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(54) FRAGRANCE-CARRYING CONSTITUENT MEMBER OF TOBACCO PRODUCT, TOBACCO PRODUCT, AND METHOD FOR PRODUCING SAME

(57) This fragrance-carrying constituent member of a tobacco product comprises: a constituent member of a tobacco product; and a fragrance composition which is carried on the constituent member and contains a fragrance-preserving agent and a fragrance.

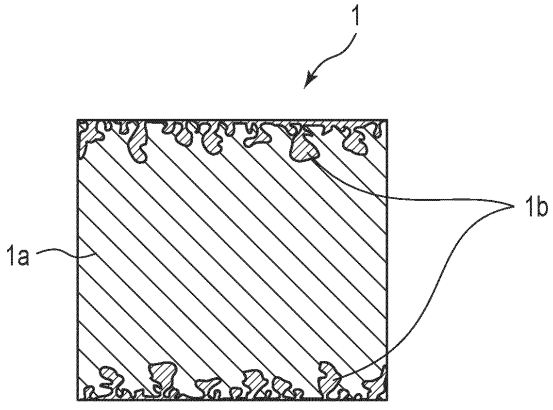

FIG. 1

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Description

FIELD

[0001] The present invention relates to a flavorant-carrying constituent member of a tobacco product, a tobacco product, and a method of producing the same.

BACKGROUND

[0002] As tobacco products including a tobacco flavor source such as cut tobacco, a flavor inhaler with which the user tastes the flavor through inhalation, and smokeless tobacco with which the user tastes the flavor by introducing the product directly into the nasal cavity or oral cavity are known. The flavor inhaler can be roughly divided into a combustion-type smoking system typified by a conventional cigarette and a non-combustion-type smoking system.

[0003] Such tobacco products are required to provide users with a stable flavor over a period of use. However, such tobacco products have a problem that, if a volatile flavorant component such as menthol is added in a solution state to cut tobacco, the flavorant component disappears after long-term storage, causing the flavorant effect to not last. Various reports have been made to solve the problem of disappearance of the flavorant component that occurs during storage.

[0004] For example, Patent Document 1 discloses that a pre-synthesized vanillin ester is added to cigarette paper or a tobacco filler of a cigarette, and the vanillin ester is decomposed by thermal decomposition during smoking, thereby releasing vanillin and ester flavor components. Also, Patent Document 2 discloses that a dispersion liquid including leaf tobacco particles is applied to cut tobacco or cigarette paper in order to provide a stable flavor over a puff period of a cigarette.

CITATION LIST

PATENT LITERATURE

[0005]

Patent Document 1: Jpn. Pat. Appln. KOKAI Publication No. 5-320097
Patent Document 2: WO2014/185103

SUMMARY

TECHNICAL PROBLEM

[0006] An object of the present invention is to provide a flavorant-carrying constituent member of a tobacco product that can stably release the flavorant when the tobacco product is used.

SOLUTION TO PROBLEM

[0007] According to one aspect, there is provided a flavorant-carrying constituent member of a tobacco product, comprising:

a constituent member of a tobacco product; and
a flavorant composition carried on the constituent member, and including a flavorant-holding agent and a flavorant.

[0008] According to another aspect, there is provided a tobacco product comprising the above-mentioned flavorant-carrying constituent member.

[0009] According to yet another aspect, there is provided a method of producing a flavorant-carrying constituent member of a tobacco product, comprising:

applying a liquid composition containing a flavorant-holding agent, a flavorant, and a solvent onto a surface of a constituent member of a tobacco product; and
drying the liquid composition-applied constituent member to obtain a flavorant-carrying constituent member.

[0010] According to yet another aspect, there is provided a method of producing a tobacco product, comprising: producing a tobacco product using a flavorant-carrying constituent member obtainable by the above-mentioned method.

ADVANTAGEOUS EFFECTS OF INVENTION

[0011] According to the present invention, it is possible to provide a flavorant-carrying constituent member of a tobacco product that can stably release the flavorant when the tobacco product is used.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012]

FIG. 1 is a cross-sectional schematic view showing an example of a flavorant-carrying constituent member.
FIG. 2 is a partial cutaway view showing another example of the flavorant-carrying constituent member.
FIG. 3 is a cross-sectional schematic view showing an example of a heat-not-bum-type smoking system prior to heating.
FIG. 4 is a cross-sectional schematic view showing an example of the heat-not-bum-type smoking system during heating.
FIG. 5 is a cross-sectional schematic view showing an example of a heat-not-bum-type flavor inhalation article.
FIG. 6 is a perspective view showing another example of the heat-not-burn-type flavor inhalation article.
FIG. 7 is an exploded view showing the heat-not-burn-type flavor inhalation article shown in FIG. 6.
FIG. 8 is a schematic view showing an inner structure of the heat-not-bum-type flavor inhalation article shown in FIG. 6.
FIG. 9 shows images showing existence states of a flavorant composition on sheet tobacco.
FIG. 10 shows images showing existence states of a flavorant composition on sheet tobacco.
FIG. 11 is a graph indicating a residual rate of components evaporated at 200°C.
FIG. 12 is a graph indicating a relationship between the number of puffs and the release amount of menthol.
FIG. 13 shows an image showing an existence state of a flavorant composition on a granular base material.
FIG. 14 is an image showing flavorant-carrying aluminum-laminated paper.
FIG. 15 is an image showing cut pieces of the flavorant-carrying aluminum-laminated paper.

DETAILED DESCRIPTION

[0013] Hereinafter, the present invention will be described in detail; however, the following description is intended to provide a detailed description of the present invention, and is not intended to limit the present invention.

<1. Flavorant-Carrying Constituent Member>

[0014] A flavorant-carrying constituent member of a tobacco product includes:

a constituent member of a tobacco product; and
a flavorant composition carried on the constituent member, and including a flavorant-holding agent and a flavorant.

(Tobacco product)

[0015] Herein, a tobacco product includes a flavor inhalation article with which the user tastes the flavor through inhalation, and smokeless tobacco with which the user tastes the flavor by introducing the product directly into the nasal cavity or oral cavity.

[0016] The flavor inhalation article includes a flavor source, and is any inhalation article with which the user tastes the flavor derived from the flavor source through inhalation. The flavor source included in the flavor inhalation article is preferably a tobacco flavor source. Specific examples of the flavor inhalation article include a combustion-type smoking article which provides the user with the flavor by combusting the flavor source, and a heat-not-bum-type flavor inhalation article which provides the user with the flavor by heating, not combusting, the flavor source.

[0017] The smokeless tobacco includes a flavor source, and is a product with which the user tastes the flavor derived from the flavor source by introducing the product directly into the nasal cavity or oral cavity. The flavor source included in the smokeless tobacco is preferably a tobacco flavor source. As smokeless tobacco, snuff tobacco and chewing tobacco are known.

(Constituent Member of Tobacco Product)

[0018] A "constituent member of a tobacco product" is a base member for carrying a flavorant composition. Therefore, in the description that follows, a constituent member of a tobacco product is also referred to as a "base member".

[0019] The base member is, for example, a tobacco filler. The tobacco filler is a tobacco material that functions as a tobacco flavor source in a tobacco product. The tobacco filler is, for example, cut tobacco, sheet tobacco, tobacco granules, or a combination thereof. The cut tobacco refers to cut pieces of leaf tobacco (dried tobacco leaves) that are ready to be incorporated into a tobacco product. The sheet tobacco refers to a tobacco molded body obtained by molding a tobacco material, such as cut tobacco or waste leaf tobacco (such as leaf scrap or cut tobacco scrap) generated in leaf processing facilities or manufacturing facilities, into a sheet shape, or cut pieces of the tobacco molded body. The tobacco granules refer to a tobacco molded body obtained by molding a tobacco material, such as cut tobacco or waste leaf tobacco (such as leaf scrap or cut tobacco scrap) generated in leaf processing facilities or manufacturing facilities, into a granular shape.

[0020] Herein, when the base member is a tobacco filler, the flavorant-carrying constituent member is referred to as a "flavorant-carrying tobacco filler". Specifically, when the base member is cut tobacco, the flavorant-carrying constituent member is referred to as "flavorant-carrying cut tobacco"; when the base member is sheet tobacco, the flavorant-carrying constituent member is referred to as "flavorant-carrying sheet tobacco"; and when the base member is tobacco granules, the flavorant-carrying constituent member is referred to as "flavorant-carrying tobacco granules".

[0021] An example of the flavorant-carrying constituent member when sheet tobacco is used as the base member is shown in FIG. 1. FIG. 1 shows flavorant-carrying sheet tobacco 1, in which a flavorant composition 1b is formed on sheet tobacco 1a. Since the sheet tobacco 1a has pores, the flavorant composition 1b enters the pores in the sheet tobacco 1a in FIG. 1.

[0022] Alternatively, the base member may be cigarette paper. The cigarette paper is paper for wrapping a tobacco filler in a flavor inhalation article. Herein, when the base member is cigarette paper, the flavorant-carrying constituent member is referred to as "flavorant-carrying cigarette paper".

[0023] Alternatively, the base member may be a filter. Specifically, the base member may be a filter material (e.g., cellulose acetate fibers, paper, or a film) configuring a filter, or may be a plug wrapper wrapped around the filter material.

[0024] Alternatively, the base member may be a base material of the flavor filler. The flavor filler refers to a material with a flavorant carried on a base material such as a film, granules, or metal foil, and is used as a flavor source together with the tobacco filler in a tobacco product. The base material of the flavor filler does not include a tobacco material, and plays the role of carrying a flavorant.

[0025] The base material of the flavor filler is preferably a granular base material. The granular base material may be either an organic material or an inorganic material. As the granular base material, granules of saccharides and/or polysaccharides, for example, can be used. Examples of the granules of saccharides and/or polysaccharides include granules made of white sugar and starch, white sugar granules, granules made of lactose and crystalline cellulose, and D-mannitol granules. As the granules of saccharides and/or polysaccharides, commercially available granules under the trade name of, for example, NONPAREIL (registered trademark, Freund Corporation) can be used. The average particle diameter of the granular base material is, for example, 100 to 900 μm. Herein, when the base member is a granular base material, the flavorant-carrying constituent member is referred to as a "flavorant-carrying granular base material".

[0026] An example of the flavorant-carrying constituent member when a granular base material is used as the base material is shown in FIG. 2. FIG. 2 shows a flavorant-carrying granular base material 2, in which a flavorant composition 2b is formed on a granular base material 2a. Since the flavorant-carrying granular base material 2 has been formed by spray drying, the flavorant composition 2b is carried on the surface of the granular base material 2a in the form of a large number of fine particles in FIG. 2.

[0027] Alternatively, the base material of the flavor filler is preferably metal foil. The metal foil may be a thin plate made of a composite or single metal material, or may be a metal foil composite made of a laminate of a metal material and another material (e.g., paper or a film). Examples of the thin plate made of a composite or single metal material include an aluminum foil plate, a copper foil plate, an iron foil plate, and an aluminum alloy foil plate. Examples of the metal foil composite include a laminate of aluminum foil and paper, namely, aluminum-laminated paper. As the aluminum-laminated paper, aluminum-bonded paper obtained by bonding aluminum foil to paper with an adhesive and aluminum-vapor-deposited paper obtained by depositing aluminum foil on paper are known.

[0028] When a metal foil is used as the base member, since the thermal conductivity of metal is high, the flavorant composition carried on the metal foil is easily warmed up when the tobacco product is used (especially when the flavor inhalation article is heated), thus promoting release of the flavorant contained in the flavorant composition. Herein, when the base member is metal foil, the flavorant-carrying constituent member is referred to as "flavorant-carrying metal foil".

[0029] Alternatively, the base material of the flavor filler may be a film. The film may be either an organic material or an inorganic material. The film may be, for example, a polymer film such as a polyethylene terephthalate (PET) film. The base material of the flavor filler may be of any other material that is capable of carrying the flavorant composition, such as paper, sheet, or non-woven fabric, and its composition or shape is not particularly limited.

