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(54) **HEATING AND ATOMIZATION APPARATUS**

(57) A heating and atomization apparatus, comprising a host, a dielectric carrier and a temperature control unit, wherein the host comprises an outer conductor, an inner conductor and a microwave unit; the inner conductor is connected to the outer conductor and is located in a heating cavity, which is enclosed by the outer conductor; the microwave unit is used for transmitting microwaves to the heating cavity; the dielectric carrier is detachably connected to the host and comprises a bearing section, which is used for accommodating an atomization medium and is located in the heating cavity; the atomization medium can absorb the microwaves to generate heat; the temperature control unit can be located in the heating cavity and is accommodated in the bearing section to be directly coated by the atomization medium, and the inner conductor is in contact with the outer surface of the temperature control unit.

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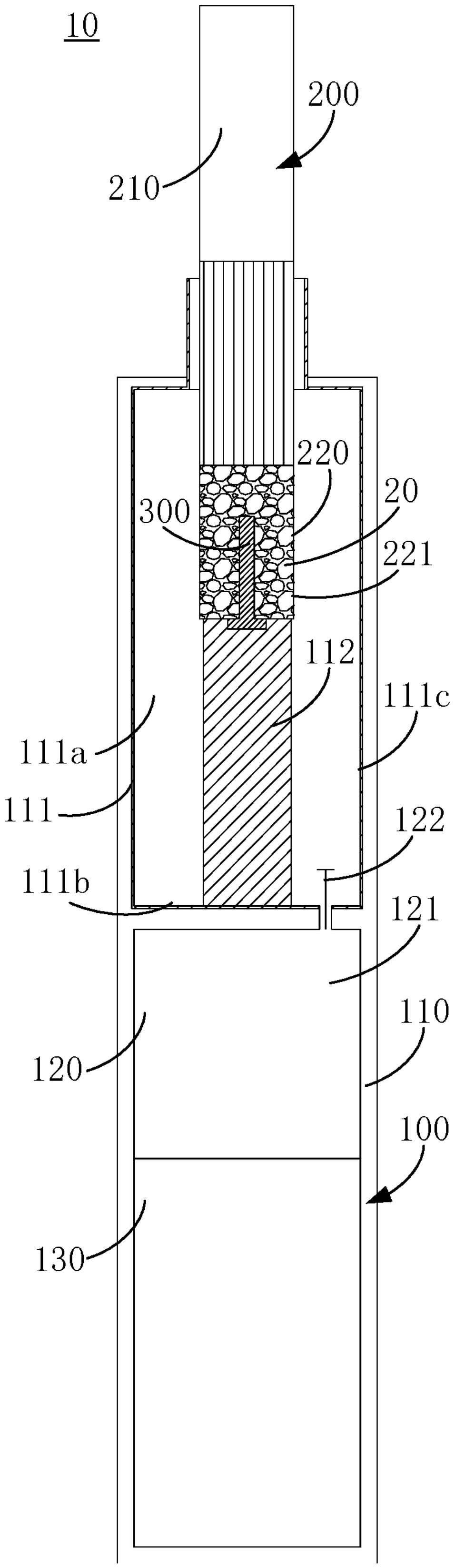
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FIG. 1

Description

TECHNICAL FIELD

[0001] The present application relates to a field of displaying technology, in particular to a heating and atomization apparatus.

BACKGROUND

[0002] The heating and atomization apparatus can heat an atomization medium in a heating but non-combustion manner, so as to reduce the emission of harmful substances after atomizing the atomization medium, and improve the health safety of the heating and atomization apparatus. However, for a conventional heating and atomization apparatus, it is usually difficult to detect the heating temperature accurately, resulting in the defect of low temperature control accuracy.

SUMMARY

[0003] According to various embodiments of the present application, a heating and atomization apparatus is provided.

[0004] The heating and atomization apparatus includes:

a main body including an outer conductor, an inner conductor, and a microwave unit, the inner conductor being connected to the outer conductor and located in a heating cavity enclosed by the outer conductor, and the microwave unit being configured to emit microwaves into the heating cavity;

a medium carrier detachably connected to the main body, the medium carrier including a carrier section configured to accommodate an atomization medium and being located in the heating cavity, and the atomization medium capable of absorbing the microwaves to generate heat; and

a temperature control unit located in the heating cavity and accommodated in the carrier section, so as to be directly wrapped by the atomization medium, and the inner conductor being in contact with an outer surface of the temperature control unit;

when a critical temperature is exceeded, an initial conductivity of the temperature control unit is changed, and the heating cavity blocks or stops a microwave transmission; and when the critical temperature is not exceeded, the temperature control unit restores to the initial conductivity thereof, and the heating cavity allows the microwave transmission. In an embodiment, the temperature control unit is independent from the main body and has a first state and a second state; when the temperature control unit is in the first state,

the temperature control unit abuts against the inner conductor, and when the temperature control unit is in the second state, the temperature control unit is fixed on the carrier section and separated from the inner conductor.

