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(71) Applicant: **Microporous Technology (Ningbo) Limited**
Ningbo, Zhejiang 315470 (CN)

(72) Inventors:
- **ZHOU, Xingfu**
  Ningbo, Zhejiang 315470 (CN)
- **SHEN, Lifu**
  Ningbo, Zhejiang 315470 (CN)
- **JIANG, Linjun**
  Ningbo, Zhejiang 315470 (CN)

(74) Representative: **Wang, Bo**
Panovision IP
Ebersberger Straße 3
85570 Markt Schwaben (DE)

(54) ATOMIZATION CORE, ATOMIZATION MODULE, AEROSOL BOMB, AND MANUFACTURING METHOD FOR ATOMIZATION CORE

(57) An atomizer, an atomizing module, an aerosol cartridge and the manufacturing method of atomizer is disclosed in the present invention. The atomizer comprises an atomizer wicking element and a mesh heating element, the mesh heating element is wrapped around the outer peripheral surface of the atomizer wicking element in a 360-degree surrounding manner, and/or is adhered to the inner peripheral surface of the atomizer wicking element in a 360-degree surrounding manner. The heat generated by the 360-degree surrounding mesh heating element can be evenly distributed on the surface of the atomizer wicking element, thereby heating and atomizing the liquid on the atomizer wicking element more efficiently, making the atomization more complete, and allowing users to obtain a more delicate and full taste.

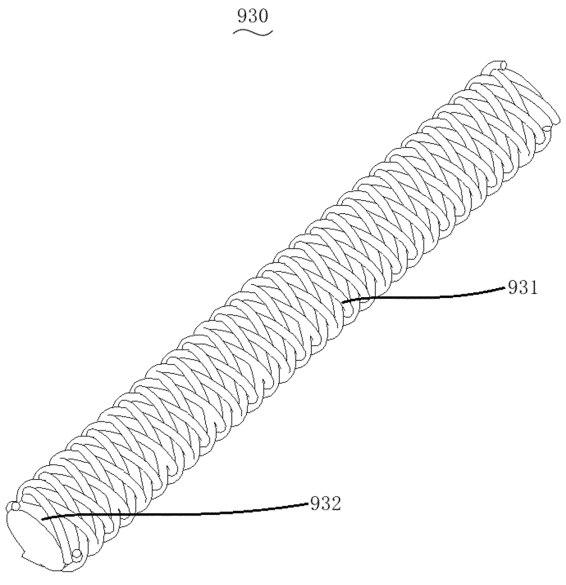

Fig.1

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Description

TECHNICAL FIELD

[0001] The present application relates to an atomizer, an atomizing module, an aerosol cartridge and the manufacturing method of atomizer, and more particularly to an atomizer, an atomizing module, an aerosol cartridge and the manufacturing method of atomizer used in the application fields of electronic cigarettes, aromatherapy, and drug solution atomization, etc.

BACKGROUND

[0002] Electronic atomization is widely used in various fields of daily life, such as electronic cigarettes, aromatherapy, and medication atomization, etc. The atomizer is a key component of electronic atomization, which usually includes an atomizer wicking element and a heating element. Common atomizer wicking elements include non-woven fabric, fiber bundles, and porous ceramics, the material of the fiber bundles includes cellulose containing fibers such as cotton fibers and hemp fibers, or carbon fibers, glass fibers, ceramic fibers, etc, sintered porous ceramics have a fixed shape and high strength, which is easy to install, but porous ceramics have strong selective adsorption and poor reduction of aroma, in addition, ceramic particles are easy to falling off, and pose a potential health risk to users. The atomizer using non-woven fabric, cotton fiber, and hemp fiber as the atomizer wicking element has good safety and high aroma reduction, in such atomizer, resistance wires are usually made into spiral heating elements and wrapped around the outer peripheral surface of the atomizer wicking element, and the two ends of the spiral heating element form pins for connecting to the power supply, due to the small coverage ratio of the spiral resistance wire on the surface of the atomizer wicking element, the atomization particles are large, and the delicacy and fullness of the taste are poor, in addition, this atomizer has low strength, poor shape and size stability, and the pin alignment is difficult during automatic installation.

SUMMARY

[0003] In order to solve the problems existing in the prior art, the present invention provides an atomizer, which comprises an atomizer wicking element and a mesh heating element, the mesh heating element is wrapped around the outer peripheral surface of the atomizer wicking element in a 360-degree surrounding manner, and/or is adhered to the inner peripheral surface of the atomizer wicking element in a 360-degree surrounding manner.

[0004] Further, the mesh heating element is partially embedded in the outer peripheral surface of the atomizer wicking element, and/or the mesh heating element is partially embedded in the inner peripheral surface of the atomizer wicking element.

[0005] Further, the mesh heating element is formed by weaving or cross-winding resistance wires.

[0006] Further, the mesh heating element comprises at least one left-handed resistance wire and at least one right-handed resistance wire.

[0007] Further, the resistance wires of the mesh heating element comprise warp resistance wires and weft resistance wires.

[0008] Further, the mesh heating element comprises at least two left-handed resistance wires or right-handed resistance wires with different pitches.

[0009] Further, the mesh heating element comprises at least one resistance wire, which includes a left-handed resistance wire and a right-handed resistance wire, the left-handed resistance wire and the right-handed resistance wire are woven or cross-wound to form a mesh.

[0010] Further, the atomizer comprises two or more layers of mesh heating elements.

[0011] Further, the atomizer wicking element and the mesh heating element are formed separately.

[0012] Further, the atomizer wicking element and the mesh heating element are formed integrally.

[0013] Further, the material of the atomizer wicking element includes fibers or powders containing cellulose, carbon fibers, glass fibers, ceramic fibers, porous ceramics, etc.

[0014] Further, the mesh heating element is formed by etching, punching, or welding resistance materials.

[0015] Further, the weight of the atomizer wicking element per meter is 1.0 to 6.0 grams.

[0016] Further, the wire diameter for resistance wire is 10 to 150 microns.

[0017] Further, the resistance of the atomizer is 0.2 ohms to 2.0 ohms.

[0018] Further, the number of resistance wires for the mesh heating element is 4 to 36.

[0019] Further, the number of mesh holes is 20 to 300 in 25.4 millimeters of the axial length of the mesh heating element.

[0020] Further, the axial lengths of the mesh heating element and the axial lengths of the atomizer wicking element are basically equal.

[0021] Further, the mesh heating element comprises at least two polygonal-shape resistance wires.

[0022] Further, the atomizer also comprises electrodes, which are parallel to axial direction of the mesh heating element and are connected to the mesh heating element.

[0023] The present invention also provides an atomizing module, which at least comprises any of the atomizer mentioned above.

[0024] Further, the atomizing module comprises an electrode and an electrode clampingpiece arranged at one end of the electrode, and the electrode clampingpiece clamps the mesh heating element.

[0025] Further, the atomizing module comprises an electrode and an electrode insertion portion arranged at one end of the electrode, and the electrode insertion portion is connected to the mesh heating element after inserted into an atomizer wicking element through-hole.

[0026] Further, the atomizing module also comprises a gas-liquid exchange element.

[0027] The present invention also provides an aerosol cartridge, which comprises a liquid storage element and any of the atomizing module mentioned above.

[0028] Further, the atomizer is connected directly with the liquid in the liquid storage element.

[0029] Further, the atomizer is connected with the liquid in the liquid storage element through the gas-liquid exchange element when the atomizing module comprises a gas-liquid exchange element and the gas-liquid exchange element is used to transport liquid to the atomizer wicking element.

[0030] Further, the outer peripheral surface of the atomizer wicking element is connected with the liquid in the liquid storage element when the mesh heating element is adhered to the inner peripheral surface of the atomizer wicking element in a 360-degree surrounding manner.

[0031] Further, at least a part of the outer peripheral surface of the atomizer wicking element is sleeved with a hollow metal tube, and the outer peripheral surface of the atomizer wicking element is connected with the liquid in the liquid storage element through the hollow metal tube.

[0032] Further, the aerosol cartridge also comprises an aerosol channel, and the angle between the atomizer wicking element through-hole and the aerosol channel is greater than or equal to 45 degrees and less than or equal to 135 degrees when the atomizer wicking element has an atomizer wicking element through-hole that axially penetrates through the atomizer wicking element.

[0033] The present invention also provides a manufacturing method of atomizer, comprising the following steps:

using cotton fiber bundles, carbon fiber bundles, ceramic fiber bundles, or glass fiber bundles as the atomizer wicking element.

weaving or cross-winding the resistance wires to form a mesh heating element that is wrapped around the outer peripheral surface of the atomizer wicking element in a 360-degree surrounding manner; wherein, at least a part of the resistance wires are controlled to form a right-handed resistance wire that is spirally wrapped around the outer peripheral surface of the atomizer wicking element, and at least a part of the resistance wires are controlled to form a left-handed resistance wire that is spirally wrapped around the outer peripheral surface of the atomizer wicking element;

producing coiled atomizer material;

cutting the required length from the coiled atomizer material as the atomizer.

[0034] The present invention also provides a manufacturing method of atomizer, comprising the following steps:

using cotton fiber bundles, carbon fiber bundles, ceramic fiber bundles, or glass fiber bundles as the atomizer wicking element.

weaving or cross-winding the resistance wires to form a mesh heating element that is wrapped around the outer peripheral surface of the atomizer wicking element in a 360-degree surrounding manner; wherein, at least one of the resistance wires are controlled to wrap around the outer peripheral surface of the atomizer wicking element with a first pitch, and at least one of the resistance wires are controlled to wrap around the outer peripheral surface of the atomizer wicking element with a second pitch, and the first pitch is not equal to the second pitch;

producing coiled atomizer material;

cutting the required length from the coiled atomizer material as the atomizer.

[0035] The present invention also provides a manufacturing method of atomizer, comprising the following steps:

using plastic or metal as an auxiliary core, weaving or cross-winding the resistance wires to form a mesh heating element that is wrapped around the outer peripheral surface of the auxiliary core in a 360-degree surrounding manner; wherein,at least a part of the resistance wires are controlled to form a right-handed resistance wire that is spirally wrapped around the outer peripheral surface of the auxiliary core, and control at least a part of the resistance wires to form a left-handed resistance wire that is spirally wrapped around the outer peripheral surface of the auxiliary core;

wrapping around the outer peripheral surface of the mesh heating element with an atomizer wicking element, such as woven or non-woven fabric, or coating the outer peripheral surface of the mesh heating element with cellulose containing fibers slurry and then drying;
producing coiled atomizer material;
cutting the required length from the coiled atomizer material and taking out the auxiliary core to form the atomizer.

[0036] The present invention also provides a manufacturing method of atomizer, comprising the following steps:

using cotton fiber bundles, carbon fiber bundles, ceramic fiber bundles, or glass fiber bundles as the atomizer wicking element;
starting a resistance wire from the lower part of the atomizer wicking element, and spiraling up and winding to the upper part of the atomizer wicking element in a left-handed or right-handed manner, to form a left-handed resistance wire or a right-handed resistance wire;
then, winding the resistance wire from the upper part of the atomizer wicking element in a left-handed or right-handed manner to the lower part of the atomizer wicking element, to form a right-handed resistance wire or a left-handed resistance wire;
weaving or cross-winding the left-handed resistance wire and the right-handed resistance wire to form a mesh heating element.

[0037] The present invention also provides a manufacturing method of atomizer, comprising the following steps:

using cotton fiber bundles, carbon fiber bundles, ceramic fiber bundles, or glass fiber bundles as the atomizer wicking element;
starting the two ends of a resistance wire from the lower part of the atomizer wicking element, spiraling up and winding to the upper part of the atomizer wicking element in a left-handed or right-handed manner respectively, and weaving or cross-winding on the outer peripheral surface of the atomizer wicking element to form a mesh like mesh heating element;
producing coiled atomizer material;
cutting the required length from the coiled atomizer material as the atomizer.

[0038] The present invention also provides a manufacturing method of atomizer, comprising the following steps:

using cotton fiber bundles, carbon fiber bundles, ceramic fiber bundles, or glass fiber bundles as the atomizer wicking element;
weaving or cross-winding a certain number of resistance wires to form a first layer of mesh heating element that is wrapped around the outer peripheral surface of the atomizer wicking element in a 360-degree surrounding manner;
weaving or cross-winding a certain number of resistance wires to form a second layer of mesh heating element that is wrapped around the outer peripheral surface of the first layer of mesh heating element in a 360-degree surrounding manner;
producing coiled atomizer material;
cutting the required length from the coiled atomizer material as the atomizer.

[0039] The present invention also provides a manufacturing method of atomizer, comprising the following steps:

weaving or cross-winding the resistance wires onto an auxiliary core to form a mesh heating element, in which the auxiliary core can be made of metal or plastic;
placing the mesh heating element containing the auxiliary core into the mold and positioning it, and injecting cellulose containing fibers or powders slurry into the mold for molding, or, continuously pulling the mesh heating element strip containing the auxiliary core in the mold, while injecting cellulose containing fibers or powders slurry for molding;
drying to produce long semi-finished product of the atomizer;
cutting off the semi-finished product of the atomizer and taking out the auxiliary core to form the atomizer.

[0040] The present invention also provides a manufacturing method of atomizer, comprising the following steps:

weaving or cross-winding resistance wires on an auxiliary core to form a two-layer mesh structure, and cutting and taking out the auxiliary core to make a mesh heating element, or, weaving or cross-winding the resistance wires into a long strip of heating element, and then cutting to form a mesh heating element;
squeezing cellulose containing fibers or powders slurry into a long tube including an axial atomizer wicking element

through-hole, drying it, and cutting it off to make an atomizer wicking element, or, squeezing cellulose containing fibers or powders slurry into a long strip including an auxiliary core, drying it, and cutting it off, then taking out the auxiliary core to make an atomizer wicking element;
sleeving the mesh heating element with an atomizer wicking element to form an atomizer, or sleeving the atomizer wicking element with a mesh heating element to form an atomizer.

[0041] The present invention also provides a manufacturing method of atomizer, comprising the following steps:

weaving or cross-winding the resistance wires into a mesh like long strip of mesh heating element;
pulling the long strip of mesh heating element in the mold, while injecting cellulose containing fibers or powders slurry for molding;
drying to make a long strip of atomizer;
cutting off the long strip of atomizer to make an atomizer.

[0042] The present invention also provides a manufacturing method of atomizer, comprising the following steps:

using cotton fiber bundles, carbon fiber bundles, ceramic fiber bundles, or glass fiber bundles as the atomizer wicking element;
weaving or cross-winding the resistance wires to form a mesh heating element that is wrapped around the outer peripheral surface of the atomizer wicking element in a 360-degree surrounding manner; wherein at least two polygonal resistance wires are controlled to interlock at adjacent bends to form a mesh and are wrapped around the outer peripheral surface of the atomizer wicking element;
producing coiled atomizer material;
cutting the required length from the coiled atomizer material as the atomizer.

[0043] The atomizer of the present invention comprises a mesh heating element that is wrapped around the outer or inner peripheral surface of the atomizer wicking element in a 360-degree surrounding manner, so that the atomizer has better strength and shape stability. The heat generated by the 360-degree surrounding mesh heating element can be evenly distributed on the surface of the atomizer wicking element , by which the liquid on the atomizer wicking element can be atomized more sufficiently, thereby making the atomization more stable and reliable, and the taste more delicate and fuller. The traditional atomizer with spiral heating elements and pins has poor shape stability, difficulty in controlling pin alignment during installation, and low assembly efficiency. Because the mesh heating element is wrapped around the outer or inner peripheral surface of the atomizer wicking element in 360-degree surrounding manner, the atomizer in the present invention does not need pins, so that the electrode can contact the outer or inner peripheral wall of the mesh heating element from any direction, which is conducive to the efficient assembly of the atomizer in the aerosol cartridge.

[0044] The atomizer in the prior art usually requires individual production, resulting in low production efficiency. According to the atomizer of the present invention, it is possible to continuously produce and harvest coiled atomizer material, which can greatly improve production efficiency and facilitate the storage and transportation of atomizer, thus significantly reduce the cost of atomizer. The atomizer can be installed by unwinding and cutting the required length, which is conducive to the automatic assembly of the atomizer.

[0045] Compared with the prior art, the atomizer of the present invention has low cost, good atomization sufficiency, delicate and full taste. The atomization of the aerosol cartridge using this atomizer is stable and reliable with small individual differences and good user experience.

[0046] In order to make the above content of the present invention more obvious and understandable, the following preferred embodiments are presented in detail with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0047] One or more embodiments are illustrated by way of example with reference to the pictures in the corresponding drawings, which do not constitute a limitation on the embodiments, elements having the same reference numerals in the accompanying drawings are represented as similar elements, unless specifically stated, the figures in the drawings do not constitute a proportion limitation.

FIG. 1 shows a schematic structural view of a first atomizer according to the first embodiment of the present invention.
FIG. 2 shows a schematic structural view of a second atomizer according to the first embodiment of the present invention.
FIG. 3 shows a schematic structural view of a first mesh heating element to the first embodiment of the present invention.

FIG. 4 shows a schematic structural view of a second mesh heating element to the first embodiment of the present invention.

FIG. 5 shows a schematic structural view of a third mesh heating element to the first embodiment of the present invention.

FIG. 6 shows a schematic structural view of a fourth mesh heating element to the first embodiment of the present invention.

FIG. 7 shows a schematic structural view of a fifth mesh heating element to the first embodiment of the present invention.

FIG. 8 shows a schematic structural view of a sixth mesh heating element to the first embodiment of the present invention.

FIG. 9 shows a schematic structural view of a seventh mesh heating element to the first embodiment of the present invention.

FIG. 10 shows a schematic structural view of an eighth mesh heating element to the first embodiment of the present invention.

FIG. 11 shows a schematic structural view of a third atomizer to the first embodiment of the present invention.

FIG. 12 shows a schematic structural view of a fourth atomizer to the first embodiment of the present invention.

FIG. 13 shows a schematic structural view of a fifth atomizer to the first embodiment of the present invention.

FIG. 14 shows a schematic structural view of a sixth atomizer to the first embodiment of the present invention.

FIG. 15 shows a schematic structural view of a seventh atomizer to the first embodiment of the present invention.

FIG. 16 shows a schematic cross-sectional view of the seventh atomizer according to the first embodiment of the present invention.

FIG. 17 shows a schematic structural view of an eighth atomizer to the first embodiment of the present invention.

FIG. 18 shows a schematic cross-sectional view of the eighth atomizer according to the first embodiment of the present invention.

FIG. 19 shows a schematic structural view of a ninth atomizer to the first embodiment of the present invention.

FIG. 20 shows a schematic cross-sectional view of the ninth atomizer according to the first embodiment of the present invention.

FIG. 21 shows a schematic structural view of a tenth atomizer to the first embodiment of the present invention.

FIG. 22 shows a schematic cross-sectional view of the tenth atomizer according to the first embodiment of the present invention.

FIG. 23 shows a schematic structural view of a first aerosol cartridge to the first embodiment of the present invention.

FIG. 24 shows a schematic structural decomposition view of a first aerosol cartridge to the first embodiment of the present invention.

FIG. 25 shows a schematic structural view of a second aerosol cartridge to the first embodiment of the present invention.

FIG. 26 shows a schematic structural decomposition view of a second aerosol cartridge to the first embodiment of the present invention.

FIG. 27 shows a schematic structural view of a third aerosol cartridge to the first embodiment of the present invention.

FIG. 28 shows a schematic structural decomposition view of a third aerosol cartridge to the first embodiment of the present invention.

FIG. 29 shows a schematic structural view of a first aerosol cartridge to the second embodiment of the present invention.

FIG. 30 shows a schematic structural decomposition view of the first aerosol cartridge to the second embodiment of the present invention.

FIG. 31 shows a schematic structural view of a second aerosol cartridge to the second embodiment of the present invention.

FIG. 32 shows a schematic structural decomposition view of the second aerosol cartridge to the second embodiment of the present invention.

FIG. 33 shows a schematic structural view of a third aerosol cartridge to the second embodiment of the present invention.

FIG. 34 shows a schematic structural decomposition view of the third aerosol cartridge to the second embodiment of the present invention.

FIG. 35 shows a schematic structural view of a first aerosol cartridge to the third embodiment of the present invention.

FIG. 36 shows a schematic structural decomposition view of the first aerosol cartridge to the third embodiment of the present invention.

FIG. 37 shows a schematic structural view of a second aerosol cartridge to the third embodiment of the present invention.

FIG. 38 shows a schematic structural decomposition view of the second aerosol cartridge to the third embodiment of

the present invention.

FIG. 39 shows a schematic structural view of a first aerosol cartridge to the fourth embodiment of the present invention.

FIG. 40 shows a schematic structural decomposition view of the first aerosol cartridge to the fourth embodiment of the present invention.

FIG. 41 shows a schematic structural view of a second aerosol cartridge to the fourth embodiment of the present invention.

FIG. 42 shows a schematic structural decomposition view of the second aerosol cartridge to the fourth embodiment of the present invention.

FIG. 43 shows a schematic structural view of a first aerosol cartridge to the fifth embodiment of the present invention.

FIG. 44 shows a schematic structural decomposition view of the first aerosol cartridge to the fifth embodiment of the present invention.

FIG. 45 shows a schematic structural view of a first atomizer of an aerosol cartridge to the fifth embodiment of the present invention.

FIG. 46 shows a schematic structural view of a second aerosol cartridge to the fifth embodiment of the present invention.

FIG. 47 shows a schematic structural decomposition view of the second aerosol cartridge to the fifth embodiment of the present invention.

FIG. 48 shows a schematic structural view of an eleventh atomizer according to the first embodiment of the present invention.

FIG. 49 shows a schematic structural view of a twelfth atomizer according to the first embodiment of the present invention.

FIG. 50 shows a schematic cross-sectional view of the twelfth atomizer according to the first embodiment of the present invention.

FIG. 51 shows a schematic structural view of an aerosol cartridge according to the eighth embodiment of the present invention.

DETAILED DESCRIPTION

[0048] The embodiments of the present invention are described below by way of specific embodiments, and those skilled in the art can readily understand other advantages and functions of the present invention from the disclosure of the present invention.

[0049] Exemplary embodiments of the present invention will now be described with reference to the accompanying drawings; however, the invention may be embodied in many different forms and is not limited to the embodiments described herein, which are provided for the purpose of providing a detailed and complete disclosure of the present invention, and fully conveying the scope of the invention to those skilled in the art. The terminology shown in the exemplary embodiments in the drawings is not intended to be limiting of the present invention. In the drawings, the same elements/components generally use the same or similar reference numerals.

[0050] As used herein, the terms including scientific and technical terms have the meanings commonly understood to one skilled in the art, unless otherwise indicated. In addition, it is to be understood that a term defined in commonly used dictionaries should be understood to have a consistent meaning in the context of its associated domain and should not be interpreted as an idealized or overly formal meaning.

The first embodiment

[0051] FIG. 1 shows a schematic structural view of a first atomizer according to the first embodiment of the present invention. FIG. 2 shows a schematic structural view of a second atomizer according to the first embodiment of the present invention.

[0052] As shown in FIGS. 1 and 2, an atomizer 930 comprises an atomizer wicking element 932 and a mesh heating element 931, and the mesh heating element 931 is wrapped around the outer peripheral surface of the atomizer wicking element 932 in a 360-degree surrounding manner, and/or is adhered to the inner peripheral surface of the atomizer wicking element 932 in a 360-degree surrounding manner.

[0053] The mesh heating element 931 can be partially embedded in the outer peripheral surface of the atomizer wicking element 932, and/or, the mesh heating element 931 can be partially embedded in the inner peripheral surface of the atomizer wicking element 932. That is to say, the mesh heating element 931 can be partially embedded in the atomizer wicking element 932, partially exposed from the outer and/or inner peripheral surface of the atomizer wicking element 932.

[0054] The atomizer wicking element 932 can be a conventional atomizer wicking element 932 in the art, which is used to transport the liquid to be atomized to the atomizer 930.

[0055] The mesh heating element 931 can be formed into a 360-degree surrounding mesh structure by etching,

punching, weaving, cross-winding, or welding resistance materials. Preferably, the mesh heating element 931 is made of resistance wires 9311 by weaving or cross-winding.

[0056] In the present invention, the resistance wires 9311 generally refers to metal or non-metal wires that have a certain resistance and can generate heat when energized, such as nickel-chromium alloy wire, iron-chromium alloy wire, etc. The cross-section of the resistance wires 9311 can be circular, rectangular, or other geometric shapes. The diameter of the resistance wires 9311 with a circular cross-section can be selected according to application requirements.

[0057] FIG. 3 shows a schematic structural view of a first mesh heating element to the first embodiment of the present invention. FIG. 4 shows a schematic structural view of a second mesh heating element to the first embodiment of the present invention. FIG. 5 shows a schematic structural view of a third mesh heating element to the first embodiment of the present invention. FIG. 6 shows a schematic structural view of a fourth mesh heating element to the first embodiment of the present invention. FIG. 7 shows a schematic structural view of a fifth mesh heating element to the first embodiment of the present invention. FIG. 8 shows a schematic structural view of a sixth mesh heating element to the first embodiment of the present invention. FIG. 9 shows a schematic structural view of a seventh mesh heating element to the first embodiment of the present invention. FIG. 10 shows a schematic structural view of an eighth mesh heating element to the first embodiment of the present invention.

< Mesh heating element >

[0058] As shown in FIGS. 3 to 10, the mesh heating element 931 is formed by weaving or cross-winding one or more resistance wires 9311. The resistance value of the resistance wires 9311 of the weaved mesh heating element 931 can be the same or different.

[0059] The mesh heating element 931 may include, but is not limited to, the following woven or cross-wound structures:

1) As shown in FIGS. 3, 4, 5, and 6, the mesh heating element 931 comprises at least one left-handed resistance wire 9311a and at least one right-handed resistance wire 9311b. Preferably, the mesh heating element 931 includes two to eight resistance wires 9311, one part of which is left-handed resistance wires 9311a, and the other part is right-handed resistance wires 9311b. In the present invention, the left-handed resistance wire 9311a is formed by spiraling the resistance wires 9311 upwards in a clockwise direction from bottom to top when the mesh heating element 931 is placed vertically and viewed from top to bottom, and the right-handed resistance wire 9311b is formed by spiraling the resistance wires 9311 upwards in a counterclockwise direction from bottom to top when the mesh heating element 931 is placed vertically and viewed from top to bottom.

[0060] As shown in FIG. 3, the mesh heating element 931 comprises a left-handed resistance wire 9311a and a right-handed resistance wire 9311b, and it can be seen that the left-handed resistance wire 9311a and the right-handed resistance wire 9311b spiral upwards and intersect with each other to form a 360-degree surrounding mesh structure when the mesh heating element 931 is placed vertically.

[0061] As shown in FIG. 4, the mesh heating element 931 comprises a left-handed resistance wire 9311a and two right-handed resistance wires 9311b, and it can be seen that the left-handed resistance wire 9311a and the right-handed resistance wire 9311b spiral upwards and intersect each other to form a 360-degree surrounding mesh structure when the mesh heating element 931 is placed vertically.

[0062] As shown in FIG. 5, the mesh heating element 931 comprises two left-handed resistance wires 9311a and two right-handed resistance wires 9311b, and it can be seen that the left-handed resistance wire 9311a and the right-handed resistance wire 9311b spiral upwards and intersect each other to form a 360-degree surrounding mesh structure when the mesh heating element 931 is placed vertically.

[0063] As shown in FIG. 6, the mesh heating element 931 comprises three left-handed resistance wires 9311a and three right-handed resistance wires 9311b, and it can be seen that the left-handed resistance wire 9311a and the right-handed resistance wire 9311b spiral upwards and intersect each other to form a 360-degree surrounding mesh structure when the mesh heating element 931 is placed vertically.

[0064] The left-handed resistance wire 9311a and the right-handed resistance wire 9311b exist simultaneously in the mesh heating element 931, and the left-handed resistance wire 9311a and the right-handed resistance wire 9311b intersect each other to form a 360-degree surrounding mesh structure, which helps to improve the overall strength and shape retention ability of the atomizer 930, and also helps the mesh heating element 931 to evenly distribute heat on the outer peripheral surface or inner peripheral surface of the atomizer wicking element 932 when it is energized. The use of this atomizer 930 can improve the atomization efficiency and make the atomization more thorough. If the atomizer 930 is used in inhalation devices such as electronic cigarettes, it can make the taste more delicate and fulfilling when the aerosol is inhaled.

[0065] 2) As shown in FIG. 7 and 8, the resistance wires 9311 of the mesh heating element 931 comprises warp resistance wires 9311c and weft resistance wires 9311d.

[0066] As shown in FIG. 7, the warp resistance wires 9311c can be multiple resistance wires 9311 arranged in parallel along the axial direction, and the weft resistance wires 9311d can be multiple circular resistance wires 9311 that intersect perpendicularly with the warp resistance wire 9311c. In this case, multiple warp resistance wires 9311c and multiple weft resistance wires 9311d can be woven into a mesh on the outer or inner peripheral surface of the atomizer wicking element 932.

[0067] As shown in FIG. 8, the mesh heating element 931 can also be made by weaving or cross-winding a weft resistance wire 9311d and multiple warp resistance wires 9311c. Alternatively, a resistance wire 9311 can be twisted back and forth to form a warp resistance wire 9311c, and then woven or cross-wound with a spiral weft resistance wire 9311d. Alternatively, a resistance wire 9311 can be twisted back and forth to form a warp resistance wire 9311c, and then woven or cross-wound with multiple circular weft resistance wires 9311d.

[0068] 3) As shown in FIG. 9, the mesh heating element 931 may also comprise at least two left-handed resistance wires 9311a or right-handed resistance wires 9311b with different pitches. Two or more left-handed resistance wires 9311a or right-handed resistance wires 9311b with different pitches will intersect on the mesh heating element 931 at certain intervals to form a mesh structure. As shown in FIG. 9, the mesh heating element 931 includes two right-handed resistance wires 9311b with different pitches, which are cross-wound to form the mesh heating element 931.

[0069] 4) As shown in FIG. 10, the mesh heating element 931 comprises at least one resistance wire 9311, which includes a left-handed resistance wire 9311a and a right-handed resistance wire 9311b. The left-handed resistance wire 9311a and the right-handed resistance wire 9311b are woven or cross-wound to form a mesh.

[0070] As shown in FIG. 10, the mesh heating element 931 includes a resistance wire 9311. It can be seen that the resistance wire 9311 spirals upwards from bottom to top to form a right-handed resistance wire 9311b when the mesh heating element 931 is placed vertically. After the resistance wire 9311 spirals up to a certain height, it then spirals down from top to bottom to form a left-handed resistance wire 9311a. Thus, the left-handed resistance wire 9311a and the right-handed resistance wire 9311b are woven or cross-wound to form the mesh heating element 931. Because the same resistance wire 9311 has both left-handed resistance wire 9311a and the right-handed resistance wire 9311b which are intersected to form a network, it helps to improve the strength and shape retention ability of the atomizer 930, and also helps to evenly distribute heat on the outer or inner peripheral surface of the atomizer wicking element 932 when it is energized, so that the atomization is uniform and stable.

< **Atomizer** >

[0071] FIG. 11 shows a schematic structural view of a third atomizer to the first embodiment of the present invention. FIG. 12 shows a schematic structural view of a fourth atomizer to the first embodiment of the present invention.

[0072] As shown in FIGS. 11 and 12, when the mesh heating element 931 is adhered to the inner peripheral surface of the atomizer wicking element 932 in a 360-degree surrounding manner, the outer peripheral surface of the mesh heating element 931 can be coated with cellulose fiber or powder slurry and then dried to form the atomizer wicking element 932.

[0073] As shown in FIG. 11, it is also possible to use woven or non-woven fabrics as the atomizer wicking element 932 to wrap around the outer peripheral surface of the mesh heating element 931. In this case, a binding wire L can be wrapped around the outer peripheral surface of the atomizer wicking element 932 to make the atomizer 930 more stable.

[0074] As shown in FIG. 12, the mesh heating element 931 can also be provided on both the outer and inner peripheral surfaces of the atomizer 930 as needed. The mesh heating element 931 provided on the outer peripheral surface can not only play the role of heating, but also can play the role of binding the atomizer wicking element 932, so that the atomizer 930 is more stable.

[0075] FIG. 13 shows a schematic structural view of a fifth atomizer to the first embodiment of the present invention. As shown in FIG. 13, when the mesh heating element 931 is wrapped around the outer peripheral surface of the atomizer wicking element 932 in a 360-degree surrounding manner, high-temperature resistant fiber bundles or fiber rods such as cotton fiber, glass fiber, ceramic fiber or carbon fiber can be used as the atomizer wicking element 932.

[0076] The mesh heating element 931 shown in FIG. 13 includes at least one resistance wire 9311. Preferably, the mesh heating element 931 includes a resistance wire 9311. It can be seen that a resistance wire 9311 starts from the upper part of the atomizer wicking element 932 when the mesh heating element 931 is placed vertically, and spirals down in a left-handed or right-handed manner to wind to the lower part of the atomizer wicking element 932 to form a left-handed resistance wire 9311a or a right-handed resistance wire 9311b. Then, the resistance wire 9311 is wound from the lower part of the atomizer wicking element 932 to the upper part of the atomizer wicking element 932 in a left-handed or right-handed manner to form the right-handed resistance wire 9311b or the left-handed resistance wire 9311a. As required, the spiral upward winding process or spiral down winding process can be repeated to form multiple left-handed resistance wires 9311a or right-handed resistance wires 9311b to form a multi-layer mesh heating element 931.

[0077] Of course, cotton fiber, glass fiber, ceramic fiber, or carbon fiber can also be used as the atomizer wicking element 932. The two ends of a resistance wire 9311 are started from the lower part of the atomizer wicking element 932 and spiraled upwards in a left-handed or right-handed manner and wound to the upper part of the atomizer wicking element

932, and woven or cross-wound on the outer peripheral surface of the atomizer wicking element 932 to form a mesh heating element 931.

[0078] FIG. 14 shows a schematic structural view of a sixth atomizer to the first embodiment of the present invention. As shown in FIG. 14, the atomizer 930 comprises an atomizer wicking element 932 and a mesh heating element 931, and the mesh heating element 931 wraps around the outer peripheral surface of the atomizer wicking element 932 in a 360-degree surrounding manner in the structure of the sixth atomizer according to the first embodiment of the present invention.

[0079] The mesh heating element 931 woven from resistance wires 9311 comprises at least one left-handed resistance wire 9311a and at least one right-handed resistance wire 9311b. Preferably, the mesh heating element 931 comprises 2 to 8 resistance wires 9311, one part of which is formed into the left-handed resistance wire 9311a, and the other part forms the right-handed resistance wire 9311b. The left-handed resistance wire 9311a and the right-hand resistance wire 9311b that exist simultaneously in the mesh heating element 931 intersect with each other to form a mesh.

[0080] As shown in FIG. 14, the mesh heating element 931 with a two-layer mesh structure, comprises a first layer mesh heating element 931f and a second layer mesh heating element 9311s in the structure of the sixth atomizer according to the first embodiment of the present invention. In FIG. 14, the dashed line represents the first layer mesh heating element 931f closely attached to the outer peripheral surface of the atomizer wicking element 932, and the solid line represents the second layer mesh heating element 9311s wrapped on top of the first layer heating element. The number and resistance values of the resistance wires of the two layers of heating elements can be the same or different. The second layer mesh heating element 9311s can further heat the aerosol generated by the first layer mesh heating element 9311f to form smaller aerosol particles, thereby allowing users to experience a delicate and drier aerosol.

[0081] FIG. 15 shows a schematic structural view of a seventh atomizer to the first embodiment of the present invention. FIG. 16 shows a schematic cross-sectional view of the seventh atomizer according to the first embodiment of the present invention.

[0082] According to the seventh atomizer 930 of the first embodiment of the present invention, the atomizer wicking element 932 can be cellulose fiber or powder, which can be derived from cotton, wood, flax, etc., or can be regenerated cellulose fiber. The atomizer wicking element 932 can also be porous ceramics, which are hard and easy to assemble when sintered. The atomizer wicking element 932 and the mesh heating element 931 are preferably formed integrally. The mesh heating element 931 is adhered to the inner peripheral surface of the atomizer wicking element 932 in a 360-degree surrounding manner, and the mesh heating element 931 is partially embedded in the inner peripheral surface of the atomizer wicking element 932.

[0083] FIG. 17 shows a schematic structural view of an eighth atomizer to the first embodiment of the present invention. FIG. 18 shows a schematic cross-sectional view of the eighth atomizer according to the first embodiment of the present invention.

[0084] According to the eighth atomizer 930 of the first embodiment of the present invention, the atomizer wicking element 932 is cellulose fiber, the mesh heating element 931 and the atomizer wicking element 932 are formed separately, and the mesh heating element 931 is sleeved with an atomizer wicking element 932, so that the mesh heating element 931 is adhered to the inner peripheral surface of the atomizer wicking element 932 in a 360-degree manner.

[0085] The heating element is preferably formed by weaving or cross-winding the resistance wire 9311, and the atomizer 930 comprises more than two layers of mesh heating element 931, one of which is closely attached to the inner peripheral surface of the atomizer wicking element 932. The atomizer 930 with multi-layer mesh heating elements 931 can more fully atomize liquids, which is beneficial for reducing the particles of the aerosol thereby allowing users to experience a drier aerosol.

