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(54) **HEATING CIGARETTE WITH ADJUSTABLE TUBE WALL AIR PERMEABILITY AND AIR PERMEATION POSITION, AND ADJUSTMENT METHOD**

(57) The present disclosure discloses a heating cigarette with adjustable pipe-wall air permeability and permeation position, including a smoking segment (1) and a heating cigarette filter rod with natural permeability function, the heating cigarette filter rod with natural permeability function sequentially includes a smoke extraction segment (2) and a functional filter rod segment (3), the smoke extraction segment (2) has permeability func-

tion itself; a tipping paper (5) only partially wraps the smoke extraction segment (2), the outer part of the smoke extraction segment (2) close to the smoking segment (1) is only equipped with a shaping paper (4), without being wrapped by the tipping paper (5); the shaping paper (4) is permeable, while the tipping paper (5) is impermeable, the length and position of the tipping paper (5) are adjustable. Due to the heating cigarette structure of the

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present disclosure, air permeability and permeation position of the smoke extraction segment (2) can be adjusted by adjusting the size and position of the tipping paper (5) covering the area of the smoke extraction segment (2), thereby adjusting air permeability and permeation position of the heating cigarette.

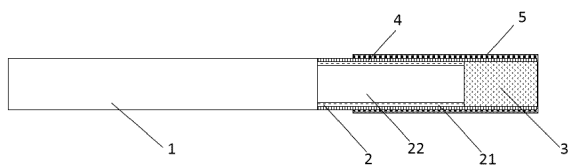


FIG. 3

Description**TECHNICAL FIELD**

5 **[0001]** The present disclosure belongs to the technical field of heating cigarette, and in particular, to a heating cigarette with adjustable pipe-wall air permeability and permeation position and an adjusting method therefor.

BACKGROUND

10 **[0002]** With consumers' increasing attention to health and demand for personalized experience of cigarette products, various heating cigarettes with reduced coke and harm have been developed as a continuous response to the upgrading of consumers' needs. Among which, heat-not-burning cigarettes can provide a healthier smoking experience while satisfying consumers' sensory requirements for cigarette products due to their different heating methods from traditional cigarette products.

15 **[0003]** Existing heating cigarettes mainly include a smoking core material segment, a hollow support segment, a cooling segment and a filter segment. In order to introduce air, increase ventilation volume and effectively reduce the temperature of the smoke, the method of online laser drilling is often used to perforate in the hollow support segment of the heating cigarette, and the pipe wall of the hollow support segment as well as the shaping paper and tipping paper wrapping the hollow support segment are perforated to form ventilation pores and introduce air; however, this method
20 still has the following problems: 1. The process of online laser drilling has higher requirements on the pipe-wall material and thickness of the hollow support segment, the material of the hollow support segment pipe wall can neither collapse during the process, nor be too thick to perforate during the process; 2. the process of online laser drilling has high requirements on laser power, in case laser drilling equipment fails to perforate the pipe wall of the hollow support segment, problems of unqualified heating cigarettes and overheating of smoke temperature may arise; 3. at present, ventilation
25 pores are formed by punching through the hollow support segment as well as the shaping paper and tipping paper wrapping the hollow support segment, outside air directly enters the hollow support segment through the ventilation pores, quick air introduction of ventilation pores, limited contact area between the introduced air and the smoke, and uneven mixing may result in an increase in the amount of smoke inhaled into the consumer's mouth, while smoke concentration is low as it is obviously mixed with a large amount of air, so that smoking quality is seriously affected.

30 **[0004]** Besides, problems of using physical perforation method to make the wall of heating cigarette pipe ventilate include nonadjustable permeability volume and fixed permeability position; as introduction of air through physical perforation only lies in where to perforate and where to introduce ambient air for ventilation and cooling, permeability rate is fixed with the size of the hole. However, as the smoking segment material or the adapted smoking apparatus changes, it is desirable that air permeability and permeation position of the heating cigarette can be adjusted.

35 **[0005]** Thus, it is desirable to design a heating cigarette that can ensure not only the cooling effect for the smoke, but also the smoking amount and the quality of the smoke, as well as air permeability and its volume of the heating cigarette can be adjusted.

