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(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)
- **Li, Juan**
  Kunming, Yunnan 650231 (CN)
- **ZHAN, Jianrong**
  Kunming, Yunnan 650231 (CN)
- **YANG, Liu**
  Kunming, Yunnan 650231 (CN)
- **LEI, Ping**
  Kunming, Yunnan 650231 (CN)
- **LI, Shiwei**
  Kunming, Yunnan 650231 (CN)
- **DUAN, Yuanxing**
  Kunming, Yunnan 650231 (CN)
- **GONG, Xiaowei**
  Kunming, Yunnan 650231 (CN)
- **GONG, Weimin**
  Kunming, Yunnan 650231 (CN)
- **XIANG, Nengjun**
  Kunming, Yunnan 650231 (CN)
- **SHEN, Qinpeng**
  Kunming, Yunnan 650231 (CN)

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

(54) AEROSOL GENERATING PRODUCT HAVING COMPOSITE-FORM BLOCKING MEMBER

(57) The present disclosure discloses an aerosol generating product with a composite plugging part, including an integrated outer sleeve (1), an aerosol generating matrix (6), a plugging part (2), a hollow cavity structure (3) and a filtering part (4) located inside the outer sleeve (1); the plugging part (2) includes a tube wall (21) and a tube cavity (22), the tube wall (21) has a groove corrugated structure, including an outer layer (211), an inner layer (212), and a groove corrugated layer (213) between them; the outer layer (211) limits the outer surface of the plugging part (2), and the inner layer (212) limits the tube cavity (22); a convergent sheet rod (221) is provided inside the tube cavity (22). During smoking, the convergent sheet rod shrinks by heat and blocks part of the central airflow, so that more aerosols contact with aroma-enhancing materials and / or smoking materials on the groove corrugated layer (213), thereby improving the effect of aerosol flavoring and increasing smoke amount.

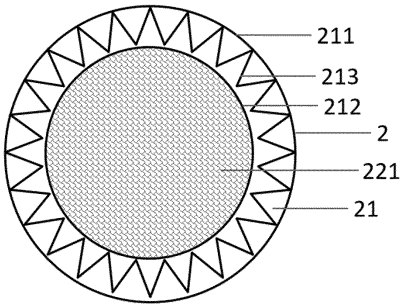

FIG.4

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Description

TECHNICAL FIELD

[0001] The present disclosure belongs to a heat-not-burn (HNB) cigarette field, and in particular, to an aerosol generating product with a composite plugging part.

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] The existing integrated aerosol generating products include outer sleeves and aerosol generating matrix filled in the outer sleeves, as well as other units for cooling and circulating aerosol. At present, the aerosol generating matrix of integrated aerosol generating products is usually granular aerosol generating material, as bulk aerosol generating granules cannot be fixed, they must be filled into the outer sleeve 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 hollow cavity (a hollow cavity section) limited by the outer sleeve, and the downstream of the hollow cavity section is a filtering section. 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 the aerosol generating matrix, the plugging part and the filtering part are sequentially filled from the other end, when filling the filtering part, a hollow 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. 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 hollow cavity, resulting in inconsistent axial lengths of the hollow 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 hollow cavity section, or the filtering part is partially sucked out of the outer sleeve 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.

[0004] Moreover, the existing plugging parts are usually multi-hole firmware sections (commonly known as "gears"), the multi-hole firmware sections are usually made of ceramic or silicone, the outer wall is firmly bonded to the inner wall of the paper tube by binder, and at least one axial through-hole is provided in the center, and / or, at least one peripheral ventilation groove is provided on the periphery, and their size can let smoke pass through while preventing aerosol source-material granules from passing through, not only blocking aerosol source-material granules but transferring aerosols.

[0005] However, existence of multi-hole firmware sections brings more costs and operational inconveniences to industrial manufacturing of granular aerosol generating products, thus, those skilled in the art have been hoping to eliminate the multi-hole firmware section. However, once eliminating multi-hole firmware sections, there is a dilemma that an airflow channel must be set in the downstream of the granule section to collect and accommodate aerosol, and the section can also constrain scattered aerosol source-material granules, thus, improvement is needed for design of the plugging part.

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

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

SUMMARY

[0008]

The present disclosure provides an aerosol generating product with a composite plugging part, including an integrated outer sleeve 1, and an aerosol generating matrix 6, a plugging part 2, a hollow cavity structure 3 and a filtering part 4 located inside the outer sleeve 1;

The plugging part 2 includes a tube wall 21 and a tube cavity 22, the tube wall 21 has a groove corrugated structure, including an outer layer 211, an inner layer 212 and a groove corrugated layer 213 between them, the outer layer

211 limits the outer surface of the plugging part 2, and the inner layer 212 limits the tube cavity 22;
A convergent sheet rod 221 is provided inside the tube cavity (22). That is, the plugging part 2 of the present disclosure has its own outer layer 211 instead of taking the outer sleeve 1 as the outer layer.

[0009] Preferably, the convergent sheet rod 221 is formed by converging sheet materials, the volume of the convergent sheet rod 221 accounts for 30-80% of that of the tube cavity 22, i.e., the filling amount of the sheet material in the tube cavity 22 is 30-80 %. Convergence can either be out of order or with order and regularity.