[0086] FIG. 19 shows a schematic structural view of a ninth atomizer to the first embodiment of the present invention. FIG. 20 shows a schematic cross-sectional view of the ninth atomizer according to the first embodiment of the present invention.

[0087] According to the ninth atomizer 930 of the first embodiment of the present invention, the atomizer wicking element 932 and the mesh heating element 931 are formed integrally. The mesh heating element 931 is wrapped around the outer peripheral surface of the atomizer wicking element 932 in a 360-degree surrounding manner, and the mesh heating element 931 is partially embedded in the outer peripheral surface of the atomizer wicking element 932. The material of the atomizer wicking element 932 can be fibers or powders containing cellulose, carbon fibers, and porous ceramics.

[0088] FIG. 21 shows a schematic structural view of a tenth atomizer to the first embodiment of the present invention. FIG. 22 shows a schematic cross-sectional view of the tenth atomizer according to the first embodiment of the present invention.

[0089] According to the tenth atomizer 930 of the first embodiment of the present invention, the atomizer wicking element 932 and the mesh heating element 931 are formed separately, and the atomizer wicking element 932 is sleeved with the mesh heating element 931, so that the mesh heating element 931 wraps around the outer peripheral surface of the atomizer wicking element 932 in a 360-degree surrounding manner. The mesh heating element 931 is preferably formed by weaving or cross-winding resistance wires 9311, the atomizer 930 comprises two or more layers of mesh heating elements 931, one of which is tightly attached to the outer peripheral surface of the atomizer wicking element 932. The

atomizer 930 with multi-layer mesh heating elements 931 can more fully atomize liquids, which is beneficial for reducing the particles of the aerosol and allowing users to feel a drier aerosol. The material of the atomizer wicking element 932 can be fibers or powders containing cellulose, carbon fibers, or porous ceramics.

< Manufacturing method of atomizer >

[0090] The manufacturing method of the first atomizer provided by the present invention comprises the following steps:

Using cotton fiber bundles, carbon fiber bundles, ceramic fiber bundles, or glass fiber bundles as the atomizer wicking element 932;
Weaving or cross-winding the resistance wires 9311 to form a mesh heating element 931 that is wrapped around the outer peripheral surface of the atomizer wicking element 932 in a 360-degree surrounding manner; wherein at least a part of the resistance wires 9311 are controlled to form a right-handed resistance wire 9311b that is spirally wrapped around the outer peripheral surface of the atomizer wicking element 932, and at least a part of the resistance wires 9311 are controlled to form a left-handed resistance wire 9311a that is spirally wrapped around the outer peripheral surface of the atomizer wicking element 932;
Producing coiled atomizer material;
Cutting the required length from the coiled atomizer material as the atomizer 930.

[0091] The manufacturing method of the second atomizer provided by the present invention comprises the following steps:

Using cotton fiber bundles, carbon fiber bundles, ceramic fiber bundles, or glass fiber bundles as the atomizer wicking element 932;
Weaving or cross-winding the resistance wires 9311 to form a mesh heating element 931 that is wrapped around the outer peripheral surface of the atomizer wicking element 932 in a 360-degree surrounding manner; wherein at least one of the resistance wires 9311 are controlled to wrap around the outer peripheral surface of the atomizer wicking element 932 with a first pitch, and at least one of the resistance wires 9311 are controlled to wrap around the outer peripheral surface of the atomizer wicking element 932 with a second pitch, and the first pitch is not equal to the second pitch;
Producing coiled atomizer material;
Cutting the required length from the coiled atomizer material as the atomizer 930.

[0092] The manufacturing method of the third atomizer provided by the present invention comprises the following steps:

Using plastic or metal as an auxiliary core, weave or cross-wind the resistance wires 9311 to form a mesh heating element 931 that is wrapped around the outer peripheral surface of the auxiliary core in a 360-degree surrounding manner; wherein at least a part of the resistance wires 9311 are controlled to form a right-handed resistance wire 9311b that is spirally wrapped around the outer peripheral surface of the auxiliary core, and at least a part of the resistance wires 9311 are controlled to form a left-handed resistance wire 9311a that is spirally wrapped around the outer peripheral surface of the auxiliary core;
Wrapping around the outer peripheral surface of the mesh heating element 931 with an atomizer wicking element 932, such as woven or non-woven fabric, or coating the outer peripheral surface of the mesh heating element 931 with cellulose containing fibers or powders slurry and then dry;
Producing coiled atomizer material;

[0093] Cutting the required length from the coiled atomizer material and taking out the auxiliary core to form the atomizer 930.

[0094] The manufacturing method of the fourth atomizer provided by the present invention comprises the following steps:

Using cotton fiber bundles, carbon fiber bundles, ceramic fiber bundles, or glass fiber bundles as the atomizer wicking element 932;
Starting a resistance wire 9311 from the lower part of the atomizer wicking element 932, and spiraling up and winding to the upper part of the atomizer wicking element 932 in a left-handed or right-handed manner to form a left-handed resistance wire 9311a or a right-handed resistance wire 9311b;
Then, winding the resistance wire 9311 from the upper part of the atomizer wicking element 932 in a left-handed or right-handed manner to the lower part of the atomizer wicking element 932, to form a right-handed resistance wire

9311b or a left-handed resistance wire 9311a;
Weaving or cross-winding the left-handed resistance wire 9311a and the right-handed resistance wire 9311b to form a mesh heating element 931.

[0095] The manufacturing method of the fifth atomizer provided by the present invention comprises the following steps:

Using cotton fiber bundles, carbon fiber bundles, ceramic fiber bundles, or glass fiber bundles as the atomizer wicking element 932;
Starting the two ends of a resistance wire 9311 from the lower part of the atomizer wicking element 932, spiraling up and winding to the upper part of the atomizer wicking element 932 in a left-handed or right-handed manner respectively, and weaving or cross-winding on the outer peripheral surface of the atomizer wicking element 932 to form a mesh like mesh heating element 931;
Producing coiled atomizer material;
Cutting the required length from the coiled atomizer material as the atomizer 930.

[0096] The manufacturing method of the sixth atomizer provided by the present invention comprises the following steps:

Using cotton fiber bundles, carbon fiber bundles, ceramic fiber bundles, or glass fiber bundles as the atomizer wicking element 932;
Weaving or cross-winding a certain number of resistance wires 9311 to form a first layer of mesh heating element 9311f that is wrapped around the outer peripheral surface of the atomizer wicking element 932 in a 360-degree surrounding manner;
Weaving or cross-winding a certain number of resistance wires 9311 to form a second layer of mesh heating element 9311s that is wrapped around the outer peripheral surface of the first layer of mesh heating element 9311f in a 360-degree surrounding manner;
Producing coiled atomizer material;
Cutting the required length from the coiled atomizer material as the atomizer 930.

[0097] The manufacturing method of the seventh atomizer provided by the present invention comprises the following steps:

Weaving or cross-winding the resistance wires 9311 onto an auxiliary core to form a mesh heating element 931, and the auxiliary core can be made of metal or plastic;
Placing the mesh heating element 931 containing the auxiliary core into the mold and position it, and injecting cellulose containing fibers or powders slurry into the mold for molding, alternatively, continuously pulling the mesh heating element strip containing the auxiliary core in the mold, while injecting cellulose containing fibers or powders slurry for molding;
Drying to produce long semi-finished product of the atomizer 930;
Cutting off the semi-finished product of the atomizer 930 and taking out the auxiliary core to form the atomizer 930.

[0098] The manufacturing method of the eighth atomizer provided by the present invention comprises the following steps:

Weaving or cross-winding resistance wires on an auxiliary core to form a two-layer mesh structure, and cutting and taking out the auxiliary core to make a mesh heating element 931, alternatively, weaving or cross-winding the resistance wires 9311 into a long strip of heating element, and then cutting to form a mesh heating element 931;
Squeezing cellulose containing fibers or powders slurry into a long tube including an axial atomizer wicking element through-hole 932b, dry it, and cutting it off to make an atomizer wicking element 932, alternatively, squeezing cellulose containing fibers or powders slurry into a long strip including an auxiliary core, drying it, and cutting it off, then taking out the auxiliary core to make an atomizer wicking element 932;
Sleeving the mesh heating element 931 with an atomizer wicking element 932 to form an atomizer 930, or sleeving the atomizer wicking element 932 with a mesh heating element 931 to form an atomizer 930.

[0099] The manufacturing method of the ninth atomizer provided by the present invention comprises the following steps:

Weaving or cross-winding the resistance wires 9311 into a mesh like long strip of mesh heating element 931;
Pulling the long strip of mesh heating element 931 in the mold, while injecting cellulose containing fibers or powders slurry for molding;

Drying to make a long strip of atomizer 930;
Cutting off the long strip of atomizer 930 to make an atomizer 930.

[0100] The manufacturing method of the tenth atomizer provided by the present invention comprises the following steps:

Weaving or cross-winding the resistance wires 9311 on an auxiliary core to form a two-layer mesh structure, cutting and taking out the auxiliary core to make a mesh heating element 931, alternatively, Weaving or cross-winding the resistance wires 9311 into a long strip of the mesh heating element 931, and then cutting to form a mesh heating element 931.
Squeezing cellulose containing fibers or powders slurry into a long tube including an axial atomizer wicking element through-hole 932b, drying it, and cutting it off to make an atomizer wicking element 932, alternatively, squeezing cellulose containing fibers or powders slurry into a long strip including an auxiliary core, drying it, and cutting it off, then taking out the auxiliary core to make an atomizer wicking element 932.
Sleeving the atomizer wicking element 932 with a mesh heating element 931 to form an atomizer 930.

< Atomizing module and aerosol cartridge >

[0101] FIG. 23 shows a schematic structural view of a first aerosol cartridge to the first embodiment of the present invention. FIG. 24 shows a schematic structural decomposition view of a first aerosol cartridge to the first embodiment of the present invention. FIG. 25 shows a schematic structural view of a second aerosol cartridge to the first embodiment of the present invention. FIG. 26 shows a schematic structural decomposition view of a second aerosol cartridge to the first embodiment of the present invention. FIG. 27 shows a schematic structural view of a third aerosol cartridge to the first embodiment of the present invention. FIG. 28 shows a schematic structural decomposition view of a third aerosol cartridge to the first embodiment of the present invention.

[0102] As shown in FIGS. 23 to 28, the present invention also provides an atomizing module 700, which at least comprises any of the atomizer 930 mentioned above. The atomizer 930 comprises an atomizer wicking element 932 and a mesh heating element 931, and the mesh heating element 931 is wrapped around the outer peripheral surface of the atomizer wicking element 932 in a 360-degree surrounding manner.

[0103] As shown in FIGS. 23 to 28, the atomizing module 700 according to the first embodiment of the present invention comprises an electrode 936 and an electrode clampingpiece 9364 arranged at one end of the electrode 936, and the electrode clampingpiece 9364 clamps the mesh heating element 931.

[0104] When the mesh heating element 931 is wrapped around the peripheral surface of the atomizer wicking element 932 in a 360-degree surrounding manner, the electrode clampingpiece 9364 can be clamped from the radial direction of the atomizer 930 to the outer peripheral surface of the mesh heating element 931.

[0105] In addition to the above-mentioned method of engaging the electrode 936 with the mesh heating element 931, those skilled in the art can also choose conventional methods in this field to electrically connect the electrode 936 with the mesh heating element 931, such as plugging, crimping, welding, etc.

[0106] According to different usage requirements, the resistance of the mesh heating element 931 between the two electrodes 936 is usually controlled at 0.5 to 2.0 ohms.

[0107] As shown in FIGS. 23 and 24, The atomizing module 700 of the first aerosol cartridge according to the first embodiment of the present invention comprises an atomizing module upper cover 710 and an atomizing module base 720, an atomizer 930 arranged between the atomizing module base 720 and the atomizing module upper cover 710, and an electrode 936. The electrode 936 is electrically connected to the mesh heating element 931 by passing through the atomizing module base 720.

[0108] As shown in FIGS. 23 to 28, the present invention also provides an aerosol cartridge 800, which comprises a liquid storage element 100 and any of the atomizing module 700 mentioned above.

[0109] The atomizer wicking element 932 can be connected directly with the liquid in the liquid storage element 100.

[0110] As shown in FIGS. 23 and 24, the first aerosol cartridge 800 according to the first embodiment of the present invention comprises an aerosol cartridge housing 810, a liquid storage element 100 arranged in the aerosol cartridge housing 810, an aerosol channel 1303 axially penetrating the liquid storage element 100, and a liquid storage element sealing element 823 sealing the bottom opening of the liquid storage element 100.

[0111] The aerosol cartridge 800 also comprises a base sealing element 824 that seals the bottom of the aerosol cartridge housing 810 and the gap between the aerosol cartridge housing 810 and the atomizing module base 720.

[0112] The liquid storage element sealing element 823 is provided with a liquid supply port 825 and an aerosol channel assembly port 826 penetrating through the liquid storage element sealing element 823. The liquid supply port 825 is correspondingly arranged with the atomizing module liquid guide hole 712. The aerosol channel assembly port 826 has a downward extending tubular protrusion. During assembly, the aerosol channel assembly port 826 of the liquid storage element sealing element 823 is sleeved on the outer peripheral surface of the aerosol channel 1303, and atomizing module

upper interface 711 is sleeved on the outer peripheral wall of the tubular protrusion of the aerosol channel assembly port 826.

[0113] In this embodiment, the upper end of the atomizing module liquid guide hole is docked to the liquid supply port 825, and the lower end is in contact with the atomizer 930, thereby allowing the atomizer 930 to directly connect with the liquid in the liquid storage element 100.

[0114] The top outlet of the aerosol channel 1303 is an aerosol outlet 1301, and the bottom opening of the aerosol channel 1303 is the atomizing module connection port 1302, which is used to connect with the atomizing module upper interface 711. The aerosol atomized by the atomizing module 700 escapes after passing through the atomizing module upper interface 711, the atomizing module connection port 1302, the aerosol channel 1303, and the aerosol outlet 1301. The atomization module base 720 is provided with an air inlet 1121 that axially penetrates through the atomizing module base 720 which is served as a channel for external air to enter the atomizing module 700.

[0115] The aerosol outlet 1301 can be provided with an aerosol outlet sealing plug 1306 that encloses the aerosol outlet 1301, and the air inlet 1121 of the atomizing module base 720 can be provided with an air inlet sealing plug (not shown) that encloses the air inlet 1121. The aerosol outlet sealing plug 1306 and the air inlet sealing plug can be respectively provided with silicone sealing plugs. The setting of the aerosol outlet sealing plug and the air inlet sealing plug can further enhance the anti-leakage capability of the aerosol cartridge 800 during storage and transportation.

[0116] In this embodiment, it is preferable to set two atomizing module liquid guide hole712, and the lower opening of the atomizing module liquid guide hole 712 is connected with the parts of the two ends of the atomizer 930 that do not pass through current. Usually, in the mesh heating element 931, only the portion located between the electrodes 936 will pass current and generate heat, while the portion outside the two electrodes will have almost no current passing through and basically does not generate heat.

[0117] In addition, according to the second atomizing module 700 of the aerosol cartridge in the first embodiment of the present invention, the mesh heating element 931 can be partially embedded in the outer peripheral surface of the atomizer wicking element 932. Moreover, the material of the atomizer wicking element 932 can be fibers or powders containing cellulose, carbon fibers, and porous ceramics. The atomizer 930 and the mesh heating element 931 can be formed integrally.

[0118] As shown in FIGS. 25 and 26, the structure of the third atomizing module 700 of the aerosol cartridge according to the first embodiment of the present invention is basically the same as that in FIGS. 23 and 24, and the same parts will not be repeated. In FIGS. 25 and 26, the atomizing module 700 also comprises a gas-liquid exchange element 290.

[0119] The atomizing module 700 comprises a gas-liquid exchange element 290, and the atomizer 930 is connected with the liquid in the liquid storage element 100 through a gas-liquid exchange element 290. The gas-liquid exchange element 290 can be assembled in the atomizing module liquid guide hole 712, and the two ends of the atomizer 930 that do not pass current are connected with the liquid in the liquid storage element 100 through the gas-liquid exchange element 290. The gas-liquid exchange element 290 can be a tubular bonding fiber with an axial through hole. In FIGS. 25 and 26, the lengths of the mesh heating element 931 and the atomizer wicking element 932 are basically the same.

[0120] As shown in FIGS. 27 and 28, the structure of the third atomizing module 700 of the aerosol cartridge according to the first embodiment of the present invention is basically the same as that in FIGS. 25 and 26, and the same parts will not be repeated. In FIGS. 27 and 28, The length of the atomizer wicking element 932 is greater than the length of the mesh heating element 931, so that both ends of the atomizer wicking element 932 extend out of the mesh heating element 931. The part of the atomizer wicking element 932 extending out of the mesh heating element 931 can be connected to the gas-liquid exchange element 290.

[0121] In this embodiment, since the mesh heating element 931 is wrapped around the outer peripheral surface of the atomizer wicking element 932 in a 360-degree surrounding manner, the pin connected from the atomizer 930 to the electrode 936 can be omitted. The electrode 936 can be electrically connected by contacting the mesh heating element 931 in any direction, thus reducing the difficulty of assembling the atomizer 930 in the aerosol cartridge 800 and greatly improving assembly efficiency.

[0122] The atomizer 930 of the present invention can continuously produce and harvest coiled atomizer material, which can greatly improve production efficiency and facilitate the storage and transportation of atomizer 930, thus significantly reducing the cost of atomizer 930.

[0123] When installing the atomizer 930, it can be unwound and cut the required length, which is conducive to the automatic assembly of the atomizer.

[0124] In this embodiment, the cross-section of the atomizer 930 can be made circular, but it can also be made elliptical or other geometric shapes as needed.

The second embodiment

[0125] FIG. 29 shows a schematic structural view of a first aerosol cartridge to the second embodiment of the present invention. FIG. 30 shows a schematic structural decomposition view of the first aerosol cartridge to the second

embodiment of the present invention. The structure of the present embodiment is similar to that of the first embodiment, and the same parts as the first embodiment will not be repeated in the description of this embodiment.

[0126] As shown in FIGS. 29 and 30, an atomizer 930 comprises an atomizer wicking element 932 and a mesh heating element 931, and the mesh heating element 931 is wrapped around the outer peripheral surface of the atomizer wicking element 932 in a 360-degree surrounding manner, and/or is adhered to the inner peripheral surface of the atomizer wicking element 932 in a 360-degree surrounding manner.

[0127] In this embodiment, the mesh heating element 931 is adhered to the inner peripheral surface of the atomizer wicking element 932 in a 360-degree surrounding manner.

[0128] Preferably, the mesh heating element 931 includes two to eight resistance wires 9311, one part of which is left-handed resistance wires 9311a, and the other part is right-handed resistance wires 9311b.

[0129] As shown in FIGS. 29 and 30, the atomizer wicking element 932 is formed with an atomizer wicking element through-hole 932b that axially penetrates through the atomizer wicking element 932, and the mesh heating element 931 is arranged in the atomizer wicking element through-hole 932b and is adhered to the inner peripheral surface of the atomizer 930. The outer peripheral surface of the atomizer wicking element 932 is connected with the liquid in the liquid storage element 100.

[0130] The atomizing module 700 according to this embodiment comprises an electrode 936 and an electrode insertion portion 9365 arranged at one end of the electrode 936, and the electrode insertion portion 9365 is connected to the mesh heating element 931 after inserted into the atomizer wicking element through-hole 932b. Specifically, the electrode insertion portion 9365 is in the shape of an earplug with a through hole, and the electrode insertion portions 9365 of the two electrodes 936 are respectively inserted into the atomizer wicking element through-hole 932b from the two ends of the horizontally arranged atomizer 930 and are connected to the mesh heating element 931.

[0131] In this embodiment, the liquid storage element sealing element 823 can be omitted, and the atomizing module upper cover 710 can also be used as the liquid storage element sealing element 823. The atomizing module upper cover 710 can be provided with only one atomizing module wicking hole 712. In order to transport the liquid in the liquid storage element 100 to the atomizer wicking element 932, the upper opening of the atomizing module wicking hole 712 is directly connected with the liquid in the liquid storage element 100, and its lower opening is in contact with the outer peripheral surface of the atomizer wicking element 932.

[0132] In this embodiment, aerosol cartridge 800 also comprises an aerosol channel 1303, and the angle between the atomizer wicking element through-hole 932b and the aerosol channel 1303 is greater than or equal to 45 degrees and less than or equal to 135 degrees when the atomizer wicking element 932 has an atomizer wicking element through-hole 932b that axially penetrates through the atomizer wicking element 932. Preferably, the angle between the atomizer wicking element through-hole 932b and the aerosol channel 1303 is 45 degrees, 60 degrees, 75 degrees, 90 degrees, 105 degrees, 120 degrees, and 135 degrees. The most preferred angle is basically equal to 90 degrees, that is to say, the most preferred configuration is that the atomizer wicking element through-hole 932b is arranged basically perpendicular to the aerosol channel 1303.

[0133] The atomizer wicking element through-hole 932b is connected with the aerosol channel 1303. When the aerosol cartridge 800 is working, the mesh heating element 931 surrounding the inner peripheral surface of the atomizer wicking element 932 evaporates the liquid, and the evaporated gas is mixed with the air flowing through the interior of the atomizer 930 to form an aerosol, which escapes through the aerosol channel 1303. This structure is conducive to the rapid replenishment of liquid from the liquid storage element 100 to the atomizer wicking element 932.

[0134] Moreover, because the atomizer wicking element through-hole 932b is arranged basically perpendicular to the aerosol channel 1303, the condensate of large particles is difficult to enter the aerosol channel 1303 due to inertia when the high-temperature condensate generated near the atomizer 930 turns vertically and enters the aerosol channel 1303, thereby reducing or avoiding the direct entry of condensate of large particles into the oral cavity and improving the user experience.

[0135] FIG. 31 shows a schematic structural view of a second aerosol cartridge to the second embodiment of the present invention. FIG. 32 shows a schematic structural decomposition view of the second aerosol cartridge to the second embodiment of the present invention.

[0136] As shown in FIGS. 31 and 32, the structure of the second atomizing module 700 of the aerosol cartridge according to the second embodiment of the present invention is basically the same as that in FIGS. 29 and 30, and the same parts will not be repeated.

[0137] As shown in FIGS. 31 and 32, the atomizing module upper cover 710 is provided with a first atomizing module wicking hole 712a and a second atomizing module wicking hole 712b. The upper opening of the first atomizing module wicking hole 712a is directly connected with the liquid in the liquid storage element 100, and its lower opening is in contact with the outer peripheral surface of the atomizer wicking element 932, thereby transporting the liquid in the liquid storage element 100 to the atomizer wicking element 932. The upper opening of the second atomizing module wicking hole 712b is directly connected with the liquid in the liquid storage element 100, and its lower opening is connected with the atmosphere, and the second atomizing module wicking hole 712b is provided with a gas-liquid exchange element

290. In this embodiment, the gas-liquid exchange element 290 is mainly used for delivering gas to the liquid storage element 100, thereby making the atomization of the atomizing module 700 more stable and reliable.

[0138] The gas-liquid exchange element 290 can be a tubular bonded fiber or tubular plastic product or tubular metal product including axial through-holes. The atomizer wicking element through-hole 932b is connected with the aerosol channel 1303.

[0139] In the second atomizing module 700 of the aerosol cartridge according to the second embodiment of the present invention, the atomizing module 700 comprises an electrode 936 and an electrode insertion portion 9365 arranged at one end of the electrode 936, and the electrode insertion portion 9365 is connected to the mesh heating element 931 after inserted into the atomizer wicking element through-hole 932b. Specifically, the electrode insertion portion 9365 is in the shape of an arrow with a reverse hook, the electrode insertion portions 9365 of the two electrodes 936 can be respectively pierced through the atomizer wicking element 932 of the horizontally arranged atomizer 930, and entered into the atomizer wicking element through-hole 932b to connect with the mesh heating element 931.

[0140] FIG. 33 shows a schematic structural view of a third aerosol cartridge to the second embodiment of the present invention. FIG. 34 shows a schematic structural decomposition view of the third aerosol cartridge to the second embodiment of the present invention. The structure of the third atomizing module 700 of the aerosol cartridge according to the second embodiment of the present invention is basically the same as that in FIGS. 31 and 32, and the same parts will not be repeated.

[0141] As shown in FIGS. 33 and 34, the third aerosol cartridge 800 according to the second embodiment of the present invention has an independent liquid storage element sealing element 823, and the liquid storage element sealing element has a liquid supply port 825 and a breath channel 836 arranged at the bottom of the liquid storage element sealing element 823.

[0142] The atomizing module 700 is an independent integrated assembly, which comprises an atomizing module upper cover 710, an atomizing module base 720, an atomizer 930 installed between the atomizing module base 720 and the atomizing module upper cover 710, a gas-liquid exchange element 290, and an electrode 936. The atomizing module upper cover 710 is provided with a first atomizing module wicking hole 712a, a second atomizing module wicking hole 712b, and an atomizing module upper interface 711.The first atomizing module wicking hole 712a has a downward extending tubular protrusion. The upper part of the gas-liquid exchange element 290 is assembled in the second atomizing module wicking hole 712b, and its lower part can be extended into the groove on the atomizing module base 720 and be connected with the atmosphere.

[0143] When the atomizing module 700 and the liquid storage element 100 are assembled together, an aerosol cartridge 800 can be formed. After assembled, the first atomizing module wicking hole 712a extends upward to form a tubular protrusion that is inserted into the liquid supply port 825, and a breath hole 827 is formed between the tubular protrusion and the inner peripheral wall of the liquid supply port 825. The breath hole 827 is connected with the breath channel 836, and the breath channel 836 is connected with the assembled gas-liquid exchange element 290.

[0144] According to the third aerosol cartridge 800 of the second embodiment of the present invention, the atomizing module 700 adopts a detachable structure, which is easy to replace the liquid storage element 100 in the aerosol cartridge 800, as well as facilitates maintenance and replacement of the atomizing module 700.

[0145] In this embodiment, the second atomizing module wicking hole 712b can also be arranged to extend upward to form a tubular protrusion, the second atomizing module wicking hole 712b can be also passed through the liquid storage element sealing element 823 and be inserted into the liquid storage element 100 when assembled with the liquid storage element 100, so that the gas-liquid exchange element 290 can be connected with the liquid storage element 100 without providing the breath hole 827 and the breath 836. In this embodiment, the gas-liquid exchange element 290 mainly plays the role of an independent breath guide without undertaking the function of transporting liquid to the atomizer wicking element 932.

The third embodiment

[0146] FIG. 35 shows a schematic structural view of a first aerosol cartridge to the third embodiment of the present invention. FIG. 36 shows a schematic structural decomposition view of the first aerosol cartridge to the third embodiment of the present invention. FIG. 37 shows a schematic structural view of a second aerosol cartridge to the third embodiment of the present invention. FIG. 38 shows a schematic structural decomposition view of the second aerosol cartridge to the third embodiment of the present invention. The structure of the present embodiment is similar to that of the first embodiment, and the same parts as the first embodiment will not be repeated in the description of this embodiment.

[0147] As shown in FIGS. 35 and 36, an atomizer 930 comprises an atomizer wicking element 932 and a mesh heating element 931, and the mesh heating element 931 is wrapped around the outer peripheral surface of the atomizer wicking element 932 in a 360-degree surrounding manner, and/or is adhered to the inner peripheral surface of the atomizer wicking element 932 in a 360-degree surrounding manner.

[0148] In this embodiment, the mesh heating element 931 is adhered to the inner peripheral surface of the atomizer

wicking element 932 in a 360-degree surrounding manner. Preferably, the mesh heating element 931 includes two to eight resistance wires 9311, one part of which is left-handed resistance wires 9311a, and the other part is right-handed resistance wires 9311b.

[0149] As shown in FIGS. 35 and 36, in the present embodiment, according to the atomizing module 700 in the first aerosol cartridge 800 of the third embodiment of the present invention, the atomizer wicking element 932 is formed with an atomizer wicking element through-hole 932b that axially penetrates through the atomizer wicking element 932, the mesh heating element 931 is arranged in the atomizer wicking element through-hole 932b and is adhered to the inner peripheral surface of the atomizer 930.

[0150] The atomizer 930 is vertically arranged, that is, the central axis of the atomizing module 700 is perpendicular to the horizontal plane when the atomizing module 700 is placed horizontally.

[0151] At least a part of the outer peripheral surface of the atomizer wicking element 932 is sleeved with a hollow metal tube 9396, and the outer peripheral surface of the atomizer wicking element 932 is connected with the liquid in the liquid storage element 100 through the hollow metal tube 9396.

[0152] Specifically, the atomizing module 700 comprises a first electrode 936a and a second electrode 936b. One end of the first electrode 936a is provided with a first electrode insertion portion 9365a, and the electrode insertion portion 9365 is inserted into the atomizer wicking element through-hole 932b and connected to the mesh heating element 931. The second electrode 936b comprises a hollow metal tube 9396 sleeved on the outer peripheral surface of the atomizer wicking element 932, and a metal ring 9397 arranged at one end of the second electrode 936b. The metal ring 9397 is sleeved on the outer peripheral wall of the hollow metal tube 9396 and connected to it, and the end of the hollow metal tube 9396 opposite to the first electrode insertion portion 9365a protrudes inward into the hollow metal tube 9396 to form a second electrode insertion portion 9365b. When the hollow metal tube 9396 is sleeved on the outer peripheral surface of the atomizer 930, the second electrode insertion part 9365b is inserted into the atomizer wicking element through-hole 932b and connected to the mesh heating element 931.

[0153] In the present invention, the hollow metal tube 9396 refers to a metal tube with multiple through holes formed on the tube wall, which can allow liquid to enter the tube wall from outside through the multiple through holes on the tube wall.

[0154] The atomizing module 700 is an independent integrated assembly, which comprises an atomizing module upper cover 710, an atomizing module base 720, an atomizer 930 installed between the atomizing module base 720 and the atomizing module upper cover 710, a gas-liquid exchange element 290, and an electrode 936. The atomizing module upper cover 710 is provided with a first atomizing module wicking hole 712a, a second atomizing module wicking hole 712b, and an atomizing module upper interface 711.The first atomizing module wicking hole 712a extends upwards to form a tubular protrusion. The upper part of the gas-liquid exchange element 290 is assembled in the second atomizing module wicking hole 712b, and its lower part can be extended into the groove on the atomizing module base 720 and be connected with the atmosphere.

[0155] The atomizing module 700 also comprises an atomizing module upper cover 710, an atomizing module base 720, an atomizer 930 installed between the atomizing module base 720 and the atomizing module upper cover 710, and a gas-liquid exchange element 290. The atomizing module upper cover 710 is provided with a first atomizing module wicking hole 712a, a second atomizing module wicking hole 712b, and an atomizing module upper interface 711. The first atomizing module wicking hole 712a extends downward from the upper surface of the atomizing module upper cover 710, and then laterally extends to the atomizing module upper interface 711. The atomizer 930 is vertically installed in the atomizing module upper interface 711 and is connected with the first atomizing module wicking hole 711.

[0156] The upper part of the gas-liquid exchange element 290 is assembled in the second atomizing module wicking hole 712b, and its lower part can be extended into the groove on the atomizing module base 720 and be connected with the atmosphere.

[0157] As shown in FIGS. 35 and 36, according to the first aerosol bomb 800 of the third embodiment of the present invention, the liquid storage element sealing element is omitted, and the atomizing module upper cover 710 is also used as the liquid storage element sealing element. The liquid in the liquid storage element 100 is directly connected with to the hollow metal tube 9396 through the first atomizing module wicking hole 712a, and is connected with the atomizer wicking element 932 through the hollow metal tube 9396. The gas-liquid exchange element 290 is connected with the liquid in the liquid storage element 100 without participating in the delivery of liquid to the atomizer 930. and is mainly used to independently breath to the liquid storage element 100.

[0158] According to the first aerosol bomb 800 of the third embodiment of the present invention, the mesh heating element 931 adhered to the inner peripheral surface of the atomizer wicking element 932 atomizes the liquid, and the atomized gas is mixed with the air passing through the atomizer wicking element through-hole 932b to form an aerosol when the aerosol cartridge 800 is working.

[0159] The aerosol cartridge 800 is provided with a gas-liquid exchange element 290, which can make the atomization more stable and reliable. The gas-liquid exchange element 290 can be a tubular bonded fiber including axial through-holes.

[0160] As shown in FIGS. 37 and 38, the structure of the second aerosol cartridge according to the third embodiment of

the present invention is basically the same as that in FIGS. 35 and 36, and the same parts will not be repeated.

[0161] As shown in FIGS. 37 and 38, according to the second aerosol cartridge in the third embodiment of the present invention, there is an opening between the aerosol channel 1303 and the atomizing module upper cover 710 for transporting liquid to the atomizer 930 laterally, and the hollow metal pipe 9396 sleeved on the outer peripheral surface of the atomizer 930 is arranged relative to the opening of the transporting liquid. The upper part of the atomizer 930 is fixed by the inner tube wall of the aerosol channel 1303, and the lower part of the atomizer 930 is fixed by the atomizing module upper interface 711. The central axis of the atomizer 930 is preferably set to coincide with the central axis of the aerosol channel 1303.

The fourth embodiment

[0162] FIG. 39 shows a schematic structural view of a first aerosol cartridge to the fourth embodiment of the present invention. FIG. 40 shows a schematic structural decomposition view of the first aerosol cartridge to the fourth embodiment of the present invention. FIG. 41 shows a schematic structural view of a second aerosol cartridge to the fourth embodiment of the present invention. FIG. 42 shows a schematic structural decomposition view of the second aerosol cartridge to the fourth embodiment of the present invention. The structure of the present embodiment is similar to that of the first embodiment, and the same parts as the first embodiment will not be repeated in the description of this embodiment.

[0163] As shown in FIGS. 39 and 40, an atomizer 930 comprises an atomizer wicking element 932 and a mesh heating element 931, and the mesh heating element 931 is wrapped around the outer peripheral surface of the atomizer wicking element 932 in a 360-degree surrounding manner, and/or is adhered to the inner peripheral surface of the atomizer wicking element 932 in a 360-degree surrounding manner.

[0164] As shown in FIGS. 39 and 40, the atomizer 930 comprises more than two layers of mesh heating elements 931, one of which is closely attached to the outer peripheral surface of the atomizer wicking element 932 in the atomizing module 700 of the first aerosol cartridge 800 according to the fourth embodiment of the present invention. The atomizer 930 with multi-layer mesh heating elements 931 can more fully atomize liquids, which is beneficial for reducing the particles of the aerosol, so that the user can feel a drier aerosol.

[0165] As shown in FIGS. 41 and 42, the atomizing module 700 further comprises a first gas-liquid exchange element 290A and a second gas-liquid exchange element 290B in the atomizing module 700 of the first aerosol cartridge 800 according to the fourth embodiment of the present invention.

[0166] The first gas-liquid exchange element 290A can be made of plastic or fiber, and outer peripheral grooves or internal through-holes can be provided along the axial direction of the first gas-liquid exchange element 290A. The first gas-liquid exchange element 290A is preferably a tubular bonded fiber with axial through-holes.

[0167] The second gas-liquid exchange element 290B is preferably made of porous materials such as sponges, bonded fibers, sintered powder plastics, etc.

[0168] The atomizing module 700 also comprises an atomizing module upper cover 710, an atomizing module base 720, an atomizer 930 installed between the atomizing module base 720 and the atomizing module upper cover 710, and an electrode 936. The electrode 936 is passed through the atomizing module base 720 and is electrically connected to the mesh heating element 931.

[0169] The atomizing module upper cover 710 comprises an atomizing module upper interface 711 that penetrates through the atomizing module upper cover 710 and an atomizing module wicking hole 712.

[0170] The first gas-liquid exchange element 290A is assembled in the atomizing module wicking hole 712, and the groove on the outer peripheral surface of the first gas-liquid exchange element 290A and the inner peripheral wall of the atomizing module wicking hole 712 can form a through-hole for wicking or breathing.

[0171] The atomizer wicking element 932 is formed with an axial atomizer wicking element through-hole 932b, the atomizer wicking element 932 is sleeved on the outer peripheral wall of the second gas-liquid exchange element 290B, and the inner periphery wall of the atomizer wicking element 932 is in contact with the outer periphery wall of the second gas-liquid exchange element 290B. Moreover, the two ends of the second gas-liquid exchange element 290B respectively pass through the two ends of the atomizer wicking element 932, and the lower end faces of the two first gas-liquid exchange elements 290A are respectively connected with the two ends of the second gas-liquid exchange element 290B. The liquid in the gas-liquid exchange element 290 is transported from the first gas-liquid exchange element 290A to the second gas-liquid exchange element 290B, and then transported to the atomizer wicking element 932 from the second gas-liquid exchange element 290B.

The fifth embodiment

[0172] It should be further explained that the mesh heating element 931 in the present invention forms a hollow columnar shape, and the hollow columnar mesh heating element 931 is wrapped around the outer peripheral surface of the atomizer wicking element 932 or is adhered to the inner peripheral surface of the atomizer wicking element 932.

[0173] In the present invention, the mesh number of the mesh heating element 931 is defined as the number of woven or etched mesh holes in the axial length of 25.4 millimeters of the mesh heating element 931. Mesh number is a measure of the density of woven or etched mesh holes.

[0174] In the present invention, the axial length of the mesh heating element 931 and the axial length of the atomizer wicking element 932 are basically equal, which means that the length difference between the two does not exceed 20%.

