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(54) SMOKING APPARATUS FOR ENHANCING HEAT EXCHANGE EFFECT

(57) The present disclosure relates to the field of novel cigarette smoking utensil, and in particular, to a smoke generating device with enhanced heat exchange effect. The smoke generating device includes: a cigarette introduction pipe (1); the cigarette introduction pipe (1) is disposed at the upper end of the smoke generating device, with a hollow tubular structure, its internal cavity is an air-mixing cavity (1D), which is divided into an upper duct (1F) and a lower duct (1J), and at least one heat insulation pad is disposed between the upper duct (1F) and the lower duct (1J). In the present disclosure, for the first time, the cigarette introduction pipe is designed with two separable parts-the upper and lower duct, the heat insulation pad performs relative heat insulation on the upper duct and the lower duct, further playing the role of reducing the heat transmitting from the lower heating cup and heating element to the upper part. Thus, the temperature of the upper duct in contact with the cigarette filter rod is lower, which greatly reduces heat shrinkage or collapse caused by the material of the supporting section of the cigarette filter rod in contact with the cigarette introduction pipe of the smoke generating device that cannot withstand high temperature of the heating body.

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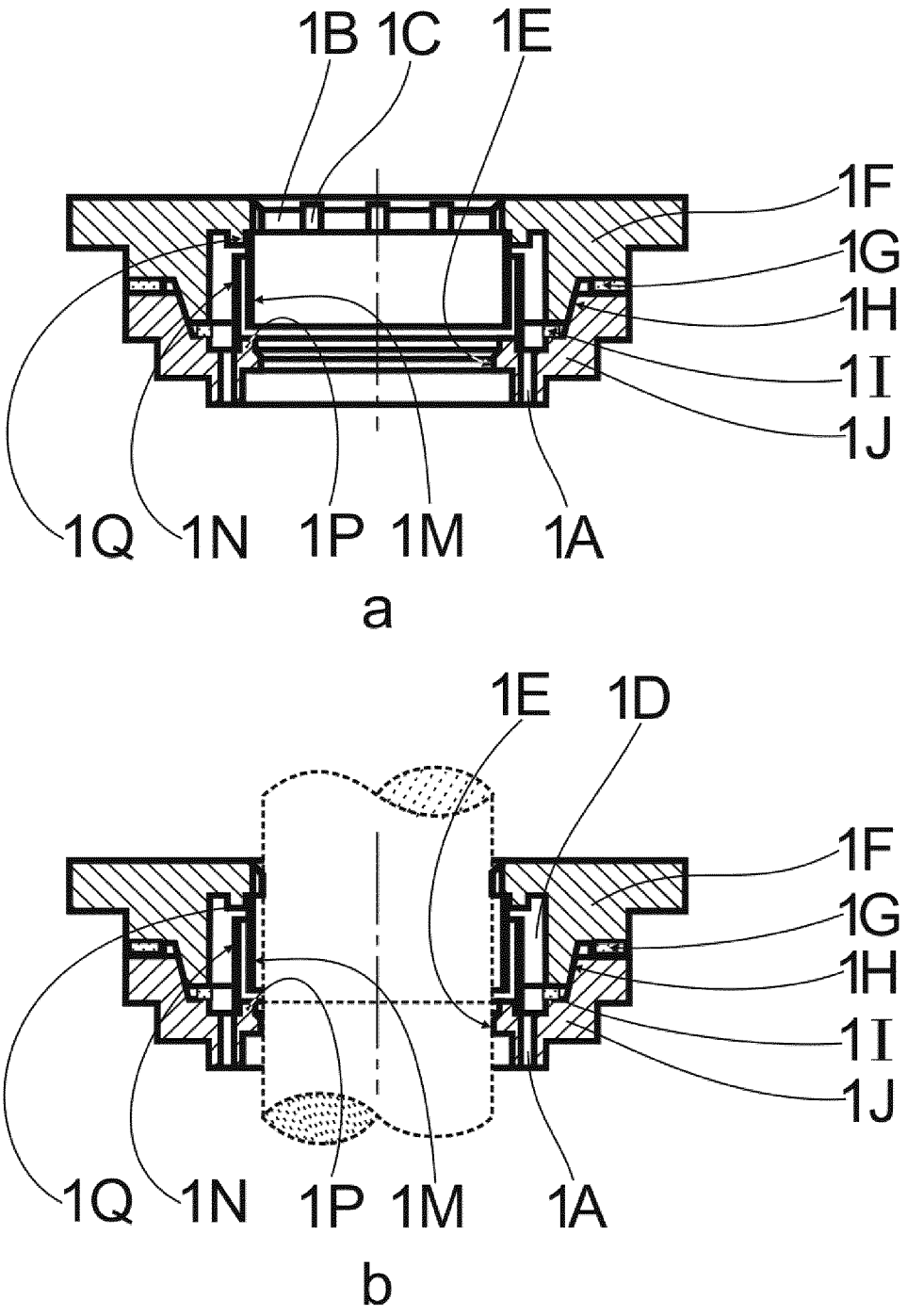
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FIG.1

Description

TECHNICAL FIELD

[0001] The present disclosure relates to the field of novel cigarette smoking utensil, and in particular, to a smoke generating device with enhanced heat exchange effect.

BACKGROUND

[0002] Existing heating cigarettes consist of two parts: a tobacco section and a filter rod. Most of filter rods are composed of a supporting section close to the tobacco section, a cooling section in the middle, and the end that is in contact with the consumer's lips. When the heating cigarette is inserted into the existing smoke generating device to heat the cigarette, as the tobacco section of the cigarette is relatively short, most of which is only 10~15mm, with the maximum no more than 20mm. Most cigarettes need to be inserted the smoke generating device together with the tobacco section and/or the supporting section of the filter rod into the heating cavity. Besides, in case consumers use general-purpose smoking utensils that are not produced for a certain variety (or brand) of cigarettes, the end of the heating element may be less than 2mm away from the supporting section of the cigarette filter rod, or even penetrating into the head of the supporting section of the filter rod. Under the above circumstances, once the cigarette is normally heated and smoked, there is a high probability that the supporting-section material cannot withstand the high temperature of the heating body with the occurrence of heat shrinkage or collapse. This not only affects the smoking of the second half of the cigarette (the cigarette deforms or softens due to heat shrinkage or collapse of the supporting section), but also directly affects the smoking taste of the cigarette.