[0010] Preferably, the sheet materials include heat-shrinkable and non-heat-shrinkable materials. The heat-shrinkable materials are selected from polymer materials or cellulose acetate, the polymer materials include polylactic acid and polycarbonate; non-heat-shrinkable material is selected from paper;
The convergent sheet rod 221 selected from heat-shrinkable material deforms when the temperature reaches 120-180°C, more preferably, deforms at 120°C.

[0011] Preferably, the outer layer 211 is selected from paper material; the inner layer 212 is selected from tow or folded sheet material, the tow materials include acetate fiber tow and polylactic acid tow; folded sheet materials include paper (paper can be coated with polymer materials), reconstituted tobacco or polymer sheet material; the groove corrugated layer 213 is selected from paper or non-woven fabric with groove structure.

[0012] In the actual selection process, if folded sheets are needed, non-woven fabrics are preferred; if smooth sheets are needed, paper is preferred. In addition, preferably, the groove corrugated sheet should be pre-pressed to form groove creases, and wrapped with the outer layer 211 and the inner layer 212 to form the tube wall of the groove corrugated structure. Correspondingly, during preparation of the convergent sheet rod 221 in the tube cavity, the sheet material is pre-pressed to form creases and converge, so as to facilitate converging.

[0013] Preferably, the cross section of the groove in the groove corrugated layer 213 is of a "U" type or "V" type.

[0014] Preferably, the groove corrugated layer 213 is also provided with an aroma-enhancing material layer and / or a smoking material layer, it can be selected from commonly-used flavors, fragrances or smoking agents, e.g., the aroma-enhancing materials are selected from natural aroma raw-materials and tobacco extract; the smoking materials are selected from propylene glycol and glycerol.

[0015] Preferably, the hollow cavity structure 3 is also provided with functional materials; and / or, the hollow cavity structure 3 is also provided with an empty-tube part 32. The tube wall of the empty-tube part 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 aroma-enhancing function in the prior art.

[0016] Preferably, an air vent 31 that axially penetrates the outer sleeve 1 is provided on the outer sleeve 1 in the hollow cavity structure. When an empty-tube part is provided inside the hollow cavity section 3, an air vent 31 penetrates through the outer sleeve 1 and the empty-tube part. The air vent 31 is to introduce air into the hollow cavity section, so as to reduce aerosol temperature and suction resistance, thus, determine whether the air vent 31 is needed according to the actual aerosol temperature and suction resistance. When it is necessary to set the air vent 31, preferably by penetrating through. Certainly, except for penetrating through, it is also possible to use permeable paper as the outer sleeve or the empty paper tube in the hollow cavity section, as long as air can be introduced into the hollow cavity section.

[0017] Preferably, there is a binder between the outer surface of the plugging part 2 and the inner surface of the outer sleeve 1, and there is a binder between the outer surface of the filtering part 4 and the inner surface of the outer sleeve 1. The binder is selected from ordinary lap adhesive.

[0018] Preferably, the outer sleeve 1 is made of paper and non-woven fabric. The anti-seepage / heat-conduction layer with anti-seepage or heat-conduction function is provided on the outer sleeve 1 (especially when the outer sleeve 1 is made of non-woven), the anti-seepage / heat-conduction layer includes a water-proof layer and / or an oil-proof layer and / or a heat-conduction layer;
The water-proof layer uses alkyl ketene dimer (AKD), cationic rosin gum, non-iron aluminum sulfate mix or paraffin material; the oil-proof layer uses 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, but also conducting and preserving heat, so that the smoking material on the inner wall of the cigarette is evenly heated.

[0019] Preferably, the water-proof layer and / or oil-proof layer are coated on the inner wall of the cigarette paper tube by spraying.

[0020] 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 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.

[0021] 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.

[0022] Preferably, the aerosol generating matrix 6 is flaky, filamentous, granular, paste-like or rod-like with its own pore structure. Paste-like aerosol generating matrix include smoking agent, tobacco powder, adhesives, flavors and fragrances, PH regulators, flame retardants, etc., wherein, adhesives are selected from cassava starch and CMC, PH regulators are selected from carbonate or citrate, more preferably, potassium carbonate.

[0023] Preferably, when the aerosol generating matrix 6 is flake or filamentous, it can be reconstituted tobacco or cut tobacco. In this case, the preparation method of aerosol generating products can be conventional compounding and rolling. Of course, the following preparation method can also be used for preparation, that is, the method of compounding and then filling.

[0024] Preferably, when the aerosol generating matrix 6 is granular or paste-like, the preparation method of the aerosol generating product includes the following steps (subsequently referred to as the preparation method 1):

Step 1, preparation of filter-tip rod:

An outer sleeve 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 hollow cavity section 3 limited by the outer sleeve 1,
One end of plugging part (2) far away from the hollow cavity section 3 is an aerosol generating matrix accommodating cavity 5 limited by the outer sleeve 1;

Step 2, filling of the aerosol generating matrix 6:

Place the filter-tip rod in a vertical state, that is, perpendicular to the horizontal plane, wherein, the aerosol generating matrix accommodating cavity 5 is vertically upward, and the aerosol generating matrix 6 is filled into the aerosol generating matrix accommodating cavity 5;

When the aerosol generating matrix 6 is rod-like with its own pore structure, the preparation method of the aerosol generating product includes the following steps (subsequently referred to as the preparation method 2):

Step 1, preparation of filter-tip rod:

An outer sleeve 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 hollow cavity section 3 limited by the outer sleeve 1,
One end of plugging part 2 far away from the hollow cavity section 3 is an aerosol generating matrix accommodating cavity 5 limited by the outer sleeve 1;

Step 2, filling of aerosol generating material:
Place the filter-tip rod in a vertical state, that is, perpendicular to the horizontal plane, wherein, the aerosol generating matrix accommodating cavity 5 is vertically upward, the flowing aerosol generating material is squeezed into the aerosol generating matrix accommodating cavity 5;

Step 3, forming of the aerosol generating matrix 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 matrix 6 in the aerosol generating matrix accommodating cavity 5.