[0005] In an embodiment, the temperature control unit includes a negative temperature coefficient thermistor; and when a temperature of the temperature control unit is greater than the critical temperature, a resistance of the temperature control unit is decreased suddenly and the temperature control unit is converted into a conductor, and when the temperature of the temperature control unit is less than or equal to the critical temperature, the temperature control unit is restored to an insulator.

[0006] In an embodiment, the temperature control unit includes a positive temperature coefficient thermistor; and when a temperature of the temperature control unit is greater than the critical temperature, a resistance of the temperature control unit is increased suddenly and the temperature control unit is converted into an insulator, and when the temperature of the temperature control unit is less than or equal to the critical temperature, the temperature control unit is restored to a conductor.

[0007] In an embodiment, the outer conductor, the inner conductor, and the temperature control unit are coaxially arranged.

[0008] In an embodiment, the outer conductor includes a bottom plate and a side cylinder, and the side cylinder is arranged around a central axis of the outer conductor and is connected to a periphery of the bottom plate.

[0009] In an embodiment, the inner conductor is fixed on the bottom plate, and the temperature control unit is in contact with an end of the inner conductor away from the bottom plate.

[0010] In an embodiment, when a temperature of the temperature control unit is greater than the critical temperature, a resonant frequency of the heating cavity does not match an emission frequency of the microwaves; and when the temperature of the temperature control unit is less than or equal to the critical temperature, the resonant frequency of the heating cavity matches the emission frequency of the microwaves.

[0011] In an embodiment, the carrier section includes a wave-transmissive body capable of transmitting the microwaves, and the wave-transmissive body is configured to accommodate the atomization medium.

[0012] In an embodiment, the microwave unit includes a microwave generator and an antenna connected to each other, the microwave generator is located outside the heating cavity, and a portion of the antenna extends into the heating cavity.

[0013] In an embodiment, a value range of the critical temperature is about 100°C to about 400°C.

[0014] In an embodiment, the medium carrier further includes a suction nozzle section, and the suction nozzle section is connected to the carrier section and at least partially located outside the heating cavity.

[0015] In an embodiment, the temperature control unit is in a sheet shape or a column shape.

[0016] An embodiment of the present application has the following technical effects. In such embodiment, the inner conductor is in contact with the outer surface of the temperature control unit. When the critical temperature is exceeded, the initial conductivity of the temperature control unit is changed, the heating cavity blocks or stops the microwave transmission, and the main body will stop heating the atomization medium; and when the critical temperature is not exceeded, the temperature control unit restores to the initial conductivity thereof, the heating cavity allows the microwave transmission, and the main body will resume heating the atomization medium. Therefore, on the basis that the atomization medium is effectively atomized, as long as the atomizing temperature of the atomization medium exceeds the critical temperature, the main body will stop heating, so as to prevent the atomization medium from being heated and atomized in a state higher than the critical temperature, improve the control accuracy of the atomizing temperature of the atomization medium, avoid the pyrolysis of the atomization medium due to the excessive high temperature and the production of harmful substance having the charred smell, and improve the health safety of the heating and atomization apparatus.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] In order to more clearly illustrate the technical solutions in the embodiments of the present specification or the prior art, a brief description is given below for the drawings referred in the description of the embodiments or the prior art. Obviously, the drawings in the following description are merely some embodiments of the specification. For those of ordinary skill in the art, other drawings can also be obtained based on these drawings without involving any inventive effort.

FIG. 1 is a schematic cross-sectional view of a heating and atomization apparatus according to an embodiment.

FIG. 2 is a schematic partial view of the heating and atomization apparatus shown in FIG. 1.

FIG. 3 is a schematic view illustrating a medium carrier assembled to a temperature control unit in the heating and atomization apparatus shown in FIG. 1.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0018] In order to facilitate the understanding of the present application, a more comprehensive description of the present application will be provided below with reference to the relevant drawings Preferred embodiments of the present application are set forth in the drawings. However, the present application may be implemented in many different forms and is not limited to the embodiments described herein. Rather, these embodiments are provided for the purpose of making the disclosure of the present application more thorough and comprehensive.

[0019] It should be noted that, when an element is referred to as being "fixed to" another element, it may be directly on the other element or may also be present with an intermediate element. When an element is referred to as being "connected" to another element, it may be directly connected to the other element or may be present with an intermediate element at the same time. The terms "inner", "outer", "left", "right" and similar expressions used herein are only for the purpose of illustration, rather than presenting the only ways for implementation.

[0020] The present application provides a heating and atomization apparatus capable of improving temperature control accuracy.

[0021] Referring to FIG. 1 to FIG. 3, the heating and atomization apparatus 10 according to an embodiment of the present application includes a main body 100, a medium carrier 200, and a temperature control unit 300. The main body 100 is detachably connected to the medium carrier 200, and the temperature control unit 300 can be received in the medium carrier 200.

