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(54) **ELECTRONIC ATOMIZATION DEVICE, ATOMIZATION BODY AND ATOMIZER THEREOF, AND HEATING CONTROL METHOD THEREFOR**

(57) The present disclosure relates to an electronic atomization device, an atomization body and an atomizer thereof, and a heating control method therefor. The atomizer includes a second coil that is configured to obtain energy from the atomization body through inductive coupling in the state where the atomizer is installed to the atomization body, so as to heat the aerosol producing substrate. The atomization body includes a first coil. When the atomization body is in a working state, the first coil generates electromagnetic energy, and heats the aerosol producing substrate accommodated in the atomizer through inductive coupling to generate aerosol. By implementing the present disclosure, the liquid leakage phenomenon of the atomizer is effectively improved, and the heating efficiency is greatly improved.

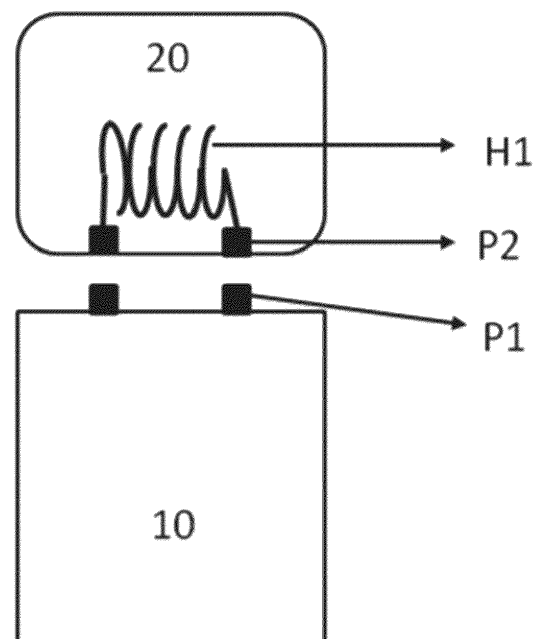


FIG. 1

Description

FIELD

[0001] The present disclosure relates to atomization devices, and more specifically, to an electronic atomization device, an atomization body and an atomizer thereof, and a heating control method therefor.

BACKGROUND

[0002] An electronic atomization device is a device capable of atomizing the aerosol producing substrate in an atomizer, and has the advantages of safety, convenience, health, environmental protection and the like, and is increasingly interesting and favored by people.

[0003] Currently, the heating of the aerosol producing substrate is generally divided into a contact heating and a non-contact heating.

[0004] The contact heating is generally to heat a heating wire (or a heating film plated on a ceramics) directly, and two contact points need to be reserved to connect with a circuit of the heating part. As shown in FIG. 1, the heating wire H1 of the atomizer 20 is in contact with two contact points P1 of the atomization body 10 through two contact points P2. In the working state of the atomizer, the atomization body 10 energizes the heating wire H1 through the contact points P1 and P2, and the internal resistance of the heating wire H1 is about 1 Ω , and the aerosol producing substrate can be atomized when heated. However, since the contact points need to be reserved, the heating mode not only has complex assembly, but also has the risk of liquid leakage. In addition, the resistances of the contact points are existed, which makes the heating efficiency low.

[0005] The non-contact heating generally adopts electromagnetic induction to generate eddy currents for heating. As shown in FIG. 2, a winding coil L1 and a capacitor (not shown) of the atomization body 10 form an LC resonant circuit, and by controlling the LC resonant circuit to achieve the most effective oscillation frequency. A metal heating sheet H2 (or a metal heating needle) is placed in the winding coil L1. When the winding coil L1 is powered on, the eddy currents are formed on the surfaces of the metal heating sheet H2 to achieve the purpose of heating. However, the heating efficiency is low when the heating is applied to a small-size heating member by eddy currents generated by electromagnetic induction.

SUMMARY

[0006] A technical problem to be resolved by the present disclosure is to provide an electronic atomization device with liquid leakage prevention and high heating efficiency, and further provide an atomization body and an atomizer thereof, and a heating control method therefor.

