedly connected to the groove wall of the upper heating groove 1111.

[0075] Two bases 320 correspond to one heating tooth 310, and two end portions 312 of each heating tooth 310 respectively correspond to one base 320.

[0076] Material of the heating tooth 310 is rigid, and has a relatively high hardness, thereby being not easy to deform.

[0077] A printed circuit board (PCB) bridge board 360 is further arranged and welded in the upper cover 111, and the PCB bridge board 360 is disposed below the base 320. The base 320 is connected to the PCB bridge board 360 by using a connecting conducting wire 350, and then connected to a conductive column 420 by using the PCB bridge board 360. A power supply module 330, a control module 340, and a charging column 430 are arranged inside the lower cover 112. The power supply module 330 is fixedly connected to a power supply groove 410, and the base 320 is connected to the control module 340 and the power supply module 330 by using a connecting conducting wire 350.

[0078] It can be learned that in this embodiment, an original heating assembly is replaced with the heating teeth 310 which are uniformly arranged on the upper heating groove 1111. Each heating tooth 310 may be energized separately, so that the aerosol article 120 is more uniformly heated during heating. This enables the aerosol substrate inside the aerosol article 120 to be sufficiently heated, thereby improving heating efficiency, reducing a case in which heating is insufficient, and improving inhalation experience of the user.

[0079] With reference to FIG. 4, FIG. 9, FIG. 10, and FIG. 11, FIG. 4 is a schematic diagram of a scenario in which a heating tooth 310 in the heat-not-burn apparatus

110 shown in FIG. 1 or FIG. 2 pierces the aerosol article 120, FIG. 9 is a schematic structural diagram of a lower cover 112 of a heat-not-burn apparatus 110 of the heat-not-burn system 100 shown in FIG. 1 from an angle, FIG. 10 is a cross-sectional schematic structural diagram of a lower cover 112 of a heat-not-burn apparatus 110 of the heat-not-burn system 100 shown in FIG. 1 from another angle, and FIG. 11 is a perspective structural diagram of a lower cover 112 of a heat-not-burn apparatus 110 of the heat-not-burn system 100 shown in FIG. 1.

[0080] In the lower cover 112, the heating teeth 310 are distributed and fastened on a groove wall of the lower heating groove 1121. The heating tooth 310 may be made of conductive material such as nickel-chromium alloy, ferrochromium aluminum alloy, and stainless steel. A shape of the heating tooth 310 is a strip-shaped sheet. The heating teeth 310 are vertically arranged in the length direction of the aerosol article, and are horizontally staggered in the width direction of the lower heating groove, to be uniformly arranged in the accommodating cavity 150. The base 320 used to fasten the heating tooth 310 is made of low-resistance material such as copper alloy, silver palladium alloy, and pure gold with excellent conductivity. The base 320 is fastened to the groove wall of the lower heating groove 1121, and is welded and fastened to the end portion 312 of the heating tooth 310. A middle portion of the heating tooth 310 protrudes from the end portions 312 at two ends to form a tooth portion 311, to be inserted into the aerosol article 120.

[0081] A quantity of the heating teeth 310 is not limited, the end portion 312 of the heating tooth 310 is fixedly connected to the base 320, and the base 320 is fixedly connected to the groove wall of the lower heating groove 1121.

[0082] Two bases 320 correspond to one heating tooth 310, and two end portions 312 of each heating tooth 310 respectively correspond to one base 320.

[0083] Material of the heating tooth 310 is rigid, and has a relatively high hardness, thereby being not easy to deform.

[0084] The charging column 430 is connected to the outside, and the charging column 430 may be connected to a charger of the user to supply power to the power supply module 330.

[0085] The power supply module 330 supplies power to the heating tooth 310, and the control module 340 controls the heating tooth 310 to be turned on.

[0086] A rotating shaft 113 connects the upper cover 111 and the lower cover 112, and the upper cover rotates around an axial direction of the rotating shaft 113 to open and close.

[0087] It can be learned that in this embodiment, the original heating assembly is replaced with the heating teeth 310 which are uniformly arranged in the lower heating groove 1121. Each heating tooth 310 may be energized separately, so that the aerosol article 120 is heated more uniformly during heating. In addition, the rotating shaft 113 is used to connect the upper cover 111

and the lower cover 112, making it convenient for the user to install and remove the aerosol article 120. The control module 340 turns on and off a current of the heating tooth 310 to control heating time of the heating tooth 310, so that the heating tooth 310 performs heating according to a setting during heating. This enables the aerosol substrate inside the cartridge to be sufficiently heated, thereby improving heating efficiency, reducing a case in which heating is insufficient, and improving inhalation experience of the user.

[0088] In an optional embodiment, with reference to FIG. 1 and FIG. 2, when the upper cover 111 and the lower cover 112 are tightly closed, the power supply groove 410 is attached to the conductive column 420, and a circuit is turned on. The power supply module 330 supplies power to the heating teeth 310 of the upper cover 111 while supplying power to the heating teeth 310 of the lower cover 112. The control module 340 simultaneously controls the heating teeth 310 of the upper cover 111 and the lower cover 112.

[0089] It can be learned that the control module 340 turns on and off the current of the heating tooth 310 to control the heating time of the heating tooth 310, so that the heating tooth 310 performs heating according to a setting during heating. This enables the aerosol substrate inside the cartridge to be sufficiently heated, thereby improving heating efficiency, reducing a case in which heating is insufficient, and improving inhalation experience of the user.

