(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 4 327 672 A1**

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
28.02.2024 Bulletin 2024/09

(21) Application number: **22865875.3**

(22) Date of filing: **23.06.2022**

(51) International Patent Classification (IPC):
A24F 40/20 *(2020.01)* ***A24D 1/02*** *(2006.01)*

(86) International application number:
PCT/CN2022/100622

(87) International publication number:
WO 2023/245528 (28.12.2023 Gazette 2023/52)

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(30) Priority: **21.06.2022 CN 202210707595**

(71) Applicant: **CHINA TOBACCO YUNNAN INDUSTRIAL CO., LTD**
Wuhua District
Kunming
Yunnan 650231 (CN)

(72) Inventors:
- **ZHAO, Yang**
  Kunming, Yunnan 650231 (CN)
- **LI, Xuemei**
  Kunming, Yunnan 650231 (CN)
- **QIN, Yunhua**
  Kunming, Yunnan 650231 (CN)
- **YANG, Liu**
  Kunming, Yunnan 650231 (CN)
- **LI, Shiwei**
  Kunming, Yunnan 650231 (CN)
- **ZHE, Wei**
  Kunming, Yunnan 650231 (CN)
- **XIA, Jianjun**
  Kunming, Yunnan 650231 (CN)
- **LI, Juan**
  Kunming, Yunnan 650231 (CN)
- **LEI, Ping**
  Kunming, Yunnan 650231 (CN)
- **DUAN, Yuanxing**
  Kunming, Yunnan 650231 (CN)
- **SHEN, Qinpeng**
  Kunming, Yunnan 650231 (CN)
- **GONG, Weimin**
  Kunming, Yunnan 650231 (CN)
- **XIANG, Nengjun**
  Kunming, Yunnan 650231 (CN)
- **GUO, Dingrong**
  Kunming, Yunnan 650231 (CN)

(74) Representative: **Gille Hrabal**
Partnerschaftsgesellschaft mbB
Patentanwälte
Brucknerstraße 20
40593 Düsseldorf (DE)

(54) PREPARATION METHOD FOR MULTI-SECTION AEROSOL GENERATING PRODUCT

(57) The present disclosure discloses a preparation method of multi-sectional aerosol generating products, wherein, the method includes the following steps: step 1, preparation of filter-tip rod; step 2, filling of an aerosol generating material; step 3, forming of an aerosol generating rod (6). The method of compounding before filling of the present disclosure can greatly improve production efficiency, to ensure that the plugging part (2) and the filtering part (4) are stable without moving during smoking or transportation, and better maintain consistency of axial lengths of the cavity section of different samples. Besides, in the present disclosure, the flowing aerosol generating material is filled by squeezing, which is dried and expands, so that the flowing aerosol generating material is solidified to form a fixed aerosol generating rod (6), production efficiency is higher by the method of squeezing, the aerosol generating rod (6) obtained after drying and expansion has pore structure, which can facilitate release and circulation of aerosols.

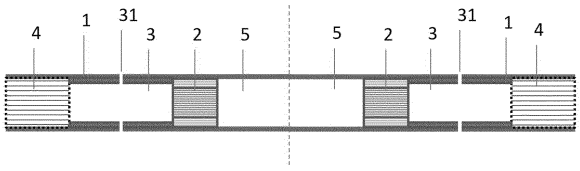

FIG.1

EP 4 327 672 A1

Description

TECHNICAL FIELD

[0001] The present disclosure belongs to a heat-not-burn (HNB) cigarette field, and in particular, to a preparation method of multi-sectional aerosol generating products.

BACKGROUND

[0002] With increasing attention of consumers to health and increasing demand for personalized experiences of cigarette products, the tobacco industry has continuously responded to upgrading of consumers' needs, various smoking products with tar reduction have been developed so as to bring less harm to consumers. Among which, because of different heating methods compared with traditional cigarette products, heating cigarettes can provide a healthier smoking experience while meeting consumers' sensory needs for cigarette products.

[0003] Aerosol generating matrix of granular heating cigarette is bulk aerosol generating granules, in the prior art, as bulk aerosol generating granules cannot be fixed, they must be filled into the outer tube by filling, besides, both sides of the aerosol generating granule section are sealed by sealing paper and plugging part to fix granules, while in order to gather aerosol and increase the amount of smoke, the downstream of the plugging part is usually a section of cavity (a cavity section) limited by the outer tube, and the downstream of the cavity section is a filtering section.