(Flavorant composition)

[0030] The "flavorant composition" is carried on a base member, and includes a flavorant-holding agent and a flavorant. The flavorant composition can be formed by applying a liquid composition containing the flavorant-holding agent, the flavorant, and a solvent to the base member, and drying the liquid composition-applied base member. Accordingly, the flavorant composition is a dried composition formed on the base member, namely, a solid composition, and can also be referred to as a "flavorant-carried region". The drying may be performed until the liquid composition is visually in a solid state, and the solvent may be either completely removed or partly remain.

[0031] The "flavorant-holding agent" is preferably a flavorant-holding agent soluble in an organic solvent. In one embodiment, the flavorant-holding agent is preferably a polysaccharide, and more preferably a polysaccharide soluble in an organic solvent. In another embodiment, the flavorant-holding agent is preferably a cellulose derivative, and more preferably a cellulose derivative soluble in an organic solvent. Here, the cellulose derivative refers to a derivative obtained by introducing a substituent into the OH group of cellulose, and examples include ethyl cellulose, hydroxypropyl cellulose, and hydroxypropyl methylcellulose (e.g., hydrophobically-modified hydroxypropyl methylcellulose). The cellulose derivative is widely used in general as a binder, a film-forming agent, and a gelling agent, with the complex effects brought about by its characteristic functional group. Here, the organic solvent as in the expression "soluble in an organic solvent..." is, for example, ethanol. When a flavorant-holding agent soluble in an organic solvent is used as the flavorant-holding agent, the solvent in the liquid composition is an organic solvent.

[0032] The cellulose derivative is preferably an amphipathic cellulose derivative, and more preferably hydroxypropyl cellulose. The substitution degree of hydroxypropyl cellulose is, for example, 0.1 to 4.5, preferably 2.0 to 4.5. Herein, the substitution degree of hydroxypropyl cellulose represents the number of hydroxypropyl groups per glucose. As the hydroxypropyl cellulose, a commercially available product under the trade name of, for example, CELNY from Nippon Soda Co., Ltd. can be used.

[0033] Advantages of using hydroxypropyl cellulose as a flavorant-holding agent will be described below. Hydroxypropyl cellulose is a derivative of cellulose, and is a substance obtained by substituting the OH groups of cellulose with hydroxypropyl groups. Hydroxypropyl cellulose is widely used as a binder, a film-forming agent, and a gelling agent. Cellulose is a hydrophobic substance, since OH groups are hydrogen-bonded between molecules to crystallize. On the other hand, hydroxypropyl cellulose has hydroxypropyl groups, which make it difficult to form hydrogen bonds between molecules, and is therefore a substance having both hydrophilicity and hydrophobicity (i.e., an amphipathic substance).

[0034] It has been reported that, in a system including glycerin, hydroxypropyl cellulose forms a complex with a network structure through an interaction (hydrogen bond) between the hydroxypropyl groups of the hydroxypropyl cellulose and the OH groups of glycerin. Even when a flavorant other than glycerin is used, it is considered that hydroxypropyl cellulose can form a complex with a network structure through an interaction (hydrogen bond, a hydrophobic interaction, etc.) with the flavorant. Further, since hydroxypropyl cellulose has amphipathicity, it is considered that a hydrophilic flavorant and a hydrophobic flavorant can be incorporated into the network structure without using an emulsifier or the like. It is considered that such a complex with a network structure allows the flavorant to be stably carried without being volatilized during storage of the tobacco product, and to be stably released during the use of the tobacco product (in particular, during heating of the flavor inhalation article).

[0035] In addition, hydroxypropyl cellulose is soluble in an organic solvent, in particular, ethanol. Therefore, when the liquid composition containing hydroxypropyl cellulose, a flavorant, and a solvent is prepared as an ethanol solution, the viscosity of the ethanol solution can be made lower than that of an aqueous solution, which is advantageous over the aqueous solution in terms of transportation, coating, etc. in the manufacturing process. When the ethanol solution is dried to form a flavorant composition (e.g., a film of hydroxypropyl cellulose), the solvent vaporizes faster than in the case of the aqueous solution, which is advantageous in terms of reduction in manufacturing time and reduction in energy cost during drying.

[0036] The "flavorant" contained in the flavorant composition is a substance that provides a flavor and taste. The flavorant may be either a natural or synthetic flavorant. The flavorant may be either a single kind of flavorant, or a mixture of a plurality of kinds of flavorants. As the flavorant, any flavorant commonly used in tobacco products (in particular, flavor inhalation articles) can be used. The flavorant can be contained in the flavorant composition in an amount such that the flavorant-carrying constituent member can provide a preferable flavor and taste. The flavorant may be contained in the flavorant composition in an amount of, for example, 0.5 to 7000% by mass with respect to the flavorant-holding agent.

[0037] The flavorant is, for example, a liquid flavorant or flavorant component-containing particles. Hereinafter, the "liquid flavorant" and the "flavorant component-containing particles" will be described in this order.

[0038] The liquid flavorant refers to a flavorant that is present in a liquid state in the liquid composition used as a raw material for forming the flavorant composition.

[0039] The liquid flavorant may be a liquid flavorant containing only flavorant component(s), or may be a liquid flavorant consisting of a solvent and flavorant component(s) dissolved or dispersed in the solvent. Examples of the former liquid flavorant include glycerin, propylene glycol, 1,3-butanediol, and polyethylene glycol 200. The latter liquid flavorant may

be a liquid flavorant consisting of a water-soluble flavorant and water, a liquid flavorant consisting of an oil-soluble flavorant and edible oil, or an emulsified flavorant consisting of an oil-soluble flavorant and water. Examples of the latter liquid flavorant include an essential oil and plant extracts.

[0040] The former liquid flavorant may be present as a liquid on the base member in the flavorant-carrying constituent member, or may be present in a state of being soaked in the base member in the flavorant-carrying constituent member. For the latter liquid flavorant, all the solvent may be volatilized and removed from the flavorant-carrying constituent member, or part of the solvent may remain in the flavorant-carrying constituent member. When a part of the solvent contained in the liquid flavorant remains in the flavorant-carrying constituent member, the latter liquid flavorant may be present as a liquid on the base member, or may be present in a state of being soaked in the base member.

[0041] As the liquid flavorant, any liquid flavorant commonly used in combination with a tobacco flavor source in tobacco products (in particular, flavor inhalation articles) can be used. The liquid flavorant is, for example, polyol. Alternatively, the liquid flavorant may be a combination of polyol and a flavorant other than polyol. Polyol is a compound having a plurality of alcoholic hydroxy groups, and is also referred to as a polyhydric alcohol. Polyol is, for example, glycerin, propylene glycol, 1,3-butanediol, polyethylene glycol 200, or a combination thereof. In addition to the role of providing the flavor and taste, polyol can play a role of controlling, in the presence of another flavorant (i.e., a flavorant other than polyol), release of said another flavorant. Polyol can be contained in the flavorant composition in an amount such that the flavorant-carrying constituent member can provide a preferable flavor and taste. Polyol may be contained in the flavorant composition in an amount of, for example, 0.5 to 7000% by mass with respect to the flavorant-holding agent.

[0042] The "flavorant other than polyol" is typically a substance that provides a flavor. The flavorant other than polyol is, preferably, a liquid flavorant other than polyol. As the flavorant other than polyol, any flavorant (preferably a liquid flavorant) commonly used in a tobacco product (in particular, a flavor inhalation article) can be used, and preferably, any flavorant (preferably a liquid flavorant) commonly used in combination with a tobacco flavor source in a tobacco product (in particular, a flavor inhalation article) can be used. Examples of the flavorant other than polyol include synthetic flavorants such as menthol, jasmonate, maltol, β-ionone, citral, ethyl butyrate, and undecalactone; essential oils such as mint oil, orange oil, styrax, and green tea extracts; oleoresin such as vanilla oleoresin; plant extracts such as a tobacco extraction liquid; and a combination thereof. The flavorant other than polyol may be either a natural flavorant or a synthetic flavorant. The flavorant other than polyol may be a single kind of flavorant, or a mixture of a plurality of kinds of flavorants. The flavorant other than polyol can be contained in the flavorant composition in an amount such that the flavorant-carrying constituent member can provide a preferable flavor and taste. The flavorant other than polyol may be contained in the flavorant composition in an amount of, for example, 0.5 to 7000% by mass with respect to the flavorant-holding agent.

[0043] The "flavorant component-containing particles" refer to any particles containing flavorant component(s), and are, for example, ground leaf tobacco or a powder flavorant. The flavorant component-containing particles can be present in a solid state both in the liquid composition used as a raw material for forming the flavorant composition and in the flavorant composition.

[0044] The "ground leaf tobacco" are particles obtained by grinding leaf tobacco (i.e., dried tobacco leaves used as a tobacco flavor source of a tobacco product). The ground leaf tobacco may have, for example, an average particle diameter of 30 to 120 μm. The grinding may be performed using a known grinding mill, and may be either dry grinding or wet grinding. Accordingly, the ground leaf tobacco may also be referred to as "leaf tobacco particles". Herein, the average particle diameter is determined by a laser diffraction/scattering method, and refers to a value measured using a laser diffraction particle size distribution analyzer (e.g., LA-950 from Horiba, Ltd.). The ground leaf tobacco can be contained in the flavorant composition in an amount such that the flavorant-carrying constituent member can provide a preferable flavor and taste. The ground leaf tobacco may be contained in the flavorant composition in an amount of, for example, 0.5 to 7000% by mass with respect to the flavorant-holding agent.

[0045] The "powder flavorant" is any powder containing flavorant component(s). The "powder flavorant" does not encompass ground leaf tobacco. The powder flavorant may be either a natural flavorant or a synthetic flavorant. The powder flavorant may be either a single kind of powder flavorant, or a mixture of a plurality of kinds of powder flavorants. As the powder flavorant, any powder flavorant commonly used in tobacco products (in particular, flavor inhalation articles) can be used. The powder flavorant may be, for example, cocoa, or powder obtained by spray-drying and powderizing a flavorant dispersion liquid. Alternatively, the powder flavorant may be powder obtained by adsorbing a flavorant on porous fine particle calcium carbonate (e.g., PORECAL-N from Shiraishi Calcium Kaisha, Ltd.), or porous fine particle activated carbon (e.g., KURARAY COAL from Kuraray Co., Ltd.). The powder flavorant may have, for example, an average particle diamter of 7 to 80 μm.

[0046] The powder flavorant is present in the form of particles on the base member at the stage of the flavorant-carrying constituent member. The powder flavorant is dispersed in the dispersion medium at the stage of the liquid composition (raw material of the flavorant composition) and does not dissolve in the dispersion medium. The powder flavorant can be contained in the flavorant composition in an amount such that the flavorant-carrying constituent member can provide a preferable flavor and taste. The powder flavorant may be contained in the flavorant composition in an amount of, for example, 0.5 to 7000% by mass with respect to the flavorant-holding agent. The powder flavorant may

be used in combination with ground leaf tobacco.

[0047] When the flavorant is "flavorant component-containing particles", the flavorant composition may further include a liquid flavorant, in addition to the flavorant-holding agent and the flavorant component-containing particles. The liquid flavorant is as described above. For example, the flavorant composition may further include polyol, in addition to the flavorant-holding agent and the flavorant component-containing particles (e.g., ground leaf tobacco or powder flavorant).

[0048] The flavorant composition may be present in the form of a coating on the surface of the base member so as to cover the entire surface of the base member, or may be present on the base member so as to cover part of the surface of the base member. The flavorant composition may be locally present on the surface of the base member (i.e., may be present only on the surface of the base member and may not permeate the base member), or all of the flavorant composition may not necessarily be present on the surface of the base member, with part of the flavorant composition permeating the base member.

