

ATOMIZING DEVICE, ATOMIZING ASSEMBLY, AND MANUFACTURING PROCESS OF ATOMIZING ASSEMBLY

FIELD

[1] The present invention relates to the technical field of electronic cigarette sets, and more specifically, to an atomizing dev

[2] ice, an atomizing assembly, and a manufacturing process of the atomizing assembly.

BACKGROUND

[3] The electric heating atomization technology is to use the electric energy to heat atomizable liquid to make it reach the boiling point to produce aerosol to be mixed with air.

[4] The atomizing core is the core part of the atomizer, and the key of the atomizing core is the matching and consistency of the liquid conducting material and the heating material. The heating member and the liquid conducting material should be well bonded. While if the heating member meets the resistance requirement, it generally has a poor strength and is prone to deformation.

[5] Different from other electric heating methods, due to the fact that the electronic atomizing device is limited by the volume and the usage scenario, the characteristics of the use of the device are: the working time of each time is short (since the smoking of the user usually is generally within 5 seconds), and the use frequency is high (may be used more than 100 to 200 times a day). The principle of the electronic atomizing device is to heat the atomizable liquid to evaporate it instantaneously at a high temperature. Therefore, it is required that the working of the heating member can reach the boiling point of the atomizable liquid instantaneously. The main components of the atomizable liquid are propylene glycol and glycerol, and the boiling point of the mixed liquid is about 230 degrees Celsius.

[6] However, limited to these conditions, the material selection of the heating member is generally thin (generally a round wire with a diameter of 0.2 mm, that is, a cross-sectional area of 0.0314 mm²), so that the strength of the heating member is weak, and it is difficult to have a supporting force to ensure the contact between the heating member and the liquid conducting cotton. Therefore, the wire is often wound into a spiral shape in the industry, but there is still a problem of poor contact, and dry burning is easy to occur.

SUMMARY

[7] A technical problem to be solved by the present invention is, in view of the defects of the poor contact and the easy dry burning of the heating member and the liquid conducting cotton in the prior art, to provide an atomizing device, an atomizing assembly, and a manufacturing process of the atomizing assembly.

[8] A technical solution adopted by the present invention to solve the technical problem is, to provide an atomizing assembly, including a first liquid conducting member, a heating assembly and an electrode; wherein,

[9] the first liquid conducting member is flexible and configured for adsorbing an atomizable medium,

[10] the heating assembly is fixed to the first liquid conducting member through sewing, and

[11] the electrode is connected to the heating assembly, so that the heating assembly heats and atomizes the atomizable medium in the first liquid conducting member when electrified.

[12] In some embodiments, the heating assembly includes a first wire and a second wire that are flexible, the second wire is electrically conductive, and the first wire and the second wire are respectively sewn to the first liquid conducting member from two opposite sides of the first liquid conducting member and are interwoven with each other.

[13] In some embodiments, an interwoven position of the second wire and the first wire is in the first liquid conducting member or is flush with a surface of the first liquid conducting member.

[14] In some embodiments, the first wire is electrically conductive, and the resistance of the second wire is smaller than the resistance of the first wire.

[15] In some embodiments, the heating assembly includes a second wire interposed in the first liquid conducting member, and the second wire is electrically conductive.

[16] In some embodiments, the second wire is interposed between two opposite sides of the first liquid conducting member.

[17] In some embodiments, the second wire includes at least one heating section, and the heating section includes a first section located on a first surface of the first liquid conducting member, a second section interposed in the first liquid conducting member and a third section located on a second surface of the first liquid conducting member.

[18] In some embodiments, the heating assembly includes a heating member and a fixing thread that is sewn to the first liquid conducting member to fix the heating member.

[19] In some embodiments, the heating member includes at least one heating circuit, and the electrode includes a first electrode and a second electrode that are respectively connected to two ends of the heating circuit.

[20] In some embodiments, the heating member further includes a number of support portions connected to the at least one heating circuit respectively, and the fixing thread is sewn to the support portions.

[21] In some embodiments, the shape of the heating member is one or a combination of a mesh shape, a linear shape, or a sheet shape.

[22] In some embodiments, the electrode and the heating member are in an integral structure, or the electrode is formed by sewing a conductive wire to the first liquid conducting member.

[23] An atomizing device is provided, including the atomizing assembly.

[24] A manufacturing process of an atomizing assembly is provided, including the following steps:

[25] providing a liquid conducting substrate that is flexible; and

[26] sewing a heating assembly to the liquid conducting substrate.

[27] In some embodiments, the manufacturing process further includes the following steps:

[28] providing a first wire and a second wire that are flexible, the second wire electrically conductive, and sewing the first wire and the second wire to the liquid conducting substrate from two opposite sides of the liquid conducting substrate to be interwoven with each other to form the heating assembly.

[29] In some embodiments, the manufacturing process further includes the following steps:

[30] providing a second wire that is flexible and electrically conductive, and interposing and sewing the second wire on the liquid conducting substrate to form the heating assembly.

[31] In some embodiments, a heating member and a fixing thread are provided, and the heating member are sewn and fixed on the liquid conducting substrate by the fixing thread to form the heating assembly.

[32] In some embodiments, the heating assembly is provided with an electrode, a number of heating assemblies are sewn on the liquid conducting substrate in a zoned manner, and the atomizing assembly with the heating assembly and the electrode is formed by slitting; or,

[33] a number of heating assemblies on the liquid conducting substrate in a zoned manner, and electrodes corresponding to various heating assemblies are provided on the liquid conducting substrate, and the atomizing assembly with the heating assembly and the electrode is formed by slitting.

