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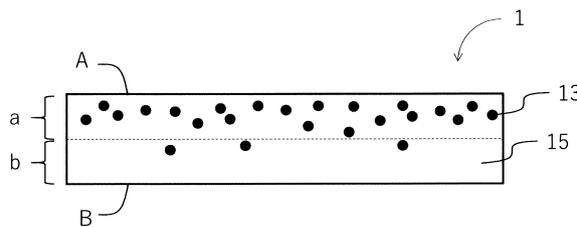
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(54) **PARTICLE-CONTAINING SHEET FOR FLAVOR INHALATION ARTICLE FILTER AND METHOD FOR PRODUCING SAME**

(57) A sheet for a smoking article filter containing: a fiber, particles with a particle size of 20 to 200 mesh, and an adhesive, when the weight of the particles present in a region from the center in the thickness direction to one surface divided by the weight of total particles is defined as distribution

ratio CA, and the weight of the particles present in a region from the center in the thickness direction to the other surface divided by the weight of total particles is defined as distribution ratio CB, CA > CB is satisfied.

Fig. 1



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Description

TECHNICAL FIELD

[0001] The present invention relates to a sheet for a flavor inhalation article filter containing particles and a method for producing the same.

BACKGROUND ART

[0002] A technique is known in which activated carbon is contained in a smoking article filter to selectively remove volatile components in tobacco smoke to make taste and aroma mild. For example, PTL 1 discloses a filter medium for a smoking article filter obtained by mixing powdered activated carbon with wood pulp fibers disintegrated in air, dispersing and collecting the mixture in air to form a web, and further spraying an adhesive on the web and then drying the web. In addition, a technique is also known in which an adsorbent other than activated carbon, particles carrying flavor or the like is disposed in a filter.

CITATION LIST

PATENT LITERATURE

[0003] PTL 1: JP S48-85874 A

SUMMARY OF INVENTION

TECHNICAL PROBLEM

[0004] By the way, in order to improve production efficiency, the sheet for a flavor inhalation article filter itself is usually produced at a high speed, and is also handled at a high speed when forming the sheet into a flavor inhalation article filter. Therefore, the sheet is required to have high tensile strength. However, when functional particles such as activated carbon are added to the sheet, the tensile strength of the sheet decreases. In view of such circumstances, an object of the present invention is to provide a sheet for a particle-containing flavor inhalation article filter having high strength.

SOLUTION TO PROBLEM

[0005] The inventors have found that the above problem can be solved by a sheet in which particles are unevenly distributed in the thickness direction. That is, the above problem is solved by the following present invention.

(1) A sheet for a flavor inhalation article filter, containing:

a fiber, particles with a particle size of 20 to 200 mesh, and an adhesive,

when a weight of the particles present in a region from a center in a thickness direction to one surface divided by a weight of total particles is defined as distribution ratio CA, and a weight of the particles present in a region from the center in the thickness direction to the other surface divided by the weight of total particles is defined as distribution ratio CB, CA > CB is satisfied.

(2) The sheet according to (1), in which the weight of the particles contained per unit area of the sheet is 7 to 80 g/m².

(3) The sheet according to (1) or (2), in which the CA is 60 to 100, and the CB is 0 to 40.

(4) The sheet according to any one of (1) to (3), in which when a weight of the particles present in a region of 5% in the thickness direction from one surface divided by the weight of total particles is defined as distribution ratio CAs, and

a weight of the particles present in a region of 5% in the thickness direction from the other surface divided by the weight of total particles is defined as distribution ratio CBs, CAs is 0 to 10, and CBs is 0 to 5.

(5) The sheet according to any one of (1) to (4), in which the particles include:

an adsorbent or a component releasing agent.

(6) The sheet according to any one of (1) to (5), in which the fiber is a wood pulp fiber.

(7) The sheet according to (6), in which a weight of the wood pulp fiber contained per unit area of the sheet is 25 to 50 g/m².

(8) The sheet according to (1) to (7), in which the adhesive is polyvinyl alcohol, a vinyl acetate acrylic copolymer, or a mixture thereof.

(9) The sheet according to any one of (1) to (8), in which the weight of the adhesive contained per unit area of the sheet is 4 to 40 g/m².

(10) A method for producing the sheet according to any one of (1) to (9), including the following steps:

step 1: forming a sheet by placing a fiber on a mesh sucked from a back surface;

step 2: adding an adhesive to one surface A of the sheet;

step 3: reversing the sheet obtained in the step 2; and

step 4: adding the particles and an adhesive simultaneously to the other surface B of the sheet, or adding an adhesive after adding the particles.

(11) The method according to (10), in which the step 1 includes spraying the fiber onto the mesh using a gas as a medium.

(12) The method according to (10) or (11), further

including a step of drying the surface A of the sheet between the step 2 and the step 3.

(13) A flavor inhalation article filter including the sheet according to any one of (1) to (9).

ADVANTAGEOUS EFFECTS OF INVENTION

[0006] According to the present invention, a sheet for a particle-containing flavor inhalation article filter having high strength can be provided.

BRIEF DESCRIPTION OF DRAWINGS

[0007]

FIG. 1 is a cross-sectional view of a sheet for a flavor inhalation article filter.

FIG. 2 is a view showing a method for producing a sheet for a flavor inhalation article filter.

FIG. 3 is a conceptual diagram of a flavor inhalation article filter.

FIG. 4 is a diagram showing one embodiment of a combustion tobacco flavor inhalation article.

FIG. 5 is a diagram showing one embodiment of a non-combustion tobacco flavor inhalation article.

DESCRIPTION OF EMBODIMENTS

[0008] Hereinafter, the present invention will be described in detail. In the present invention, the expression "X to Y" includes the end values X and Y.

[0009] In the present invention, the "flavor inhalation article" refers to an article for a user to suck flavor. Among flavor inhalation articles, those having tobacco or a component derived from the tobacco are referred to as "tobacco flavor inhalation articles". Tobacco flavor inhalation articles are roughly classified into "combustion tobacco flavor inhalation articles" (also simply referred to as "smoking articles") that generate flavor by combustion, and "non-combustion tobacco flavor inhalation articles" that generate flavor without combustion. Furthermore, non-combustion tobacco flavor inhalation articles are roughly classified into "non-combustion-heating-type tobacco flavor inhalation articles" that generate flavor by heating and "non-heating, non-combustion tobacco flavor inhalation articles" that generate flavor without heating.

1. Sheet for flavor inhalation article filter

[0010] The sheet for a flavor inhalation article filter contains a fiber, particles with a particle size of 20 to 200 mesh, and an adhesive, and the particles are unevenly distributed in the thickness direction.