[0175] The mesh heating element 931 can include an electrified portion and a non-electrified portion. The electrified portion generates heat, which is also conducted to the non-electrified portion.

[0176] In the present invention, the wire diameter of the resistance wire 9311 refers to the diameter when the cross-section of the resistance wire 9311 is circular, but the cross-section of the resistance wire 9311 used in the present invention can be any geometric shape, which can be converted into the diameter of a circular resistance wire 9311 with the same cross-sectional area as the wire diameter of the resistance wire 9311 when the cross-section of the resistance wire 9311 is non-circular.

[0177] In the present invention, the resistance of atomizer 930 refers to the resistance measured by the two electrodes 936 after the atomizer 930 is connected to the electrodes 936.

[0178] The parts that are the same as other embodiments in this embodiment will not be repeated.

[0179] As shown in FIGS. 1 and 2, an atomizer 930 comprises an atomizer wicking element 932 and a mesh heating element 931, and the mesh heating element 931 is wrapped around the outer peripheral surface of the atomizer wicking element 932 in a 360-degree surrounding manner, and/or is adhered to the inner peripheral surface of the atomizer wicking element 932 in a 360-degree surrounding manner.

[0180] The atomizer wicking element 932 is used to transport the liquid to be atomized to the atomizer 930, and its material can include fibers or powders containing cellulose, carbon fibers, glass fibers, ceramic fibers, porous ceramics, etc. The most commonly used atomizer wicking element 932 includes cotton rope or glass fiber. The weight of the atomizer wicking element 932 per meter is preferably 1.0 to 6.0 grams, and more preferably 1.8 to 4.5 grams. Cotton rope has good taste reductibility for atomized liquids, and glass fiber and porous ceramics are heat-resistant and have advantages in systems that require high-temperature atomization, such as THC atomization.

[0181] In the present invention, resistance wire 9311 generally refers to metal or non-metal wires that have a certain resistance and can generate heat when energized, such as nickel-chromium alloy wire, iron-chromium alloy wire, etc. The cross-section of resistance wire 9311 can be geometric shapes such as circular or rectangular, of which the circular is the most commonly used. The preferred wire diameter for resistance wire 9311 is 10 to 150 microns, such as 10, 12.5, 20, 25, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 150 microns, etc. The more preferred wire diameter for resistance wire 9311 is 25 to 100 microns.

[0182] As shown in FIGS. 3 to 10, the mesh heating element 931 is formed by weaving or cross-winding one or more resistance wires 9311. The resistance value of the resistance wire 9311 used to make the mesh heating element 931 can be the same or different.

[0183] In the present invention, the resistance of the atomizer 930 refers to the resistance measured by two electrodes 936 after the atomizer 930 is connected to the electrodes 936. In the present invention, the resistance of the atomizer 930 is preferably 0.2 ohms to 2.0 ohms, such as 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1.0, 1.2, 1.5, 1.8, 2.0 ohms, etc. The normal resistance of the atomizer 930 entwined with spiral resistance wire 9311 is 1.2 to 1.8 ohms. Since the mesh heating element 931 can flexibly select the wire diameter, quantity and mesh number of the resistance wire 9311, the range of resistance can be greatly expanded to meet different application needs. For example, 8 to 36 resistance wires 9311 can be used to weave a two-layer mesh heating element 931, so that the resistance of the atomizer 930 is as low as 0.2 to 1.0 ohms, and the lower resistance of the atomizer 930 can extend the battery's lifespan when the host is outputting constant power.

[0184] Preferably, the mesh heating element 931 includes 4 to 36 resistance wires 9311, and more preferably the number of resistance wires 9311 is a multiple of 4 or 6 among the 4 to 36 wires, such as 4, 6, 8, 12, 16, 18, 20, 24, 28, 32, 36, etc.

[0185] Preferably, the number of mesh holes is 20 to 300 in 25.4 millimeters of the axial length of the mesh heating element, that is, the mesh number of the mesh heating element 931 ranges from 20 to 300, such as 20 mesh, 30 mesh, 40 mesh, 50 mesh, 60 mesh, 70 mesh, 80 mesh, 100 mesh, 120 mesh, 150 mesh, 200 mesh, 250 mesh, 300 mesh, etc. In the case that the number of resistance wires 9311 is the same, the smaller mesh number is beneficial for the atomizer 930 to produce larger aerosol particles, resulting in moister aerosol taste; a larger mesh number is beneficial for the atomizer 930 to produce fine aerosol particles, and the aerosol taste is relatively dryer.

[0186] As shown in FIGS. 14, The atomizer 930 can include two or more layers (including two layers) of mesh heating elements 931. The mesh number and resistance of the two-layer mesh heating element 931, as well as the number and wire diameter of the resistance wires 9311 used to make the two-layer mesh heating element 931, can be the same or different. To achieve the requirements of delicate and dry aerosol, the number of layers of the mesh heating element 931 can be further increased to improve the heating of the aerosol.

[0187] As shown in FIGS. 11 and 12, when the mesh heating elements 931 is adhered to the inner peripheral surface of

the atomizer wicking element 932 in a 360-degree surrounding manner, cellulose fibers or powder slurry can be coated on the outer peripheral surface of the mesh heating element 931 and then be dried to form the atomizer wicking element 932. In the present invention, the powder slurry can be a clay slurry.

[0188] In the present invention, the left-handed and right-handed resistance wire 9311 can be used in various ways such as one up and one down, one up and two down, or two up and two down when the resistance wire 9311 is woven or cross-wound.

[0189] As shown in FIGS. 23 to 28, when the mesh heating elements 931 is wrapped around the outer peripheral surface of the atomizer wicking element 932 in a 360-degree surrounding manner, and the electrode clampingpiece 9364 can be clamped from the radial direction of the atomizer 930 to the outer peripheral surface of the mesh heating element 931. After the atomizer 930 is installed into the electrode clampingpiece 9364, the end of the electrode clampingpiece 9364 can be retracted to enhance the fixation of the electrode clampingpiece 9364 to the atomizer 930.

[0190] As shown in FIGS. 23 to 26, the lengths of the mesh heating element 931 and the lengths of the atomizer wicking element 932 are basically equal. This structure can bring additional benefits, in other words, the electrified part of the mesh heating element 931 between the electrodes 936 generates heat to atomize the liquid during atomization, and some of the heat is conducted to the non-electrified parts at both ends of the atomizer 930, thereby heating the liquid at both ends of the atomizer 930 and reducing the viscosity of the liquid, and increasing the speed of liquid conducted from both ends of the atomizer 930 to the heating part in the middle of the atomizer 930. This is helpful for atomizing viscous liquids, such as CBD and THC aerosols, which are relatively viscous or even paste like at room temperature, and electronic cigarette liquids that are also very viscous in cold outdoor environments, but the viscosity of these liquids significantly decreases when heated above 50 °C.

[0191] FIG. 43 shows a schematic structural view of a first aerosol cartridge to the fifth embodiment of the present invention. FIG. 44 shows a schematic structural decomposition view of the first aerosol cartridge to the fifth embodiment of the present invention. FIG. 45 shows a schematic structural view of a first atomizer of an aerosol cartridge to the fifth embodiment of the present invention. FIG. 46 shows a schematic structural view of a second aerosol cartridge to the fifth embodiment of the present invention. FIG. 47 shows a schematic structural decomposition view of the second aerosol cartridge to the fifth embodiment of the present invention. The structure of the present embodiment is similar to that of the first embodiment, and the same parts as the first embodiment will not be repeated in the description of this embodiment.

[0192] As shown in FIGS. 43 to 45, an atomizer 930 comprises an atomizer wicking element 932 and a mesh heating element 931, the mesh heating element 931 is wrapped around the outer peripheral surface of the atomizer wicking element 932 in a 360-degree surrounding manner in the atomizing module 700 of the first aerosol cartridge 800 according to the fifth embodiment of the present invention. The mesh heating element 931 is a single layer structure, which is woven from 8 resistance wires 9311 with a weaving density of 50 mesh, and the resistance of the atomizer is 1.2 ohms.

[0193] As shown in FIGS. 44 and 45, an atomizer 930 comprises an atomizer wicking element 932 and a mesh heating element 931, the mesh heating element 931 is wrapped around the outer peripheral surface of the atomizer wicking element 932 in a 360-degree surrounding manner in the atomizing module 700 of the second aerosol cartridge 800 according to the fifth embodiment of the present invention. The mesh heating element 931 consists of two layers, and the first layer is woven from 8 resistance wires 9311 with a weaving density of 60 mesh, and the second layer is woven from 8 resistance wires 9311 with a weaving density of 40 mesh, and the resistance of the atomizer is 0.6 ohms.

[0194] According to the first and the second aerosol cartridge of the fifth embodiment of the present invention, the atomizer wicking element 932 is made of cotton rope weighing 3.2 grams per meter, and the resistance wire 9311 used to make the mesh heating element 931 has a wire diameter of 60 microns.

[0195] The output power of each aerosol cartridge for the best suction taste is as follows, which is obtained by injecting three different aerosol liquids, such as tobacco flavor, mint tobacco flavor, and double apple hookah flavor into the aerosol cartridge, and comparing and testing with an adjustable constant power output host.

	The mesh heating element	Tobacco flavor	Mint tobacco flavor	Double apple hookah flavor
The output power of the first aerosol cartridge	Single layer	11 watts	13 watts	9.5 watts
The output power of the second aerosol cartridge	Two layers	7.5 watts	8 watts	7 watts

[0196] The experimental results show that the atomizer 930 with a two-layer mesh heating element 931 can achieve the best suction taste at lower power by comparing with the atomizer 930 with a single-layer mesh heating element 931, including aroma stimulation, fullness, persistence, aerosol temperature, etc., so the atomizer 930 with a two-layer mesh heating element 931 is conducive to saving the power of the host and increasing the endurance. The experimental results also show that the atomizer 930 with a two-layer mesh heating element 931 can produce more delicate mist and richer

aroma than the atomizer 930 with a single-layer mesh heating element 931. These results indicate that the liquid is atomized by the first layer mesh heating element 931 closely attached to the atomizer wicking element 932 in the aerosol cartridge with a two-layer mesh heating element 931, and then further heated or baked by the mesh heating elements 931 of other layers, which is beneficial for reducing the particles of the aerosol, and making the atomization more complete, thereby allowing the user to feel a more delicate, drier, and more fragrant aerosol.

[0197] In this embodiment, the first electrode 936a with an electrode clampingpiece 9364 clamps the atomizer 930, and the upper end of the second electrode 936b is in contact with the lower end of the first electrode 936a. The advantage of this split type of electrode 936 is that it can improve the flexibility of connecting the aerosol cartridge 800 to the host (not shown in the figures).

[0198] The atomizer 930 of the present invention is conducive to making the mesh heating element 931 into a structure of two or more layers (including two layers), wherein the first layer of mesh heating element 931 in contact with the atomizer wicking element 932 heats and atomizes the liquid, and the generated aerosol is further heated and baked by other layers of mesh heating elements 931, resulting in more delicate and drier smoke and more sufficient aroma stimulation. The traditional atomizer with spiral heating elements and pins has poor shape stability, difficulty in controlling pin alignment during installation, and low assembly efficiency. Because the mesh heating element 931 is wrapped around the outer or inner peripheral surface of the atomizer wicking element in 360-degree surrounding manner, the atomizer 930 of the present invention has high strength and good stability without pins, so that the electrode can contact the outer or inner peripheral wall of the mesh heating element from any direction, which is conducive to the efficient assembly of the atomizer in the aerosol cartridge.

The sixth embodiment

[0199] FIG. 48 shows a schematic structural view of an eleventh atomizer according to the first embodiment of the present invention. The sixth embodiment is a variant of the first embodiment, which has a similar structure to the first embodiment. The same parts as the first embodiment will not be repeated in the description of this embodiment.

[0200] The mesh heating element 931 according to this embodiment can also be formed by interlocking at least two polygonal-shape resistance wires 9311 at adjacent bends. As shown in FIG. 48, the mesh heating element 931 is made of eight polygonal-shape resistance wires 9311, each of which is interlocked with adjacent resistance wires 9311 at the bend to form a hollow columnar mesh structure.

[0201] The hollow columnar mesh heating element 931 is wrapped around the outer peripheral surface of the atomizer wicking element 932 or adhered to the inner peripheral surface of the atomizer wicking element 932, so that the atomizer 930 has good strength and shape stability, the heat generated by the 360-degree surrounding mesh heating element 931 can be evenly distributed on the surface of the atomizer wicking element 932, and the liquid on the atomizer wicking element 932 can be atomized more evenly, thereby making the atomization more stable and reliable, and making the taste more delicate and full.

The seventh embodiment

[0202] The manufacturing method of the tenth atomizer provided by the present invention comprises the following steps:

Using cotton fiber bundles, carbon fiber bundles, ceramic fiber bundles, or glass fiber bundles as the atomizer wicking element 932;

Making the resistance wires 9311 into a polygonal shape, such as bending it into an S shape or Z shape, and interlocking adjacent resistance wires 9311 at the bending point, form a mesh heating element 931 on the outer peripheral surface of the atomizer wicking element 932, wherein the network heating element 931 is wrapped around the atomizer wicking element 932 in a 360-degree surrounding manner;

Producing coiled atomizer material;

Cutting the required length from the coiled atomizer material as the atomizer 930.

The eighth embodiment

[0203] FIG. 49 shows a schematic structural view of a twelfth atomizer according to the first embodiment of the present invention. FIG. 50 shows a schematic cross-sectional view of the twelfth atomizer according to the first embodiment of the present invention. FIG. 51 shows a schematic structural view of an aerosol cartridge according to the eighth embodiment of the present invention. The structure of the present embodiment is similar to that of the first embodiment, and the same parts as the first embodiment will not be repeated in the description of this embodiment.

[0204] As shown in FIGS. 48 to 51, an atomizer 930 comprises an atomizer wicking element 932 and a mesh heating element 931, and the mesh heating element 931 is wrapped around the outer peripheral surface of the atomizer wicking

element 932 in a 360-degree surrounding manner, and/or is adhered to the inner peripheral surface of the atomizer wicking element 932 in a 360-degree surrounding manner.

[0205] The mesh heating element 931 is preferably adhered to the inner peripheral surface of the atomizer wicking element 932 in a 360-degree surrounding manner.

[0206] The atomizer 930 also comprises electrodes 936, which are parallel to axial direction of the mesh heating element 931 and are connected to the mesh heating element 931. Electrodes 936 are preferably wires.

[0207] In this embodiment, the mesh heating element 931 can be one layer, or two or more layers (including two layers). The electrode 936 and the mesh heating element 931 can be connected by welding or mechanical contact.

[0208] When the mesh heating element 931 has two or more layers, the electrode 936 can be buried between the mesh heating elements 931 of the first layer and the second layer, so that the electrode 936 is in contact with the mesh heating element 931.

[0209] Preferably, the electrode 936 consists of two wires axially parallel to the mesh heating element 931. To make the atomizer evenly heated, the circumference of the cross-section of the mesh heating element 931 is divided equally by the two wires.

[0210] The length of the connection between the electrode 936 and the mesh heating element 931 can be equal to or less than the axial length of the mesh heating element 931.

[0211] In this embodiment, the resistance of the atomizer 930 can be changed by changing the length of the connection between the electrode 936 and the mesh heating element 931.

[0212] In this embodiment, the atomizer wicking element 932 can be made of non-woven fabric, cotton paddle, etc. At least a part of the outer peripheral surface of the atomizer wicking element 932 is sleeved with a hollow metal tube 9396 and a hollow metal tube wall through-hole 9397 is arranged on the tube wall of the hollow metal tube 9396, the outer face of the atomizer wicking element 932 is connected with the liquid in the liquid storage element 100 through the hollow metal tube wall through-hole 9397.

[0213] In this embodiment, the atomizer 930 is arranged parallel or coincident with the central axis of the aerosol channel 1303, the hollow metal tube 9396 is connected with the aerosol channel 1303 after the atomizer 930 is inserted into the liquid storage element 100, the hollow metal tube wall through-hole 9397 is in direct contact with the liquid in the liquid storage element 100, and the liquid in the liquid storage element 100 is conducted to the atomizer wicking element 932 through the hollow metal tube wall through-hole 9397.

[0214] In this embodiment, as shown in FIGS. 51, the atomizing module upper cover 710 is provided with an atomizing module wicking hole 712. The upper opening of the atomizing module wicking hole 712 is directly connected with the liquid in the liquid storage element 100, and the lower opening is connected with the atmosphere, and the atomizing module wicking hole 712 is provided with a gas-liquid exchange element 290.

[0215] In summary, the atomizer 930 of the present invention includes a mesh heating element 931 that is wrapped around the outer peripheral surface of the atomizer wicking element 932 in a 360-degree surrounding manner, and/or is adhered to the inner peripheral surface of the atomizer wicking element 932 in a 360-degree surrounding manner. The atomizer 930 has good strength and shape stability.

[0216] The heat generated by the 360-degree surrounding mesh heating element 931 can be more evenly distributed on the surface of the atomizer wicking element 932, and the liquid on the atomizer wicking element 932 can be heated more efficiently, so that the atomization is more sufficient, and the user can obtain more delicate and full taste.

[0217] The atomizer of the present invention is conducive to making the mesh heating element 931 into a structure of two or more layers (including two layers). Compared to a single-layer mesh heating element 931, the use of an aerosol cartridge with two or more layers (including two layers) of mesh heating element 931 results in more complete atomization and more delicate aerosol.

[0218] According to the atomizer 930 of the present invention, because the mesh heating element 931 is wrapped around the outer peripheral surface of the atomizer wicking element 932 in a 360-degree surrounding manner, and/or is adhered to the inner peripheral surface of the atomizer wicking element 932 in a 360-degree surrounding manner, the atomizer 930 does not need to be provided with pins connected with the electrode 936, so that the electrode 936 can contact the outer or inner peripheral wall of the mesh heating element 931 from any direction, which is conducive to the assembly of the atomizer 930 in the aerosol cartridge 800.

[0219] According to the atomizer 930 of the present invention, it is possible to continuously produce and harvest coiled atomizer material, which can greatly improve production efficiency and facilitate the storage and transportation of atomizer 930, thus significantly reducing the cost of atomizer 930. When installing the atomizer 930, the coiled atomizer material can be unwound and cut the required length, which is conducive to the automatic assembly of the atomizer.

[0220] The foregoing embodiments are only intended to illustrate the principle and advantages of the present disclosure rather than limiting the present disclosure. Those skilled in the art can make modifications or changes to the foregoing embodiments without departing from the spirit and scope of the present disclosure. Therefore, all equivalent modifications or changes made by those skilled in the art without departing from the spirit and technical concepts disclosed by the present disclosure shall still be covered by the claims of the present disclosure.

Claims

1. An atomizer, wherein the atomizer comprises an atomizer wicking element and a mesh heating element, and the mesh heating element is wrapped around the outer peripheral surface of the atomizer wicking element in a 360-degree surrounding manner, and/or is adhered to the inner peripheral surface of the atomizer wicking element in a 360-degree surrounding manner.

2. The atomizer of claim 1, wherein the mesh heating element is partially embedded in the outer peripheral surface of the atomizer wicking element, and/or the mesh heating element is partially embedded in the inner peripheral surface of the atomizer wicking element.

3. The atomizer of claim 1 or 2, wherein the mesh heating element is formed by weaving or cross-winding resistance wires.

4. The atomizer of claim 1 or 2, wherein the mesh heating element comprises at least one left-handed resistance wire and at least one right-handed resistance wire.

5. The atomizer of claim 1 or 2, wherein the resistance wires of the mesh heating element comprise warp resistance wires and weft resistance wires.

6. The atomizer of claim 1 or 2, wherein the mesh heating element comprises at least two left-handed resistance wires or right-handed resistance wires with different pitches.

7. The atomizer of claim 1 or 2, wherein the mesh heating element comprises at least one resistance wire, which includes a left-handed resistance wire and a right-handed resistance wire, and the left-handed resistance wire and the right-handed resistance wire are woven or cross-wound to form a mesh.

8. The atomizer of claim 1 or 2, wherein the atomizer comprises two or more layers of mesh heating elements.

9. The atomizer of claim 1 or 2, wherein the atomizer wicking element and the mesh heating element are formed separately.

10. The atomizer of claim 1 or 2, wherein the atomizer wicking element and the mesh heating element are formed integrally.

11. The atomizer of claim 1 or 2, wherein the material of the atomizer wicking element includes fibers or powders containing cellulose, carbon fibers, glass fibers, ceramic fibers, porous ceramics, etc.

12. The atomizer of claim 1 or 2, wherein the mesh heating element is formed by etching, punching, or welding resistance materials.

13. The atomizer of claim 1 or 2, wherein the weight of the atomizer wicking element per meter is 1.0 to 6.0 grams.

14. The atomizer of claim 1 or 2, wherein the wire diameter for resistance wire is 10 to 150 microns.

15. The atomizer of claim 1 or 2, wherein the resistance of the atomizer is 0.2 ohms to 2.0 ohms.

16. The atomizer of claim 1 or 2, wherein the number of resistance wires for the mesh heating element is 4 to 36.

17. The atomizer of claim 1 or 2, wherein the number of mesh holes is 20 to 300 in 25.4 millimeters of the axial length of the mesh heating element.

18. The atomizer of claim 1 or 2, wherein the axial lengths of the mesh heating element and the axial lengths of the atomizer wicking element are basically equal.

19. The atomizer of claim 1 or 2, wherein the mesh heating element comprises at least two polygonal-shape resistance wires.

20. The atomizer of claim 1 or 2, wherein the atomizer also comprises electrodes, which are parallel to axial direction of the mesh heating element and are connected to the mesh heating element.

21. An atomizing module, wherein the atomizing module at least comprises the atomizer as claimed in any one of claims 1 to 19.

22. The atomizing module of claim 21, wherein the atomizing module comprises an electrode and an electrode clampingpiece arranged at one end of the electrode, and the electrode clampingpiece clamps the mesh heating element.

23. The atomizing module of claim 21, wherein the atomizing module comprises an electrode and an electrode insertion portion arranged at one end of the electrode, and the electrode insertion portion is connected to the mesh heating element after inserted into an atomizer wicking element through-hole.

24. The atomizing module of claim 21, wherein the atomizing module also comprises a gas-liquid exchange element.

25. An aerosol cartridge, wherein the aerosol cartridge comprises a liquid storage element and the atomizing module as claimed in any one of claims 21 to 24.

26. The aerosol cartridge of claim 25, wherein the atomizer is connected directly with the liquid in the liquid storage element.

27. The aerosol cartridge of claim 25, wherein the atomizer is connected with the liquid in the liquid storage element through the gas-liquid exchange element when the atomizing module comprises a gas-liquid exchange element and the gas-liquid exchange element is used to transport liquid to the atomizer wicking element.

28. The aerosol cartridge of claim 25, wherein the outer peripheral surface of the atomizer wicking element is connected with the liquid in the liquid storage element when the mesh heating element is adhered to the inner peripheral surface of the atomizer wicking element in a 360-degree surrounding manner.

29. The aerosol cartridge of claim 28, wherein at least a part of the outer peripheral surface of the atomizer wicking element is sleeved with a hollow metal tube, and the outer peripheral surface of the atomizer wicking element is connected with the liquid in the liquid storage element through the hollow metal tube.

30. The aerosol cartridge of claim 25, wherein the aerosol cartridge also comprises an aerosol channel, and the angle between the atomizer wicking element through-hole and the aerosol channel is greater than or equal to 45 degrees and less than or equal to 135 degrees when the atomizer wicking element has an atomizer wicking element through-hole that axially penetrates through the atomizer wicking element.

31. A manufacturing method of atomizer, wherein the manufacturing method of atomizer comprises the following steps:

using cotton fiber bundles, carbon fiber bundles, ceramic fiber bundles, or glass fiber bundles as the atomizer wicking element;
weaving or cross-winding the resistance wires to form a mesh heating element that is wrapped around the outer peripheral surface of the atomizer wicking element in a 360-degree surrounding manner, wherein at least a part of the resistance wires are controlled to form a right-handed resistance wire that is spirally wrapped around the outer peripheral surface of the atomizer wicking element, and at least a part of the resistance wires are controlled to form a left-handed resistance wire that is spirally wrapped around the outer peripheral surface of the atomizer wicking element;
producing coiled atomizer material;
cutting the required length from the coiled atomizer material as the atomizer.

32. A manufacturing method of atomizer, wherein the manufacturing method of atomizer comprises the following steps:

using cotton fiber bundles, carbon fiber bundles, ceramic fiber bundles, or glass fiber bundles as the atomizer wicking element;
weaving or cross-winding the resistance wires to form a mesh heating element that is wrapped around the outer peripheral surface of the atomizer wicking element in a 360-degree surrounding manner; wherein, at least one of

the resistance wires are controlled to wrap around the outer peripheral surface of the atomizer wicking element with a first pitch, and at least one of the resistance wires are controlled to wrap around the outer peripheral surface of the atomizer wicking element with a second pitch, and the first pitch is not equal to the second pitch;
producing coiled atomizer material;
cutting the required length from the coiled atomizer material as the atomizer.

33. A manufacturing method of atomizer, wherein the manufacturing method of atomizer comprises the following steps:

using plastic or metal as an auxiliary core, weaving or cross-winding the resistance wires to form a mesh heating element that is wrapped around the outer peripheral surface of the auxiliary core in a 360-degree surrounding manner; wherein at least a part of the resistance wires are controlled to form a right-handed resistance wire that is spirally wrapped around the outer peripheral surface of the auxiliary core, and at least a part of the resistance wires are controlled to form a left-handed resistance wire that is spirally wrapped around the outer peripheral surface of the auxiliary core;
wrapping around the outer peripheral surface of the mesh heating element with an atomizer wicking element, such as woven or non-woven fabric, or coating the outer peripheral surface of the mesh heating element with cellulose containing fibers slurry and then drying;
producing coiled atomizer material;
cutting the required length from the coiled atomizer material and taking out the auxiliary core to form the atomizer.

34. A manufacturing method of atomizer, wherein the manufacturing method of atomizer comprises the following steps:

using cotton fiber bundles, carbon fiber bundles, ceramic fiber bundles, or glass fiber bundles as the atomizer wicking element;
starting a resistance wire from the lower part of the atomizer wicking element, and spiraling up and winding to the upper part of the atomizer wicking element in a left-handed or right-handed manner, to form a left-handed resistance wire or a right-handed resistance wire;
then, winding the resistance wire from the upper part of the atomizer wicking element in a left-handed or right-handed manner to the lower part of the atomizer wicking element, to form a right-handed resistance wire or a left-handed resistance wire;
weaving or cross-winding the left-handed resistance wire and the right-handed resistance wire to form a mesh heating element.

35. A manufacturing method of atomizer, wherein the manufacturing method of atomizer comprises the following steps:

using cotton fiber bundles, carbon fiber bundles, ceramic fiber bundles, or glass fiber bundles as the atomizer wicking element;
starting the two ends of a resistance wire from the lower part of the atomizer wicking element, spiraling up and winding to the upper part of the atomizer wicking element in a left-handed or right-handed manner respectively, and weaving or cross-winding on the outer peripheral surface of the atomizer wicking element to form a mesh like mesh heating element;
producing coiled atomizer material;
cutting the required length from the coiled atomizer material as the atomizer.

36. A manufacturing method of atomizer, wherein the manufacturing method of atomizer comprises the following steps:

using cotton fiber bundles, carbon fiber bundles, ceramic fiber bundles, or glass fiber bundles as the atomizer wicking element;
weaving or cross-winding a certain number of resistance wires to form a first layer of mesh heating element that is wrapped around the outer peripheral surface of the atomizer wicking element in a 360-degree surrounding manner;
weaving or cross-winding a certain number of resistance wires to form a second layer of mesh heating element that is wrapped around the outer peripheral surface of the first layer of mesh heating element in a 360-degree surrounding manner;
producing coiled atomizer material;
cutting the required length from the coiled atomizer material as the atomizer.

37. A manufacturing method of atomizer, wherein the manufacturing method of atomizer comprises the following steps:

weaving or cross-winding the resistance wires onto an auxiliary core to form a mesh heating element, in which the auxiliary core can be made of metal or plastic;
placing the mesh heating element containing the auxiliary core into the mold and positioning it, and injecting cellulose containing fibers or powders slurry into the mold for molding, or, continuously pulling the mesh heating element strip containing the auxiliary core in the mold, while injecting cellulose containing fibers or powders slurry for molding;
drying to produce long semi-finished product of the atomizer;
cutting off the semi-finished product of the atomizer and taking out the auxiliary core to form the atomizer.

38. A manufacturing method of atomizer, wherein the manufacturing method of atomizer comprises the following steps:

weaving or cross-winding resistance wires on an auxiliary core to form a two-layer mesh structure, and cutting and taking out the auxiliary core to make a mesh heating element, or, weaving or cross-winding the resistance wires into a long strip of heating element, and then cutting to form a mesh heating element;
squeezing cellulose containing fibers or powders slurry into a long tube including an axial atomizer wicking element through-hole, drying it, and cutting it off to make an atomizer wicking element, or, squeezing cellulose containing fibers or powders slurry into a long strip including an auxiliary core, drying it, and cutting it off, then taking out the auxiliary core to make an atomizer wicking element;
sleeving the mesh heating element with an atomizer wicking element to form an atomizer, or sleeving the atomizer wicking element with a mesh heating element to form an atomizer.

39. A manufacturing method of atomizer, wherein the manufacturing method of atomizer comprises the following steps:

weaving or cross-winding the resistance wires into a mesh like long strip of mesh heating element;
pulling the long strip of mesh heating element in the mold, while injecting cellulose containing fibers or powders slurry for molding;
drying to make a long strip of atomizer;
cutting off the long strip of atomizer to make an atomizer.

40. A manufacturing method of atomizer, wherein the manufacturing method of atomizer comprises the following steps:

using cotton fiber bundles, carbon fiber bundles, ceramic fiber bundles, or glass fiber bundles as the atomizer wicking element;
weaving or cross-winding the resistance wires to form a mesh heating element that is wrapped around the outer peripheral surface of the atomizer wicking element in a 360-degree surrounding manner; wherein at least two polygonal resistance wires are controlled to interlock at adjacent bends to form a mesh and are wrapped around the outer peripheral surface of the atomizer wicking element;
producing coiled atomizer material;
cutting the required length from the coiled atomizer material as the atomizer.