[34] The implementation of the atomizing device, the atomizing assembly, and the manufacturing process of the atomizing assembly in the present invention provides the following beneficial effects: the heating assembly of the atomizing assembly can be manufactured to the first liquid conducting member through sewing, the production is relatively simple and easy to implement,

the heating material is fixed to the liquid conducting substrate based on the sewing principle, to form the atomizing assembly with good reliability, easy to batch production, and having good contact between the heating and the liquid conducting substrate, and the problems that the flexible liquid conducting substrate such as the liquid conducting cotton, is prone to being in poor contact with the heating assembly during application to result in dry burning, the heating assembly is prone to deformation, and taking is difficult during assembly, are solved.

BRIEF DESCRIPTION OF THE DRAWINGS

[35] Subject matter of the present invention will be described in even greater detail below based on the exemplary figures. In the accompanying drawings:

[36] Fig. 1 is a three-dimensional structural diagram of an atomizing assembly when a first wire and a second wire are sewn to a first liquid conducting member in a first embodiment of the present invention;

[37] Fig. 2 is a sectional schematic diagram of the atomizing assembly in Fig. 1;

[38] Fig. 3 is a three-dimensional structural diagram of an atomizing assembly in a second embodiment of the present invention;

[39] Fig. 4 is a sectional structural diagram of the atomizing assembly in Fig. 3;

[40] Fig. 5 is an exploded diagram of the second wire, the electrode and the conductive layer in Fig. 3;

[41] Fig. 6 is a schematic diagram showing that when the second wire adopts another sewing method in the second embodiment;

[42] Fig. 7 is a sectional schematic diagram of the atomizing assembly in Fig. 6;

[43] Fig. 8 is a three-dimensional schematic diagram of an atomizing assembly in another embodiment, wherein the first liquid conducting member includes three layers of liquid conducting layers and the second wire is flush with the atomizing surface on which it is located;

[44] Fig. 9 is a sectional schematic diagram of the atomizing assembly in Fig. 8;

[45] Fig. 10 is a schematic diagram of the first wire and the second wire after sewing in Fig. 8;

[46] Fig. 11 is a schematic diagram showing that when two second wires are bent back and forth to make the two second wires crossed;

[47] Fig. 12 is a schematic diagram showing that when two second wires are bent back and forth to make the two second wires parallel and side by side;

[48] Fig. 13 is a schematic diagram of cutting the atomizing assembly after the first wire, the second wire, and the electrode are sewn to the liquid conducting cotton;

[49] Fig. 14 is a schematic diagram of sewing the first wire, the second wire and the electrode after sewing the support line on the first liquid conducting cotton;

[50] Fig. 15 is a schematic diagram showing that the support line supports the second wire in Fig. 14;

[51] Fig. 16 is a three-dimensional schematic diagram of an atomizing assembly in a third embodiment;

[52] Fig. 17 is an exploded diagram of the atomizing assembly in Fig. 16;

[53] Fig. 18 is a sectional schematic diagram of the atomizing assembly in Fig. 16; and

[54] Fig. 19 is a schematic diagram of the atomizing assembly when the heating member thereof is meshed in the third embodiment.

DETAILED DESCRIPTION

[55] For better understanding of the technical features, objects and effects of the present invention, the specific embodiments of the present invention will be described in detail with reference to the accompanying drawings.

[56] An atomizing device in a preferred embodiment of the present invention includes an atomizer and a battery assembly. The atomizer includes a housing, and a liquid storage cavity and an atomizing assembly 10 that are arranged in the housing. The liquid storage cavity is configured to store an atomizable medium. The atomizing assembly 10 can adsorb the atomizable medium. When the atomizing assembly 10 is electrified by the battery assembly, the atomizable medium on the atomizing assembly 10 can be heated to generate aerosols to flow out.

[57] As shown in Fig. 1 to Fig. 7, the atomizing assembly 10 includes a first liquid conducting member 11, a heating assembly, and an electrode. The first liquid conducting member 11 is made of a flexible material. Generally, the first liquid conducting member 11 is provided with holes, or is made of woven material, and is configured to adsorb the atomizable medium. The heating assembly is fixed to the first liquid conducting member 11 through sewing, and the electrode is electrically connected to the heating assembly. When the electrode is energized, the heating assembly is energized to generate heat to atomize the atomizable medium on the first liquid conducting member 11.

[58] In some embodiments, the first liquid conducting member 11 includes an atomizing surface A and an liquid inlet surface B. Generally, the atomizing surface A and the liquid inlet surface B are located on two opposite sides of the first liquid conducting member 11, respectively. The atomizable medium enters the first liquid conducting member 11 from the liquid inlet surface B, and the

adsorbed atomizable medium is heated to generate aerosol when the heating assembly is powered on, then the generated aerosol flows outward from the atomizing surface A by airflow, so that the liquid inlet and the atomization are not interfered. Preferably, the atomizing surface A is provided with a concave-convex structure that allows the heating assembly to be embedded in the surface of the first liquid conducting member 11, increasing the contact area between the heating assembly and the first liquid conducting member 11.