[0004] At present, the above aerosol generating products are prepared by filling, the production process order is as follows: one end of the tube is sealed, while aerosol generating matrix, the plugging part and the filtering part are sequentially filled from the other end, when filling the filtering part, a cavity distance between the filtering part and the plugging part is reserved, and the outer surface of the plugging part and the filtering part is not glued to the inner wall of the paper tube, after direct filling to a fixed position, they are fixed by friction with the inner wall of the paper tube.

[0005] Problem of the above filling method are as follows: 1. The tube is placed vertically during filling, and it is difficult to locate positions of the plugging part and the filtering part on both sides of the cavity, resulting in inconsistent axial lengths of the cavity section of different samples; 2. As the outer surface of the plugging part and filtering part and the inner wall of the paper tube are fixed only by friction, during transportation, the plugging part and filtering part are easy to move toward the cavity section, or the filtering part is partially sucked out of the outer tube during smoking; 3. The filling method is limited in that it can only be filled in batches for individual tubes, resulting in low production efficiency.

[0006] Therefore, efficient production of granular aerosol generating products with a cavity structure, while ensuring stability of the plugging and filtering parts without moving are key problems to be solved in production of granular aerosol generating products.

[0007] The present disclosure is proposed to solve the problems above.

SUMMARY

[0008] The present disclosure uses a rolling and compounding method to form each unit except the aerosol generating granule section, and a cavity for filling the aerosol generating material is reserved during compounding, cutting is carried out as needed after compounding, and the cut filter tip with an aerosol generating matrix accommodating cavity is placed vertically, then the aerosol generating material is filled into the aerosol generating matrix accommodating cavity, the method of compounding before filling of the present disclosure can greatly improve production efficiency, and ensure that the plugging part 2 and the filtering part 4 are stable without moving during smoking or transportation, and better maintain consistency of axial lengths of the cavity section of different samples.

[0009] The present disclosure provides a preparation method of multi-sectional aerosol generating products, including the following steps:

Step 1, preparation of filter-tip rod:

A composite tube 1 is used to wrap a plugging part 2 and a filtering part 4, a first axial length of the interval between the plugging part 2 and the filtering part 4, the length is a cavity section 3 limited by the composite tube 1,

One end of plugging part 2 far away from the cavity section 3 is an aerosol generating matrix accommodating cavity 5 limited by the composite tube 1;

Step 2, filling of aerosol generating material:

The filter-tip rod is in a vertical state, that is, perpendicular to the horizontal plane, wherein, the aerosol generating matrix accommodating cavity 5 is vertically upward, and the flowing aerosol generating material is squeezed into the aerosol generating matrix accommodating cavity 5;

Step 3, forming of aerosol generating rod 6:

Rotate the filter-tip rod filled with aerosol generating material by 180° , so that the aerosol generating matrix accommodating cavity 5 is vertically downward, place it on the plane to dry and expand at a certain temperature, so that the aerosol generating material is solidified to form a fixed aerosol generating rod 6 in the aerosol generating matrix accommodating cavity 5.

[0010] In step 2, the flowing aerosol generating mate-

rial can be filled into the aerosol generating matrix accommodating 5 in any way, e.g., squeezing;

In step 1, preparation of the filter-tip rod can be in a horizontal, vertical or any state between the two, as long as the filter-tip rod is placed in a vertical state during filling of aerosol generating materials in step 2, so as to facilitate quantitative squeezing of the flowing aerosol generating material.

[0011] The purpose of drying and expanding at a certain temperature on the plane after inversion is to make the end face of the aerosol generating rod 6 far away from the filtering part even.

[0012] Preferably, in step 1, the filter-tip rod can be cut into a plurality of filter tips, and the plurality of filter tips are connected by the filtering part 4 and / or the aerosol generating matrix accommodating cavity 5; at this time, there is also a cutting step between step 1 and step 2, which is to cut at the connected filtering part 4 and / or the connected aerosol generating matrix accommodating cavity 5, to cut the filter-tip rod into a plurality of filter tips.

[0013] That is to say, the filter-tip rod in step 1 can be a separate filter tip, that is, the composite tube 1 includes a plugging part 2, a cavity section 3, a filtering part 4 and an aerosol generating matrix accommodating cavity 5; in this case, when step 2 is carried out, it is only necessary to place the aerosol generating matrix accommodating cavity 5 vertically upward.