(Preferable Embodiments of Flavorant Composition)

[0049] In one embodiment, the flavorant composition includes hydroxypropyl cellulose and a flavorant.

First Embodiment (Embodiment in which Liquid Flavorant is Contained as Flavorant)

[0050] In a first embodiment, the flavorant composition includes hydroxypropyl cellulose and a liquid flavorant.

[0051] In a preferable embodiment, the flavorant composition includes hydroxypropyl cellulose and polyol. In a more preferable embodiment, the flavorant composition includes hydroxypropyl cellulose and glycerin. In a yet more preferable embodiment, the flavorant composition includes hydroxypropyl cellulose, glycerin, and propylene glycol.

[0052] In another preferable embodiment, the flavorant composition includes hydroxypropyl cellulose, polyol, and a flavorant other than polyol (preferably a liquid flavorant other than polyol). The flavorant other than polyol is in general a liquid flavorant used in combination with a tobacco flavor source in a tobacco product (in particular, a flavor inhalation article), and is, for example, menthol. In a more preferable embodiment, the flavorant composition includes hydroxypropyl cellulose, glycerin, and a flavorant other than polyol (preferably, a liquid flavorant other than polyol). In a yet more preferable embodiment, the flavorant composition includes hydroxypropyl cellulose, glycerin, propylene glycol, and a flavorant other than polyol (preferably, a liquid flavorant other than polyol).

[0053] When a combination of polyol and a flavorant other than polyol is used as the flavorant, the polyol can promote the release of the flavorant other than polyol during the use of the tobacco product (in particular, during heating of the flavor inhalation article). In this case, by adjusting the ratio of hydroxypropyl cellulose to polyol, the release timing of the flavorant other than polyol can be regulated.

Second Embodiment (Embodiment in which Flavorant Component-Containing Particles are Contained as Flavorant)

[0054] In the second embodiment, the flavorant composition includes hydroxypropyl cellulose and flavorant component-containing particles (e.g., ground leaf tobacco or powder flavorant).

[0055] In a preferable embodiment, the flavorant composition includes hydroxypropyl cellulose, flavorant component-containing particles, and polyol. In a more preferable embodiment, the flavorant composition includes hydroxypropyl cellulose, flavorant component-containing particles, and glycerin. In a yet more preferable embodiment, the flavorant composition includes hydroxypropyl cellulose, flavorant component-containing particles, glycerin, and propylene glycol.

[0056] In another preferable embodiment, the flavorant composition includes hydroxypropyl cellulose, flavorant component-containing particles, polyol, and a liquid flavorant other than polyol. The liquid flavorant other than polyol is in general a liquid flavorant used in combination with a tobacco flavor source in a tobacco product (in particular, a flavor inhalation article), and is, for example, menthol. In a more preferable embodiment, the flavorant composition includes hydroxypropyl cellulose, flavorant component-containing particles, glycerin, and a liquid flavorant other than polyol. In a yet more preferable embodiment, the flavorant composition includes hydroxypropyl cellulose, flavorant component-containing particles, glycerin, propylene glycol, and a liquid flavorant other than polyol.

[0057] When a combination of polyol and a liquid flavorant other than polyol is used in addition to the flavorant component-containing particles, the polyol can promote the release of the liquid flavorant other than polyol during the use of the tobacco product (in particular, during heating of the flavor inhalation article). In this case, by adjusting the ratio of hydroxypropyl cellulose to polyol, the release timing of the liquid flavorant other than polyol can be regulated.

<2. Method of Producing Flavorant-Carrying Constituent Member>

[0058] The above-described "flavorant-carrying constituent member of a tobacco product" can be produced using a liquid composition as a raw material for forming a flavorant composition. That is, according to another aspect, there is

provided a method of producing a flavorant-carrying constituent member of a tobacco product, including:

applying a liquid composition containing a flavorant-holding agent, a flavorant, and a solvent onto a surface of a constituent member of a tobacco product; and
drying the liquid composition-applied constituent member to obtain a flavorant-carrying constituent member.

[0059] The "liquid composition" contains a flavorant-holding agent, a flavorant, and a solvent. The "flavorant-holding agent" and the "flavorant" are as discussed in the section "1. Flavorant-Carrying Constituent Member". It is preferable that the solvent be an organic solvent. By using an organic solvent as the solvent, it is possible to reduce the time of the drying process, thereby allowing the flavorant-carrying constituent member to be produced in a short period of time. The organic solvent is, for example, ethanol. When the flavorant is a liquid flavorant, the solvent dissolves the flavorant-holding agent, and the solvent and the liquid flavorant are mixed. On the other hand, when the flavorant is flavorant component-containing particles, the solvent dissolves the flavorant-holding agent, and the flavorant component-containing particles are dispersed in the solvent. That is, when the flavorant is flavorant component-containing particles, the solvent plays the role of the dispersion medium, in addition to the role of the solvent.

[0060] The blending of the liquid composition can be suitably determined in such a manner that the flavorant-carrying constituent member can provide a preferable flavor and taste, depending on the type of the blended component (e.g., the flavorant), the type of the base member, etc. According to the examples to be described later, the blending of the liquid composition can be, for example, approximately 15 to approximately 25 grams of hydroxypropyl cellulose, approximately 30 to approximately 60 grams of ground leaf tobacco, and approximately 20 to approximately 50 grams of glycerin, with respect to 100 mL of ethanol. According to the examples to be described later, the content of ethanol in the liquid composition can be, for example, approximately 40 to approximately 70% by mass. According to the examples to be described later, the mass ratio of hydroxypropyl cellulose to the flavorant (ground leaf tobacco and glycerin) in the liquid composition can be, for example, 1: approximately 2 to 1: approximately 6.

[0061] First, the liquid composition is applied onto a surface of a constituent member of a tobacco product. The "constituent member of the tobacco product" has been discussed in the section "1. Flavorant-Carrying Constituent Member", and will also be referred to as a "base member" in the description that follows.

[0062] The method of applying the liquid composition to the base member may be any method that is capable of uniformly applying the liquid composition onto the base member, and is not particularly limited. For example, the liquid composition may be added onto or coated on the surface of the base member, the liquid composition may be sprayed onto the surface of the base member, the base member may be immersed in the liquid composition, or the liquid composition may be directly injected into the portion of the base member in a tobacco rod via an injector, etc.

[0063] Approaches that can be adopted in applying the liquid composition to cut tobacco include: directly adding the liquid composition to a surface of the cut tobacco via a transfer pump; spraying the liquid composition on the cut tobacco with a nozzle atomizer; or directly injecting the liquid composition into the portion of the cut tobacco in a tobacco rod via an injector, etc. Alternatively, the application of the liquid composition to cut tobacco may be performed by immersing the cut tobacco in the liquid composition.

[0064] Approaches that can be adopted in applying the liquid composition to sheet tobacco include: extruding the liquid composition onto a surface of the sheet tobacco with a slit feeder; and coating the liquid composition on the sheet tobacco with a film applicator, etc. Alternatively, approaches such as spraying and immersing can also be adopted, in accordance with the same approach that can be adopted in the application to cut tobacco. When sheet tobacco is cut, it is preferable to follow the same approach as that in the application to cut tobacco.

[0065] Approaches that can be adopted in applying the liquid composition to cigarette paper include: extruding the liquid composition with a slit feeder; and coating the liquid composition with a film applicator, etc., as described above. Alternatively, approaches such as spraying and immersing can also be adopted, in accordance with the same approach that can be adopted in the application to cut tobacco.

[0066] When the liquid composition is applied to tobacco granules or a granular base material, a granule coating technique can be used. For example, in accordance with the same approach that can be adopted in the application to cut tobacco, approaches such as directly adding the liquid composition to surfaces of the tobacco granules or a surface of the granular base material, or spraying the liquid composition on the tobacco granules or the granular base material with a nozzle atomizer can be adopted.

[0067] The application amount of the liquid composition can be suitably determined in such a manner that the flavorant-carrying constituent member can provide a preferable flavor and taste, depending on the composition (i.e., the type and amount of the blended components) of the liquid composition, the type of the base member, etc. According to the examples to be described later, when the liquid composition containing ground leaf tobacco is applied to sheet tobacco, the application amount of the liquid composition can be approximately 0.1 to approximately 2 grams with respect to 100 cm^2 of the sheet tobacco. According to the examples to be described later, when the liquid composition containing ground leaf tobacco is applied to a granular base material, the application amount of the liquid composition can be

approximately 50 to approximately 150 parts by mass with respect to 100 parts by mass of the granular base material.

[0068] Next, a base member to which the liquid composition has been applied is dried. The drying may be performed until the liquid composition is visually in a solid state, and the solvent may be either completely removed or partly remain. It is desirable that the drying be performed until most of the solvent in the liquid composition is volatilized.

[0069] The drying may be performed by either natural drying or heat drying. However, when the drying is performed by heat drying, it is preferable to set the heating conditions in such a manner that the flavorant component(s) in the liquid composition will not be lost. In the case of, for example, hot-air drying, it is preferable to set the hot air temperature, the hot air volume, the cooling temperature, and the cooling air volume in such a manner that the flavorant component(s) in the liquid composition will not be lost in the heat drying and the cooling after the heat drying.

[0070] Through the drying process, the flavorant composition is formed on a base member, and a flavorant-carrying constituent member is produced. The solvent included in the liquid composition may be completely volatilized and removed in the flavorant-carrying constituent member, or part of the solvent included in the liquid composition may remain in the flavorant-carrying constituent member.

[0071] According to another aspect, there is provided a flavorant-carrying constituent member obtainable by the above-described method. According to yet another aspect, there is provided a method of producing a tobacco product, including: producing a tobacco product using a flavorant-carrying constituent member obtainable by the above-described method.

<3. Tobacco Product>

[0072] The above-described "flavorant-carrying constituent member", such as a flavorant-carrying tobacco filler, flavorant-carrying cigarette paper, flavorant-carrying granular base material, or flavorant-carrying metal foil, can be incorporated into a tobacco product. Specifically, when the tobacco product is a flavor inhalation article, at least one of the flavorant-carrying tobacco filler, the flavorant-carrying cigarette paper, the flavorant-carrying granular base material, and the flavorant-carrying metal foil can be incorporated into the flavor inhalation article. When the tobacco product is smokeless tobacco, at least one of the flavorant-carrying tobacco filler, the flavorant-carrying granular base material, and the flavorant-carrying metal foil can be incorporated into the smokeless tobacco. That is, according to another aspect, there is provided a tobacco product including the above-described "flavorant-carrying constituent member".

[0073] The tobacco product of the present invention has the same configuration as that of an ordinary tobacco product, except that a constituent member of the ordinary tobacco product is replaced with the flavorant-carrying constituent member of the present invention. In a specific embodiment, the tobacco product of the present invention may include at least one selected from the above-described "flavorant-carrying cut tobacco", the above-described "flavorant-carrying sheet tobacco", the above-described "flavorant-carrying tobacco granules", the above-described "flavorant-carrying granular base material", the above-described "flavorant-carrying metal foil", and the above-described "flavorant-carrying cigarette paper". The tobacco product of the present invention may include the above-described "flavorant-carrying constituent member" in combination. For example, the above-described "flavorant-carrying cut tobacco" and the above-described "flavorant-carrying sheet tobacco" may be included in combination, or the above-described "flavorant-carrying cut tobacco" and the above-described "flavorant-carrying cigarette paper" may be included in combination.

[0074] The flavorant-carrying constituent member may be blended into the tobacco product in any amount. The flavorant-carrying constituent member may be used in combination with a constituent member that does not carry a flavorant, or may be used alone, not in combination with a constituent member that does not carry a flavorant. The flavorant-carrying cut tobacco, the flavorant-carrying sheet tobacco, the flavorant-carrying tobacco granules, the flavorant-carrying granular base material, and the flavorant-carrying metal foil can be blended in an amount of, for example, 20 to 100% by mass with respect to the entire tobacco filler, assuming that the entire tobacco filler included in a single tobacco product is 100% by mass.