[0090] The conductive column 420 is arranged in a direction perpendicular to an extension direction of the lower cover 112, that is, the length direction of the aerosol article. The heating teeth are respectively arranged in a direction perpendicular to the extension direction of the lower heating groove 1121 and the extension direction of the upper heating groove 1111.

[0091] In an optional embodiment, referring to FIG. 1 to FIG. 3, and FIG. 6 to FIG. 11, a plurality of bases 320 are fixedly connected to each of the upper heating groove 1111 and the lower heating groove 1121, the heating tooth 310 is fixedly installed on the base 320, two ends of the heating tooth 310 are welded and fixed to the base 320, the bases 320 are in a one-to-one correspondence with the two ends of the heating tooth 310, and the heating teeth 310 are uniformly distributed in the upper heating groove 1111 and the lower heating groove 1121.

[0092] The heat-not-burn apparatus 110 is fixedly connected to a mouthpiece 130, and the mouthpiece 130 is in a truncated pyramid shape.

[0093] On an inner side of the upper cover 111, two protruding cylindrical magnets A 114 are disposed on two sides of the upper heating groove 1111 at positions close to the mouthpiece 130, and two cylindrical recessed magnets B 115 are disposed at corresponding positions of the lower cover 112. The magnet A 114 and the magnet B 115 can attract each other. Attraction between the magnet A 114 and the magnet B 115 enables the upper cover 111 and the lower cover 112 to be tightly attached

and locked. The mouthpiece 130 is connected to the lower cover 112. The mouthpiece 130 is made of silicone material. Openings are disposed at two ends of the mouthpiece 130. The openings at the two ends run through the mouthpiece 130, and are in communication with the lower heating groove 1121 to form a channel 140. The channel 140 enables airflow to flow from the cartridge to the outside.

[0094] When the upper cover 111 and the lower cover 112 are closed, the magnet A 114 and the magnet B 115 attract each other, the mouthpiece 130 is made of silicone material, and is tightly closed with the upper cover 111 and the lower cover 112, and the channel 140 in the mouthpiece 130 forms an inhalation channel.

[0095] A plurality of protruding conductive columns 420 are disposed on the inner side of the upper cover 111 at positions close to the rotating shaft 113. The conductive columns 420 are arranged and installed in the width direction of the upper heating groove. A quantity of the conductive columns 420 may be 6, or may be another quantity, which is not limited herein. A plurality of recessed power supply grooves 410 are disposed at corresponding positions on an inner side of the lower cover 112, and a quantity of the power supply grooves 410 is the same as a quantity of the conductive columns 420, and the power supply grooves 410 are in a one-to-one correspondence with the conductive columns 420. The rotating shaft 113 is used to fixedly connect the upper cover 111 and the lower cover 112, and the upper cover 111 and the lower cover 112 are rotatably connected, for example, are connected by a hinge.

[0096] The plurality of conductive columns 420 are in a one-to-one correspondence with the power supply grooves 410. After the upper cover 111 and the lower cover 112 are attached, the mouthpiece 130 enables the upper cover 111 and the lower cover 112 to be tightly attached, and the conductive column 420 and the power supply groove 410 are also tightly attached. A current passes through the conductive column 420 and the power supply groove 410 to form a circuit, and the current may be transmitted to the base 320 through the conductive column 420 and the power supply groove 410, and then to the heating tooth 310, so that the heating tooth 310 is energized for heating.

[0097] The base 320 is connected to a conducting wire, and each heating tooth 310 corresponds to the conducting wire, and may be separately energized.

[0098] It can be learned that in this embodiment of this application, a heating tooth structure of the heat-not-burn system corresponds to the vertical fiber structure of the aerosol article 120, so that the plurality of heating teeth in the upper heating groove and the lower heating groove can easily penetrate the aerosol article 120, and pierce into the aerosol article 120, thereby helping enable the aerosol substrate of the aerosol article 120 to be uniformly heated and helping improve heating efficiency.

[0099] Referring to FIG. 12, FIG. 12 is a cross-sectional schematic diagram of a mold according to an embodi-

ment of this application. An embodiment of this application provides a mold 500, including:

an inner mold 510 and an outer mold 520, where a rectangular annular cavity is formed between the inner mold 510 and the outer mold 520, the cavity is used to place a fiber structure raw material, and both the inner mold 510 and the outer mold 520 are capable of heating the fiber structure raw material in the cavity, so as to form the fiber structure raw material into a vertical fiber structure 200.

[0100] The inner mold 510 and the outer mold 520 are concentrically disposed to ensure that a thickness of the rectangular annular cavity between the inner mold 510 and the outer mold 520 is uniform, that is, a thickness of a protective layer formed by the vertical fiber structure 200 formed through processing by using the mold is uniform.

[0101] An interior of the inner mold 510 may be solid or hollow, both a solid inner mold and a hollow inner mold have a heating function, and a heating effect of the inner mold is not affected. Whether the inner mold is solid or hollow is not limited herein.

[0102] A hollow rectangular shape enclosed by the protective layer formed through processing by using the mold 500 has openings at two ends.

[0103] It can be learned that in this embodiment, the rectangular annular cavity formed between the inner mold 510 and the outer mold 520 can heat a raw material of the vertical fiber structure 200 to form a circumferential rectangular annular protective layer that has openings at two ends. Both the inner mold 510 and the outer mold 520 have a heating function, so as to more uniformly heat the vertical fiber structure raw material.