[0014] Certainly, the filter-tip rod in step 1 can be cut into a plurality of filter tips, that is, the composite tube 1 includes a plugging part 2, a cavity section 3, a filtering part 4 and an aerosol generating matrix accommodating cavity 5, and the plurality of filter tips are connected by the filtering part 4 and / or the aerosol generating matrix accommodating cavity 5, the junction has twice the axial length of the filtering part 4 or the aerosol generating matrix accommodating cavity 5, in this case, when step 2 is carried out, it is also necessary to cut the filter-tip rod into a plurality of filter tips, and place the aerosol generating matrix accommodating cavity 5 vertically upward.

[0015] That is to say, the axial length of the filtering part at the junction is twice that of the filtering part in a single filter tip; similarly, the axial length of the aerosol generating matrix accommodating cavity reserved at the junction is twice that of the aerosol generating matrix accommodating cavity in a single filter tip, so that each filter tip has a complete filtering part and an aerosol generating matrix accommodating cavity after cutting.

[0016] Preferably, in step 2, the flowing aerosol generating material includes smoking raw materials, smoking agents and solvents, the smoking raw materials are crushed in advance and passed through a 40-200 mesh sieve, the smoking raw materials after sieving are mixed separately with smoking agents and solvents in a certain proportion to form a flowing aerosol generating material like plaster;

[0017] Preferably, in step 2, the filling amount of the flowing aerosol generating material is 50-95 % of volume of the aerosol generating matrix accommodating cavity 5, more preferably, 90%.

[0018] Preferably, in step 2, there is a binder in the flowing aerosol generating material, the flowing aerosol generating material is bonded to the inner wall of the composite tube 1 with its own binder during drying and expansion. The binder is selected from chitosan, ethyl cellulose with hydroxyethylation compound modification, guar gum, carboxymethyl cellulose, starch, modified starch, plant cellulose, microcrystalline cellulose, hydroxyethyl cellulose, hydroxyethyl methyl cellulose.

[0019] Preferably, in step 2, the flowing aerosol generating material is squeezed into the aerosol generating matrix accommodating cavity 5 while cleaving to the inner surface of the composite tube 1, and the squeezed flowing aerosol generating material forms a central cavity, the center is the volume reserved for expansion of aerosol generating materials; or,

[0020] The flowing aerosol generating material is filled into the aerosol generating matrix accommodating cavity 5 in two parts, wherein, a first part of the aerosol generating material is squeezed into the aerosol generating matrix accommodating cavity 5 while cleaving to the inner surface of the composite tube 1, the first part of the squeezed aerosol generating material forms a central cavity, and a second part of the aerosol generating material is squeezed into the central cavity, there is a gap between the first part of the aerosol generating material and the second part of the aerosol generating material, the gap is the volume reserved for expansion of aerosol generating materials.

[0021] Preferably, there is also a sealing step after step 2 to make the aerosol generating matrix accommodating cavity 5 filled with the aerosol generating matrix 6 far away from the end surface of the filtering section to form a sealing film. In actual production processes, determine whether the sealing film is needed according to conditions of the aerosol generating matrix 6.

[0022] Preferably, in step 3, drying temperature in step 3 depends on the solvent in the aerosol generating material, i.e., in case the solvent is ethanol, the drying temperature is 50-60°C, with drying time of 0.5-1h; in case the solvent is water, the drying temperature is 60-70°C, with drying time of 1-2h.

[0023] Preferably, the cavity section 3 also includes functional materials; and / or, the cavity section 3 also includes an empty-tube fitting, the wall of the empty-tube fitting 32 is made of paper, silica gel, cellulose acetate, polylactic acid and non-woven fabric. Functional materials can be any form of material with cooling and flavoring function in the prior art.

[0024] Preferably, the air vent 31 is provided on the composite tube 1 in the cavity section 3 that radially penetrates through the composite tube 1. In case the empty-tube fitting is provided within the cavity section, the air vent 31 penetrates through the composite tube 1 and the empty-tube fitting at the same time. The air vent 31 is to introduce air into the cavity section, so as to reduce aer-

osol temperature and suction resistance, thus, to determine whether the vent 31 is needed according to actual aerosol temperatures and suction resistance. In case the air vent 31 is needed, preferably, perforating is used to form the air vent, certainly, it is also possible to use permeable paper as a composite tube or an empty-paper pipe in the cavity section without perforating, as long as air can be introduced into the cavity section.