[0022] The main body 100 includes a mounting housing 110, a microwave unit 120, a battery 130, and a control unit. The microwave unit 120, the battery 130, and the control unit are all located in the mounting housing 110.

[0023] The mounting housing 110 includes an outer conductor 111 and an inner conductor 112 that have conductive properties. The outer conductor 111 may be a columnar structure, such as a cylinder structure or a prism structure. The outer conductor 111 includes a bottom plate 111b and a side cylinder 111c. The side cylinder 111c is provided vertically and arranged around a center axis of the entire outer conductor 111. The bottom plate 111b is provided horizontally, and the side cylinder 111c is connected to a periphery of the bottom plate 111b. The side cylinder 111c and the bottom plate 111b cooperatively enclose a heating cavity 111a. The inner conductor 112 is located in the heating cavity 111a. A lower end of the inner conductor 112 is a fixed end and is fixedly connected to the bottom plate 111b, and an upper end of the inner conductor 112 is a free end.

[0024] The microwave unit 120 includes a microwave generator 121 and an antenna 122 connected to each other. The microwave generator 121 is located outside the heating cavity 111a. A portion of the antenna 122 extends into the heating cavity 111a, and the microwave generated by the microwave generator 121 is transmitted into the heating cavity 111a through the antenna 122.

[0025] The battery 130 is configured to power the control unit and the microwave generator 121. When the main body 100 operates, the control unit controls the battery 130 to supply power to the microwave generator 121, so that the microwave generator 121 can generate microwaves.

[0026] In some embodiments, the medium carrier 200 includes a suction nozzle section 210 and a carrier section 220 that are connected to each other.

[0027] The suction nozzle section 210 is at least partially located outside the heating cavity 111a, so that the user may be in contact with a portion of the suction nozzle section 210 located outside the heating cavity 111a to inhale.

[0028] The carrier section 220 is located in the heating cavity 111a. The carrier section 220 includes a wave-transmissive body 221 which may be made of a non-metallic material. The wave-transmissive body 221 encloses to form an accommodating cavity. The atomization medium 20 is wrapped in the accommodating cavity by the wave-transmissive body 221, that is, the wave-transmissive body 221 is configured to accommodate the atomization medium 20. The wave-transmissive body 221 does not hinder the transmission of microwaves, that is, microwaves can pass through the wave-transmissive body 221. When the microwave generated by the microwave generator 121 is transmitted into the heating cavity 111a, the microwave in the heating cavity 111a will further enter into the accommodating cavity through the wave-transmissive body 221, so as to be absorbed by the atomization medium 20. The atomization medium 20 will absorb the microwave and generate heat due to the microwave heating principle, so that the atomization medium 20 is atomized under the action of heat to form an aerosol that can be inhaled by the user.

[0029] In some embodiments, the temperature control unit 300 is fixed in the carrier section 220. The temperature control unit 300 is attached to the medium carrier 200, and the temperature control unit 300 is independent from the main body 100. The temperature control unit 300 is inserted in the carrier section 220 so that the atomization medium 20 directly wraps the temperature control unit 300. When the medium carrier 200 is mounted on the main body 100, the carrier section 220 is located in the heating cavity 111a, and the temperature control unit 300 and the inner conductor 112 abut against each other. When the medium carrier 200 is detached from the main body 100, the carrier section 220 is located outside the heating cavity 111a, and the temperature control unit 300 and the inner conductor 112 are separated from each other.

[0030] Therefore, the temperature control unit 300 has a first state and a second state. When the temperature control unit 300 is in the first state, the temperature control unit 300 is located in the heating cavity 111a, and an outer surface of the temperature control unit 300 abuts against the free end of the inner conductor 112 to form a contact relationship therebetween. When the temperature control unit 300 is in the second state, the outer surface of the temperature control unit 300 no longer abuts against the free end of the inner conductor 112, so that the temperature control unit 300 is fixed on the carrier section 220 and separated from the inner conductor 112, that is, the temperature control unit 300 is separated from the inner conductor 112 together with the medium carrier 200.

[0031] In other embodiments, the temperature control unit 300 may be directly fixed on the free end of the inner conductor 112. The temperature control unit 300 is attached to the main body 100, and the temperature control unit 300 is independent from the medium carrier 200. When the medium carrier 200 is mounted on the main body 100, the carrier section 220 is located in the heating cavity 111a, and the temperature control unit 300 is inserted in the carrier section 220. When the medium carrier 200 is detached from the main body 100, the carrier section 220 is located outside the heating cavity 111a, and the temperature control unit 300 is still fixed on the inner conductor 112. Therefore, the outer surface of the temperature control unit 300 is always connected to the free end of the inner conductor 112 to form a contact relationship therebetween.