In the preparation method 1:

[0025] 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 filling of the aerosol generating matrix 6.

[0026] Preferably, when the aerosol generating matrix 6 is granular, there is also a sealing step after step 2, so that the aerosol generating matrix accommodating cavity 5 containing the aerosol generating matrix 6 that is away from the end face of the filtering section may form a sealing film 7; when the aerosol generating matrix 6 is paste-like, the sealing

step is not needed, of course, adding a sealing step does not matter. In actual production, determine whether the sealing film is needed according to conditions of the aerosol generating matrix 6.

[0027] Preferably, in step 1, the filter-tip rod can be divided 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.

[0028] Preferably, 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.

[0029] That is, the filter-tip rod in step 1 can be a separate filter tip, i.e., the outer sleeve 1 contains a plugging part 2, a hollow 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. Certainly, the filter-tip rod in step 1 can be divided into a plurality of filter tips, i.e., the outer sleeve 1 contains a plugging part 2, a hollow 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, and the joint 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 first cut the filter-tip rod into a plurality of filter tips, and place the aerosol generating matrix accommodating cavity 5 vertically upward.

[0030] That is, the axial length of the filtering part at the connection 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 connection is twice that of the aerosol generating matrix accommodating cavity in a single filter tip, so that each filter tip has a complete set of a filtering part and an aerosol generating matrix accommodating cavity after cutting.

In the preparation method 2:

[0031] In step 2, the flowing aerosol generating material can be loaded into the aerosol generating matrix accommodating cavity 5 in any way, such as squeezing;

[0032] 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 squeezing of the flowing aerosol generating material.

[0033] The purpose of drying and expanding at a certain temperature on the plane after inversion is to make the end face of one end of the aerosol generating rod 6 away from the filtering part even.

[0034] Preferably, in step 1, the filter-tip rod can be divided 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 5, to cut the filter-tip rod into a plurality of filter tips.

[0035] That is, the filter-tip rod in step 1 can be a single filter tip, i.e., the outer sleeve 1 includes a plugging part 2, a hollow 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. Certainly, the filter-tip rod in step 1 can be divided into a plurality of filter tips, i.e., the outer sleeve 1 contains a plugging part 2, a hollow cavity section 3, a filtering part 4 and an aerosol generating matrix accommodating cavity 5, the plurality of filter tips are connected by the filtering part 4 and / or the aerosol generating matrix accommodating cavity 5, and the joint 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 first cut the filter-tip rod into a plurality of filter tips, and place the aerosol generating matrix accommodating cavity 5 vertically upward. That is, the axial length of the filtering part at the connection 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 connection is twice that of the aerosol generating matrix accommodating cavity in a single filter tip, so that each filter tip has a complete set of a filtering part and an aerosol generating matrix accommodating cavity after cutting.

[0036] Preferably, in step 2, the flowing aerosol generation materials include smoking raw materials, smoking additives and solvents, the smoking raw materials are pre-crushed and pass through a 40-200 mesh sieve, and the sifted smoking raw materials are mixed with smoking additives and solvents in a certain proportion to form a paste-like flowing aerosol generating material;

[0037] Preferably, in step 2, the filling amount of the flowing aerosol generating material is 50-95% of the volume of the aerosol generating matrix accommodating cavity 5, more preferably 90%.

[0038] Preferably, in step 2, the flowing aerosol generating material is also provided with a binder, and the flowing aerosol generating material is bonded to the inner wall of the outer sleeve 1 with its own binder during drying and expansion. The binder is selected from chitosan, hydroxyethyl composite modified ethyl cellulose, guar gum, carboxymethyl cellulose, starch, modified starch, plant cellulose, microcrystalline cellulose, hydroxyethyl cellulose, hydroxyethyl methyl cellulose.

[0039] Preferably, in step 2, the flowing aerosol generating material is squeezed into the aerosol generating matrix accommodating cavity 5 while adhering to the inner surface of the outer sleeve 1, and the squeezed flowing aerosol generating material forms a central hollow cavity, which is the volume reserved for expansion of the aerosol generating material; or.

[0040] 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 adhering to the inner surface of the outer sleeve 1, and the squeezed first part of the aerosol generating material forms a central hollow cavity, and a second part of the aerosol generating material is squeezed into the central hollow cavity, there is a gap between the first and the second part of the aerosol generating material, which is the volume reserved for expansion of the aerosol generating material.

[0041] 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 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.

[0042] 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.