[0007] A technical solution adopted by the present dis-

closure to resolve the technical problem is to provide an atomizer for an electronic atomization device, which is configured to accommodate aerosol producing substrate, and cooperate with an atomization body to atomize the aerosol producing substrate, the atomizer including:

a second coil, configured to obtain energy from the atomization body through inductive coupling in the state where the atomizer is installed to the atomization body, so as to heat the aerosol producing substrate.

[0008] Optionally, the second coil is an inductance coil, and the inductance coil includes two endpoints, and the atomizer further includes a heating member, and the two ends of the heating member are connected with the two endpoints of the second coil respectively.

[0009] Optionally, at least a portion of the heating member is disposed in the aerosol producing substrate.

[0010] Optionally, the second coil is a resistance coil wound with a heating wire, and the two ends of the second coil are short circuited.

[0011] Optionally, the second coil is disposed around the periphery of the aerosol producing substrate.

[0012] Optionally, the atomizer further includes a magnetic conductive medium, and the second coil is sleeved on the magnetic conductive medium.

[0013] Optionally, the magnetic conductive medium includes a soft magnetic material.

[0014] Optionally, the magnetic conductive medium has a Curie point temperature, and the Curie point temperature is less than or equal to the dry burning temperature of the aerosol producing substrate.

[0015] Optionally, the Curie point temperature is 280 $^{\circ}\text{C}$.

[0016] The present disclosure further provides an atomization body for an electronic atomization device, which is configured to cooperate with an atomizer to atomize aerosol producing substrate, the atomization body including a first coil,

when the atomization body is in a working state, the first coil generates electromagnetic energy, and heats the aerosol producing substrate accommodated in the atomizer through inductive coupling to generate aerosol.

[0017] The present disclosure further provides an electronic atomization device, including:

the atomizer described above; and

the atomization body described above.

[0018] Optionally, the arrangement of the first coil and the second coil includes: an up-and-down arrangement, a left-and-right arrangement, or a concentric arrangement.

[0019] The present disclosure further provides a heating control method for an electronic atomization device, including:

a first coil of an atomization body generating elec-

tromagnetic energy in the state where an atomizer is installed to the atomization body; and

the first coil supplying energy to a second coil in the atomizer through inductive coupling, to heat aerosol producing substrate accommodated in the atomizer to generate aerosol.

[0020] The implementation of the present disclosure provides the following beneficial effects: since the atomization body is provided with a first coil, and the atomizer is provided with a second coil, and the first coil conducts electric energy to the second coil through inductive coupling, the atomizer and the atomization body no longer need to be provided with contact points for electrical connection, therefore, the liquid leakage phenomenon of the atomizer is effectively improved compared with the traditional contact (i.e., the atomizer and the atomization body are connected through the contact points) conduction of the electric energy; and the heating efficiency is greatly improved compared with the traditional non-contact conduction of the electric energy.

BRIEF DESCRIPTION OF THE DRAWINGS

[0021] Subject matter of the present disclosure will be described in even greater detail below based on the exemplary figures. In the accompanying drawings:

FIG. 1 is a schematic diagram of a heating mode for an aerosol producing substrate in the prior art;

FIG. 2 is a schematic diagram of another heating mode for an aerosol producing substrate in the prior art;

FIG. 3 is a structural diagram of an electronic atomization device in a first embodiment of the present disclosure;

FIG. 4 is a structural diagram of an electronic atomization device in a second embodiment of the present disclosure; and

FIG. 5 is a flowchart of a heating control method for an electronic atomization device in a first embodiment of the present disclosure.

DETAILED DESCRIPTION

[0022] The technical solutions in the embodiments of the present disclosure will be described in even greater detail below with reference to the accompanying drawings. Obviously, the described embodiments are merely some embodiments of the present disclosure, rather than all of the embodiments. All other embodiments obtained by a person skilled in the art based on the embodiments in the present disclosure without creative efforts shall fall

within the scope of the present disclosure.