(1) Particle

[0011] The particle contained in the sheet for a flavor

inhalation article filter have a particle size of 20 to 200 mesh. When the particle size is excessively small, handling becomes difficult. When the particle size is excessively large, the particles are less likely to stay inside the sheet, and many of the particles are present on the surface of the sheet. As a result, there is a concern that a particle present on the surface of the sheet and the surface of the apparatus comes into contact with each other at a high speed at the time of producing a filter using the sheet, and the surface of the apparatus may be damaged, or the mechanical characteristics of the sheet may be deteriorated due to falling of the particle from the sheet, or the like. From this viewpoint, the lower limit value of the numerical range is preferably 28 mesh or more, and more preferably 70 mesh or more. The upper limit value of the numerical range is preferably 150 mesh or less. A particle of 28 mesh or more is preferable because it is easily embedded inside the sheet for a smoking article filter.

[0012] The particle is not limited as long as it is used in the field of flavor inhalation articles, but is preferably an adsorbent or a component releasing agent. The adsorbent is a material that adsorbs a part of a component for inhalation generated from a flavor inhalation article, and examples thereof include porous materials such as activated carbon and zeolite, and polar group-containing materials such as cellulose. The component releasing agent is a material containing a substance and a carrier that supports the substance so as to be releasable, or a material that releases the substance by itself. In the former, examples of the substance include flavors such as menthol, and examples of the carrier include an inclusion compound such as cyclodextrin and a porous material such as calcium carbonate and alumina. Examples of the latter include mint leaf particles obtained by pulverizing a mint leaf, tobacco particles obtained by pulverizing a tobacco plant, and the like. The mint leaf particles release menthol and the like, and the tobacco particles release flavor. Total particles may be composed of an adsorbent or a component releasing agent, or a part of the total particles may be composed of an adsorbent or a component releasing agent. In the latter, the lower limit of the total amount of the adsorbent and the component releasing agent in total particles is preferably 80 wt% or more, more preferably 90 wt% or more, and further preferably 95 wt% or more. Also, the upper limit is preferably 99 wt% or less, and more preferably 98 wt% or less.

(2) Fiber

[0013] The fiber is not limited as long as it can form a matrix of the sheet for a flavor inhalation article filter. Examples thereof include synthetic fibers or semi-synthetic fibers made of cellulose acetate, PP, PE, PET, polylactic acid, or the like. In addition, examples thereof include natural fibers such as plant fibers using cellulose or the like as a raw material, but natural fibers are preferable

from the viewpoint of reducing environmental load. The length of the fiber is not particularly limited, but a relatively short fiber is preferable in order to form a matrix of the sheet, and the fiber length thereof is preferably 5 mm or less. The fineness of the fiber is not particularly limited, but in the case of synthetic fibers or semi-synthetic fibers, the single fineness is preferably 1 to 30 (denier/filament), and more preferably 1 to 10 (denier/filament). In the case of natural fibers, the roughness can be used as an index representing thickness and length. From the viewpoint of more easily achieving airflow resistance suitable for inhalation, the roughness is preferably 0.15 to 0.25 mg/m, more preferably 0.16 to 0.24 mg/m, and further preferably 0.18 to 0.22 mg/m. The roughness is measured in accordance with JIS P 8120: 1998.

[0014] The cross-sectional shape of the fiber when the synthetic fiber or semi-synthetic fiber is used is not limited, but an R-shape or a Y-shape is preferable, and a Y-shape is more preferable from the viewpoint of cost. In addition, a plasticizer or a binder can be used in order to improve the sheet strength by bonding a contact point between the fibers during sheet molding. When natural fibers such as cellulose are used, water-soluble binders such as starch, modified starch, modified cellulose, PVA, or PVAc can be used singly or in combination of plural kinds thereof, or latex or the like can also be used. When acetate fibers are used as the fibers, the binder for natural fibers can be used, and a plasticizer (triacetin) having an ability to dissolve cellulose acetate can also be used.

[0015] Among them, natural fibers are preferable because of a smaller environmental load than synthetic fibers and semi-synthetic fibers, and wood pulp fibers are particularly preferable from the viewpoint of excellent heat resistance. In this case, the weight of the wood pulp fibers contained per unit area of the sheet is preferably 25 to 50 g/m² from the viewpoint of production suitability in forming the sheet into a filter and rod hardness after the filter formation.

(3) Adhesive

[0016] As the adhesive, a known adhesive can be used. Among them, the adhesive is preferably selected from polyvinyl alcohol, a vinyl acetate acrylic copolymer, or a mixture thereof from the viewpoint of having a relatively small influence on flavor of the flavor inhalation article and excellent heat resistance. Adhesive weight (solid content weight) is preferably 4 to 40 g/m² per unit area of the sheet. When the amount of the adhesive is excessively large, it is economically disadvantageous, and influence on the flavor is concerned. In addition, if the amount is excessively small, the number of adhesion points between fibers is small, and problems such as fibers coming apart and sheet tensile strength not being maintained may occur.

(4) Distribution ratio of particles

[0017] The particles are distributed in the sheet for a flavor inhalation article filter with the following distribution ratio. The distribution ratio will be described with reference to FIG. 1. FIG. 1 shows a cross section of a sheet for a flavor inhalation article filter. In the figure, reference sign 1 denotes a sheet for a flavor inhalation article filter, reference sign 13 denotes a particle, reference sign 15 denotes a fiber, A denotes one surface, a denotes a region from the center in the thickness direction to one surface, B denotes the other surface, and b denotes a region from the center in the thickness direction to the other surface. Distribution ratios CA and CB are defined as follows.

CA = Weight of particles present in region a/weight of total particles

CB = Weight of particles present in region b/weight of total particles

[0018] The particles are distributed in the sheet so as to satisfy CA > CB. CA : CB is preferably 60 to 100 : 0 to 40, and more preferably 70 to 90 : 10 to 30.

[0019] The total weight of the particles is preferably 7 to 80 g/m² and more preferably 10 to 40 g/m² per unit area of the sheet for a flavor inhalation article filter. When the weight of the particles is less than the lower limit value, function of the particle cannot be sufficiently exhibited, and when the weight exceeds the upper limit value, it is economically disadvantageous.

[0020] The distribution ratio of particles in the vicinity of the surface layer of the sheet for a flavor inhalation article filter is preferably low. This is because if a large amount of particles are present in the vicinity of the surface layer of the sheet for a flavor inhalation article filter, a production apparatus may be damaged during production. From such a viewpoint, distribution ratio CAs in the vicinity of the surface layer of the particle defined as follows is preferably 0 to 10, more preferably 0 to 5, and further preferably 0 to 3, and distribution ratio CBs is preferably 0 to 5, more preferably 0 to 3, and further preferably 0 to 1. From the viewpoint of protecting the production apparatus, both CAs and CBs are more preferably 0, and when both CAs and CBs are not 0, the particle is preferably embedded into the sheet for a flavor inhalation article filter.

