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(54) **HEATING ASSEMBLY AND AEROSOL FORMING DEVICE**

(57) A heating assembly (60) and an aerosol forming device (600). The heating assembly (60) comprises a substrate (61), at least one heating element (62), a first electrode (63a) and a second electrode (63b); the substrate (61) is configured to be at least partially inserted into an aerosol forming matrix (67), and the substrate (61) has a first end (M) and a second end (N); the at least one heating element (62) is embedded in the substrate (61), and the heating element (62) has a first connection end (E) and a second connection end (F) opposite to the first connection end (E); at least one of the first electrode (63a) and the second electrode (63b) extends from the first end (M) to the second end (N), one of the first electrode (63a) and the second electrode (63b) is electrically connected to the first connection end (E) and the other electrode is electrically connected to the second connection end (F); and the at least one heating element (62) is configured to be inserted into the aerosol forming matrix (67) and powered by the first electrode (63a) and the second electrode (63b) to generate heat. The heating assembly (60) can avoid the problem of failure caused by the heating element (62) falling off from the substrate

(61) during high-temperature heating, thus greatly improving the reliability of the heating assembly (60).

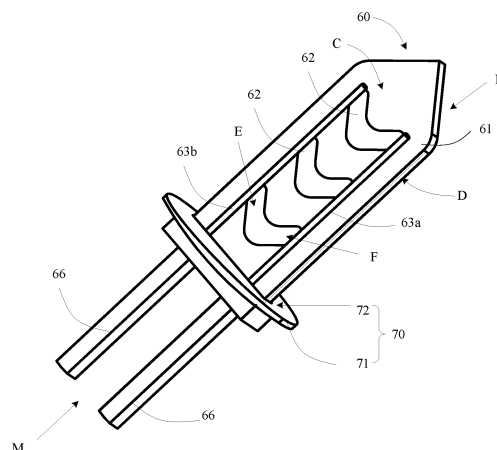


FIG. 1a

Description

TECHNICAL FIELD

[0001] The present disclosure relates to the field of HNB (Heat Not Burn) device technology, and in particular, to a heating assembly and an aerosol generating device.

BACKGROUND

[0002] As a substitute for cigarettes, electronic cigarettes have been paid more and more attention and favored due to the advantages of safety, convenience, good for health, environmentally friendly, etc. A HNB device is an example, also called HNB aerosol generating device.

[0003] The existing HNB aerosol generating device generally adopts a tubular peripheral heating or a central embedded heating method. Tubular peripheral heating refers to surrounding the heating tube outside the aerosol-generating material (such as tobacco) so as to heat it. Central embedded heating refers to inserting the heating assembly into the aerosol-generating material so as to heat it. Among them, heating assemblies are widely used as they can be easily manufactured, conveniently used and have other advantages. At present, the heating assembly mainly adopts ceramic or insulated metal as the substrate, which is further screen-printed or coated with resistance heating circuits. The resistance heating circuits are fixed on the substrate after high temperature treatment.

[0004] However, the resistance heating circuits on the current heating assembly is a thin film screen-printed or coated on the substrate at later stage. Inserting the heating assembly into the aerosol-generating material for many times will result in the bending or deformation of the substrate. The resistance heating circuits tend to fall off from the substrate at high temperature, resulting in poor stability. And during the heating process, the aerosol-generating material is only contacted at the side of the substrate with resistance heating circuits, while the aerosol-generating material on the other side of the substrate is avoided from contacting the resistance heating circuits, resulting in poor heating uniformity.

SUMMARY

[0005] The present disclosure provides a heating assembly and an aerosol-generating device, to overcome the problem that a resistance heating circuit on the existing heating assembly tends to fall off from the substrate and has a poor stability at high temperature, and that the resistance heating circuit causes poor heating uniformity to the aerosol-generating material during heating.

[0006] In order to overcome the aforementioned technical problem, the first technical solution provided in the present disclosure is a heating assembly. The heating

assembly includes a base board, at least one heating unit, a first electrode and a second electrode. The base board, having a first end and a second end, is applicable for at least being partially inserted into the aerosol forming substrate. The at least one heating unit is embedded in the base board. The heating unit has a first connecting end and a second connecting end opposite to the first connecting end. At least one electrode of the first electrode and the second electrode is extended from the first end to the second end. One electrode of the first electrode or the second electrode is electrically connected with the first connecting end, and the other electrode is electrically connected with the second connecting end. At least one heating unit is applicable for being inserted into the aerosol forming substrate and be heated by the power supply provided by the first electrode and the second electrode.

[0007] In order to overcome the aforementioned technical problem, a second technical solution provided in the present disclosure is an aerosol generating device.

The aerosol generating device includes a housing, a heating assembly and a power supply assembly both configured in the housing. The power supply assembly is connected to the heating assembly to supply power to the heating assembly. The heating assembly is the one described above.

[0008] The heating assembly and aerosol generating device are provided in this disclosure. The heating assembly comprises a base board and a heating unit. The aerosol forming substrate is heated by the heating unit. Meanwhile, the heating unit is embedded in the base board, which can effectively improve the strength of the heating assembly. As a result, by inserting the base board to the aerosol forming substrate instead, the heating assembly can effectively avoid the bending problem caused by the force formed during the insertion process. Compared with the resistance heating circuits made by silk-screen printing or coating on the substrate, the base board and heating unit of this disclosure can directly and independently insert into the aerosol forming substrate. Moreover, it can avoid that the heating unit tends to fall off from the base board at high temperature, greatly improving the stability of the heating assembly. In addition, by configuring the first electrode and the second electrode, and by extending the first end of at least one electrode of the first electrode and the second electrode to the second end of the base board, one of the first electrode and the second electrode is electrically connected with the first connecting end of the heating unit, and the other electrode is electrically connected with the second connecting end of the heating unit. Therefore, the heating unit forms a current loop. It can not only avoid short circuit problems, but also simplify the manufacturing process and the strengthen the heating assembly.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009]

FIG. 1a is a structural schematic diagram of a heating assembly according to the first embodiment of the present disclosure.

FIG. 1b is a schematic diagram of a heating assembly inserted into the aerosol forming substrate according to an embodiment of the present disclosure.

FIG. 2 is a schematic product size diagram of the heating assembly shown in FIG. 1a according to an embodiment of the present disclosure.

FIG. 3 is a schematic product size diagram of the heating assembly shown in FIG. 1a according to another embodiment of the present disclosure.

FIG. 4a is a side view of the heating assembly according to the first specific embodiment of the present disclosure.

FIG. 4b is a side view of the heating assembly according to the second specific embodiment of the present disclosure.

FIG. 4c is a side view of the heating assembly according to the third specific embodiment of the present disclosure.

FIG. 5 is a side view of the heating assembly according to the fourth specific embodiment of the present disclosure.

FIG. 6 is a side view of the heating assembly according to an embodiment of the present disclosure.

FIG. 7 is a structural schematic diagram of the heating assembly according to the second embodiment of the present disclosure.

FIG. 8a is a structural schematic diagram of the heating assembly according to the third embodiment of the present disclosure.

FIG. 8b is a side view of the heating assembly according to the fifth embodiment of the present disclosure.

FIG. 9 is a side view of the heating assembly according to the sixth embodiment of the present disclosure.

FIG. 10 is a structural schematic diagram of the heating assembly according to the fourth embodiment of the present disclosure.

FIG. 11 is a side view of the heating assembly according to the seventh embodiment of the present disclosure.

FIG. 12 is a structural schematic diagram of the aerosol generating device according to an embodiment of the present disclosure.

DETAILED DESCRIPTION

[0010] Technical solutions of the embodiments of the present disclosure will be clearly and comprehensively described by referring to the accompanying drawings. Obviously, the embodiments described herein are only a part of, but not all of, the embodiments of the present disclosure. Based on the embodiments in the present disclosure, all other embodiments obtained by a person of ordinary skill in the art without any creative work shall

fall within the scope of the present disclosure.

[0011] It should be noted that, the expressions "first", "second", "third" and the like are utilized for descriptive purposes only, and shall not be interpreted as indicating or implying relative importance or implicitly specifying the number of an indicated technical feature. Therefore, features defined by "first", "second" and "third" may explicitly or implicitly include at least one of the such feature. In the present disclosure, "multiple" means at least two, such as two, three, etc., unless otherwise expressly specified. Directional indications if present (such as up, down, left, right, front, back,) in the embodiments of the present disclosure are only expressed to explain relative positional relationships and movement between components in a particular attitude (as shown in the drawings). When the particular attitude is changed, the directional indications shall also be changed accordingly. The terms "comprising" and "having", and any variation thereof, are intended to cover non-exclusive inclusion. A process, method, system, product, or device consisting of a series of steps or units is not limited to the listed steps or units, but optionally includes steps or units not listed, or optionally includes other steps or units inherent to those processes, methods, products, or devices.

[0012] Reference to "embodiments" in this disclosure means that the particular features, structures or characteristics described in conjunction with the embodiments may be included in at least one embodiment of this application. The presence of the phrase at various locations in the specification does not necessarily refer to the same embodiment, nor is it a separate or alternative embodiment that is mutually exclusive with other embodiments. It is understood explicitly and implicitly by those skilled in the field that the embodiments described herein may be combined with other embodiments.

[0013] The following is a detailed description of this disclosure in combination with the attached drawings and embodiments.