[59] As shown in Fig. 8 and Fig. 9, the first liquid conducting member 11 may include one layer of liquid conducting layer 111, or may include more than one layer of liquid conducting layer 111 stacked in layers. When multiple layers of liquid conducting layers 111 are adopted, gaps are reserved between the various layers, which can store part of the atomizable liquid to improve the use effect. Meanwhile, the multi-layer first liquid conducting member 11 is sewn into a whole structure, which is also convenient for subsequent assembly. Further, the multi-layer structure may be made of different materials, so that some requirements can be taken into account, for example, the liquid inlet side needs to be made of a material with fast liquid conduction and good oil locking, and the part that is tightly attached to the second wire 13 needs to be made of a material with a high-temperature resistant, while the problem can be well solved by adopting the multi-layer first liquid conducting member 11.

[60] When the first liquid conducting member 11 is a multi-layer liquid conducting layer 111, the liquid conducting layer 111 of the atomizing surface A of the first liquid conducting member 11 may be made of one of the materials of linen cotton or aramid fiber woven fabric, or may be formed by weaving the above several materials, or may be made of some high-temperature resistant mixed materials.

[61] In addition, when the first liquid conducting member 11 is a multi-layer liquid conducting layer 111, the liquid conducting layer 111 of the liquid inlet surface B of the first liquid conducting member 11 may be made of one or a combination of a non-woven fabric, a grating, and a mesh cotton. Further, the liquid inlet surface B is provided with grooves or mesh holes, so that the liquid conduction is faster, ensuring a timely liquid supply during atomization, and avoiding the dry burning due to insufficient liquid supply.

[62] The first liquid conducting member 11 may be used in combination with other liquid conducting cotton. Preferably, the atomizing assembly 10 further includes a second liquid conducting member attached to the first liquid conducting member 11, and the second liquid conducting member is located on the side opposite the atomizing surface A.

[63] The second liquid conducting member may be a liquid conducting cotton, a porous ceramic, or a liquid storage cotton or the like. The combined shape of the second liquid conducting member and the first liquid conducting member 11 may be a flat plate shape, or may be curled into a columnar shape, a tubular shape, or a curved shape.

[64] Further, as shown in Fig. 1 and Fig. 2, in a first embodiment, the heating assembly includes a first wire 12 and a second wire 13 that are flexible. Preferably, the second wire 13 is made

of electrically conductive material. The first wire 12 and the second wire 13 are respectively sewn onto the first liquid conducting member 11 from two opposite sides of the first liquid conducting member 11 and interwoven with each other, and are respectively fixed to the first liquid conducting member 11 from two sides.

[65] Further, the electrodes include a first electrode 15 and a second electrode 16 that are respectively electrically connected to the heating assembly, and preferably, connected to two ends of the heating assembly, and connected to the battery assembly through contacts or conducting wires to supply power to the heating assembly. In other embodiments, the electrodes may include a plurality of electrodes that may be connected to the battery assembly respectively.

[66] Correspondingly, in the embodiment, the side where the second wire 13 is located is the atomizing surface A, and the side where the first wire 12 is located is the liquid inlet surface B. The atomizable medium enters the first liquid conducting member 11 from the side where the first wire 12 is located. When the second wire 13 made of a conductive material is energized, the adsorbed atomizable medium is heated to generate aerosol, which flows outward from the side where the second wire 13 is located under the action of the airflow. Of course, when the first wire 12 is made of a conductive material and the second wire 13 is made of a non-conductive material, the liquid inlet surface B and the atomizing surface A are exchanged. Or alternatively, both the first wire 12 and the second wire 13 are made of a conductive material, and both sides are atomized simultaneously, and the liquid may be entered from an end portion or a lateral side.

[67] Further, in some embodiments, the first wire 12 may be made of a non-conductive material, and of course, the first wire 12 may also be made of a conductive material. When the first wire 12 is made of a conductive material, the resistance of the second wire 13 is less than the resistance of the first wire 12.

[68] According to the sewing principle of a sewing machine, the first wire 12 and the second wire 13 with different resistances on the two sides are interwoven to form an integral structure with the first liquid conducting member 11. At least one of the first wire 12 and the second wire 13 can generate heat. The second wire 13 that can generate heat is fixed to the first liquid conducting member 11, which can ensure the contact between the second wire 13 and the first liquid conducting member 11, and is conducive to heating and atomizing, so that the problem of dry burning is avoided, and mass production can be realized.

[69] According to the sewing principle of the sewing machine, one of the wires is changed into a conductive heating wire and the heating wire is fixed to the first liquid conducting member 11, so that the heating wire is assisted by an object and not easily separated from the liquid conducting substrate, meanwhile, large-batch production can be achieved, and the production cost is low.

[70] Further, the heating assembly is fixed by sewing and has a good contact with the first liquid conducting member 11, so that the loosening is avoided. The first wire 12 and the second wire

13 can adopt thinner wires, and since the sectional areas of the first wire 12 and the second wire 13 can be smaller than that of the prior art, the thermal startup speed is fast, the heat dissipation is also fast, and a lower power can be used to drive the atomizing assembly 10, which is more energy-saving. Large-scale production is facilitated in the mode that the first wire 12 and the second wire 13 are interwoven after sewing. The wire-shaped process generally adopts a wire drawing forming through a die hole, and the sizes of the first wire 12 and the second wire 13 can be controlled accurately, which can make the resistance of the atomizing assembly 10 more stable.