[0104] In a possible embodiment, at least one of the inner mold 510 and the outer mold 520 is made of Teflon or stainless steel material.

[0105] The Teflon or stainless steel material is material having relatively good thermal conductivity. In actual application, the outer mold 520 may be made of Teflon material, and the inner mold 510 may be made of another material. Alternatively, the outer mold 520 may be made of stainless steel material, and the inner mold 510 may be made of another material. The outer mold 520 may be made of another material, and the inner mold 510 may be made of Teflon material. Alternatively, the outer mold 520 may be made of another material, and the inner mold 510 may be made of stainless steel material. The another material is material having thermal conductivity, and specific material is not limited herein.

[0106] For example, in a process of preparing the aerosol article 120, the inner mold 510 and the outer mold 520 simultaneously perform heating to cause the bonding layer 220 to be heated. When a temperature reaches the melting point of the bonding layer 220, the bonding layer 220 melts first, and the melted adjacent bonding layers 220 are bonded to each other. After cooling, the adjacent bonding layers 220 are bonded into a whole. In this process, the skeleton layer 210 does not melt.

[0107] It can be learned that in this embodiment, both the inner mold 510 and the outer mold 520 have a heat conducting function, and one of the inner mold 510 and the outer mold 520 is made of material with good thermal conductivity, which is conducive to more uniform heating of the vertical fiber structure raw material to form a uniform and solid protective layer.

Claims

1. An aerosol article, configured to be used in conjunction with a heat-not-burn apparatus, wherein the aerosol article comprises:

a protective layer, wherein the protective layer comprises circumferentially arranged vertical fiber structures, the vertical fiber structures extend in a length direction of the aerosol article, and a piercing position for a heating tooth of the heat-not-burn apparatus to pierce is formed between every two vertical fiber structures; and an aerosol substrate, filling an accommodating space enclosed by the protective layer.

2. The aerosol article according to claim 1, wherein the vertical fiber structure comprises a skeleton layer and a bonding layer, the bonding layer is located on a periphery of the skeleton layer and wraps the skeleton layer, and the piercing position is formed between adjacent bonding layers.

3. The aerosol article according to claim 2, wherein at least one bonding layer wraps a plurality of skeleton layers.

4. The aerosol article according to claim 2, wherein a melting point of the skeleton layer is higher than that of the bonding layer, the skeleton layer is one of polyethylene terephthalate and PP, and the bonding layer is one of polyamide 6, PE, and polyethylene terephthalate.

5. The aerosol article according to any one of claims 1 to 4, wherein a cross section of the aerosol article in the length direction of the aerosol article is rectangular.

6. A heat-not-burn system, comprising the aerosol article according to any one of claims 1 to 5 and a heat-not-burn apparatus.

7. The heat-not-burn system according to claim 6, wherein the heat-not-burn apparatus comprises an upper cover and a lower cover, an upper heating groove is disposed on the upper cover, a lower heating groove is disposed on the lower cover, and a plurality of heating teeth are respectively dis-

posed in each of the upper heating groove and the lower heating groove; and when the upper heating groove and the lower heating groove are aligned and closed together, the heating teeth of the upper heating groove and the lower heating groove are inserted into the piercing position of the aerosol article and located inside the aerosol article, so as to heat the aerosol substrate.

8. The heat-not-burn system according to claim 7, wherein the heating teeth on the upper cover are arranged at intervals in an extension direction of the upper heating groove, and the heating teeth on the lower cover are arranged at intervals in an extension direction of the lower heating groove; and/or

a plurality of rows of heating teeth are disposed in the upper heating groove, and the plurality of rows of heating teeth are disposed side by side in a width direction of the upper heating groove; and/or

a plurality of rows of heating teeth are disposed in the lower heating groove, and the plurality of rows of heating teeth are disposed side by side in a width direction of the lower heating groove.

9. The heat-not-burn system according to any one of claims 6 to 8, wherein when the upper heating groove and the lower heating groove are aligned and closed together, the heating teeth of the upper heating groove and the heating teeth of the lower heating groove are staggered in the extension direction of the upper heating groove.

10. A mold for a protective layer of the aerosol article according to any one of claims 1 to 5, comprising an inner mold and an outer mold, wherein a rectangular annular cavity is formed between the inner mold and the outer mold, the cavity is used to place a fiber structure raw material, and both the inner mold and the outer mold are capable of heating the fiber structure raw material in the cavity, so as to form the fiber structure raw material into a vertical fiber structure.

11. The mold for a protective layer of the aerosol article according to claim 10, wherein at least one of the inner mold and the outer mold is made of Teflon or stainless steel material.