[0043] Compared with the prior art, the present disclosure has the following beneficial effects:

1. The outer layer of the plugging part of the present disclosure is a groove corrugated tube wall, the axial hollow cavity formed by the groove structure can be used as an airflow channel for aerosol circulation, further, an aroma-enhancing material layer and/ or a smoking layer is provided on the groove corrugated layer 213, to further supplement aroma of the aerosol passing through and increase smoke amount. The multi-layer groove corrugated layers support each other, so that more airflow channels can be reserved as much as possible while ensuring plugging of aerosol generating materials. The present disclosure eliminates the multi-hole firmware section for the first time, combining the groove corrugated part with the bulk aerosol source-material granules, as the tube wall of the groove corrugated structure and the plugging structure in the tube cavity can play the role of constraining of aerosol source-material granules, the multi-hole firmware is not needed.

2. A convergent sheet rod 221 is provided in the tube cavity of the plugging part of the present disclosure, the volume of the convergent sheet rod 221 accounts for 30-80% of that of the tube cavity 22, the convergent sheet rod can block granular aerosol generating materials, but also reserve more airflow channels as much as possible. Further, the convergent sheet rod divides the central hollow cavity into a plurality of airflow channels, which can disperse aerosol, and the large contact area between the sheet rod and aerosol can facilitate reduction of aerosol temperature. The structure can ensure the effect of plugging, cooling and resistance at the same time. More importantly, the volume of the convergent sheet rod 221 of the present disclosure accounts for 30-80% of that of the tube cavity 22 (before smoking), when exceeding the filling amount, suction resistance may increase greatly; when it is below the filling amount, it is difficult to block aerosol generating materials while cooling aerosol.

3. In the preferred embodiment of the present disclosure, the convergent sheet rod 221 deforms when the temperature reaches 120°C. That is, during smoking, the convergent sheet rod shrinks by heat and blocks part of central airflow, as the diameter of the airflow channel changes, more aerosols flow into the groove corrugated structure of the tube wall, and the groove corrugated layer 213 is also provided with an aroma-enhancing material layer and / or a smoking material layer, so that more aerosols can be in contact with aroma-enhancing materials and / or smoking materials, thereby further improving effect of aerosol flavoring and increasing smoke amount.

[0044] As for the preparation method:

4. Each unit except the aerosol generating granule section is formed by rolling and compounding in the present disclosure, a hollow cavity that can be filled with aerosol generating material is reserved during compounding, cutting is carried out as needed after compounding, and the filter rod filled with aerosol generating matrix accommodating cavity 5 after cutting is placed vertically, the aerosol generating material is filled into the aerosol generating matrix accommodating cavity 5, as both 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 the axial position, so as to ensure consistency of axial lengths of the hollow cavity section 3 of different samples.

5. As the plugging part 2 and filtering part 4 are formed by compounding and rolling, the binder can be more easily applied 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.

6. Compounding and then filling is used to prepare aerosol generating products in the present disclosure, which can simultaneously compound a plurality of filter tips, and filling the aerosol generating materials after cutting, except

for the aerosol generating material, other units are prepared by compounding, efficiency of each unit is greatly improved compared with individual filling.

7. The flowing aerosol generating material is filled through squeezing in the present disclosure, then 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 matrix 6 in the aerosol generating matrix accommodating cavity 5, production efficiency is higher by squeezing, and the aerosol generating rod 6 obtained after drying and expansion 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 away from the filtering part even.

DRAWINGS OF THE DESCRIPTION

[0045]

FIG. 1 is a structural schematic view of a filter-tip rod with two filter tips before cutting in embodiment 1 and embodiment 3, 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 and embodiment 4, the dotted line in the figure is the cutting position;

FIG.3 is a structural schematic view of the aerosol generating product prepared in embodiment 1.

FIG.4 is a cross-sectional view of the plugging part close to the aerosol generating matrix.

[0046] List of the reference signs of figures in the description of figures: 1-Outer sleeve, 2-Plugging part, 3-Hollow cavity structure, 4-Filtering part, 5-Aerosol generating matrix accommodating cavity, 6-Aerosol generating matrix, 21-Tube wall, 22-Tube cavity, 31-Air vent, 32-Empty-tube part, 211-Outer layer, 212-Inner layer, 213-Groove corrugated layer, 221-Convergent sheet rod.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0047] The present disclosure is further illustrated through specific embodiments.

[0048] 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.

[0049] 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.

[0050] 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.

[0051] 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.

[0052] 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

[0053] Multi-sectional aerosol generating products are prepared according to the preparation method 2, including the following steps:

Step 1, preparation of the filter-tip rod,

An outer sleeve 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 hollow cavity section 3 limited by the outer sleeve 1,
One end of plugging part 2 far away from the hollow cavity section 3 is an aerosol generating matrix accommodating cavity 5 limited by the outer sleeve 1;

Step 2, filling of aerosol generating materials:
Place the filter-tip rod in a vertical state, that is, perpendicular to the horizontal plane, wherein, the aerosol generating matrix accommodating cavity 5 is vertically upward, the flowing aerosol generating material is squeezed into the aerosol generating matrix accommodating cavity 5;
Step 3, forming of the 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 matrix 6 in the aerosol generating matrix accommodating cavity 5.