[71] Generally, the conductive material of the second wire 13 is one or a combination of a conductive metal alloy wire, a conductive metal fiber wire, a conductive carbon fiber wire, and a conductive graphite wire, which generates heat when the current is input, so that the second wire 13 generates heat when being energized. In some embodiments, the second wire 13 may adopt a round wire with the wire diameter ranging from 0.03 mm to 0.2 mm, and preferably 0.11 mm, which is relatively proper in diameter and is not easy to break, and relatively thin and soft to be bent easily, and meanwhile, some requirements of the atomizing device on the resistance can be met. An optional material of the second wire 13 may be a metal material such as a nickel-based alloy, a stainless steel series alloy, a chromium-containing alloy, a titanium-containing alloy, a tungsten-containing alloy, a molybdenum-containing alloy, an iron-containing alloy, or a tin-containing alloy, or may be a non-metallic conductive material such as a carbon fiber wire or a graphite fiber wire, or may also be a filamentary shape twisted by one or two of an extremely fine conductive metal wire and an extremely fine conductive non-metallic wire. The conductive metal wire and the conductive non-metallic wire are relatively thin, and may be a fine wire with a diameter of several microns to tens of microns, which are not limited specifically.

[72] The first wire 12 used to fix the second wire 13 has a wide range of material selection, which may be either a conductive material or a non-conductive material. The wire diameter of the first wire 12 also has a wide selection, and preferably is about 0.15 mm with a shape of a filament.

[73] Specifically, the first liquid conducting member 11 is a liquid conducting cotton. After sewing, most of the second wire 13 is exposed on the atomizing surface A, and part of the second wire 13 is slightly sunken into the first liquid conducting member 11, so that the liquid on the surface of the first liquid conducting member 11 can be rapidly heated to the boiling point to generate atomized vapor when the two ends of the second wire 13 are energized.

[74] It can be understood that the second wire 13 may be bent, and the bending mode may adopt a back-and-forth bending mode or a waveform bending mode. In addition, the second wire 13 may also be curved, and the curved mode is not limited herein.

[75] Further, in order to make the area of heat radiation larger, the heating assembly includes several second wires 13 located on the same side of the first liquid conducting member 11. Preferably, the number of the second wires 13 may be two or more. The various second wires 13 may be interwoven to form a mesh structure as shown in Fig. 11, or the various second wires 13 may

be arranged side by side as shown in Fig. 12, or may also be arranged in a combination manner of interwoven and side-by-side arrangement. A plurality of second wires 13 may also be bent and curved to form a mesh structure.

[76] When the second wire 13 is relatively soft in the material or relatively thin in the wire diameter, the interwoven position of the second wire 13 and the first wire 12 may be trapped in the first liquid conducting member 11 or may be flush with the surface of the first liquid conducting member 11.

[77] Further, as shown in Fig. 8 to Fig. 10, when the second wire 13 has a thicker wire diameter, such as 0.15 mm or more, the second wire 13 may be flush with the surface of the first liquid conducting member 11 due to its high hardness and difficulty in bending. When the first wire 12 is a relatively soft wire, such as a cotton thread, a linen thread, an aramid fiber or other flexible wire, the second wire 13 may be flush with the surface of the first liquid conducting member 11 without being trapped in the first liquid conducting member 11, or may be slightly bent.

[78] In some embodiments, the first wire 12 is made of a non-conductive material, and the atomizable medium enters the first liquid conducting member 11 from the side where the first wire 12 is located. Further, the non-conductive material of the first wire 12 may be cotton thread, flax, aramid fiber, glass fiber yarn, ceramic fiber yarn, or other material with a high temperature resistance, which is not limited herein.

[79] In addition, in other embodiments, the first wire 12 may also be made of a conductive material, and the resistance of the second wire 13 is smaller than the resistance of the first wire 12. For example, when the atomizable medium is relatively viscous, the first wire 12 adopts a metal wire, such that the first wire 12 also generates heat, which is equivalent to preheating the e-liquid to a certain extent, thereby reducing its viscosity, and thus accelerating its flow speed.

[80] Since most of the surface of the first wire 12 is trapped in the first liquid conducting member 11 or located at the liquid inlet surface B, and the first wire 12 is in contact with the second wire 13 of the first liquid conducting member 11, when the first wire 12 is made of a metal material, which means the first wire 12 and the second wire 13 are in a parallel state, and the heat generated by the first wire 12 in the direction close to the liquid inlet surface B can play a role in heating the e-liquid, which is equivalent to the effect of preheating.

[81] The first wire 12 and the second wire 13 are arranged in parallel, so that the resistance of the second wire 13 needs to be smaller than the resistance of the first wire 12, making the power of the second wire 13 higher than that of the first wire 12. Due to the equal voltage of the parallel circuit, when the resistance of the second wire 13 is smaller than that of the first wire 12, the current flowing through the second wire 13 is larger than that of the first wire 12, and the temperature generated by the thermal effect of resistance of the first wire 12 is higher.

[82] In some embodiments, as shown in Fig. 3 and Fig. 5, the first electrode 15 and the second electrode 16 are formed by sewing a conductive wire onto the first liquid conducting member 11, and it can be understood that one of the first electrode 15 and the second electrode 16 is formed by sewing a conductive wire onto the first liquid conducting member 11, which is conducive to the batch and automated production of the atomizing assembly.

[83] Further, the first electrode 15 and the second electrode 16 are located on a same side of the first liquid conducting member 11. Preferably, the first electrode 15, the second electrode 16 and the second wire 13 are formed by a same conductive wire. The first electrode 15, the second electrode 16, and the second wire 13 may be once-sewn by one conductive wire, thereby improving the production efficiency.

[84] Of course, in other embodiments, it may also be that the first electrode 15 is located on the side where the first wire is located, and the second electrode 16 is located on the side where the second wire 13 is located. The first electrode 15 and the first wire are a same conductive wire, so that the first electrode 15 and the first wire 12 are sewn by one conductive wire. The second electrode 16 and the second wire 13 are a same conductive wire, so that the second electrode 16 and the second wire 13 are sewn by one conductive wire.