[0006] The present disclosure is proposed to solve the above problems.

40 **SUMMARY**

[0007] A first aspect of the present disclosure provides a heating cigarette with adjustable pipe-wall air permeability and permeation position, the heating cigarette with adjustable pipe-wall air permeability and permeation position includes a smoking segment 1 and a heating cigarette filter rod with natural permeability function, the smoking segment and the
45 heating cigarette filter rod are assembled and molded by a shaping paper 4; a tipping paper 5 wraps around at least part of the outer side of the shaping paper 4 wrapping the heating cigarette filter rod with natural permeability function;

From the distal lip end to the proximal lip end, the heating cigarette filter rod with natural permeability function sequentially includes a smoke extraction segment 2 and a functional filter rod segment 3, the smoke extraction
50 segment 2 has permeability function itself, outside air can enter the interior of the heating cigarette through the smoke extraction segment 2;

The tipping paper 5 only partially wraps the smoke extraction segment 2, at least part of the outer part of the smoke extraction segment 2 close to the smoking segment 1 is only equipped with the shaping paper 4, without being wrapped by the tipping paper 5;

55 The shaping paper 4 is permeable, while the tipping paper 5 is impermeable, the length and position of the tipping paper 5 are adjustable.

[0008] Preferably, the smoke extraction segment 2 has a hollow structure, including a pipe wall 21 and a pipe cavity

22. The pipe wall 21 does not need to be perforated due to its permeability function, there are ventilation pores disposed inside the pipe wall 21, outside air can enter the pipe cavity 22 through the ventilation pores inside the pipe wall 21. Wherein, the cross-segmental area of the pipe cavity 22 is not limited to a circle, which can also be of any shape such as a triangle, a polygon, or a pentagram.

[0009] Preferably, the tipping paper 5 covers 1/6-5/6 of the axial length of the smoke extraction segment 2.

[0010] Preferably, air permeability of the shaping paper 4 is 1000-10000CU.

[0011] The pipe wall 21 is molded by particles adhesion and extrusion, and the voids among the particles after molding are used as the ventilation pores, the pipe wall 21 itself has a permeability function;

The particle diameter is 200-25000 microns; after the particles is molded into the pipe wall of a hollow pipe, the thickness of the pipe wall 21 is 1.0-2.0mm, and the voids among the particles in the pipe wall 21 are in dispersed form with a porosity of 50-80%.

[0012] Preferably, the particles are selected from organic particles or inorganic particles, among which the inorganic particles include aluminum oxide, zirconia, calcium carbonate, glass beads, silica, iron, copper, aluminum, gold, platinum, magnesium silicate balls or calcium sulfate; while organic particles include at least one of cellulose acetate, cellulose acetate propionate, cellulose acetate butyrate, microcrystalline cellulose, sucrose powder, dextrin, lactose, powdered sugar, glucose, mannitol, starch, methylcellulose, ethylcellulose, polylactic acid, polyethylene, polypropylene, polyhydroxybutyrate, poly(ϵ -caprolactone), polyglycolic acid, polyhydroxyalkanoate, starch-based thermoplastic resin.

[0013] Preferably, binders among particles include: at least one of polyethylene, polypropylene, polylactic acid, polyolefin, polyester, polyamide, polyacrylic acid polyvinyl compound, polytetrafluoroethylene, polyether ether ketone, polyethylene terephthalate, polybutylene terephthalate, polycyclohexamethylene terephthalate, polypropylene terephthalate, polyacrylate acid compounds, polymethyl methacrylate, acrylonitrile-butadiene-styrene, styrene-acrylonitrile, styrene-butadiene, styrene-maleic acid, cellulose acetate, cellulose acetate butyrate, plasticized cellulose plastic, cellulose propionate, or ethyl cellulose, or any derivative, copolymer as well as any combination thereof.

[0014] Preferably, the pipe wall 21 is made of a cellulose acetate tow, the filling amount of the cellulose acetate tow is based on medium cigarettes at this time, after the cellulose acetate tow forms the pipe wall of a hollow pipe, the thickness of the pipe wall 21 is 1.0-3.0mm. At this time, the filling amount of the acetate cellulose tow is based on medium cigarettes, and when its size of filter rod circumference is 19.8mm, 2000-4500 filaments are filled.