[0025] Preferably, there is a binder between the outer surface of the plugging part 2 and the inner surface of the composite tube 1, and there is a binder between the outer surface of the filtering part 4 and the inner surface of the composite tube 1. The binder is selected from ordinary lap adhesive.

[0026] Preferably, the composite tube 1 is made of paper and a non-woven fabric. The anti-seepage / heat-conduction layer with anti-seepage or heat-conduction function on the composite tube 1 (especially when the composite tube 1 is made of non-woven fabric), the anti-seepage / heat-conduction layer includes a water-proof layer and / or an oil-proof layer and / or a heat-conduction layer;

[0027] The water-proof layer is made of alkyl ketene dimer (AKD), cationic rosin gum, non-iron aluminum sulfate mix or paraffin material; the oil-proof layer is made of fluorocarbon organic matter, modified starch, AKD and paraffin mixture, AKD and modified starch mixture material. The heat-conduction layer is selected from but not limited to an aluminum foil layer, which is added to the inner wall of the cigarette paper tube by paste; the aluminum foil layer can play the role of water-proof and / or oil-proof, while conducting and preserving heat, so that the smoking material in the inner wall of the cigarette is evenly heated.

[0028] Preferably, the water-proof layer and / or oil-proof layer are coated on the inner wall of the cigarette paper tube by spraying.

[0029] As moisture in the smoking material during cigarette storage seeps to the outside of the cigarette paper tube and results in yellow spots, it is necessary to add a water-proof layer to the inner wall of the cigarette paper tube filled with smoking material. The water-proof layer is made of alkyl ketene dimer (AKD), cationic rosin gum or non-iron aluminum sulfate mix and paraffin material, so as to prevent moisture in the smoking material from seeping to the outside of the cigarette paper tube.

[0030] Similarly, smoking agents, flavors and fragrances are added to smoking materials, during long-term placement, smoking agents in the smoking materials may carry flavors and fragrances to seep to the outside of the paper tube, resulting in yellow spots and affecting appearances of paper tubes, as smoking agents are oily, it is necessary to add an oil-proof layer to the inner wall of the cigarette paper tube filled with smoking materials. The oil-proof layer is made of fluorocarbon organic matter, modified starch, AKD and paraffin mixture, AKD and modified starch mixture, so as to prevent smoking agents in smoking material carrying flavors and fragrances to seep to the outside of the paper tube and occurrence of yellow spots.

[0031] The plugging part can be in any form, as long as blocking aerosol generating matrix (6) from moving downstream.

[0032] Compared with the prior art, the present disclosure has the following beneficial effects:

1. The present disclosure uses a rolling and compounding method to form each unit except the aerosol generating granule section, and a cavity for filling the aerosol generating material is reserved during compounding, cutting is carried out as needed after compounding, and the cut filter tip with an aerosol generating matrix accommodating cavity 5 is placed vertically, then the aerosol generating material is filled into the aerosol generating matrix accommodating cavity 5, as the plugging part 2 and the filtering part 4 are formed by compounding and rolling, it is easier to locate the plugging part 2 and the filtering part 4 in axial positions, to better ensure consistency of axial lengths of the cavity section 3 of different samples.

[0033] As the plugging part 2 and the filtering part 4 are formed by compounding and rolling, it is more convenient to apply a binder between the outer surface of the plugging part 2 and the filtering part 4 and the inner surface of the paper tube, so as to ensure that no displacement occurs at both ends during smoking or transportation.

2. The present disclosure uses the method of compounding and then filling to prepare aerosol generating products, which can simultaneously compound a plurality of filter tips, then cut and fill the aerosol generating material, as other units are compounded except the aerosol generating material, efficiency of each unit is greatly improved compared with separate filling.

3. In the present disclosure, the flowing aerosol generating material is filled by squeezing, places the aerosol generating matrix accommodating cavity 5 vertically downward on the plane to dry and expand at a certain temperature, so that the aerosol generating material is solidify to form a fixed aerosol generating rod 6 located in the aerosol generating matrix accommodating cavity 5, production efficiency is higher by squeezing, and the aerosol generating rod 6 obtained after drying and expanding has a pore structure, which can facilitate release and circulation of aerosol. The purpose of drying and expanding at a certain temperature on the plane after inversion is to make the end face of the aerosol generating rod 6 far away from the filtering part even.