CAs = Weight of particles present in region of 5% in thickness direction from one surface (surface A)/weight of total particles

CBs = Weight of particles present in region of 5% in thickness direction from other surface (surface B)/weight of total particles

[0021] These distribution ratios can be determined by image analysis of the cross section of the sheet for a flavor inhalation article filter, or can also be determined

by dividing the sheet for a flavor inhalation article filter by a plane parallel to a main surface at the center in the thickness direction or 5% from the surface, and measuring weights of the particles and the sheet. From the viewpoint of convenience, the former method is preferable. Since the distribution ratio in the sheet for a flavor inhalation article filter is uniform in the plane direction, the distribution ratio of the entire sheet may be obtained by performing image analysis on one cross section of the sheet for a flavor inhalation article filter in the method.

(5) Shape of sheet for flavor inhalation article filter

[0022] The shape is appropriately prepared according to the application. For example, in the case of a cylindrical flavor inhalation article filter with a diameter of 24 mm and a height of 27 mm, the shape of the sheet for a flavor inhalation article filter is about 27 mm in length, 50 to 150 mm in width, and 0.8 to 2.0 mm in thickness. The thickness can be measured by performing optical measurement such as image analysis on the cross section of the sheet. It can also be measured using paper and board thickness measurement method indicated by JIS P 8118: 2014. Apparent density of the sheet for a flavor inhalation article filter is also not limited, and is 30 to 200 g/m³ in one embodiment. The apparent density referred to herein can be calculated by dividing the basis weight of a sheet including all of fibers, adhesives and particles, which are sheet components, by volume of the sheet.

2. Production method

[0023] The sheet for a flavor inhalation article filter can be produced by any method, but is preferably produced by a method including the following steps:

- step 1: forming a sheet by placing a fiber on a mesh sucked from a back surface;
- step 2: adding an adhesive to one surface A of the sheet;
- step 3: reversing the sheet obtained in step 2; and
- step 4: adding the particles and an adhesive simultaneously to the other surface B of the sheet, or adding an adhesive after adding the particles.

[0024] FIG. 2 shows one embodiment of the production method. In the figure, reference sign 3 denotes a mesh, reference signs 5 and 7 denote sheet conveyors, reference sign 10 denotes a sheet not containing particles, reference sign 1 denotes a sheet for a flavor inhalation article filter, reference sign 31 denotes a fiber feeder, reference sign 33 denotes an adhesive feeder, reference sign 37 denotes an inhalation device, reference sign 55 denotes a dryer, reference sign 71 denotes a particle feeder, reference sign 73 denotes an adhesive feeder, and reference sign 75 denotes a dryer. Although a plurality of sheets 10 are illustrated for easy understanding, the sheet 10 on the mesh 3 to the sheet 1 may be con-

tinuous.

(1) Step 1

[0025] In this step, the fiber is placed on the mesh sucked from the back surface to form the sheet 10. The mesh is not limited as long as it is used in the production of a nonwoven fabric, and examples thereof include a wire mesh and the like. Since the mesh is sucked from the back surface, the placed fiber is fixed. This step is preferably performed by spraying a fiber onto the mesh using a gas as a medium. As the gas, air can be used.

(2) Step 2

[0026] In this step, an adhesive is added to one surface A of the sheet 10. The adhesive is as described above, and the amount thereof is also appropriately adjusted, but in consideration of the amount of the adhesive added to the other surface B, the amount contained per unit area of the sheet is finally adjusted to about 4 to 40 g/m² in terms of weight of the adhesive solid content. For example, the adhesive can be added to the surface A at about 2 to 20 g/m², and the adhesive can be added to the surface B at about 2 to 20 g/m² in step 4. The adhesive feeder 33 is a spray and the adhesive is preferably sprayed. The sheet 10 to which the adhesive has been added is delivered to the sheet conveyor 5, and is preferably dried. Drying may be performed using the dryer 55 or may be performed by air drying. As the sheet conveyor, for example, a belt conveyor can be used. In this step, an adhesive is applied to the surface A to fix the fibers to each other.

(3) Step 3

[0027] In this step, the sheet 10 obtained in step 2 is reversed. Specifically, when the sheet 10 is delivered from the sheet conveyor 5 to the sheet conveyor 7, the surface B is reversed so as to face upward on the paper surface.

(4) Step 4

[0028] In this step, the particles and the adhesive are simultaneously added to the other surface B of the sheet 10, or the adhesive is added after the particles are added. FIG. 2 shows an embodiment in which particles are fed from the particle feeder 71 to the surface B of the sheet 10, and then an adhesive is sprayed from the adhesive feeder 73. The adhesive and the particles may be fed simultaneously. The adhesive feeder 73 is preferably a spray as described above. The amount of the adhesive added in this step is adjusted so that the weight of the adhesive solid content finally becomes about 4 to 40 g/m² as described above. The amount of the particles is appropriately adjusted so that a desired amount can be achieved. The sheet 1 for a smoking article filter thus

produced has many particles on the surface A side.

(5) Drying step

[0029] In the present production method, a drying step can be provided at an arbitrary position. FIG. 2 shows an embodiment in which a drying step of drying the sheet is provided between steps 2 and 3 and after step 4. This embodiment is suitable when a water-soluble adhesive is used. Drying may be performed by air drying. When latex is used as the adhesive, air drying may be performed without providing a drying step using a dryer, or the drying step may not be provided.

3. Flavor inhalation article

[0030] A flavor inhalation article filter is prepared from a sheet for a flavor inhalation article filter. The preparation method is not limited and can be performed by a known method, but for example, a cut sheet for a flavor inhalation article filter can be wound to form a cylindrical shape, or as shown in FIG. 3, a plurality of cut sheets 1 for a flavor inhalation article filter can be stacked and bent so that the sheet cross section draws an S-shape, and packed in a wrapper to form a cylindrical shape, thereby forming a filter segment 100. The method of FIG. 3 can be performed as described in, for example, JP S44-3727 B. The filter segment and another segment such as a flavor generating segment can be combined to form a combustion tobacco flavor inhalation article or a non-combustion tobacco flavor inhalation article, particularly, a non-combustion-heating-type tobacco flavor inhalation article.

(1) Combustion tobacco flavor inhalation article

[0031] An example of the combustion tobacco flavor inhalation article is shown in FIG. 4. As shown in FIG. 4, a combustion tobacco flavor inhalation article 240 includes a tobacco rod portion 250, and a second filter segment F2 and a first filter segment F1 (these are also collectively referred to as "filter portion") provided adjacent thereto. FIG. 4 shows an embodiment in which the second filter segment F2 includes the filter segment 100 of the present invention, but the first filter segment F1 may include the filter segment 100 of the present invention. The tobacco rod portion 250 includes shredded tobacco 260 (shredded leaves, cigarettes) and a cigarette paper 270 wound around the shredded tobacco. The tobacco rod portion 250, the first filter segment F1 and the second filter segment F2 are connected by a tipping paper member 280. The tipping paper member 280 may have a vent hole in a part of the outer periphery thereof. The number of vent holes may be one or more, and for example, 10 to 40 vent holes can be formed. When the number of vent holes is plural, the vent holes can be, for example, annularly arranged in a line on the outer peripheral portion of the tipping paper member 280. The plurality of vent holes may be arranged at substantially

constant intervals. By providing the vent hole, air is taken into the filter portion from the vent hole during inhalation. By diluting mainstream smoke with outside air from the vent hole, a product design with a desired tar value can be made. When F2 is the filter segment of the present invention, F1 may be a normal acetate filter in which triacetin as a plasticizer is added to a cellulose acetate long fiber bundle and then wound in a cylindrical shape with a filter wrapper, a nonwoven fabric filter in which a nonwoven fabric sheet containing fibers and an adhesive obtained by removing a granular material from the filter of the present invention is wound in a cylindrical shape with a filter wrapper, or a paper filter in which paper is creped and gathered and wound in a cylindrical shape with a filter wrapper.