[0003] Smoke generating device with induction heating in a folded airway (Application No. 2020110443853) by the applicant designs a novel cigarette introduction pipe that reduces the contact area between the smoking utensil and the cigarette filter rod to reduce heat shrinkage of the material in the supporting section of the cigarette filter rod.

[0004] The present disclosure further improves on the basis of the above-mentioned patent (Application No.: 2020110443853). It is expected to further reduce heat transmission of the smoking utensil to the supporting section of the cigarette filter rod, while enhancing heat exchange effect of the smoking utensil and increasing heat utilization rate.

SUMMARY

[0005] The present disclosure only improves the cigarette introduction pipe 1 of the smoking utensil in the above-mentioned patent (Application No.: 2020110443853), and the remaining parts, e.g., the heating part, are the same as the patent (Application No.: 2020110443853), which will not be described in detail in the description.

[0006] The present disclosure provides a smoke generating device with enhanced heat exchange effect. The smoke generating device includes: a cigarette introduction pipe 1;

[0007] Wherein, the cigarette introduction pipe 1 is disposed at the upper end of the smoke generating device, with a hollow tubular structure, its internal cavity is an air-mixing cavity 1D, the center of the upper end of the cigarette introduction pipe 1 is the first introduction hole 1B, and the center of its lower end is the second introduction hole IE, the outer ring of the first introduction hole 1B is provided with a plurality of air-guiding grooves 1C, the diameter of the air-mixing cavity 1D is greater than that of the first introduction hole 1B, the second introduction hole 1E and the first introduction hole 1B have the same diameter and are co-axial, the lower end of the cigarette introduction pipe 1 has at least one air inlet channel 1A;

[0008] Wherein, the cigarette introduction pipe 1 is divided into an upper duct IF and a lower duct 1J, and at least one heat insulation pad is disposed between the upper duct IF and the lower duct 1J.

[0009] Preferably, the upper duct IF and the lower duct 1J are detachably connected or fixed by an adhesive.

[0010] Preferably, the lower end of the upper duct IF and the upper end of the lower duct 1J have/form a positioning and matching platform 1H fitting up and down to realize the positioning and matching of the two ducts, the positioning and matching platform 1H is conical or cylindrical.

[0011] Preferably, the groove or gap between the lower end of the upper duct IF and the lower duct 1J is provided with a heat insulation pad, and the heat insulation pad itself is not filled with the groove or gap.

[0012] In order to make the upper duct IF and the lower duct 1J tightly connected, an inorganic high-temperature resistant adhesive with poor heat conductivity and large heat resistance is preferably used for connecting cylindrical table, of course, they can also be connected with traditional screws; the cone-shaped can be fixed by the self-locking and positioning function of the cone.

[0013] The lower end of the upper duct IF and the upper end of the lower duct 1J realize positioning and matching of each other through the positioning and matching platform 1H that fits up and down, or a part of the lower end of the upper duct IF and a part of the upper end of the lower duct 1J together form a positioning and matching platform 1H.

[0014] Preferably, in case the positioning and matching platform 1H is a cylindrical, the lower end of the upper duct IF includes a stepped round platform, the upper end of the lower duct 1J includes a matching stepped round platform, together forming a positioning and matching platform 1H.

[0015] The contact surfaces of the upper duct IF and

the lower duct 1J are the upper and lower horizontal planes and the vertical plane in the middle of the horizontal planes, an upper heat insulation pad 1G is disposed between two upper horizontal planes, and a lower heat insulation pad 1I is disposed between the two lower horizontal planes.

[0016] Preferably, in case the positioning and matching platform 1H is cone-shaped, the lower end of the upper duct IF includes a cone-shaped platform, the upper end of the lower duct 1J includes a cone-shaped that fits it, the contact surfaces of the upper duct IF and the lower duct 1J are two horizontal planes at the upper and lower part and a slope surface in the middle of the two horizontal planes, an upper heat insulation pad 1G is disposed between two upper horizontal planes, and a lower heat insulation pad 1I is disposed between the two lower horizontal planes.

[0017] Purposes of using heat insulation pad: performing relative heat insulation treatment on the upper duct IF and the lower duct 1J, so that the heat of induction heating from the lower duct 1J is more concentrated on the lower duct 1J, only a relatively small part can be transferred to the upper duct IF through the positioning and matching platform 1H and the heat insulation pad with relatively large heat resistance; thus, the temperature at which the upper duct IF is slightly lower than that of the lower duct 1J. Whereas the first introduction hole 1B on the upper duct IF is only a part of the circular ring, and the circumference of the contact part of the upper duct IF with the cigarette does not include the arc length corresponding to the multiple air-guiding groove 1C for air inlet, thus, there are fewer arcs in direct contact with the supporting section of the cigarette filter rod, which can reduce the heat transmitting from the lower part of the smoking utensil, thereby obviously improving heat shrinkage of the supporting section of the filter rod.

[0018] Preferably, the air-mixing cavity 1D of the cigarette introduction pipe 1 is further provided with a first air-guiding duct 1M and a second air-guiding duct 1N;

[0019] Wherein, the heights of the first air-guiding duct 1M and the second air-guiding duct IN are smaller than the minimum height of the air-mixing cavity 1D, the inner diameters of the first air-guiding duct 1M and the second air-guiding duct IN are smaller than the minimum diameter of the air-mixing cavity 1D, the axes of the two ducts are coincident with or in parallel with the axe of the air-mixing cavity 1D, the upper end of the first air-guiding duct 1M abuts against the inner wall of the upper end of the cigarette introduction pipe 1, the lower end of the second air-guiding duct IN abuts against the inner wall of the lower end of the cigarette introduction pipe 1;

[0020] The second air-guiding duct IN is disposed inside the air inlet channel 1A and surrounds the periphery of the first air-guiding duct 1M, and the gap between the first air-guiding duct 1M and the second air-guiding duct IN serves as an airflow channel.

[0021] Preferably, the first air-guiding duct 1M or the second air-guiding duct IN are integrally or detachably connected to the cigarette introduction pipe 1.