[0032] When the outer surface of the temperature control unit 300 is in contact with the free end of the inner conductor 112, the outer conductor 111, the inner conductor 112, and the temperature control unit 300 may be coaxially arranged, so that the heating cavity 111a forms a resonant cavity. The length of the inner conductor 112 and the length of the temperature control unit 300 in a conductor state will each form an influence factor of the resonant frequency of the heating cavity 111a. When the resonant frequency of the heating cavity 111a does not match the emission frequency of the microwave, which can be understood as that when the resonant frequency is not equal to the emission frequency, or the difference between the resonant frequency and the emission frequency is larger than a preset range, the heating cavity 111a blocks or stops the microwave transmission, so that the microwave generated by the microwave generator 121 cannot enter the heating cavity 111a, and consequently the atomization medium 20 cannot absorb the microwave and continue to generate heat, which can be commonly understood as that the main body 100 cannot heat the atomization medium 20. When the resonant frequency of the heating cavity 111a matches the emission frequency of the microwave, which can be understood as that when the resonant frequency is equal to the emission frequency, or the difference between the resonant frequency and the emission frequency is smaller than the set range, the heating cavity 111a allows the microwave transmission, so that the microwave generated by the microwave generator 121 smoothly enters the heating cavity 111a, and consequently ensuring that the atomization medium 20 effectively absorbs the microwave and continues to generate heat, which can be commonly understood as that the main body 100 can heat the atomization medium 20.

[0033] In some embodiments, the temperature control unit 300 may have a columnar structure, a sheet structure, etc. The temperature control unit 300 includes a thermistor. Temperature control unit 300 has a critical temperature. When the temperature is greater than, that is, exceeds the critical temperature, a resistance of the temperature control unit 300 changes sharply from an initial range, thereby changing its initial conductivity. When the temperature is less than or is equal to, that is, does not exceed the critical temperature, the resistance of the temperature control unit 300 is restored to the initial range, so that the initial conductivity of the temperature control unit 300 is restored. A value range of the critical temperature of the temperature control unit 300 may be about 100°C to about 400°C, and a specific value of the critical temperature may be about 100°C, about 250°C, about 300°C, about 400°C, etc.

[0034] In some embodiments, the thermistor may be a negative temperature coefficient (NTC) thermistor, and the resistance value of the temperature control unit 300 decreases as the temperature increases. When the temperature of the temperature control unit 300 rises above the critical temperature, the resistance value of the temperature control unit 300 will decrease exponentially by a plurality of orders of magnitude from the initial range, which can be understood as that the resistance value of the temperature control unit 300 will be in an avalanche decreasing state, so that the initial conductivity of the temperature control unit 300 is changed. When the temperature of the temperature control unit 300 is reduced to be equal to or less than the critical temperature, the resistance value of the temperature control unit 300 is quickly restored to the initial range, so that the temperature control unit 300 is restored to the initial conductivity. Generally, when the critical temperature is not exceeded, the resistance of the temperature control unit 300 is large and the conductivity can be neglected, that is, the temperature control unit 300 is an insulator; while when the critical temperature is exceeded, the resistance of the temperature control unit 300 is relatively small, so that the temperature control unit 300 is converted from an insulator to a conductor.

[0035] In other embodiments, the thermistor may be a positive temperature coefficient (PTC) thermistor, and the resistance value of the temperature control unit 300 increases as the temperature increases. When the temperature of the temperature control unit 300 rises above the critical temperature, the resistance value of the temperature control unit 300 will increase exponentially by a plurality of orders of magnitude from the initial range, which can be understood as that the resistance value of the temperature control unit 300 will be in a rocket rising state, so that the initial conductivity of the temperature control unit 300 is changed. When the temperature of the temperature control unit 300 is reduced to be equal to or less than the critical temperature, the resistance value of the temperature control unit 300 is quickly restored to the initial range, so that the temperature control unit 300 is restored to the initial conductivity. Generally, when the critical temperature is not exceeded, the resistance of the temperature control unit 300 is relatively small, so that the temperature control unit 300 is a conductor, when the critical temperature is exceeded, the resistance of the temperature control unit 300 is relatively large, so that the temperature control unit 300 is converted from a conductor to an insulator.

[0036] Since the length of the inner conductor 112 and the length of the temperature control unit 300 in the conductor state each forms an influence factor of the resonant frequency of the heating cavity 111a, the emission frequency of the microwave generated by the microwave generator 121 may be about 2450 MHz, the wavelength of such microwave may be about 122 mm, and the length of the temperature control unit 300 may be about 8 mm. When the user inhales, the temperature control unit 300 and the inner conductor 112 are in contact with each other. The resonant frequency of the heating cavity 111a can be represented by the following expression: $f=c/\lambda$, where c represents the speed of light, and λ represents the wavelength corresponding to the resonant frequency of the heating cavity 111a.