[0054] In step 2, the flowing aerosol generating material is loaded into the aerosol generating matrix accommodating cavity 5 by extrusion; in step 1, the filter-tip rod is prepared in a horizontal state by using the existing compounding machine.
[0055] In step 1, the filter-tip rod can be divided into two filter tips, and the two filter tips are connected by the aerosol generating matrix accommodating cavity 5; at this time, there is also a cutting step between step 1 and step 2, which is cut at the connected aerosol generation matrix accommodating cavity 5, 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 has a complete aerosol generating matrix accommodating cavity after cutting.
[0056] In step 2, the flowing aerosol generation materials include smoking raw materials, smoking additives and solvents, the smoking raw materials are pre-crushed and pass through a 40-200 mesh sieve, and the sifted smoking raw materials are mixed with smoking additives and solvents in a certain proportion to form a paste-like flowing aerosol generating material;
[0057] In step 2, the filling amount of the flowing aerosol generating material is 90% of the volume of the aerosol generating matrix accommodating cavity 5.
[0058] In step 2, the flowing aerosol generating material is also provided with a binder inside, and the flowing aerosol generating material is bonded to the inner wall of the outer sleeve 1 with its own binder during drying and expansion. The binder is selected from carboxymethyl cellulose.
[0059] In step 2, the flowing aerosol generating material is squeezed into the aerosol generating matrix accommodating cavity 5 while adhering to the inner surface of the outer sleeve 1, and the squeezed flowing aerosol generating material forms a central hollow cavity, which is a volume reserved for expansion of the aerosol generating material.
[0060] In step 3, the drying temperature depends on the solvent in the aerosol generating material, in this embodiment, the solvent is water, the drying temperature is 60°C, with drying time of 1h.
[0061] The hollow cavity section 3 also includes an empty-tube part inside, which can be made of paper. An air vent 31 that axially penetrates the outer sleeve 1 is provided on the outer sleeve 1 in the hollow cavity section 3. When an empty-tube part is provided inside the hollow cavity section 3, the air vent 31 penetrates through the outer sleeve 1 and the empty-tube part.
[0062] There is a binder between the outer surface of the plugging part 2 and the inner surface of the outer sleeve 1, and there is a binder between the outer surface of the filtering part 4 and the inner surface of the outer sleeve 1.
[0063] The outer sleeve is made of paper.
[0064] The aerosol generating product with a composite plugging part prepared by the embodiment includes an integrated outer sleeve 1, as well as an aerosol generating matrix 6, a plugging part 2, a hollow cavity structure 3 and a filtering part 4 located in the outer sleeve 1;
[0065] The plugging part 2 includes a tube wall 21 and a tube cavity 22, the tube wall 21 has a groove corrugated structure, including an outer layer 211, an inner layer 212 and a groove corrugated layer 213 located between them. The outer layer 211 limits the outer surface of the plugging part 2, and the inner layer 212 limits the tube cavity 22;
[0066] The tube cavity 22 has a convergent sheet rod 221 inside, the convergent sheet rod deforms when the tem-

perature reaches 120-180°C. More preferably, deformation occurs when the temperature reaches 120°C. That is, the plugging part 2 of the present disclosure has its own outer layer 211 instead of taking the outer sleeve 1 as the outer layer.

[0067] The convergent sheet rod 221 is converged by heat-shrinkable materials. The heat shrinkable materials are selected from polylactic acid. The volume of the convergent sheet rod 221 accounts for 45% of that of the tube cavity 22, that is, the filling amount of the polylactic acid sheet in the tube cavity 22 is 45%.

[0068] The outer layer 211 and the inner layer 212 are made of paper material; the groove corrugated layer 213 is made of non-woven fabric with groove structure; the space layer 221 is made of non-woven fabric.

[0069] The cross section of the groove in the groove corrugated layer 213 is of a "V" type.

[0070] The groove corrugated layer 213 is also provided with an aroma-enhancing material layer and a smoking-material layer.

Embodiment 2

[0071] The multi-sectional aerosol generating products are prepared in this embodiment according to the preparation method 2, the differences between this embodiment and embodiment 1 are as follows: 1. In step 1, the filter-tip rod can be divided 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, to cut the filter-tip rod into four filter tips. The axial length of the filtering part at the joint is twice that of the filter in a single filter tip, similarly, the axial length of the aerosol generating matrix accommodating cavity reserved at the joint is twice that of the aerosol generating matrix accommodating cavity in a single filter tip, so that each filter tip has a complete set of a 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 adhering to the inner surface of the outer sleeve 1, and the squeezed first part of the aerosol generating material forms a central hollow cavity, a second part of the aerosol generating material is squeezed into the central hollow cavity, there is a gap between the first and the second part of the aerosol generating material, which is the volume reserved for expansion of the aerosol generating material.

Embodiment 3

[0072] In the embodiment, the multi-sectional aerosol generating product prepared by the preparation method 1, the structure of the plugging part in the aerosol generating product is the same as that in embodiment 1, including the following steps:

Step 1, preparation of filter-tip rod:

An outer sleeve 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 hollow cavity section 3 limited by the outer sleeve 1,
One end of the plugging part 2 far away from the hollow cavity section 3 forms an aerosol generating matrix accommodating cavity 5 limited by the outer sleeve 1.

Step 2, filling of the aerosol generating matrix 6:
The filter-tip rod is in a vertical state, wherein the aerosol generating matrix accommodating cavity 5 is vertically upward, and the aerosol generating matrix 6 is filled into the aerosol generating matrix accommodating cavity 5.