[0032] In the combustion tobacco flavor inhalation article, segment length of F2 can be about 10 to 15 mm. In that case, about 20 to 100 mg of the granular material can be packed in the F2 segment. When activated carbon is used as the granular material, it is desirable to fill about 20 to 50 mg in the F2 segment from the viewpoint of flavor quality when using the combustion tobacco flavor inhalation article, and it is desirable to fill about 50 to 100 mg in the F2 segment from the viewpoint of removing volatile components in the mainstream smoke.

[0033] The user can enjoy the flavor of the tobacco by igniting the tip of the tobacco rod portion 250 and sucking the mouthpiece end of the first filter segment F1 with his/her mouth. By appropriately selecting the particles 13 in the filter segment 100, various functions can be imparted to the combustion tobacco flavor inhalation article 240.

(2) Non-combustion-heating-type tobacco flavor inhalation article

[0034] An example of the non-combustion-heating-type tobacco flavor inhalation article is shown in FIG. 5. In the figure, reference sign 300 denotes a non-combustion-heating-type tobacco flavor inhalation article, and includes a tobacco rod portion 310 and a mouthpiece segment 320. The mouthpiece segment 320 includes a cooling segment 330, a center hole segment 340, a first filter segment F1, and a second filter segment F2. The first filter segment F1 and the second filter segment F2 are also collectively referred to as a "filter portion". FIG. 5 shows an embodiment in which the second filter segment F2 includes the filter segment 100 of the present invention. However, the first filter segment F1 may be constituted by the filter segment 100 of the present invention, and in this case, the second filter segment F2 can be omitted. During inhalation, the tobacco rod portion 310 is heated and inhalation takes place at the end of the first filter segment F1.

[0035] The tobacco rod portion 310 includes a tobacco filler 350 containing tobacco and an aerosol former, and a tubular wrapper 360 that covers the tobacco filler 350. The tobacco filler 350 may further contain a volatile flavor

component and water. The size of the tobacco used as the filler and a preparation method thereof are not limited. For example, dry tobacco leaves shredded into a width of 0.8 to 1.2 mm may be used. When shredded into the above width, the shreds have a length of about 5 to 20 mm. Alternatively, those prepared by uniformly pulverizing dry tobacco leaves into an average particle size of about 20 to 200 μm , forming into sheets, and shredding the sheets into a width of 0.8 to 1.2 mm may also be used. When shredded into the above width, the shreds have a length of about 5 to 20 mm. Further, the above-mentioned formed sheets may be gathered without shredding and used as a filler. Moreover, a plurality of sheets formed into a cylindrical shape may be concentrically arranged. In either case of using dry tobacco leaves as shreds or as sheets formed after uniform pulverization, various types of tobacco may be employed for a tobacco filler. Flue-cured, burley, oriental, and domestic species, and other *Nicotiana tabacum* varieties or *Nicotiana rustica* varieties can be blended as appropriate for an intended taste and used. Details of the varieties of tobacco are disclosed in "Tobacco no Jiten (Dictionary of Tobacco), Tobacco Academic Studies Center, March 31, 2009."

[0036] A plurality of methods are known as methods for pulverizing tobacco and forming into uniform sheets. First is a sheet made by a paper-making process, second is a cast sheet made by uniformly mixing with a suitable solvent such as water, thinly casting the resulting uniform mixture on a metal plate or a metal plate belt, and drying the uniform product, and third is a rolled sheet made by extruding a uniform mixture with a suitable solvent such as water into a sheet shape and molding the extruded sheet. Details of the types of the uniform sheets are disclosed in "Tobacco no Jiten (Dictionary of Tobacco), Tobacco Academic Studies Center, March 31, 2009."

[0037] The filling density of the tobacco filler 350 is not particularly limited, but is usually 250 mg/cm^3 or more, preferably 320 mg/cm^3 or more, and usually 520 mg/cm^3 or less, preferably 420 mg/cm^3 or less from the viewpoint of ensuring performance of the non-combustion-heating-type tobacco flavor inhalation article 300 and imparting a good flavor. Specifically, in the case of the tobacco rod portion 310 of 22 mm in circumference and 20 mm in length, the content range of the tobacco filler 350 can be 200 to 450 mg and is preferably 280 to 400 mg per tobacco rod portion 310.

[0038] The aerosol former is a material that can generate an aerosol by heating, and is not particularly limited, and examples thereof include glycerol, propylene glycol (PG), triethyl citrate (TEC), triacetin, 1,3-butanediol, and the like. These may be used alone or in combination of two or more kinds.

[0039] The types of volatile flavor component is not particularly limited, and examples include, from the viewpoint of imparting a good flavor, acetanisole, acetophenone, acetylpyrazine, 2-acetylthiazole, alfalfa extract, amyl alcohol, amyl butyrate, trans-anethole, star anise