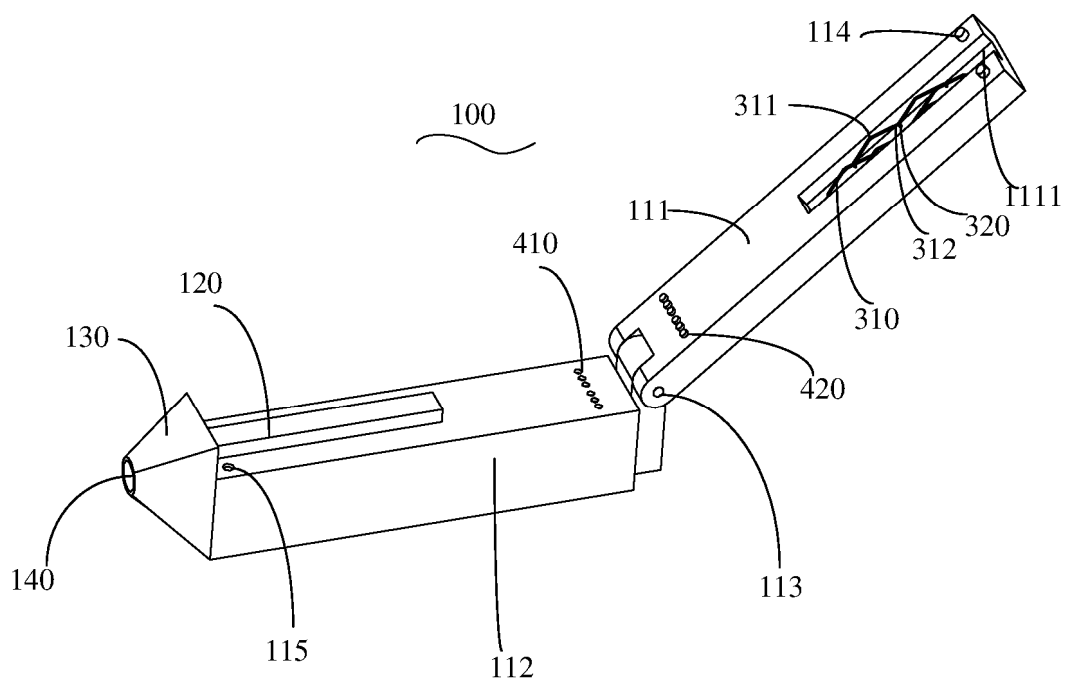


FIG. 1

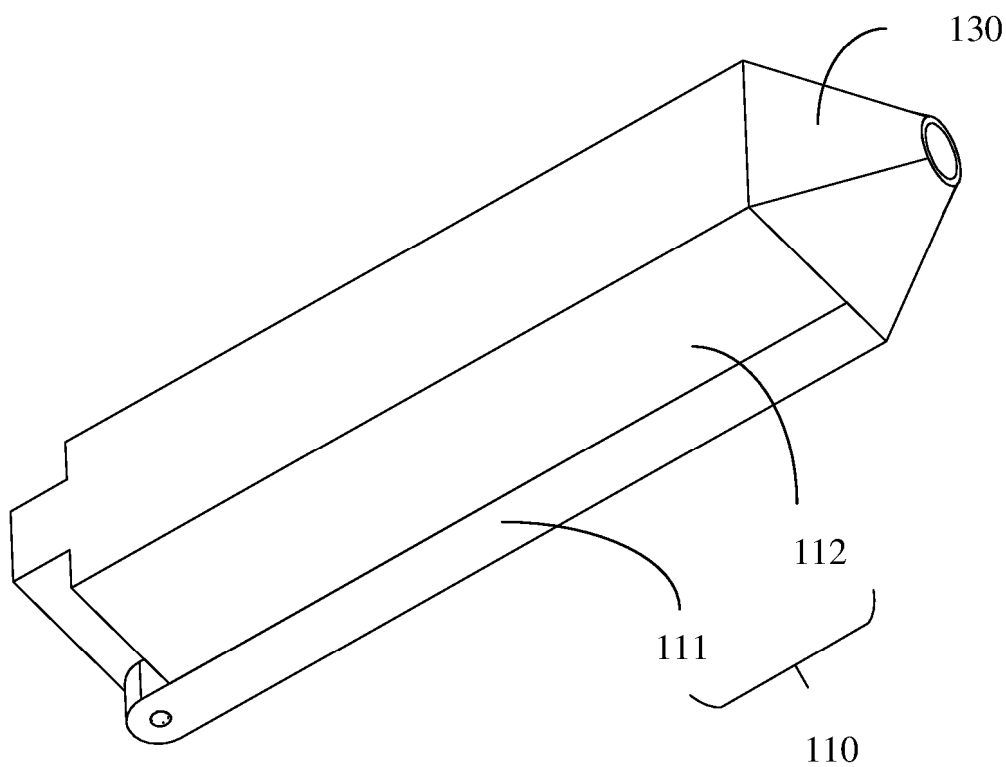


FIG. 2

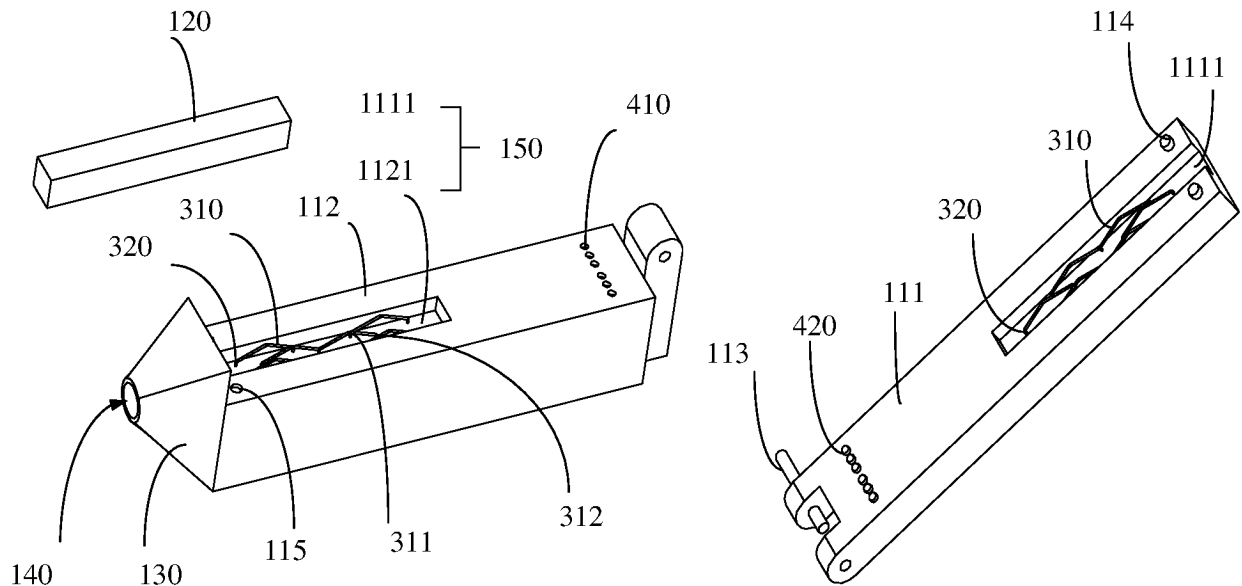


FIG. 3

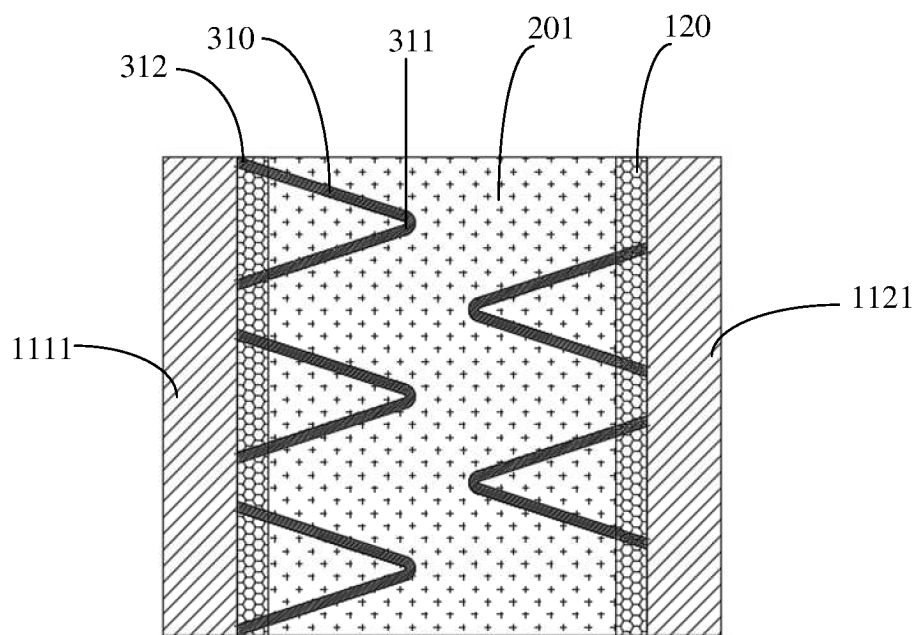


FIG. 4

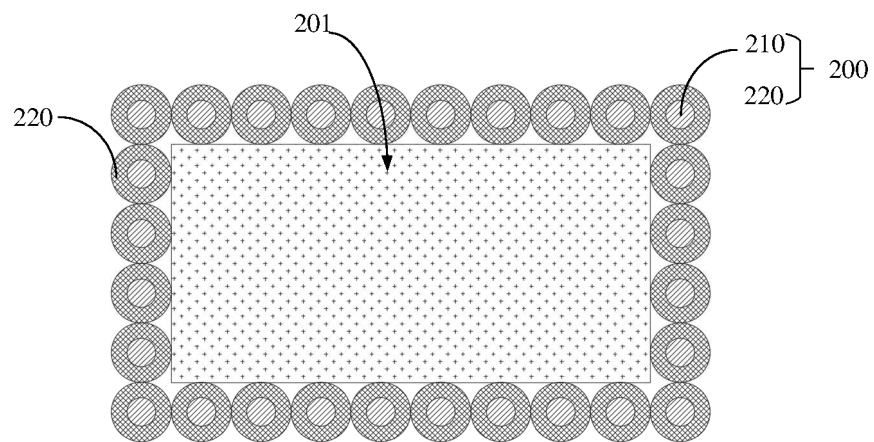


FIG. 5

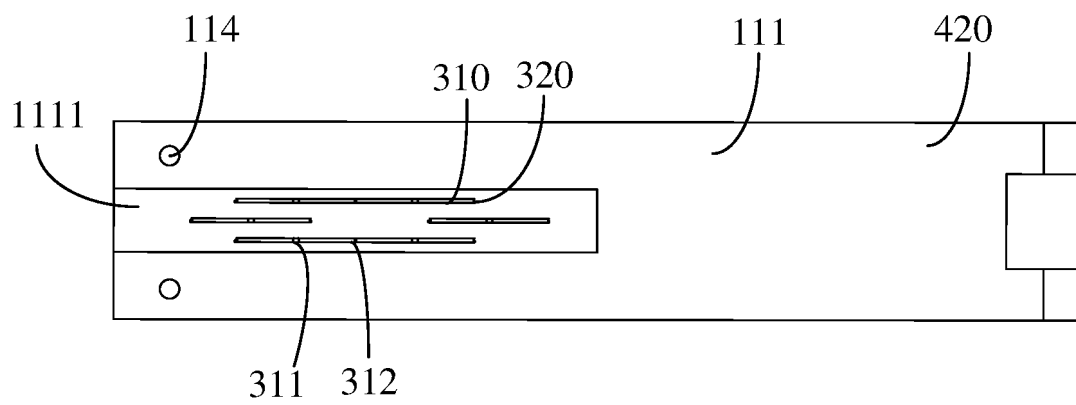


FIG. 6

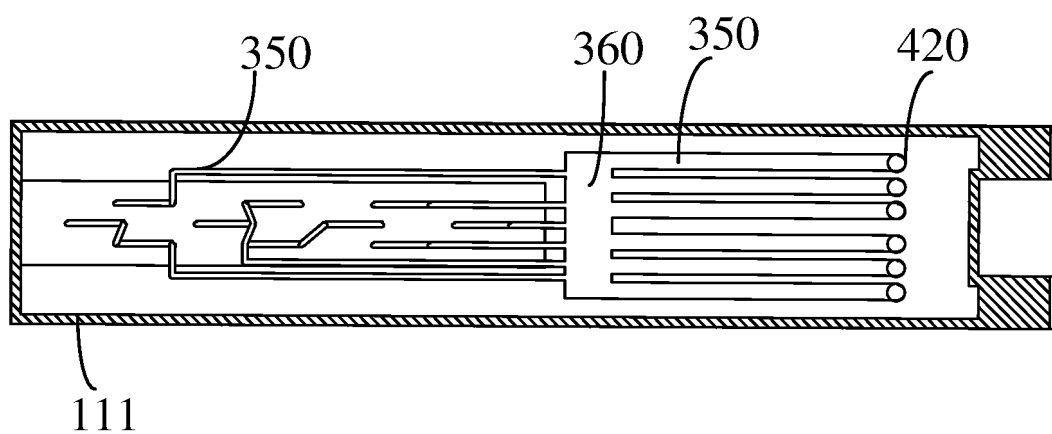


FIG. 7

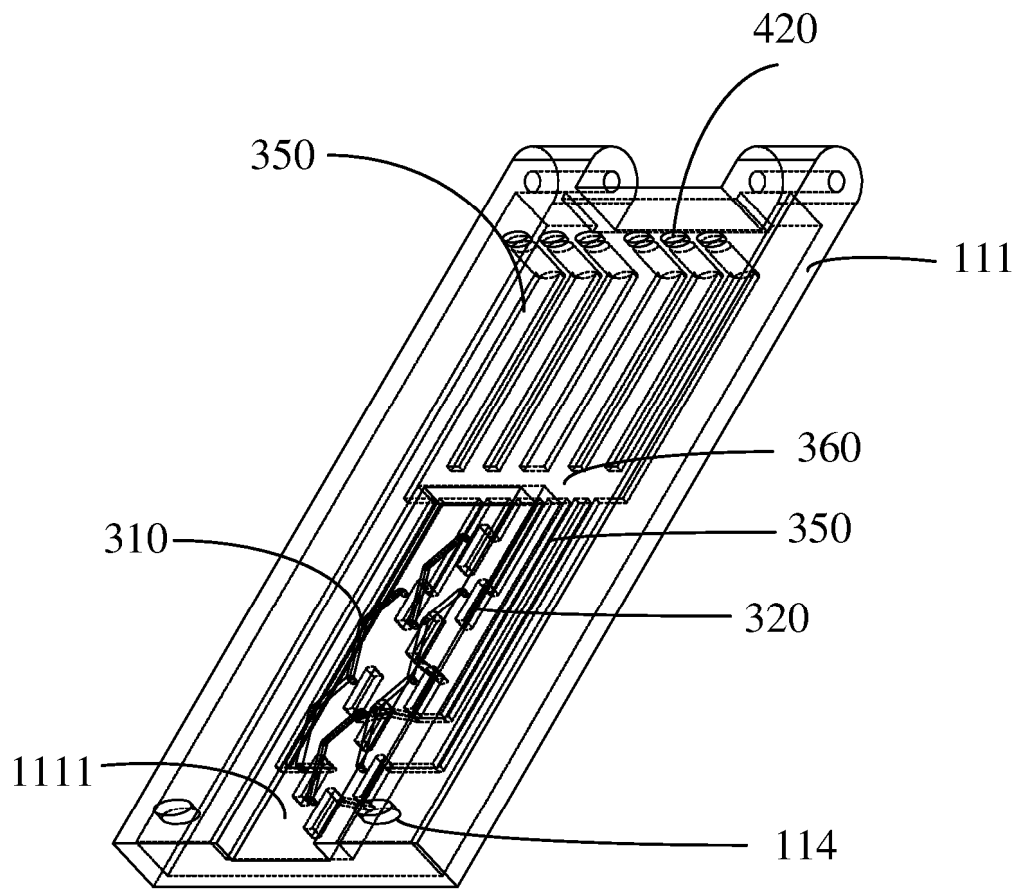


FIG. 8

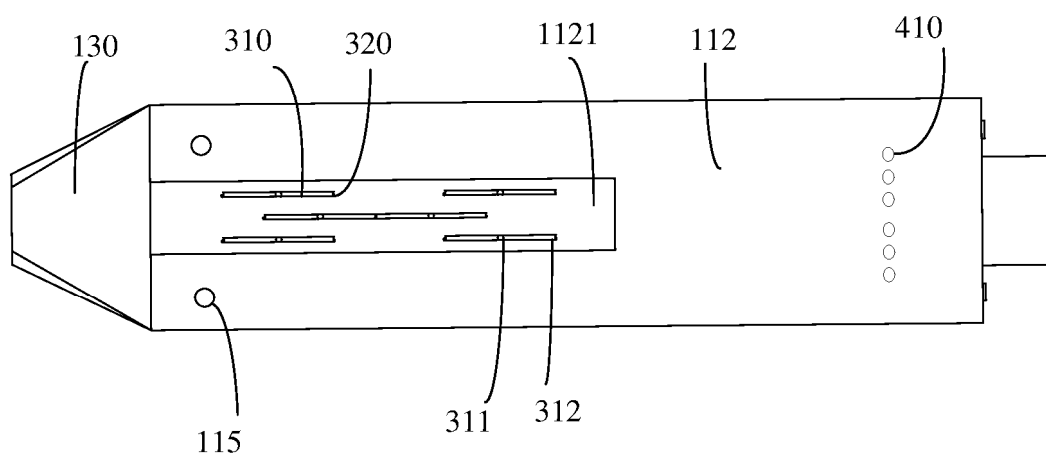


FIG. 9

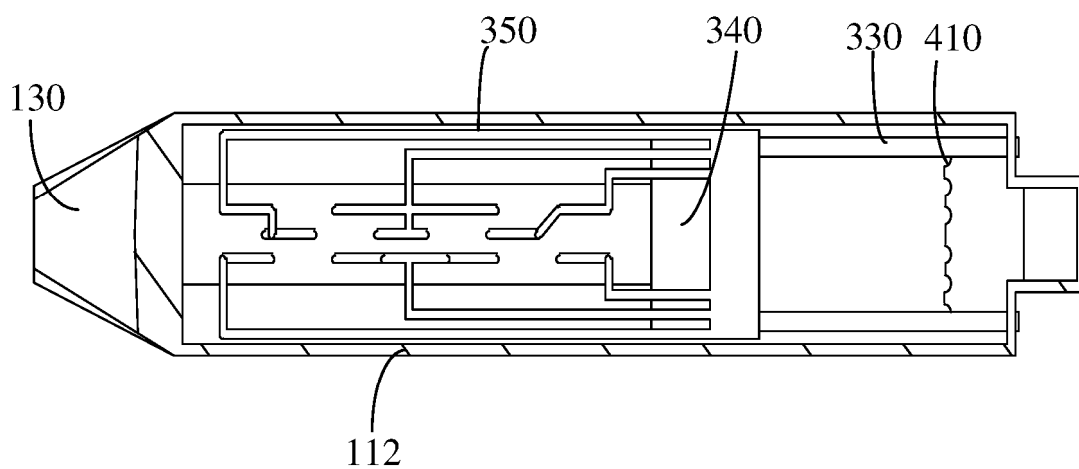