DRAWINGS OF THE DESCRIPTION

[0034]

FIG.1 is a structural schematic view of a filter-tip rod with two filter tips before cutting in Embodiment 1, the dotted line in the figure is the cutting position.
FIG.2 is a structural schematic view of a filter-tip rod with three filter tips before cutting in Embodiment 1, the dotted line in the figure is the cutting position.
FIG.3 is a structural schematic view of the aerosol generating products obtained.

[0035] List of the reference signs of figures in the description of figures: 1. Composite tube, 2. Plugging part, 3. Cavity section, 4. Filtering part, 5. Aerosol generating matrix accommodating cavity, 6. Aerosol generating rod, 31. Air vent.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0036] The present disclosure is further illustrated through specific embodiments.

[0037] It is understood by those skilled in the art that, the following embodiments are only for illustrating the present disclosure and should not be interpreted as limiting the scope of the present disclosure. In case no specific technique or condition is indicated in the embodiment, the technique or condition described in the literature in the field or the product specification is based on. In case the materials or equipment used are not indicated with manufacturers, they are all ordinary products that can be obtained through purchase.

[0038] It can be understood by those skilled in the art that, the singular forms "a", "an" and "the" used herein can include the plural forms as well, unless expressly stated otherwise. It should be further understood that "including" used in the description of the present disclosure means that the features, integers, steps, operations, elements and/or components exist; however, the existence or addition of one or more other features, integers, steps, operations, elements, components and/or groups thereof is not excluded. It should be understood that, when an element is referred to be "connected" to another one, it may be directly connected to another element, or there may be intermediate elements as well. Moreover, "connection" as used herein may include wireless connections.

[0039] In the description of the present disclosure, unless otherwise stated, "a plurality of" means two or more. The orientation or state relationship indicated by the terms "inside", "above", "below", etc. is based on that shown in the figures, which is only for convenience of describing the present disclosure and simplifying description, rather than indicating or implying that the device or element must have a particular orientation, or must be constructed and operated in a particular orientation, and thus should not be interpreted as limitations of the present disclosure.

[0040] In the description of the present disclosure, it should be noted that, the terms "mount", "connect" and "provided with" should be interpreted broadly unless otherwise expressly specified and defined, such as fixed connection, detachable connection, or integral connection; either mechanical connection or electrical connection; direct connection or indirect connection through intermediate media. The specific meanings of the terms above in the present disclosure can be understood by persons skilled in the art in actual conditions.

[0041] It is understood by those skilled in the art that, unless otherwise defined, all terms including technical and scientific terms used herein have the same meanings as commonly understood by the ordinary persons skilled in the art to the technical field to which the present disclosure belongs. It should also be understood that terms such as those defined in the general dictionary should be understood to have meanings consistent with those in the context of the prior art; moreover, unless defined as herein, the terms may not be explained with idealized or overly formal senses.

Embodiment 1

[0042] The embodiment provides a preparation method of multi-sectional aerosol generating products, including the following steps:

Step 1, preparation of filter-tip rod:

A composite tube 1 is used to wrap a plugging part 2 and a filtering part 4, there is a first axial length of the interval between the plugging part 2 and the filtering part 4, the length is a cavity section 3 limited by the composite tube 1,
One end of plugging part 2 far away from the cavity section 3 is an aerosol generating matrix accommodating cavity 5 limited by the composite tube 1;

Step 2, filling of aerosol generating material:
The filter-tip rod is in a vertical state, that is, perpendicular to the horizontal plane, wherein, the aerosol generating matrix accommodating cavity 5 is vertically upward, and the flowing aerosol generating material is squeezed into the aerosol generating matrix accommodating cavity 5;
Step 3, forming of aerosol generating rod 6:
Rotate the filter-tip rod filled with aerosol generating material by 180° , so that the aerosol generating matrix accommodating cavity 5 is vertically downward, place it on the plane to dry and expand at a certain temperature, so that the aerosol generating material is solidified to form a fixed aerosol generating rod 6 in the aerosol generating matrix accommodating cavity 5.

[0043] In step 2, the flowing aerosol generating material is filled into the aerosol generating matrix accommodating cavity 5 by squeezing; in step 1, preparation of filter-tip rod is in a horizontal state by existing compounding machines.