[0014] Referring to FIGS. 1a to FIG. 3, wherein FIG. 1a is a structural schematic diagram of a heating assembly according to the first embodiment of the present disclosure; FIG. 1b is a schematic diagram of a heating assembly inserted into the aerosol forming substrate according to an embodiment of the present disclosure; FIG. 2 is a schematic product size diagram of the heating assembly shown in FIG. 1a according to an embodiment of the present disclosure; FIG. 3 is a schematic product size diagram of the heating assembly shown in FIG. 1a according to another embodiment of the present disclosure. In one embodiment, a heating assembly 60 is provided for inserting and heating the aerosol forming substrate 67. For example, in an embodiment, the heating assembly 60 is inserted into the tobacco and heat it. This example is taken in the following embodiments. It can be understood that in this embodiment, the aerosol forming substrate 67 can specifically be tobacco. Please refer to FIG. 1b for the schematic diagram of the heating assembly 60 inserted into the aerosol forming substrate 67.

[0015] Please refer to FIG. 1a, the heating assembly 60 includes a base board 61, at least one heating unit 62, a first electrode 63a and a second electrode 63b. The base board 61, having a first end M and a second end N opposite to the first end M, is applicable for at least being partially inserted into the aerosol forming substrate 67. At least one heating unit 62 is configured to heat the tobacco after inserting into it. The heating unit 62 is embedded into the base board 61 to effectively improve the strength of the heating unit 60, so that the base board 61 can bear the force while inserting into the tobacco, which further effectively avoids the bending or fracture of the heating unit 62. Meanwhile, compared with the resistance heating circuits made by silkscreen-printing or coating on the substrate, the base board 61 and heating unit 62 of this disclosure can directly and independently insert into the aerosol forming substrate 67. Moreover, it avoids that the heating unit 62 will fall off from the substrate at high temperature, greatly improving the stability of the heating assembly 60. In an embodiment, at least a part of the base board 61 corresponded to heating unit 62 is inserted into the aerosol forming substrate 67.

[0016] To be specific, the heating unit 62 is provided with a first connecting end E and a second connecting end F. Of the first electrode 63a and the second electrode 63b, at least one electrode is extended from the first end M to the second end N, so that one of the first electrode 63a and the second electrode 63b is electrically connected with the first connecting end E of the heating unit 62, and the other electrode is electrically connected with the second connecting end F of the heating unit 62. Then the heating unit 62 forms a current loop. Compared with the way of making a resistance heating circuit by silkscreen-printing or coating on the substrate in the prior art, the heating unit 62 is embedded in the base board 61. On the one hand, the thickness of the heating unit 62 can be increased, so that it will not be deformed or damaged due to the deformation of the base board 61. On the other hand, the two opposite surfaces of the base board 61 are adjacent to the heating unit 62, so that the heat generated on both surfaces is more evenly.

[0017] In an embodiment, at least one of the first electrode 63a and the second electrode 63b extends from the first end M to a position near the second end N. In other embodiments, the first electrode 63a or the second electrode 63b can also be located close to the first end M or in the middle of the base board 61. The layout can be based on the position and the series/parallel combinations of the heating units 62, which is not limited in this embodiment.

[0018] The shape of base board 61 can be rectangular. When inserting the heating assembly 60 into the tobacco, the second end N of the base board 61 contact the tobacco first. Therefore, to facilitate the insertion of the heating unit 60 into the tobacco, the second end N of the base board 61 can be designed as a tip. In other words, it is a triangular structure, and the angle α_1 formed by two adjacent edges of the tip can be 45 degrees to 90

degrees, such as 60 degrees. In this embodiment, the joint portion between each of the two edges of the tip and each side of the base board 61 is an arc. The radius R_1 of the arc can be 1-3 mm, such as 1 mm.

[0019] The base board 61 can be made of insulating ceramic. The thermal conductivity of the insulating ceramic can be 4-18 W/(m.k), the bending strength can be above 600 MPa, the thermal stability can exceed 450 degrees, and the fire resistance performance can be higher than 1450 degrees. In some other embodiments, the base board 61 can also be made of metal with an insulating coating, such as stainless steel. Therefore, it can improve the strength of the heating unit 60, prevent it from bending or breaking, and diffuse the heat generated by the heating unit 62 to the tobacco contacted with the base board 61, thereby improving the heat homogeneity to the tobacco. In one embodiment, the material of the base board 61 can be zirconia. The base board 61 made of zirconia can keep and transfer the heat generated by the heating unit 62 to improve the energy utilization rate of the heating assembly 60. In other embodiments, the material of the insulating ceramic can also be ZTA (toughened zirconia), MTA (mullite alumina composite) and other ceramics. In other embodiments, the heating unit 62 can also be made of metal alloy or ceramic alloy made of iron, silicon and aluminum.

[0020] Please refer to FIG. 2, in one embodiment, the base board 61 can be provided with at least one holding slot 611 along its longitudinal direction. The heating unit 62 is contained in the holding slot 611, so that while inserting the heating assembly 60 into the tobacco, the base board 61 is stressed instead to prevent the heating unit 62 from being bent due to direct stress. The base board 61 can be cut by a laser according to the preset size to form the holding slot 611, so as to ensure the dimensional accuracy of the holding slot 611. The distance between the holding slot 611 and each edge of both sides of the base board 61 is the same, that is, the holding slot 611 is centrally arranged along the width direction of the base board 61. In some embodiments, glass ceramic materials can be coated on the inner wall of the holding slot 611 to cohere the base board 61 and the heating unit 62, then the insulating ceramics, glass ceramics and electrodes can be sintered together. Due to the high viscosity of glass ceramics, the binding force between the heating unit 62 and the base board 61 can be effectively improved, thus enhancing the utility stability. The coating thickness can be 0.05-0.1mm, such as 0.05mm.

[0021] Please refer to FIG. 2, in one embodiment, the base board 61 can be provided with three holding slots 611 spaced along its longitudinal direction. The spacing distance L_{34} can be 2-3 mm, for example, 2.90 mm. The cross section of the holding slot 611 can be bar-shaped and bent or curved, such as a V-shaped structure (see FIG. 2) or a straight-shaped structure (see FIG. 8a below). The heating unit 62 formed in or arranged in the holding slot 611 can also be a bent or curved shape.

When the holding slot 611 is in a V-shaped structure, the heating unit 62 is also in a V-shaped structure. When the holding slot 611 is in a straight-shaped structure, the heating unit 62 is also in a straight-shaped structure. In other words, the shape of the heating unit 62 matches the shape of the holding slot 611. In an embodiment, the V-shaped heating unit 62 has a V-shaped bottom facing the first end M and the resistance is larger at the bottom, which conforms to the design that the heat of the heating unit 62 diffuses from bottom to top, thus ensuring the overall temperature of the heating unit 62 be more evenly. It can be understood that the shape of the cross section of the holding slot 611 is not limited and can be designed according to the shape of the heating unit 62.

[0022] In an embodiment, FIGS. 2 and 3 show the size of the base board 61 with a V-shaped holding slot 611. The length L31 of the base board 61 can be 10-15 mm, such as 13.20 mm, and the width W31 can be 4-6 mm, such as 5 mm. The length L35 of the V-shaped holding slot 611 opened in the base board 61 can be 3-4 mm, for example, 3.00 mm, with a corresponding effective length being 4.2 mm and the thickness being 0.3-0.6 mm, such as 0.5 mm. The radius R_2 corresponding to the arc formed in the middle of the inner ring edge can be 0.5-1 mm, for example, 0.75 mm. The radius R_3 corresponding to the arc formed in the middle of the outer ring edge can be 0.5-1 mm, for example, 0.75 mm. The radius of the inner wall fillet R_4 can be 0.2-0.5 mm, for example, 0.25 mm. The radius of the outer fillet R_5 can be 1-2 mm, for example, 1 mm. The distance W32 from the bottom of the inner ring edge to the bottom of the outer ring edge can be 1-2 mm, for example, 1.15 mm. The distance W33 from the bottom of the inner ring edge to the top of the inner ring edge can be 0.5-1 mm, for example, 0.82 mm. The distance L32 from the bottom of the inner ring edge to the top of the second end N of the base board 61 can be 3-4 mm, such as 3.94 mm. The radian α_2 formed by the outer ring edge can be 45 degrees - 90 degrees, for example, 90 degrees. It should be noted that the inner concave part of the V-shaped holding slot 611 is defined as the inner ring edge and the outer convex part is defined as the outer ring edge.

[0023] The base board 61 has a first surface C and a second surface D opposite to the first surface C. The holding slot 611 can be a through hole that runs through the first surface C and the second surface D. The heating unit 62 is incorporated in the through hole. In one embodiment, the heating unit 62 has a first heating surface and a second heating surface opposite to the first heating surface. In one embodiment, the first heating surface and the second heating surface of the heating unit 62 in the holding slot 611 are at a height even with the first surface C and the second surface D of the base board 61 respectively. Wherein, by configuring the holding slot 611 as a through hole structure, the heating unit 62 in the holding slot 611 can be exposed from the side of the first surface C and the side of the second surface D of the base board 61, so that both surfaces of the heating unit 62 can directly

contact with the tobacco after the heating unit 62 is inserted into the tobacco. Thus, not only a high energy utilization rate is ensured, but also a homogeneous heating and the preset temperature field boundary can be guaranteed. In particular, the low voltage startup is convenient for real-time power control and design. It can be easily understood that the holding slot 611 can also be a blind slot or a blind hole.