[85] Further, the first electrode 15 and the second electrode 16 formed by sewing may be provided with a conductive layer 17, which can stabilize the resistance and facilitate the external connection of leads or contacts. In some embodiments, the conductive layer 17 is formed by coating or printing a conductive paste or a conductive adhesive.

[86] It can be understood that in other embodiments, the conductive layer 17 may also be a metal sheet attached to the first electrode 15 and the second electrode 16. The material of the metal sheet may be nickel, stainless steel, copper, aluminum foil, or the like. Then the metal sheet may be punctured and sewn to the first liquid conducting member 11 by sewing, so that the metal sheet and the first liquid conducting member 11 are fixed and compounded together. The advantage is that the electrode will have a certain hardness, making it more convenient to contact the external electrode of the atomizer.

[87] In addition, in some other embodiments, one or both of the first electrode 15 and the second electrode 16 are inserted into the first liquid conducting member 11. Preferably, the heating assembly is clamped and fixed in a metal riveting method, and then the atomizing assembly is powered in a contact type by contacts or a lead-out type by lead wires.

[88] Since the first liquid conducting member 11 is relatively fluffy and needs to be able to store more liquid, and meanwhile, the liquid leakage prevention effect needs to be good, a fluffy liquid conducting cotton is adopted. When the filamentous first wire 12 and second wire 13 of the heating assembly has a thinner wire diameter, such as a wire diameter of less than 0.08 mm, due to the liquid conducting cotton is fluffy, the filamentous trajectory for heating will be trapped in the liquid conducting

cotton and thus will be completely wrapped by the liquid conducting cotton, as a result, the atomized vapor cannot emerge from the liquid conducting cotton, and a carbon deposition is easily formed on the liquid conducting cotton.

[89] Further, as shown in Fig. 14 and Fig. 15, in order to improve the above problems, in this embodiment, support lines 18 for supporting the first wire 12, the second wire 13, and the electrode are sewn to the first liquid conducting member 11. The support lines 18 are made of an insulating material to avoid the problem of heating due to electric conduction. In other embodiments, according to the wire diameters of the first wire 12, the second wire 13, and the electrode, if recesses are likely to occur when sewing the first wire 12, the second wire 13, and the electrode, the support lines 18 may be sewn to the positions corresponding to the first wire 12, the second wire 13, and the electrode.

[90] Generally, the support lines 18 are arranged side by side in a same direction, and staggered with the first wire 12, the second wire 13, and the electrode, allowing the support lines 18 to support the first wire 12, the second wire 13, and the electrode. In other embodiments, the support lines 18 are sewn crosswise to form a mesh shape, so that the first wire 12, the second wire 13, and the electrode can be supported by the support lines 18 regardless of the direction in which they are sewn.

[91] First, the strip-shaped or mesh-shaped support lines 18 are sewn to the liquid conducting cotton, and then the heating assembly and the electrodes are sewn to the liquid conducting cotton. In this way, the filamentous trajectory for heating is not easily trapped entirely in the liquid conducting cotton due to the support from the strip-shaped or mesh-shaped line.

[92] Further, the present invention provides a manufacturing process of the atomizing assembly 10 in the first embodiment, including the following steps:

[93] providing a flexible liquid conducting substrate; and

[94] sewing a heating assembly on the liquid conducting substrate.

[95] Wherein, a flexible first wire 12 and a flexible second wire 13 are provided, the first wire 12 is electrically conductive or insulating, and the second wire 13 is electrically conductive.

[96] The first wire 12 and the second wire 13 are respectively sewn from two opposite sides of the liquid conducting substrate to the liquid conducting substrate and interwoven with each other to form the heating assembly.

[97] Further, the manufacturing process includes the following steps: arranging an electrode on the liquid conducting substrate to electrically connect the electrode to the heating assembly.

[98] Specifically, the manufacturing process further includes the following steps: sewing a conductive wire onto the liquid conducting substrate to form the electrode, and further, arranging a conductive layer 17 on the electrode after the electrode is sewn.

[99] In this embodiment, a first electrode 15 and a second electrode 16 are arranged on the liquid conducting substrate to electrically connect the first electrode 15 and the second electrode 16 to the heating assembly.

[100] The sewing process is adjusted according to the specific requirements of the bending and curling shapes of the first wire 12 and the second wire 13.

[101] Further, the first electrode 15 and the second electrode 16 may be formed by sewing the conductive wire/wires. Preferably, when the first electrode 15 and the second electrode 16 are located on the same side, the first electrode 15, the second electrode 16 and the second wire 13 adopts a same conductive wire to sew, which can improve the production efficiency of the atomizing assembly. Of course, only one of the first electrode 15 and the second electrode 16 may be made by sewing.

[102] Preferably, as shown in Fig. 5, the manufacturing process further includes the following steps: after sewing the first electrode 15 and the second electrode 16, arranging a conductive layer 17 on the first electrode 15 and the second electrode 16. In some embodiments, a conductive adhesive or a conductive paste may be coated or printed onto the first electrode 15 and the second electrode 16 to form the conductive layer 17, or, a metal sheet is sewn onto the first electrode 15 and the second electrode 16 to form the conductive layer 17.