[0022] Preferably, the cigarette introduction pipe 1 is also provided with a fixing part for fixing the first air-guiding duct 1M and the second air-guiding duct 1N.

[0023] Preferably, the fixing part that fixes the first air-guiding duct 1M and the second air-guiding duct IN is at least one upper inner protrusion 1Q and at least one lower inner protrusion 1P provided on the inner wall of the cigarette introduction pipe 1;

[0024] Wherein, the upper inner protrusion 1Q is integrally connected to the inner wall of the upper end of the cigarette introduction pipe 1, and protrudes downward into the air-mixing cavity 1D relative to the inner wall;

[0025] The lower inner protrusion 1P is disposed on the inner side of the air inlet channel 1A, which is integrally connected to the inner wall of the lower end of the cigarette introduction pipe 1, and protrudes upward into the air-mixing cavity 1D relative to the inner wall; the first air-guiding duct 1M abuts against the side wall of the upper inner protrusion 1Q and is restricted to its inner side; the second air-guiding duct 1N abuts against the side wall of the lower inner protrusion 1P and is restricted to its outer side.

[0026] The "periphery" and "outer side" in the present disclosure refers to the direction away from the central axis of the heating cup 5 of the smoke generating device.

[0027] The "inner" of "inner side" in the present disclosure refers to the direction close to the central axis of the heating cup 5 of the smoke generating device.

[0028] Preferably, the upper inner protrusion 1Q and the lower inner protrusion 1P are point-shaped or ring-shaped.

[0029] The gap between the lower end of the first air-guiding duct 1M and the inner wall of the lower end of the cigarette introduction pipe 1 serves as an airflow channel. The gap between the upper end of the second air-guiding duct 1N and the inner wall of the upper end of the cigarette introduction pipe 1 serves as an airflow channel. The gap between the outer wall of the second air-guiding duct 1N and the inner side wall of the cigarette introduction pipe 1 serves as an airflow channel.

[0030] Preferably, the inner diameter of the first air-guiding duct 1M is equal to or greater than the outer diameter of the cigarette.

[0031] The cigarette introduction pipe 1 is made of a high-temperature resistant synthetic material, e.g., PEEK plastic cement, etc.

[0032] The first air-guiding duct 1M is made of aluminum, copper or zinc alloy, which is easy to process and conduct heat, or it can be a high-temperature resistant synthetic material, e.g., PEEK plastic cement, etc.

[0033] The second air-guiding duct 1M is made of aluminum, copper or zinc alloy, which is easy to process and conduct heat, or it can be a high-temperature resistant synthetic material, e.g., PEEK plastic cement, etc.

[0034] The circulation path and heat-exchange process of outside air in the air-mixing cavity 1D are as follows: In case the cigarette is inserted into the smoke generating

device for smoking, the outside air enters the gap between the outer wall of the cigarette and the air-guiding groove 1C distributed in the circumferential direction of the first introduction hole 1B, while entering the bottom of the air-mixing cavity 1D, the outside air at room-temperature relatively cools down the outer wall of the heated and sucked cigarette filter rod of the smoke generating device. The air enters the gap between the first air-guiding duct 1M and the second air-guiding duct 1N through the airflow channel between the lower end of the first air-guiding duct 1M and the air-mixing cavity 1D, flowing upward to the airflow channel between the upper end of the second air-guiding duct 1N and the air-mixing cavity 1D, and entering the air inlet channel 1A downwards through the airflow channel between the outer wall of the second air-guiding duct 1N and the inner wall of the air-mixing cavity 1D.

[0035] During this process, the airflow is folded back in the air-mixing cavity 1D many times, and the heat conducted from the inside of the smoke generating device exchanges with the air at room-temperature flowing through the air-mixing cavity 1D through the upper duct 1F and the lower duct 1J, until the passing air, under the negative pressure of smokers' suction, finally sends the preliminarily heated air (through the airflow channel where the heating element 6 is located) into the cigarette accommodating cavity through the air inlet channel 1A.

[0036] Meanwhile, the first air-guiding duct 1M and the second air-guiding duct 1N may also obtain maximum heat through radiation of the cigarette introduction pipe 1 and the heating element 6 in contact with them, when the circulated air passes around the first air-guiding duct 1M and the second air-guiding duct 1N, the air is also heated.

[0037] Another solution of the present disclosure is: the second air-guiding duct 1N is replaced with a plurality of annularly distributed air inlet needles 1L inserted into the air inlet channel 1A in an interference fit manner.

[0038] The gap between the air inlet hole at the upper end of the air inlet needle 1L and the inner wall of the cigarette introduction pipe 1 serves as an airflow channel.

[0039] The air passes through the small hole inside the air inlet needle 1L and sends the preliminarily heated air into the heating cavity, meanwhile, the air inlet needle 1L inserted from the end of the air inlet channel 1A may also obtain maximum heat through radiation of the heating element of the lower duct 1J below it and the lower duct 1J, when the circulating air passes through it, the air is also heated.

[0040] The diameter of the inner hole of the air inlet needle 1L is 0.1-0.9mm.

[0041] Preferably, the upper end hole of the air inlet needle 1L is an inclined end surface, which can speed up air inlet rate and prevent accidental blockage during installation.

[0042] The above technical solutions can be freely combined under the premise of no contradiction.

[0043] The present disclosure has the following beneficial effects:

1. The present disclosure designs a smoke generating device with enhanced heat exchange effect, and the cigarette introduction pipe is designed as two separable parts

- the upper and lower duct, the heat insulation pad performs relative heat insulation on the upper duct and the lower duct, further playing the role of reducing the heat transmitting from the lower heating cup and heating element to the upper part. Thus, the temperature of the upper duct in contact with the cigarette filter rod is lower, which greatly reduces heat shrinkage or collapse caused by the material of the supporting section of the cigarette filter rod in contact with the cigarette introduction pipe of the smoke generating device that cannot withstand high temperature of the heating body.

2. In the preferred technical solutions, the present disclosure designs the first air-guiding duct 1M and the second air-guiding duct 1N that guide air circulation inside the cigarette introduction pipe, the air can go back and forth many times in the air-mixing chamber 1D to fully exchange heat. The outside air cools down the cigarette introduction pipe, while the cigarette introduction pipe and the heating element preheat the air.