[0024] In other embodiments, the first heating surface and the second heating surface of the heating unit 62 can also slightly be protruded from the first surface C and the second surface D of the base board 61, or be slightly recessed to the first surface C and the second surface D, respectively, according to the actual needs for temperature field distribution during heating process. In this way, when the first heating surface and the second heating surface of the heating unit 62 are protruded from the first surface C and the second surface D of the base board 61, the higher temperature of the heating unit 62 can be concentrated on the first heating surface and the second heating surface, and the tobacco in contact with them can be baked at a higher temperature, so that the aerosol formed can meet stricter demands. However, when the first heating surface and the second heating surface of the heating unit 62 is slightly recessed to (or lower than) the first surface C and the second surface D of the base board 61, due to the barrier effect of the base board 61, the first heating surface and the second heating surface of the heating unit 62 can contact the tobacco more loosely. Then the baking temperature of the heating unit 62 to the tobacco can be slightly reduced, so as to meet the demand for a softer smoke.

[0025] The number of the heating unit 62 can be one or more. In an embodiment, the heating unit 62 can be a self-supporting structure, that is, the heating unit 62 can exist independently without attaching to other carriers. Compared with the existing resistance heating circuits formed by printing or coating on the substrate, the heating unit 62 with a self-supporting structure can effectively avoid the problem that it might fall off from the base board 61 when heated at high temperature or when the base board 61 is deformed, greatly improving the reliability of the heating assembly 60. Since the heating unit 62 has a self-supporting structure and can be exposed from one side of the first surface and one side of the second surface of the base board 61 at the same time, it effectively guarantees heat utilization and heating uniformity.

[0026] The shape of the heating unit 62 shall not be limited and can be designed as required. In an embodiment, the heating unit 62 can be strip-shaped and be extended along the width direction of the base board 61, in a bent or curved structure. In an embodiment, a bending part or a curving part is formed in the middle of the strip-shaped heating unit 62, and the angle of the bending part or the curving part can be greater than 45 degrees. For example, the angle can be 90 degrees, 120 degrees or 145 degrees.

[0027] The material of the heating unit 62 can be conductive ceramics. Compared with the existing metal materials, conductive ceramics have higher conductivity and ensure more uniform temperature when heated. Moreover, the heating unit 62 made of conductive ceramics can be adjusted and designed at 3-4 watts. The conductivity can reach 1×10^{-4} ohm to 1×10^{-6} ohm, such as 5×10^{-5} ohm. It is suitable for low voltage startup to facilitate real-time power control and design. The bending strength of conductive ceramics can be higher than 40MPa, and the fire resistance performance can be higher than 1200 °C. At the same time, the heating unit 62 made of the conductive ceramic has the characteristics of a full starting voltage.

[0028] The heating wavelength of the conductive ceramic adopted as the material of the heating unit 62 can be medium infrared electromagnetic, benefiting atomizing tobacco oil and improving taste. In addition, the crystal phase structure of the conductive ceramic is a high-temperature stable oxide ceramic. As the oxide ceramic has good fatigue resistance, high strength, and high density, it can effectively avoid the problem of harmful heavy metal volatilization and dust, and greatly improve the life of the heating unit 62.

[0029] The heating unit 62 made of whole pieces of ceramic can reduce the area of hot spots of highest temperature, eliminate the risk of fatigue cracking and the increase of fatigue resistance, and has good consistency. As the ceramic has high strength and smoothness due to its microcrystalline structure, the surface of the heating unit 62 is easy to clean while not prone to adhere. In addition, the process of manufacturing the heating unit 62 from ceramic is simple and convenient to control, and the cost is low, which could facilitate the production application and economic benefits.

[0030] The heating unit 62 made of conductive ceramic includes main compositions and crystal compositions. The main compositions ensure its conduct electricity and resistance, which can be selected from one or more of the following: manganese, strontium, lanthanum, tin, antimony, zinc, bismuth, silicon and titanium. Crystal compositions, the main material of the ceramic, mainly form its shape and structure and can be one or more of the following: lanthanum manganate, strontium lanthanum manganate, tin oxide, zinc oxide, antimony oxide, bismuth oxide, silicon oxide and yttrium oxide. In other embodiments, the heating unit 62 can also be made of metal alloy or ceramic alloy made of iron silicon aluminum alloy and ceramics.

[0031] The conductive ceramic mentioned above is a material with TCR characteristics. In other words, the temperature is corresponded with the resistance value. Therefore, the temperature can be obtained by detecting the resistance value during use to control the temperature of the heating unit 62.

[0032] The first electrode 63a and the second electrode 63b can be made by the method of coating. In one embodiment, the first electrode 63a and the second elec-

trode 63b are both configured on the base board 61 and electrically connected with the heating unit 62. In an embodiment, the first electrode 63a is directly formed on the surface of the base board 61. For example, it is formed on the first surface 63a or the second surface 63b of the base board 61. In another embodiment, the base board 61 is provided with two opposite arranged slots, the first electrode 63a and the second electrode 63b are configured in the two slots respectively, and are electrically connected with the first connecting end E and the second connecting end F of the heating unit 62.

[0033] Please refer to FIG. 4a, which is a side view of the heating assembly provided by the first embodiment of the present disclosure. The first electrode 63a and the second electrode 63b include a first part and a second part respectively. The first part of at least one of the first electrode 63a and the second electrode 63b is formed on the surface of the base board 61, and the second part is formed on the surface of the heating unit 62. Further, a first groove is configured at the position, where the base board 61 corresponds to the first part of the electrode. The first part of the electrode is located in this first groove. A second groove is configured at the position, where the heating unit 62 corresponds to the second part of the electrode. The second part of the electrode is located in the second groove. In an embodiment, the thickness of the first part of the electrode is the same as the depth of the first groove, and the thickness of the second part of the electrode is the same as the thickness of the second groove.

[0034] FIG. 4b is a side view of the heating assembly provided by the second embodiment of this disclosure. In this embodiment, the first electrode 63a and the second electrode 63b respectively further include a third part. The third part of at least one electrode of the first electrode 63a and the second electrode 63b is extended to the side surface of the heating unit 62 abutting the base board 61.

[0035] In another embodiment, one of the first electrode 63a and the second electrode 63b is arranged on the base board 61, and the other electrode is arranged on the heating unit 62. The electrode arranged on the heating unit 62 can also be directly formed on the surface or in the groove of the heating unit 62, then electrically connects with the heating unit 62. Coating the first electrode 63a and the second electrode 63b on the base board 61 and/or on the heating unit 62 can improve the binding force between the first electrode 63a and the second electrode 63b and the base board 61 and/or the heating unit 62, thereby improving the joint stability between the electrode lead 66 of the first electrode 63a and the second electrode 63b and the heating unit 62. It can be understood that the ceramic has a microporous structure, which ensures the binding force between the first electrode 63a and the second electrode 63b and the base board 61 and/or the heating unit 62 even when the thickness of coating is large. Thus, it can greatly improve the binding force between the first electrode 63a and the second electrode 63b and the base board 61 and/or the heat-

ing unit 62. The above-mentioned coating material can be silver paste. It can be understood that the first electrode 63a and the second electrode 63b can also be formed by the depositing of a metal film. For example, materials can be gold, platinum, copper or other metal materials with the conductivity higher than 1×10^{-6} ohm. The length of the coating can be 5-8 mm, such as 6.5 mm. The thickness of the silver electrode coating can be 0.05-0.1 mm, such as 0.06 mm.

[0036] In this embodiment, for example, the first electrode 63a and the second electrode 63b are both configured on the base board 61. The first electrode 63a and the second electrode 63b are configured on the same surface of the base board 61, which can be the first surface C or the second surface D. In other embodiments, the first electrode 63a and the second electrode 63b can also be configured on each surface respectively. For example, the first electrode 63a is configured on the first surface C, and the second electrode 63b is configured on the second surface D. It can be selected according to the requirements of the actual lead space needed. In other embodiments, the first electrode 63a and the second electrode 63b can be simultaneously configured on both surfaces of the base board 61. In this case, the number of the first electrode 63a and the second electrode 63b is two. In this way, the conductive compositions of the conductive ceramic can have a short current path close to both surfaces of the conductive ceramic, so that the temperature field on both surfaces of the heating unit 62 is more uniform. Meanwhile, it is not only convenient for welding, but also can increase the contact area with the heating unit 62 as much as possible to reduce the contact resistance. Therefore, when the heating unit 62 is electrified, it will generate less heat, thus reducing the temperature. Besides, while two surfaces of the heating unit 62 made of conductive ceramics are electrified at the same time, the same potential on both surfaces is formed, which evens the electric field generated by the conductive compositions between the two surfaces and then improves the heating effect.

[0037] In one embodiment, at least two heating units 62 are arranged in parallel between the first electrode 63a and the second electrode 63b. In this embodiment, since at least two heating units 62 are in parallel layout, the size of each heating unit 62 can be made small, so that each heating unit 62 can be supported without additional supporting bump 65 (see FIG. 4c below) needed in the holding slot 611 of the base board 61. The heating unit 62 can also have a good binding force with the base board 61. Moreover, the volume of the entire heating unit 62 can be smaller, thereby saving electric energy and facilitating manufacturing process. The first electrode 63a and the second electrode 63b are spaced in parallel, and extended from the first end M to the second end N of the base board 61. The three heating units 62 are arranged in parallel along the longitudinal direction of the baseboard 61 and spaced between the first electrode 63a and the second electrode 63b. And one end of each

heating unit 62 is electrically connected with the first electrode 63a and the other end is electrically connected with the second electrode 63b. In an embodiment, parts of the first electrode 63a and the second electrode 63b can be coated on the surface of the end of the heating unit 62, so as to realize the electrical connection between the heating unit 62 and the first electrode 63a and the second electrode 63b.