[0015] Preferably, the pipe wall 21 is made of an air-permeable ceramic material.

[0016] In other words, the shaping paper 4 in this heating cigarette structure has assembly function in the following two aspects: (1) the smoke extraction segment 2 and the functional filter rod segment 3 are assembled to form the heating cigarette filter rod with natural permeability function; (2) assembling the heating cigarette filter rod with natural permeability function and the smoking segment 1 to form a heating cigarette. However, the tipping paper does not play the role of assembly, it is used to control the permeability volume and position of the smoke extraction segment 2 through controlling the length of the tipping paper; meanwhile, the tipping paper can also print patterns and LOGO as conventional purposes.

[0017] A second aspect of the present disclosure provides a method for adjusting the heating cigarette with adjustable pipe-wall air permeability and permeation position of the first aspect of the present disclosure, air permeability and permeation position of the smoke extraction segment 2 can be adjusted by adjusting the size and position of the area of the smoke extraction segment 2 covered by the tipping paper 5, thereby adjusting air permeability and permeation position of the heating cigarette.

[0018] Besides, the heating cigarette filter rod with natural permeability function of the present disclosure is not limited to only include the smoke extraction segment 2 and the functional filter rod segment 3; according to actual needs, it can also be a ternary composite structure, other functional segments such as support segment, cooling segment, and aroma enhancement segment can be added.

[0019] Compared with the prior art, the present disclosure has the following beneficial effects:

1. The heating cigarette with adjustable pipe-wall air permeability and permeation position of the present disclosure, includes a smoke extraction segment 2 with permeability function itself, outside air can enter the inside of the heating cigarette through the smoke extraction segment 2; the tipping paper 5 only partially wraps the smoke extraction segment 2, the outer part of the smoke extraction segment 2 close to the smoking segment 1 is only equipped with the shaping paper 4, without being wrapped by the tipping paper 5; the shaping paper 4 is permeable, while the tipping paper 5 is impermeable, the length and position of the tipping paper 5 are adjustable, so that air permeability and permeation position of the smoke extraction segment 2 can be adjusted by adjusting the size and position of the area of the smoke extraction segment 2 covered by the tipping paper 5, thereby adjusting air permeability and permeation position of the heating cigarette. Due to the cigarette structure of the present disclosure, air permeability volume and position of the smoke extraction segment 2 can be more flexibly controlled through controlling the length of the tipping paper 5.

2. The heating cigarette filter rod with natural permeability function of the present disclosure includes a smoke

extraction segment 2, wherein the pipe wall 21 of the smoke extraction segment 2 does not need to be perforated due to its permeability, there are ventilation pores inside the pipe wall 21, outside air can enter the pipe cavity 22 through the ventilation pores inside the pipe wall 21; in other words, the pipe wall 21 itself has pores with natural ventilation effect, the shaping paper 4 and the tipping paper 5 are used together to achieve permeability of the pipe wall of the cooling segment, outside air enters the inside of the heating cigarette through the pores to mix with the smoke, so as to achieve the purpose of introducing air into the inside of the heating cigarette without perforating while avoiding the problems caused by perforating on the pipe wall 21 of the smoke extraction segment 2.

3. In the preferred embodiment of the present disclosure, the pipe wall 21 is molded by particles adhesion and extrusion, the voids among particles play a role of natural ventilation after molding; after the particles form a hollow pipe, the voids among the particles in the pipe wall are dispersed, compared with directly perforating the cooling segment, the air introduced into the smoke extraction segment filled with particles of the present disclosure is more dispersed, while ensuring that the amount of air introduced is enough for cooling, the air can also be uniformly introduced into the heating cigarette, so that the air introduced and smoke are mixed more evenly, thus solving the problem of poor smoke quality due to uneven mixing of air and smoke, just like the drilling process mentioned before, which only guarantees the introduction of a large amount of air to achieve the cooling effect.

4. In case the particles are used in solid cooling rods, although the cooling effect is good, the smoke must pass through the particle pores in the solid cooling rods to reach the filter tip for consumers to smoke, leading to a large amount of smoke adsorption of the solid cooling rods. In the present disclosure, while introducing air to reduce the temperature of the smoke, selection of particle materials is also critical. The particle materials of the present disclosure are selected from those with a cooling effect, when the smoke passes through, the pipe wall material of the smoke extraction segment can also cool down the smoke.