[103] As shown in Fig. 14 and Fig. 15, in some embodiments, support lines 18 are sewn to the liquid conducting substrate before sewing the first wire 12, the second wire 13, and the electrode, and then the first wire 12, the second wire 13, and the electrode are sewn on the support lines 18 to avoid the first wire 12, the second wire 13, and the electrode being recessed.

[104] Combined with Fig. 13, when the size of the liquid conducting substrate is small, the liquid conducting substrate may be the first liquid conducting member 11. Or, multiple sets of heating assemblies and electrodes may be sewn on a large liquid conducting substrate in a zoned manner in advance. Preferably, the multiple sets of heating assemblies and electrodes are sewn at one time, and the circuits in various zones are connected. After the sewing is completed, the liquid conducting substrate is cut to form a plurality of atomizing assemblies with heating assemblies and electrodes.

[105] As shown in Fig. 3 to Fig. 7, in the second embodiment, the heating assembly includes a second wire 13 interposed in the first liquid conducting member 11. The second wire 13 is made of a conductive material, and is sewn and inserted in the first liquid conducting member 11, to generate heat after being electrified to atomize the atomizable medium on the first liquid conducting member 11. Preferably, the second wire 13 is interposed between two opposite sides of the first liquid conducting

member, wherein one of the two opposite sides is the liquid inlet surface B and the other is atomizing surface A. In other embodiments, the second wire 13 may also be interposed between other different sides of the first liquid conducting member according to the position requirements of the liquid inlet and the atomization.

[106] Specifically, in the embodiment, the second wire 13 includes a heating section, which includes a first section 131 located on a first surface of the first liquid conducting member 11, a second section 132 interposed in the first liquid conducting member 11, and a third section 133 located on a second surface of the first liquid conducting member 11. The lengths of the first section 131 and the third section 133 are not limited. Generally, the second wire 13 includes several heating sections sewn to the first liquid conducting member 11, and the routing direction and the layout method of the second wire 13 may be designed according to requirements.

[107] As shown in Fig. 11 to Fig. 12, it can be understood that in order to make the heating radiation area larger, the heating assembly may include several second wires 13 located on a same side of the first liquid conducting member 11. Preferably, the number of the second wires 13 may be two or more. The various second wires 13 may be interwoven to form a mesh structure as shown in Fig. 11, or the various second wires 13 may be arranged side by side as shown in Fig. 12, or may also be arranged in a combination manner of interwoven and side-by-side arrangement. A plurality of second wires 13 may also be bent and curved to form a mesh structure.

[108] Further, as shown in Fig. 3, the electrodes include a first electrode 15 and a second electrode 16 that are respectively electrically connected to the heating assembly, and preferably, connected to two ends of the heating assembly, and connected to the battery assembly through contacts or conducting wires to supply power to the heating assembly. In other embodiments, the electrodes may include a plurality of electrodes that may be connected to the battery assembly respectively.

[109] Further, as shown in Fig. 3 and Fig. 4, the present invention further provides a manufacturing process of the atomizing assembly 10 in the first embodiment, including the following steps:

[110] providing a flexible liquid conducting substrate;

[111] sewing a heating assembly on the liquid conducting substrate.

[112] Specifically, the manufacturing process further includes the following steps: providing a flexible second wire 13 which is made of an electrically conductive material, and interposing and sewing the second wire 13 on the liquid conducting substrate to form the heating assembly. Preferably, the second wire 13 is interposed between two opposite sides of the liquid conducting substrate.

[113] Further, the manufacturing process includes the following steps: arranging an electrode on the liquid conducting substrate to electrically connect the electrode to the heating assembly.

[114] Specifically, a conductive wire is sewn onto the liquid conducting substrate to form the electrode, and further, a conductive layer 17 is arranged on the electrode after the electrode is sewn.

[115] In some embodiments, the first electrode 15 and the second electrode 16 may be formed by sewing the conductive wire/wires. Preferably, when the first electrode 15 and the second electrode 16 are located on the same side, the first electrode 15, the second electrode 16 and the second wire 13 adopts a same conductive wire to sew, which can improve the production efficiency of the atomizing assembly. Of course, only one of the first electrode 15 and the second electrode 16 may be made by sewing.

[116] Preferably, as shown in Fig. 5, the manufacturing process further includes the following steps: after sewing the first electrode 15 and the second electrode 16, arranging a conductive layer 17 on the first electrode 15 and the second electrode 16. In some embodiments, a conductive adhesive or a conductive paste may be coated or printed onto the first electrode 15 and the second electrode 16 to form the conductive layer 17, or, a metal sheet is sewn onto the first electrode 15 and the second electrode 16 to form the conductive layer 17.

[117] Combined with Fig. 13, when the size of the liquid conducting substrate is small, the liquid conducting substrate may be the first liquid conducting member 11. Or, multiple sets of heating assemblies and electrodes may be sewn on a large liquid conducting substrate in a zoned manner in advance. Preferably, the multiple sets of heating assemblies and electrodes are sewn at one time, and the circuits in various zones are connected. After the sewing is completed, the liquid conducting substrate is cut to form a plurality of atomizing assemblies with heating assemblies and electrodes.

[118] Further, as shown in Fig. 16 to Fig. 18, in the third embodiment, the heating assembly includes a heating member 19 and a fixing thread 191. The fixing thread 191 is sewn to the liquid conducting substrate to fix the heating member 19. The fixing thread 191 is sewn to fix the heating member 19 on the liquid conducting substrate, making the heating member 19 in a good contact with the liquid conducting substrate, enabling a sufficient atomization, meanwhile, facilitating the subsequent assembly, and making the heating member 19 less prone to deformation.