oil, apple juice, Peru balsam oil, beeswax absolute, benzaldehyde, benzoin resinoid, benzyl alcohol, benzyl benzoate, benzyl phenylacetate, benzyl propionate, 2,3-butanedione, 2-butanol, butyl butyrate, butyric acid, caramel, cardamom oil, carob absolute, β -carotene, carrot juice, L-carvone, β -caryophyllene, cassia bark oil, cedarwood oil, celery seed oil, chamomile oil, cinnamaldehyde, cinnamic acid, cinnamyl alcohol, cinnamyl cinnamate, citronella oil, DL-citronellol, clary sage extract, cocoa, coffee, cognac oil, coriander oil, cuminaldehyde, davana oil, δ -decalactone, γ -decalactone, decanoic acid, dill oil, 3,4-dimethyl-1,2-cyclopentanedione, 4,5-dimethyl-3-hydroxy-2,5-dihydrofuran-2-one, 3,7-dimethyl-6-octenoic acid, 2,3-dimethylpyrazine, 2,5-dimethylpyrazine, 2,6-dimethylpyrazine, ethyl 2-methylbutyrate, ethyl acetate, ethyl butyrate, ethyl hexanoate, ethyl isovalerate, ethyl lactate, ethyl laurate, ethyl levulinate, ethyl maltol, ethyl octanoate, ethyl oleate, ethyl palmitate, ethyl phenylacetate, ethyl propionate, ethyl stearate, ethyl valerate, ethyl vanillin, ethyl vanillin glucoside, 2-ethyl-3,(5 or 6)-dimethylpyrazine, 5-ethyl-3-hydroxy-4-methyl-2(5H)-furanone, 2-ethyl-3-methylpyrazine, eucalyptol, fenugreek absolute, genet absolute, gentian root infusion, geraniol, geranyl acetate, grape juice, guaiacol, guava extract, γ -heptalactone, γ -hexalactone, hexanoic acid, cis-3-hexen-1-ol, hexyl acetate, hexyl alcohol, hexyl phenylacetate, honey, 4-hydroxy-3-pentenoic acid lactone, 4-hydroxy-4-(3-hydroxy-1-butenyl)-3,5,5-trimethyl-2-cyclohexen-1-one, 4-(p-hydroxyphenyl)-2-butanone, 4-hydroxyundecanoic acid sodium salt, immortelle absolute, β -ionone, isoamyl acetate, isoamyl butyrate, isoamyl phenylacetate, isobutyl acetate, isobutyl phenylacetate, jasmine absolute, kola nut tincture, labdanum oil, terpeneless lemon oil, licorice extract, linalool, linalyl acetate, lovage root oil, maltol, maple syrup, menthol, menthone, L-menthyl acetate, p-methoxybenzaldehyde, methyl-2-pyrrolyl ketone, methyl anthranilate, methyl phenylacetate, methyl salicylate, 4'-methylacetophenone, methyl cyclopentenolone, 3-methylvaleric acid, mimosa absolute, molasses, myristic acid, nerol, nerolidol, γ -nonalactone, nutmeg oil, δ -octalactone, octanal, octanoic acid, orange flower oil, orange oil, oris root oil, palmitic acid, ω -pentadecalactone, peppermint oil, petitgrain Paraguay oil, phenethyl alcohol, phenethyl phenylacetate, phenylacetic acid, piperonal, plum extract, propenylguaethol, propyl acetate, 3-propylenephthalide, prune juice, pyruvic acid, raisin extract, rose oil, rum, sage oil, sandalwood oil, spearmint oil, styrax absolute, marigold oil, tea distillate, α -terpineol, terpinyl acetate, 5,6,7,8-tetrahydroquinoxaline, 1,5,5,9-tetramethyl-13-oxatricyclo(8.3.0.0.(4.9))tridecane, 2,3,5,6-tetramethylpyrazine, thyme oil, tomato extract, 2-tridecanone, triethyl citrate, 4-(2,6,6-trimethyl-1-cyclohexenyl)2-buten-4-one, 2,6,6-trimethyl-2-cyclohexene-1,4-dione, 4-(2,6,6-trimethyl-1,3-cyclohexadienyl)2-buten-4-one, 2,3,5-trimethylpyrazine, γ -undecalactone, γ -valerolactone, vanilla extract, vanillin, veratraldehyde, violet leaf absolute, and extracts of tobacco

plants (tobacco leaf, tobacco stem, tobacco flower, tobacco root, and tobacco seed). Among these, menthol is particularly preferable. These volatile flavor components may be used alone or in combination of two or more kinds thereof.

[0040] The content of the aerosol former in the tobacco filler 350 is not particularly limited, and is usually 5 to 50 wt% and preferably 10 to 20 wt%, from the viewpoint of sufficiently generating an aerosol and imparting a good flavor. When the tobacco filler 350 contains a volatile flavor component, the content of the volatile flavor component in the tobacco filler is not particularly limited, and is usually 100 ppm or more, preferably 10,000 ppm or more, more preferably 25,000 ppm or more, and is usually 100,000 ppm or less, preferably 50,000 ppm or less, more preferably 33,000 ppm or less based on the weight of the tobacco filler, from the viewpoint of imparting a good flavor.

[0041] A method for filling the tobacco filler 350 in the wrapper 360 is not particularly limited, but for example, the tobacco filler 350 may be wrapped in the wrapper 360, or the tubular wrapper 360 may be filled with the tobacco filler 350. When the shape of tobacco has a longitudinal direction as in a rectangle, the tobacco may be packed with the longitudinal direction randomly aligned within the wrapper 360 or may be packed with the longitudinal direction aligned with the axial direction or the direction perpendicular to the axial direction of the tobacco rod portion 310. The tobacco component, the aerosol former and water contained in the tobacco filler 350 are vaporized by heating the tobacco rod portion 310, and they moved to the mouthpiece segment 320 through inhalation.

[0042] The cooling segment 330 includes a tubular member 370. The tubular member 370 can be, for example, a paper tube of cylindrically processed cardboard. The cylindrical member 370 and a mouthpiece lining paper 420 to be described later are provided with a perforation 380 penetrating therethrough. Due to the presence of the perforation 380, external air is introduced inside the cooling segment 330 during inhalation. As a result, a vaporized aerosol component generated by heating the tobacco rod portion 310 comes into contact with external air, and the temperature thereof decreases, so that the aerosol is liquefied to form an aerosol. A diameter (diameter length) of the perforation 380 is not particularly limited, and can be, for example, 0.5 to 1.5 mm. The number of perforation 380 is not particularly limited and may be one or two or more. For example, a plurality of perforations 380 may be provided on the periphery of the cooling segment 330.

[0043] The center hole segment 340 includes a filling layer 390 having a hollow portion and an inner plug wrapper 400 that covers the filling layer 390. The center hole segment 340 has a function of increasing strength of the mouthpiece segment 320. The filling layer 390 can be, for example, a rod of $\phi 5.0$ to $\phi 1.0$ mm in inner diameter that is filled with cellulose acetate fibers at a high density

and hardened with a plasticizer containing triacetin added in an amount of 6 to 20 wt% based on the weight of cellulose acetate. Since the filling layer 390 has a high filling density of fibers, air or aerosol flows only in the hollow portion during inhalation, and hardly flows in the filling layer 390. When it is desired to reduce a decrease due to filtration of the aerosol component in the filter portion, it is effective to shorten the length of the filter portion and replace the filter portion with the center hole segment 340 in order to increase the delivery amount of the aerosol component. Since the filling layer 390 inside the center hole segment 340 is a fiber-filled layer, touch from the outside during use is favorable.

[0044] The center hole segment 340 and the filter portion are joined with an outer plug wrapper 410. The outer plug wrapper 410 can be, for example, a cylindrical paper. In addition, the tobacco rod portion 310, the cooling segment 330, and the joined center hole segment 340 and the filter portion are joined with the mouthpiece lining paper 420. These can be joined by, for example, applying a glue such as a vinyl acetate-based glue to the inner side surface of the mouthpiece lining paper 420, and winding around the three segments.