FIG. 10

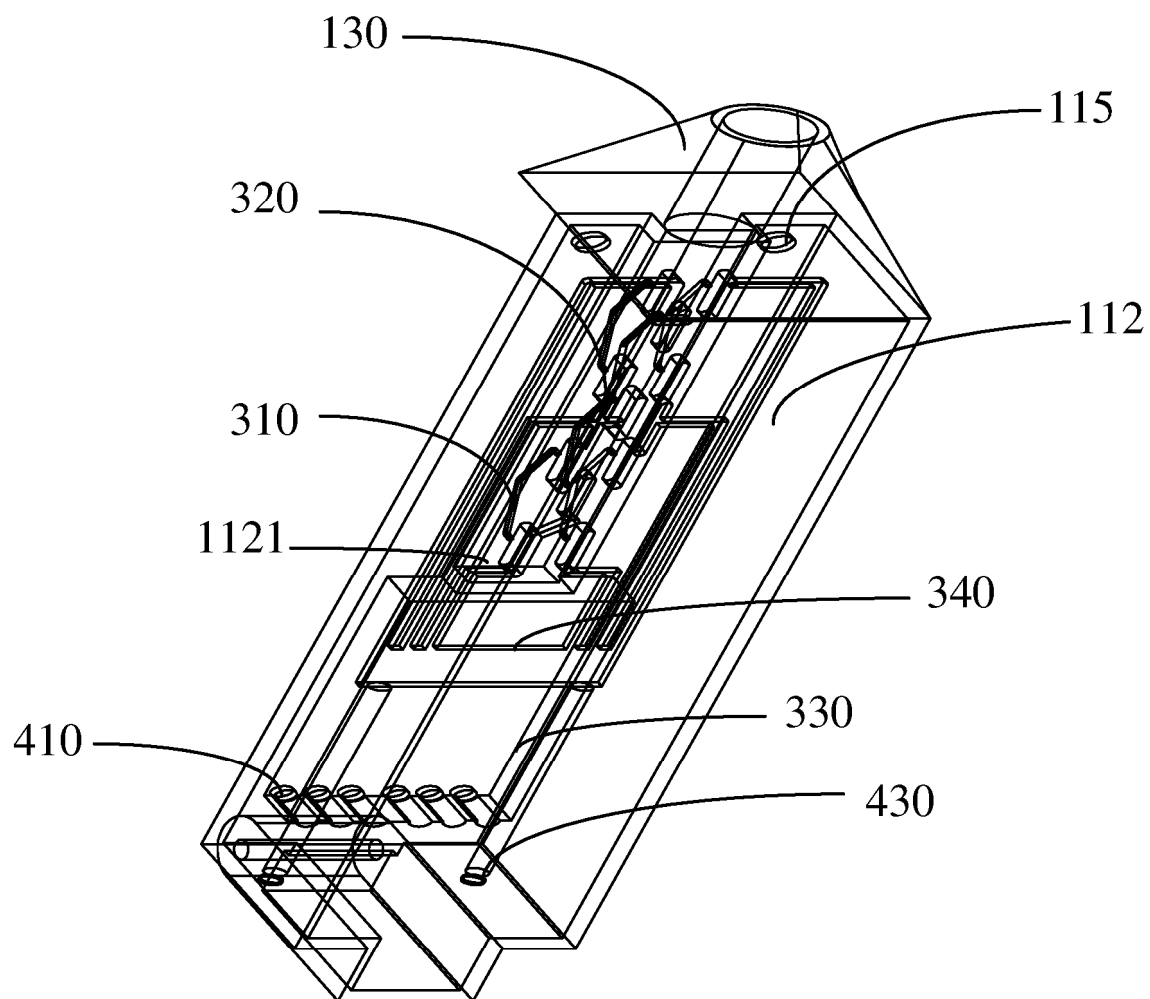


FIG. 11

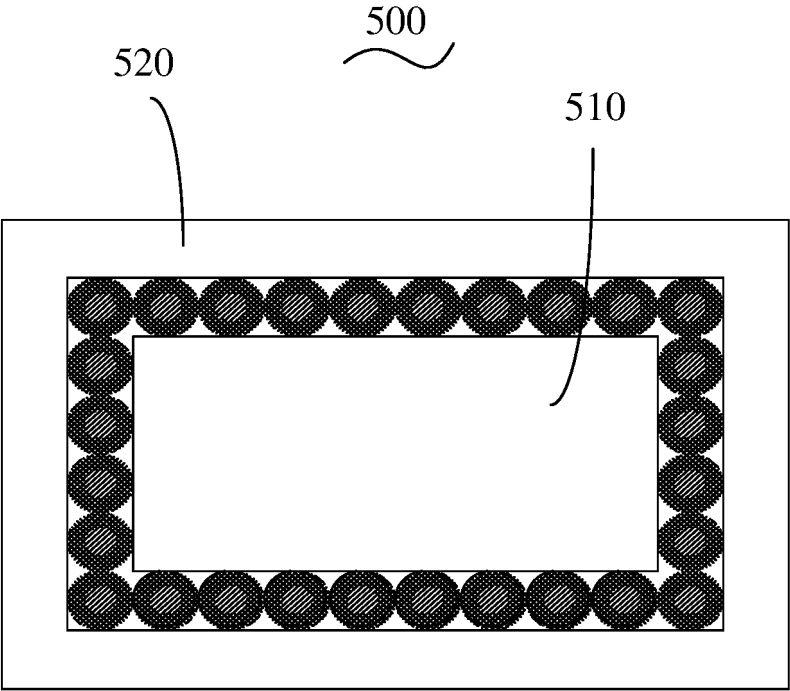


FIG. 12

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2024/084385

A. CLASSIFICATION OF SUBJECT MATTER

A24B15/16(2020.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC:A24B15/-

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)

VCN, CJFD, CNTXT, ENTXT, ENTXTC, VEN: 谦逊恩典, 爱奇迹, 包覆, 包裹, 保护, 表面, 外侧, 凹, 沟, 波纹, 槽, 侧面, 插, 穿, 刺, 破, 多个, 若干, 分布, 加热, 均匀, 配合, 