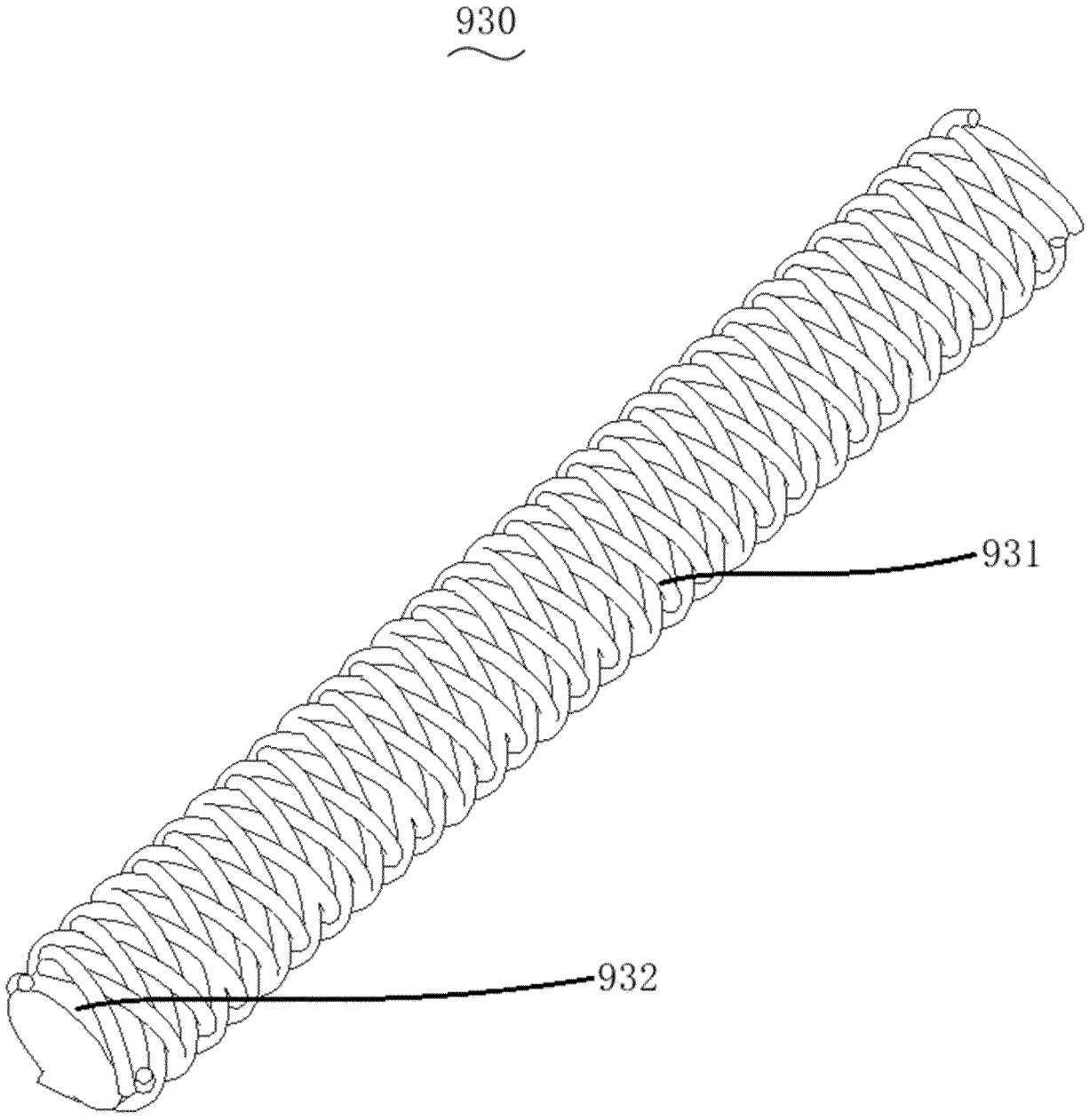

Fig.1

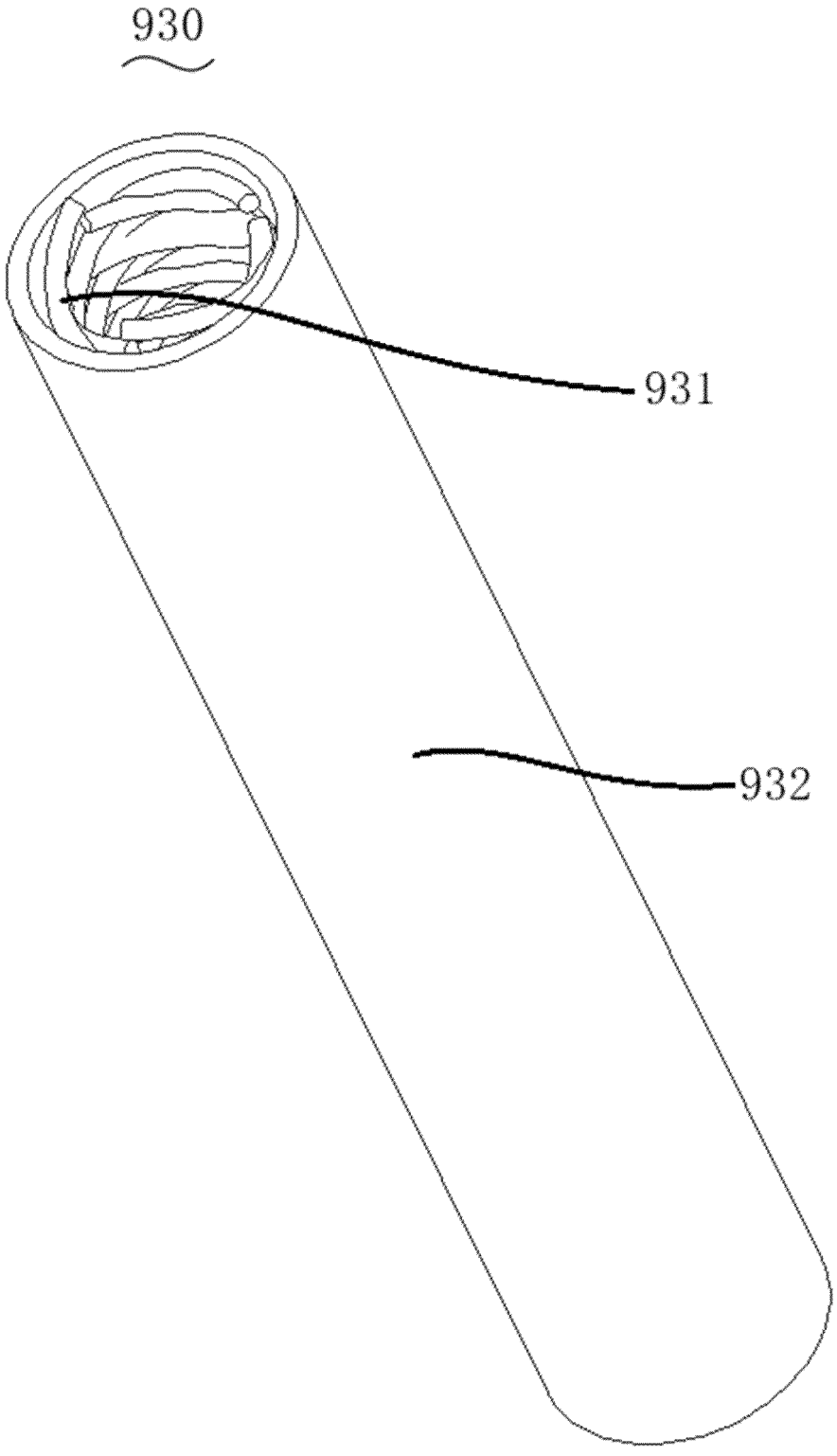

Fig.2

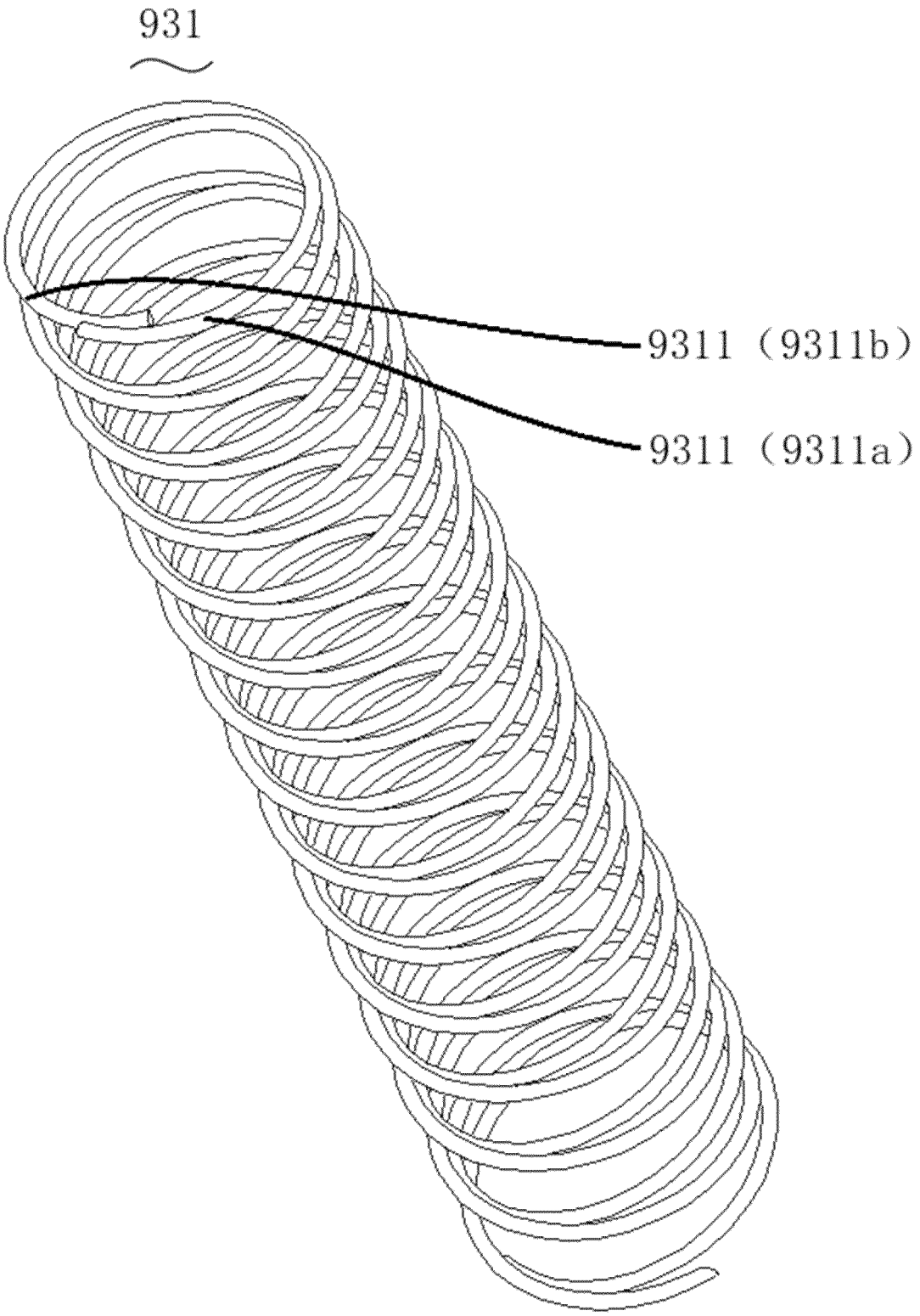

Fig.3

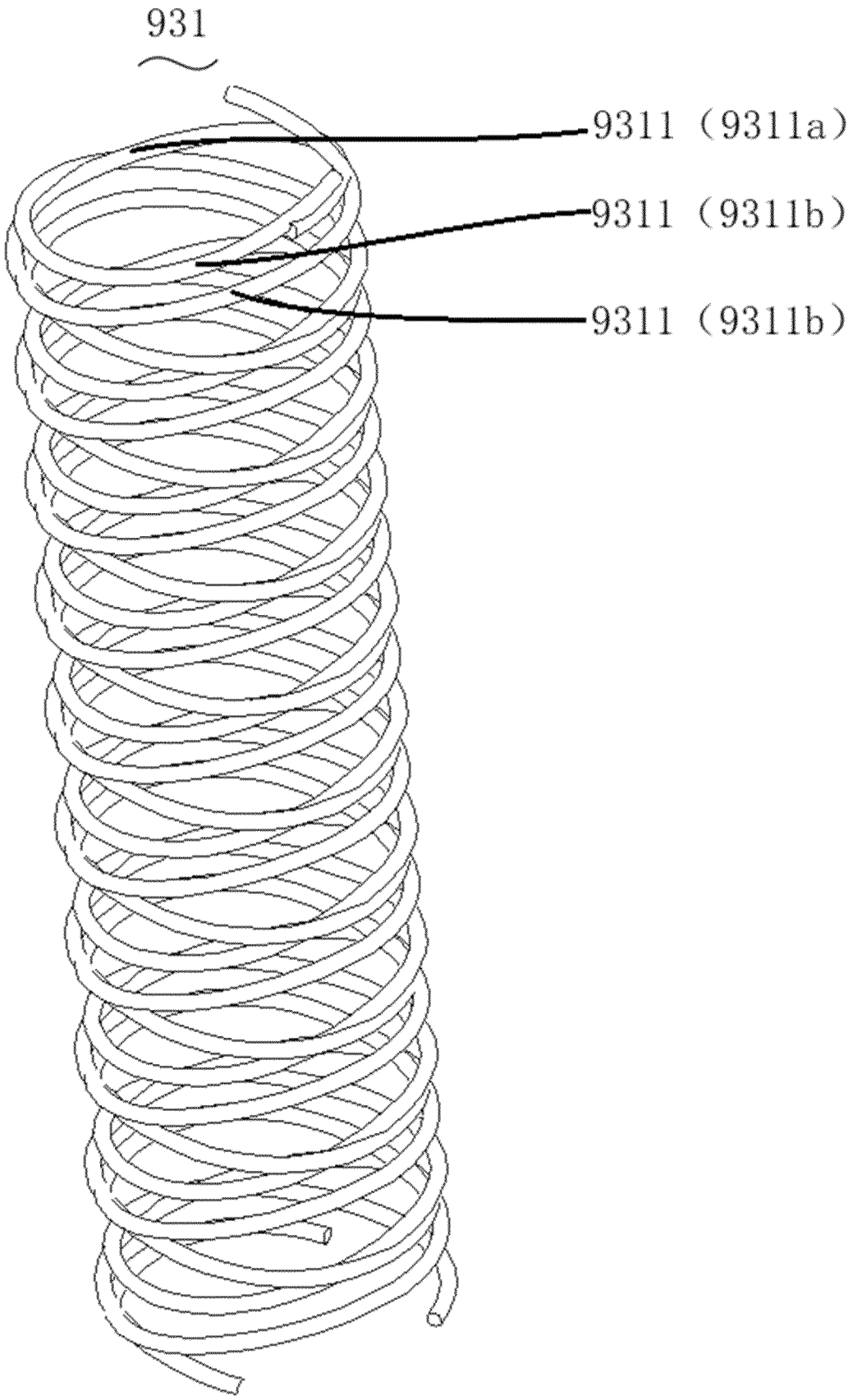

Fig.4

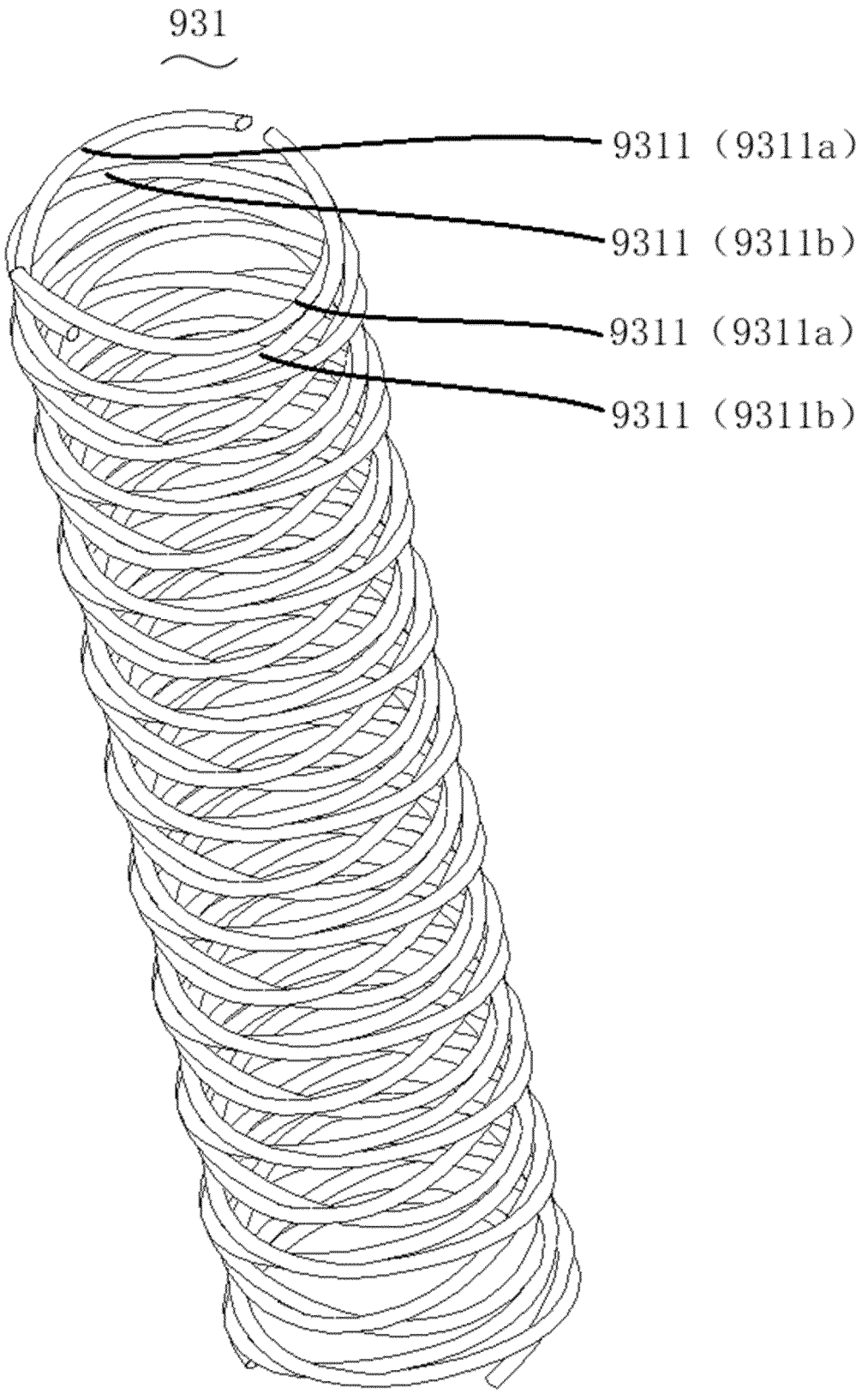

Fig.5

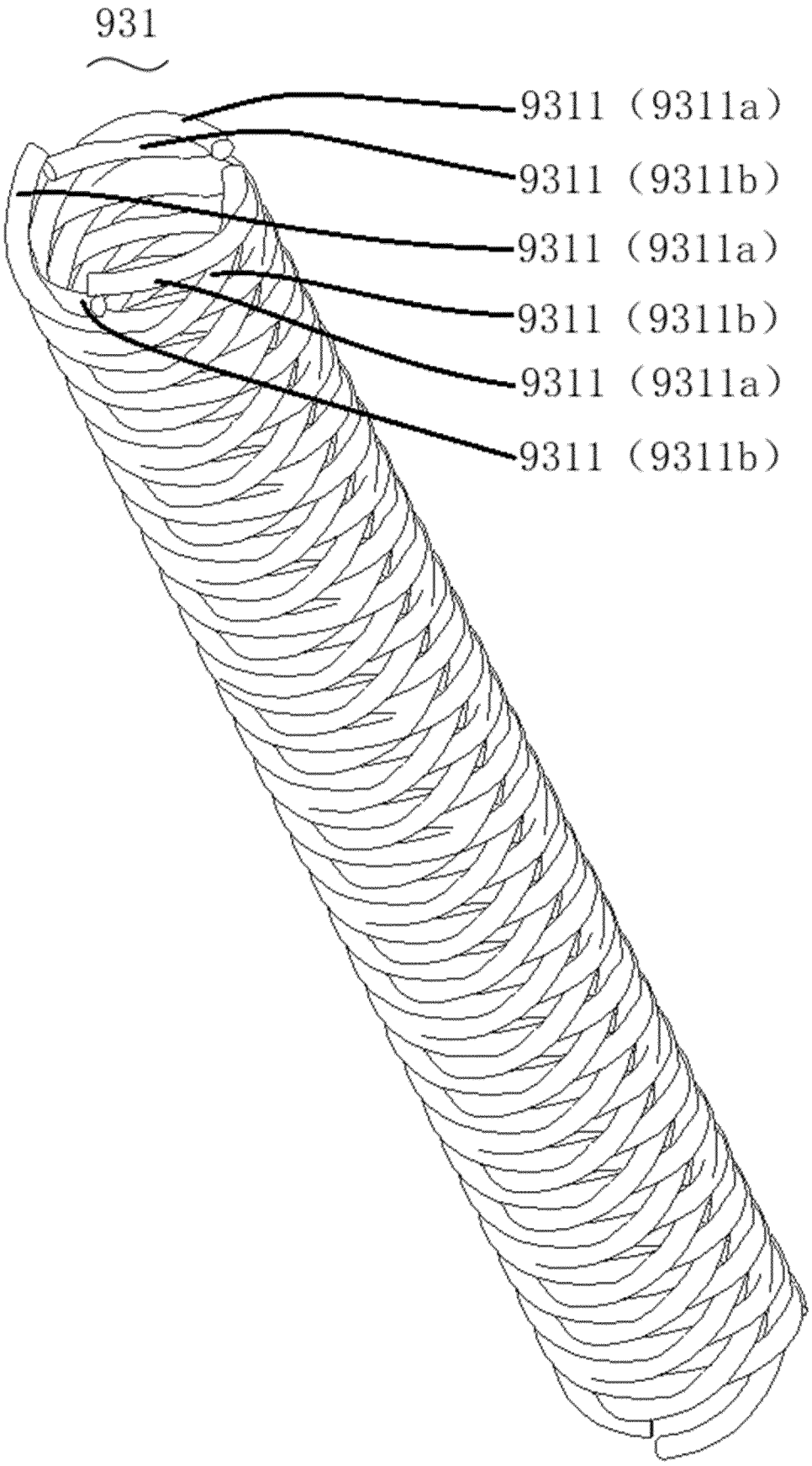
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Fig.6