[119] The heating member 19 may be a flat-plate heating sheet with a heating circuit 192 formed of a planar metal by cutting, stamping, etching, or the like. Preferably, the heating member 19 may be mesh shaped, and in other embodiments, the heating member 19 may also be in a grid shape or a linear shape.

[120] In this embodiment, the heating member 19 includes two heating circuits 192 arranged side by side, and several support portions 193 connected to the heating circuits 192 respectively. The support portions 193 and the heating circuits 192 are connected to each other to form a mesh

shaped heating member 19. The electrode is used for connecting an external lead or directly contacting an external electrode. The electrodes include a first electrode 15 and a second electrode 16 respectively connected to two ends of the heating circuits 192, for connecting to the power supply. The heating circuits 192 generate heat after being energized.

[121] In this embodiment, the first electrode 15, the second electrode 16, and the heating member 19 are in an integrated structure and may be formed integrally. In other embodiments, the first electrode 15 and the second electrode 16 may also be formed by sewing the conductive wire/wires to the first liquid conducting member 11 and electrically connected to the heating member 19.

[122] In other embodiments, one or two sides of the heating circuits 192 are connected with support portions 193. The heating circuits 192 are connected between the electrodes, and generate heat when the electrodes at the two ends are powered. The support portions play a role in connecting the multiple heating circuits 192, and making the heating portion have a certain strength.

[123] The fixing thread 191 used to fix the heating member 19 may be one thread interpenetrated between the liquid conducting cotton or two threads crossed with each other, and the fixing thread 191 needs to adopt a non-conductive filament or fiber. The number of the fixing threads 191 may be multiple or one.

[124] As the current travels the shortest distance in the circuit, and the support portions connected to the heating circuits 192 does not form a loop, the support portions connected between the two heating circuits 192 are in the loop but do not pass through the current. Therefore, when heating, the heat of the support portions is far lower than that of the heating portion, since the heat is mainly transmitted from the heating circuits 192. Therefore, the preferred sewing position of the fixing thread 191 is the position of the support portion of the heating member 19, since the temperature of the support portion of the heating member 19 is relatively low, and the temperature resistance requirement for the fixing thread 191 for fixing the heating member 19 is relatively low.

[125] The heating member 19 provides the following beneficial effects:

[126] 1, the heating member 19 can be produced by stamping to facilitate a mass production;

[127] 2, the spacing and the shape of the heating circuit 192 of the heating member 19 are more regular, and the heat distribution is more stable, balanced, and consistent.

[128] 3, the electrode portion can be designed to have a large area, which is convenient to connect with an external lead or contact with the electrode of the atomizing device.

[129] Further, as shown in Fig. 19, when the heating member 19 is mesh shaped, a plurality of thinner conductive wires may be used to be woven into a mesh shape, or a conductive metal sheet or a conductive thin film may be used to be punched or etched to form a whole array of grids or mesh holes, to serve as a mesh-shaped heating structure, and the fixing thread 191 is sewn to the first liquid

conducting member 11 to fix the heating member 19. The heating member 19 is formed with a plurality of mesh holes penetrated therethrough, and has a certain resistance value after being cut to a certain size, and can be used in the field of resistance heating.

[130] The heating member 19 may also be mesh shaped formed by weaving other conductive fiber and non-conductive fiber, such as a cloth-like structure formed by mixing and weaving carbon fiber and cotton fiber. Wherein, the carbon fiber acts as the conductive wire, and generates heat after being electrified at the two ends to heat the atomizable liquid. The cotton fiber plays a role in conducting the liquid and is weaved with the carbon fiber to provide a good fixing effect. The conductive wire is not limited to the carbon fiber.

[131] The heating member 19 with the mesh structure formed by weaving is commonly used in a specification ranging from 50 meshes to 400 meshes (referring to the number of mesh holes per square inch). The mesh hole is small in size, and the liquid can form a film between the mesh holes due to liquid tension, so that the oil leakage is not likely to happen. Moreover, various parts of the heating member are in contact with the conductive mesh, to enable a large atomization area.

[132] The heating member 19 is relatively more uniform in heat, has a larger heating area, and tends to generate heat throughout the entire surface. The mesh-shaped heating member 19 generates heat more uniform and has a larger heating area. The mesh spacing and the heating trajectory of the heating member 19 are more regular, and the heat distribution is more stable, balanced, and consistent.

[133] Further, the present invention provides a manufacturing process of the atomizing assembly 10 in the third embodiment, including the following steps:

[134] providing a flexible liquid conducting substrate;

[135] sewing a heating assembly on the liquid conducting substrate.

[136] Specifically, in this embodiment, manufacturing process further includes the following steps: providing a heating member 19 and a fixing thread 191, and sewing the fixing thread 191 onto the liquid conducting substrate to fix the heating member 19.

[137] In this embodiment, the electrode and the heating member 19 are in an integrated structure. In other embodiments, referring to the first embodiment and the second embodiment, the electrode is arranged on the liquid conducting substrate by such as sewing, and a conductive layer 17 is arranged on the electrode to electrically connect the electrode and the heating member 19.

[138] When the size of the liquid conducting substrate is small, the liquid conducting substrate may be the first liquid conducting member 11. Or, multiple sets of heating assemblies and electrodes may be sewn on a large liquid conducting substrate in a zoned manner in advance. Preferably, the multiple sets of heating assemblies and electrodes are sewn at one time, and the circuits in various

zones are connected. After the sewing is completed, the liquid conducting substrate is cut to form a plurality of atomizing assemblies with heating assemblies and electrodes.