[0044] In step 1, the filter-tip rod can be cut into two filter tips, and the two filter tips are connected by aerosol generating matrix accommodating cavity 5; at this time, there is also a cutting step between step 1 and step 2, which is to cut at the connected aerosol generating matrix accommodating cavity 5, so as to cut the filter-tip rod into two filter tips. The joint has twice the axial length of the aerosol generating matrix accommodating cavity 5, so that each filter-tip rod has a complete aerosol generating matrix accommodating cavity after cutting.

[0045] In step 2, the flowing aerosol generating material includes smoking raw materials, smoking agents and solvents, the smoking raw materials are crushed in advance and passed through a 40-200 mesh sieve, the smoking raw materials after sieving are mixed separately with smoking agents and solvents in a certain proportion to form a flowing aerosol generating material like plaster; In step 2, the filling amount of the flowing aerosol generating material is 90% of volume of the aerosol generating matrix accommodating cavity 5.

[0046] In step 2, there is a binder in the flowing aerosol generating material, the flowing aerosol generating material is bonded to the inner wall of the composite tube 1 with its own binder during drying and expansion. The binder is selected from carboxymethyl cellulose.

[0047] In step 2, the flowing aerosol generating material is squeezed into the aerosol generating matrix accommodating cavity 5 while cleaving to the inner surface of the composite tube 1, and the squeezed flowing aerosol generating material forms a central cavity, the center is the volume reserved for expansion of aerosol generating materials.

[0048] In step 3, the drying temperature depends on the solvent in the aerosol generating material, in the embodiment, the solvent is water, the drying temperature is 60 °C with drying time of 1h.

[0049] The cavity section 3 also includes an empty-tube fitting, the empty-tube fitting can be empty paper tube. The composite tube 1 in the cavity section 3 has an air vent 31 that penetrates radially through the composite tube 1. In case an empty-tube fitting is provided in the cavity section 3, the air vent 31 runs through the composite tube 1 and the empty-tube fitting at the same time.

[0050] There is a binder between the outer surface of the plugging part 2 and the inner surface of the composite tube 1, and there is a binder between the outer surface of the filtering part 4 and the inner surface of the composite tube 1.

[0051] The composite tube 1 is made of paper.

Embodiment 2

[0052] The differences between embodiment 2 and embodiment 1 are that, 1. In step 1, the filter-tip rod can be cut into four filter tips, and the four filter tips are connected by the filtering part 4 and the aerosol generating matrix accommodating cavity 5; at this time, there is also a cutting step between step 1 and step 2, which is to cut at the connected filtering part 4 and the connected aerosol generating matrix accommodating cavity 5, so as to cut the filter-tip rod into 4 filter tips. The axial length of the filtering part at the junction is twice that of the filtering part in a single filter-tip; similarly, the axial length of the aerosol generating matrix accommodating cavity reserved at the junction is twice that of the aerosol generating matrix accommodating cavity in a single filter-tip, so that each filter rod has a complete filtering part and an aerosol generating matrix accommodating cavity after cutting. 2. In step 2, the flowing aerosol generating material is filled into the aerosol generating matrix accommodating cavity 5 in two parts, wherein, a first part of the aerosol generating material is squeezed into the aerosol generating matrix accommodating cavity 5 while cleaving to the inner surface of the composite tube 1, the first part of the squeezed aerosol generating material forms a central cavity, and a second part of the aerosol generating material is squeezed into the central cavity, there is a gap between the first part of the aerosol generating material and the second part of the aerosol generating material, the gap is the volume reserved for expansion of aerosol generating materials.

Claims

1. A preparation method of multi-sectional aerosol generating products, wherein, the method comprises the following steps:

Step 1, preparation of filter-tip rod:

A composite tube (1) is used to wrap a plugging part (2) and a filtering part (4), there is a first axial length of the interval between the plugging part (2) and the filtering part (4), the length is a cavity section (3) limited by the composite tube (1),
One end of plugging part (2) far away from the cavity section (3) is an aerosol generating matrix accommodating cavity (5) limited by the composite tube (1);

Step 2, filling of an aerosol generating material: The filter-tip rod is in a vertical state, wherein the aerosol generating matrix accommodating cavity (5) is vertically upward, and the flowing aerosol generating material is filled into the aerosol generating matrix accommodating cavity

(5);

Step 3, forming of an aerosol generating rod (6): Rotate the filter-tip rod filled with aerosol generating material by 180° , so that the aerosol generating matrix accommodating cavity (5) is vertically downward, place it on the plane to dry and expand at a certain temperature, so that the aerosol generating material is solidified to form a fixed aerosol generating rod (6) in the aerosol generating matrix accommodating cavity (5).