[0037] In the case where the temperature control unit 300 is an NTC thermistor, the length of the inner conductor 112 may be about 30.5 mm. When the temperature of the temperature control unit 300 does not exceed the critical temperature, the temperature control unit 300 is an insulator, and the length of the temperature control unit 300 does not constitute an influence factor of the resonant frequency of the heating cavity 111a. The wavelength corresponding to the resonant frequency of the heating cavity 111a is just four times of the length of the inner conductor 112. Therefore, the wavelength corresponding to the resonant frequency of the heating cavity 111a is 4*30.5 mm = 122 mm, and such wavelength is just equal to the wavelength of the microwave, so that the resonant frequency of the heating cavity 111a is equal to the emission frequency of the microwave, and the resonant frequency will match the emission frequency. As a result, the microwave can be transmitted in the heating cavity 111a to be absorbed by the atomization medium 20, so that the main body 100 heats the atomization medium 20. When the temperature of the temperature control unit 300 exceeds the critical temperature, the temperature control unit 300 is converted from an insulator to a conductor. The length of the temperature control unit 300 constitutes an influence factor of the resonant frequency of the heating cavity 111a. The wavelength corresponding to the resonant frequency of the heating cavity 111a is just four times of the sum of the length of the inner conductor 112 and the length of the temperature control unit 300. Therefore, the wavelength corresponding to the resonant frequency of the heating cavity 111a is 4* (30.5+8) mm = 154 mm, and the resonant frequency of the heating cavity 111a is 1948 Mhz. As a result, the resonant frequency of the heating cavity 111a is substantially less than the emission frequency of the microwave, the resonant frequency will not match the emission frequency, and the microwave cannot be transmitted in the heating cavity 111a. The atomization medium 20 cannot absorb the microwave, so that the main body 100 cannot heat the atomization medium 20. Since the main body 100 cannot heat the atomization medium 20, the temperature of the atomization medium 20 and the temperature control unit 300 will drop to no more than the critical temperature. At this time, the temperature control unit 300 will be restored to an insulator, and then the resonant frequency of the heating cavity 111a will be restored to the state equal to the emission frequency of the microwave, so as to ensure that the main body 100 heats the atomization medium 20 again.

[0038] In the case where the temperature control unit 300 is an PTC thermistor, the length of the inner conductor 112 may be 22.5 mm. Obviously, the length of the inner conductor 112 in this case is smaller than the length of the inner conductor 112 in the case where the temperature control unit 300 is an NTC thermistor. When the temperature of the temperature control unit 300 does not exceed the critical temperature, the temperature control unit 300 is a conductor. The length of the temperature control unit 300 constitutes an influence factor of the resonant frequency of the heating cavity 111a. The wavelength corresponding to the resonant frequency of the heating cavity 111a is just four times of the sum of the length of the inner conductor 112 and the length of the temperature control unit 300. Therefore, the wavelength corresponding to the resonant frequency of the heating cavity 111a is 4* (22.5+8) mm = 122 mm, such wavelength is just equal to the wavelength of the microwave, so that the resonant frequency of the heating cavity 111a is equal to the emission frequency of the microwave, and the resonant frequency will match the emission frequency. As a result, the microwave can be transmitted in the heating cavity 111a to be absorbed by the atomization medium, so that the main body 100 heats the atomization medium 20. When the temperature of the temperature control unit 300 exceeds the critical temperature, the temperature control unit 300 is converted from a conductor to an insulator. The length of the temperature control unit 300 does not constitute an influence factor of the resonant frequency of the heating cavity 111a. The wavelength corresponding to the resonant frequency of the heating cavity 111a is just the length of the inner conductor 112. Therefore, the wavelength corresponding to the resonant frequency of the heating cavity 111a is 4*22.5 mm = 90 mm, and the resonant frequency of the heating cavity 111a is 3333 Mhz. As a result, the resonant frequency of the heating cavity 111a is substantially larger than the emission frequency of the microwave, the resonant frequency will not match the emission frequency, and the microwave cannot be transmitted in the heating cavity 111a. The atomization medium 20 cannot absorb the microwave, so that the main body 100 cannot heat the atomization medium 20. Since the main body 100 cannot heat the atomization medium 20, the temperature of the atomization medium 20 and the temperature control unit 300 will drop to no more than the critical temperature. At this time, the temperature control unit 300 will be restored to a conductor, and then the resonant frequency of the heating cavity 111a will be restored to the state equal to the emission frequency of the microwave, so as to ensure that the main body 100 continues to heat the atomization medium 20.