[0038] See FIGS. 4c and 5 for other embodiments, wherein FIG. 4c is a side view of the heating assembly provided in the third specific embodiment of this disclosure and FIG. 5 is a side view of the heating assembly provided in the fourth specific embodiment of this disclosure. A supporting bump 65 can also be configured on the inner wall surface of the holding slot 611 near the second surface of the base board 61. The heating unit 62 is specifically lapped on the surface of the supporting bump 65 far from the second surface of the base board 61. In this embodiment, the thickness of the heating unit 62 can be less than that of the base board 61. One side of the surface of the heating unit 62 is at a height even with the first surface C of the base board 61, while the other side is lower than the second surface D. The specific structure is shown in FIG. 4c. However, the thickness of the heating unit 62 can also be the same as that of the base board 61, and the two opposite surfaces of the heating unit 62 are flush with the first surface C and the second surface D of the base board 61 respectively. At the same time, the position corresponding to the supporting bump 65 on the heating unit 62 is provided with a yielding part, so that the heating unit 62 is lapped on the supporting bump 65, thereby preventing the heating unit 62 from falling off from the holding slot 611 of the base board 61. The specific structure is shown in FIG. 5.

[0039] Please refer to FIGS. 1a to 3 for the details. There can be three heating units 62, which are spaced along the longitudinal direction of the base board 61. The spacing distance L34 can be 2-3 mm, for example, 2.90 mm. The first connecting end E and the second connecting end F of the heating unit 62 are relatively arranged along the width direction of the base board 61. The three heating units 62 are contained in the holding slot 611 of the baseboard 61, as their structures are shown in FIG. 2 or FIG. 3. Their corresponding structures and dimensions are the same as those of the holding slot 611 shown in FIG. 2 and FIG. 3. Please refer to the above text for details. In this embodiment, at least the position of the base board 61 corresponding to the heating unit 62 is inserted into the aerosol forming substrate 67.

[0040] In this embodiment, the first electrode 63a and the second electrode 63b are both configured on the base board 61, and are both extended from the first end M of the base board 61 to a position near the second end N. The first electrode 63a and the second electrode 63b are located on the opposite sides of the heating unit 62. The first connecting end E and the second connecting end F of each heating unit 62 are extended to both sides of the base board 61 to connect with the first electrode 63a and

the second electrode 63b, respectively. Then a current loop is formed, and at the same time, each heating unit 62 is arranged in parallel. The thickness of silver coating can be 0.05-0.1mm, such as 0.06mm.

[0041] In an embodiment, as shown in FIG. 6, which is the side view of the heating assembly provided in an embodiment of this disclosure. At least one surface of the base board 61 is coated with a protective layer 64, which covers the heating unit 62, the first electrode 63a and the second electrode 63b. Thus, it can prevent the smoke formed during the tobacco heating period from damaging the first electrode 63a, the second electrode 63b and the heating unit 62. Furthermore, the protective layer 64 can also cover the entire base board 61, so that the entire heating assembly 60 has a smooth surface. The protective layer 64 can be a glass glaze layer.

[0042] The heating assembly 60 provided in this embodiment includes the base board 61 and the heating unit 62, and the tobacco is heated by the heating unit 62. Besides, by embedding the heating unit 62 in the base board 61, the strength of the heating assembly 60 can be effectively improved. Therefore, the heating assembly 60 can bear the force through the base board 61 when inserting into the tobacco, effectively avoiding the bending or fracture of the heating unit 62 due to the force. Compared with the existing resistance heating circuits printed or coated on the substrate, the base board 61 and heating unit 62 of this disclosure can directly and independently insert into the aerosol forming substrate 67. The heating unit 62 will not result in failure by falling off from the base board 61, when it is at high temperature or when base board 61 is deformed. The reliability of the heating assembly 60 is greatly improved. In addition, at least one electrode of the first electrode 63a and the second electrode 63b is extended from the first end M to the second end N of the base board 61, one of the first electrode 63a and the second electrode 63b is electrically connected with the first connecting end E of the heating unit 62, and the other electrode is electrically connected with the second connecting end F of the heating unit 62, so that a current loop is formed. Moreover, by configuring the protective layer 64, the tobacco oil formed during tobacco heating can be prevented from damaging the first electrode 63a, the second electrode 63b and the heating element 62.

[0043] A heating assembly 60 is provided in another embodiment, as shown in FIG. 7, which is the structural diagram of the heating assembly provided in the second embodiment of this disclosure. Different from the heating assembly 60 provided in the first embodiment, three heating units 62 are connected in series to form a heating element, and only one of the first electrode 63a and the second electrode 63b extends from the first end M to a position near the second end N of the base board 61. In an embodiment, the first electrode 63a can be extended from the first end M to a position near the second end N of the base board 61, while the second electrode 63b is arranged at the first end M of the base board 61 (see

FIG. 7). This example is shown in the following embodiment. Instead, the second electrode 63b can be extended from the first end M to a position near the second end N of the base board 61, while the first electrode 63a is arranged at the first end M of the base board 61.

[0044] See FIG. 7, in this embodiment, the number of heating unit 62 can be three. The second connecting end F of one heating unit 62 of two adjacent heating units 62 connects with the first connecting end E of the other heating unit 62 to form an integral bent heating element. One end of the heating element is connected with the first electrode 63a and the other end is connected with the second electrode 63b to form a whole current loop. In other embodiments, the first electrode 63a and the second electrode 63b can also both be extended to the position near the second end N of the base board 61. This is not limited in this embodiment, as long as one end of the heating element is connected with the first electrode 63a and the other end is connected with the second electrode 63b.

[0045] Compared with the first embodiment, strength of the heating assembly 60 provided in this embodiment is effectively improved, so that it can bear the force through the base board 61 during the insertion of tobacco, and effectively prevent the heating unit 62 from being bent caused by the force. Meanwhile, it is not necessary to extend the second electrode 63b to a position near the second end N of the base board 61, which simplifies the manufacturing process and lowers the cost. The way that at least two heating units 62 are linked into a entire heating element so as to connect with the first electrode 63a and the second electrode 63b can avoid failure caused by poor contact between part of the heating unit 62 and the first electrode 63a and/or the second electrode 63b.

[0046] In another embodiment, as shown in FIG. 8a, which is the structural diagram of the heating assembly provided in the third embodiment of this disclosure. Different from the heating assembly 60 provided in the first and the second embodiment, the heating unit 62 is extended along the longitudinal direction of the base board 61. One of the first electrode 63a and the second electrode 63b is located on the base board 61 and extended from the first end M to a position near the second end N, and is electrically connected with the second connecting end F of the heating unit 62, while the other electrode is located at the first connecting end E of the heating unit 62.

[0047] In this embodiment, the heating unit 62, bearing a long stripped structure, is extended from the first end M to a position close to the second end N of the base board 61. The part of the heating unit 62 close to the first end M defines its first connecting end E, and the part of the heating unit 62 close to the second end N defines its second connecting end F. In one embodiment, of the first electrode 63a and the second electrode 63b, the first electrode 63a is extended from the first end M to the second end N of the base board 61 to electrically connect with the second connecting end F of the heating unit 62, and the second electrode 63b is located at the first con-

nection end E of the heating unit 62. In an embodiment, as shown in FIG. 8b, which is a side view of the heating assembly provided in the fifth specific embodiment of this disclosure. The position of the heating unit 62 corresponding to the second electrode 63b is lower than the surface of the base board 61 to form a groove. The second electrode 63b is formed in this groove.

[0048] Please refer to FIG. 8a for a specific embodiment. The first electrode 63a includes a first electrode part 63a₁ and a second electrode part 63a₂ vertical to each other. The first electrode part 63a₁ is configured on one side of the base board 61 coupled to the first surface C, and the first electrode part 63a₁ extends from the first end M of the base board 61 to a position near the second end N. The second electrode part 63a₂ is electrically connected with an end of the first electrode portion 63a₁, wherein the end is close to near the second end N, and the second electrode part 63a₂ is configured on the first surface C of the base board 61 and close to the second end N, and the second electrode part 63a₂ is electrically connected with the second connecting end F.

[0049] In this embodiment, the heating unit 62 includes a first heating area A and a second heating area B coupled to the first heating area A. The first heating area A is the main atomization area when heated after being inserted into tobacco. The atomization temperature of the first heating area A is mainly from 280°C to 350 °C, and the first heating area A accounts for 75% or more than 75% of the whole atomization area. The second heating area B is the main matching section of the heating unit 62, and the temperature is 150°C or below 150°C. In an embodiment, the second electrode 63b is configured at the second heating area B of the heating unit 62, so as to reduce the atomization temperature of this heating unit 62 made of ceramics. The ratio of the heating temperature of the first heating area A to that of the second heating area B of the heating unit 62 is greater than 2.

[0050] In an embodiment, the resistivity of the material of the heating unit 62 configured at the second heating area B is less than that of the material of the heating unit 62 configured at the first heating area A, so as to ensure that the temperature of the first heating area A of the heating unit 62 is greater than that of the second heating area B. Meanwhile, materials in different heating areas are with different resistivity, so that the temperature of different heating areas can be controlled through the difference of resistivity. Specifically, the main compositions of the ceramic materials of the first heating area A and the second heating area B of the heating unit 62 are basically the same and are integrally molded together. While the proportion of the ceramic materials of the first heating area A and the second heating area B are different or some other compositions are different, resulting in that the resistivity of the first heating area A is different from that of the second heating area B. Compared with the prior art, different conductive materials are adopted in the first heating area A and the second heating area B, such as aluminum film or gold film. The scheme of

splicing two different conductive materials can effectively avoid the problem of conductor fracture of the first heating area A and the second heating area B of the heating unit 62.