[0075] According to one embodiment, the above-described "flavorant-carrying constituent member" can be incorporated into a combustion-type flavor inhalation article or a heat-not-bum type flavor inhalation article. That is, according to a preferable embodiment, a combustion-type flavor inhalation article or a heat-not-bum type flavor inhalation article including the above-described "flavorant-carrying constituent member" is provided. The combustion-type flavor inhalation article is a flavor inhalation article which provides the user with the flavor by combusting the flavor source, as described above. Also, the heat-not-burn type flavor inhalation article is a flavor inhalation article which provides the user with the flavor by heating, not combusting, the flavor source.

[0076] Examples of the combustion-type flavor inhalation article include a cigarette, a pipe, a *kiseru* (i.e., traditional Japanese pipe for fine cut tobacco), a cigar, and a cigarillo.

[0077] The heat-not-bum type flavor inhalation article may be heated by a heating device separate from the article, or may be heated by a heating device integrated with the article. Herein, the heat-not-bum type flavor inhalation article and the heating device in the former flavor inhalation article (separate type) are collectively referred to as a "heat-not-bum type smoking system".

[0078] Hereinafter, an example of the heat-not-bum type smoking system will be described with reference to FIGS. 3

to 5. Furthermore, an example of the heat-not-bum type flavor inhalation article in the latter flavor inhalation article (integrated type) will be described with reference to FIGS. 6 to 8.

[0079] FIGS. 3 and 4 are cross-sectional schematic views showing an example of the heat-not-burn type smoking system. FIG. 3 shows a state before a heat-not-bum type flavor inhalation article 20 is inserted into a heating device 10, and FIG. 4 shows a state in which the heat-not-bum type flavor inhalation article 20 is inserted into the heating device 10 and heated. FIG. 5 is a cross-sectional view of the heat-not-bum type flavor inhalation article 20.

[0080] As shown in FIGS. 3 and 4, the heat-not-bum type smoking system includes the heat-not-bum type flavor inhalation article 20, and the heating device 10 which heats a tobacco-containing segment 20A of the heat-not-bum type flavor inhalation article 20 from outside. The heat-not-bum type smoking system is not limited to the configuration of FIGS. 3 and 4, provided that a heat-not-bum type flavor inhalation article 20 and a heating device 10 for heating the heat-not-bum type flavor inhalation article 20 are provided.

[0081] The heating device 10 shown in FIGS. 3 and 4 includes a body 11, a heater 12, a metal tube 13, a battery unit 14, and a control unit 15. The body 11 includes a tubular recess 16, and the heater 12 and the metal tube 13 are arranged on an inner side surface of the recess 16 at a position corresponding to the tobacco-containing segment 20A of the heat-not-bum type flavor inhalation article 20 inserted into the recess 16. The body 11 further includes a ventilation hole 17, and the ventilation hole 17 allows the outside of the body 11 to communicate with the recess 16 to supply air to the heat-not-bum type flavor inhalation article 20 put into the recess 16.

[0082] The heater 12 may be an electrical resistance-based heater, and heating of the heater 12 is performed through electric power supplied from the battery unit 14 in accordance with an instruction from the control unit 15 that performs temperature control.

[0083] The heat generated from the heater 12 is conveyed to the tobacco-containing segment 20A of the heat-not-bum type flavor inhalation article 20 through the metal tube 13 having a high thermal conductivity.

[0084] Since a schematic view is shown in FIG. 4, a gap appears to exist between an outer periphery of the heat-not-bum type flavor inhalation article 20 and an inner periphery of the metal tube 13; in actuality, however, it is desirable that a gap between the outer periphery of the heat-not-bum type flavor inhalation article 20 and the inner periphery of the metal tube 13 be absent for the purpose of efficient heat transfer.

[0085] The heating device 10 heats the tobacco-containing segment 20A of the heat-not-bum type flavor inhalation article 20 from the outside, but may heat it from the inside.

[0086] The heating temperature of the heating device 10 is not particularly limited, but is preferably 400°C or lower, more preferably 150°C or higher and 400°C or lower, and even more preferably 200°C or higher and 350°C or lower. The heating temperature refers to a temperature of the heater 12 of the heating device 10.

[0087] As shown in FIG. 5, the heat-not-bum type flavor inhalation article 20 (hereinafter simply referred to as "flavor inhalation article 20") has a cylindrical shape. The circumference of the flavor inhalation article 20 is preferably 16 mm to 27 mm, more preferably 20 mm to 26 mm, and even more preferably 21 mm to 25 mm. A full length (horizontal length) of the flavor inhalation article 20 is not particularly limited, but is preferably 40 mm to 90 mm, more preferably 50 mm to 75 mm, and even more preferably 50 mm to 60 mm.

[0088] The flavor inhalation article 20 is configured of a tobacco-containing segment 20A filled with a tobacco filler 21, a filter part 20C configuring a mouthpiece, and a connecting part 20B connecting the tobacco-containing segment 20A and the filter part 20C.

[0089] The tobacco-containing segment 20A has a cylindrical shape. A full length (axial length) of the tobacco-containing segment 20A is, for example, preferably 20 to 70 mm, more preferably 20 to 50 mm, and even more preferably 20 to 30 mm. A cross-sectional shape of the tobacco-containing segment 20A is not particularly limited, but may be, for example, a circle, an ellipse, or a polygon.

[0090] The tobacco-containing segment 20A includes a tobacco filler 21, and cigarette paper 22 wrapped around the tobacco filler 21. The tobacco filler 21 may include the "flavorant-carrying constituent member" of the present invention, such as the "flavorant-carrying cut tobacco", the "flavorant-carrying sheet tobacco", the "flavorant-carrying tobacco granules", the "flavorant-carrying granular base material", or the "flavorant-carrying metal foil". The cigarette paper 22 may be the flavorant-carrying cigarette paper of the present invention.

[0091] The tobacco filler 21 may include an ordinary tobacco filler, in addition to the "flavorant-carrying constituent member" of the present invention. The ordinary tobacco filler can be constituted of cut tobacco and/or cut pieces obtained by cutting sheet tobacco at a predetermined width (cut pieces of sheet tobacco). The "flavorant-carrying cut tobacco" of the present invention and the "flavorant-carrying sheet tobacco" of the present invention may have the same size as that of the ordinary tobacco filler. The tobacco filler 21 may contain an aerosol-generating substrate. Examples of the aerosol-generating substrate include glycerin, propylene glycol (PG), triethyl citrate (TEC), triacetin, and 1,3-butanediol. These may be used either alone or in combination of two or more.

[0092] The filter part 20C has a cylindrical shape. The filter part 20C includes a rod-shaped first segment 25 configured by being filled with cellulose acetate fibers and a rod-shaped second segment 26 configured by being similarly filled with cellulose acetate fibers. The first segment 25 is located on the side of the tobacco-containing segment 20A. The first

segment 25 may include a hollow part. The second segment 26 is located on the side of the mouthpiece. The second segment 26 is solid. The first segment 25 is configured of a first filling layer (cellulose acetate fibers) 25a and an inner plug wrapper 25b wrapped around the first filling layer 25a. The second segment 26 is configured of a second filling layer (cellulose acetate fibers) 26a and an inner plug wrapper 26b wrapped around the second filling layer 26a. The first segment 25 and the second segment 26 are connected by an outer plug wrapper 27. The outer plug wrapper 27 is adhered to the first segment 25 and the second segment 26 with a vinyl acetate emulsion-based adhesive, etc.

[0093] The length of the filter part 20C may be, for example, 10 to 30 mm, the length of the connecting part 20B may be, for example, 10 to 30 mm, the length of the first segment 25 may be, for example, 5 to 15 mm, and the length of the second segment 26 may be, for example, 5 to 15 mm. The lengths of these individual segments are an example, and may be suitably varied according to the production suitability, the required quality, the length of the tobacco-containing segment 20A, etc.

[0094] For example, the first segment 25 (center hole segment) is configured of a first filling layer 25a including one or more hollow parts, and an inner plug wrapper 25b that covers the first filling layer 25a. The first segment 25 has a function of increasing the strength of the second segment 26. The first filling layer 25a of the first segment 25 is filled with, for example, cellulose acetate fibers at a high density. The cellulose acetate fibers are cured through addition of, for example, 6 to 20% by mass of a triacetin-containing plasticizer with respect to the mass of cellulose acetate. The hollow part of the first segment 25 has an inner diameter of, for example, φ 1.0 to φ 5.0 mm.

[0095] The fiber filling density of the first filling layer 25a of the first segment 25 may be configured, for example, to be relatively high, or may be equivalent to the fiber filling density of the second filling layer 26a of the second segment 26 to be described below. Therefore, at the time of inhalation, air or aerosol flows only through the hollow part, and almost no air or aerosol flows through the first filling layer 25a. When it is desired, for example, to reduce a decrease in the aerosol components due to filtration in the second segment 26, the length of the second segment 26 may be shortened and the first segment 25 may be lengthened accordingly.

[0096] Replacing the shortened second segment 26 with the first segment 25 is effective in increasing the delivery amount of the aerosol components. Since the first filling layer 25a of the first segment 25 is a fiber-filling layer, the feeling of touch from the outside during use does not cause discomfort to the user.

[0097] The second segment 26 is configured of the second filling layer 26a and an inner plug wrapper 26b that covers the second filling layer 26a. The second segment 26 (filter segment) is filled with cellulose acetate fibers at a general density, and has filtration properties of general aerosol components.

[0098] The first segment 25 and the second segment 26 may have different filtration properties for filtering aerosol (mainstream smoke) released from the tobacco-containing segment 20A. At least one of the first segment 25 and the second segment 26 may include a flavorant. The filter part 20C may take any structure, which may be a structure including a plurality of segments, or may be configured of a single segment.

[0099] The connecting part 20B has a cylindrical shape. The connecting part 20B has a paper tube 23 formed in a cylindrical shape using, for example, thick paper.

[0100] The lining paper 28 is wrapped in a cylindrical shape around the outside of the tobacco-containing segment 20A, the connecting part 20B, and the filter part 20C so as to connect them integrally. A vinyl acetate emulsion-based adhesive is applied onto the entire surface or substantially the entire surface of one surface (inner surface) of the lining paper 28 except in the vicinity of ventilation opening parts 24. The ventilation opening parts 24 are formed by laser processing from outside, after the tobacco-containing segment 20A, the connecting part 20B, and the filter part 20C are integrally formed by the lining paper 28.

[0101] The ventilation opening part 24 has two or more through holes that penetrate the connecting part 20B in a thickness direction. The two or more through holes are formed so as to be arranged radially when viewed from an extension of the central axis of the flavor inhalation article 20. In the present embodiment, the ventilation opening part 24 is provided in the connecting part 20B, but may be provided in the filter part 20C. In the present embodiment, two or more through holes of the ventilation opening part 24 are provided side by side in a single row at regular intervals on one ring; however, they may be provided side by side in two rows at regular intervals on two rings, or one or two rows of the ventilation opening part 24 may be provided side by side in a discontinuous or irregular manner. When the user holds a mouthpiece to inhale, the outside air is taken into the mainstream smoke via the ventilation opening part 24.

[0102] Hereinafter, another example of the heat-not-bum type flavor inhalation article will be described with reference to FIGS. 6 to 8.

[0103] FIG. 6 is a perspective view showing an example of an outer appearance of the heat-not-burn type flavor inhalation article. FIG. 7 is an exploded view showing an example of the heat-not-bum type flavor inhalation article. A heat-not-burn type flavor inhalation article 30 (hereinafter simply referred to as a flavor inhalation article 30) is an electronic cigarette, a nebulizer, or the like, and generates an aerosol in accordance with the inhalation of the user and provides it to the user. A single continuous inhalation performed by the user is referred to as a "puff". The flavor inhalation article 30 adds components such as flavor components to the generated aerosol and releases them into the oral cavity of the user.