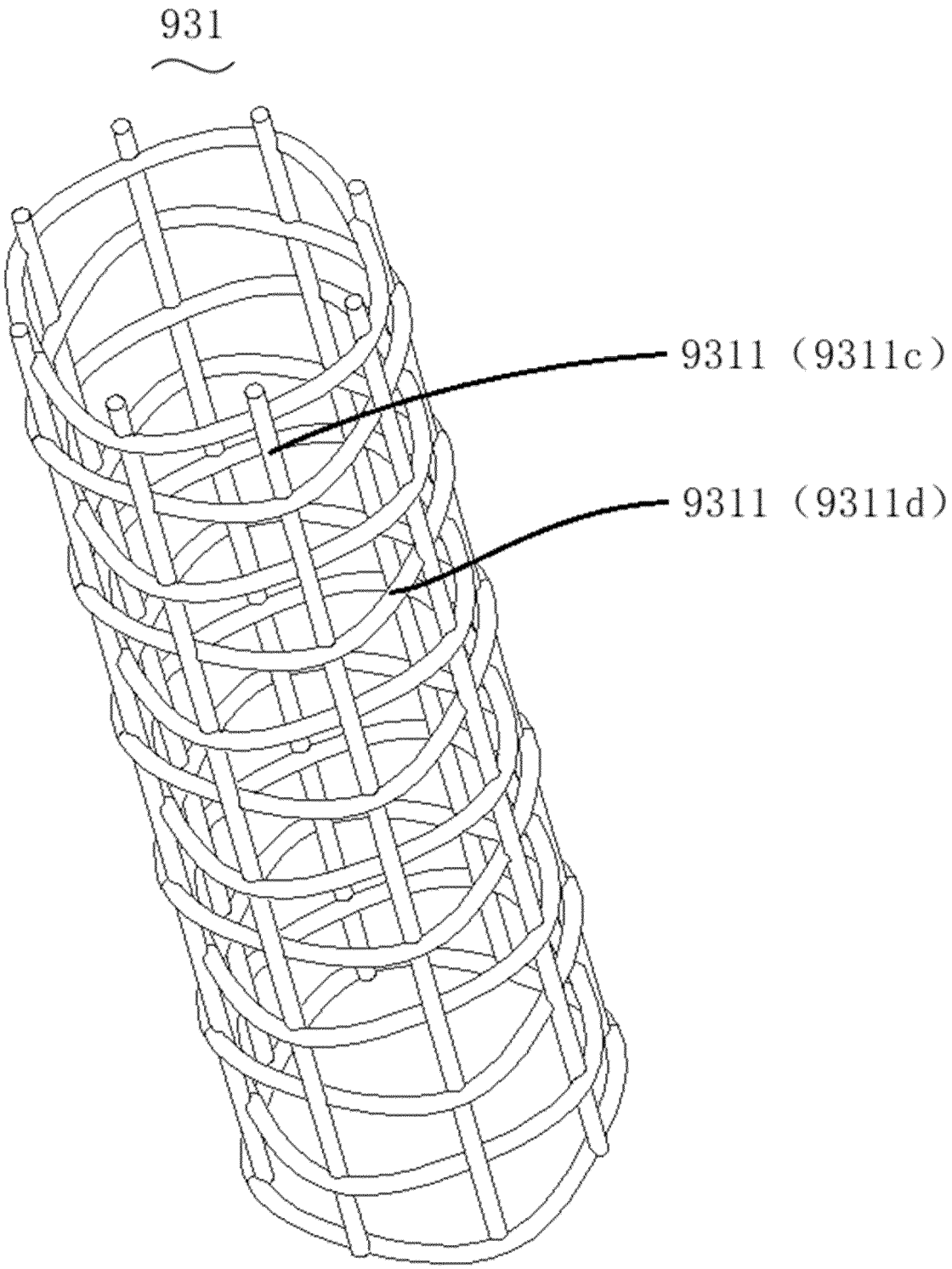

Fig.7

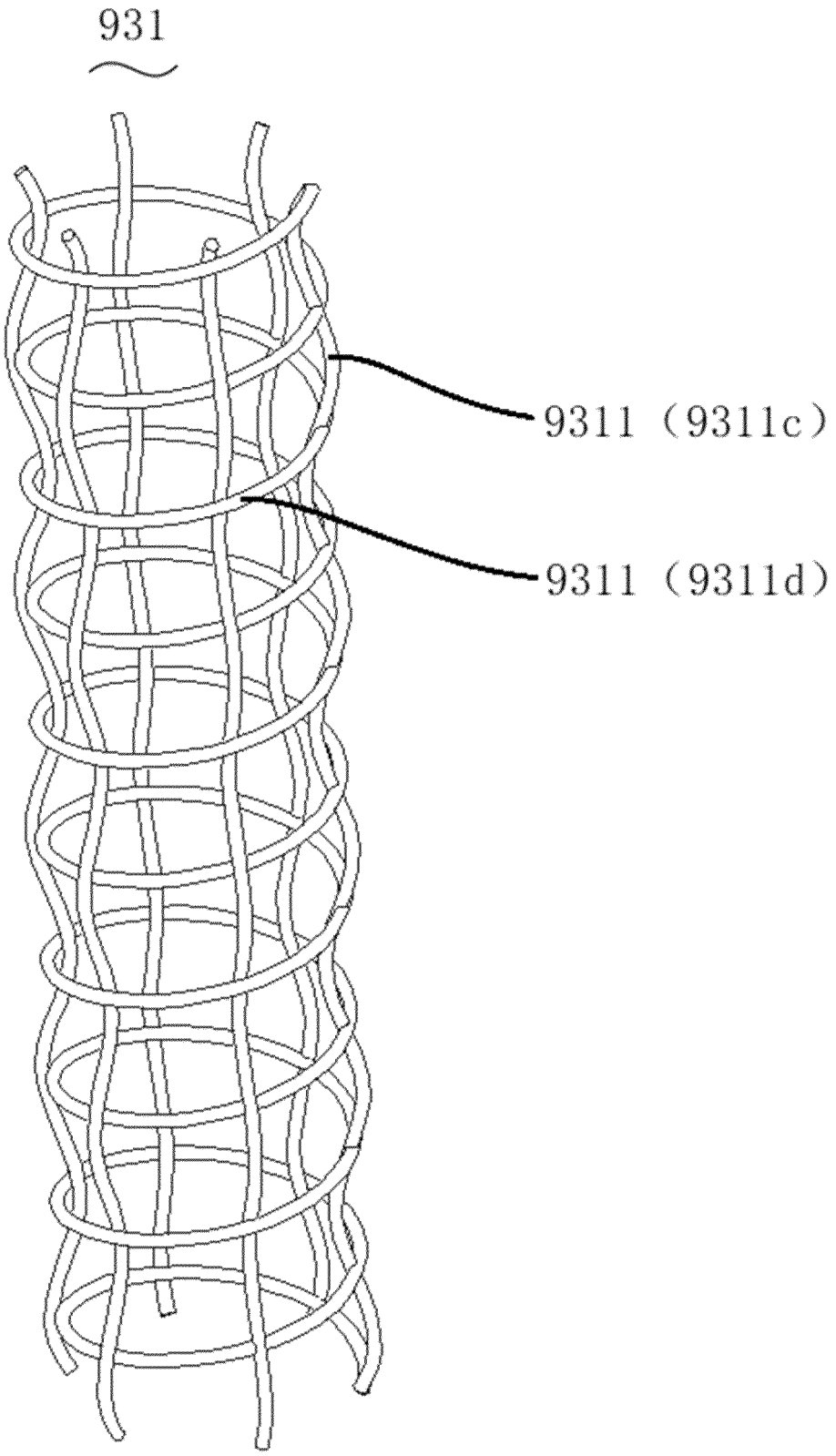

Fig.8

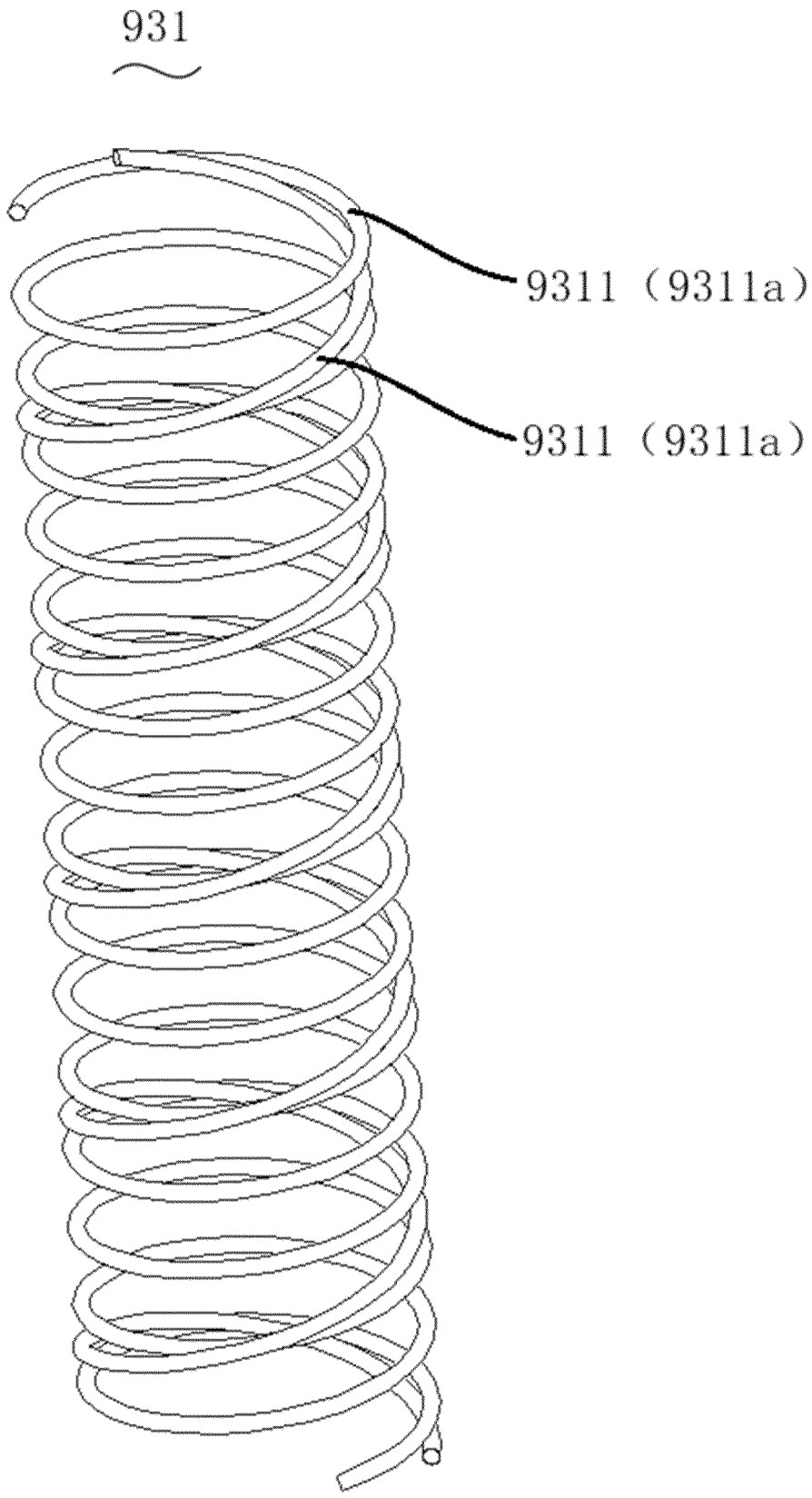

Fig.9

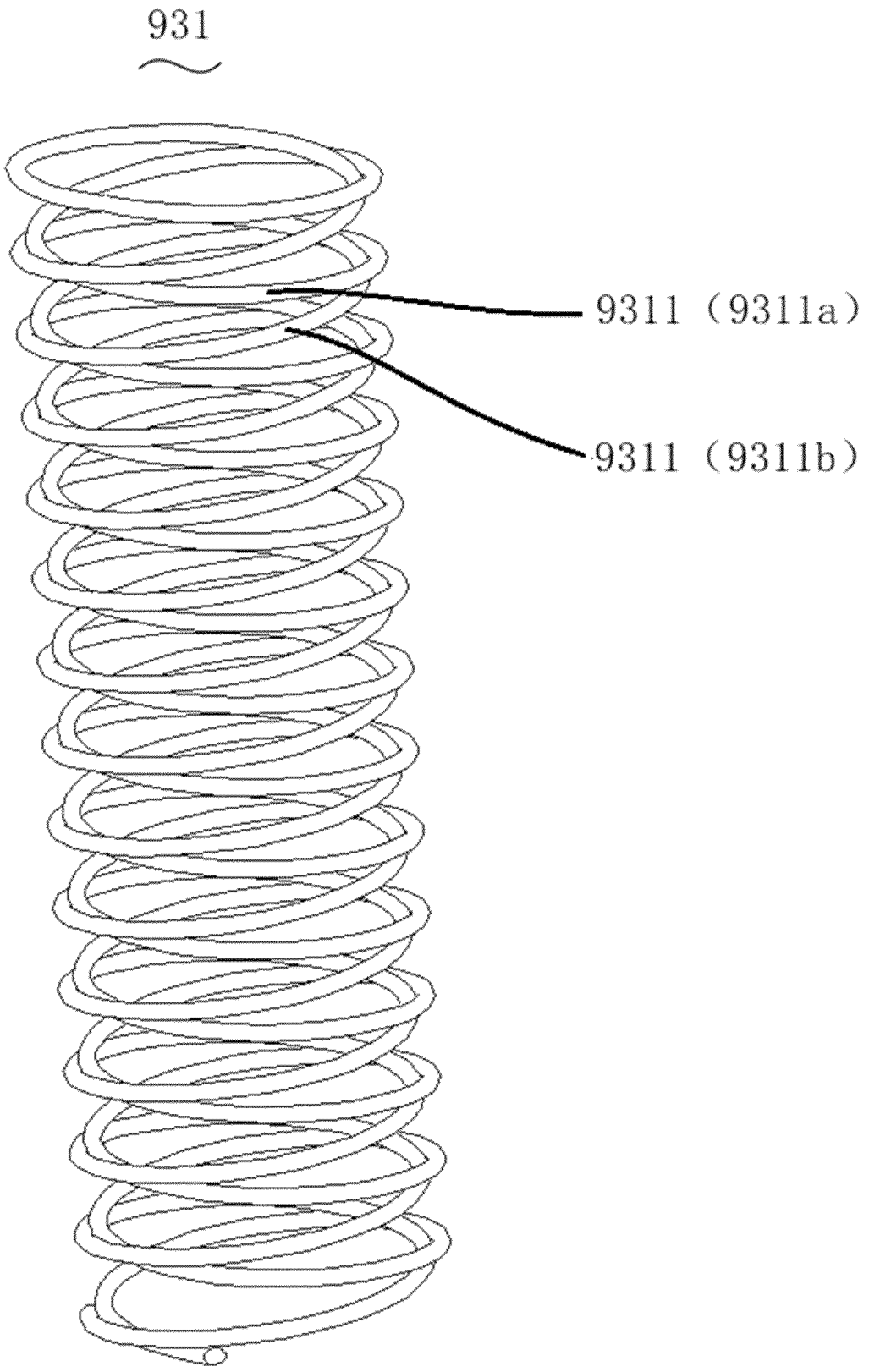

Fig.10

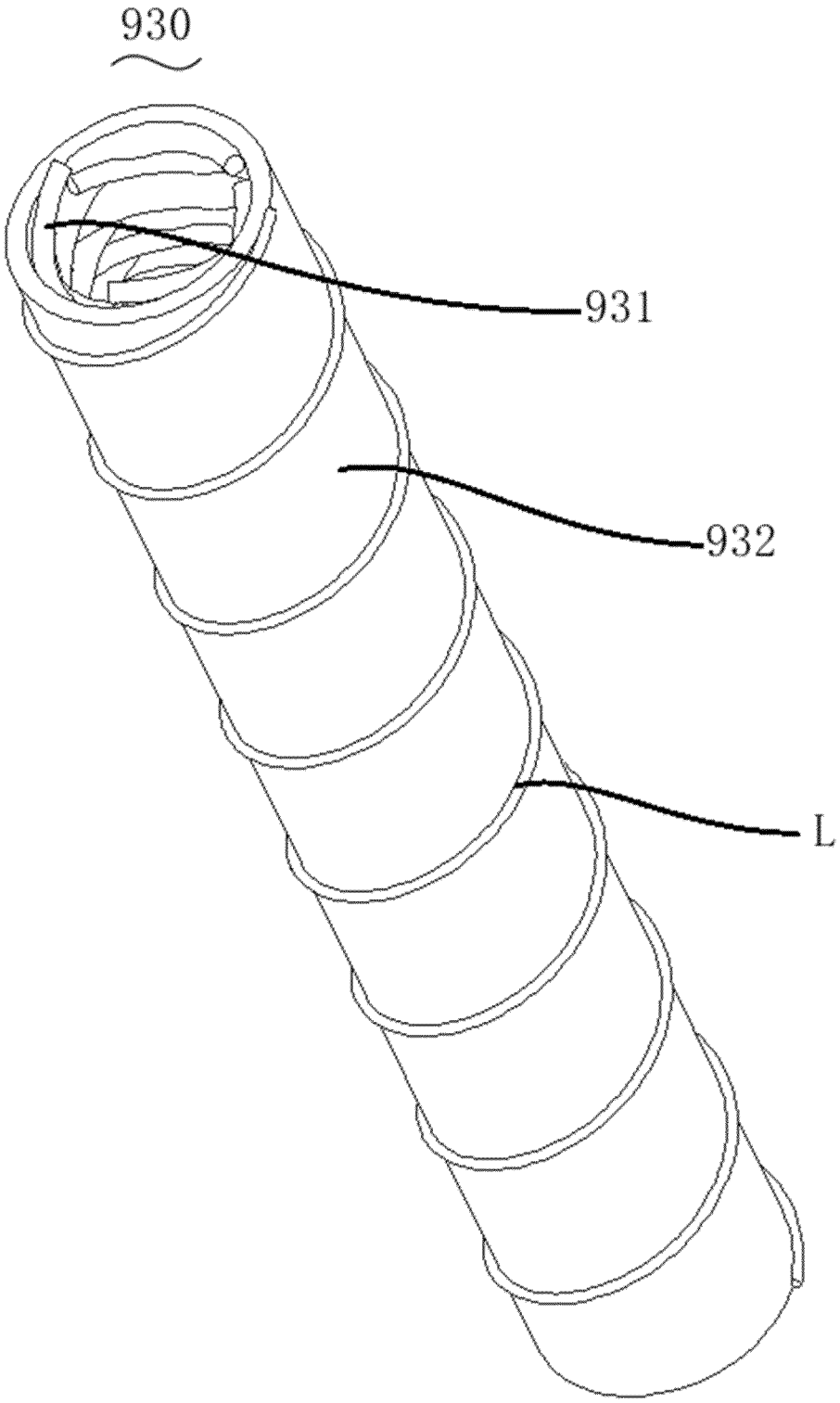

Fig.11

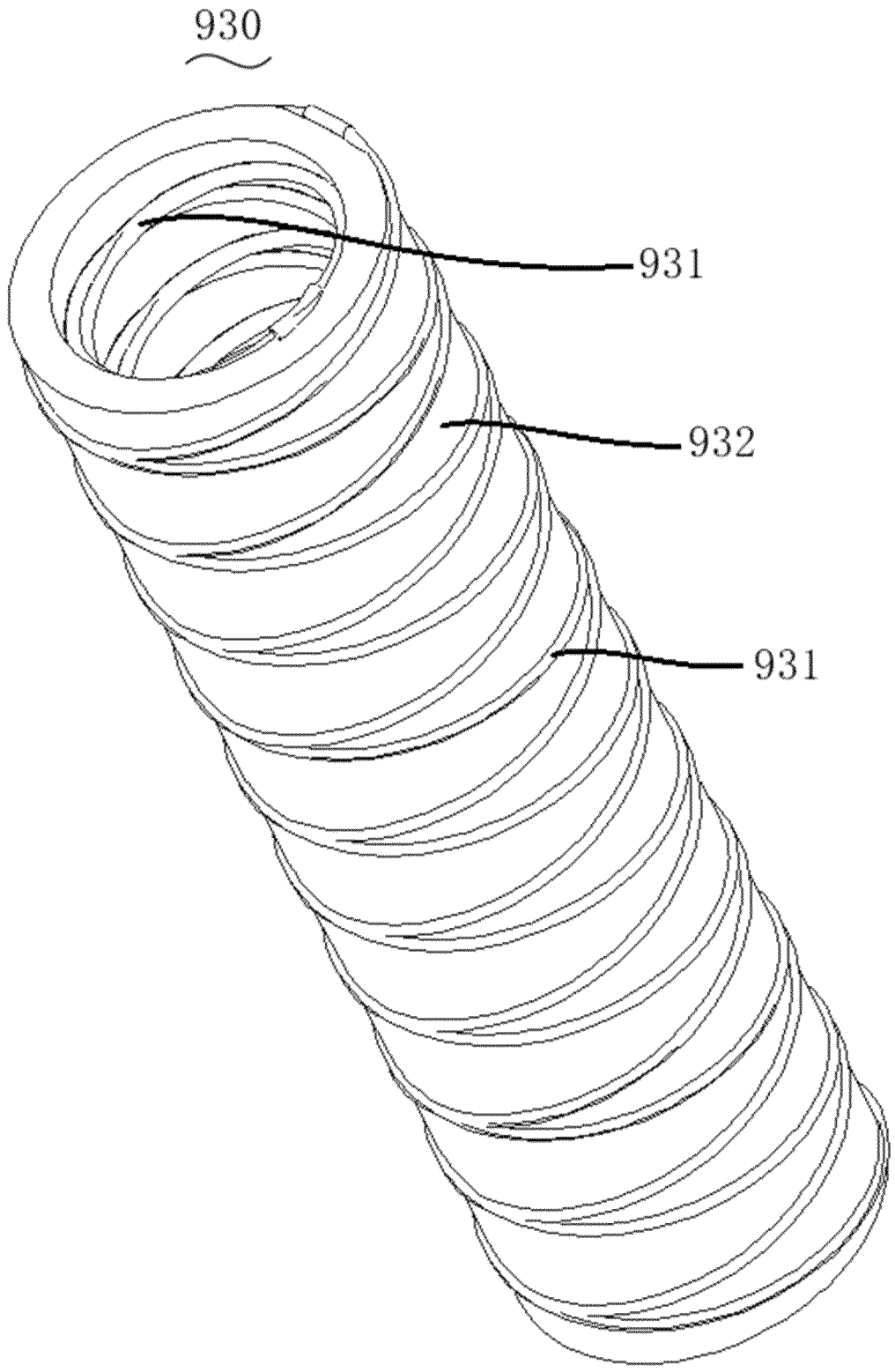

Fig.12

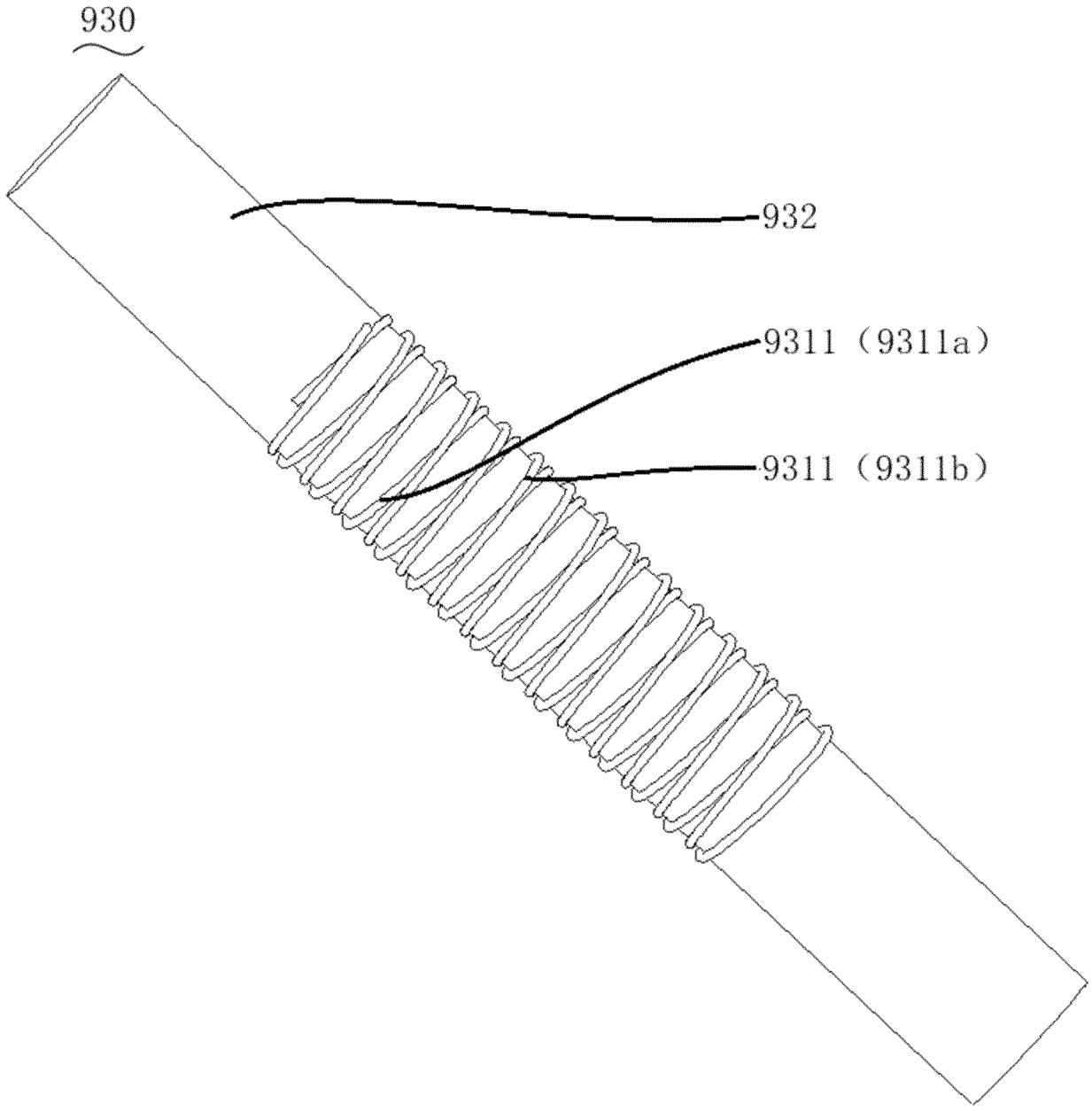

Fig.13

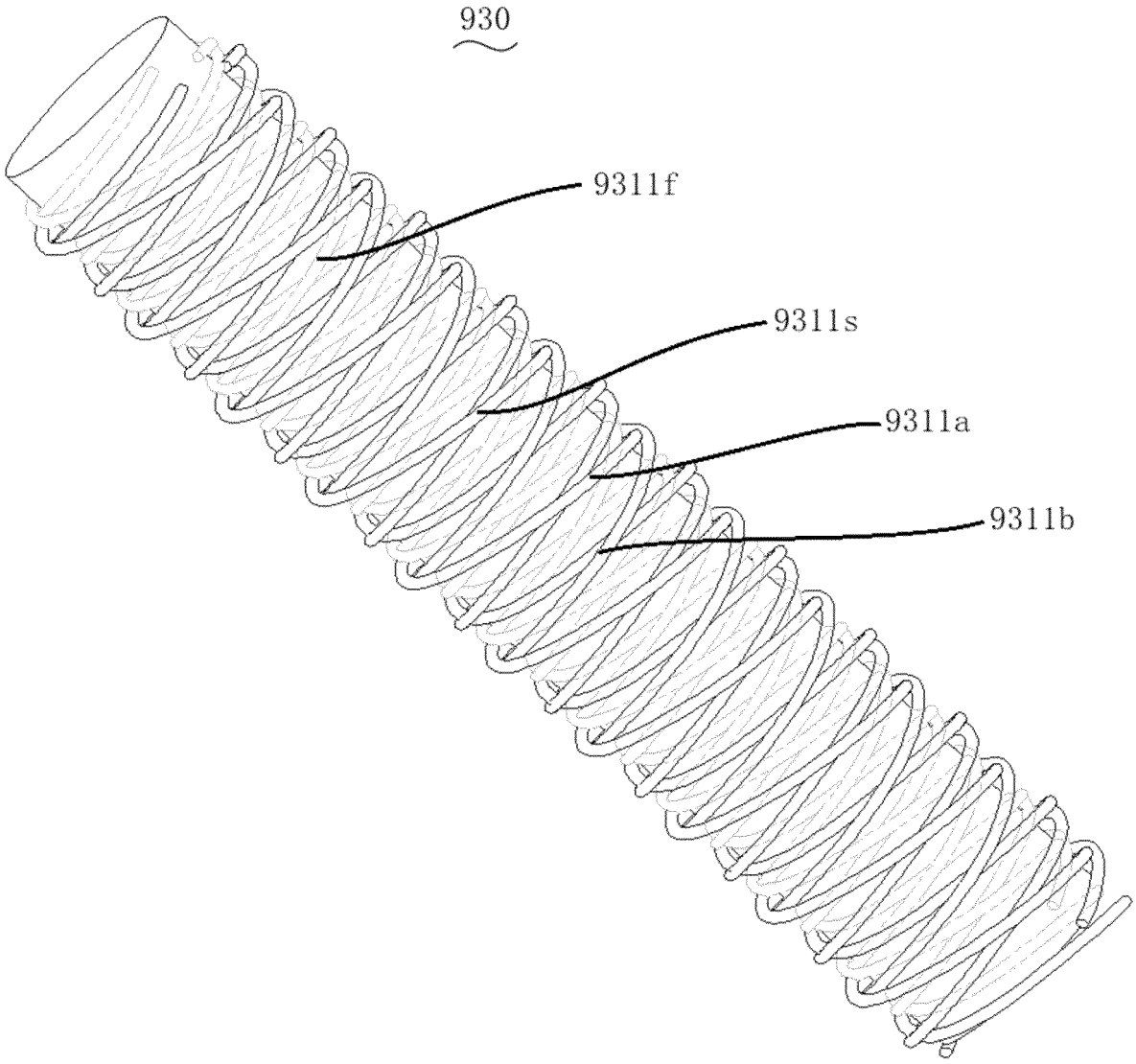

Fig.14

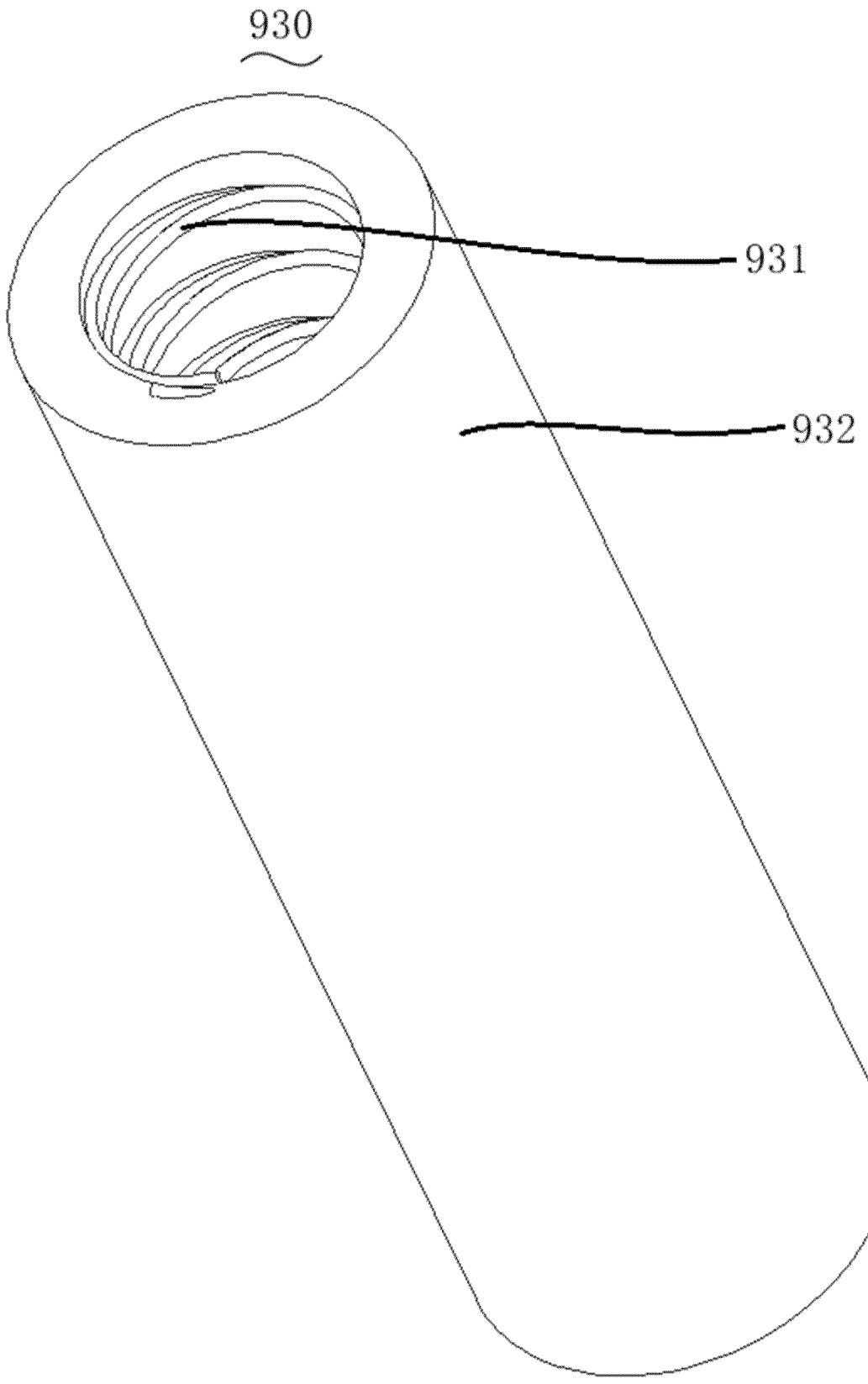

Fig.15

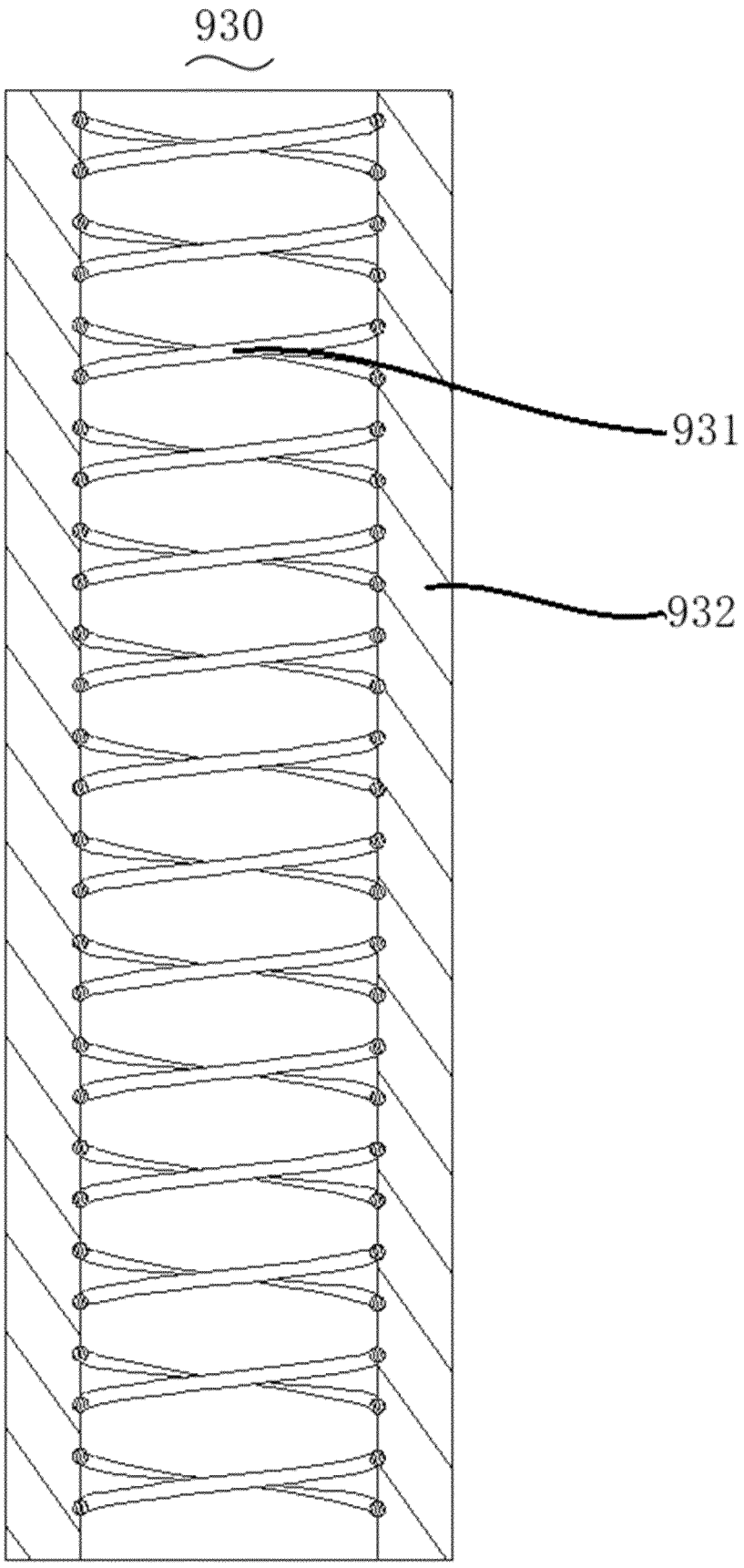

Fig.16

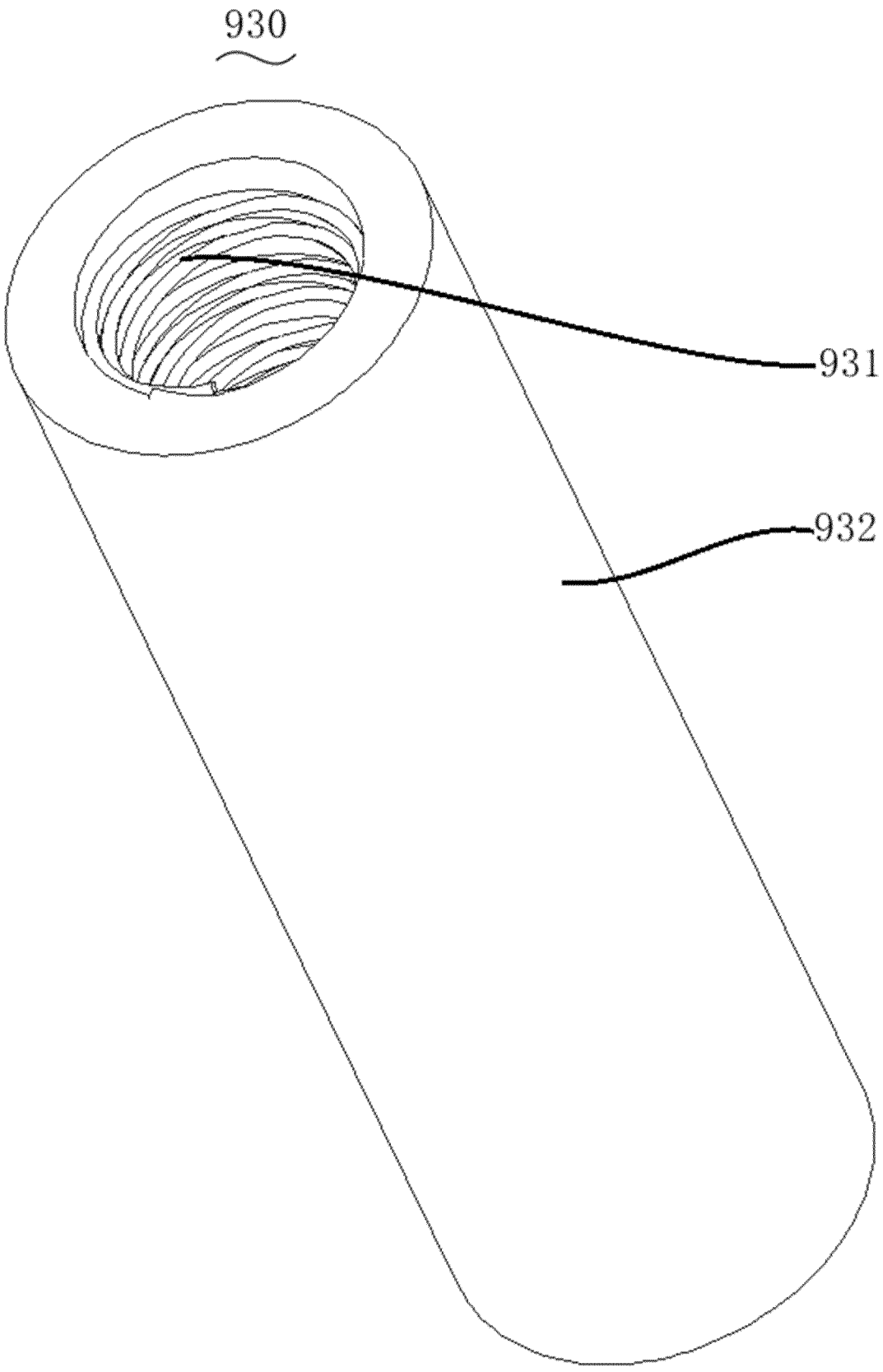

Fig.17

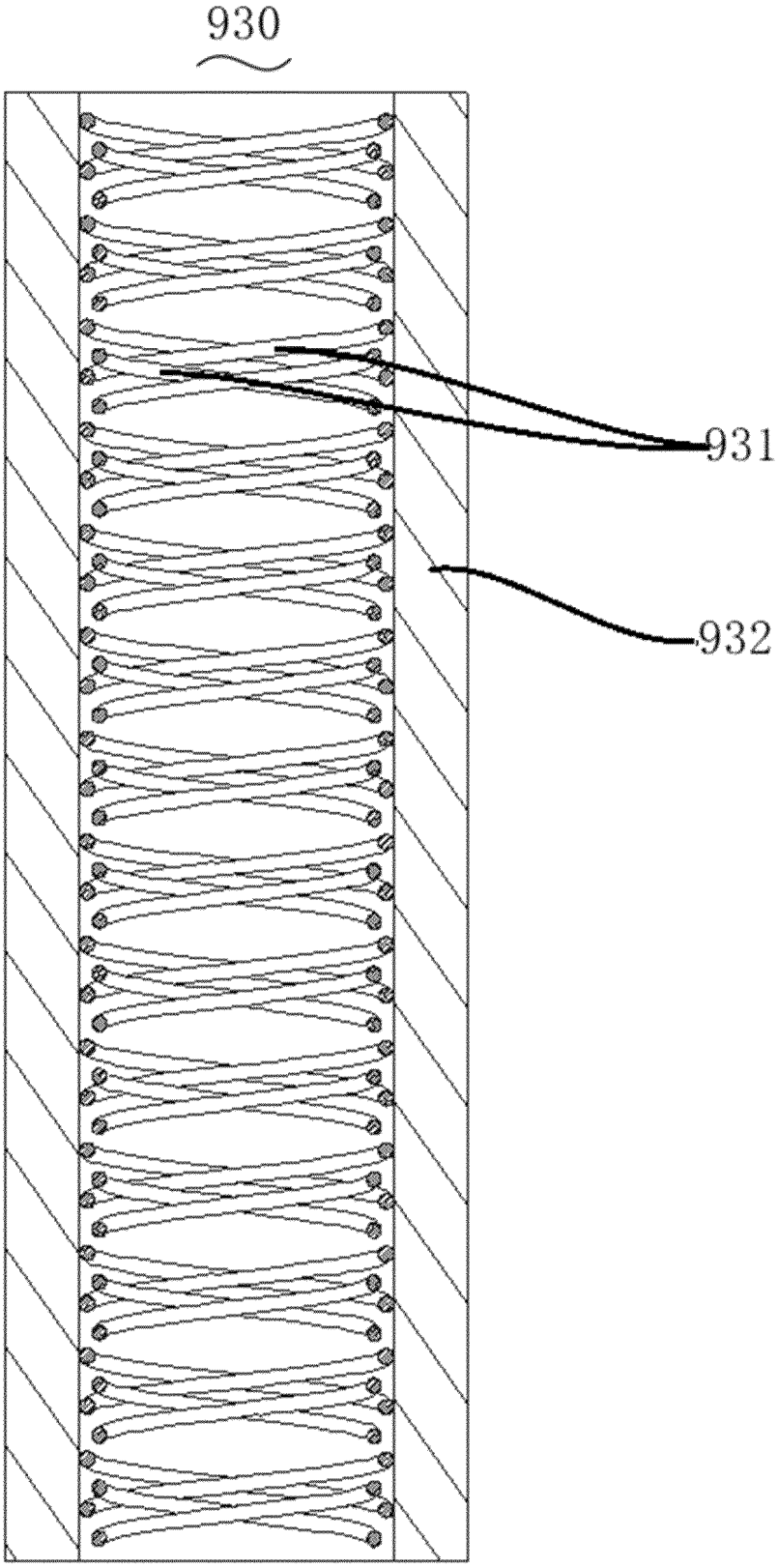

Fig.18

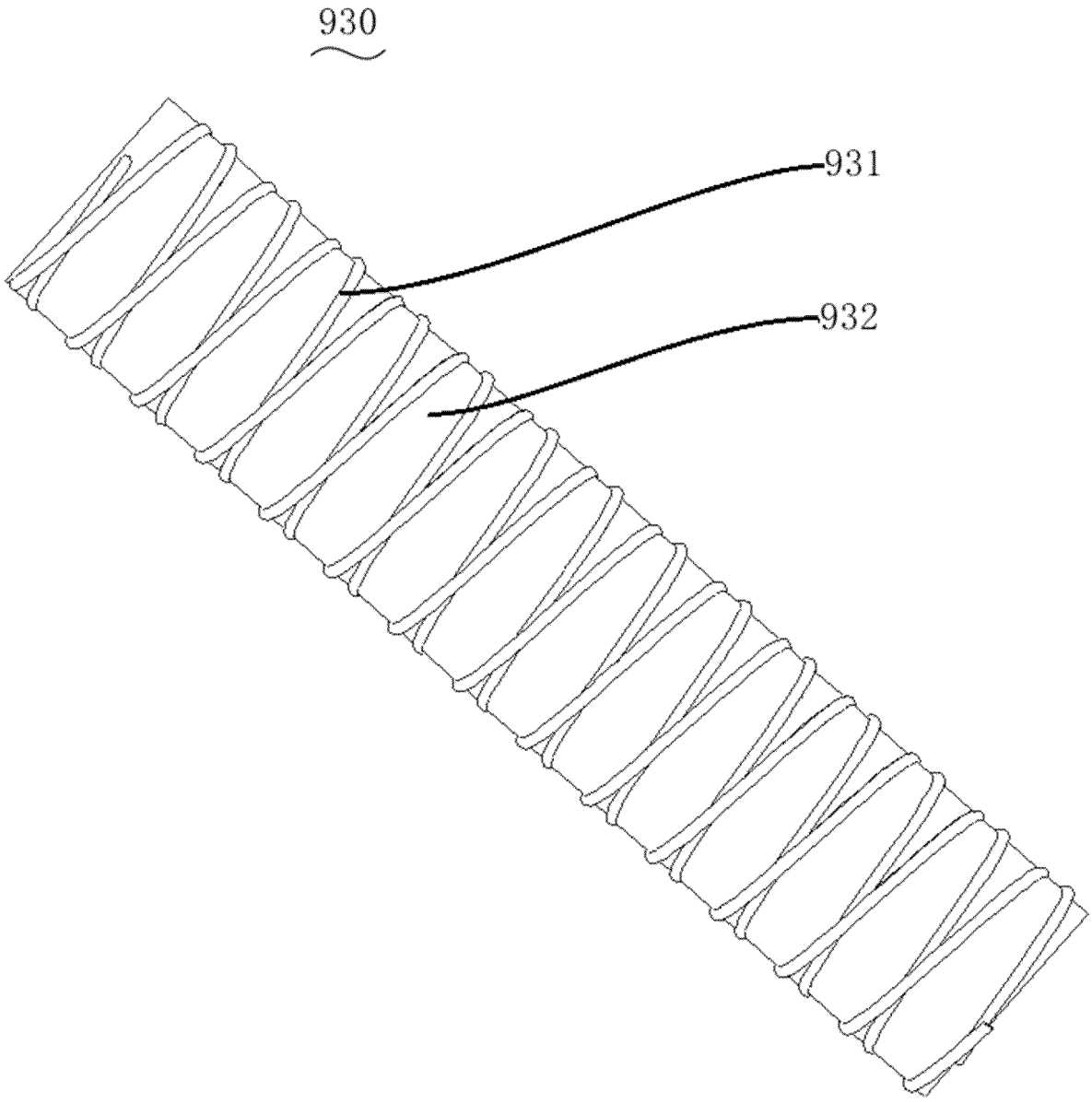

Fig.19

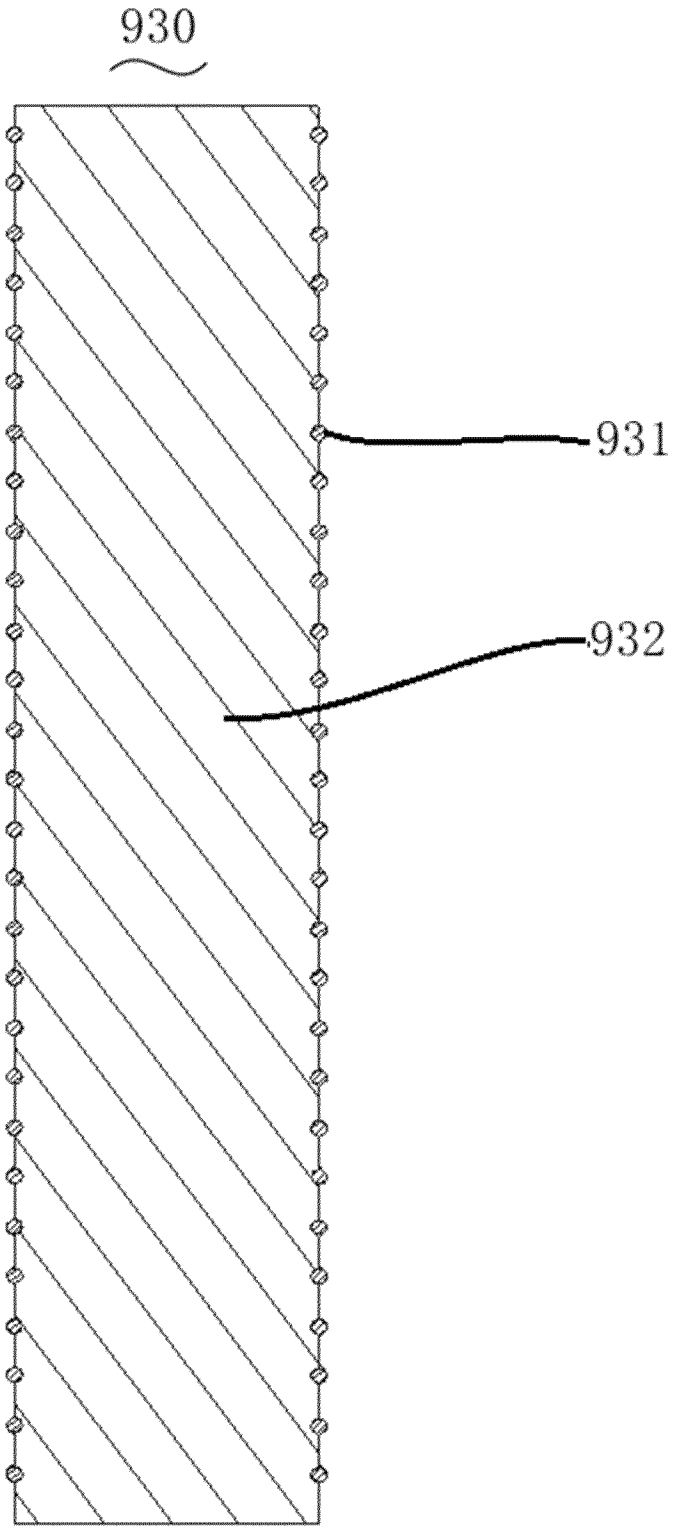

Fig.20

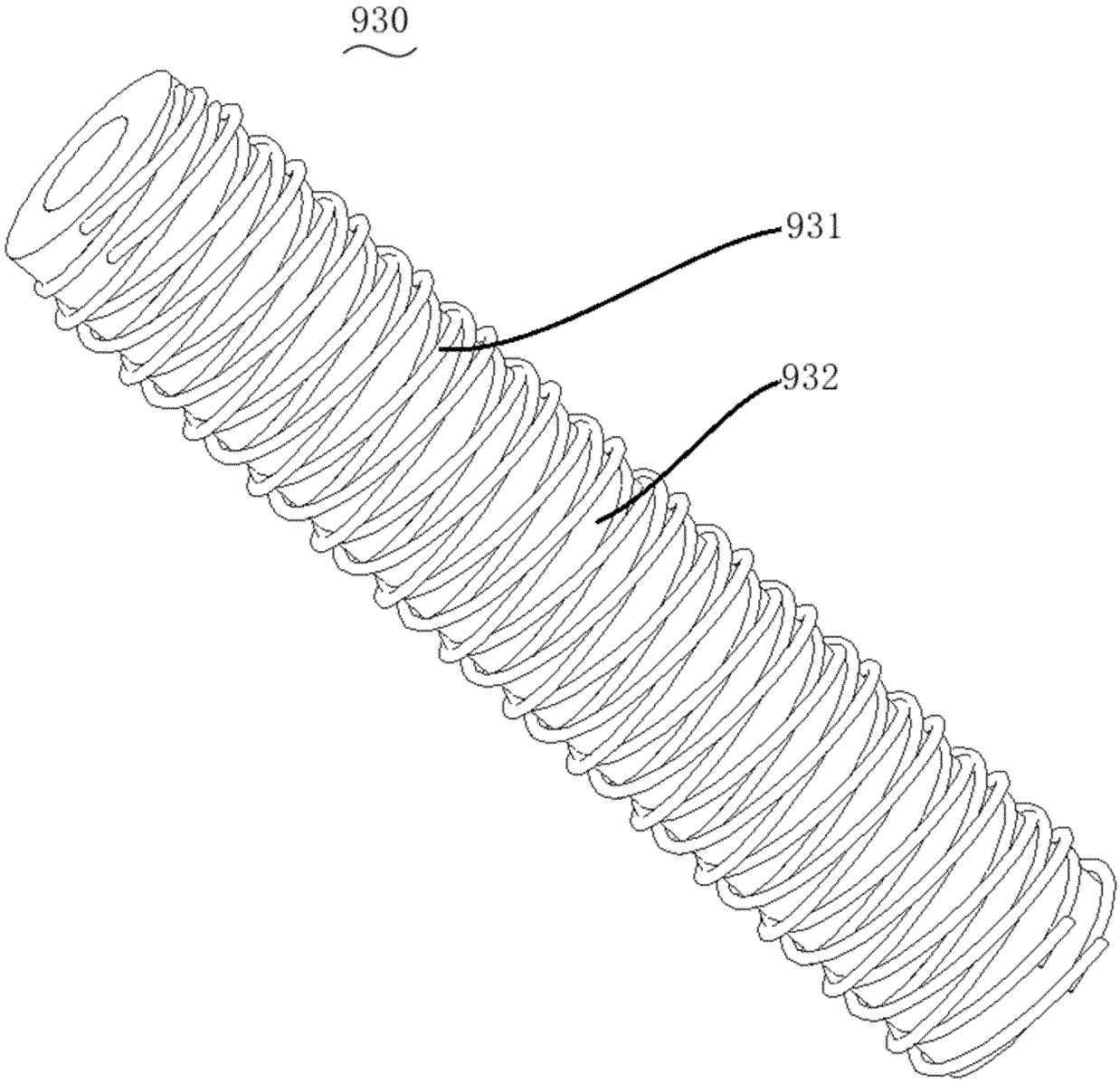

Fig.21

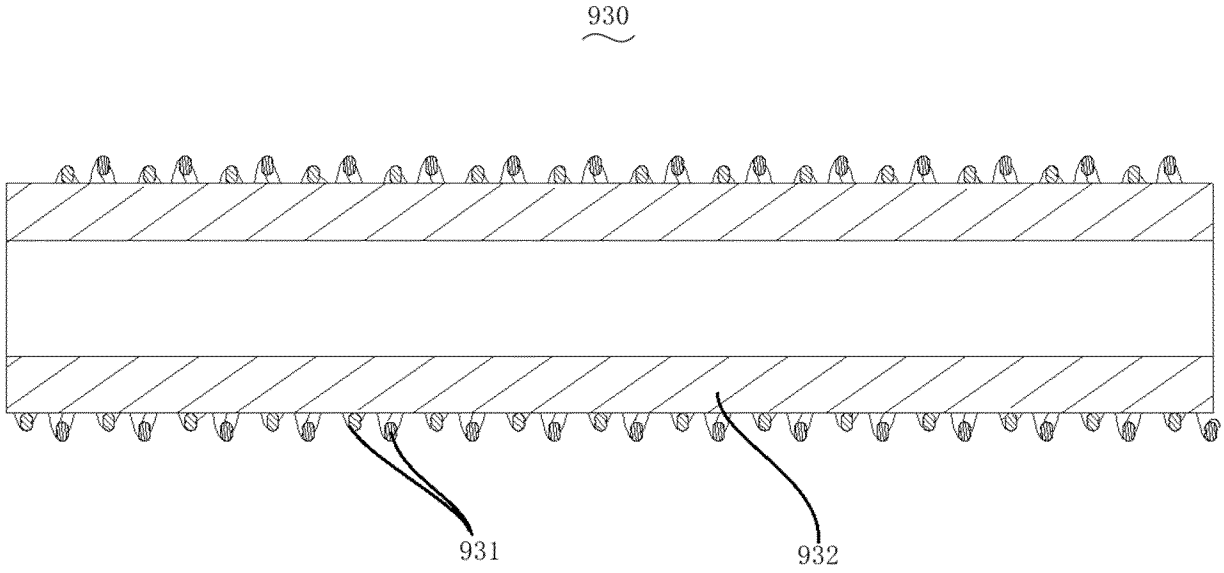

Fig.22

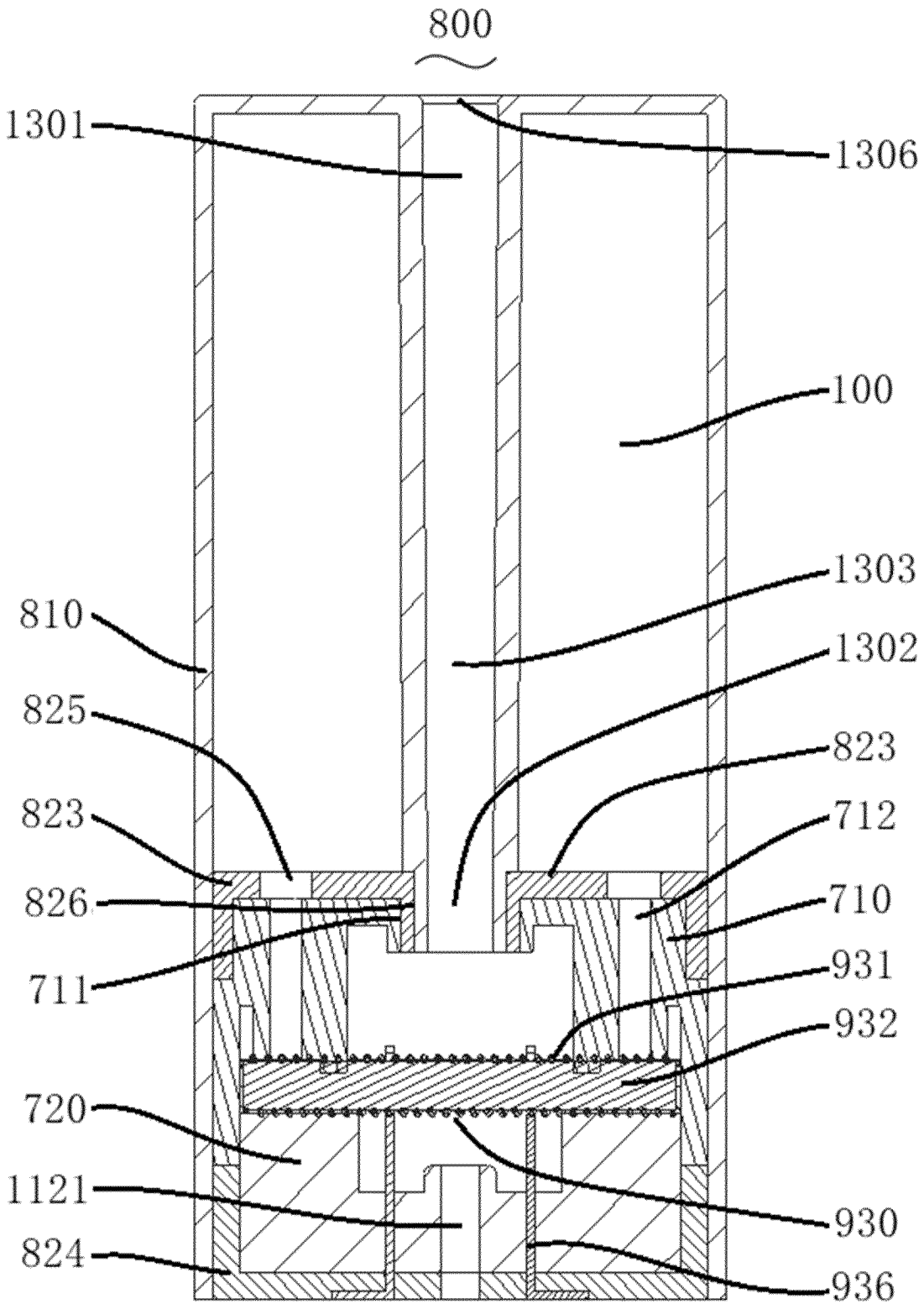
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Fig.23