[0023] FIG. 3 shows an electronic atomization device in a first embodiment in the present disclosure. The electronic atomization device in the embodiment includes an atomization body 10 and an atomizer 20 that are detachably connected. The atomization body 10 is provided with a first coil 11 therein, an aerosol producing substrate is accommodated in the atomizer 20, and the atomizer 20 is provided with a second coil 21 therein. Wherein, the first coil 11 is an inductance coil composed of a common wound coil. The second coil 21 and the first coil 11 are arranged in an up-and-down arrangement, and are coupled with each other. In the state when the atomizer 20 is installed to the atomization body 10, the first coil 11 generates electromagnetic energy, and the second coil 21 acquires the energy from the first coil 11 of the atomization body 10 in an inductive coupling manner, so as to heat the aerosol producing substrate in the atomizer 20 to generate aerosol.

[0024] Further, in the embodiment, combined with FIG. 3, the second coil 21 is an inductance coil, and has two endpoints, that is, the second coil 21 is also an inductance coil composed of a common wound coil, and has a small internal resistance. Moreover, the electronic atomization device in the embodiment further includes a heating member 22, which includes but is not limited to a heating wire or a ceramic heating core, and is connected to the two endpoints of the second coil 21. Alternatively, at least a portion of the heating member 22 may be disposed in the aerosol producing substrate. In the embodiment, the first coil 11 generates electromagnetic energy when energized. According to the mutual inductance principle, the electric energy is transmitted to the second coil 21 to supply power to heating member 22, so as to realize the heating and atomizing of the aerosol producing substrate.

[0025] In the electronic atomization device of the above embodiment, since the first coil and the second coil that are coupled with each other are provided, and the electric energy is conducted by inductive coupling, the atomizer and the atomization body no longer need to be provided with the contact points for electrical connection. Therefore, compared with the traditional contact (i.e., the atomizer and the atomization body are connected through the contact points) conduction of the electric energy, the liquid leakage phenomenon of the atomizer of the electronic atomization device in the embodiment can be effectively improved. Compared with the traditional non-contact conduction of the electric energy, the heating efficiency of the electronic atomization device in the embodiment can be greatly improved.

[0026] Further, the electronic atomization device in the embodiment includes a magnetic conductive medium, which may be a magnetic conductive medium of a soft magnetic material, such as a magnetic conductive rod 30. Moreover, a recess portion 23 is provided on a connecting portion of the atomizer 20 (realizing the mating installation with the atomization body 10) to accommo-

date the magnetic conductive rod 30. In addition, the first coil 21 and the second coil 21 are both sleeved on the magnetic guide rod 30. In the embodiment, one magnetic conductive medium (such as the magnetic conductive rod 30) is provided between the two coils, which can increase the inductive conduction efficiency.

[0027] FIG. 4 is the structural diagram of the electronic atomization device in the second embodiment of the present disclosure. Compared with the embodiment shown in FIG. 3, the difference of the electronic atomization device of this embodiment is: the second coil 21' is a resistance coil wound by a heating wire, and has a relatively large internal resistance, and the two ends of the second coil 21' are short circuited, for example, the two ends of the second coil 21' are connected through a metal wire 22' (such as a gold wire) with a very small internal resistance, or, the two ends of the second coil 21' are directly connected together. In this embodiment, the heating wire is wound into a coil to form the second coil 21', with two ends short circuited. Alternatively, the second coil 21' is arranged around a periphery of the aerosol producing substrate. When the first coil 11 generates electromagnetic energy when energized, the electric energy is transferred to the second coil 21' according to the principle of mutual inductance, which will generate induced current on the second coil 21', and the second coil 21' will generate heat due to short circuit, so as to realize the heating and atomizing of the aerosol producing substrate.

[0028] Further, in an optional embodiment, the magnetic conductive rod 30 is a magnetic conductive rod with a specific Curie point temperature, and the specific Curie point temperature is less than or equal to the dry burning temperature of the aerosol producing substrate. For example, the magnetic conductive rod 30 is a magnetic conductive rod with a Curie point temperature of 280 °C. In this embodiment, the magnetic conductive rod has the characteristic that the magnetic conductive performance disappears when the temperature rises to the Curie point temperature. When the aerosol producing substrate is dry burned, the temperature of the heating member/wire is too high, the temperature of the magnetic conductive rod 30 extending through the heating member/wire will rise according to the conductivity of the thermal energy. Assuming that the heating member/wire will dry burn when the temperature of which exceeds 280 °C, a magnetic conductive rod with a Curie point temperature of 280 °C may be selected. When the aerosol producing substrate is dry burned, the temperature of the magnetic conductive rod will exceed the Curie point temperature, therefore the magnetic conductive performance of the magnetic conductive rod will be greatly weakened, and the electromagnetic induction intensity of the magnetic conductive rod will be correspondingly weakened, and thus the induced current flowing through the heating member/wire will be reduced, which is not enough to provide the required power output, thereby achieving an anti-dry burning effect. Therefore, the electronic atomization