2. The preparation method of claim 1, wherein, in step 1, the filter-tip rod can be cut into a plurality of filter tips, and the plurality of filter tips are connected by the filtering part (4) and / or the aerosol generating matrix accommodating cavity (5).
At this time, there is also a cutting step between step 1 and step 2, which is to cut at the connected filtering part (4) and / or the connected aerosol generating matrix accommodating cavity (5), to cut the filter-tip rod into a plurality of filter tips.

3. The preparation method of claim 1, wherein, in step 2, the flowing aerosol generating material comprises smoking raw materials, smoking agents and solvents, the smoking raw materials are crushed in advance and passed through a 40-200 mesh sieve, the smoking raw materials after sieving are mixed separately with smoking agents and solvents in a certain proportion to form a flowing aerosol generating material.
The filling amount of the flowing aerosol generating material is 50-95 % of volume of the aerosol generating matrix accommodating cavity (5).

4. The preparation method of claim 3, wherein, in step 2, there is a binder in the flowing aerosol generating material, the flowing aerosol generating material is bonded to the inner wall of the composite tube (1) with its own binder during drying and expansion.

5. The preparation method of claim 1, wherein, in step 2, the flowing aerosol generating material is squeezed into the aerosol generating matrix accommodating cavity (5) while cleaving to the inner surface of the composite tube (1), and the squeezed flowing aerosol generating material forms a central cavity; or,
The flowing aerosol generating material is filled into the aerosol generating matrix accommodating cavity (5) in two parts, wherein, a first part of the aerosol generating material is squeezed into the aerosol generating matrix accommodating cavity (5) while cleaving to the inner surface of the composite tube (1), the first part of the squeezed aerosol generating material forms a central cavity, and a second part of the aerosol generating material is squeezed into the central cavity, there is a gap between the first part of the aerosol generating material and the second part of the aerosol generating material.

6. The preparation method of claim 1, wherein, after step 2, there is also a sealing step to make the aerosol generating matrix accommodating cavity (5) filled with the aerosol generating matrix (6) far away from the end surface of the filtering section to form a sealing film.

7. The preparation method of claim 1, wherein, drying temperature in step 3 depends on the solvent in the aerosol generating material, i.e., in case the solvent is ethanol, the drying temperature is 50-60°C, with drying time of 0.5-1h; in case the solvent is water, the drying temperature is 60-70°C, with the drying time of 1-2h.

8. The method of claim 1, wherein, the cavity section (3) also comprises functional materials; and / or,
The cavity section (3) also comprises an empty-tube fitting.

9. The method of claim 1, wherein, the composite tube (1) in the cavity section (3) has an air vent (31) that penetrates radially through the composite tube (1).

10. The preparation method of claim 1, wherein, there is a binder between the outer surface of the plugging part (2) and the inner surface of the composite tube (1), and there is a binder between the outer surface of the filtering part (4) and the inner surface of the composite tube (1).