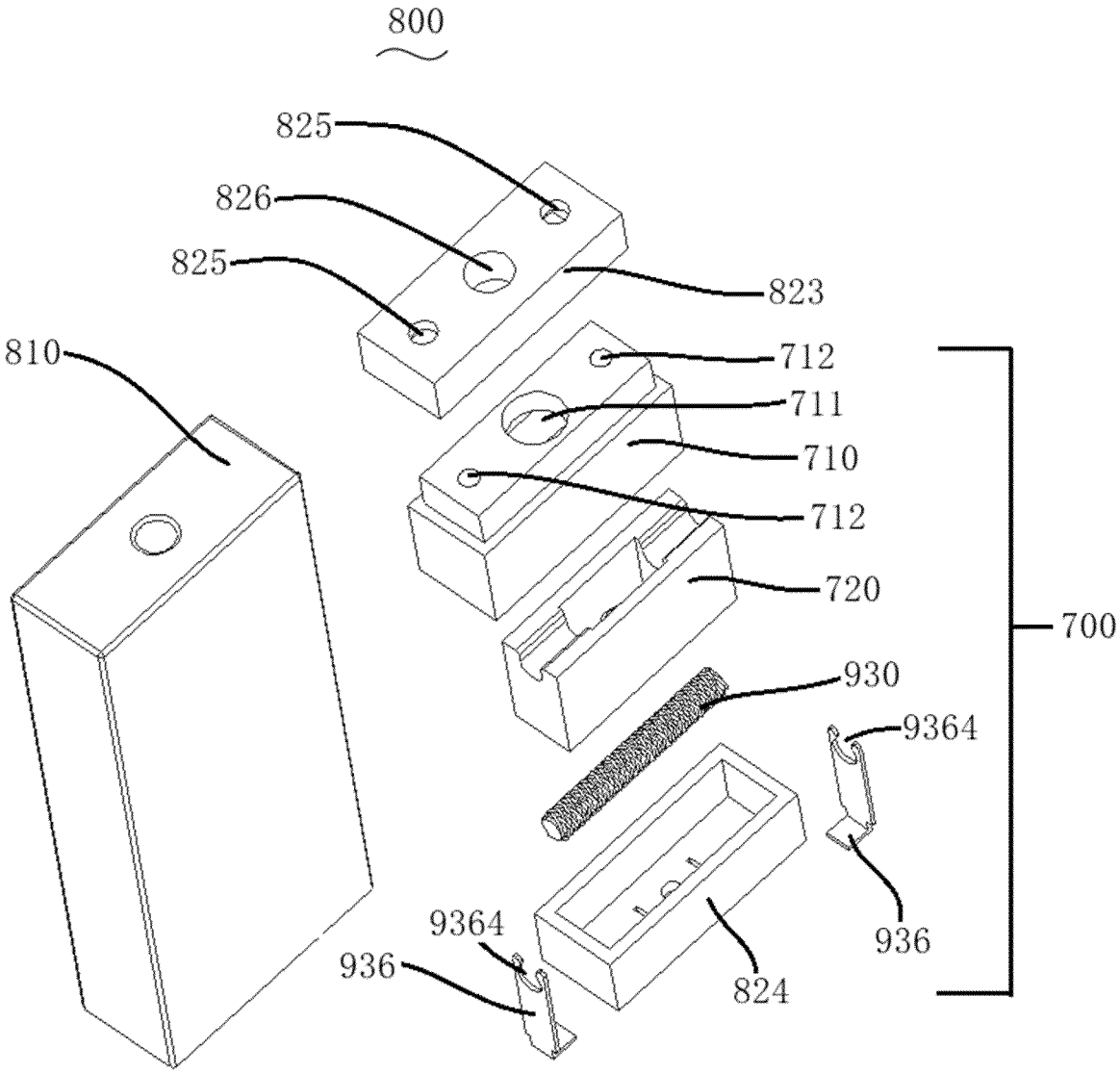
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Fig.24

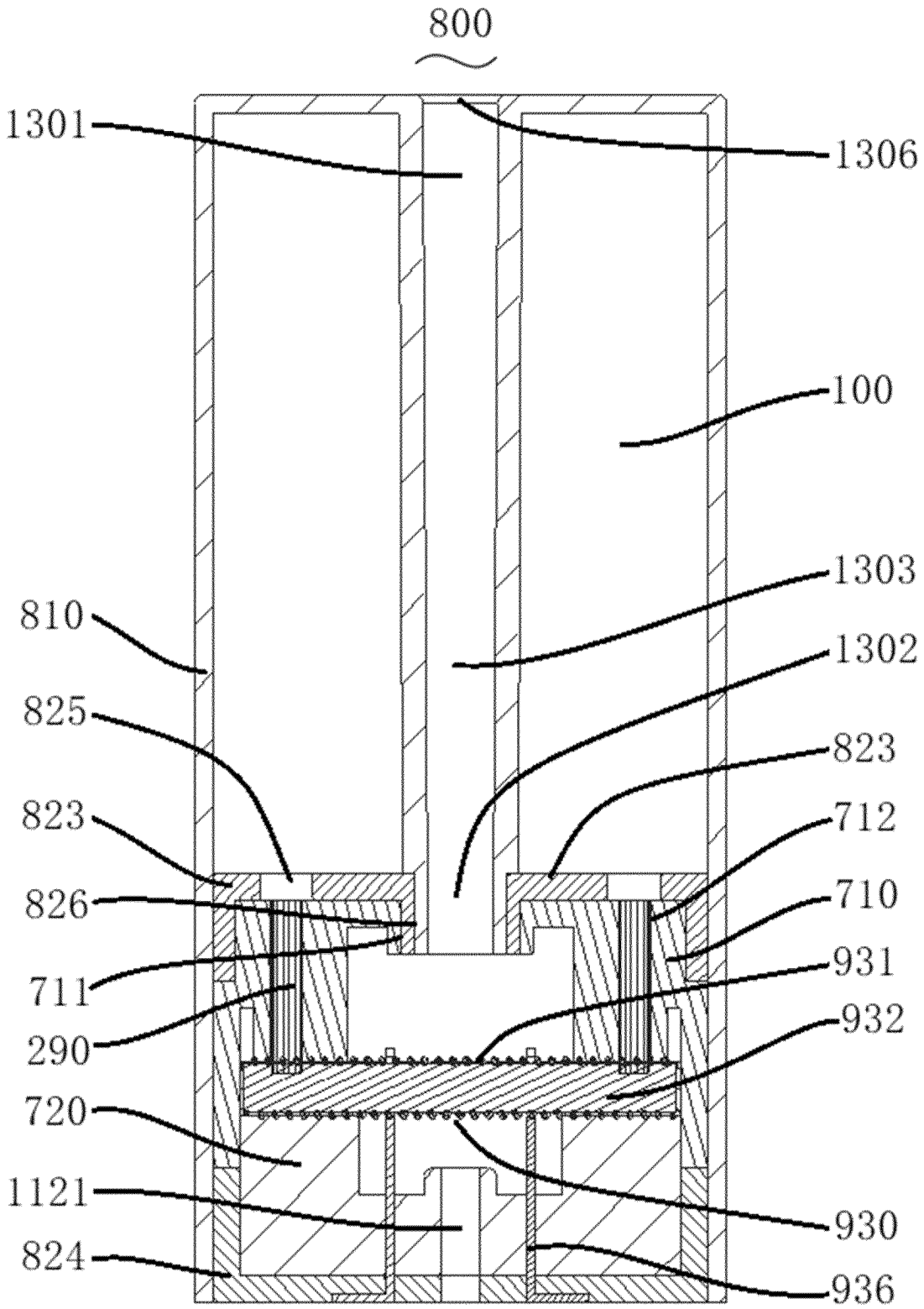
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Fig.25

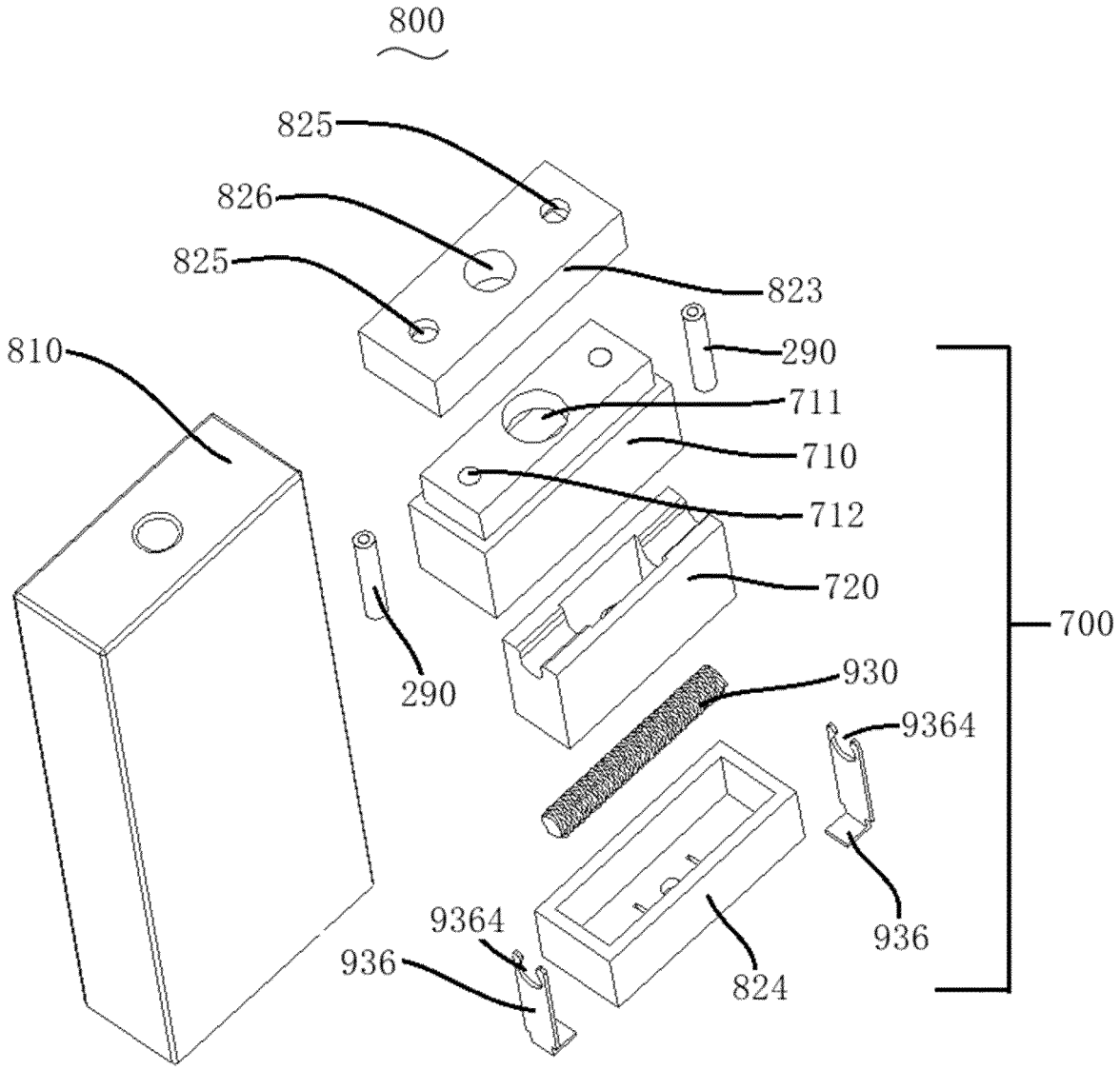
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Fig.26

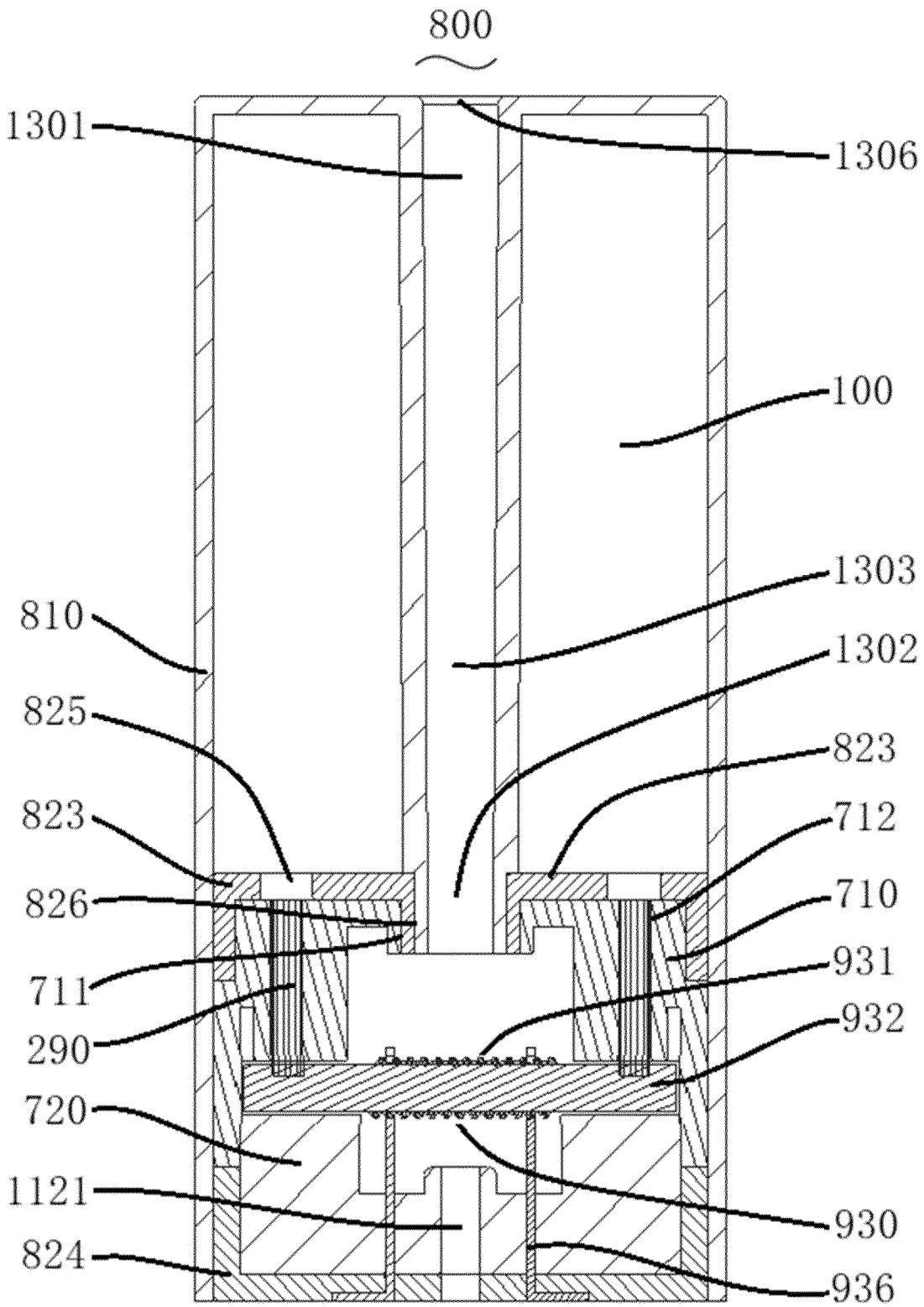
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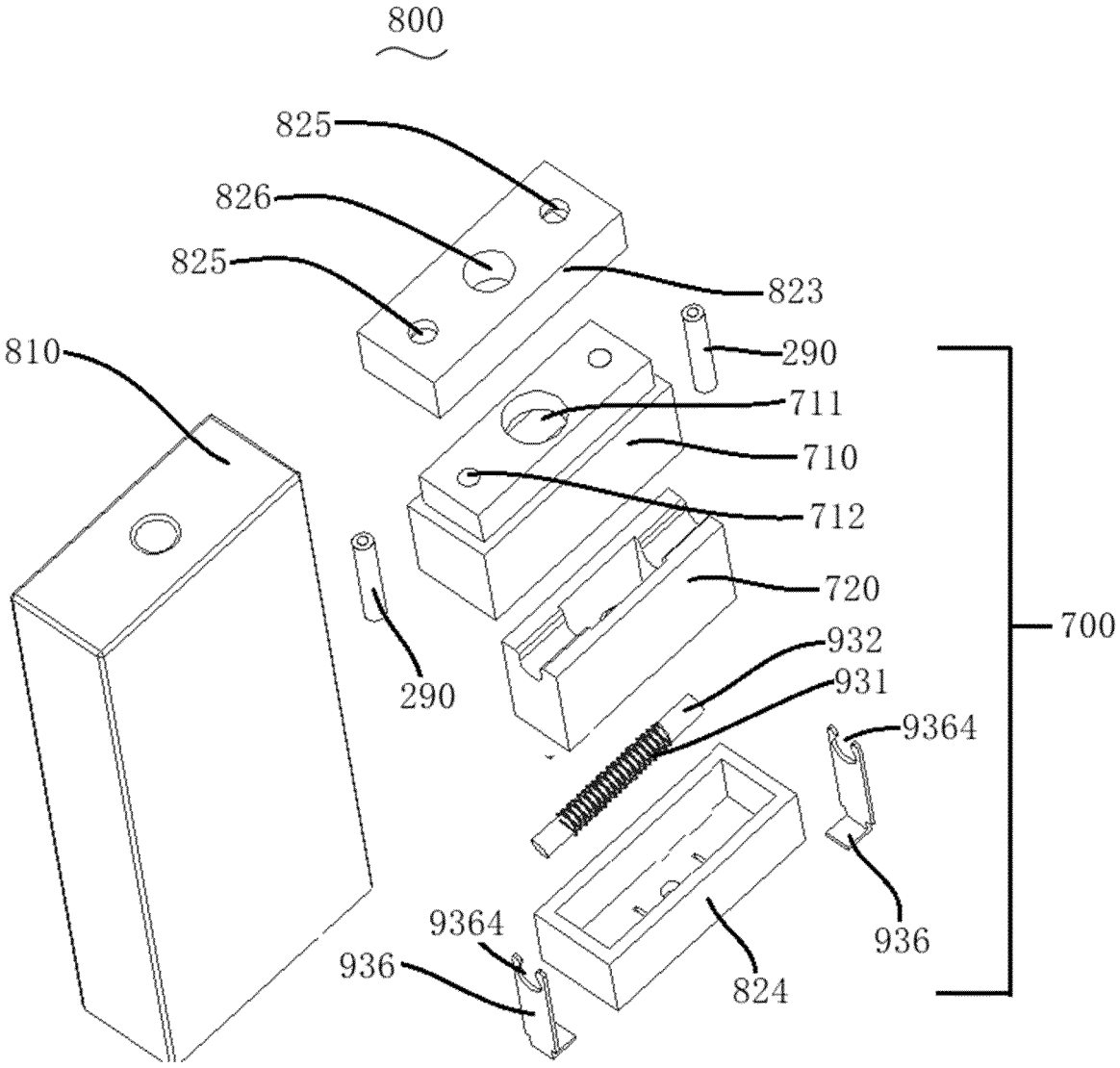
Fig.27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936

Fig.28

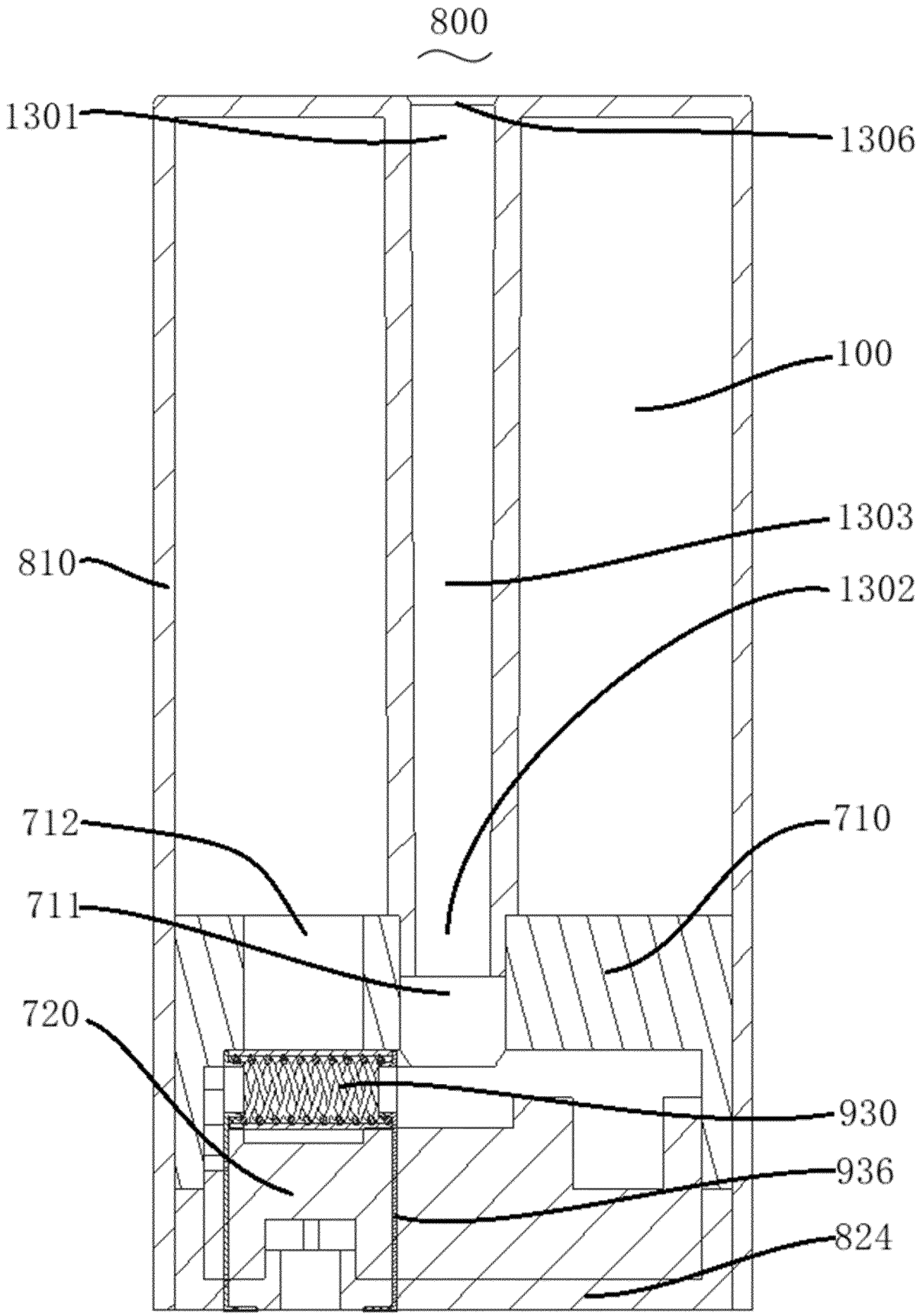


Fig.29

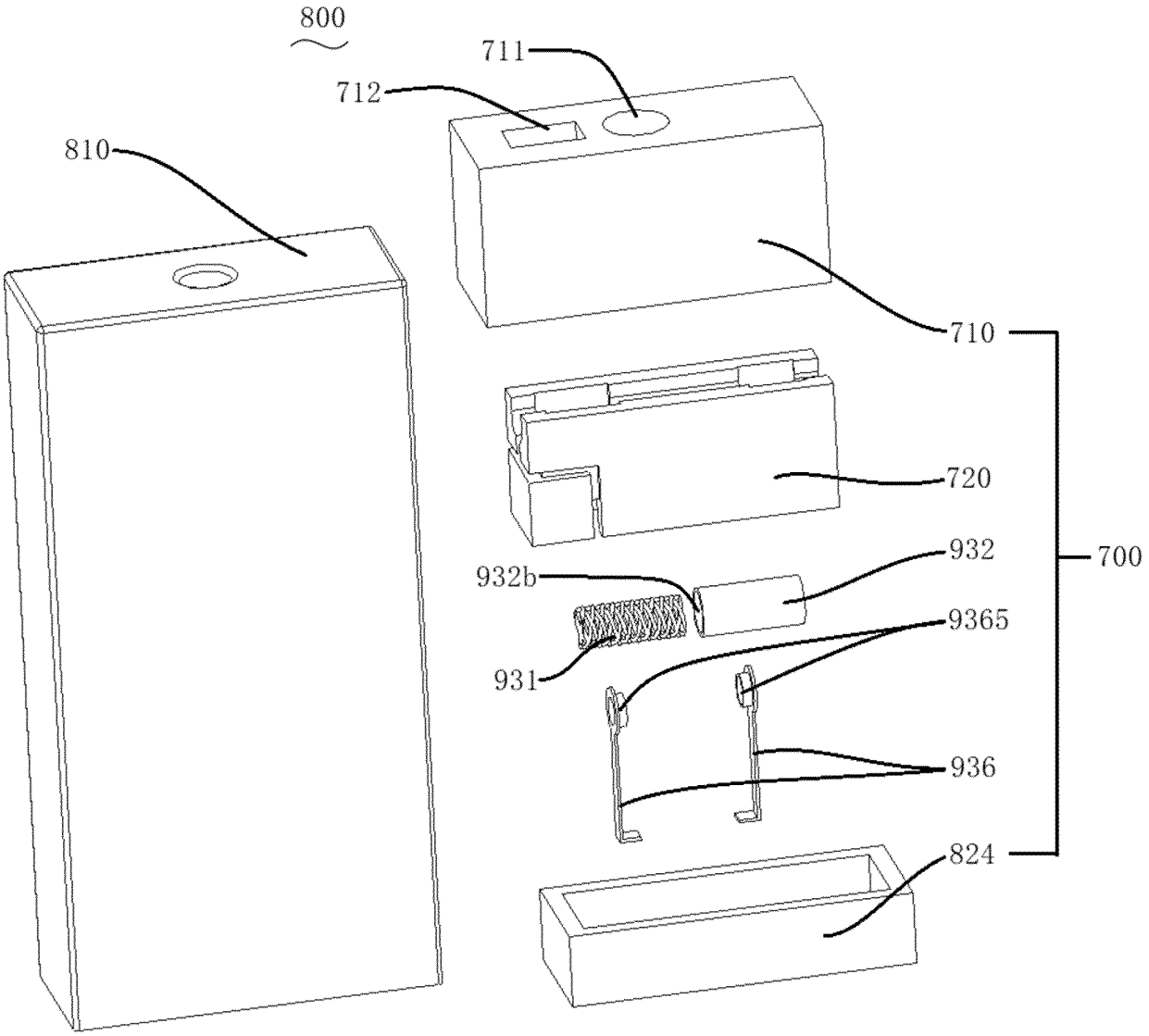
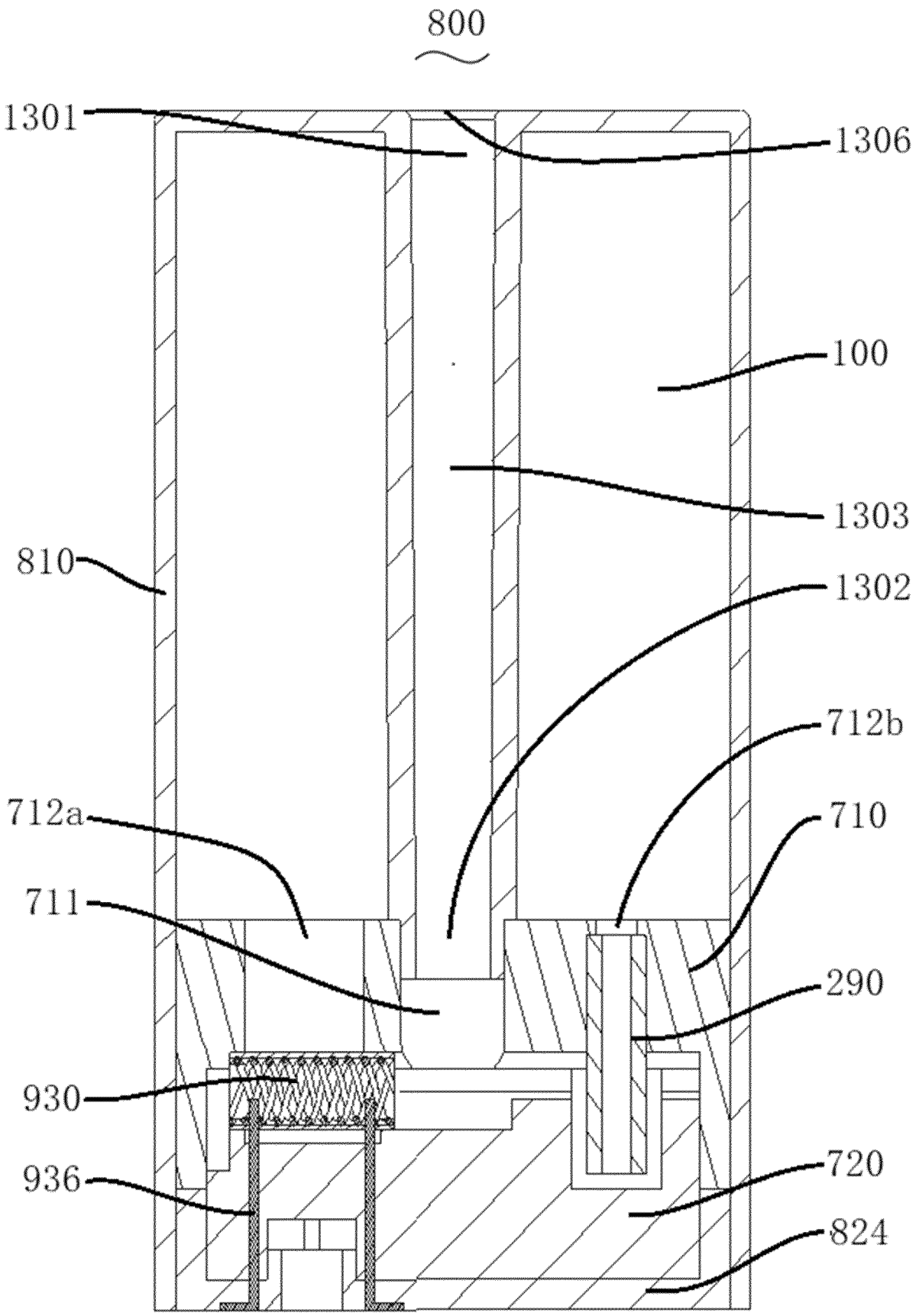


Fig.30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1301
1306
100
1303
810
1302
712b
712a
710
711
290
930
720
936
824

Fig.31

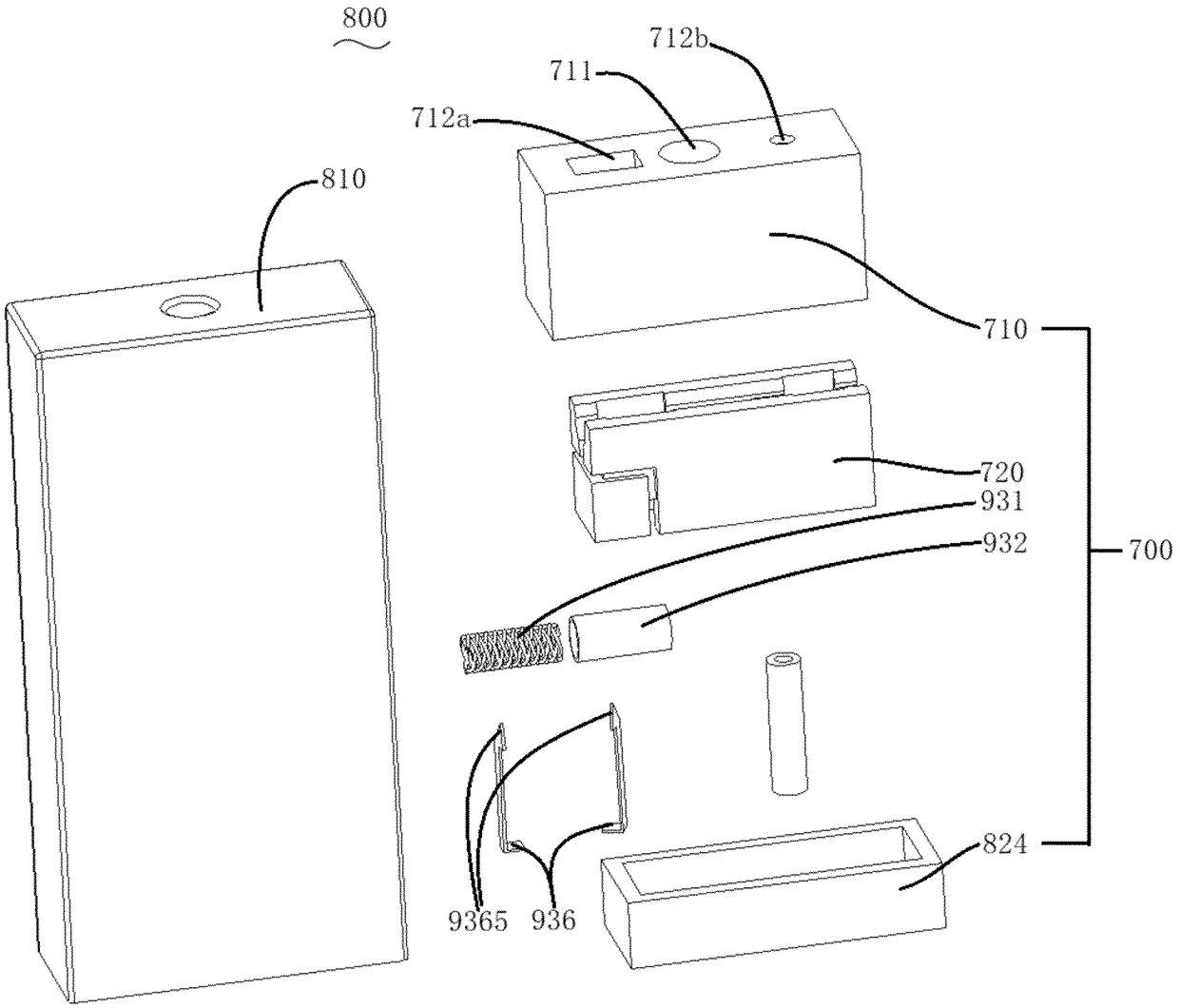
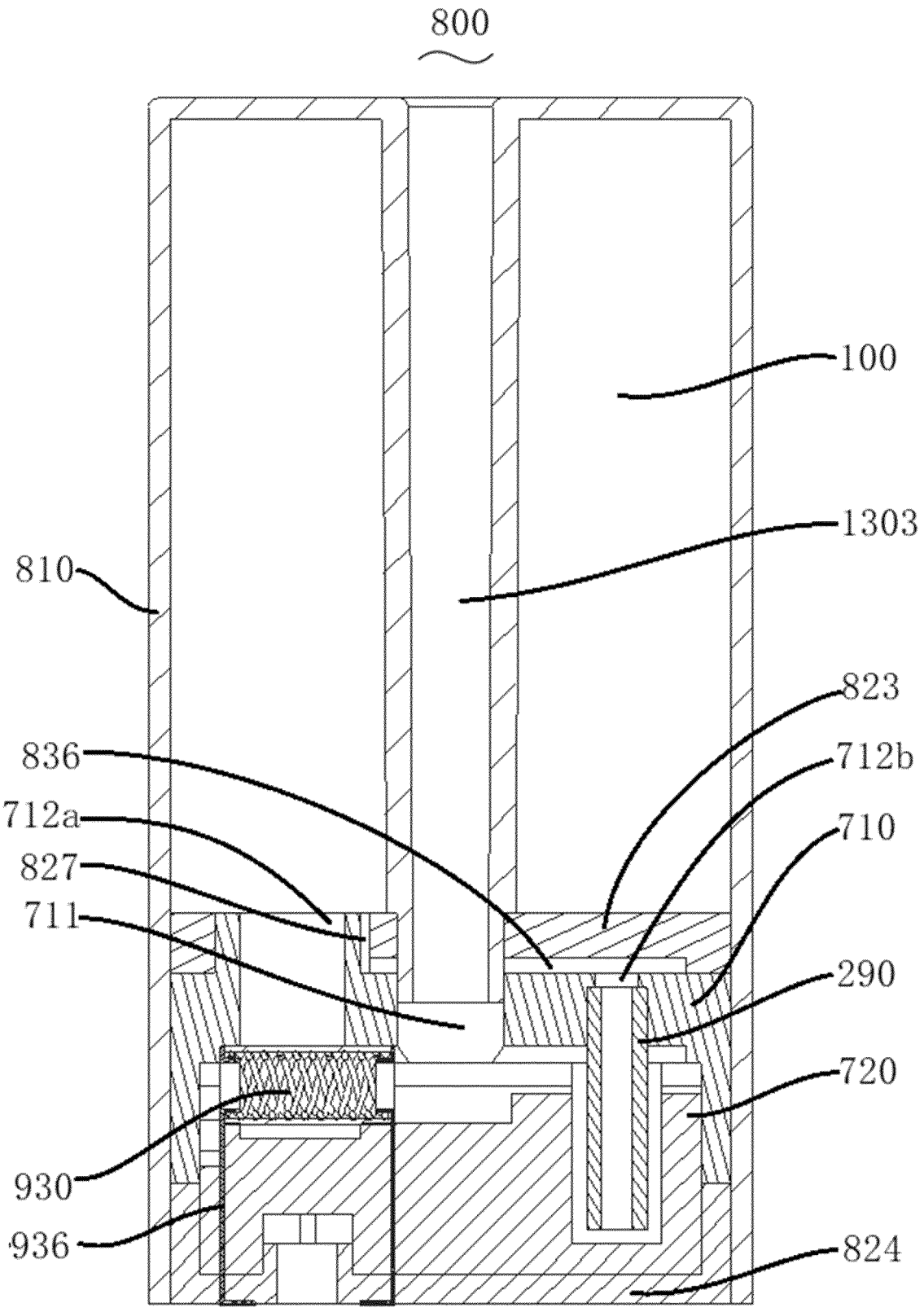