[0073] The filter-tip rod in step 1 is prepared in a horizontal state.

[0074] In step 2, the aerosol generating matrix 6 is granular. In this case, there is also a sealing step after step 2, so that the aerosol generating matrix accommodating cavity 5 containing the aerosol generating matrix 6 away from the end face of the filtering section can form a sealing film 7.

[0075] In step 1, the filter-tip rod can be divided into two filter tips, and the two filter tips are connected by the aerosol generating matrix accommodating cavity 5; at this time, there is also a cutting step between step 1 and step 2, which is cut at the connected aerosol generation matrix accommodating cavity 5, 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 has a complete aerosol generating matrix accommodating cavity after cutting.

[0076] The hollow cavity section 3 also includes an empty-tube part inside, which can be made of paper. An air vent 31 that axially penetrates the outer sleeve 1 is provided on the outer sleeve 1 in the hollow cavity section 3. When an

empty-tube part is provided inside the hollow cavity section 3, the air vent 31 penetrates through the outer sleeve 1 and the empty-tube part.

[0077] There is a binder between the outer surface of the plugging part 2 and the inner surface of the outer sleeve 1, and there is a binder between the outer surface of the filtering part 4 and the inner surface of the outer sleeve 1.

[0078] The outer sleeve 1 is made of paper.

Embodiment 4

[0079] The multi-sectional aerosol generating products are prepared in this embodiment according to the preparation method 1, the differences between this embodiment and embodiment 3 are as follows: 1. In step 1, the filter-tip rod can be divided 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, to cut the filter-tip rod into four filter tips. The axial length of the filtering part at the connection is twice that of the filter in a single filter tip, similarly, the axial length of the aerosol generating matrix accommodating cavity reserved at the connection is twice that of the aerosol generating matrix accommodating cavity in a single filter tip, so that each filter tip has a complete set of a filtering part and an aerosol generating matrix accommodating cavity after cutting. 2. the aerosol generating matrix 6 in step 2 is paste-like, in this case, the sealing step is not needed.

Embodiment 5

[0080] The difference between this embodiment and embodiment 1 lies only in that, the volume of the convergent sheet rod 221 in this embodiment accounts for 90 % of the volume of the tube cavity 22, that is, the filling amount of the polylactic acid sheet in the tube cavity 22 is 90 %.

[0081] Sensory evaluation is performed on the aerosol generating products prepared by embodiment 1 and embodiment 5, and the scores are shown in Table 1.

[0082] The basis is Q/YNZYJ07.022.

Table 1 Sensory evaluation scores of various aerosol generating products during smoking

Sample	Smoke amount 10	Fragrances 30	Strength 10	Harmony 10	Irritant 15	Taste 25	Total 100
Embodiment 1	9.0	26.5	9.0	8.5	12.0	22.0	87.0
Embodiment 5	6.0	25.0	8.0	8.0	11.5	21.0	79.5

[0083] It can be seen from table 1 that, there are insignificant differences between aerosol generating products in embodiment 1 and embodiment 5 in terms of fragrances, irritant improvement, strength, harmony and taste, however, smoke amount of aerosol generating products in embodiment 5 during smoking is far less than that in embodiment 1, the reason lies in that, the volume of the convergent sheet rod 221 in embodiment 5 accounts for 90% of that of the tube cavity 22, that is, the volume of the airflow channel accounts for 10% before smoking, the convergent sheet rod 221 deforms by heat during smoking, blocking most of the airflow channels, aerosol can only pass through the groove corrugated structure of the tube wall, resulting in a significant decrease in the smoke amount, the small amount of smoke may result in bad performances in fragrances, irritant improvement, strength, harmony and taste. Besides, during smoking, sensory evaluators also obviously feel that suction resistance of aerosol generating products in embodiment 5 is large with poor smoking feeling. Thus, in actual smoking, deformation of the convergent sheet rod 221 by heat may properly block part of the central airflow channel, so that aerosol can pass through the groove corrugated layer to improve aroma-enhancing effect, however, it may also lead to reduction of airflow channels; thus, it is necessary to take into account effects of smoke amount and aroma enhancement. The volume of the convergent sheet rod 221 in the present disclosure accounts for 30-80% of that of the tube cavity 22.

Claims

1. An aerosol generating product with a composite plugging part, wherein, the product comprises an integrated outer sleeve (1), an aerosol generating matrix (6), a plugging part (2), a hollow cavity structure (3) and a filtering part (4) located inside the outer sleeve (1);

The plugging part (2) comprises a tube wall (21) and a tube cavity (22), the tube wall (21) has a groove corrugated structure, comprising an outer layer (211), an inner layer (212), and a groove corrugated layer (213) between them; the outer layer (211) limits the outer surface of the plugging part (2), and the inner layer (212) limits the tube cavity (22);
A convergent sheet rod (221) is provided inside the tube cavity (22).

2. The aerosol generating product with a composite plugging part of claim 1, wherein, the convergent sheet rod (221) is formed by converging sheet materials, the volume of the convergent sheet rod (221) accounts for 30-80% of that of the tube cavity (22).

3. The aerosol generating product with a composite plugging part of claim 2, wherein, the sheet materials comprise heat-shrinkable and non-heat-shrinkable materials, the heat-shrinkable materials are selected from polymer materials or cellulose acetate, the polymer materials comprise polylactic acid and polycarbonate, the non-heat-shrinkable material is selected from paper;
The convergent sheet rod (221) selected from the heat-shrinkable material can deform when the temperature reaches 120-180°C.