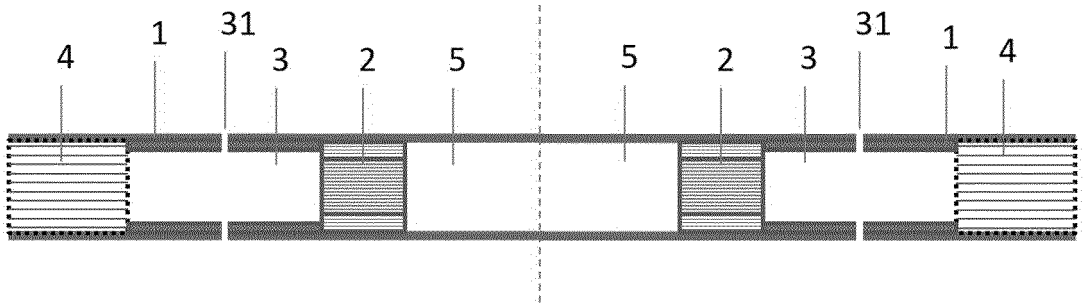

FIG.1

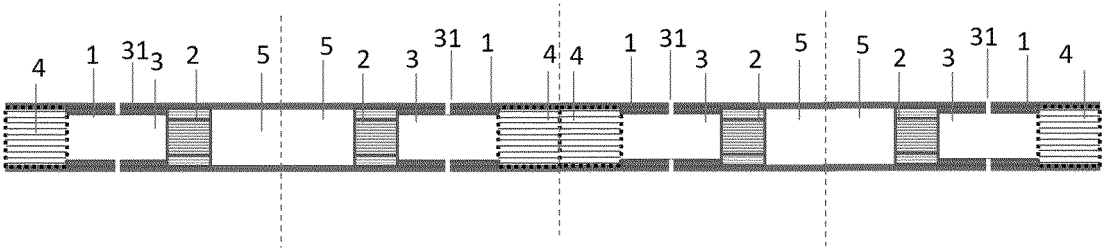

FIG.2

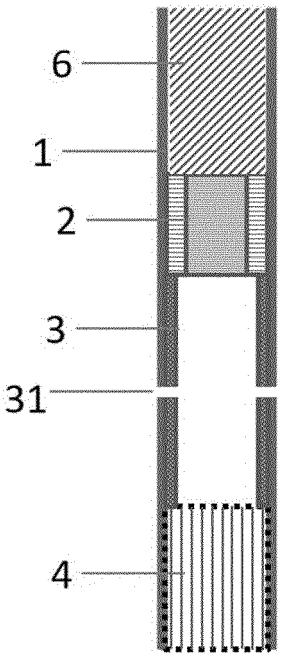

FIG.3

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2022/100622

A. CLASSIFICATION OF SUBJECT MATTER

A24F 40/20(2020.01)i; A24D 1/02(2006.01)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 40/-; A24D 1/-

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)

CNPAT, WPI, CNKI: 气溶胶, 生成棒, 嘴棒条, 封堵件, 过滤件, 空腔, 复合管, aerosol, filter, rod

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 111567876 A (LI KEFU) 25 August 2020 (2020-08-25) claims 1-8	1-10
A	CN 112716031 A (CHINA TOBACCO JIANGXI INDUSTRIAL LLC) 30 April 2021 (2021-04-30) entire document	1-10
A	WO 2020055093 A1 (KT&G CORPORATION) 19 March 2020 (2020-03-19) entire document	1-10
A	US 2021106046 A1 (PHILIP MORRIS PRODUCTS S.A.) 15 April 2021 (2021-04-15) entire document	1-10
A	US 2019059442 A1 (PHILIP MORRIS PRODUCTS S.A.) 28 February 2019 (2019-02-28) entire document	1-10

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

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

Date of the actual completion of the international search	Date of mailing of the international search report
10 December 2022	**20 December 2022**
Name and mailing address of the ISA/CN **China National Intellectual Property Administration (ISA/CN)** **No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088, China** Facsimile No. **(86-10)62019451**	Authorized officer Telephone No.

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

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2022/100622

Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)			Publication date (day/month/year)
CN	111567876	A	25 August 2020	None			
CN	112716031	A	30 April 2021	None			
WO	2020055093	A1	19 March 2020	KR	20200030371	A	20 March 2020
US	2021106046	A1	15 April 2021	EP	3772248	A1	10 February 2021
				BR	112020018379	A2	29 December 2020
				JP	2021520219	A	19 August 2021
				WO	2019197170	A1	17 October 2019
				KR	20200134321	A	01 December 2020
				CN	111902055	A	06 November 2020
				RU	2020136112	A	11 May 2022
US	2019059442	A1	28 February 2019	ES	2746328	T3	05 March 2020
				AR	106163	A1	20 December 2017
				MX	2018003690	A	30 April 2018
				AU	2016329264	A1	01 February 2018
				EP	3355727	A1	08 August 2018
				BR	112018004236	A2	02 October 2018
				JP	2018529338	A	11 October 2018
				CN	108024572	A	11 May 2018
				PH	12018500018	A1	09 July 2018
				KR	20180058714	A	01 June 2018
				RU	2707427	C1	26 November 2019
				HK	1255812	B	17 July 2020
				PL	3355727	T3	30 April 2020
				WO	2017055456	A1	06 April 2017

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