BRIEF DESCRIPTION OF THE DRAWINGS

[0044]

FIG.1 is a schematic longitudinal cross-sectional view of the cigarette introduction pipe 1 of Embodiment 1. FIG.1a shows the condition in which cigarettes are not inserted, while FIG.1b shows the part of the inserted cigarette with a dotted line.

FIG.2 is a schematic longitudinal cross-sectional view of the smoke generating device of Embodiment 1 after inserting a cigarette.

FIG.3 is a schematic longitudinal cross-sectional view of the cigarette introduction pipe 1 of Embodiment 2. FIG.3a shows the condition in which cigarettes are not inserted, while FIG.3b shows the part of the inserted cigarette with a dotted line.

FIG.4 is a schematic longitudinal cross-sectional view of the cigarette introduction pipe 1 of Embodiment 3.

[0045] List of signs in the drawings:

1. Cigarette introduction pipe, 1A. Air inlet channel, 1B. First introduction hole, 1C. Air-guiding groove, 1D.Air-mixing cavity, 1E. Second introduction hole, IF. Upper duct, 1G. Upper heat insulation pad, 1H.

Positioning and matching platform, 1I. Lower heat insulation pad, 1J. Lower duct, 1K. Integrated duct, 1L. Air inlet needle, 1M. First air-guiding duct, 1N. Second air-guiding duct, 1P. Lower inner protrusion, 1Q, Upper inner protrusion,

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0046] The present disclosure will be further explained below through specific embodiments.

Embodiment 1

[0047] As shown in FIG.1, a smoke generating device with enhanced heat exchange effect, the smoke generating device includes: a cigarette introduction pipe 1; other parts of the smoking utensil are the same as those in the patent (Application No.2020110443853);

[0048] Wherein, the cigarette introduction pipe 1 is disposed at the upper end of the smoke generating device, with a hollow tubular structure, its internal cavity is an air-mixing cavity 1D, the center of the upper end of the cigarette introduction pipe 1 is the first introduction hole 1B, and the center of its lower end is the second introduction hole IE, the outer ring of the first introduction hole 1B is provided with a plurality of air-guiding grooves 1C, the diameter of the air-mixing cavity 1D is greater than that of the first introduction hole 1B, the second introduction hole 1E and the first introduction hole 1B have the same diameter and are co-axial, the lower end of the cigarette introduction pipe 1 has at least one air inlet channel 1A;

[0049] Wherein, the cigarette introduction pipe 1 is divided into an upper duct IF and a lower duct 1J, and at least one heat insulation pad is disposed between the upper duct 1F and the lower duct 1J.

[0050] The diameter of the first introduction hole 1B is equal to that of the cigarette accommodating cavity 8, both are slightly larger than the outer diameter of the inserted cigarette.

[0051] In the embodiment, the lower end of the upper duct 1F and the upper end of the lower duct 1J realize the positioning and matching of each other by forming a positioning and matching platform 1H that fits up and down. The positioning and matching platform 1H is cone-shaped, which can be fixed by the self-locking and positioning function of the cone. The positioning and matching platform 1H is formed by a conical part at the lower end of the upper duct 1F and a conical part at the upper end of the lower duct 1J. The contact surfaces of the upper duct 1F and the lower duct 1J are two horizontal planes at the upper and lower part and a slope surface in the middle of the two horizontal planes, an upper heat insulation pad 1G is disposed between the two upper horizontal planes, and a lower heat insulation pad 1I is disposed between the two lower horizontal planes. Both the upper heat insulation pad 1G and the lower heat insulation pad 1I are made of silica gel with high-temperature resistance and good heat insulation performance.

[0052] Of course, in other embodiments, the contact surface between the upper air-guiding duct 1F and the lower air-guiding duct 1J may also have other forms, as long as the above functions can be realized.

[0053] The air-mixing cavity 1D of the cigarette introduction pipe 1 is further provided with a first air-guiding duct 1M and a second air-guiding duct 1N;

[0054] Wherein, the heights of the first air-guiding duct 1M and the second air-guiding duct 1N are smaller than the minimum height of the air-mixing cavity 1D, the inner diameters of the first air-guiding duct 1M and the second air-guiding duct 1N are smaller than the minimum diameter of the air-mixing cavity 1D, the axes of the two ducts are in parallel with the axe of the air-mixing cavity 1D, the upper end of the first air-guiding duct 1M abuts against the inner wall of the upper end of the cigarette introduction pipe 1, the lower end of the second air-guiding duct 1N abuts against the inner wall of the lower end of the cigarette introduction pipe 1; the second air-guiding duct 1N is disposed inside the air inlet channel 1A and surrounds the periphery of the first air-guiding duct 1M, the gap between the first air-guiding duct 1M and the second air-guiding duct 1N serves as an airflow channel.

[0055] The first air-guiding duct 1M, the second air-guiding duct 1N are separate from the cigarette introduction pipe 1.

[0056] The cigarette introduction pipe 1 is also provided with an upper inner protrusion 1Q and a lower inner protrusion 1P inside to fix the position of the first air-guiding duct 1M and the second air-guiding duct 1N;

[0057] Wherein, the upper inner protrusion (1Q) is a ring-shaped boss, which is connected to the inner wall of the upper end of the cigarette introduction pipe 1, and protrudes downward into the air-mixing cavity 1D relative to the inner wall;

[0058] The lower inner protrusion 1P is a ring-shaped boss, which is disposed on the inner side of the air inlet channel 1A and connected to the inner wall of the lower end of the cigarette introduction pipe 1, it protrudes upward into the air-mixing cavity 1D relative to the inner wall; the first air-guiding duct 1M abuts against the side wall of the upper inner protrusion 1Q and is restricted to its inner side; the second air-guiding duct 1N abuts against the side wall of the lower inner protrusion 1P and is restricted to its outer side.

[0059] The lower end of the first air-guiding duct 1M is opposite to the lower inner protrusion 1P, with the gap therebetween serves as an airflow channel. The upper end of the second air-guiding duct 1N is opposite to the upper inner protrusion 1Q, with the gap therebetween serves as an airflow channel. The gap between the outer wall of the second air-guiding duct 1N and the inner side of the air-mixing cavity 1D serves as an airflow channel.