5. In the preferred embodiment of the present disclosure, the pipe wall 21 is an acetate cellulose tow, which is not the traditional acetate tow used for filters, the acetate tow used for the pipe wall 21 of the present disclosure is based on medium cigarettes, making the acetate tow itself porous and permeable, like a window screen with grid. Compared with directly perforating the cooling segment, the air introduced into the smoke extraction segment of the acetate tow is more dispersed, while ensuring that the amount of air introduced is enough for cooling, the air can also be uniformly introduced into the heating cigarette, so that the air introduced and smoke are mixed more evenly, thus solving the problem of poor smoke quality due to uneven mixing of air and smoke, just like the drilling process mentioned before, which only guarantees the introduction of a large amount of air to achieve the cooling effect.

6. In the preferred embodiment of the present disclosure, the pipe wall 21 can also be made of a permeable ceramic material with permeability function while providing support.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020]

FIG.1 is a structural schematic view of the actual effect of the smoke extraction segment in the heating cigarette of Embodiment 1; wherein the pipe wall of the smoke extraction segment 2 is molded by particle bonding and extrusion; FIG.2 is a structural schematic view of the theoretical effect of smoke extraction segment in the heating cigarette of Embodiment 1;
FIG.3 is a structural schematic view of the heating cigarette in Embodiment 1 of the present disclosure;
FIG.4 is the structural schematic view of the heating cigarette in Embodiment 2;

[0021] The names of reference signs in the description of figures are as follows: 1. Smoking segment, 2. Smoke extraction segment, 3. Functional filter rod segment, 4. Shaping paper, 5. Tipping paper; 21. Pipe wall, 22. Pipe cavity.

DETAILED DESCRIPTION OF THE EMBODIMENT

[0022] The present disclosure will be further explained below through specific embodiment.

[0023] 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 the manufacturer, they are all ordinary products that can be obtained through purchase.

[0024] 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 their 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.

[0025] 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.

[0026] 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.

[0027] 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

[0028] As shown in FIGS. 1-3, the embodiment shows a heating cigarette sample 1 with adjustable pipe-wall air permeability and permeation position, the heating cigarette with adjustable pipe-wall air permeability and permeation position includes a smoking segment 1 and a heating cigarette filter rod with natural permeability function, the smoking segment and the filter rod are assembled and molded by a shaping paper 4; a tipping paper 5 wraps around the outer side of the shaping paper 4 wrapping the heating cigarette filter rod with natural permeability function;

From the distal lip end to the proximal lip end, the heating cigarette filter rod with natural permeability function sequentially includes a smoke extraction segment 2 and a functional filter rod segment 3, the smoke extraction segment 2 has permeability function itself, outside air can enter the interior of the heating cigarette through the smoke extraction segment 2;

The tipping paper 5 only partially wraps the smoke extraction segment 2, the outer part of the smoke extraction segment 2 close to the smoking segment 1 is only equipped with the shaping paper 4, without being wrapped by the tipping paper 5;

The shaping paper 4 is permeable, while the tipping paper 5 is impermeable, the length and position of the tipping paper 5 are adjustable.

[0029] The smoke extraction segment 2 has a hollow structure, including a pipe wall 21 and a pipe cavity 22. The pipe wall 21 does not need to be perforated due to its permeability function, there are ventilation pores disposed inside the pipe wall 21, outside air can enter the pipe cavity 22 through the ventilation pores inside the pipe wall 21.

[0030] The tipping paper 5 covers 1/2 of the axial length of the smoke extraction segment 2. The air permeability of the shaping paper 4 is 1000CU.

[0031] The pipe wall 21 is molded by particle bonding and extrusion, the voids among the particles after molding play a role of natural ventilation.

[0032] The particle diameter is 200-25000 microns; after the particles is molded into the pipe wall of a hollow pipe, the thickness of the pipe wall 21 is 1.5 mm, the voids among the particles in the pipe wall 21 are in dispersed form with a porosity of 50%. The particles are selected from inorganic particles of aluminum oxide. The binder between particles is polylactic acid.