[0039] Therefore, by providing the temperature control unit 300, on the basis that the atomization medium 20 is effectively atomized, as long as the atomizing temperature of the atomization medium 20 exceeds the critical temperature, the main body 100 will stop heating, so as to prevent the atomization medium 20 from being heated and atomized in a state higher than the critical temperature, improve the control accuracy of the atomizing temperature of the atomization medium 20, avoid the pyrolysis of the atomization medium 20 due to the excessive high temperature and the production of harmful substance having the charred smell, and improve the health safety of the heating and atomization apparatus 10. In addition, the atomizing temperature of the atomization medium 20 is the same each time the user inhales, so that the aerosol concentration and taste at each inhalation are kept consistent, thereby improving the inhalation experience of the user. Furthermore, the atomizing temperature of the atomization medium 20 can be controlled by the inherent property of the thermistor, and an additional control circuit can be omitted, so that the structure of the heating and atomization apparatus 10 is simplified, and the miniaturization design of the heating and atomization apparatus 10 is realized. At the same time, the temperature control unit 300 and the medium carrier 200 are disposable consumables. After the atomization medium 20 is exhausted, the temperature control unit 300 and the medium carrier 200 will be discarded. Therefore, there will be no odor substance generated due to repeated heating of the residue on the temperature control unit 300, which further improves the user's inhalation experience.

Claims

1. A heating and atomization apparatus (10), comprising:

   a main body (100) comprising an outer conductor (111), an inner conductor (112), and a microwave unit (120), the inner conductor (112) being connected to the outer conductor (111) and located in a heating cavity (111a) enclosed by the outer conductor (111), and the microwave unit (120) being configured to emit microwaves into the heating cavity (111a);
   a medium carrier (200) detachably connected to the main body (100), the medium carrier (200) comprising a carrier section (220) configured to accommodate an atomization medium (20) and being located in the heating cavity (111a), and the atomization medium (20) capable of absorbing the microwaves to generate heat; and
   a temperature control unit (300) located in the heating cavity (111a) and accommodated in the carrier section (220), so as to be directly wrapped by the atomization medium (20), and the inner conductor (112) being in contact with

an outer surface of the temperature control unit (300);
wherein when a critical temperature is exceeded, an initial conductivity of the temperature control unit (300) is changed, and the heating cavity (111a) blocks or stops a microwave transmission; and when the critical temperature is not exceeded, the temperature control unit (300) restores to the initial conductivity thereof, and the heating cavity (111a) allows the microwave transmission.

2. The heating and atomization apparatus (10) according to claim 1, wherein the temperature control unit (300) is independent from the main body (100) and has a first state and a second state; when the temperature control unit (300) is in the first state, the temperature control unit (300) abuts against the inner conductor (112), and when the temperature control unit (300) is in the second state, the temperature control unit (300) is fixed on the carrier section (220) and separated from the inner conductor (112).

3. The heating and atomization apparatus (10) according to claim 1, wherein the temperature control unit (300) comprises a negative temperature coefficient thermistor; and when a temperature of the temperature control unit (300) is greater than the critical temperature, a resistance of the temperature control unit (300) is decreased suddenly and the temperature control unit (300) is converted into a conductor, and when the temperature of the temperature control unit (300) is less than or equal to the critical temperature, the temperature control unit (300) is restored to an insulator.

4. The heating and atomization apparatus (10) according to claim 1, wherein the temperature control unit (300) comprises a positive temperature coefficient thermistor; and when a temperature of the temperature control unit (300) is greater than the critical temperature, a resistance of the temperature control unit (300) is increased suddenly and the temperature control unit (300) is converted into an insulator, and when the temperature of the temperature control unit (300) is less than or equal to the critical temperature, the temperature control unit (300) is restored to a conductor.

5. The heating and atomization apparatus (10) according to claim 1, wherein the outer conductor (111), the inner conductor (112), and the temperature control unit (300) are coaxially arranged.

6. The heating and atomization apparatus (10) according to claim 1, wherein the outer conductor (111) comprises a bottom plate (111b) and a side cylinder (111c), and the side cylinder (111c) is arranged around a central axis of the outer conductor (111) and is connected to a periphery of the bottom plate (111b).

7. The heating and atomization apparatus (10) according to claim 6, wherein the inner conductor (112) is fixed on the bottom plate (111b), and the temperature control unit (300) is in contact with an end of the inner conductor (112) away from the bottom plate (111b).

8. The heating and atomization apparatus (10) according to claim 1, wherein when a temperature of the temperature control unit (300) is greater than the critical temperature, a resonant frequency of the heating cavity (111a) does not match an emission frequency of the microwaves; and
when the temperature of the temperature control unit (300) is less than or equal to the critical temperature, the resonant frequency of the heating cavity (111a) matches the emission frequency of the microwaves.

9. The heating and atomization apparatus (10) according to claim 1, wherein the carrier section (220) comprises a wave-transmissive body (221) capable of transmitting the microwaves, and the wave-transmissive body (221) is configured to accommodate the atomization medium (20).

10. The heating and atomization apparatus (10) according to claim 1, wherein the microwave unit (120) comprises a microwave generator (121) and an antenna (122) connected to each other, the microwave generator (121) is located outside the heating cavity (111a), and a portion of the antenna (122) extends into the heating cavity (111a).

11. The heating and atomization apparatus (10) according to claim 1, wherein a value range of the critical temperature is about 100°C to about 400°C.