4. The aerosol generating product with a composite plugging part of claim 1, wherein, the outer layer (211) is selected from paper material; the inner layer (212) is selected from tow or folded sheet material, the tow materials include acetate fiber tow and polylactic acid tow, the folded sheet materials include paper, reconstituted tobacco or polymer material sheet; the groove corrugated layer (213) is selected from paper or non-woven fabric with groove structure.

5. The aerosol generating product with a composite plugging part of claim 1, wherein, the cross section of the groove in the groove corrugated layer (213) is of a "U" type or "V" type;
The groove corrugated layer (213) is also provided with an aroma-enhancing material layer and / or a smoking material layer.

6. The aerosol generating product with a composite plugging part of claim 1, wherein, the hollow cavity structure (3) is also provided with functional materials; and / or.
The hollow cavity structure (3) is also provided with an empty-tube part (32).

7. The aerosol generating product with a composite plugging part of claim 1, wherein, the hollow cavity structure (3) in the outer sleeve (1) is provided with an air vent (31) radially penetrating the outer sleeve (1).

8. The aerosol generating product with a composite plugging part of claim 1, wherein, there is a binder between the outer surface of the plugging part (2) and the inner surface of the outer sleeve (1), and there is a binder between the outer surface of the filtering part (4) and the inner surface of the outer sleeve (1).

9. The aerosol generating product with a composite plugging part of claim 1, wherein, the aerosol generating matrix (6) is flaky, filamentous, granular, paste-like or rod-like with its own pore structure.

10. The aerosol generating product with a composite plugging part of claim 9, wherein, when the aerosol generating matrix (6) is granular and paste-like, the preparation method of the aerosol generating product comprises the following steps:

Step 1, preparation of filter-tip rod:

An outer sleeve (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 hollow cavity section (3) limited by the outer sleeve (1),
One end of plugging part (2) far away from the hollow cavity section (3) is an aerosol generating matrix accommodating cavity (5) limited by the outer sleeve (1);

Step 2, filling of an aerosol generating matrix (6):

The filter-tip rod is in a vertical state, wherein the aerosol generating matrix accommodating cavity (5) is vertically upward, and an aerosol generating matrix is filled into the aerosol generating matrix accommodating cavity (5);

When the aerosol generating matrix (6) is rod-like with its own pore structure, the preparation method of the aerosol generating product comprises the following steps:

Step 1, preparation of filter-tip rod:

An outer sleeve (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 hollow cavity section (3) limited by the outer sleeve (1),
One end of plugging part (2) far away from the hollow cavity section (3) is an aerosol generating matrix accommodating cavity (5) limited by the outer sleeve (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 squeezed into the aerosol generating matrix accommodating cavity (5);
Step 3, forming of an aerosol generating matrix (6):
Rotate the filter-tip rod filled with the 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 matrix (6) in the aerosol generating matrix accommodating cavity (5).