Embodiment 2

[0033] As shown in FIG. 4, the embodiment shows a heating cigarette sample 2 with adjustable pipe-wall air permeability and permeation position, the heating cigarette with adjustable pipe-wall air permeability and permeation position includes a smoking segment 1 and a heating cigarette filter rod with natural permeability function, the smoking segment and the filter rod are assembled and molded by a shaping paper 4; a tipping paper 5 wraps around the outer side of the shaping paper 4 wrapping the heating cigarette filter rod with natural permeability function;

From the distal lip end to the proximal lip end, the heating cigarette filter rod with natural permeability function

sequentially includes a smoke extraction segment 2 and a functional filter rod segment 3, the smoke extraction segment 2 has permeability function itself, outside air can enter the interior of the heating cigarette through the smoke extraction segment 2;

The tipping paper 5 only partially wraps the smoke extraction segment 2, the outer part of the smoke extraction segment 2 close to the smoking segment 1 is only equipped with the shaping paper 4, without being wrapped by the tipping paper 5;

The shaping paper 4 is permeable, while the tipping paper 5 is impermeable, and the length and position of the tipping paper 5 are adjustable.

[0034] The smoke extraction segment 2 has a hollow structure, including a pipe wall 21 and a pipe cavity 22. The pipe wall 21 does not need to be perforated due to its permeability, there are ventilation pores disposed inside the pipe wall, outside air can enter the pipe cavity 22 through the ventilation pores inside the pipe wall 21.

[0035] The tipping paper 5 covers 1/3 of the axial length of the smoke extraction segment 2.

[0036] The pipe wall 21 is made of a cellulose acetate tow, and the filling amount of the cellulose acetate tow is based on medium cigarettes at this time, after the cellulose acetate tow forms the pipe wall of the hollow pipe, the thickness of the pipe wall 21 is 1.0mm. At this time, the filling amount of the acetate cellulose tow is based on medium cigarettes, and when its size of filter rod circumference is 19.8mm, 2833 filaments are filled.

Embodiment 3

[0037] For the heating cigarette sample 1 prepared in Embodiment 1 and the heating cigarette sample 2 prepared in Embodiment 2, according to QYNZYJ07.022-2015 standard, 20 professional sensory evaluation personnel at or above the provincial level are asked to smoke the cigarette samples, after evaluation, the scores are averaged, so that the following table 1 can be obtained.

Table 1 Sensory Quality Record of New Cigarettes

Standard basis: QYNZY.J07.022-2015																					
Item		Amount of smoke 10			Fragrance and aroma 30			Impact 10			Harmony 10			Irritation 15			Taste 25			Total 100	
		I	II	III	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III		
No.	Sample category	10	8	6	30	25	20	10	8	6	10	8	6	15	12	9	25	22	20		
1	Sample 1	8.5			27.5			8.5			8.5			13.5			23.5				90.0
2	Sample 2	8.5			27.0			8.5			8.5			13.5			23.0				89.0

[0038] It can be seen from Table 1 above that Sample 1 is better than Sample 2 in terms of aroma and taste as air permeability amount in Sample 2 is larger than that in Sample 1, resulting in a larger amount of air introduced, thereby reducing the aroma and fragrance of the smoke itself; thus, the permeability volume and position of the smoke extraction segment should be adjusted appropriately according to different smoking core materials.

Claims

1. A heating cigarette with adjustable pipe-wall air permeability and permeation position, **characterized in that**, the heating cigarette with adjustable pipe-wall air permeability and permeation position comprises a smoking segment (1) and a heating cigarette filter rod with natural permeability function, the smoking segment and the heating cigarette filter rod are assembled and molded by a shaping paper (4); a tipping paper (5) wraps around at least part of the outer side of the shaping paper (4) wrapping the heating cigarette filter rod with natural permeability function;

From the distal lip end to the proximal lip end, the heating cigarette filter rod with natural permeability function sequentially comprises a smoke extraction segment (2) and a functional filter rod segment (3), the smoke extraction segment (2) has permeability function itself, outside air can enter the interior of the heating cigarette through the smoke extraction segment (2);

The tipping paper (5) only partially wraps the smoke extraction segment (2), at least part of the outer part of the smoke extraction segment (2) close to the smoking segment (1) is only equipped with the shaping paper (4), without being wrapped by the tipping paper (5);

The shaping paper (4) is air permeable, while the tipping paper (5) is air impermeable, the length and position of the tipping paper (5) are adjustable.