[0051] Please refer to FIG. 9, which is the side view of the heating assembly provided in the sixth specific embodiment of this disclosure. In this embodiment, in order to ensure the binding force between the heating unit 62 and the base board 61 and prevent the heating unit 62 from falling off from the holding slot 611 of the base board 61, a supporting bump 65 thinner than the heating unit 62 in its height direction can be configured on the inner wall of the second surface D near the base board 61 of the holding slot 611. The specific structure can be seen in FIG. 9. In one embodiment, the thickness H of the heating unit 62 can be 0.4-0.5 mm, for example, 0.4 mm. The resistance can be 0.3-1 ohm, such as 0.6 ohm. The resistivity can be 1×10^{-4} to 3×10^{-4} ohm, for example, 2×10^{-4} ohm. The power can be 1 W to 3 W, such as 2.5 W.

[0052] In this embodiment, at least part or all of the first heating area A of the base board 61 corresponding to the heating unit 62 is inserted into the aerosol forming substrate 67. In other embodiments, some parts of the second heating area B of the base board 61 corresponding to the heating unit 62 can also be inserted into the aerosol forming substrate 67.

[0053] Compared with the second embodiment, the heating assembly 60 provided in this embodiment differs in that: By extending the first electrode 63a to the position near the second end N of the base board 61, the first electrode 63a can be connected with the second connecting end F of the heating unit 62. By directly configuring the second electrode 63b on the first connecting end E of the heating unit 62, a current loop is formed between the first connecting end E and the second connecting end F of the heating unit 62 while ensuring their effective connection. The first electrode part 63a₁ of the second electrode 63b is configured on one side of the base board 61 to effectively improve the utilization rate of the surface of the base board 61 while preventing short circuit problems caused by the first electrode part 63a₁ and the heating unit 62.

[0054] In another embodiment, as shown in FIG. 10, which is the structural diagram of the heating assembly provided in the fourth embodiment of this disclosure. Different from the third embodiment, the first electrode part 63a₁ is configured on the first surface C of the base board 61 and electrically connected with the second electrode part 63a₂ arranged near the second end N of the base board 61, thereby realizing electrical connection with the second connecting end F of the heating element 62. In this embodiment, the second electrode 63b is also arranged at the first connecting end E of the heating unit 62.

[0055] Compared with the third embodiment, by configuring the first electrode 63a₁ on the first surface C of the base board 61, the heating assembly 60 provided in this embodiment can not only ensure that the first electrode 63a and the second electrode 63b can connect with

the heating unit 62, but also ensure that the first electrode 63a₁ and the heating unit 62 will not have a short circuit problem. Moreover, it can prevent the tobacco oil formed when heating the tobacco from penetrating into the gap between the first electrode part 63a₁ and the side surface of the base board 61 due to gravity, thereby affecting the binding force between the two. The binding strength between the second electrode part 63a₂ and the base board 61 is effectively guaranteed. In addition, it can further reduce the volume of the heating assembly 60.

[0056] In this embodiment, as shown in FIG. 11, which is the side view of the heating assembly provided in the seventh embodiment of this disclosure. In order to ensure the binding force between the heating unit 62 and the base board 61 and prevent the heating unit 62 from falling off from the holding slot 611 of the base board 61, a supporting bump 65 can be configured on the inner wall surface of the holding slot 611 of the heating unit 62. See FIG. 11 for the specific structure. In an embodiment, the supporting bump 65 can be integrally molded with the base board 61 to provide support strength.

[0057] Please refer to FIG. 12, which is the structural diagram of the electronic atomization device provided by an embodiment of this disclosure. In this embodiment, an aerosol generating device 600 is provided. The aerosol generating device 600 includes a housing 601 and a heating assembly 60, a mounting base 70 and a power supply assembly 80 located in the housing 601.

[0058] The heating assembly 60 can be one provided by any of the above embodiments, and its specific structure and function can be referred to the above related text. The heating component 60 is configured on the mounting base 70 and fixedly installed on the inner wall surface of the housing 601 through the mounting base 70. The power supply assembly 80 is connected to the heating assembly 60 to supply power to the heating assembly 60. In one embodiment, the power supply assembly 80 can be a rechargeable lithium-ion battery.

[0059] The specific structure of the heating assembly 60 installed on the mounting base 70 can be seen in FIGS. 1a, 7 and 8a. Please refer to FIG. 1a for details: the mounting base 70 includes a mounting body 71 and a mounting hole 72. The heating assembly 60 is inserted into the mounting hole 72 to be fixed with the mounting base 70. The part of the base board 61 without heating unit 62 is inserted into the mounting hole 72 of the mounting base 70.

[0060] When the heating assembly 60 is of the structure shown in FIG. 8a, the second heating area B of the heating assembly 60 is inserted into the mounting hole 72 to be fixed with the mounting base 70. After inserting into the tobacco, the end of the tobacco contacts the upper surface of the mounting base 70. The side wall of the mounting hole 72 is provided with an avoidance groove through which the electrode lead 66 is extended into the mounting base 70 to connect with the first electrode 63a and the second electrode 63b. Further, referring to FIG. 8a, the mounting body 71 is also provided with at least

two clamping parts 73, through which the mounting base 70 is fixed with the housing 601 of the aerosol generating device 600.

[0061] Referring to FIG. 8a, one side of the mounting body 71 can also be provided with an extension slot 74 which is joined with the installation hole 72. The extension slot 74 can be opened on the side surface of the second end N opposite to the base board 61, and is consistent with the shape of the part of the heating assembly 60 inserted into the mounting base 70. For example, if the shape of the part of the heating assembly 60 inserted into the mounting base 70 is rectangular, the shape of the extension slot 74 is also rectangular. In addition, the extension slot 74 matches the size of the part of the heating assembly 60 inserted into the mounting base 70, so as to reinforce the part of the heating assembly 60 to prevent its fracture. In an embodiment, the mounting base 70 is provided with two extension slots 74, which are arranged vertically and crosswise.

[0062] The mounting base 70 can be made of organic or inorganic materials with a melting point higher than 160 degrees, for example, PEEK. The mounting base 70 can be glued to the heating assembly 60 through adhesive, which can be a high temperature resistant glue.

[0063] The aerosol generating device 600 provided in this embodiment comprises a heating assembly 60. The heating assembly 60 includes a base board 61 and a heating unit 62, and the tobacco is heated by the heating unit 62. Meanwhile, the heating unit 62 is embedded in the base board 61, effectively improving the strength of the heating assembly 60. Moreover, the base board 61 is to bear the force when inserting the assembly 60 into the tobacco, effectively avoiding the bending problem of the heating unit 62 due to the force. Compared with the existing resistance heating circuits formed by screen-printing or coating on the substrate, the base board 61 and heating unit 62 of this disclosure can directly and independently insert into the aerosol forming substrate 67. The heating unit 62 will not fall off from the base board 61 during high temperature heating, which will lead to failure, thus greatly improving the reliability of the heating assembly 60. In addition, by configuring the first electrode 63a and the second electrode 63b, and extending at least one electrode of the first electrode 63a and the second electrode 63b from the first end M to the second end N of the base board 61, one of the first electrode 63a and the second electrode 63b is electrically connected with the first connecting end E of the heating unit 62, and the other electrode is electrically connected with the second connecting end F of the heating unit 62. Therefore, the heating unit 62 forms a current loop. In this way, the short circuit problem can be avoided, the process is simple, and the strength of the heating assembly 60 is high.

[0064] The above shows only embodiments of the present disclosure, but does not limit the scope of the present disclosure. Any equivalent structure or equivalent process transformation made based on the specification and the accompanying drawings of the present

disclosure, applied directly or indirectly in other related arts, shall be included in the scope of the present disclosure.

Claims

1. A heating assembly, comprising:

a base board, applicable for at least being partially inserted into an aerosol forming substrate, and comprising a first end and a second end; at least one heating unit, embedded in the base board, and comprising a first connecting end and a second connecting end opposite to the first connecting end;

a first electrode and a second electrode, wherein at least one electrode of the first electrode and the second electrode is extended from the first end towards the second end, one electrode of the first electrode and the second electrode is electrically connected with the first connecting end, and the other electrode of the first electrode and the second electrode is electrically connected with the second connecting end; and wherein the at least one heating unit is applicable for being inserted into the aerosol forming substrate and to be heated by the power supply provided by the first electrode and the second electrode.

2. The heating assembly according to claim 1, wherein at least one electrode of the first electrode and the second electrode is formed on the surface of the base board and electrically connected with the heating unit.

3. The heating assembly according to claim 2, wherein each of the first electrode and the second electrode comprise a first part and a second part, wherein the first part of at least one electrode of the first electrode and the second electrode is formed on the surface of the base board, and the second part of the at least one electrode is formed on the surface of the heating unit.

4. The heating assembly according to claim 2, wherein a first groove is configured at the position, where the base board corresponds to the first part of the electrode, and the first part of the electrode is located in the first groove; a second groove is configured at the position, where the heating unit corresponds to the second part of the electrode, and the second part of the electrode is located in the second groove.