[139] The above heating assembly of the atomizing assembly 10 can be manufactured to the first liquid conducting member 11 in a sewing manner, and the structure of the atomizing assembly 10 has the following advantages: the production is relatively simple and easy to implement, the heating material is fixed on the liquid conducting substrate based on the sewing principle, to form the atomizing assembly with good reliability, easy to batch production, and having good contact between the heating and the liquid conducting substrate, and the problems that the flexible liquid conducting substrate such as the liquid conducting cotton, is prone to being in poor contact with the heating assembly during application to result in dry burning, the heating assembly is prone to deformation, and taking is difficult during assembly, are solved.

[140] It is understood that the above-mentioned technical features can be used in any combination without limitation.

[141] While the present invention has been illustrated and described in detail in the drawings and foregoing description, such illustration and description are to be considered illustrative or exemplary and not restrictive. It will be understood that changes and modifications may be made by those of ordinary skill within the scope of the following claims. In particular, the present invention covers further embodiments with any combination of features from different embodiments described above and below. Additionally, statements made herein characterizing the present invention refer to an embodiment of the present invention and not necessarily all embodiments.

CLAIMS

What is claimed is:

1. An atomizing assembly, comprising a first liquid conducting member (11), a heating assembly, and an electrode;
wherein the first liquid conducting member (11) is flexible and configured for adsorbing an atomizable medium;
wherein the heating assembly is fixed to the first liquid conducting member (11) through sewing; and
wherein the electrode is connected to the heating assembly, so that the heating assembly heats and atomizes the atomizable medium in the first liquid conducting member (11) when electrified.
2. The atomizing assembly of claim 1, wherein the heating assembly comprises a first wire (12) and a second wire (13) that are flexible,
wherein the second wire (13) is electrically conductive, and
wherein the first wire (12) and the second wire (13) are respectively sewn to the first liquid conducting member (11) from two opposite sides of the first liquid conducting member (11) and are interwoven with each other.
3. The atomizing assembly of claim 2, wherein an interwoven position of the second wire (13) and the first wire (12) is in the first liquid conducting member (11) or is flush with a surface of the first liquid conducting member (11).
4. The atomizing assembly of claim 2, wherein the first wire (12) is electrically conductive, and the resistance of the second wire (13) is smaller than the resistance of the first wire (12).
5. The atomizing assembly of claim 1, wherein the heating assembly comprises a second wire (13) interposed in the first liquid conducting member (11), and the second wire (13) is electrically conductive.
6. The atomizing assembly of claim 5, wherein the second wire (13) is interposed between two opposite sides of the first liquid conducting member.
7. The atomizing assembly of claim 5 or 6, wherein the second wire (13) comprises at least one heating section, and
wherein the heating section comprises a first section (131) located on a first surface of the first liquid conducting member (11), a second section (132) interposed in the first liquid conducting member (11) and a third section (133) located on a second surface of the first liquid conducting member (11).
8. The atomizing assembly of claim 1, wherein the heating assembly comprises a heating member (19) and a fixing thread (191) that is sewn to the first liquid conducting member (11) to fix the heating member (19).

9. The atomizing assembly of claim 8, wherein the heating member (19) comprises at least one heating circuit (192), and

wherein the electrode comprises a first electrode (15) and a second electrode (16) that are respectively connected to two ends of the heating circuit (192).

10. The atomizing assembly of claim 9, wherein the heating member (19) further comprises a number of support portions (193) connected to the heating circuit (192) respectively, and the fixing thread (191) is sewn to the support portions (193).

11. The atomizing assembly of claim 9, wherein the shape of the heating member (19) is one or a combination of a mesh shape, a linear shape, or a sheet shape.

12. The atomizing assembly of any one of claims 8 to 11, wherein the electrode and the heating member (19) are in an integral structure, or the electrode is formed by sewing a conductive wire to the first liquid conducting member (11).

13. An atomizing device, comprising:

the atomizing assembly (10) of any one of claims 1 to 12.

14. A manufacturing process of an atomizing assembly, comprising the following steps:

providing a liquid conducting substrate that is flexible; and

sewing a heating assembly to the liquid conducting substrate.

15. The manufacturing process of the atomizing assembly of claim 14, further comprising the following steps:

providing a first wire (12) and a second wire (13) that are flexible, the second wire (13) electrically conductive, and

sewing the first wire (12) and the second wire (13) to the liquid conducting substrate from two opposite sides of the liquid conducting substrate to be interwoven with each other to form the heating assembly.

16. The manufacturing process of the atomizing assembly of claim 14, further comprising the following steps:

providing a second wire (13) that is flexible and electrically conductive, and

interposing and sewing the second wire (13) on the liquid conducting substrate to form the heating assembly.

17. The manufacturing process of the atomizing assembly of claim 14, wherein,

a heating member (19) and a fixing thread (191) are provided, and the heating member (19) is sewn and fixed on the liquid conducting substrate by the fixing thread (191) to form the heating assembly.

18. The manufacturing process of the atomizing assembly of any one of claims 14 to 17, wherein the heating assembly is provided with an electrode, a number of heating assemblies are sewn on the liquid conducting substrate in a zoned manner, and the atomizing assembly with the heating assembly and the electrode is formed by slitting; or,

a number of heating assemblies on the liquid conducting substrate in a zoned manner, and electrodes corresponding to various heating assemblies are provided on the liquid conducting substrate, and the atomizing assembly with the heating assembly and the electrode is formed by slitting.