2. The heating cigarette with adjustable pipe-wall air permeability and permeation position of claim 1, **characterized in that** the smoke extraction segment (2) has a hollow structure, comprising a pipe wall (21) and a pipe cavity (22), the pipe wall (21) does not need to be perforated due to its permeability function. there are ventilation pores disposed inside the pipe wall (21), outside air can enter the pipe cavity (22) through the ventilation pores inside the pipe wall (21).

3. The heating cigarette with adjustable pipe-wall air permeability and permeation position of claim 1, **characterized in that**, the tipping paper (5) covers 1/6-5/6 of the axial length of the smoke extraction segment (2).

4. The heating cigarette with adjustable pipe-wall air permeability and permeation position of claim 1, **characterized in that**, air permeability of the shaping paper (4) is 1000-10000CU.

5. The heating cigarette with adjustable pipe-wall air permeability and permeation position of claim 2, **characterized in that**, the pipe wall (21) is molded by particles adhesion and extrusion, and the voids among the particles after molding are used as the ventilation pores, so that the pipe wall (21) itself has a permeability function;

The particle diameter is 200-25000 microns; after the particles is molded into the pipe wall of a hollow pipe, the thickness of the pipe wall (21) is 1.0-2.0mm, and the voids among the particles in the pipe wall (21) are in dispersed form with a porosity of 50-80%.

6. The heating cigarette with adjustable pipe-wall air permeability and permeation position of claim 5, **characterized in that**, the particles are selected from organic particles or inorganic particles, among which the inorganic particles include aluminum oxide, zirconia, calcium carbonate, glass beads, silica, iron, copper, aluminum, gold, platinum, magnesium silicate balls or calcium sulfate; while organic particles include at least one of cellulose acetate, cellulose acetate propionate, cellulose acetate butyrate, microcrystalline cellulose, sucrose powder, dextrin, lactose, powdered sugar, glucose, mannitol, starch, methylcellulose, ethylcellulose, polylactic acid, polyethylene, polypropylene, polyhydroxybutyrate, poly(ϵ -caprolactone), polyglycolic acid, polyhydroxyalkanoate, starch-based thermoplastic resin.

7. The heating cigarette with adjustable pipe-wall air permeability and permeation position of claim 5, **characterized in that**, binders among particles comprise: at least one of polyethylene, polypropylene, polylactic acid, polyolefin, polyester, polyamide, polyacrylic acid polyvinyl compound, polytetrafluoroethylene, polyether ether ketone, polyethylene terephthalate, polybutylene terephthalate, polycyclohexamethylene terephthalate, polypropylene terephthalate, polyacrylate acid compounds, polymethyl methacrylate, acrylonitrile-butadiene-styrene, styrene-acrylonitrile, styrene-butadiene, styrene-maleic acid, cellulose acetate, cellulose acetate butyrate, plasticized cellulose plastic, cellulose propionate, or ethyl cellulose, or any derivative, copolymer as well as any combination thereof.

8. The heating cigarette with adjustable pipe-wall air permeability and permeation position of claim 1, **characterized in that**, the pipe wall (21) is made of a cellulose acetate tow, and the filling amount of the cellulose acetate tow is based on medium cigarette at this time, after the cellulose acetate tow forms the pipe wall of the hollow pipe, the thickness of the pipe wall (21) is 1.0-3.0mm.

9. The heating cigarette with adjustable pipe-wall air permeability and permeation position of claim 1, **characterized in that**, the pipe wall (21) is made of an air-permeable ceramic material.

10. A method for adjusting the heating cigarette with adjustable pipe-wall air permeability and permeation position of claim 1, **characterized in that**, air permeability and permeation position of the smoke extraction segment (2) can be adjusted by adjusting the size and position of the area of the smoke extraction segment (2) covered by the tipping paper (5), thereby adjusting air permeability and permeation position of the heating cigarette.