[0060] The circulation path and heat-exchange process of outside air in the air-mixing cavity 1D are as follows: In case the cigarette is inserted into the smoke generating device for smoking, the outside air enters the gap between the outer wall of the cigarette and the air-guiding

groove 1C distributed in the circumferential direction of the first introduction hole 1B, while entering the bottom of the air-mixing cavity 1D, the outside air at room-temperature relatively cools down the outer wall of the heated and sucked cigarette filter rod of the smoke generating device. The air enters the gap between the first air-guiding duct 1M and the second air-guiding duct 1N through the airflow channel between the lower end of the first air-guiding duct 1M and the air-mixing cavity 1D, flowing upward to the airflow channel between the upper end of the second air-guiding duct 1N and the air-mixing cavity 1D, and entering the air inlet channel 1A downwards through the airflow channel between the outer wall of the second air-guiding duct 1N and the inner wall of the air-mixing cavity 1D.

[0061] During this process, the airflow is folded back in the air-mixing cavity 1D many times, and the heat conducted from the inside of the smoke generating device exchanges with the air at room-temperature flowing through the air-mixing cavity 1D through the upper duct 1F and the lower duct 1J, until the passing air, under the negative pressure of smokers' suction, finally sends the preliminarily heated air (through the airflow channel where the heating element 6 is located) into the cigarette accommodating cavity 8 through the air inlet channel 1A. Meanwhile, the first air-guiding duct 1M and the second air-guiding duct 1N may also obtain maximum heat through radiation of the cigarette introduction pipe 1 and the heating element 6 in contact with them, when the circulated air passes around the first air-guiding duct 1M and the second air-guiding duct 1N, the air is also heated.

FIG.1a is a schematic view of a cigarette introduction pipe 1. FIG.1b is a schematic view of the cigarette introduction pipe 1 after inserting cigarettes.

FIG.2 is a schematic view after inserting cigarettes in the smoke generating device in Embodiment 1.

FIG.2 shows the positions of each part of the cigarette, the suction of airflow, and the direction of the airflow.

Embodiment 2

[0062] A smoke generating device with enhanced heat exchange effect. The smoke generating device includes: a cigarette introduction pipe 1.

[0063] As shown in FIG.3, the difference between Embodiment 2 and Embodiment 1 is that: the second air-guiding duct 1N is replaced with a plurality of annularly distributed air inlet needle 1L inserted into the air inlet channel 1A in an interference fit manner.

[0064] The diameter of the inner hole of the air inlet needle 1L is 0.1-0.9mm.

[0065] The first air-guiding duct 1M can be replaced with: an integrated duct 1K integrally connected to the cigarette introduction pipe 1. The inner diameter of the integrated duct 1K is equal to the diameter of the first introduction hole 1B. The integrated duct 1K is thin-walled.

[0066] FIG3a is a schematic view of a cigarette introduction pipe 1. FIG3b is a schematic view of the cigarette introduction pipe 1 after inserting cigarettes.

Embodiment 3

[0067] A smoke generating device with enhanced heat exchange effect. The smoke generating device includes: a cigarette introduction pipe 1.

[0068] As shown in FIG.4, the difference from Embodiment 1 is that:
the lower end of the upper duct 1F and the upper end of the lower duct 1J realize the positioning and matching of each other by forming a positioning and matching platform 1H that fits up and down.

[0069] In case the positioning and matching platform 1H is cylindrical, the lower end of the upper duct 1F includes a stepped round platform, the upper end of the lower duct 1J includes a matching stepped round platform, together forming a positioning and matching platform 1H.

[0070] The contact surfaces of the upper duct 1F and the lower duct 1J are two upper and lower horizontal planes and the vertical plane in the middle of the horizontal planes, an upper heat insulation pad 1G is disposed between two upper horizontal planes, and a lower heat insulation pad 1I is disposed between the two lower horizontal planes.

[0071] The air-mixing cavity 1D of the cigarette introduction pipe 1 is not provided with a first air-guiding duct 1M and a second air-guiding duct 1N.

[0072] The above are only specific embodiments of the present disclosure, the protection scope of the present disclosure is not limited thereto, any person skilled in the art can easily think of changes or substitutions within the technical scope disclosed by the present disclosure, and they shall be covered by the protection scope of the present disclosure. Thus, the protection scope of the present disclosure shall be subject to the protection scope of the claims.

Claims

1. A smoke generating device with enhanced heat exchange effect, comprising a cigarette introduction pipe (1);

   Wherein, the cigarette introduction pipe (1) is disposed at the upper end of the smoke generating device, with a hollow tubular structure, the internal cavity is an air-mixing cavity (1D), the center of the upper end of the cigarette introduction pipe (1) is the first introduction hole (1B), and the center of its lower end is the second introduction hole (1E), the outer ring of the first introduction hole (1B) is provided with a plurality

of air-guiding grooves (1C), the diameter of the air-mixing cavity (1D) is greater than that of the first introduction hole (1B), the second introduction hole (1E) and the first introduction hole (1B) have the same diameter and are co-axial, the lower end of the cigarette introduction pipe (1) has at least one air inlet channel (1A);
Wherein, the cigarette introduction pipe (1) is divided into an upper duct (1F) and a lower duct (1J), and at least one heat insulation pad is disposed between the upper duct (1F) and the lower duct (1J).

2. The smoke generating device of claim 1, wherein the upper duct (1F) and the lower duct (1J) are detachably connected or fixed by an adhesive.

3. The smoke generating device of claim 1, wherein the lower end of the upper duct (1F) and the upper end of the lower duct (1J) have/form a positioning and matching platform (1H) fitting up and down to realize the positioning and matching of the two ducts, the positioning and matching platform (1H) is conical or cylindrical.

4. The smoke generating device of claim 1, wherein the groove or gap between the lower end of the upper duct (1F) and the lower duct (1J) is provided with a heat insulation pad, and the heat insulation pad itself is not filled with the groove or gap.