[0104] As shown in FIGS. 6 and 7, the flavor inhalation article 30 includes a main body 30A, an aerosol source holding

part 30B, and an additive component holding part 30C. The main body 30A supplies electric power and controls the overall operation of the device. The aerosol source holding part 30B holds an aerosol source for generating an aerosol through atomization. The additive component holding part 30C holds the tobacco filler 38. The tobacco filler 38 may include the "flavorant-carrying constituent member" of the present invention, such as the "flavorant-carrying cut tobacco", the "flavorant-carrying sheet tobacco", the "flavorant-carrying tobacco granules", the "flavorant-carrying granular base material", or the "flavorant-carrying metal foil". By holding the mouthpiece, which is an end portion on the side of the additive component holding part 30C, the user can inhale the aerosol to which the flavor or the like has been added.

[0105] The flavor inhalation article 30 is formed by assembling of the main body 30A, the aerosol source holding part 30B, and the additive component holding part 30C by the user, etc. Each of the main body 30A, the aerosol source holding part 30B, and the additive component holding part 30C has a cylindrical shape, a truncated cone shape, or the like having a predetermined diameter, and the main body 30A, the aerosol source holding part 30B, and the additive component holding part 30C can be coupled in this order. The main body 30A and the aerosol source holding part 30B are coupled to each other by, for example, screwing together a male screw portion and a female screw portion respectively provided at their end portions. The aerosol source holding part 30B and the additive component holding part 30C are, for example, coupled by fitting the additive component holding part 30C having a tapered side surface in a tubular portion provided at one end of the aerosol source holding part 30B. The aerosol source holding part 30B and the additive component holding part 30C may be disposable replacement parts.

[0106] FIG. 8 is a schematic view showing an example of an inner structure of the flavor inhalation article 30. The main body 30A includes a power supply 31, a control unit 32, and an inhalation sensor 33. The control unit 32 is electrically connected to the power supply 31 and the inhalation sensor 33. The power supply 31 is a secondary battery, etc., and supplies electric power to electric circuitry included in the flavor inhalation article 30. The control unit 32 is a processor such as a microcontroller (Micro-Control Unit: MCU), and controls the operation of the electric circuitry included in the flavor inhalation article 30. The inhalation sensor 33 is, for example, an atmospheric pressure sensor, a flow rate sensor, etc. When the user inhales from the mouthpiece of the flavor inhalation article 30, the inhalation sensor 33 outputs a value corresponding to the negative pressure generated inside the flavor inhalation article 30, a flow rate of a gas, etc. That is, the control unit 32 is capable of detecting inhalation based on the output value of the inhalation sensor 33.

[0107] The aerosol source holding part 30B of the flavor inhalation article 30 includes a storage unit 34, a supply unit 35, a load 36, and a remaining amount sensor 37. The storage unit 34 is a container that stores a liquid aerosol source that is atomized by heating. The aerosol source is a polyol-based material such as glycerin or propylene glycol. The aerosol source may be a mixed liquid further containing a nicotine liquid, water, a flavorant, and the like. It is assumed that such an aerosol source is stored in the storage unit 34 in advance. The aerosol source may be a solid that does not require the storage unit 34.

[0108] The supply unit 35 includes a wick formed by twisting a fiber material such as glass fiber. The supply unit 35 is connected to the storage unit 34. The supply unit 35 is connected to the load 36, or at least part of the supply unit 35 is arranged in the vicinity of the load 36. The aerosol source permeates the wick through a capillary phenomenon, and moves to a portion where the aerosol source can be atomized by being heated by the load 36. In other words, the supply unit 35 soaks up the aerosol source from the storage unit 34, and carries it to the load 36 or the vicinity thereof. Porous ceramic may be used as the wick instead of the glass fiber.

[0109] The load 36 is, for example, a coil-shaped heater, and generates heat by letting a current flow therethrough. Also, the load 36 has, for example, positive temperature coefficient (PTC) characteristics, and its resistance value is substantially directly proportional to the generated heat temperature. The load 36 does not necessarily have to have the positive temperature coefficient characteristics, and it suffices that there is a correlation between the resistance value and the generated heat temperature. As an example, the load 36 may have negative temperature coefficient (NTC) characteristics. The load 36 may be wound around the outside of the wick, or conversely, may be configured in such a manner that the periphery of the load 36 is covered by the wick. The power supply to the load 36 is controlled by the control unit 32. When the aerosol source is supplied from the storage unit 34 to the load 36 by the supply unit 35, the aerosol source evaporates due to the heat of the load 36, causing an aerosol to be generated. When an inhaling action by the user is detected based on the output value of the inhalation sensor 33, the control unit 32 supplies power to the load 36 to generate an aerosol. When the remaining amount of the aerosol source stored in the storage unit 34 is sufficient, a sufficient amount of the aerosol source is supplied to the load 36, and the heat generated in the load 36 is transported to the aerosol source. In other words, the heat generated in the load 36 is used for raising the temperature of the aerosol source and vaporizing the aerosol source. Therefore, in this case, the temperature of the load 36 almost never exceeds a predetermined temperature designed in advance. On the other hand, when the aerosol source stored in the storage unit 34 is depleted, the amount of the aerosol source supplied to the load 36 per hour lowers. As a result, the heat generated in the load 36 is not transported to the aerosol source. In other words, the heat generated in the load 36 is not used for raising the temperature of the aerosol source and vaporizing the aerosol source. Therefore, in this case, the load 36 overheats, which in turn increases the resistance value of the load 36.

[0110] The remaining amount sensor 37 outputs sensing data for estimating the remaining amount of the aerosol

source stored in the storage unit 34, based on the temperature of the load 36. For example, the remaining amount sensor 37 includes a resistor (shunt resistor) for current measurement connected in series with the load 36, and a measuring device connected in parallel with the resistor and configured to measure the voltage value of the resistor. The resistance value of the resistor is a predetermined constant value which does not substantially change with temperature. Therefore, the current value that flows through the resistor is obtained based on the known resistance value and the measured voltage value.

[0111] The additive component holding part 30C of the flavor inhalation article 30 holds a tobacco filler 38 inside. As described above, the tobacco filler 38 may include the "flavorant-carrying constituent member" of the present invention, for example, the "flavorant-carrying cut tobacco", the "flavorant-carrying sheet tobacco", the "flavorant-carrying tobacco granules", the "flavorant-carrying granular base material", or the "flavorant-carrying metal foil". The tobacco filler 38 may include an ordinary tobacco filler in addition to the "flavorant-carrying constituent member" of the present invention. The ordinary tobacco filler can be constituted of cut tobacco and/or cut pieces obtained by cutting sheet tobacco at a predetermined width (cut pieces of sheet tobacco). The additive component holding part 30C is provided with a ventilation hole on the mouthpiece side and a portion coupled to the aerosol source holding part 30B. Accordingly, when the user inhales from the mouthpiece, a negative pressure is generated inside the additive component holding part 30C, and the aerosol generated in the aerosol source holding part 30B is inhaled, and components such as nicotine and flavor components are added to the aerosol inside the additive component holding part 30C and released into the oral cavity of the user.

[Examples]

[1-1] Solubility of Flavorant-Holding Agent in Liquid Composition

[0112] Hydroxypropyl cellulose (Nippon Soda Co., Ltd.: CELNY SSL, which has a substitution degree of approximately 3.5 per glucose) and any one of the following solvents was mixed:

(a) water;
(b) ethanol;
(c) propylene glycol; and
(d) a mixed liquid of propylene glycol and menthol.

[0113] Propylene glycol, which corresponds to a liquid flavorant, has an octanol-water partition coefficient (Log P) of -1.4, and is an example of a hydrophilic flavorant. Menthol, which corresponds to a liquid flavorant, has an octanol-water partition coefficient (Log P) of 3.3, and is an example of a hydrophobic flavorant.

[0114] Hydroxypropyl cellulose was dissolved in all the solvents (a) to (d). From these results, it can be seen that hydroxypropyl cellulose can be used both as a flavorant-holding agent of a hydrophilic flavorant and as a flavorant-holding agent of a hydrophobic flavorant.

[1-2] Dispersion Stability of Flavorant component-Containing Particles in Liquid Composition

[0115] A slurry liquid consisting of 1.25% by weight of hydroxypropyl cellulose (Nippon Soda Co., Ltd.: CELNY SSL, which has a substitution degree of approximately 3.5 per glucose), 8.75% by weight of ethanol, 30.00% by weight of glycerin, 40.00% by weight of propylene glycol, and 20.0% by weight of ground leaf tobacco (particle diameter: 70-250 μm) was prepared (Sample 1).

[0116] For a comparative sample, as a slurry liquid not containing hydroxypropyl cellulose, a slurry liquid consisting of 20.0% by weight of ground leaf tobacco (particle diameter: 70-250 μm), 30.0% by weight of glycerin, 40.0% by weight of propylene glycol, and 10.0% by weight of water was prepared (Sample 2).

[0117] Viscosities of Sample 1 (10 ml) and Sample 2 (10 ml) at a temperature of 20°C were measured by an SV-10 from A&D Company, Limited. The results show that the viscosity of Sample 1 was 1115±55 [mPa·s], and that the viscosity of Sample 2 was 484±38 [mPa·s].

[0118] 93.0 g each of Samples 1 and 2 were placed in a glass screw tube, and were allowed to stand for 48 hours. At this time, the height from the bottom surface of the glass tube to the slurry liquid surface was approximately 75 mm

[0119] In Sample 1, no precipitation of the ground leaf tobacco was confirmed. In Sample 2, a liquid layer was confirmed at a position of 5 mm from the slurry liquid surface, and precipitation of the ground leaf tobacco was confirmed. It was shown that hydroxypropyl cellulose can maintain the dispersed state of the ground leaf tobacco and can suppress separation of the liquid layer and the solid layer.

[2] Existence States of Flavorant Composition on Sheet Tobacco

[2-1] Existence State (1) of Flavorant Composition on Sheet Tobacco

[0120] In the present example, a liquid flavorant was used as the flavorant.

[0121] A preparation liquid A consisting of a flavorant (cinnamyl alcohol) was applied to a surface of sheet tobacco, and the sheet tobacco was left at a room temperature of 22°C for 6 hours. Thereby, a flavorant composition was formed on the sheet tobacco.

[0122] On the other hand, a preparation liquid B consisting of hydroxypropyl cellulose (Nippon Soda Co., Ltd.: CELNY SSL, which has a substitution degree of approximately 3.5 per glucose), ethanol, and a flavorant (cinnamyl alcohol) was applied to a surface of sheet tobacco, and the sheet tobacco was left at a room temperature of 22°C for 6 hours. Thereby, a flavorant composition was formed on the sheet tobacco.

(Results)

[0123] FIG. 9 shows states of the sheet front surface and the sheet back surface after 6 hours. In FIG. 9, "A" indicates the case of the preparation liquid A, and "B" indicates the case of the preparation liquid B.

[0124] In the case of the preparation liquid B, the flavorant did not seep into (bleed through) the sheet back surface, and a film (flavorant composition) was locally formed on the sheet front surface. In the case of the preparation liquid B, since ethanol was sufficiently removed after the passage of 6 hours, it is considered that a complex of the flavorant and hydroxypropyl cellulose was formed on the sheet front surface. On the other hand, in the case of the preparation liquid A, the bleed-through of the flavorant was confirmed on the back surface of the sheet tobacco.

[0125] In the Detailed Description of the present application, it has been discussed that hydroxypropyl cellulose is considered to form a complex with a network structure through an interaction with a flavorant, and the above-described results support the formation of the complex of the hydroxypropyl cellulose and the flavorant.