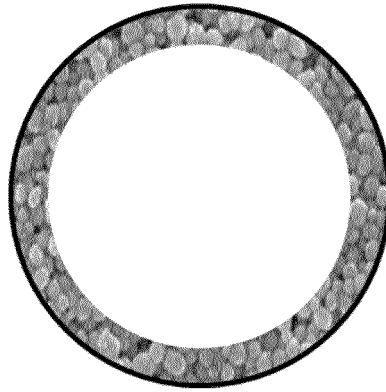


FIG. 1

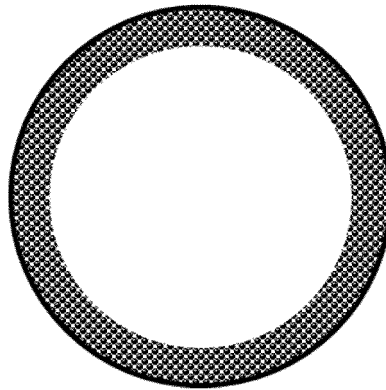


FIG. 2

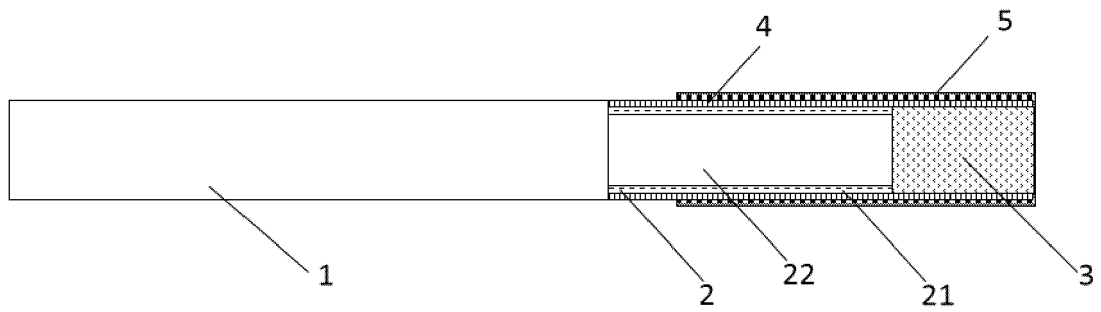


FIG. 3

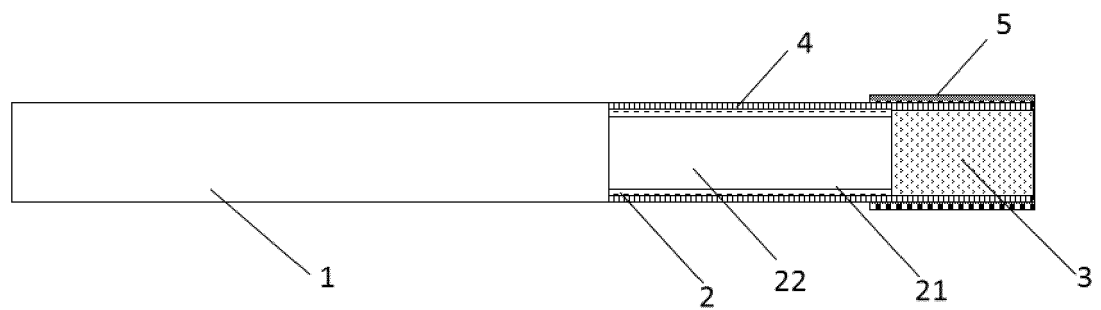


FIG. 4

TRANSLATION

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2021/098674

A. CLASSIFICATION OF SUBJECT MATTER

A24D 3/04(2006.01)i; A24D 3/14(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)

A24D3,A24D1

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)

VEN: CNABS; CNTXT: 卷烟, 烟支, 透气, 透气度, 发烟, 发烟段, 滤棒, 滤嘴, 成形纸, 成型纸, 接装纸, 包装纸, 烟气提取段, 支撑段, 支撑段, 降温段, 中空, 管状, 管, cigarette, air permeability, ventilated, smoke section, filter section, forming paper, tipping paper, smoke extracing section, support section, cooling section, hollow, tutular, pipe, tube