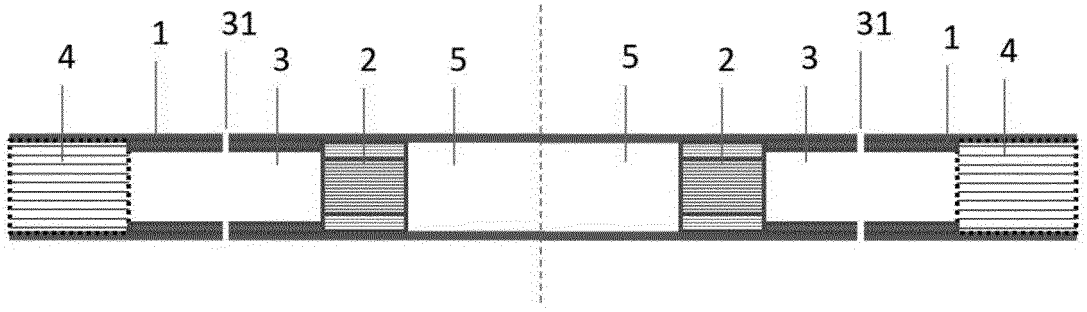

FIG.1

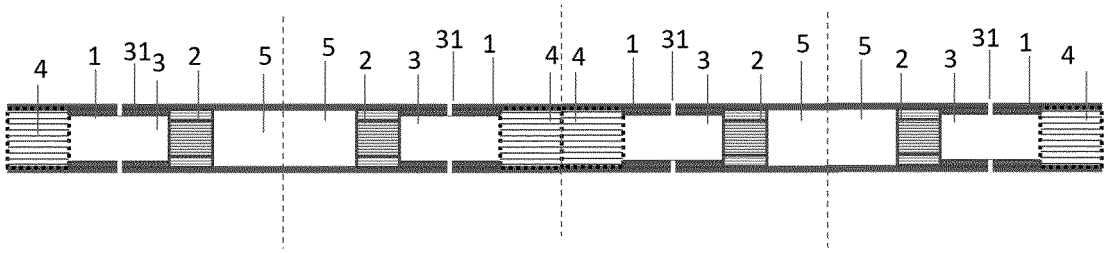

FIG.2

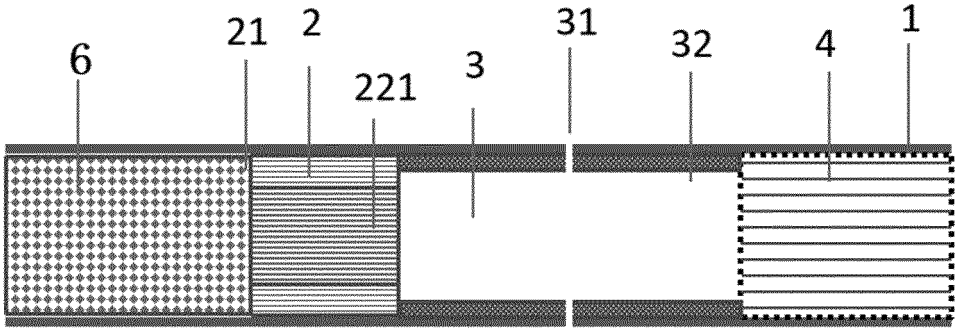

FIG.3

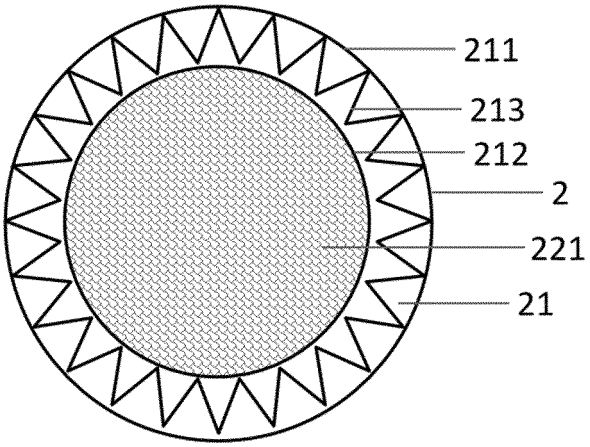

FIG.4

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2022/100623

A. CLASSIFICATION OF SUBJECT MATTER

A24F 40/40(2020.01)i; A24F 40/20(2020.01)i; A24F 40/70(2020.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A24F 40/-

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)

CNABS, CNPAT, TWABS, CNTXT, TWTXT, CNKI, DWPI, SIPOABS, USTXT, EPTXT, WOTXT: 赵杨, 李雪梅, 秦云华, 杨柳, 者为, 张建荣, 段沅杏, 向能军, 龚为民, 夏建军, 申钦鹏, 雷萍, 李世卫, 巩效伟, 郭丁荣, 云南中烟, 复合, 封堵, 气溶胶, 一体式, 外管, 基质, 空腔结构, 过滤件, 管壁, 管腔, 沟槽瓦楞, 外层, 内层, 外表面, 聚拢片材棒, 受热, 收缩, 气流, 增香, 发烟, 烟雾, aerosol, integrat, outer tube, substrate, plug, piece, cavity, filter, wall, groove, corrugat, outer layer, inner, surface, gather, sheet bar, shrink, heat, block, airflow, contact, aroma, supple, smoke

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	CN 114468351 A (CHINA TOBACCO YUNNAN INDUSTRIAL CO., LTD.) 13 May 2022 (2022-05-13) description, paragraphs [0057]-[0073], and figures 1-7	1-10
Y	CN 113925233 A (CHANGZHOU FENGYUAN BIOLOGICAL TECHNOLOGY CO., LTD.) 14 January 2022 (2022-01-14) description, paragraphs [0026]-[0046], and figures 1-5	1-10
Y	CN 112716031 A (CHINA TOBACCO JIANGXI INDUSTRIAL CO., LTD.) 30 April 2021 (2021-04-30) description, paragraphs [0031]-[0095], and figures 1-5	10
A	CN 113925196 A (CHINA TOBACCO YUNNAN INDUSTRIAL CO., LTD.) 14 January 2022 (2022-01-14) entire document	1-10
A	CN 109527638 A (CHINA TOBACCO ANHUI INDUSTRIAL CO., LTD.) 29 March 2019 (2019-03-29) 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
08 December 2022	**23 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.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2022/100623

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	WO 2022095189 A1 (YUNNAN XIKE SCIENCE & TECHNOLOGY CO., LTD.) 12 May 2022 (2022-05-12) entire document	1-10
A	CN 109998160 A (CHINA TOBACCO YUNNAN INDUSTRIAL CO., LTD.) 12 July 2019 (2019-07-12) entire document	1-10
A	CN 114568743 A (CHINA TOBACCO YUNNAN INDUSTRIAL CO., LTD.) 03 June 2022 (2022-06-03) entire document	1-10

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

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2022/100623

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CN	113925233	A	14 January 2022	None			
CN	112716031	A	30 April 2021	None			
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CN	109527638	A	29 March 2019	RU	2767008	C1	16 March 2022
				WO	2020113796	A1	11 June 2020
				CN	209300265	U	27 August 2019
CN	216292984	U	15 April 2022	None			
WO	2022095189	A1	12 May 2022	TW	202218563	A	16 May 2022
				KR	20220064345	A	18 May 2022
				US	2022346438	A1	03 November 2022
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				WO	2020220592	A1	05 November 2020
CN	114568743	A	03 June 2022	CN	217284737	U	26 August 2022

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