5. The smoke generating device of claim 1, wherein the air-mixing cavity (1D) of the cigarette introduction pipe (1) is also provided with a first air-guiding duct (1M) and a second air-guiding duct (1N);

Wherein, the heights of the first air-guiding duct (1M) and the second air-guiding duct (1N) are smaller than the minimum height of the air-mixing cavity (1D), the inner diameters of the first air-guiding duct (1M) and the second air-guiding duct (1N) are smaller than the smallest diameter of the air-mixing cavity (1D), the axes of the two air-guiding ducts coincide with the axe of the air-mixing cavity (1D) or are disposed in parallel, the upper end of the first air-guiding duct (1M) abuts against the inner wall of the upper end of the cigarette introduction pipe (1), and the lower end of the second air-guiding duct (1N) abuts against the inner wall of the lower end of the cigarette introduction pipe (1);
The second air-guiding duct (1N) is disposed inside the air inlet channel (1A) and surrounds the periphery of the first air-guiding duct (1M), the gap between the first air-guiding duct (1M) and the second air-guiding duct (1N) serves as the airflow channel.

6. The smoke generating device of claim 5, wherein the first air-guiding duct (1M) or the second air-guiding duct (1N) are integrally or detachably connected to the cigarette introduction pipe (1).

7. The smoke generating device of claim 5, wherein the cigarette introduction pipe (1) is also provided with a fixing part for fixing the first air-guiding duct (1M) and the second air-guiding duct (1N).

8. The smoke generating device of claim 7, wherein the fixing part that fixes the first air-guiding duct (1M) and the second air-guiding duct (1N) is at least one upper inner protrusion (1Q) and at least one lower inner protrusion (1P) provided on the inner wall of the cigarette introduction pipe (1);

Wherein, the upper inner protrusion (1Q) is integrally connected with the inner wall of the upper end of the cigarette introduction pipe (1), and protrudes downward into the air-mixing cavity (1D) relative to the inner wall;
The lower inner protrusion (1P) is disposed on the inner side of the air inlet channel (1A), which is integrally connected to the inner wall of the lower end of the cigarette introduction pipe (1), and protrudes upward into the air-mixing cavity (1D) relative to the inner wall; the first air-guiding duct (1M) abuts against the side wall of the upper inner protrusion (1Q) and is restricted to its inner side; the second air-guiding duct (1N) abuts against the side wall of the lower inner protrusion (1P) and is restricted to its outer side.

9. The smoke generating device of claim 5, wherein the second air-guiding duct (1N) is replaced with a plurality of annularly distributed air inlet needles (1L) inserted into the air inlet channel (1A) in an interference fit manner.

10. The smoke generating device of claim 8, wherein the upper inner protrusion (1Q) and the lower inner protrusion (1P) are point-shaped or ring-shaped.

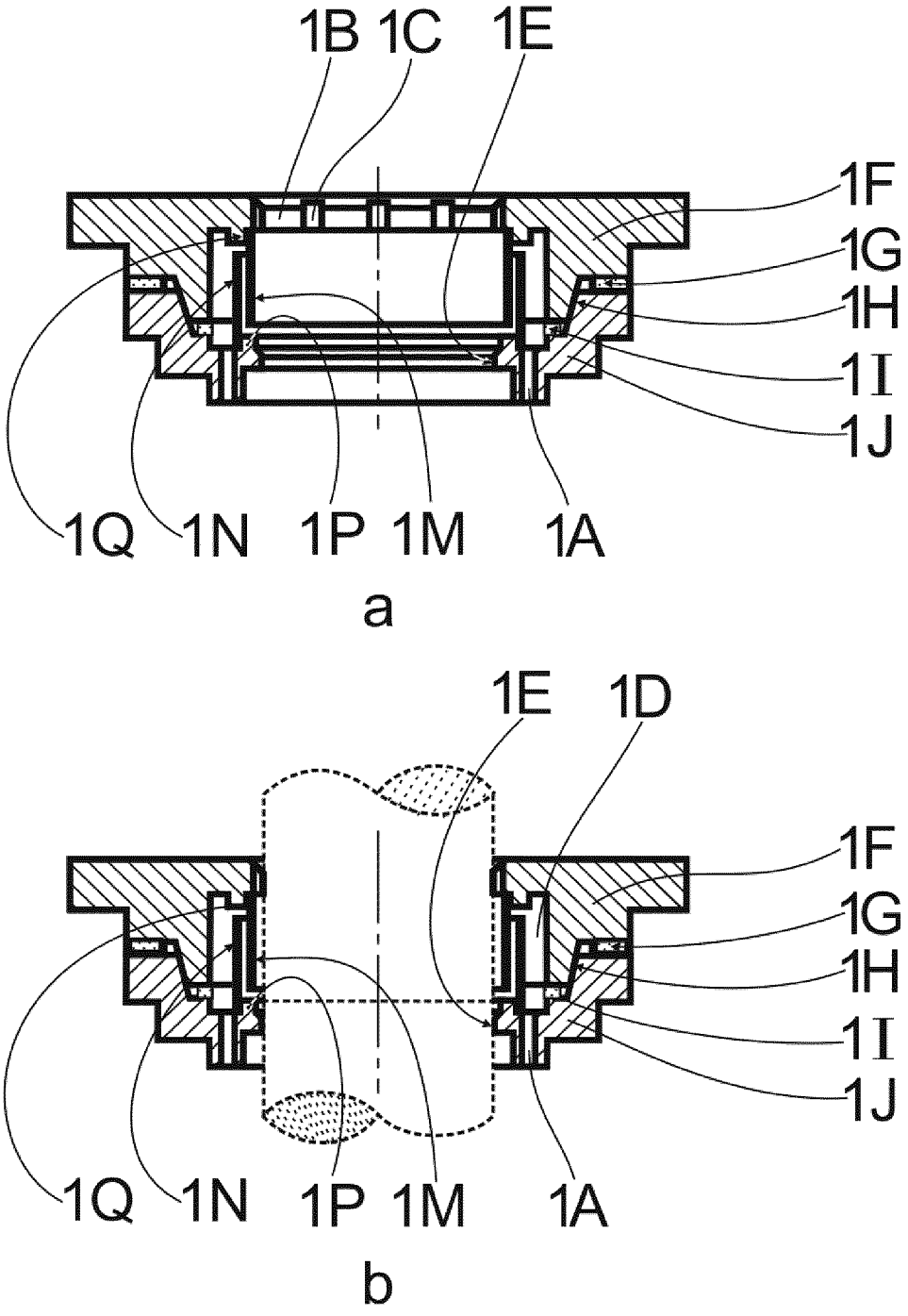
1B
1C
1E
1F
1G
1H
1I
1J
1Q
1N
1P
1M
1A
a
1E
1D
1F
1G
1H
1I
1J
1Q
1N
1P
1M
1A
b