Fig.32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1303
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823
836
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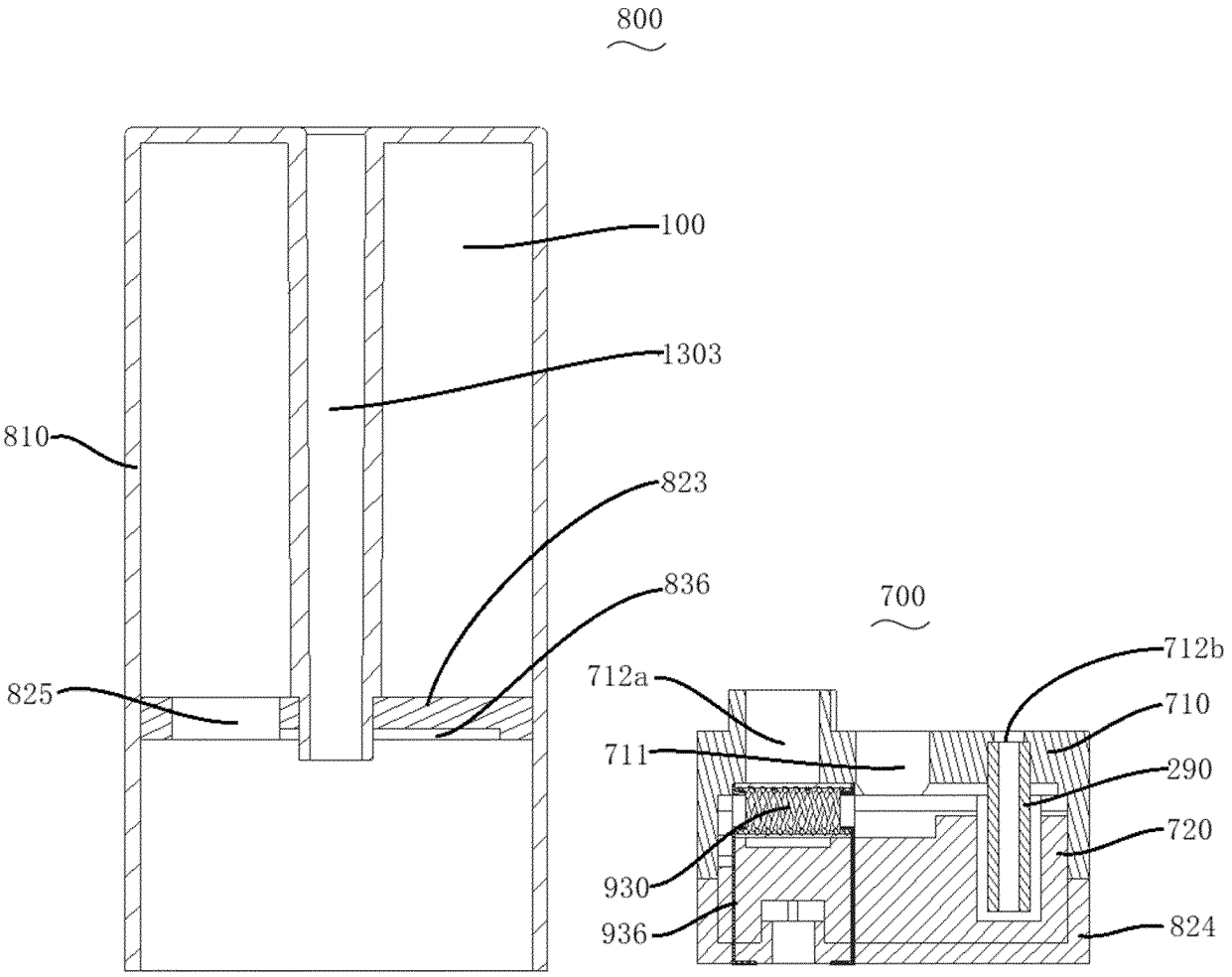
712a
710
827
711
290
720
930
936
824

Fig.33


800
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836
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712b
710
711
290
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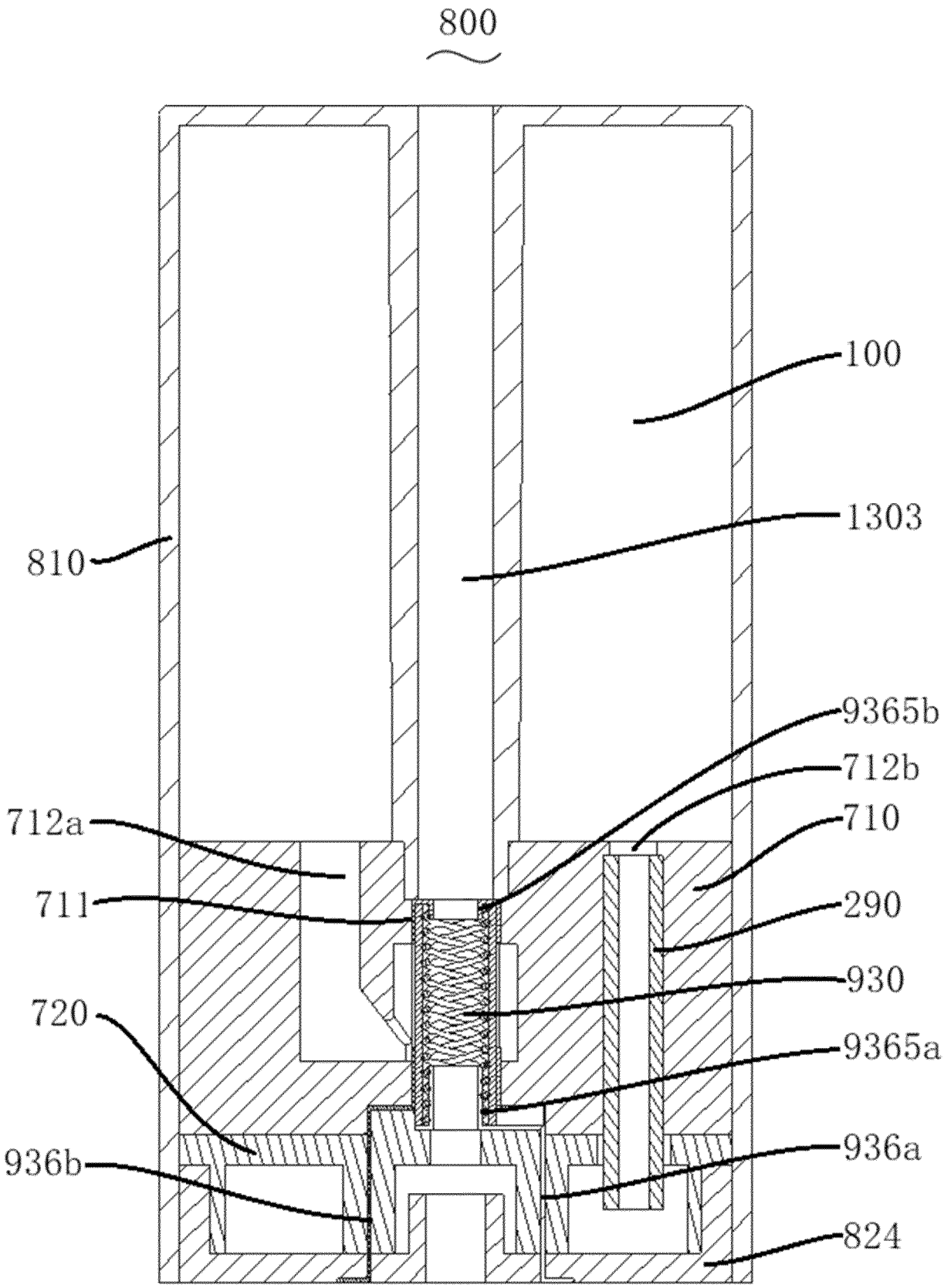
930
936
824

Fig.34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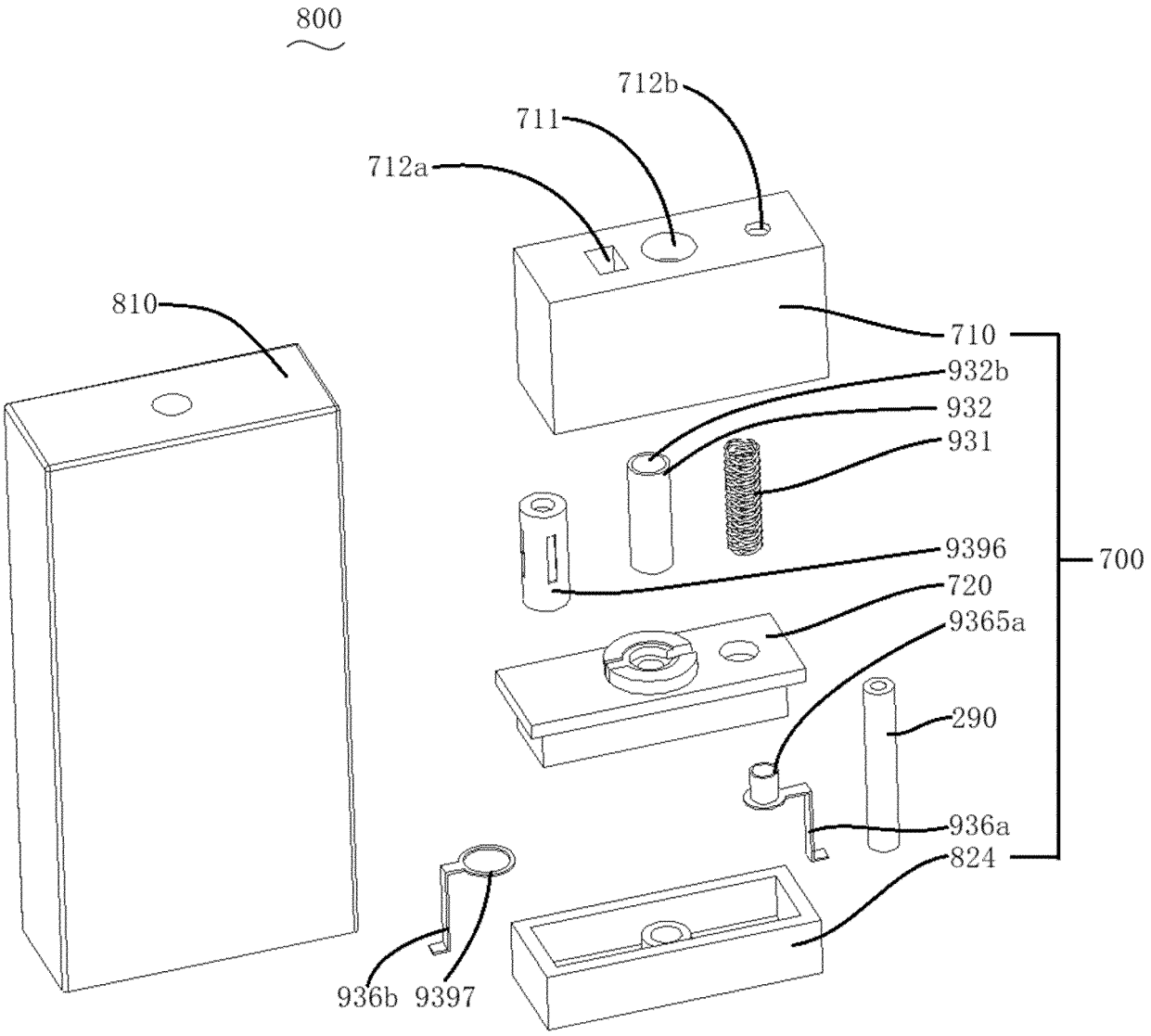
720
9365a
936b
936a
824

Fig.35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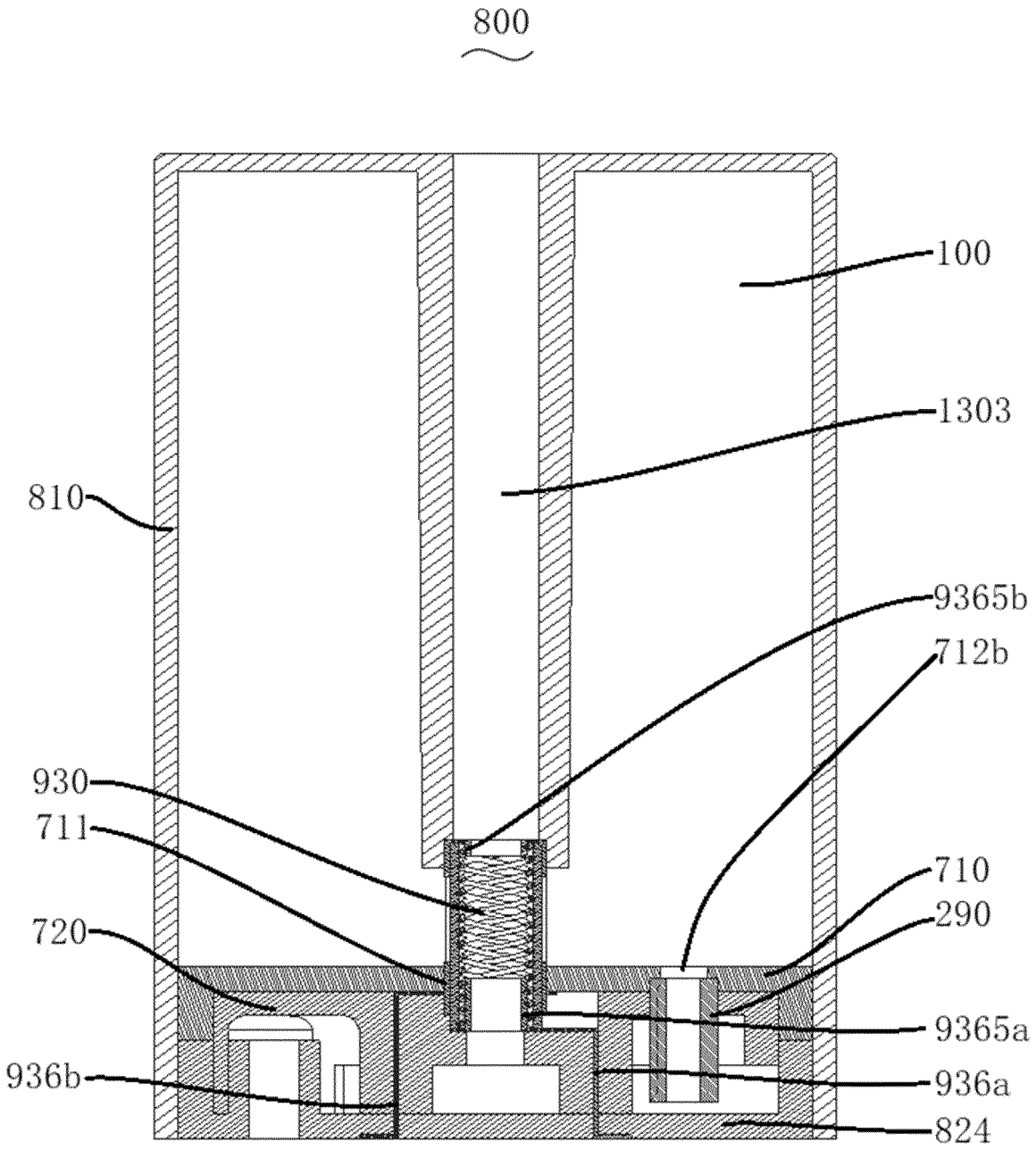
824
936b
9397

Fig.36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710
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720
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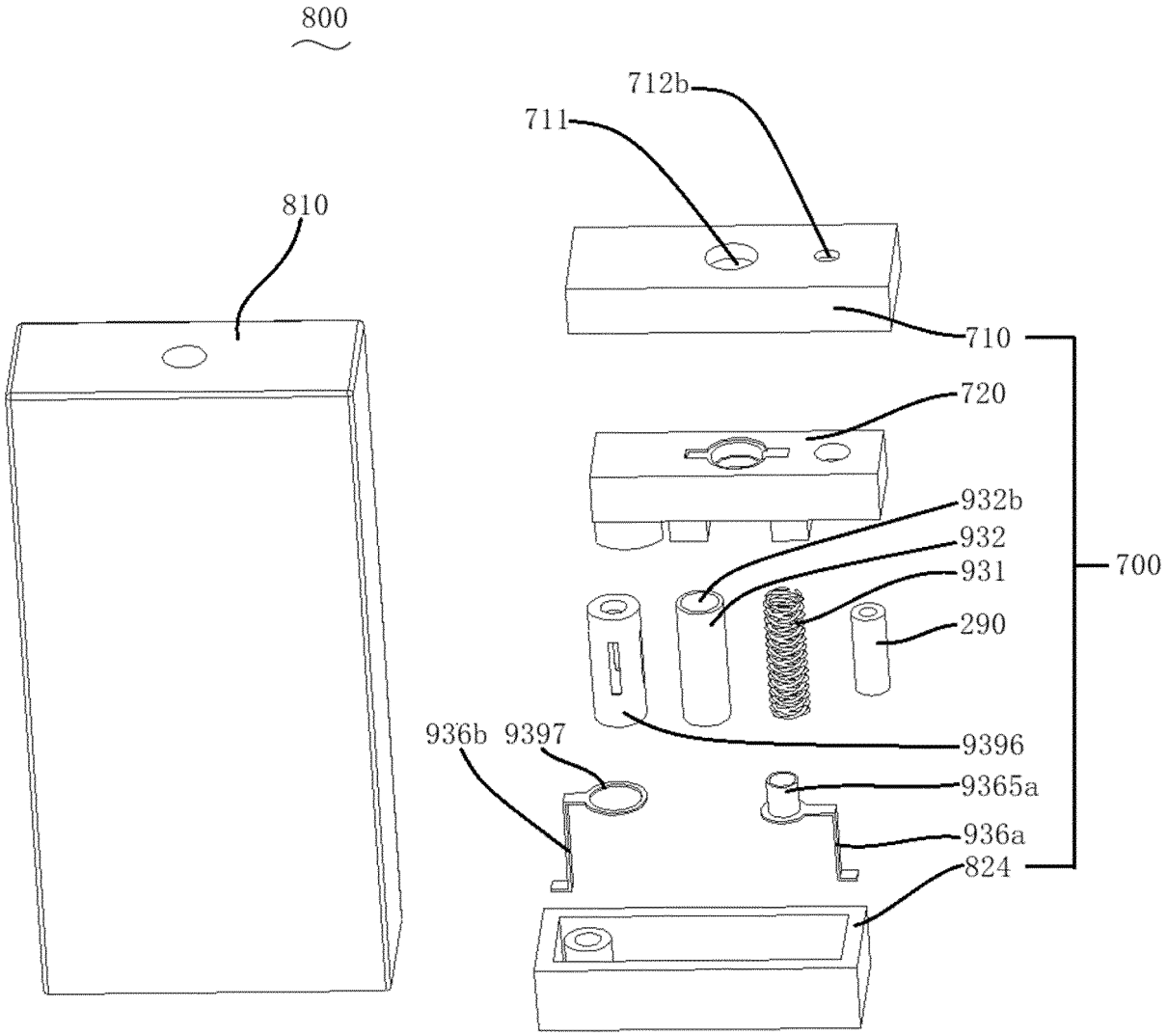
936a
824

Fig.37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9397
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824

Fig.38

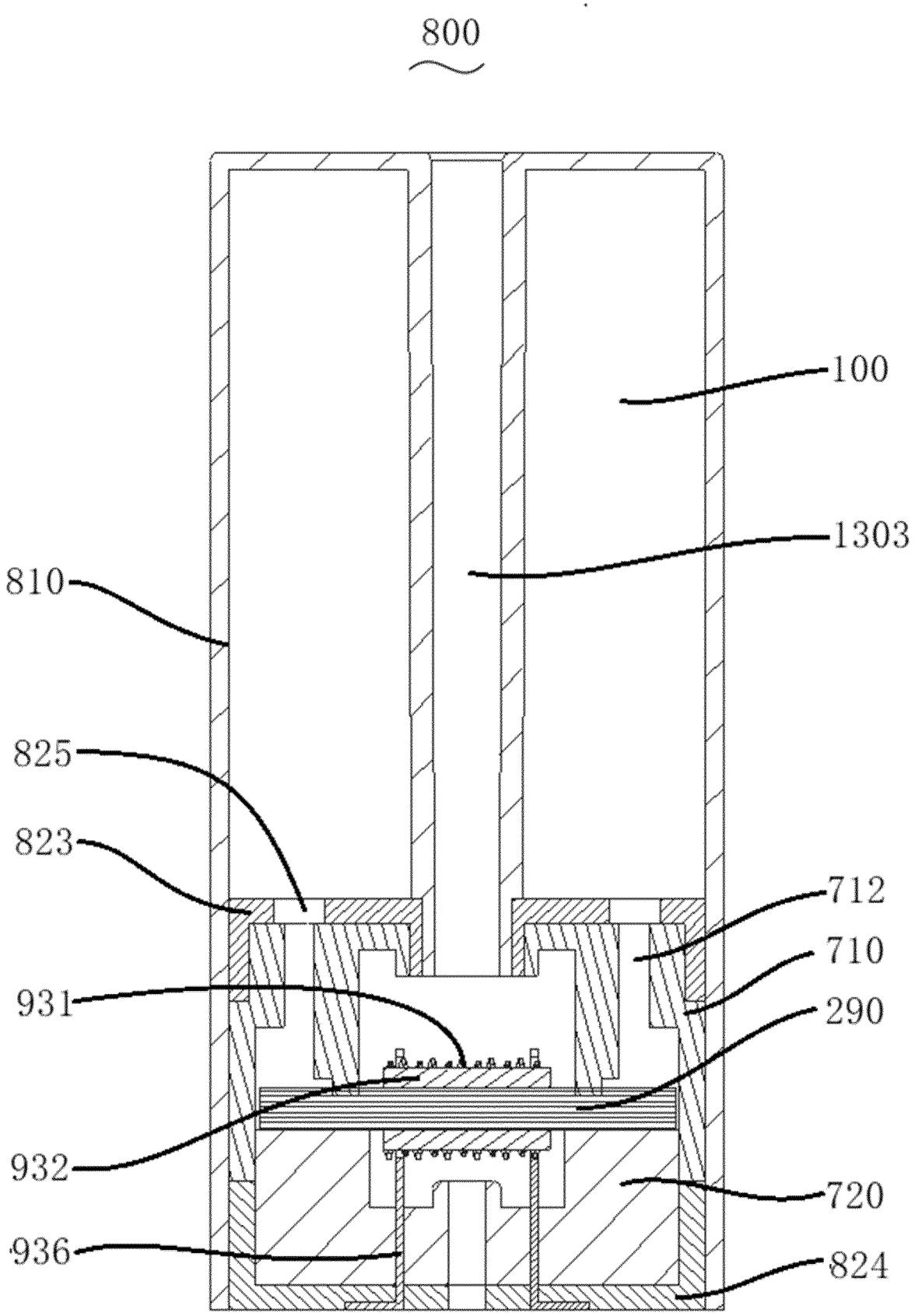


Fig.39

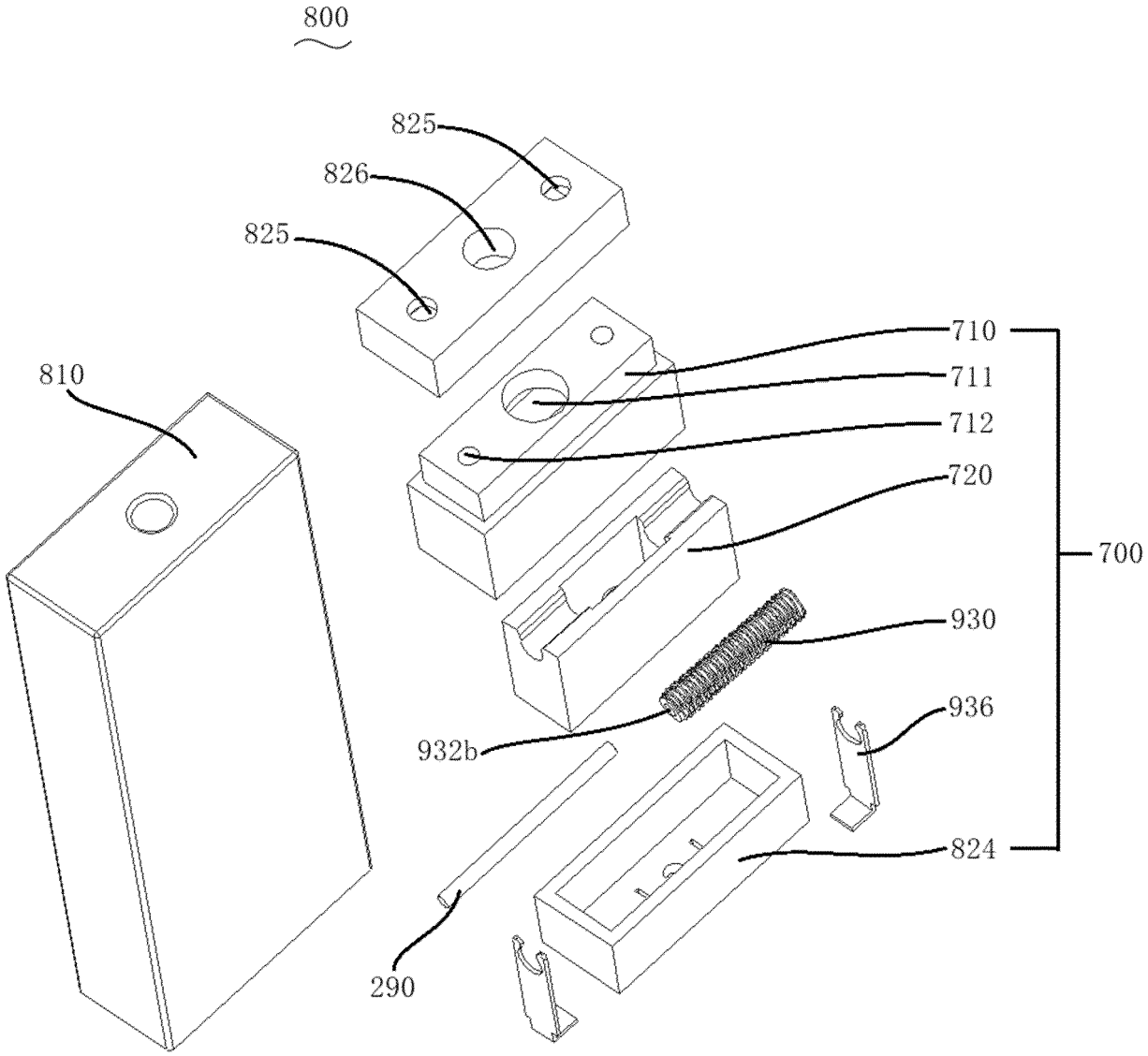


Fig.40

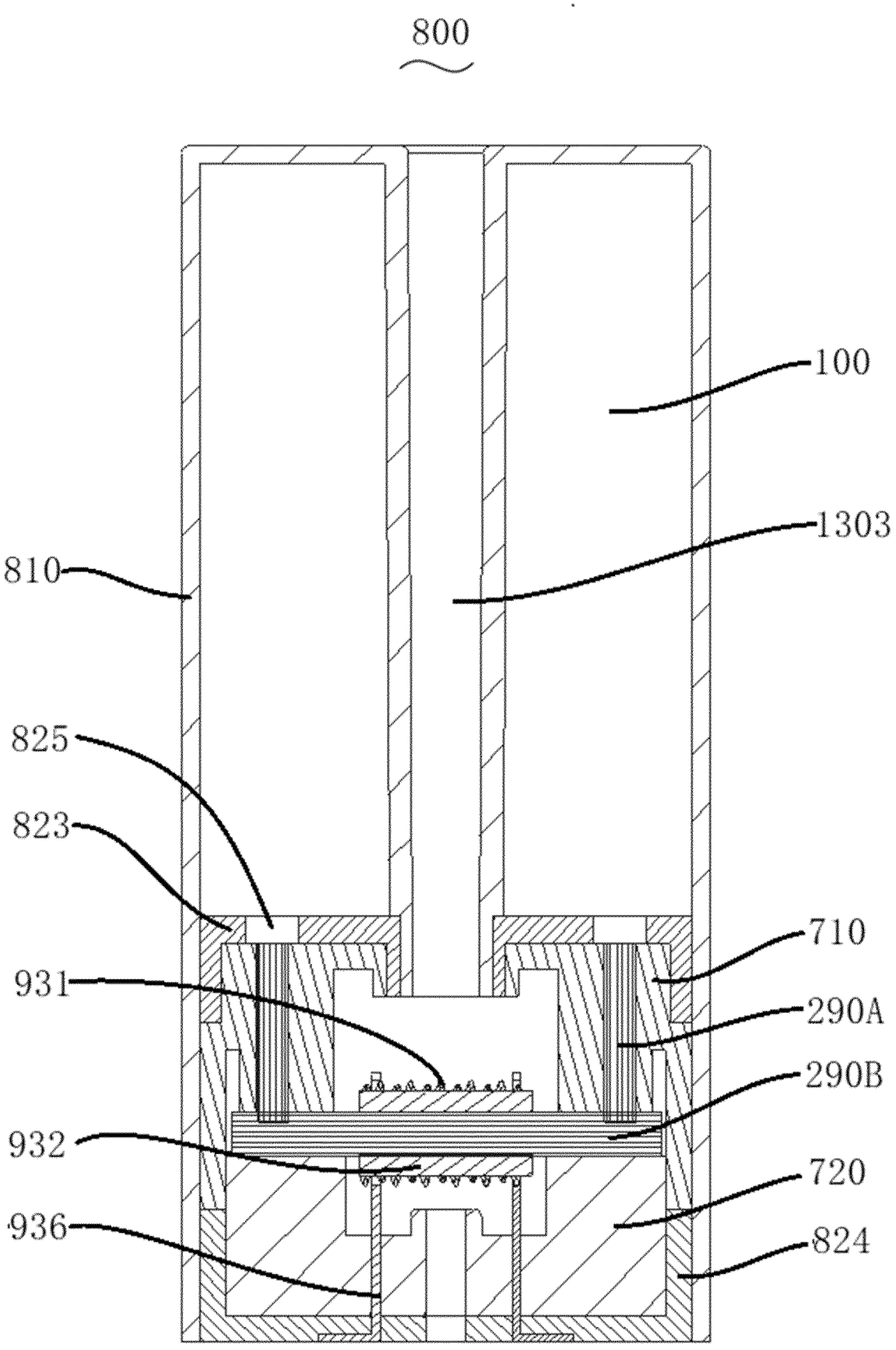
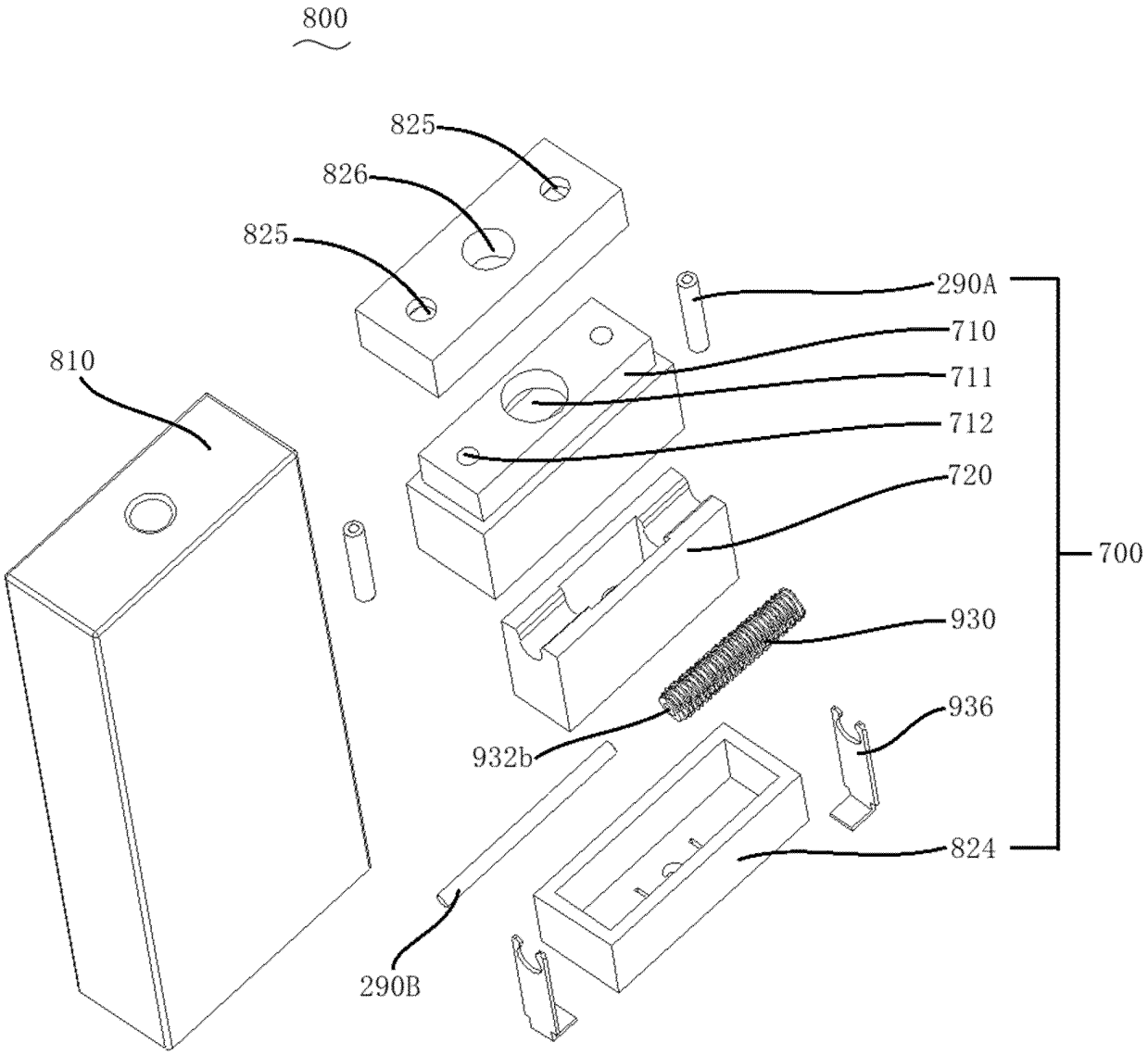