[2-2] Existence State (2) of Flavorant Composition on Sheet Tobacco

[0126] In the present example, flavorant component-containing particles (specifically, ground leaf tobacco) were used as the flavorant.

[0127] 0.800 g of sheet tobacco (11.5 cm × 11.5 cm, basis weight: 90.0 g-wet/m^2) was sprayed with, on its front surface, 1.900 g of a slurry liquid consisting of 3.70% by weight of hydroxypropyl cellulose (Nippon Soda Co., Ltd.: CELNY SSL, which has a substitution degree of approximately 3.5 per glucose), 74.10% by weight of ethanol, 11.10% by weight of glycerin, and 11.10% by weight of ground leaf tobacco (particle diameter: 70-250 μm), and was left at a room temperature of 22°C for 18 hours. Ethanol in the slurry liquid was vaporized and removed. Thereby, a flavorant composition was formed on the sheet tobacco. The back surface of the sheet tobacco was not sprayed with the slurry liquid.

(Results)

[0128] FIG. 10 shows states of the sheet front surface and the sheet back surface after 18 hours. It was confirmed that a brown solid matter peculiar to ground leaf tobacco was present on the sheet front surface. No change in color was observed on the sheet back surface, as compared with the sheet back surface prior to the application of the slurry liquid. From these results, it was shown that a powder-fixed layer can be locally formed on a front surface of the sheet tobacco (i.e., the powder-fixed layer is formed only on the sheet front surface and not on the sheet back surface).

[3] Weight Change in Flavorant-Carrying Sheet Tobacco Caused by Release of Flavorant

[0129] 0.800 g of sheet tobacco was sprayed with 1.900 g of a mixed liquid consisting of 3.7% by weight of hydroxypropyl cellulose (Nippon Soda Co., Ltd.: CELNY SSL, which has a substitution degree of approximately 3.5 per glucose), 90.74% by weight of ethanol, and 5.56% by weight of glycerin, and was left at a room temperature of 22°C for 18 hours to vaporize ethanol. Thereby, flavorant-carrying sheet tobacco (Sample A) was prepared.

[0130] On the other hand, 0.800 g of sheet tobacco was sprayed with 1.900 g of a mixed liquid consisting of 94.44% by weight of ethanol, and 5.56% by weight of glycerin, and was left at a room temperature of 22°C for 18 hours to vaporize ethanol. Thereby, flavorant-carrying sheet tobacco (Sample B) was prepared.

(Evaluation Method)

[0131] Samples A and B were cut into a size of approximately 5 cm × 0.2 cm. 0.2031 g and 0.2134 g of cut pieces

were taken from Samples A and B, respectively, and the dry weight loss of the samples was measured using a halogen moisture analyzer HR83-P from Mettler Toledo at a heating temperature of 200°C for a heating duration of 900 seconds.

[0132] The dry weight loss (%) is expressed by the following formula:

$$\text{Dry weight loss (\%)} = \{(\text{weight lost by drying}) / (\text{initial weight of sample})\} \times 100$$

[0133] In both of Samples A and B, since the dry weight loss did not fluctuate substantially when the heating duration exceeded 900 seconds, the end point of drying was set to 900 seconds.

[0134] Assuming that the dry weight loss at 900 seconds (end point of drying) of the heating duration is L900 (%) and the dry weight loss at t seconds of the heating duration is Lt (%), the residual rate R (%) of components evaporated at 200°C is calculated by the following formula:

$$R\ (\%) = \{1 - (Lt / L900)\} \times 100$$

(Results)

[0135] FIG. 11 shows the results of the "residual rate of components evaporated at 200°C". In FIG. 11, the horizontal axis denotes the heating duration (seconds), and the vertical axis denotes the residual rate of components evaporated at 200°C.

[0136] From the results of FIG. 11, it can be seen that, in the initial stage of heating (the period from the start of drying to 200 seconds of the drying duration), the residual rate of components evaporated at 200°C lowered more significantly in Sample A than in Sample B. This indicates that, in Sample A, a larger amount of glycerin evaporated in the initial stage of heating than in sample B. When sheet tobacco is heated, the temperature of its surface rises first, and then the temperature of its inside gradually rises. Therefore, the evaporation of a larger amount of glycerin in the initial stage of heating in Sample A than in Sample B suggests that the glycerin was locally present on the surface of the sheet tobacco without permeating the sheet tobacco. This suggests that the hydroxypropyl cellulose formed a complex with glycerin, and the complex was locally present only on the surface of the sheet tobacco.

[0137] In the Detailed Description of the present application, it has been discussed that hydroxypropyl cellulose is considered to form a complex with a network structure through an interaction with a flavorant, and the above-described results support the formation of the complex of the hydroxypropyl cellulose and the flavorant.

[4] Preparation of Flavorant-carrying Sheet Tobacco and Flavor Inhalation Article

[4-1] Preparation (1) of Flavorant-carrying Sheet Tobacco and Flavor Inhalation Article

[0138] In the present example, a liquid flavorant was used as the flavorant.

(Example of Present Invention)

[0139] 10 g of a preparation liquid consisting of 34.2% by weight of ethanol, 59.6% by weight of menthol, 1.8% by weight of hydroxypropyl cellulose (Nippon Soda Co., Ltd.: CELNY SSL, which has a substitution degree of approximately 3.5 per glucose), 2.2% by weight of glycerin, and 2.2% by weight of propylene glycol was prepared. 5 cm × 5 cm of sheet tobacco (0.9 g; containing 15% by weight of glycerin in advance, basis weight: 414 g/m^2) was sprayed with, on one surface, 0.030 g of the preparation liquid, and was left at a room temperature of 22°C for 30 minutes to volatilize ethanol. The sheet tobacco was sprayed with, on the other surface, 0.030 g of the preparation liquid, and was left at a room temperature of 22°C for 30 minutes to volatilize ethanol. Thereby, flavorant-carrying sheet tobacco B was prepared.

[0140] By cutting the flavorant-carrying sheet tobacco B, cut pieces of 0.75 mm × 1.5 cm was obtained. Using 260 mg of the cut pieces, a flavor inhalation article B having the same structure as the heat-not-burn type flavor inhalation article 20 shown in FIG. 5 was prepared. The flavor inhalation article B was heated by the heating device 10 shown in FIGS. 3 and 4, and sample evaluation was performed.

(Comparative Example)

[0141] 10 g of a preparation liquid consisting of 40.4% by weight of ethanol and 59.6% by weight of menthol was prepared. 5 cm × 5 cm of sheet tobacco (0.9 g; containing 15% by weight of glycerin in advance, basis weight: 414 g/m^2) was sprayed with, on one surface, 0.030 g of the preparation liquid, and was left at a room temperature of 22°C

for 30 minutes to volatilize ethanol. The sheet tobacco was sprayed with, on the other surface, 0.030 g of the preparation liquid, and was left at a room temperature of 22°C for 30 minutes to volatilize ethanol. Thereby, flavorant-carrying sheet tobacco A was prepared.

[0142] By cutting the flavorant-carrying sheet tobacco A, cut pieces of 0.75 mm × 1.5 cm was obtained. Using 260 mg of the cut pieces, a flavor inhalation article A having the same structure as the heat-not-burn type flavor inhalation article 20 shown in FIG. 5 was prepared. The flavor inhalation article A was heated by the heating device 10 shown in FIGS. 3 and 4, and sample evaluation was performed.

(Evaluation Method)

[0143] The above-described flavor inhalation articles A and B were smoked with an SM450 smoking machine (manufactured by Cerulean) every 30 seconds with a puff of 55 ml for two seconds. The total particulate matter was collected on a Cambridge filter pad for each puff. Menthol was quantified for each filter pad.

(Results)

[0144] The results of the evaluation are shown in FIG. 12. In FIG. 12, the horizontal axis denotes the number of puffs, and the vertical axis denotes the ratio of the menthol amount to the aerosol amount (hereinafter referred to as "menthol/aerosol").

[0145] The flavor inhalation article A had a high menthol/aerosol value in the first puff, and the value of menthol/aerosol lowered in every subsequent puff. On the other hand, fluctuation in menthol/aerosol according to the puff in the flavor inhalation article B was small, and the menthol/aerosol was not attenuated even in the latter half of the puff. It was shown that the flavor inhalation article B can stably release the flavorant throughout the puff period.

[4-2] Preparation (2) of Flavorant-carrying Sheet Tobacco and Flavor Inhalation Article

[0146] In the present example, flavorant component-containing particles (specifically, ground leaf tobacco) were used as the flavorant.

(Example of Present Invention)

[0147] 10 g of a concentrated slurry liquid (viscosity: 409.5 [mPa·s]) consisting of 7.4% by weight of hydroxypropyl cellulose (Nippon Soda Co., Ltd.: CELNY SSL, which has a substitution degree of approximately 3.5 per glucose), 48.2% by weight of ethanol, 22.2% by weight of glycerin, and 22.2% by weight of ground leaf tobacco (particle diameter: 70-250 μm) was prepared. A coating slurry liquid was prepared by diluting 10 g of the concentrated slurry liquid with 10 g of ethanol to adjust the viscosity to be suitable for coating on sheet tobacco.

[0148] 5 cm × 5 cm of sheet tobacco (0.9 g; basis weight: 360 g/m^2) was sprayed with, on one surface, 0.475 g of the coating slurry liquid. Thereafter, air was blown to the sheet tobacco at room temperature (22°C) to volatilize ethanol in the coating slurry liquid. Also, the sheet tobacco was sprayed with, on the other surface, 0.475 g of the coating slurry liquid. Thereafter, air was blown to the sheet tobacco at room temperature (22°C) to volatilize ethanol in the coating slurry liquid. Thereby, flavorant-carrying sheet tobacco was prepared.

[0149] By cutting the flavorant-carrying sheet tobacco, cut pieces of 0.75 mm × 1.5 cm was obtained. Using 260 mg of the cut pieces, a flavor inhalation article 4A having the same structure as the heat-not-burn type flavor inhalation article 20 shown in FIG. 5 was prepared.

(Results)

[0150] When the flavor inhalation article 4A was heated by the heating device 10 shown in FIGS. 3 and 4 and inhaled, a tobacco flavor derived from leaf tobacco was confirmed throughout the puff period.

[5] Preparation of Flavorant-carrying Cigarette Paper and Flavor Inhalation Article

(Example of Present Invention)

[0151] 100 g of a preparation liquid consisting of 64.0% by weight of ethanol, 20.0% by weight of glycerin, and 16.0% by weight of hydroxypropyl cellulose (Nippon Soda Co., Ltd.: CELNY SSL, which has a substitution degree of approximately 3.5 per glucose) was prepared. The preparation liquid was applied to 0.626 g (15 cm × 11 cm) of cigarette paper (37 white) with a bar coater (pitch: 50 μm), and the cigarette paper was left at a room temperature of 22°C for 5 hours

to volatilize ethanol. Thereby, the flavorant-carrying cigarette paper C was prepared. The weight of the flavorant-carrying cigarette paper C was 1.143 g.

[0152] The flavorant-carrying cigarette paper C was cut into a size of 2.0 cm × 2.5 cm, and the flavorant-carrying cigarette paper C was bonded to a distal end portion of the heat-not-bum type flavor inhalation article 20 shown in FIG. 5. At the time of the bonding, polyvinyl alcohol was used. Thereby, the flavor inhalation article C was prepared. The flavor inhalation article C was heated by the heating device 10 shown in FIGS. 3 and 4, and sample evaluation was performed.

(Comparative Example)

[0153] 10g of a preparation liquid consisting of 50.0% by weight of ethanol and 50.0% by weight of glycerin was prepared. 19 mg of the preparation liquid was equally injected into the tobacco-containing segment 20A (tobacco-containing segment: 250 mg) of the heat-not-burn type flavor inhalation article 20 shown in FIG. 5 using a microsyringe, and was left at a room temperature of 22°C for 5 hours to volatilize ethanol. Thereby, a flavor inhalation article D was prepared. The flavor inhalation article D was heated by the heating device 10 shown in FIGS. 3 and 4, and sample evaluation was performed.