FIG.1

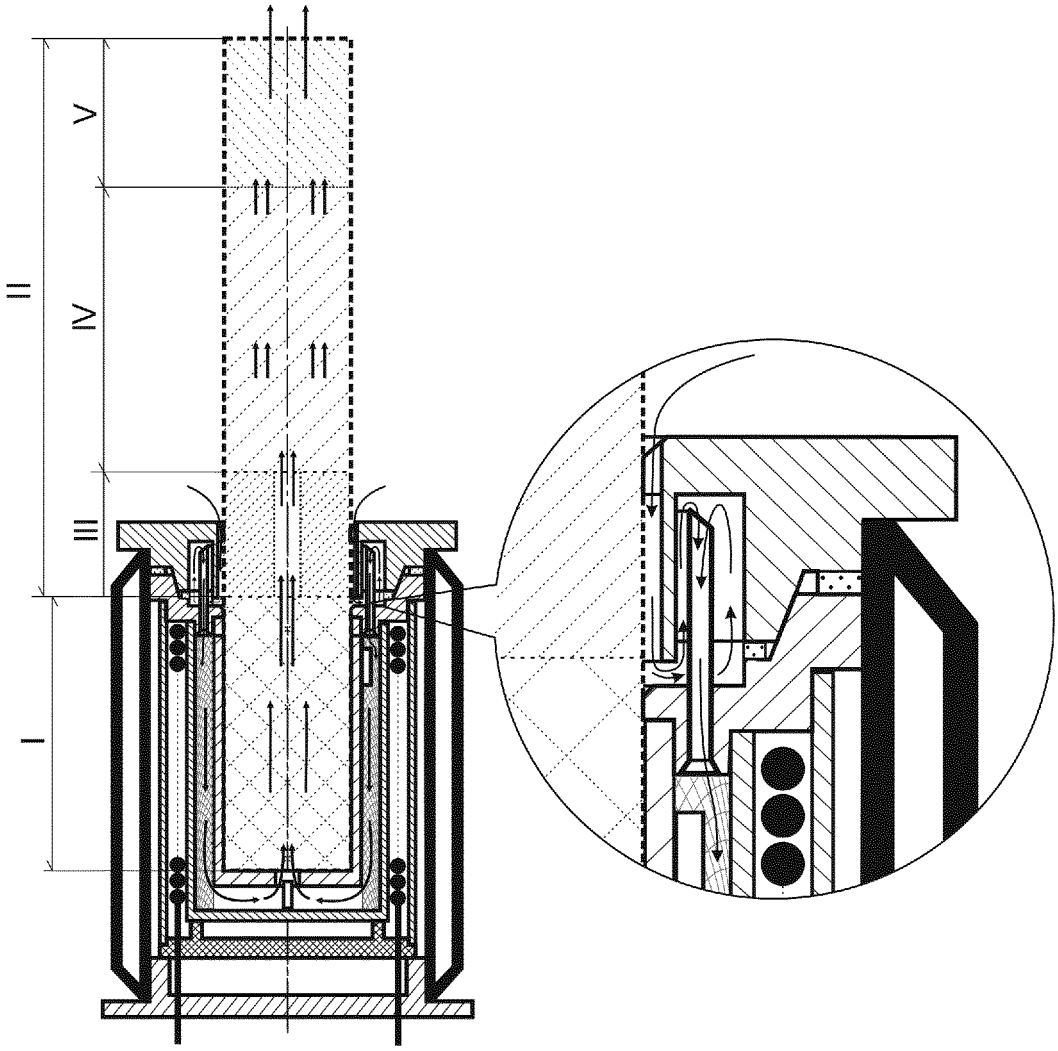

FIG.2

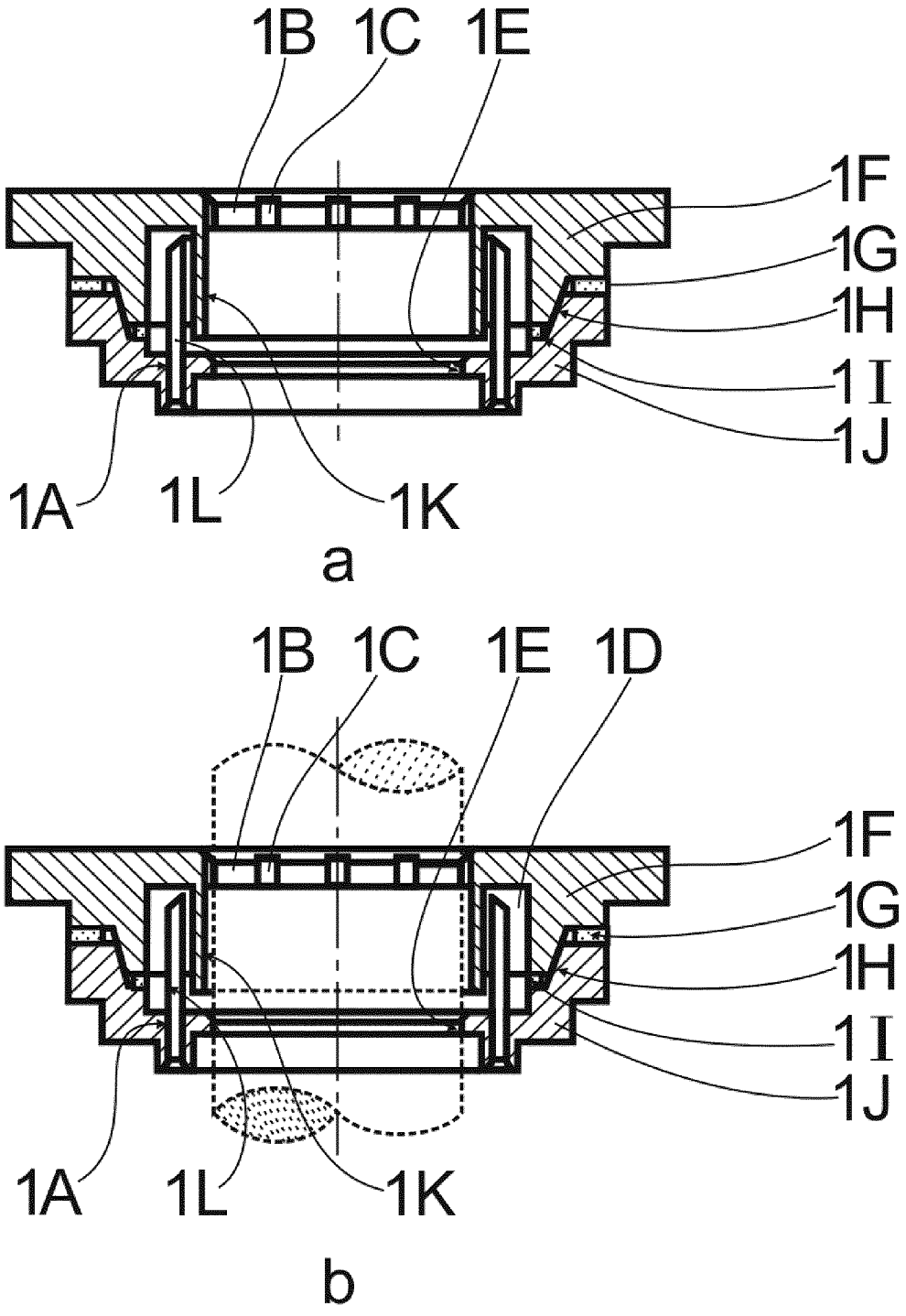

FIG.3

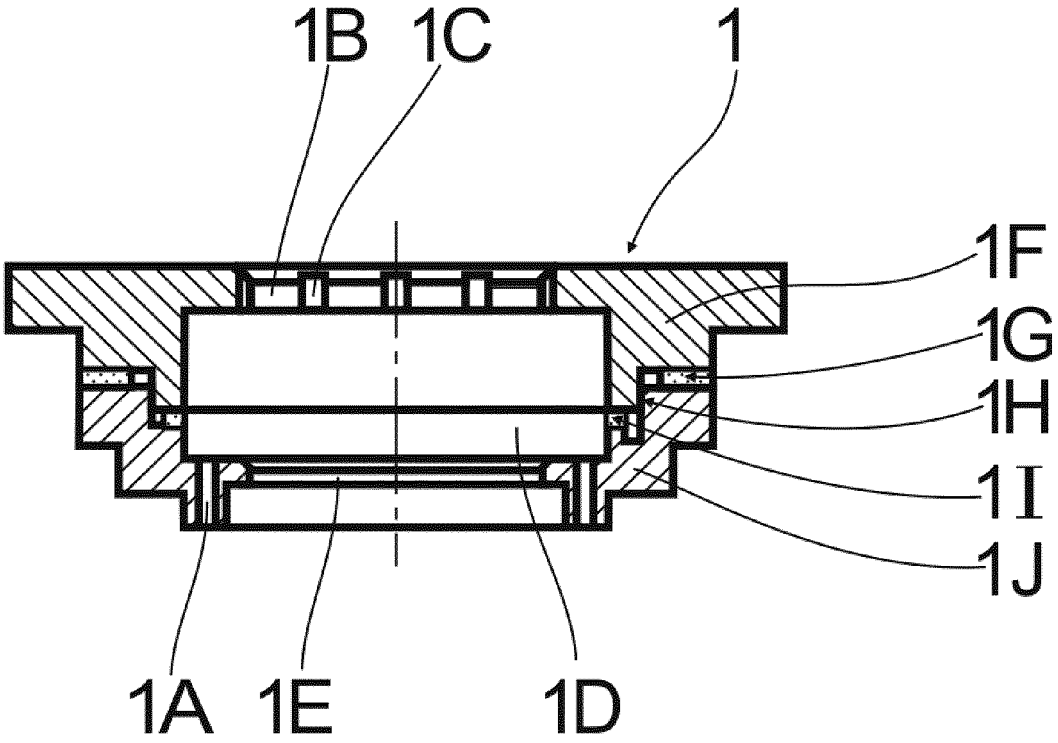

FIG.4

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2020/118752

A. CLASSIFICATION OF SUBJECT MATTER

A24F 40/40(2020.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A24F

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

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

CNABS, CNTXT, CNKI, 读秀, 超星科技数字图书馆, DWPI, SIPOABS, USTXT, EPTXT: 云南中烟, 加热, 发热, 发烟, 导气, 通气, 混气, 空气, 循环, 隔热, cigaret+, bak+, heat+, passag+, air+, flow+, guid+, conduct+

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 111449302 A (SHENZHEN CHANGNENG HUIKE TECHNOLOGY CO., LTD.) 28 July 2020 (2020-07-28) description, paragraphs [0009]-[0060], and figures 1-5	1-10
A	CN 111436662 A (CHINA TOBACCO YUNNAN INDUSTRIAL LLC.) 24 July 2020 (2020-07-24) entire document	1-10
A	CN 206923683 U (CHINA TOBACCO HUNAN INDUSTRIAL CO., LTD.) 26 January 2018 (2018-01-26) entire document	1-10
A	US 2019261688 A1 (CHANGZHOU PATENT ELECTRONIC TECHNOLOGY CO., LTD) 29 August 2019 (2019-08-29) entire document	1-10
A	US 2019191769 A1 (JOYETECH EUROPE HOLDING GMBH) 27 June 2019 (2019-06-27) entire document	1-10

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

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"A" document defining the general state of the art which is not considered to be of particular relevance
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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
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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
02 June 2021	**29 June 2021**
Name and mailing address of the ISA/CN **China National Intellectual Property Administration (ISA/CN)** **No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088** **China**	Authorized officer
Facsimile No. **(86-10)62019451**	Telephone No.

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

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2020/118752

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN 111449302 A	28 July 2020	None	
CN 111436662 A	24 July 2020	None	
CN 206923683 U	26 January 2018	None	
US 2019261688 A1	29 August 2019	CN 208144423 U	27 November 2018
US 2019191769 A1	27 June 2019	CN 107772540 A	09 March 2018
		WO 2018041065 A1	08 March 2018

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

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- WO 2020110443853 A **[0003] [0004] [0005]**
- WO NO2020110443853 A **[0047]**