Fig.41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712
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810
930
936
932b
824
290B

Fig.42

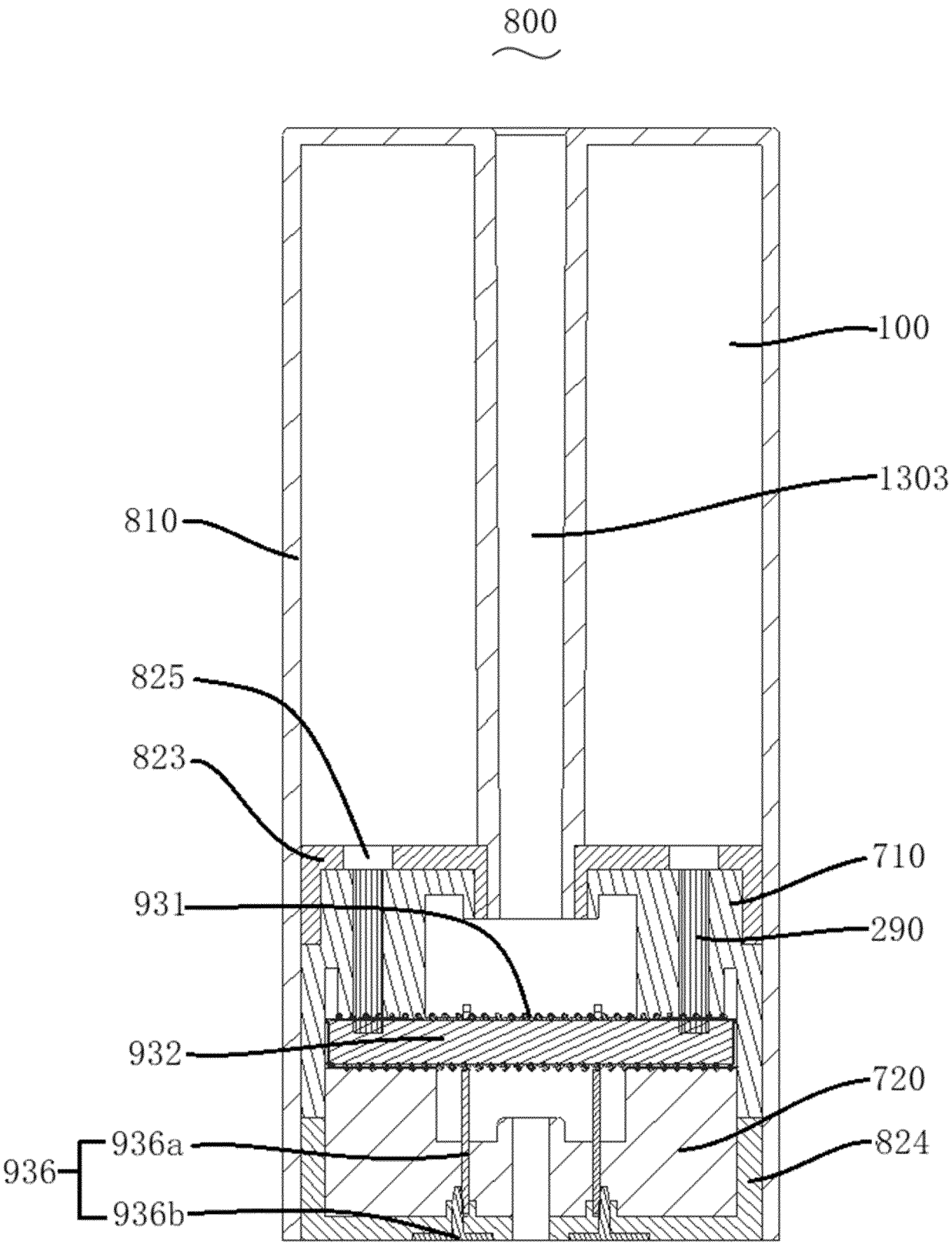

Fig.43

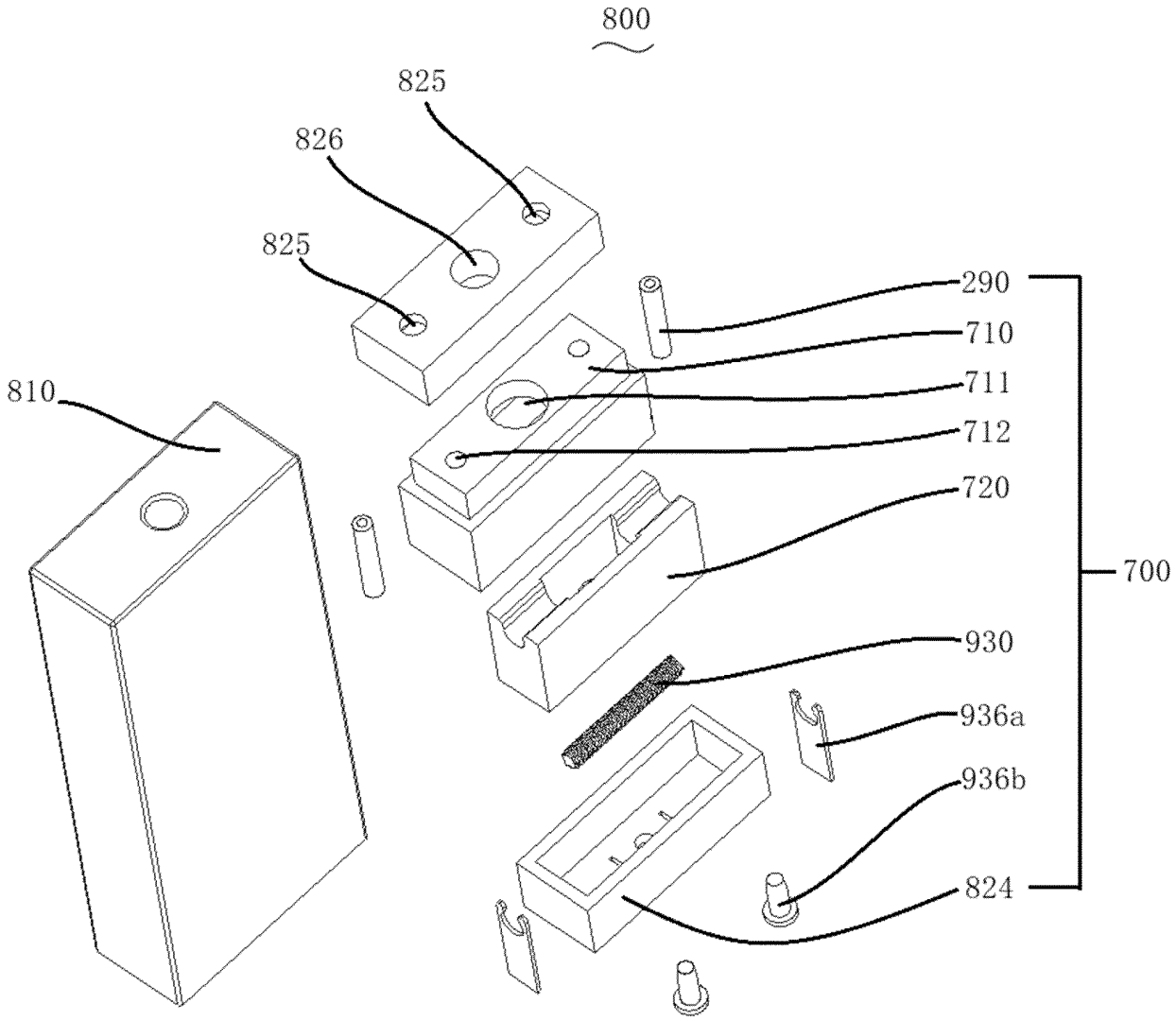

Fig.44

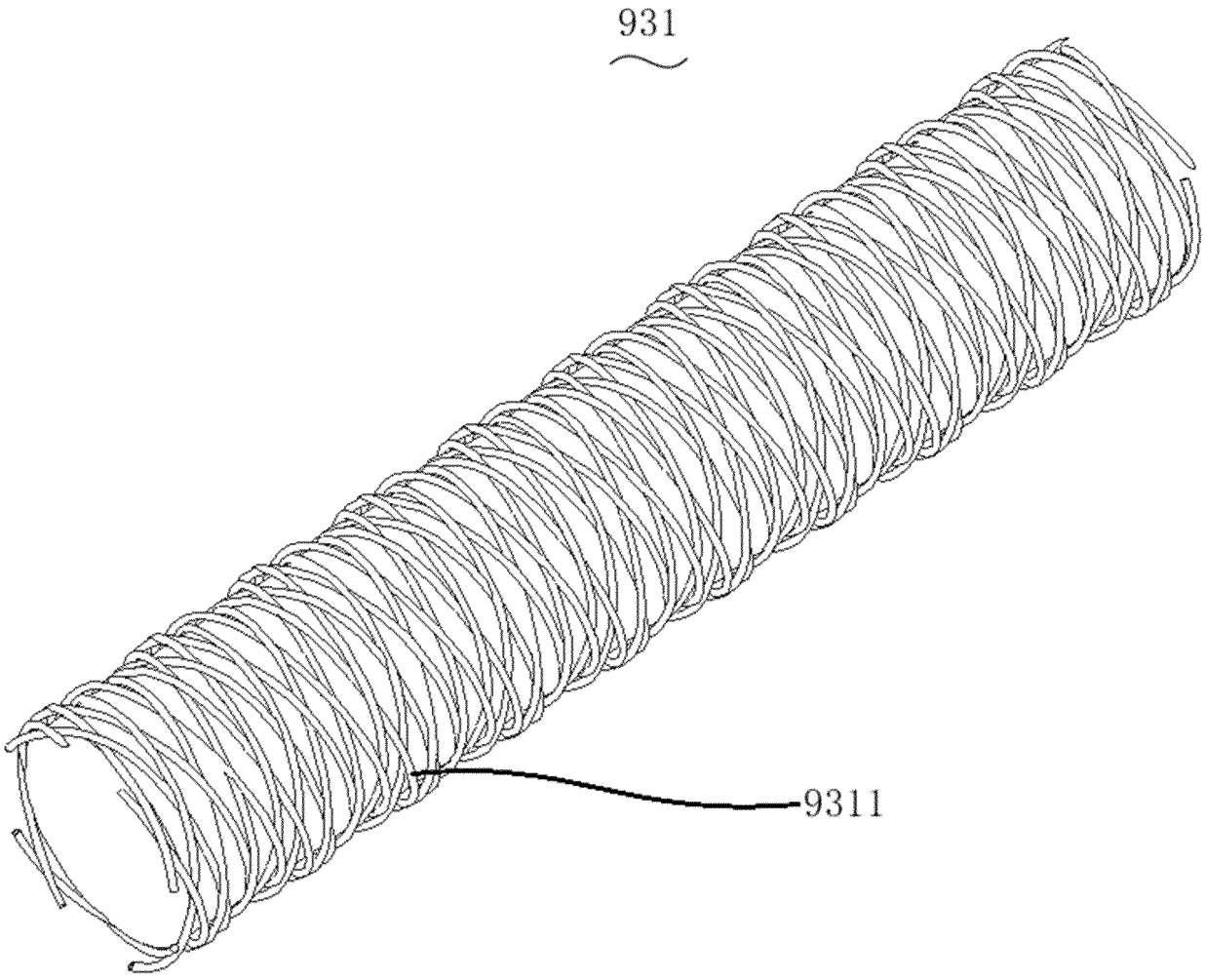

Fig.45

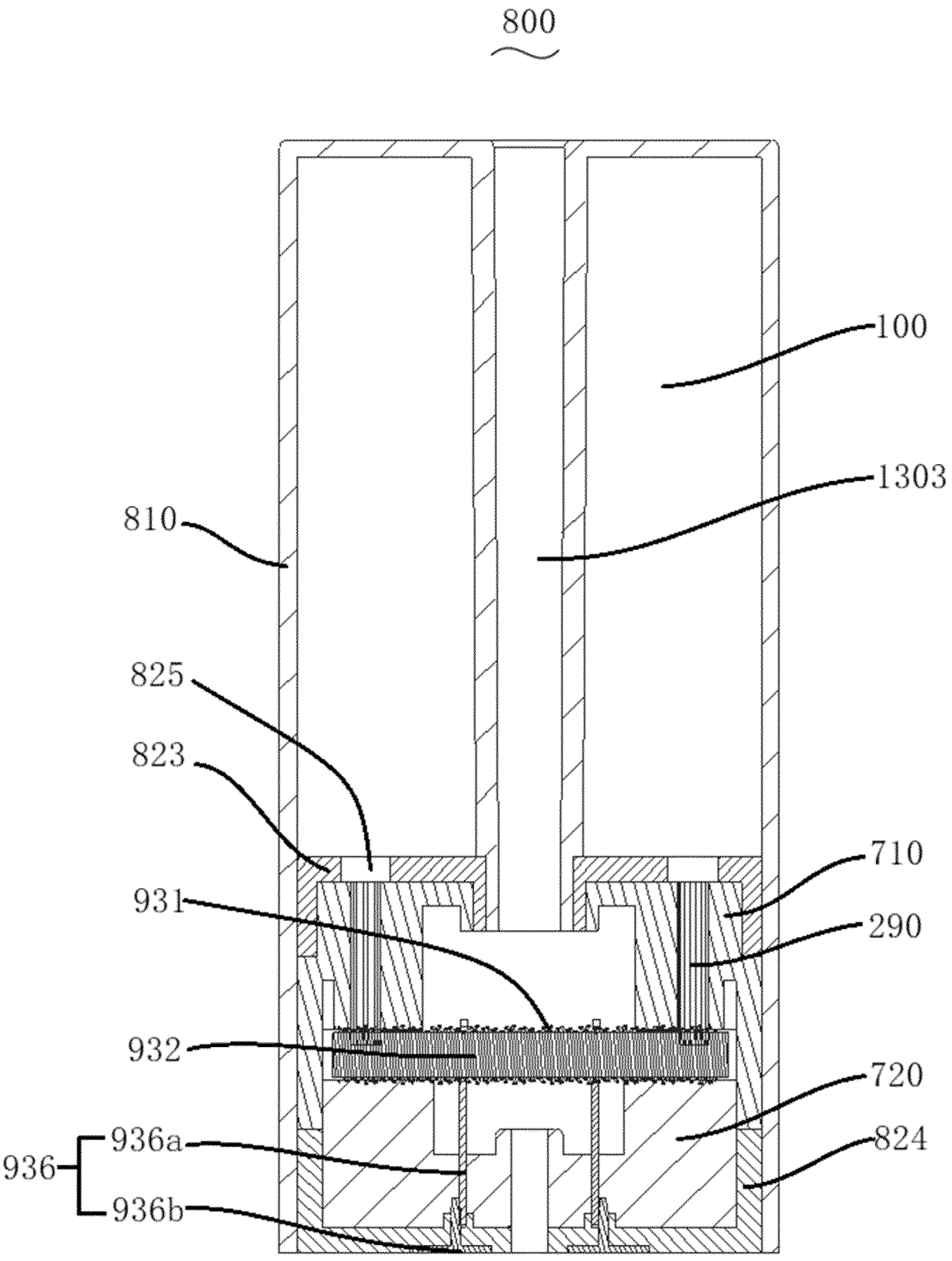

Fig.46

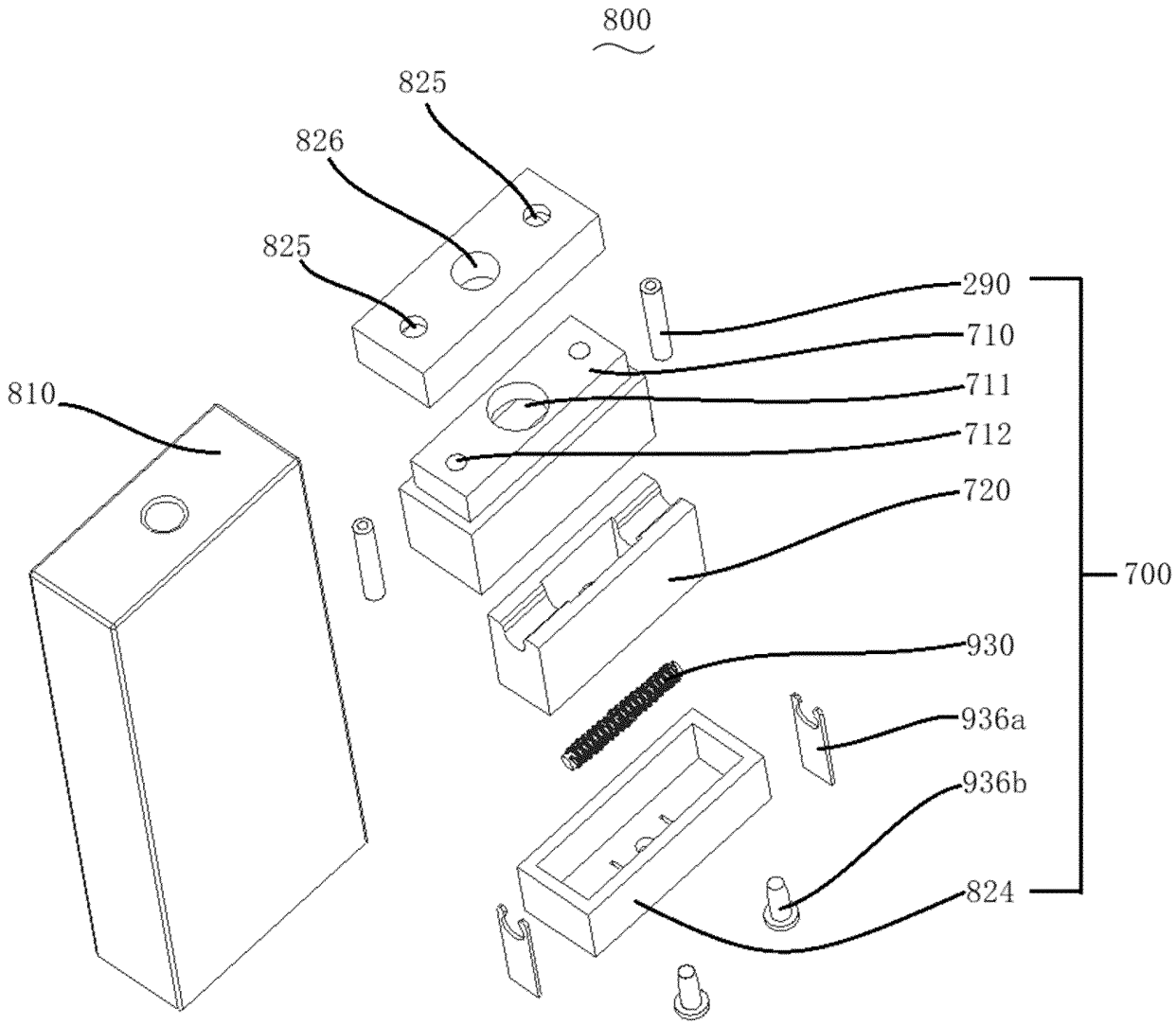

Fig.47

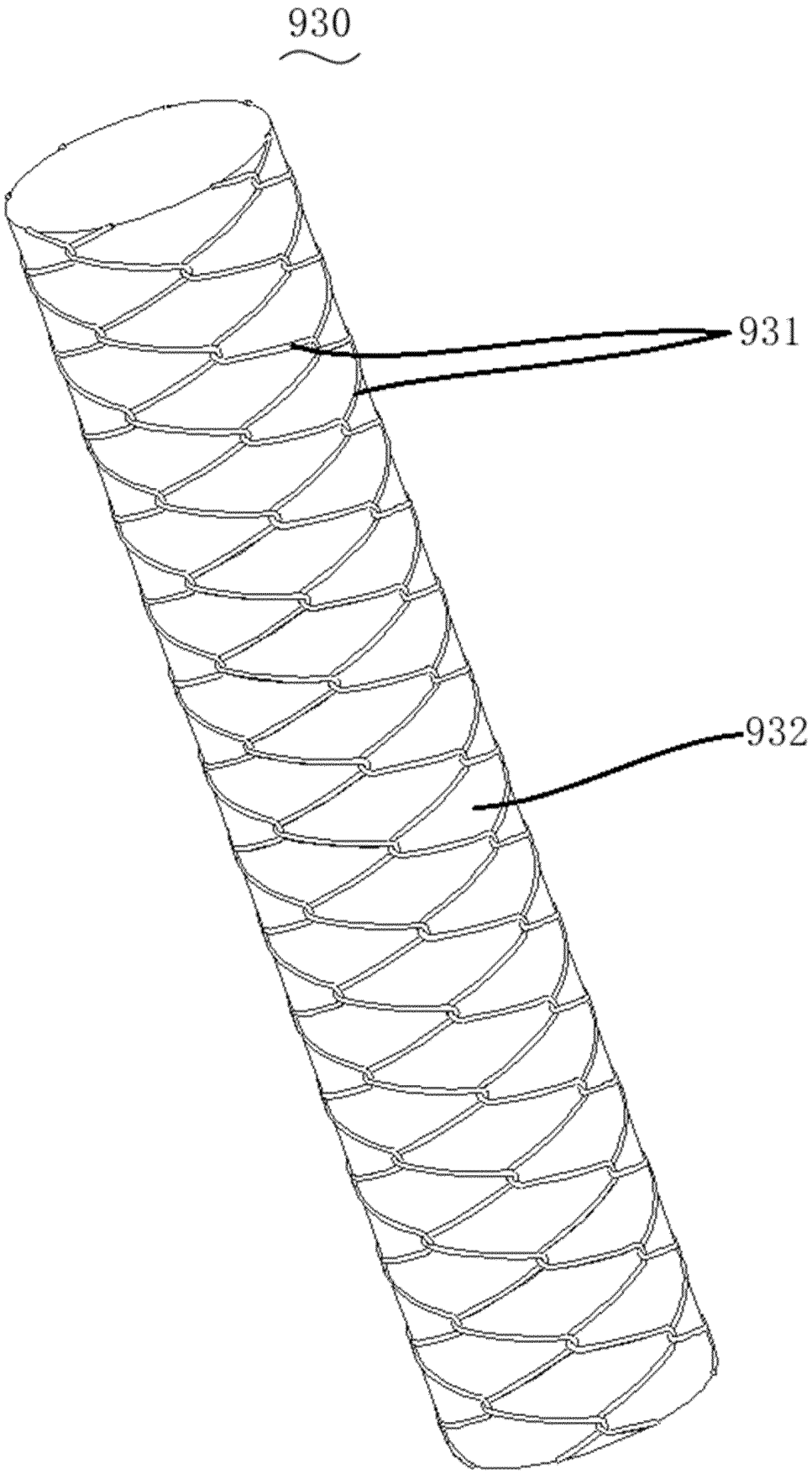

Fig.48

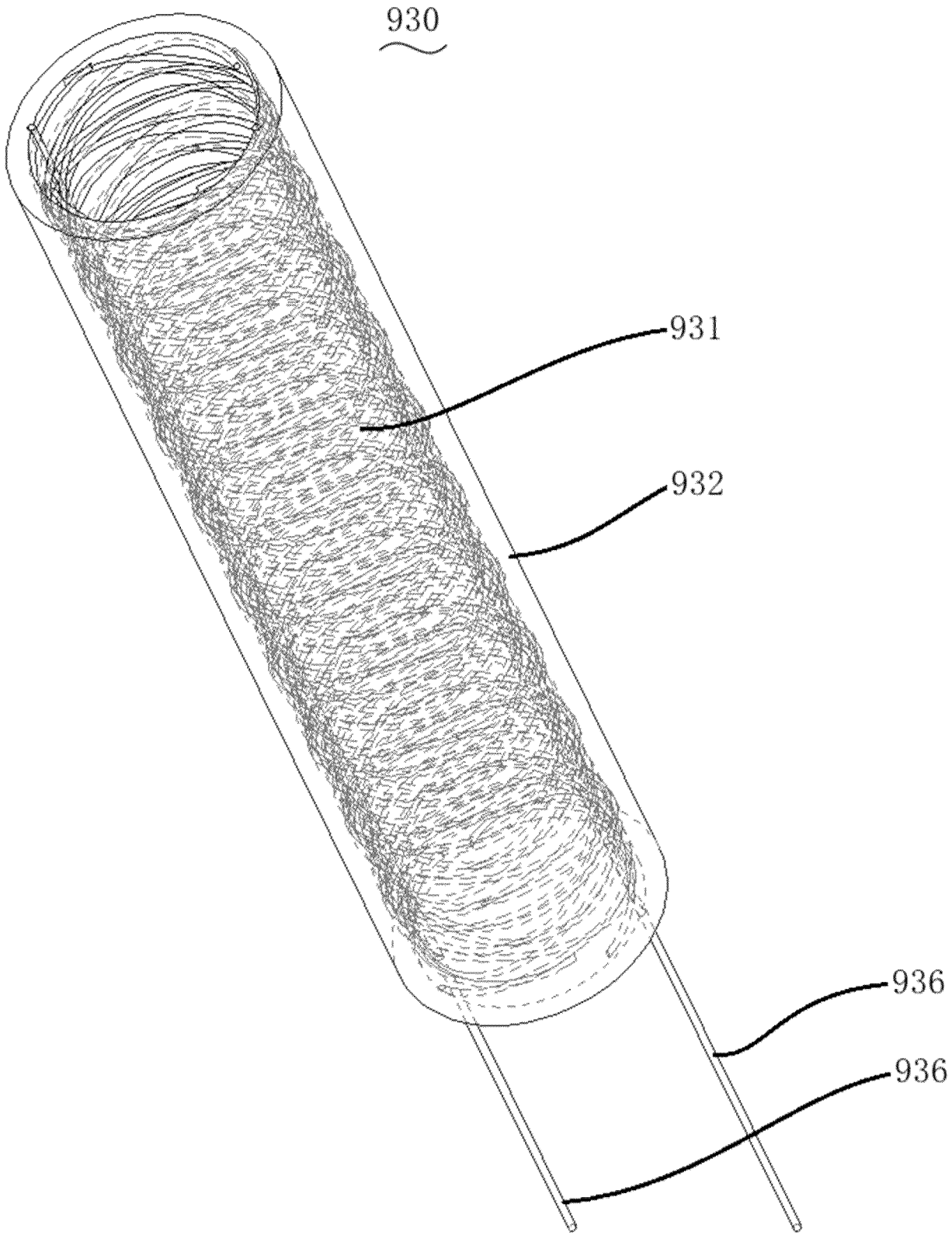

Fig.49

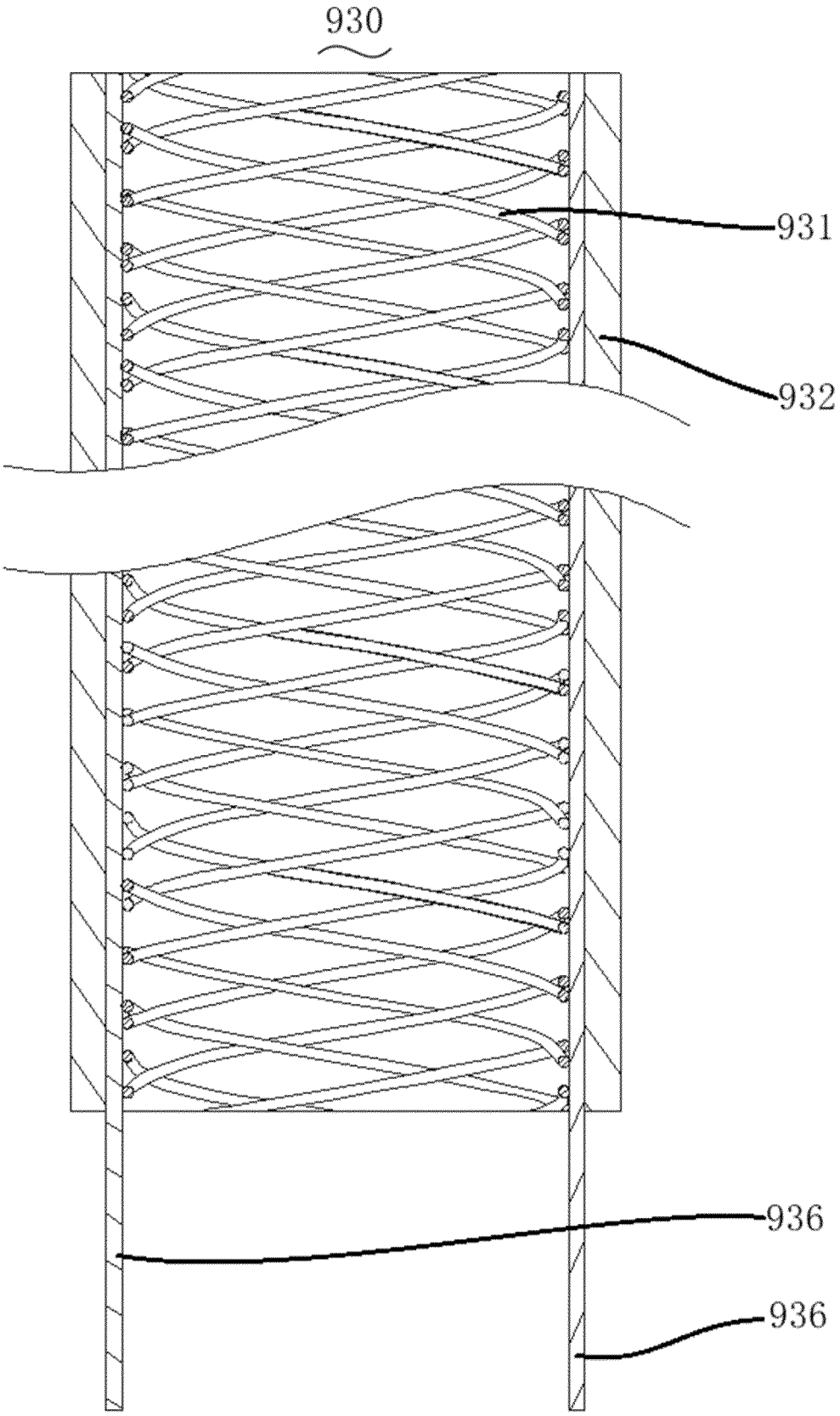

Fig.50

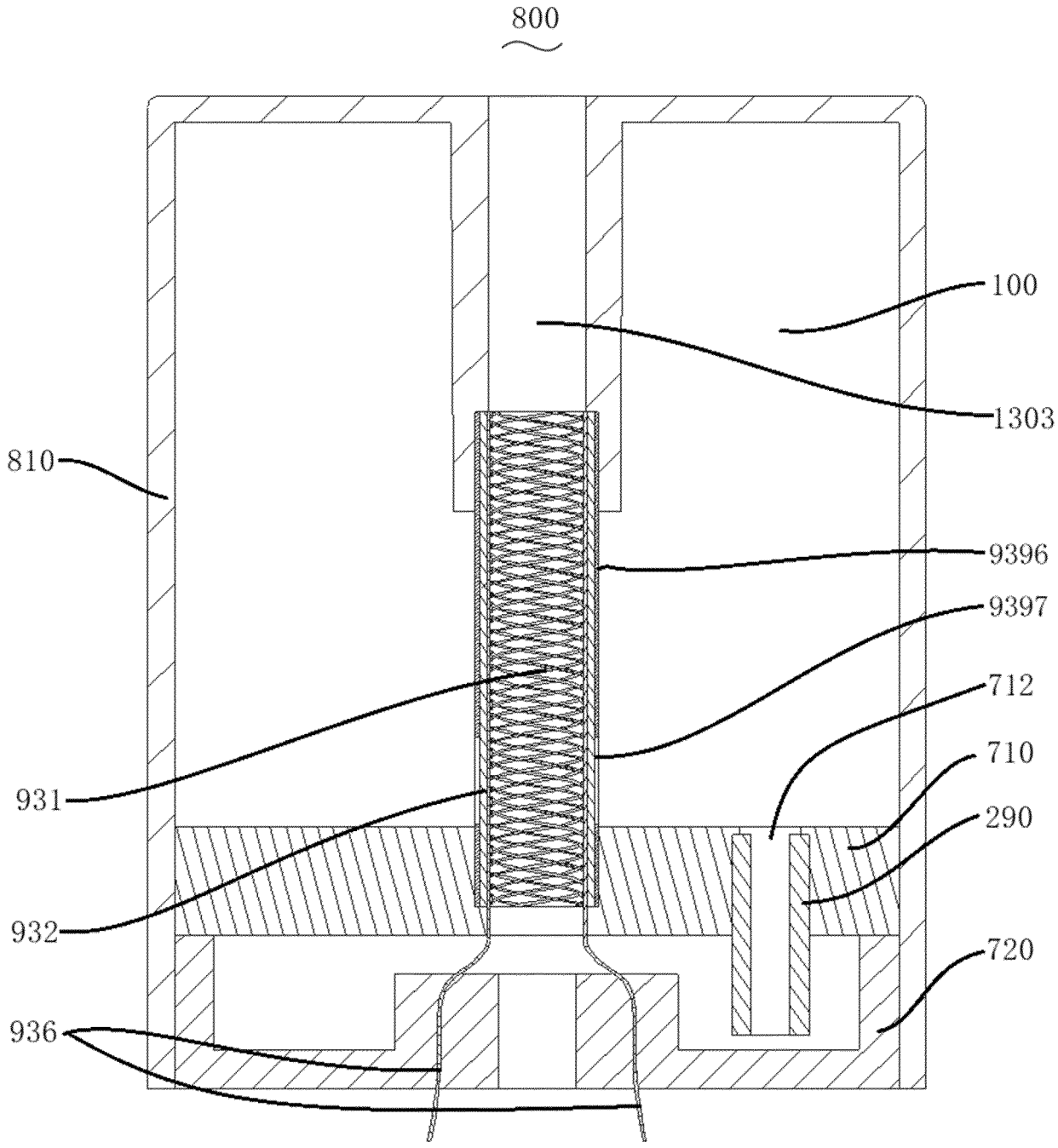

Fig.51

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2022/110970

A. CLASSIFICATION OF SUBJECT MATTER

A24F 40/46(2020.01)i; A24F 40/40(2020.01)i; A24F 40/10(2020.01)i; A24F 40/42(2020.01)i; A24F 40/70(2020.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A24F40; A24F47

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

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

CNTXT, ENTXTC, VEN: 电子烟, 雾化器, 气溶胶, 加热, 发热, 电阻丝, 电热, 网, 导液, 导流, 包围, 包覆, 覆盖, aerosol, atomizer, electronic, cigarette, heating, net, grid, liquid, oil, guide, conduct, surrounding

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 217012790 U (MAIBO HIGH-POLYMER MATERIAL (NINGBO) CO., LTD.) 22 July 2022 (2022-07-22) description, paragraphs 75-246, and figures 1-42	1-40
X	CN 205567816 U (SHENZHEN HANGSEN STAR TECHNOLOGY CO., LTD. et al.) 14 September 2016 (2016-09-14) description, paragraphs 23-41, and figures 1-3	1-40
X	CN 208657987 U (SHENZHEN YOUWEIER TECHNOLOGY CO., LTD.) 29 March 2019 (2019-03-29) description, paragraphs 31-46, and figures 1-7	1-40
X	CN 213848765 U (SHENZHEN FIRST UNION TECHNOLOGY CO., LTD.) 03 August 2021 (2021-08-03) description, paragraphs 45-86, and figures 1-14	1-40
X	CN 205728069 U (SHENZHEN FIRST UNION TECHNOLOGY CO., LTD.) 30 November 2016 (2016-11-30) description, paragraphs 21-30, and figures 1-6	1-40

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

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"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
18 November 2022	**29 November 2022**

Name and mailing address of the ISA/CN	Authorized officer
China National Intellectual Property Administration (ISA/CN) **No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088, China**	
Facsimile No. **(86-10)62019451**	Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2022/110970

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CN 113966872 A (SHENZHEN CITY SHIKAI TECHNOLOGY CO., LTD.) 25 January 2022 (2022-01-25) description, paragraphs 52-82, and figures 1-19	1-40
X	US 2020214361 A1 (SHENZHEN FIRST UNION TECHNOLOGY CO.) 09 July 2020 (2020-07-09) description, paragraphs 23-47, and figures 1-8	1-40

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

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2022/110970

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN 217012790 U	22 July 2022	None	
CN 205567816 U	14 September 2016	None	
CN 208657987 U	29 March 2019	None	
CN 213848765 U	03 August 2021	None	
CN 205728069 U	30 November 2016	EP 3216359 A1	13 September 2017
		US 2017251729 A1	07 September 2017
CN 113966872 A	25 January 2022	None	
US 2020214361 A1	09 July 2020	KR 20200085634 A	15 July 2020
		CN 209498589 U	18 October 2019
		EP 3677130 A2	08 July 2020
		EP 3677130 A3	29 July 2020
		KR 102309766 B1	06 October 2021

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