device in this embodiment does not perform dry burning without providing a temperature measurement module.

[0029] It should be understood that the above is only a specific embodiment of the disclosure. In some other embodiments, the arrangement of the first coil and the second coil may further include: a left-and-right arrangement, or a concentric arrangement. In addition, the electronic atomization device may be either a split electronic atomization device or an integrated electronic atomization device.

[0030] FIG. 5 is the flow chart of the heating control method for the electronic atomization device in the first embodiment of the present disclosure. Combined with FIG. 3 or FIG. 4, the heating control method of this embodiment includes:

Step S10, the first coil of the atomization body generating electromagnetic energy in a state where the atomizer is installed to the atomization body;

Step S20, the first coil supplying energy to the second coil in the atomizer through inductive coupling, to heat the aerosol producing substrate accommodated in the atomizer to generate aerosol.

[0031] The heating control method in this embodiment adopts inductive coupling to conduct electric energy, so that the contact points for electrical connection are no longer needed on the atomizer and the atomization body. Therefore, compared with the traditional contact conduction of the electric energy, the liquid leakage phenomenon of the atomizer can be effectively improved; compared with the traditional non-contact conduction of the electric energy, the heating efficiency of the electronic atomization device in the embodiment can be greatly improved.

[0032] Further, the electronic atomization device may be either a split electronic atomization device or an integrated electronic atomization device. Moreover, the arrangement of the first coil and the second coil may include: an up-and-down arrangement, a left-and-right arrangement, or a concentric arrangement. In addition, a magnetic conductive medium, such as a magnetic conductive rod, may be provided between the first coil and the second coil. The magnetic conductive rod may be a magnetic conductive rod with a specific Curie point temperature, and the specific Curie point temperature is less than or equal to the dry burning temperature of the aerosol producing substrate.

[0033] While the disclosure has been illustrated and described in detail in the drawings and foregoing description, such illustration and description are to be considered illustrative or exemplary and not restrictive. It will be understood that changes and modifications may be made by those of ordinary skill within the scope of the following claims. In particular, the present disclosure covers further embodiments with any combination of features from different embodiments described above and below. Addi-

tionally, statements made herein characterizing the disclosure refer to an embodiment of the disclosure and not necessarily all embodiments.

Claims

1. An atomizer (20) for an electronic atomization device, configured to accommodate aerosol producing substrate, and cooperate with an atomization body (10) to atomize the aerosol producing substrate, **characterized by** comprising:
a second coil (21, 21'), configured to obtain energy from the atomization body (10) through inductive coupling in the state where the atomizer (20) is installed to the atomization body (10), so as to heat the aerosol producing substrate. 10
2. The atomizer (20) of the electronic atomization device of claim 1, wherein the second coil (21, 21') is an inductance coil, and the inductance coil comprises two endpoints, and
wherein the atomizer (20) further comprises a heating member (22), and the two ends of the heating member (22) are connected with the two endpoints of the second coil (21, 21') respectively. 15
3. The atomizer (20) of the electronic atomization device of claim 2, wherein at least a portion of the heating member (22) is disposed in the aerosol producing substrate. 20
4. The atomizer (20) of the electronic atomization device of claim 1, wherein the second coil (21, 21') is a resistance coil wound with a heating wire, and the two ends of the second coil (21, 21') are short circuited. 25
5. The atomizer (20) of the electronic atomization device of claim 4, wherein the second coil (21, 21') forms a cavity, to accommodate the aerosol producing substrate. 30
6. The atomizer (20) of the electronic atomization device of any one of claims 1 to 5, further comprising: 35
 - a magnetic conductive medium (30);
 - wherein the second coil (21, 21') is sleeved on the magnetic conductive medium (30). 40
7. The atomizer (20) of the electronic atomization device of claim 6, wherein the magnetic conductive medium (30) comprises a soft magnetic material. 45
8. The atomizer (20) of the electronic atomization device of claim 6, wherein the Curie point temperature of the magnetic conductive medium (30) is less than or equal to the dry burning temperature of the aerosol 50

producing substrate.