[0045] The length of the non-combustion-heating-type tobacco flavor inhalation article in the axial direction, that is, the horizontal direction in FIG. 5 is not particularly limited, but is preferably 40 to 90 mm, more preferably 50 to 75 mm, and further preferably 50 to 60 mm. In addition, the peripheral length of the non-combustion-heating-type tobacco flavor inhalation article is preferably 16 to 25 mm, more preferably 20 to 24 mm, and further preferably 21 to 23 mm. In an exemplary embodiment, the length of the tobacco rod portion 310 is 20 mm, the length of the cooling segment 330 is 20 mm, the length of the center hole segment 340 is 6 mm, and the lengths of the portions of the first filter segment F1 and the second filter segment F2 are each 7.0 mm. The lengths of these individual segments can be appropriately changed according to production suitability, required quality, and the like. In this case, in an exemplary embodiment, the weight of the granular material contained in the second filter segment F2 is 15 to 50 mg. Further, only the filter portion may be disposed on the downstream side of the cooling segment 330 without using the center hole segment 340. By appropriately selecting the particles 13 in the filter segment 100, various functions can be imparted to the combustion tobacco flavor inhalation article 240.

(3) Non-combustion-heating-type tobacco flavor inhalation system

[0046] The non-combustion-heating-type tobacco flavor inhalation article is preferably used in combination with a device that heats the article. This combination is also referred to as a non-combustion-heating-type tobacco flavor inhalation system. As the device, a known device can be used, and for example, it is preferable to include a heater by electric resistance.

REFERENCE SIGNS LIST

[0047]

1	Sheet for smoking article filter	
10	Sheet not containing particles	
13	Particle	
15	Fiber	
3	Mesh	
31	Fiber feeder	
33	Adhesive feeder	
37	Inhalation device	
5	Sheet conveyor	
55	Dryer	
7	Particle-feeding region	
71	Particle feeder	
73	Adhesive feeder	
75	Dryer	
100	Filter segment	
240	Combustion tobacco flavor inhalation article	
250	Tobacco rod portion	
F1	First filter segment	
F2	Second filter segment	
260	Shredded tobacco	
270	Cigarette paper	
280	Tipping paper member	
300	Non-combustion-heating-type tobacco flavor inhalation article	
310	Tobacco rod portion	
320	Mouthpiece segment	
330	Cooling segment	
340	Center hole segment	
350	Tobacco filler	
360	Wrapper	
370	Cylindrical member	
380	Perforation	
390	Filling layer	
400	Inner plug wrapper	
410	Outer plug wrapper	
420	Mouthpiece lining paper	

Claims

1. A sheet for a flavor inhalation article filter, comprising: 45
- a fiber, particles with a particle size of 20 to 200 mesh, and an adhesive, 50
- when a weight of the particles present in a region from a center in a thickness direction to one surface divided by a weight of total particles is defined as distribution ratio CA, and 55
- a weight of the particles present in a region from the center in the thickness direction to the other surface divided by the weight of total particles is defined as distribution ratio CB, CA > CB is satisfied.

2. The sheet according to claim 1, wherein the weight of the particles contained per unit area of the sheet is 7 to 80 g/m².
3. The sheet according to claim 1 or 2, wherein the CA is 60 to 100, and the CB is 0 to 40.
4. The sheet according to any one of claims 1 to 3, wherein 10
- when a weight of the particles present in a region of 5% in the thickness direction from one surface divided by the weight of total particles is defined as distribution ratio CAs, and 15
- a weight of the particles present in a region of 5% in the thickness direction from the other surface divided by the weight of total particles is defined as distribution ratio CBs, CAs is 0 to 10, and CBs is 0 to 5.
5. The sheet according to any one of claims 1 to 4, wherein 20
- the particles comprise: an adsorbent or a component releasing agent.
6. The sheet according to any one of claims 1 to 5, wherein the fiber is a wood pulp fiber.
7. The sheet according to claim 6, wherein a weight of the wood pulp fiber contained per unit area of the sheet is 25 to 50 g/m².
8. The sheet according to claims 1 to 7, wherein the adhesive is polyvinyl alcohol, a vinyl acetate acrylic copolymer, or a mixture thereof.
9. The sheet according to any one of claims 1 to 8, wherein the weight of the adhesive contained per unit area of the sheet is 4 to 40 g/m².
10. A method for producing the sheet according to any one of claims 1 to 9, comprising the following steps: 40
- step 1: forming a sheet by placing a fiber on a mesh sucked from a back surface;
- step 2: adding an adhesive to one surface A of the sheet;
- step 3: reversing the sheet obtained in the step 2; and
- step 4: adding the particles and an adhesive simultaneously to the other surface B of the sheet, or adding an adhesive after adding the particles.
11. The method according to claim 10, wherein the step 1 comprises spraying the fiber onto the mesh using a gas as a medium.
12. The method according to claim 10 or 11, further com-

prising a step of drying the surface A of the sheet between the step 2 and the step 3.