12. The heating and atomization apparatus (10) according to claim 1, wherein the medium carrier (200) further comprises a suction nozzle section (210), and the suction nozzle section (210) is connected to the carrier section (220) and at least partially located outside the heating cavity (111a).

13. The heating and atomization apparatus (10) according to claim 1, wherein the temperature control unit (300) is in a sheet shape or a column shape.

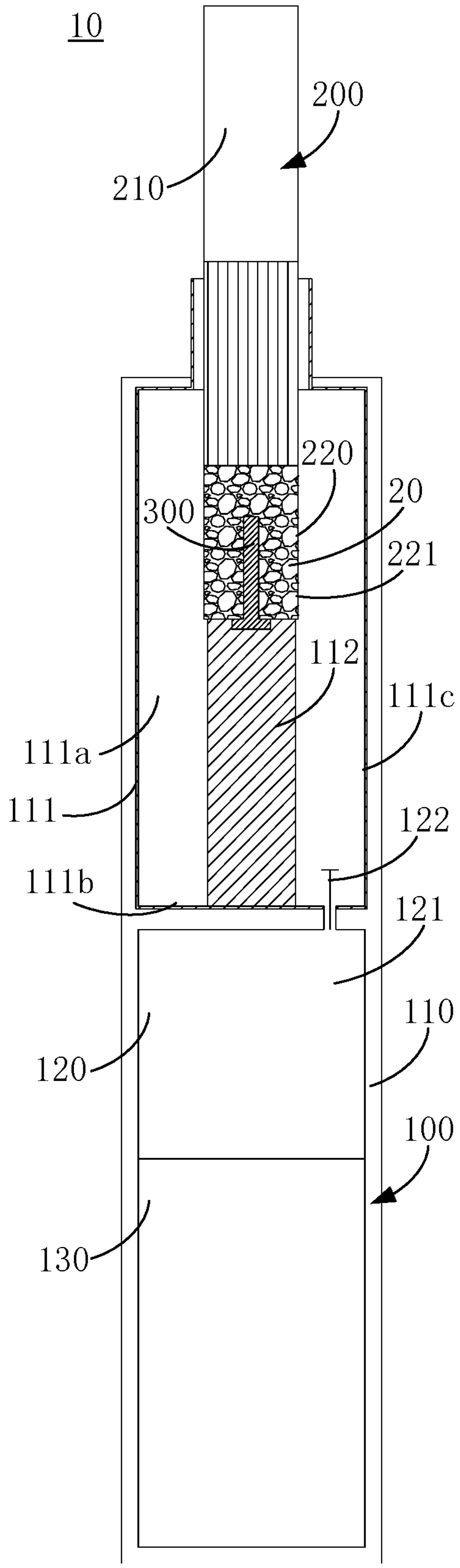
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FIG. 1

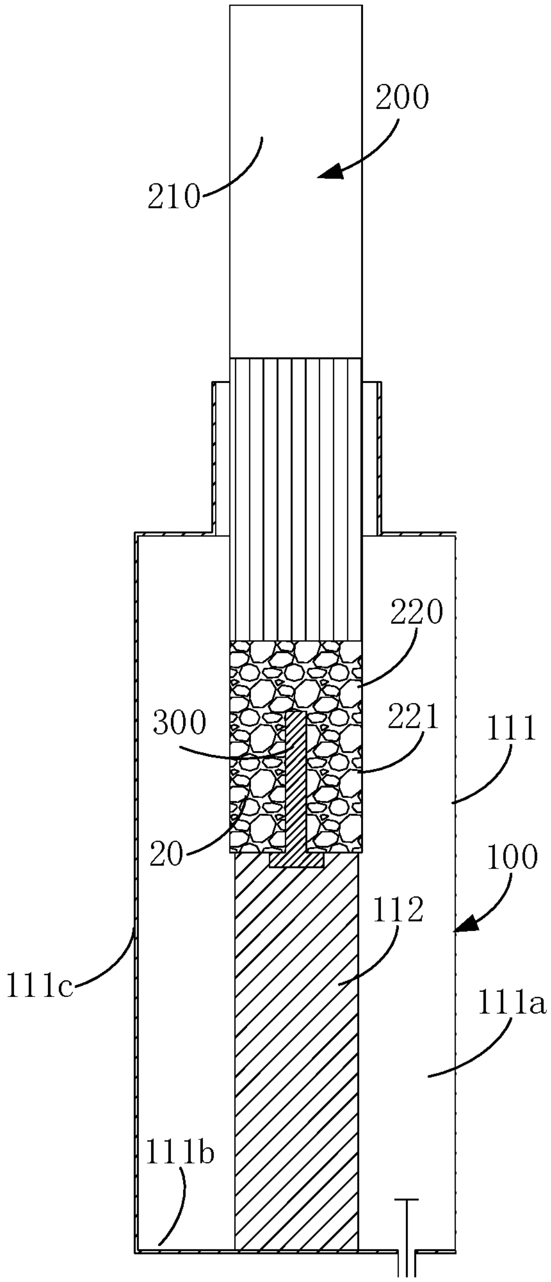
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FIG. 2