(Results)

[0154] The flavor inhalation article C and the flavor inhalation article D were coated with approximately 10 mg of glycerin per article, and were approximately equal in terms of the amount of coating of glycerin. However, the two articles differ in that, in the flavor inhalation article C, glycerin was applied to the cigarette paper 22 located closer to the heating part, whereas, in the flavor inhalation article D, glycerin was applied to the tobacco filler 21 slightly distanced from the heating part. Therefore, it was confirmed that, when the flavor inhalation article C was inhaled, the amount of glycerin vapor was larger than that of the flavor inhalation article D. In addition, in the flavor inhalation article C, glycerin vapor was confirmed throughout the puff period.

[6] Preparation of Flavorant-carrying Granular Base Material and Flavor Inhalation Article

[0155] A concentrated slurry liquid (viscosity: 691.5 [mPa·s]) consisting of 9% by weight of hydroxypropyl cellulose (Nippon Soda Co., Ltd.: CELNY SSL, which has a substitution degree of approximately 3.5 per glucose), 51% by weight of ethanol, 10% by weight of glycerin, and 30% by weight of ground leaf tobacco (particle diameter: 70-250 μm) was prepared. No precipitation of solid matter was observed in the concentrated slurry liquid even after being allowed to stand for 48 hours. A coating slurry liquid was prepared by diluting 20 g of the concentrated slurry liquid with 20 g of ethanol to adjust the viscosity to be suitable for coating on a granular base material.

[0156] NONPAREIL 103 (Freund Corporation, particle diameter: 500 to 355 μm) was used as the granular base material. 40 g of the coating slurry liquid was dropped onto 40 g of the granular base material while rolling the granular base material in a coating pan heated by applying hot air. During the dropping, ethanol in the coating slurry liquid was vaporized and removed. Thereby, a flavorant-carrying granular base material was prepared.

[0157] 310 mg of the flavorant-carrying granular base material was incorporated into the heat-not-bum type flavor inhalation article 30 shown in FIGS. 6 to 8. Specifically, a flavor inhalation article E was prepared by filling 310 mg of the flavorant-carrying granular base material into the additive component holding part 30C, connecting it to the aerosol source holding part 30B filled with a liquid of propylene glycol : glycerin = 1 : 1, and further connecting it with the main body 30A.

(Results)

[0158] As described above, the flavorant-carrying granular base material can be prepared. Photographs of the prepared flavorant-carrying granular base material are shown in FIG. 13. FIG. 13 shows, in order from the left, an outer appearance of the granular base material, an outer appearance of the flavorant-carrying granular base material, a cut surface of the flavorant-carrying granular base material, and a cut surface (enlarged) of the flavorant-carrying granular base material. The photograph of the cut surface shows that the powder layer containing ground leaf tobacco was fixed to the surface of the granular base material.

[0159] Also, when the flavorant-carrying granular base material was incorporated into the heat-not-burn type flavor inhalation article 30 shown in FIGS. 6 to 8 and the obtained flavor inhalation article was inhaled, the tobacco flavor derived from leaf tobacco was confirmed throughout the puff period.

[7] Preparation of Flavorant-carrying Aluminum-Laminated Paper and Flavor Inhalation Article

[0160] A slurry liquid consisting of 13.3% by weight of hydroxypropyl cellulose (Nippon Soda Co., Ltd.: CELNY SSL, which has a substitution degree of approximately 3.5 per glucose), 53.3% by weight of ethanol, 16.7% by weight of glycerin, and 16.7% by weight of ground leaf tobacco (particle diameter: 70-250 μm) was prepared.

[0161] As a base material, a laminate of aluminum foil and paper (hereinafter referred to as "aluminum-laminated paper") was used. As the aluminum-laminated paper, aluminum-bonded paper obtained by bonding aluminum foil to paper with an adhesive was used. The slurry liquid was applied to a paper surface side of 0.672 g of the aluminum-laminated paper with a bar coater (OSG System Products Co., Ltd.: Wireless Bar Coater). The slurry-coated aluminum-laminated paper was allowed to stand at a room temperature of 22°C to volatilize ethanol in the coating slurry liquid. Thereby, 1.222 g of flavorant-carrying aluminum-laminated paper was obtained. 250 mg of the flavorant-carrying aluminum-laminated paper was cut at a width of approximately 1 mm, and the obtained cut pieces were filled into the heat-not-bum type flavor inhalation article 20 shown in FIG. 5. Thereby, the flavor inhalation article F was prepared.

(Results)

[0162] As described above, the flavorant-carrying aluminum-laminated paper can be prepared. A photograph of the prepared flavorant-carrying aluminum-laminated paper is shown in FIG. 14. FIG. 14 shows, in order from the left, a paper surface side and an aluminum surface side of the aluminum-laminated paper, and a paper surface side (flavorant-carrying side) and an aluminum surface side of the flavorant-carrying aluminum-laminated paper. FIG. 15 shows cut pieces of the flavorant-carrying aluminum-laminated paper. FIGS. 14 and 15 show that a powder layer containing ground leaf tobacco was fixed to a surface on the paper surface side of aluminum-laminated paper.

[0163] In the example of the present invention, when the flavorant-carrying aluminum-laminated paper was incorporated into the flavor inhalation article and the flavor inhalation article was inhaled, the tobacco flavor derived from leaf tobacco was confirmed throughout the puff period.

REFERENCE SIGNS LIST

[0164] 1: Flavorant-carrying sheet tobacco, 1a: Sheet tobacco, 1b: Flavorant composition, 2: Flavorant-carrying granular base material, 2a: Granular base material, 2b: Flavorant composition, 10: Heating device, 11: Body, 12: Heater, 13: Metal tube, 14: Battery unit, 15: Control unit, 16: Recess, 17: Ventilation hole, 20: Heat-not-bum type flavor inhalation article, 20A: Tobacco-containing segment, 20B: Connecting part, 20C: Filter part, 21: Tobacco filler, 22: Cigarette paper, 23: Paper tube, 24: Ventilation opening part, 25: First segment, 25a: First filling layer, 25b: Inner plug wrapper, 26: Second segment, 26a: Second filling layer, 26b: Inner plug wrapper, 27: Outer plug wrapper, 28: Lining paper, 30: Heat-not-bum type flavor inhalation article, 30A: Main body, 30B: Aerosol source holding part, 30C: Additive component holding part, 31: Power supply, 32: Control unit, 33: Inhalation sensor, 34: Storage unit, 35: Supply unit, 36: Load, 37: Remaining amount sensor, 38: Tobacco filler.

Claims

1. A flavorant-carrying constituent member of a tobacco product, comprising:

a constituent member of a tobacco product; and
a flavorant composition carried on the constituent member, and including a flavorant-holding agent and a flavorant.

2. The flavorant-carrying constituent member according to claim 1, wherein the flavorant-holding agent is a flavorant-holding agent soluble in an organic solvent.

3. The flavorant-carrying constituent member according to claim 1, wherein the flavorant-holding agent is a polysaccharide, preferably a polysaccharide soluble in an organic solvent.

4. The flavorant-carrying constituent member according to claim 1, wherein the flavorant-holding agent is a cellulose derivative, preferably a cellulose derivative soluble in an organic solvent, and more preferably an amphipathic cellulose derivative.

5. The flavorant-carrying constituent member according to any one of claims 1 to 4, wherein the flavorant-holding agent

is hydroxypropyl cellulose.

6. The flavorant-carrying constituent member according to any one of claims 1 to 5, wherein the flavorant is a liquid flavorant.

7. The flavorant-carrying constituent member according to any one of claims 1 to 6, wherein the flavorant is polyol.

8. The flavorant-carrying constituent member according to any one of claims 1 to 7, wherein the flavorant is a combination of polyol and a flavorant other than polyol.

9. The flavorant-carrying constituent member according to any one of claims 1 to 5, wherein the flavorant is flavorant component-containing particles, preferably, ground leaf tobacco or a powder flavorant.

10. The flavorant-carrying constituent member according to any one of claims 1 to 5 and 9, wherein the flavorant is a combination of (i) flavorant component-containing particles, preferably, ground leaf tobacco or a powder flavorant, and (ii) polyol.

11. The flavorant-carrying constituent member according to any one of claims 1 to 10, wherein the constituent member is cigarette paper.

12. The flavorant-carrying constituent member according to any one of claims 1 to 10, wherein the constituent member is a tobacco filler.

13. The flavorant-carrying constituent member according to any one of claims 1 to 10, wherein the constituent member is a base material of a flavor filler, preferably, a granular base material or metal foil.

14. The flavorant-carrying constituent member according to any one of claims 1 to 13, wherein the tobacco product is a flavor inhalation article.

15. A tobacco product comprising the flavorant-carrying constituent member according to any one of claims 1 to 13.

16. A flavor inhalation article comprising the flavorant-carrying constituent member according to claim 14.

17. A method of producing a flavorant-carrying constituent member of a tobacco product, comprising:

applying a liquid composition containing a flavorant-holding agent, a flavorant, and a solvent onto a surface of a constituent member of a tobacco product; and
drying the liquid composition-applied constituent member to obtain a flavorant-carrying constituent member.

18. The method according to claim 17, wherein the flavorant-holding agent is a flavorant-holding agent soluble in an organic solvent.

19. The method according to claim 17, wherein the flavorant-holding agent is a polysaccharide, preferably a polysaccharide soluble in an organic solvent.

20. The method according to claim 17, wherein the flavorant-holding agent is a cellulose derivative, preferably a cellulose derivative soluble in an organic solvent, and more preferably an amphipathic cellulose derivative.

21. The method according to any one of claims 17 to 20, wherein the flavorant-holding agent is hydroxypropyl cellulose.

22. The method according to any one of claims 17 to 21, wherein the flavorant is a liquid flavorant.

23. The method according to any one of claims 17 to 22, wherein the flavorant is polyol.

24. The method according to any one of claims 17 to 23, wherein the flavorant is a combination of polyol and a flavorant other than polyol.

25. The method according to any one of claims 17 to 21, wherein the flavorant is flavorant component-containing

particles, preferably, ground leaf tobacco or a powder flavorant.

26. The method according to any one of claims 17 to 21 and 25, wherein the flavorant is a combination of (i) flavorant component-containing particles, preferably, ground leaf tobacco or a powder flavorant, and (ii) polyol.

27. The method according to any one of claims 17 to 26, wherein the constituent member is cigarette paper.

28. The method according to any one of claims 17 to 26, wherein the constituent member is a tobacco filler.

29. The method according to any one of claims 17 to 26, wherein the constituent member is a base material of a flavor filler, preferably, a granular base material or metal foil.

30. The method according to any one of claims 17 to 29, wherein the tobacco product is a flavor inhalation article.

31. A flavorant-carrying constituent member obtainable by the method according to any one of claims 17 to 30.

32. A method of producing a tobacco product, comprising: producing a tobacco product using a flavorant-carrying constituent member obtainable by the method according to any one of claims 17 to 29.

33. A method of producing a flavor inhalation article, comprising: producing a flavor inhalation article using a flavorant-carrying constituent member obtainable by the method according to claim 30.