9. The atomizer (20) of the electronic atomization device of claim 8, wherein the Curie point temperature is 280 °C. 5
10. An atomization body (10) for an electronic atomization device, configured to cooperate with an atomizer (20) to atomize aerosol producing substrate, **characterized by** comprising:
a first coil (11), configured to generate electromagnetic energy in a working state of the atomization body (10), and to heat the aerosol producing substrate accommodated in the atomizer (20) through inductive coupling to generate aerosol. 10
11. An electronic atomization device, **characterized by** comprising:
the atomizer (20) of any one of claims 1 to 9; and
the atomization body (10) of claim 10. 15
12. The electronic atomization device of claim 11, wherein the arrangement of the first coil (11) and the second coil (21, 21') comprises: an up-and-down arrangement, a left-and-right arrangement, or a concentric arrangement. 20
13. A heating control method for an electronic atomization device, **characterized by** comprising:
a first coil (11) supplying energy to a second coil (21, 21') in the atomizer (20) through inductive coupling, to heat aerosol producing substrate accommodated in the atomizer (20) to generate aerosol. 25

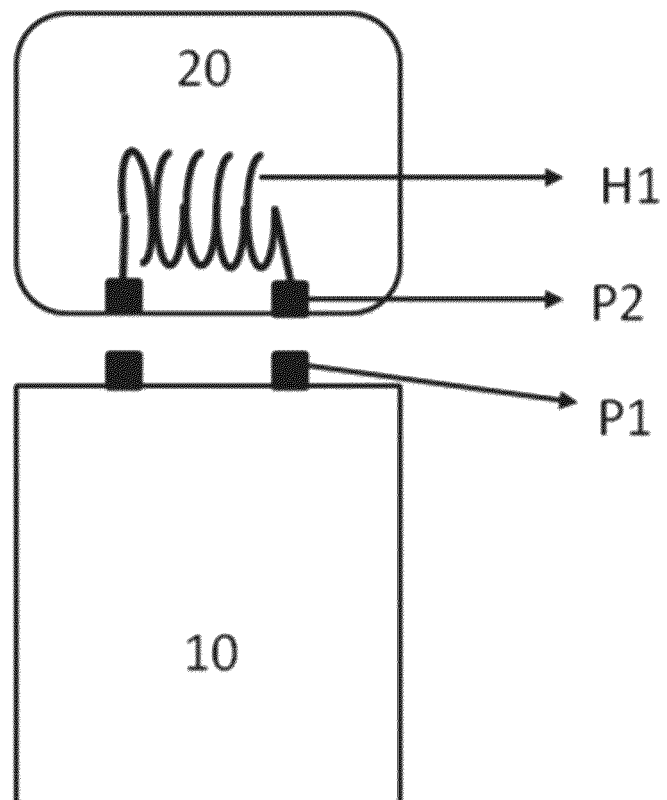


FIG. 1

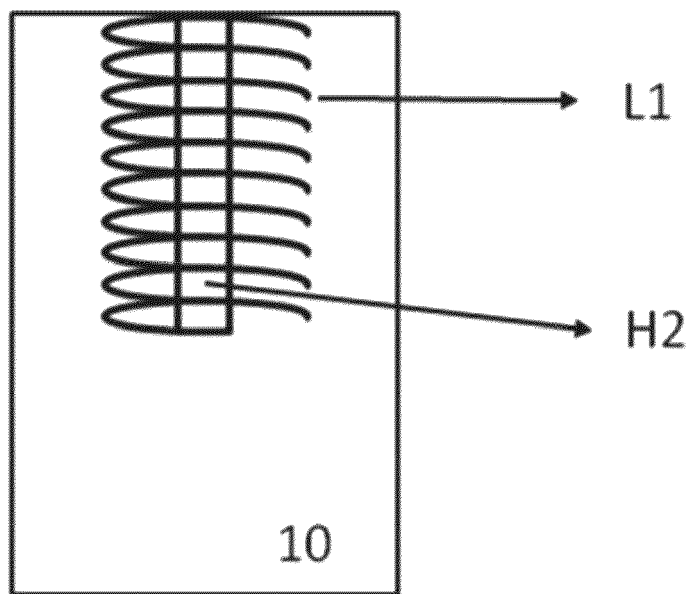


FIG. 2

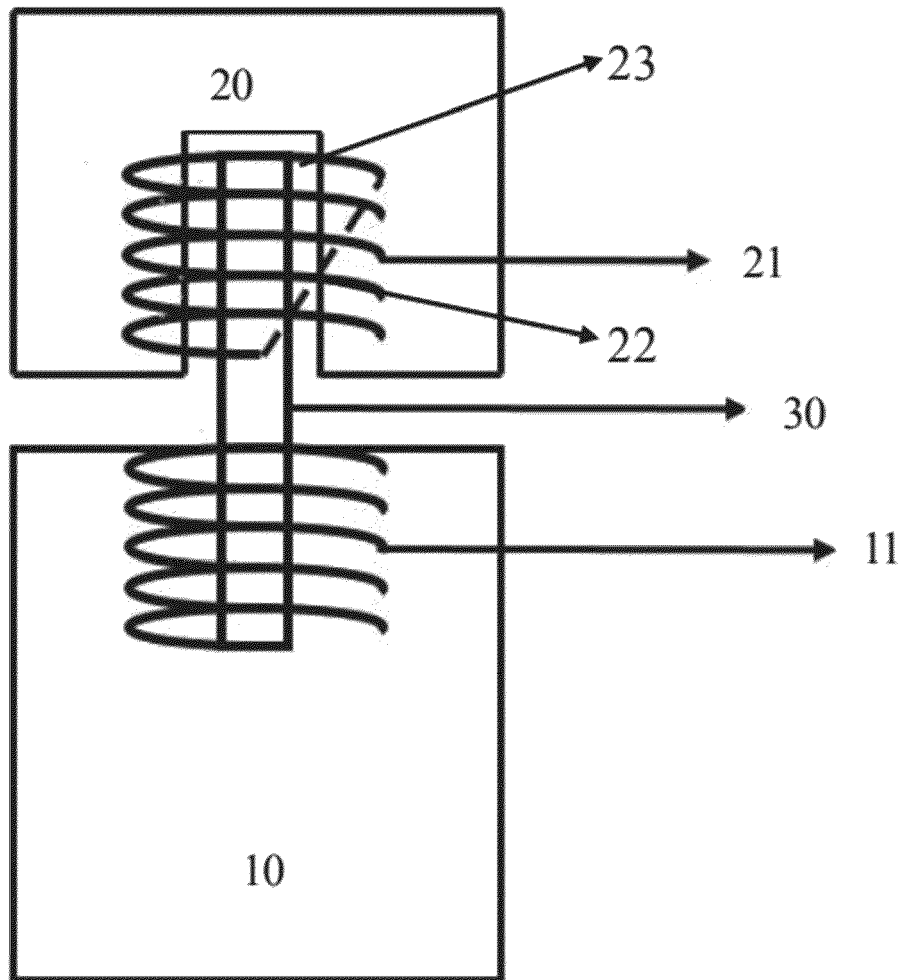


FIG. 3

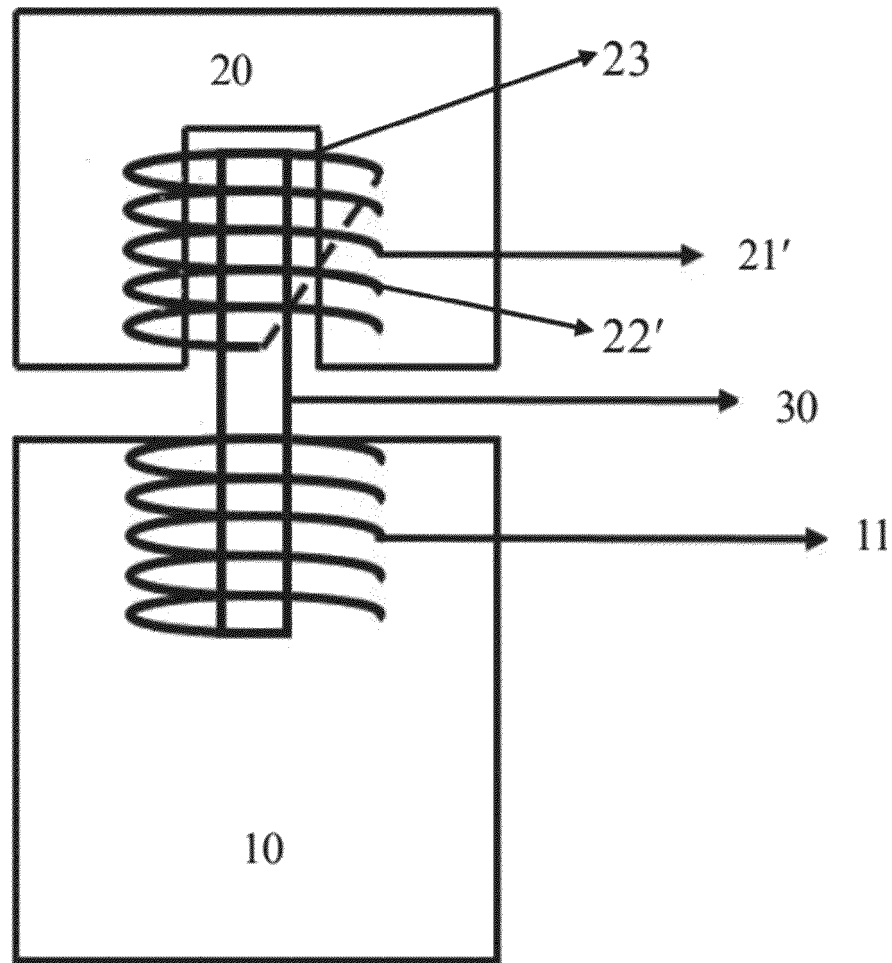


FIG. 4

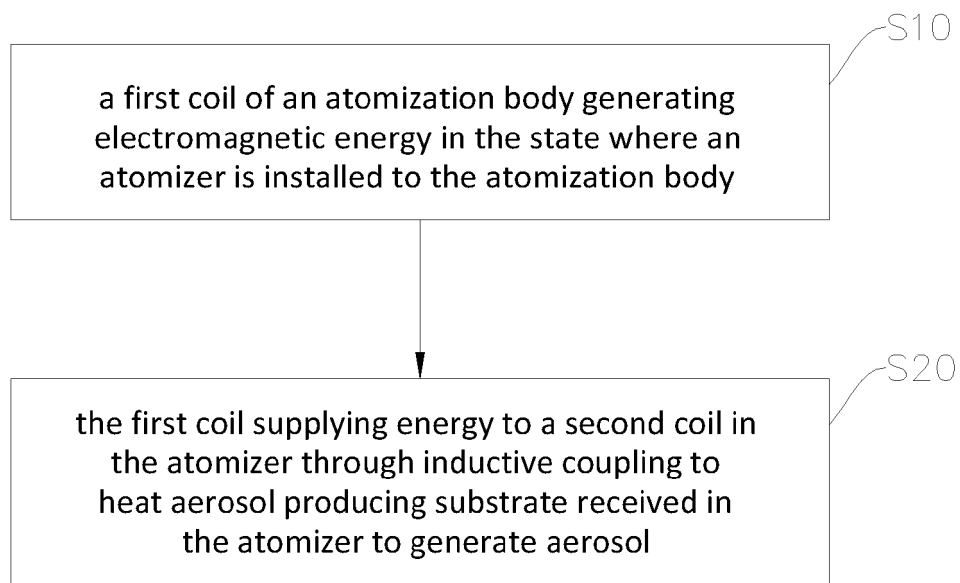


FIG. 5



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