13. A flavor inhalation article filter comprising the sheet according to any one of claims 1 to 9.

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Fig. 1

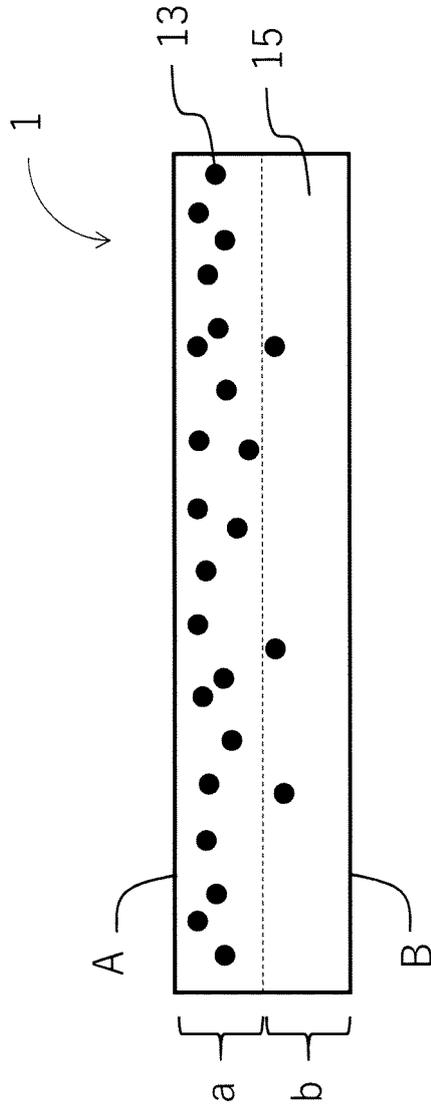
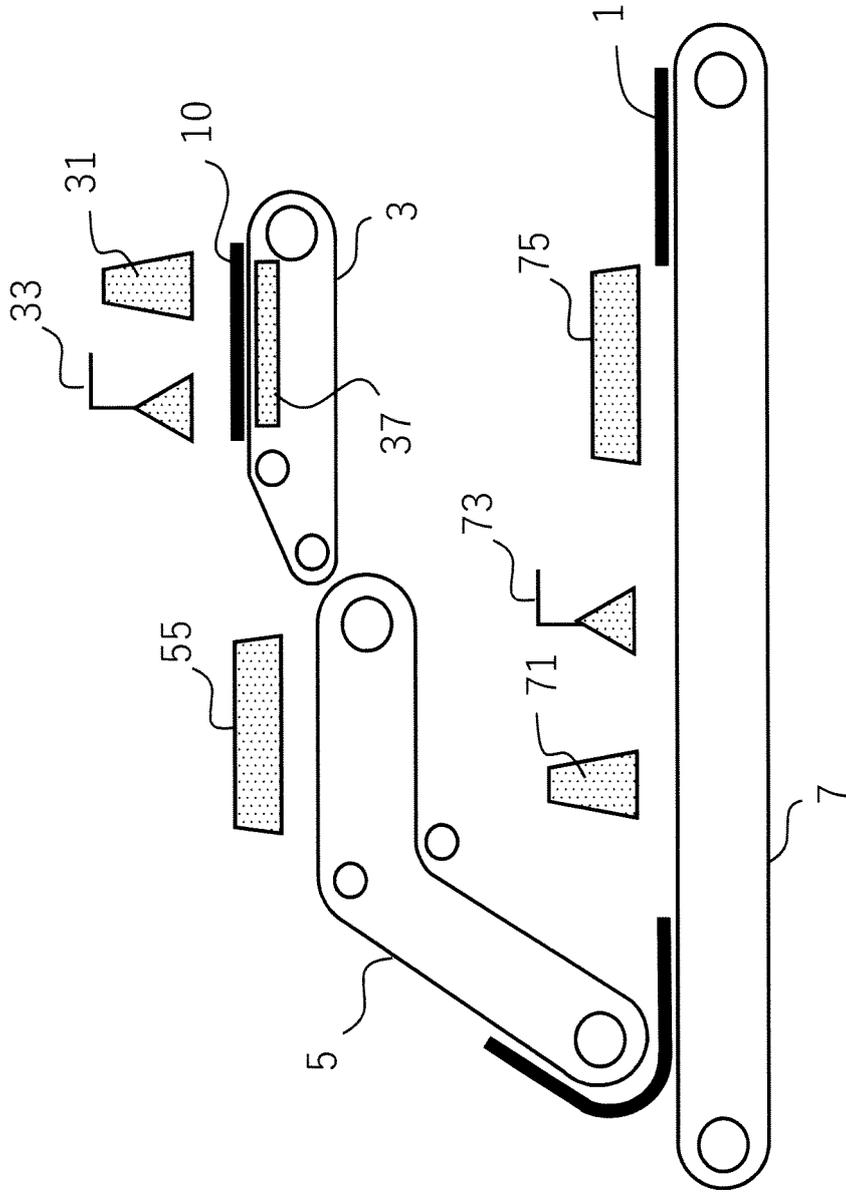