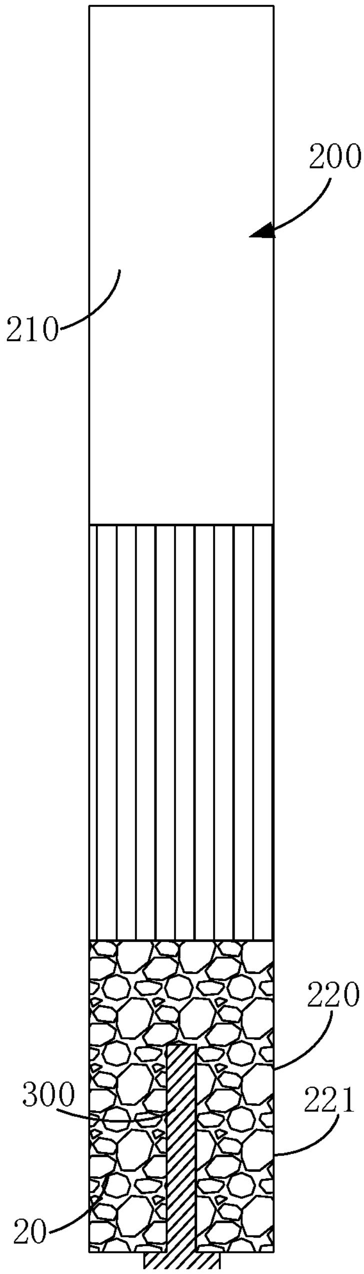
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FIG. 3

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2022/138606

A. CLASSIFICATION OF SUBJECT MATTER

A24F40/46(2020.01)i;A24F40/57(2020.01)i;A24F40/40(2020.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A24F、A61M

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, WPABSC, DWPI, VEN, Web of knowledge: 临界温度, 热敏电阻, 微波, 温度, 温度阈值, 谐振, 阈值温度, 雾化, critical temperature, Thermistor, Microwave, Temperature, Temperature Threshold, Resonance, Threshold Temperature, Atomiz+

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 217509921 U (HAINAN MOER BROTHERS TECHNOLOGY CO., LTD.) 30 September 2022 (2022-09-30) claims 1-13, description, paragraphs 3-22 and 29-42, and figures 1-4	1-13
PX	CN 217509911 U (HAINAN MOER BROTHERS TECHNOLOGY CO., LTD.) 30 September 2022 (2022-09-30) claims 1-10, description, paragraphs 3-37, and figures 1-3	1-13
X	CN 113925221 A (SHENZHEN MAISHI TECHNOLOGY CO., LTD. et al.) 14 January 2022 (2022-01-14) claims 1-16, description, paragraphs 6-62 and 76-145, and figures 1-5	1-13
A	CN 110141002 A (YUNNAN TOBACCO BIOLOGICAL TECHNOLOGY CO., LTD. et al.) 20 August 2019 (2019-08-20) entire document	1-13
A	CN 110876492 A (SHENZHEN SMOORE TECHNOLOGY LTD.) 13 March 2020 (2020-03-13) entire document	1-13

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

* Special categories of cited documents:
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- "E" earlier application or patent but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed
- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
21 February 2023	**23 February 2023**

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

Form PCT/ISA/210 (second sheet) (July 2022)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2022/138606

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 110876493 A (SHENZHEN SMOORE TECHNOLOGY LTD.) 13 March 2020 (2020-03-13) entire document	1-13
A	CN 113729270 A (SHENZHEN SMOORE TECHNOLOGY LTD. et al.) 03 December 2021 (2021-12-03) entire document	1-13
A	CN 113729304 A (SHENZHEN SMOORE TECHNOLOGY LTD. et al.) 03 December 2021 (2021-12-03) entire document	1-13
A	CN 114009840 A (SHENZHEN SMOORE TECHNOLOGY LTD.) 08 February 2022 (2022-02-08) entire document	1-13
A	EP 3636084 A1 (JT INTERNATIONAL S.A.) 15 April 2020 (2020-04-15) entire document	1-13
A	JP 2019528710 A (PHILIPS MORRIS PRODUCTS CO., LTD.) 17 October 2019 (2019-10-17) entire document	1-13
A	US 2021352966 A1 (JT INTERNATIONAL S.A.) 18 November 2021 (2021-11-18) entire document	1-13

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2022/138606

Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)			Publication date (day/month/year)
CN	217509921	U	30 September 2022	None			
CN	217509911	U	30 September 2022	None			
CN	113925221	A	14 January 2022	None			
CN	110141002	A	20 August 2019	None			
CN	110876492	A	13 March 2020	None			
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				WO	2020074601	A1	16 April 2020

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