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	CN 109998161 A (CHINA TOBACCO YUNNAN INDUSTRIAL CO., LTD.) 12 July 2019 (2019-07-12) description, paragraph 6-paragraph 25, and figures 1-4	1-10
Y	CN 111449276 A (CHINA TOBACCO YUNNAN INDUSTRIAL CO., LTD.) 28 July 2020 (2020-07-28) description, paragraph 6-paragraph 23, and figures 1-3	1-10
A	CN 107087813 A (CHINA TOBACCO YUNNAN INDUSTRIAL CO., LTD.) 25 August 2017 (2017-08-25) entire document	1-10
A	CN 109527638 A (CHINA TOBACCO ANHUI INDUSTRIAL CO., LTD.) 29 March 2019 (2019-03-29) entire document	1-10
A	CN 111035059 A (NANTONG CELLULOSE FIBERS CO., LTD. et al.) 21 April 2020 (2020-04-21) entire document	1-10

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

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Date of the actual completion of the international search

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Name and mailing address of the ISA/CN

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TRANSLATION

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2021/098674

C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 108576928 A (HUBEI CHINA TOBACCO INDUSTRY CO., LTD.) 28 September 2018 (2018-09-28) entire document	1-10
A	CN 211241732 U (YUNNAN NANZHONG TECHNOLOGY CO., LTD.) 14 August 2020 (2020-08-14) entire document	1-10
A	CN 109619671 A (HUBEI CHINA TOBACCO INDUSTRY CO., LTD.) 16 April 2019 (2019-04-16) entire document	1-10
A	CN 105768214 A (CHINA TOBACCO YUNNAN INDUSTRIAL CO., LTD.) 20 July 2016 (2016-07-20) entire document	1-10
A	US 2007235049 A1 (PHILIP MORRIS USA INC.) 11 October 2007 (2007-10-11) entire document	1-10
A	JP 2019506868 A (PHILIP MORRIS PRODUCTS SOCIETA ANONIMA) 14 March 2019 (2019-03-14) entire document	1-10
E	CN 113197340 A (CHINA TOBACCO YUNNAN INDUSTRIAL CO., LTD.) 03 August 2021 (2021-08-03) description, paragraph 6-paragraph 25, and figure 4	1, 2, 4-10
E	CN 113197343 A (CHINA TOBACCO YUNNAN INDUSTRIAL CO., LTD.) 03 August 2021 (2021-08-03) description, paragraph 8-paragraph 31, and figures 1-3	1-10

TRANSLATION

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CN2021/098674

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN 109998161 A	12 July 2019	None	
CN 111449276 A	28 July 2020	None	
CN 107087813 A	25 August 2017	None	
CN 109527638 A	29 March 2019	WO 2020113796 A1	11 June 2020
		None	
CN 111035059 A	21 April 2020	None	
CN 108576928 A	28 September 2018	None	
CN 211241732 U	14 August 2020	None	
CN 109619671 A	16 April 2019	None	
CN 105768214 A	20 July 2016	None	
US 2007235049 A1	11 October 2007	WO 2007113695 A2	11 October 2007
		WO 2007113695 A3	20 March 2008
		None	
JP 2019506868 A	14 March 2019	EP 3422876 A1	09 January 2019
		EP 3422876 B1	20 October 2021
		CN 108601394 A	28 September 2018
		MX 2018010101 A	27 September 2018
		SG 11201806834 T A	27 September 2018
		WO 2017148773 A1	08 September 2017
		BR 112018015597 A2	26 December 2018
		AR 107748 A1	30 May 2018
		US 2019045838 A1	14 February 2019
		US 11058145 B2	13 July 2021
		TW 201731397 A	16 September 2017
		AU 2017225585 A1	09 August 2018
		AU 2017225585 B2	15 October 2020
		PH 12018501786 A1	17 June 2019
		RU 2018134192 A3	01 April 2020
		RU 2018134192 A	01 April 2020
		RU 2720367 C2	29 April 2020
		KR 20180116256 A	24 October 2018
		UA 124623 C2	20 October 2021
		None	
CN 113197340 A	03 August 2021	None	
CN 113197343 A	03 August 2021	None	