5. The heating assembly according to claim 4, wherein the thickness of the first part of the electrode is the same as the depth of the first groove, and the thick-

ness of the second part of the electrode is the same as the depth of the second groove.

6. The heating assembly according to claim 3, wherein the first electrode and the second electrode respectively further comprises a third part, and the third part of at least one electrode of the first electrode and the second electrode is extended to the side surface of the heating unit abutting the base board.

7. The heating assembly according to claim 1, wherein at least one of the first electrode and the second electrode, extends from the first end to a position near the second end.

8. The heating assembly according to claim 7, wherein the base board is made of insulating ceramic and is provided with a holding slot, and the heating unit is made of conductive ceramic and embedded in the holding slot.

9. The heating assembly according to claim 8, wherein the holding slot is a through hole running through the base board, and the heating unit is exposed to two opposite surfaces of the base board.

10. The heating assembly according to claim 7, wherein both of the first electrode and the second electrode are extended from the first end to a position near the second end of the base board, the number of the heating unit is at least two, the at least two heating units are spaced along the longitudinal direction of the base board, and the at least two heating units are arranged in parallel between the first electrode and the second electrode.

11. The heating assembly according to claim 10, wherein the heating unit is a stripped structure and in a bending or curving shape.

12. The heating assembly according to claim 7, wherein only one of the first electrode and the second electrode extends from the first end of the base board to a position near the second end, the number of the heating units is at least two, and the at least two heating units are disposed in series between the first electrode and the second electrode.

13. The heating assembly according to claim 7, wherein, of the first electrode and the second electrode, only the first electrode is extended from the first end of the base board to a position near the second end; and wherein the heating unit is extended from the first end of the base board to a position near the second end.

14. The heating assembly according to claim 13, wherein the first electrode comprises a first electrode part

and a second electrode part vertical to each other;

wherein the first electrode part is configured on one side of the base board, wherein the side is coupled to the first surface, and the first electrode part extends from the first end of the base board to a position near the second end; the second electrode part is electrically connected with an end of the first electrode part, wherein the end is close to the second end, and the second electrode part is configured on the first surface of the base board and close to the second end, and so the second electrode part is electrically connected with the second connecting end; the second electrode is configured at the first connecting end of the heating unit and electrically connected with the first connecting end.

15. The heating assembly according to claim 14, wherein the entire second electrode is configured at the heating unit, the position of the heating unit corresponding to the second electrode is lower than the surface of the base board to form a groove, and the second electrode is formed in the groove.
16. The heating assembly according to claim 15, wherein the heating unit comprises a first heating area and a second heating area coupled to the first heating area, the first electrode is configured on the second heating area of the heating unit, and the second electrode part is electrically connected with the second connecting end located in the first heating area of the heating unit; and wherein the ratio of the heating temperature of the first heating area to that of the second heating area is greater than 2.
17. The heating assembly according to claim 1, further comprising a protective layer coated on the surface of the base board and covers the heating unit, the first electrode and the second electrode.
18. The heating assembly according to claim 1, wherein the heating unit comprises main compositions and crystal compositions; the main compositions are selected from one or more of the following: manganese, strontium, lanthanum, tin, antimony, zinc, bismuth, silicon and titanium; and the crystal compositions are selected from one or more of the following: lanthanum manganate, strontium lanthanum manganate, tin oxide, zinc oxide, antimony oxide, bismuth oxide, silicon oxide and yttrium oxide.
19. The heating assembly according to claim 1, wherein the heating unit has a first heating surface and a second heating surface opposite to the first heating surface; the first heating surface is at a height even with the first surface of the base board, or is recessed

to or protruded from the first surface of the base board; the second heating surface is at a height even with the second surface of the base board, or is recessed to or protruded from the second surface of the base board.

20. An aerosol generating device, comprising a housing, a heating assembly and a power supply assembly, wherein the heating assembly and the power supply assembly are configured in the housing, the power supply assembly is connected to the heating unit for supplying power to the heating unit, and the heating assembly is the heating assembly according to claim 1.