Fig. 2



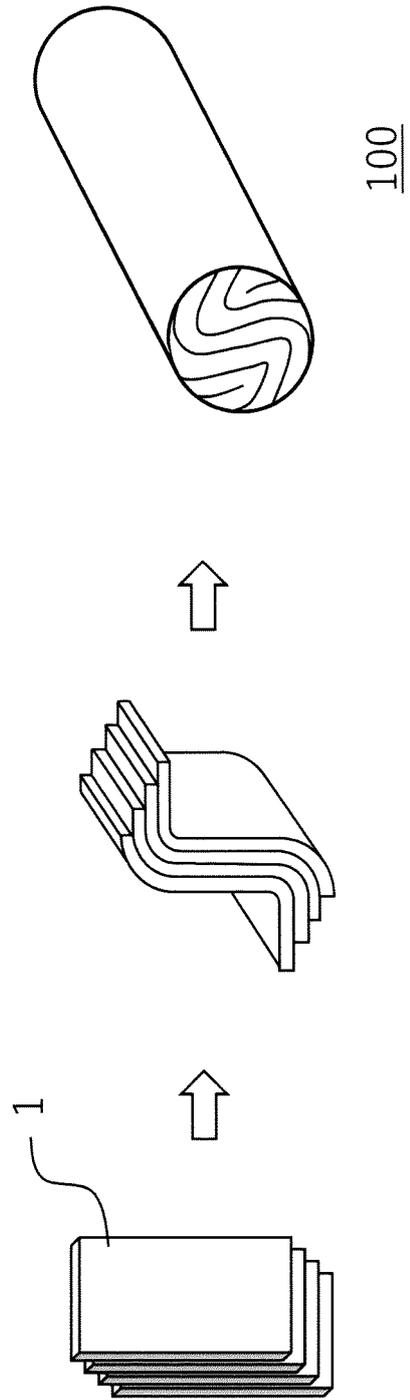


Fig. 3

Fig. 4

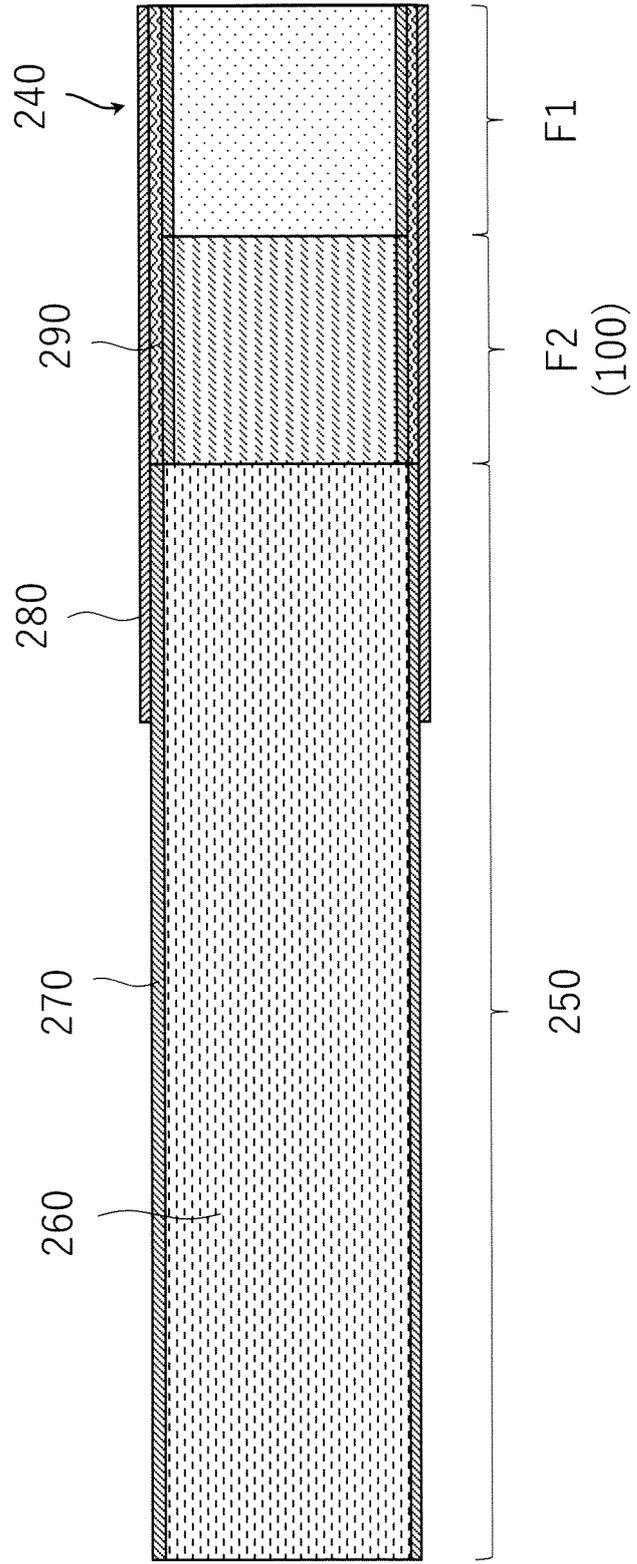
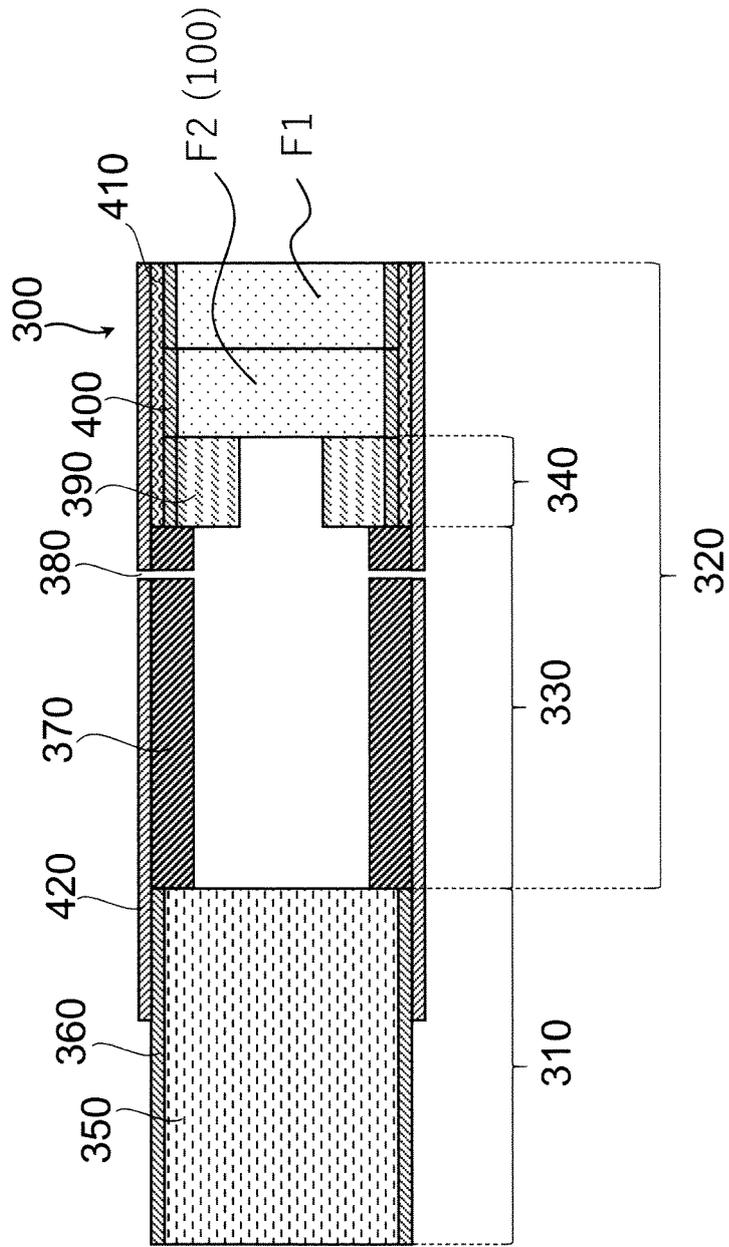


Fig. 5



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INTERNATIONAL SEARCH REPORT

International application No. PCT/JP2020/039396

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A. CLASSIFICATION OF SUBJECT MATTER
A24D 3/04 (2006.01) i
FI: A24D3/04
According to International Patent Classification (IPC) or to both national classification and IPC

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B. FIELDS SEARCHED
Minimum documentation searched (classification system followed by classification symbols)
A24D3/04
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Published examined utility model applications of Japan 1922-1996
Published unexamined utility model applications of Japan 1971-2020
Registered utility model specifications of Japan 1996-2020
Published registered utility model applications of Japan 1994-2020

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Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	JP 63-274429 A (JAPAN TOBACCO INC.) 11 November 1988 (1988-11-11) publication gazette, page 1, lower left column, line 19 to page 4, lower right column, line 16, fig. 1-9	1-3, 5-9, 13 4, 10-12
A	JP 2001-506121 A (SCHWEITZER MAUDUIT INT INC.) 15 May 2001 (2001-05-15) entire text, all drawings	1-13
A	JP 2009-112276 A (JAPAN FILTER TECHNOLOGY, LTD.) 28 May 2009 (2009-05-28) entire text, all drawings	1-13
A	JP 45-3200 B1 (HERMANN, Wiederholt) 03 February 1970 (1970-02-03) entire text, all drawings	1-13
A	WO 2005/087026 A1 (JAPAN TOBACCO INC.) 22 September 2005 (2005-09-22) entire text, all drawings	1-13

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

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* Special categories of cited documents:
 "A" document defining the general state of the art which is not considered to be of particular relevance
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 "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
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 "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

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Date of the actual completion of the international search 26 November 2020 (26.11.2020)	Date of mailing of the international search report 08 December 2020 (08.12.2020)
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Name and mailing address of the ISA/ Japan Patent Office 3-4-3, Kasumigaseki, Chiyoda-ku, Tokyo 100-8915, Japan	Authorized officer Telephone No.
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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No. PCT/JP2020/039396

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Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
JP 63-274429 A	11 Nov. 1988	(Family: none)	
JP 2001-506121 A	15 May 2001	US 5732718 A entire text, all drawings	
JP 2009-112276 A	28 May 2009	EP 0782400 B1 EP 2057908 A1 entire text, all drawings	
JP 45-3200 B1	03 Feb. 1970	(Family: none)	
WO 2005/087026 A1	22 Sep. 2005	US 2006/0252622 A1 entire text, all drawings	
		EP 1726225 A1	
		CN 1913791 A	

REFERENCES CITED IN THE DESCRIPTION

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- Tobacco no Jiten (Dictionary of Tobacco). Tobacco Academic Studies Center, 31 March 2009 [0035]
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