匹配, 适配, 周向, 纵向, 轴向, 间隔, 排布, 排列, 相邻, between, teeth, tooth, surface?, slot?, needle?, cover+, gap?, circumferent+, sword?, dent?, insert+, protect+, plung+, clearance?, adjacent+, coat+, heat +, layer?, spike?, wrap+, peripher+, knife?, longitudinal+, slit?, groove?

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 109152896 A (PHILIP MORRIS PRODUCTS S.A.) 04 January 2019 (2019-01-04) description, paragraphs 62-124, and figures 1-19	1-11
A	CN 113825419 A (PHILIP MORRIS PRODUCTS S.A.) 21 December 2021 (2021-12-21) entire document	1-11
A	CN 116571176 A (AIQILI (HONG KONG) CO., LTD.) 11 August 2023 (2023-08-11) entire document	1-11
A	EA 202291191 A1 (JT INTERNATIONAL S.A.) 12 August 2022 (2022-08-12) entire document	1-11
A	GB 1308661 A (CIGARETTE COMPONENTS LTD.) 21 February 1973 (1973-02-21) entire document	1-11

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

* Special categories of cited documents:

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“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

08 July 2024

Date of mailing of the international search report

11 July 2024

Name and mailing address of the ISA/CN

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

Authorized officer

Telephone No.

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CN2024/084385

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Form PCT/ISA/210 (patent family annex) (July 2022)

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