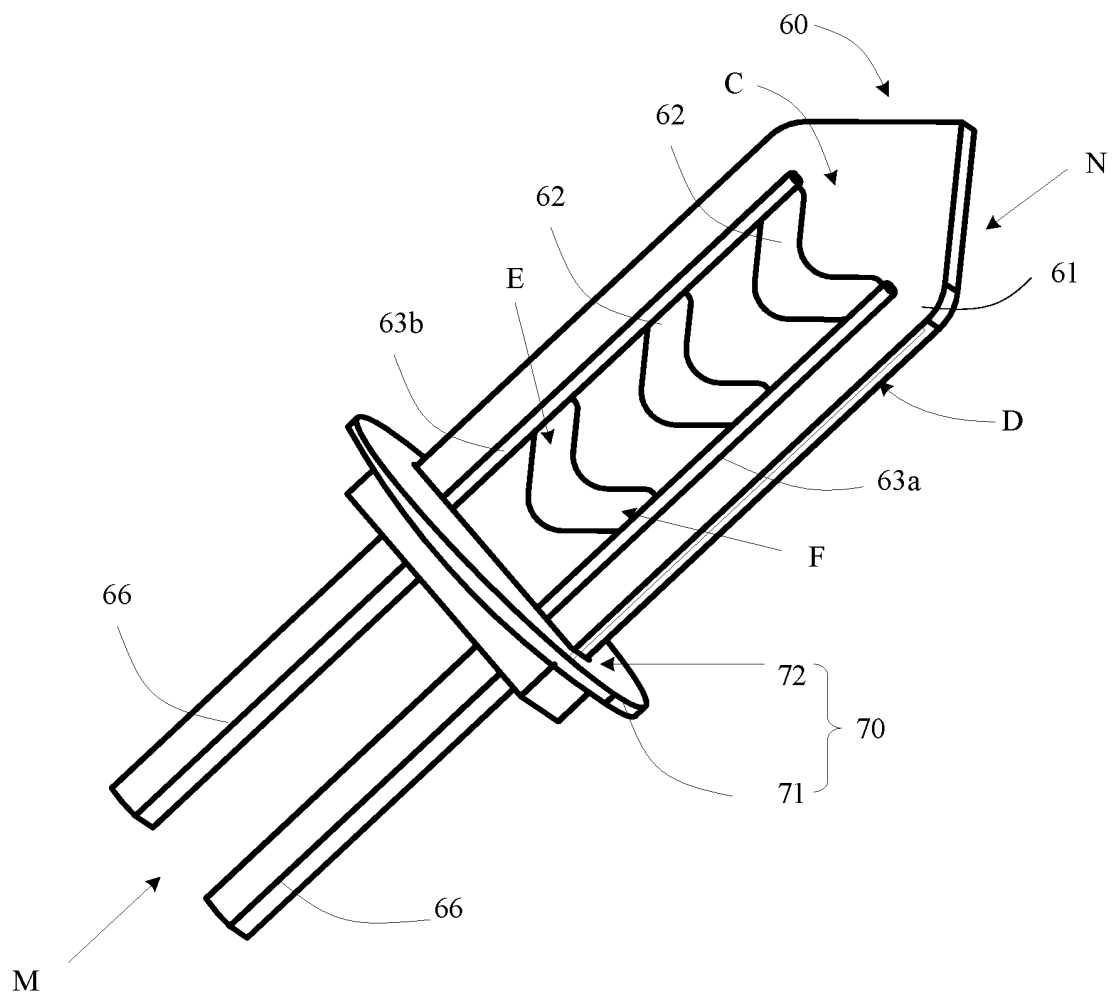


FIG. 1a

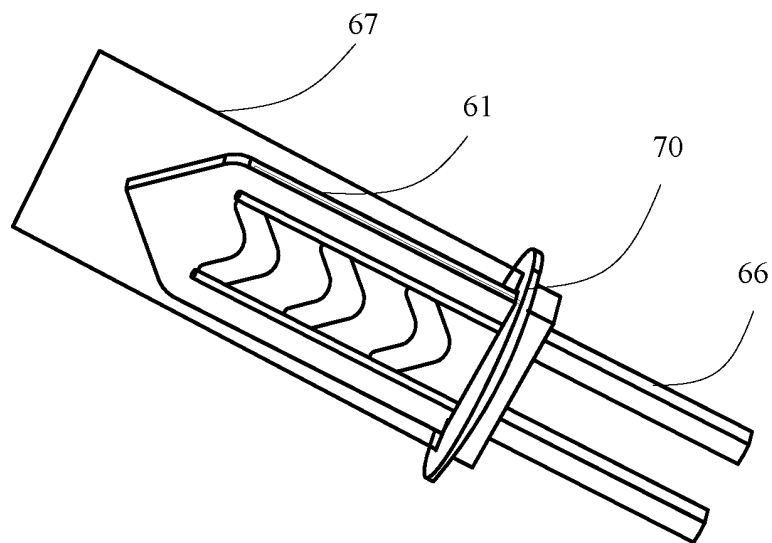


FIG. 1b

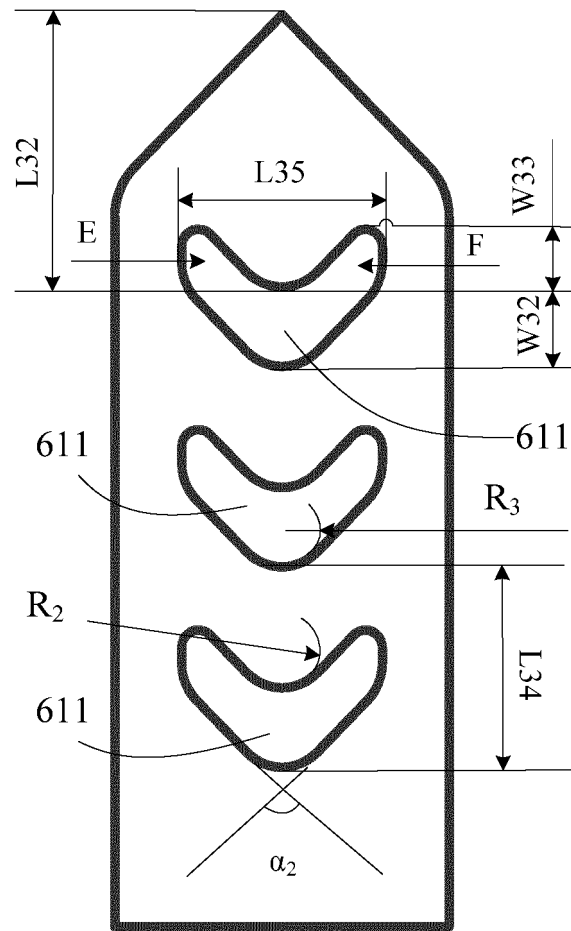


FIG. 2

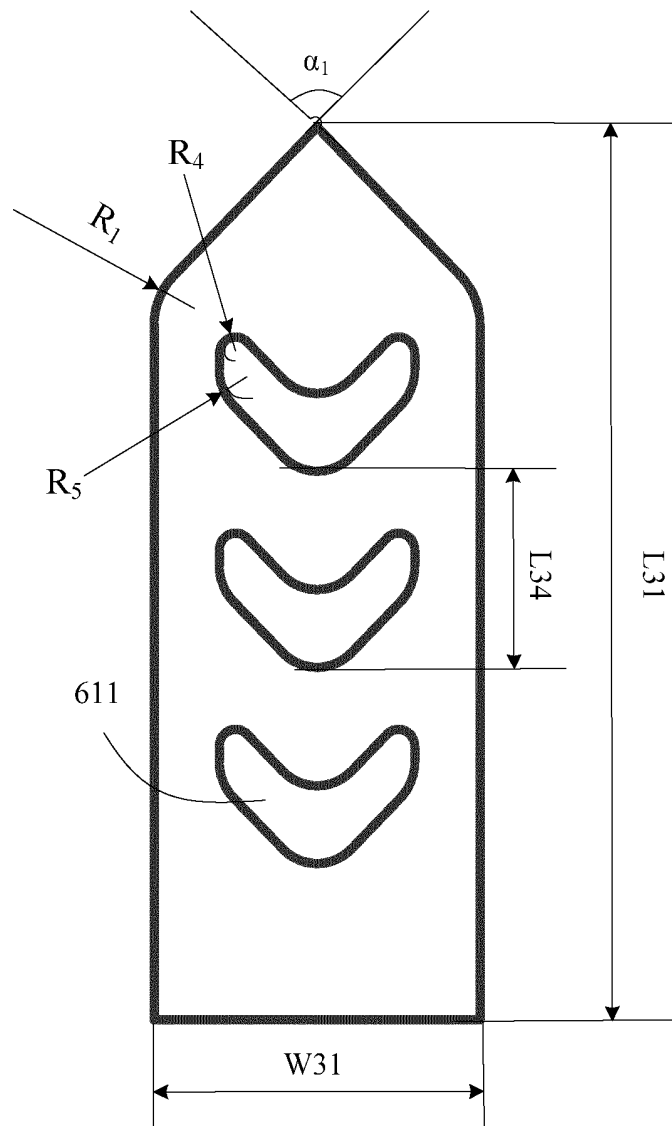


FIG. 3

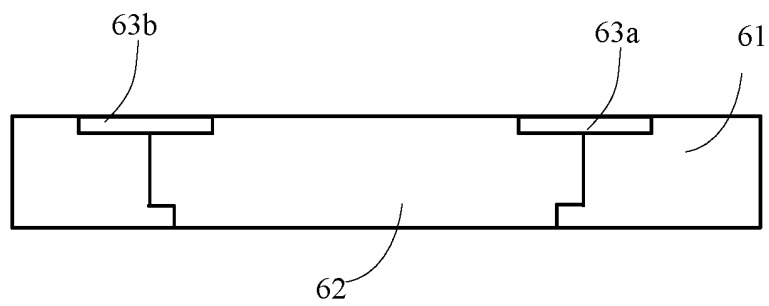


FIG. 4a

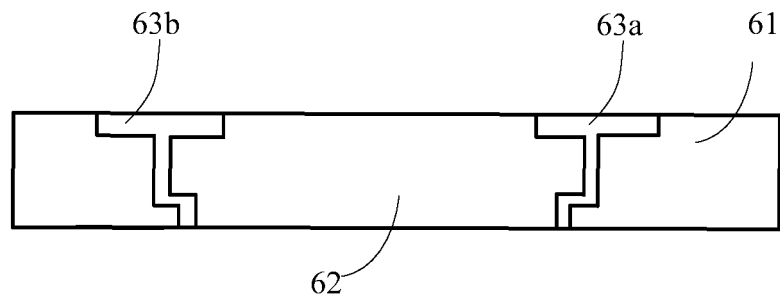


FIG. 4b

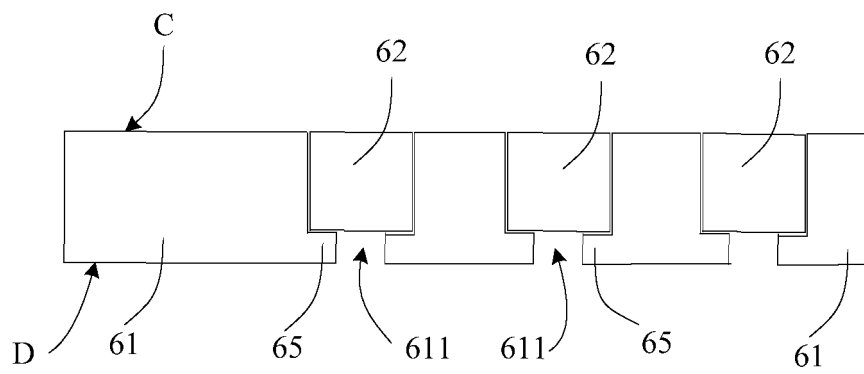


FIG. 4c

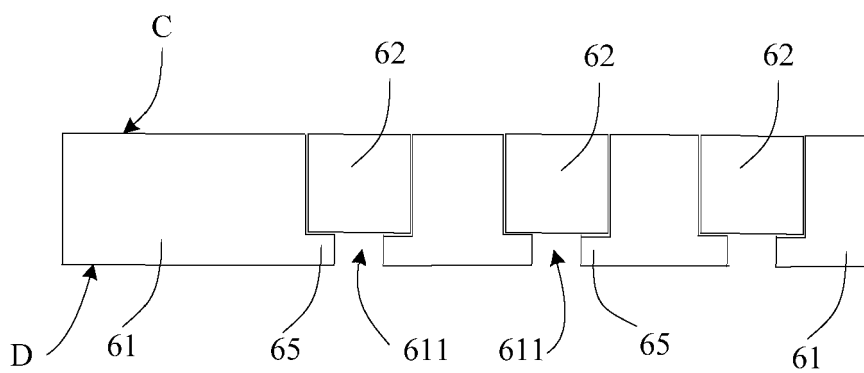


FIG. 5

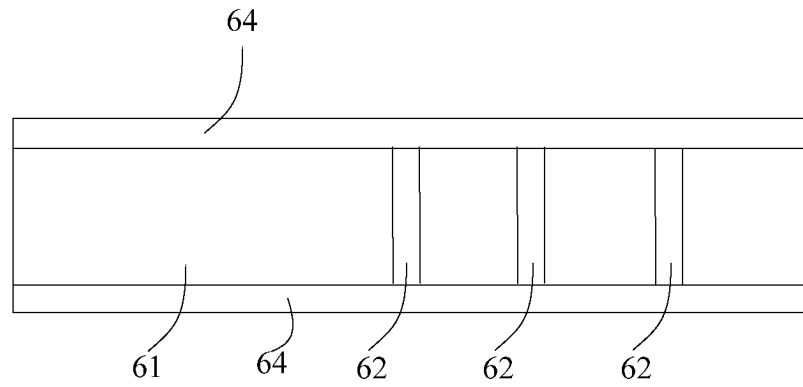


FIG. 6

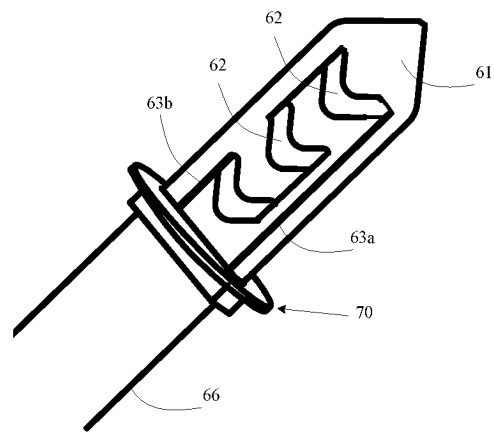


FIG. 7

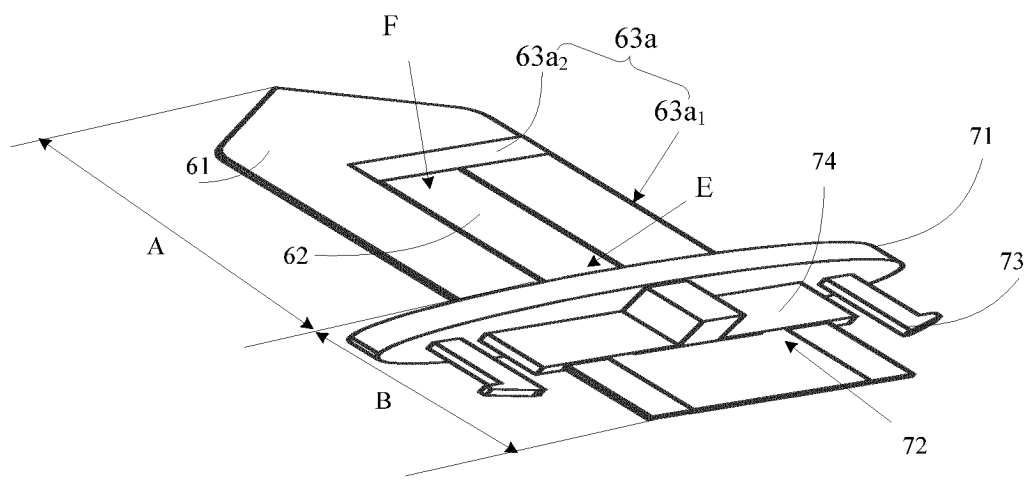


FIG. 8a

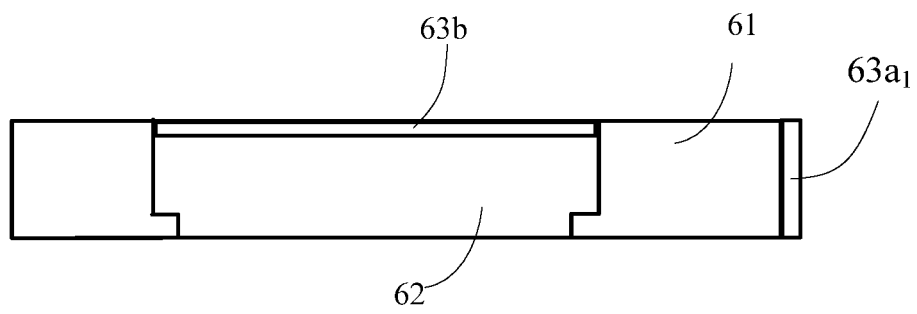


FIG. 8b

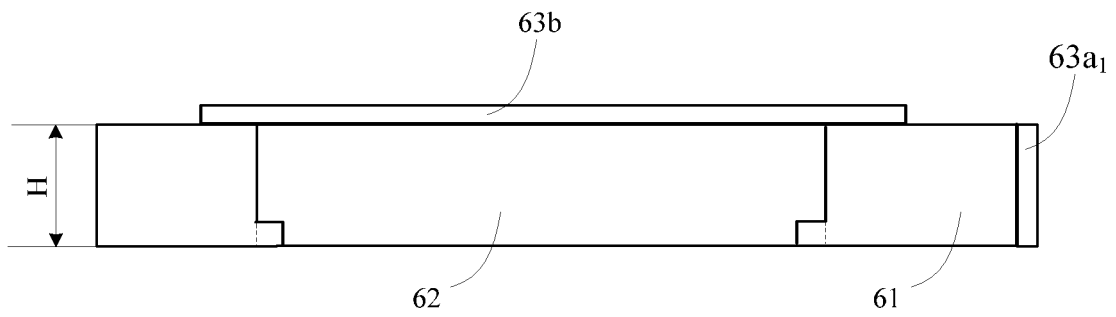


FIG. 9

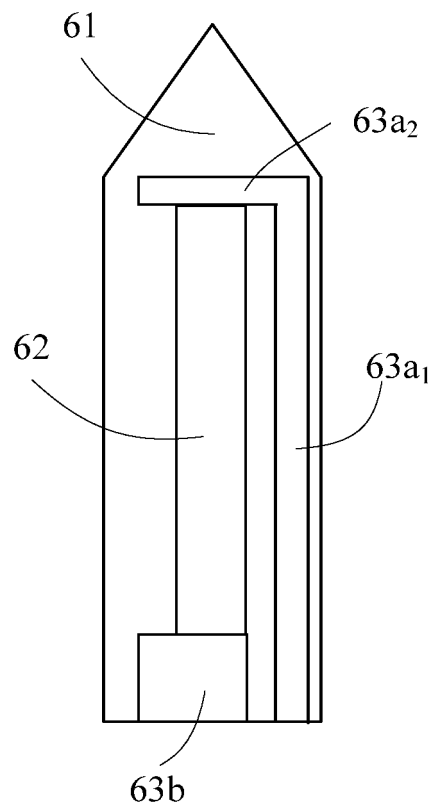


FIG. 10

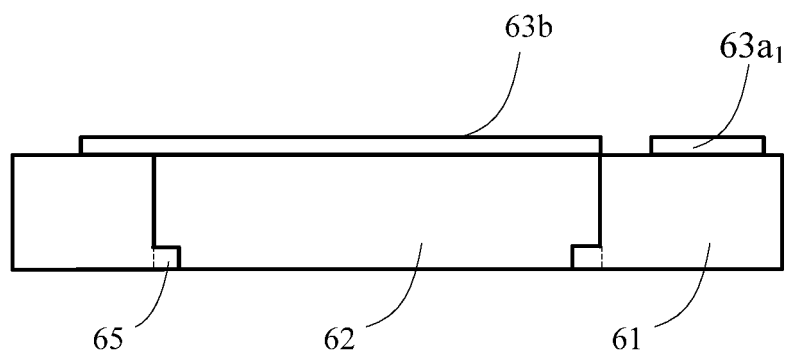


FIG. 11

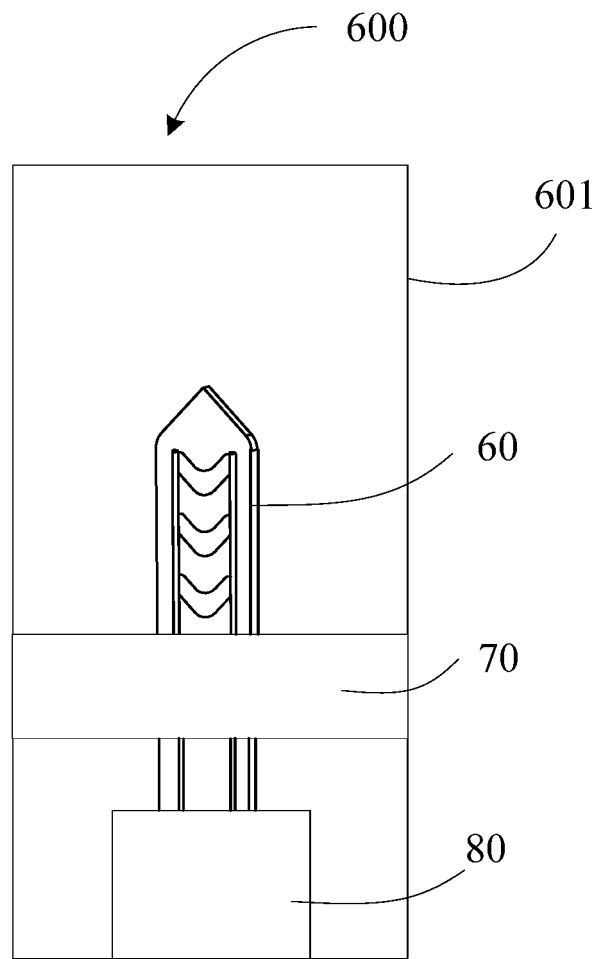


FIG. 12

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2021/096133

5	A. CLASSIFICATION OF SUBJECT MATTER A24F 40/46(2020.01)i According to International Patent Classification (IPC) or to both national classification and IPC	
10	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	
15	Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) CNPAT, CNKI, WPI, EPODOC: 气溶胶, 不燃烧, 非燃烧, 烘烤, 低温, 加热, 发热, 槽, 嵌, 基板, 基体, 基材, 基底, 电极, 正极, 负极, 片, aerosol, non-burning, low temperature, bake, heating, sheet, groove, embed, substrate, base, electrode, anode, cathode	
20	C. DOCUMENTS CONSIDERED TO BE RELEVANT	
25	Category*	Citation of document, with indication, where appropriate, of the relevant passages Relevant to claim No.
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35	X	CN 111035070 A (SHENZHEN MAISHI TECHNOLOGY CO., LTD.) 21 April 2020 (2020-04-21) description, paragraphs [0042]-[0064], and figures 1-6 1, 18, 20
40	X	CN 109068417 A (VAPETALK ELECTRONIC TECHNOLOGY (SHENZHEN) COMPANY LIMITED.) 21 December 2018 (2018-12-21) description, paragraphs [0043]-[0073], [0076]-[0079], figures 1-4, 6 1, 18, 20
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50	A	CN 111134374 A (SHENZHEN BUDDY TECHNOLOGY DEVELOPMENT CO., LTD.) 12 May 2020 (2020-05-12) entire document 1-20
55	☒ Further documents are listed in the continuation of Box C. ☒ See patent family annex.	
	* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family
	Date of the actual completion of the international search 04 August 2021	Date of mailing of the international search report 23 August 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.

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INTERNATIONAL SEARCH REPORT

International application No.

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A	WO 2020017696 A1 (MTIG et al.) 23 January 2020 (2020-01-23) entire document	1-20

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