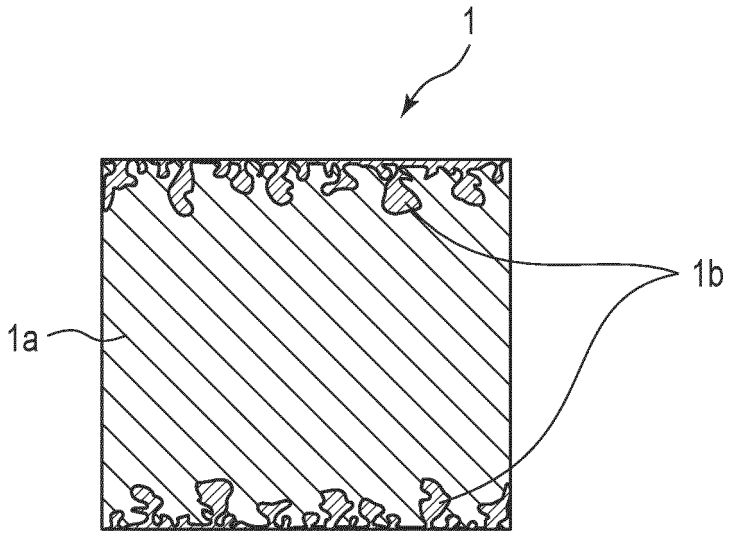

FIG. 1

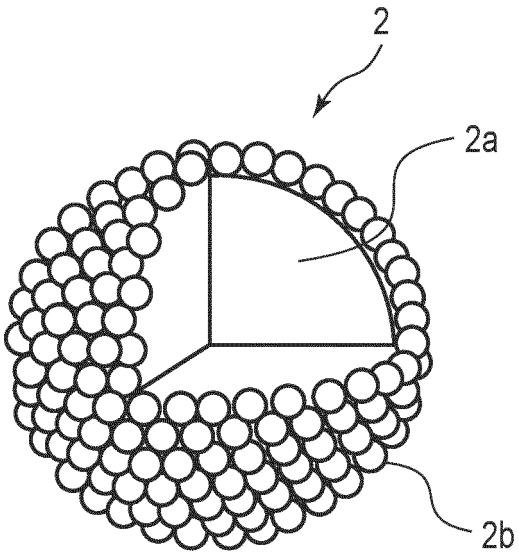

FIG. 2

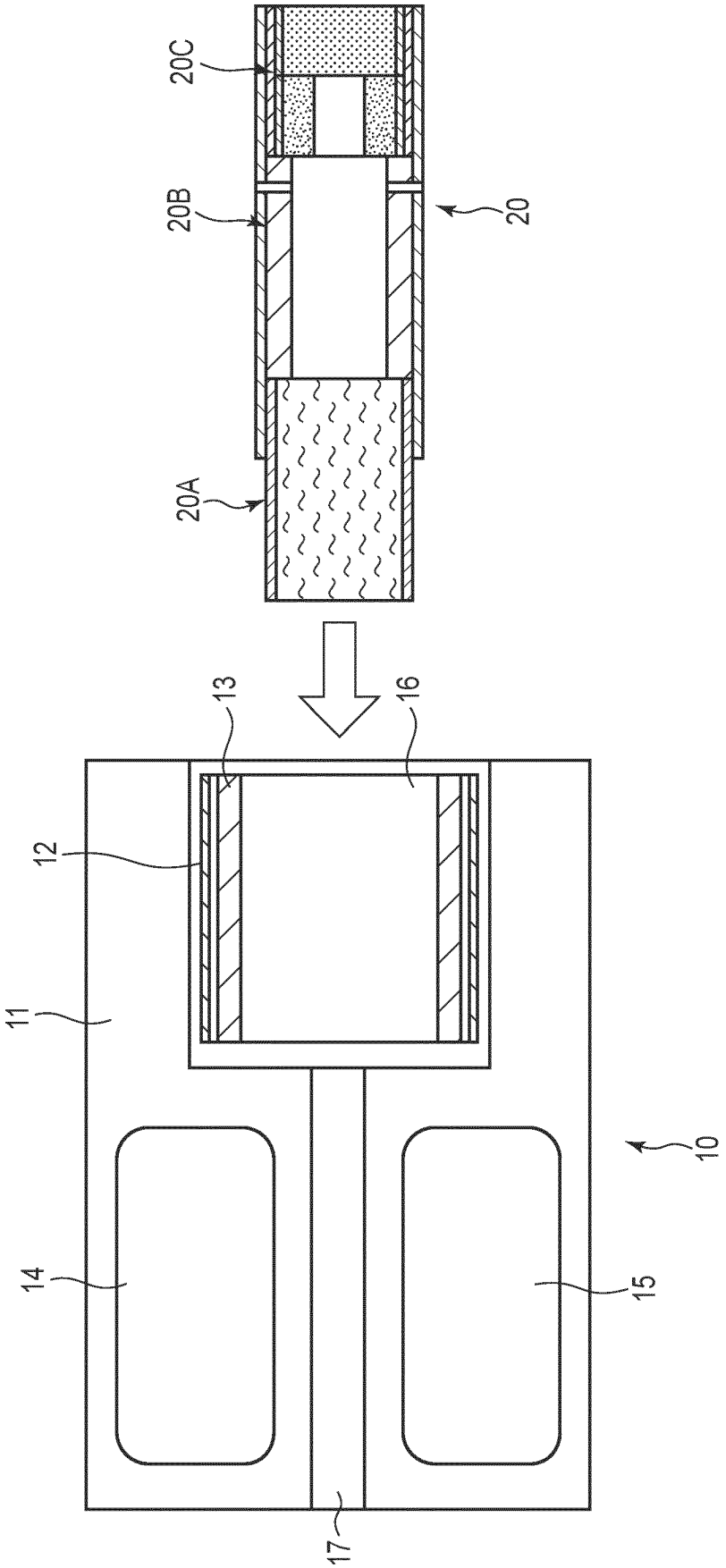

FIG. 3

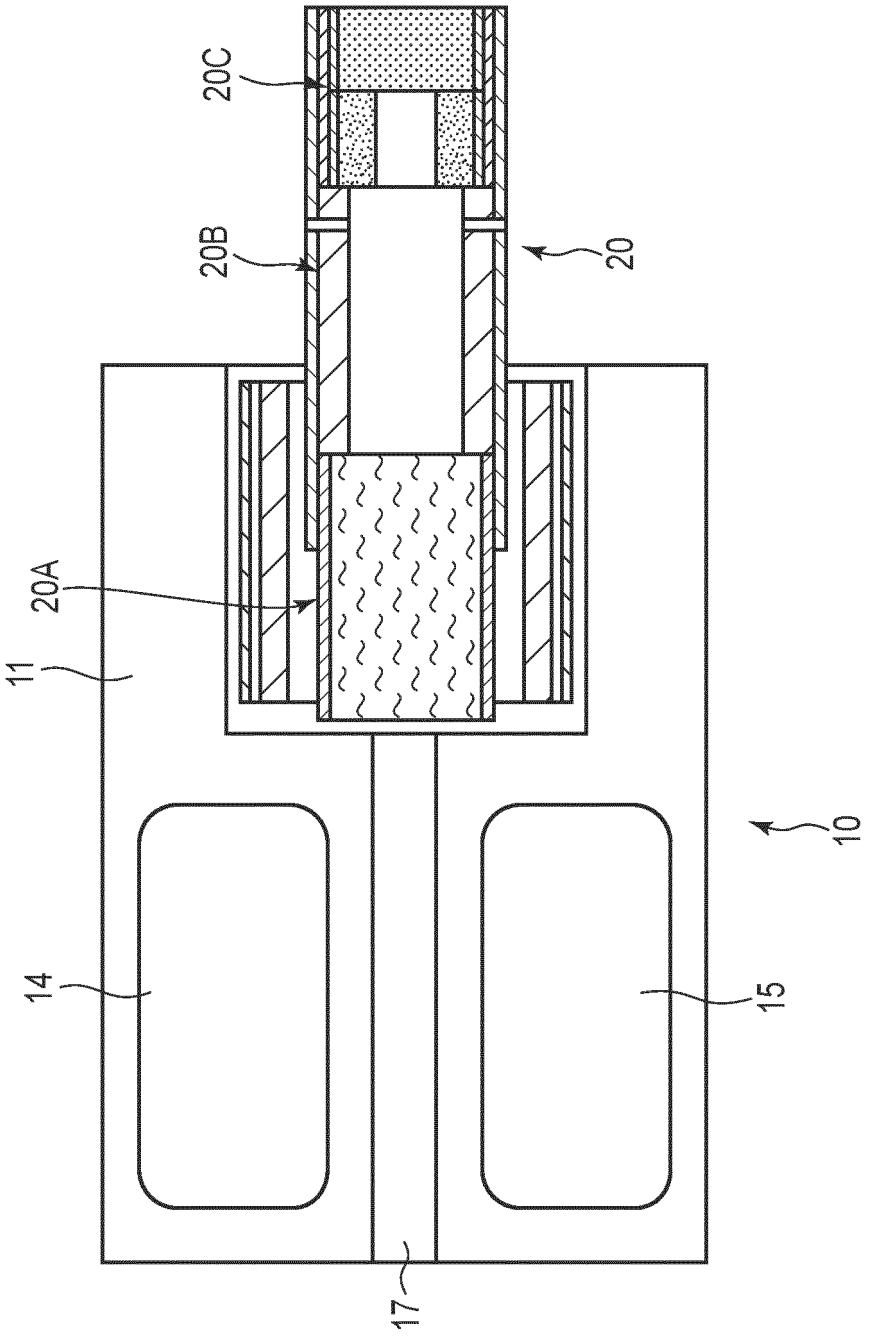

FIG. 4

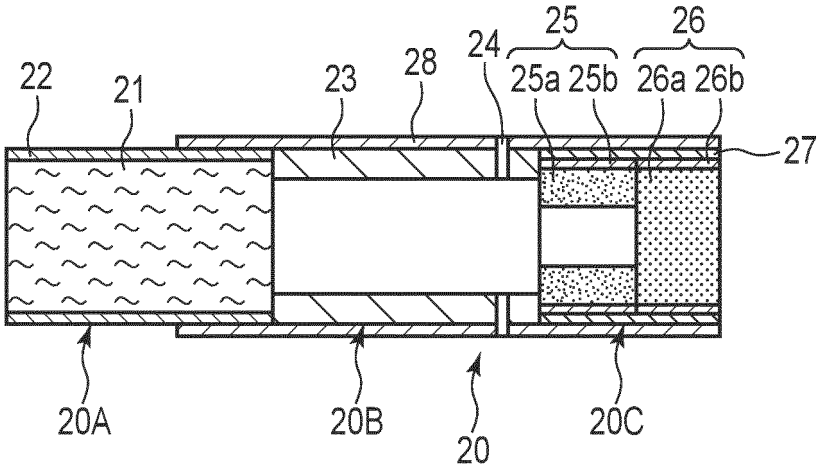

FIG. 5

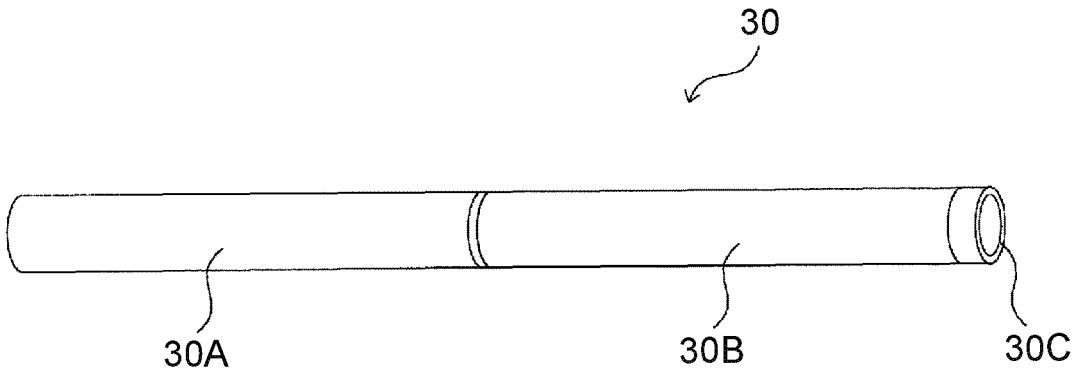

FIG. 6

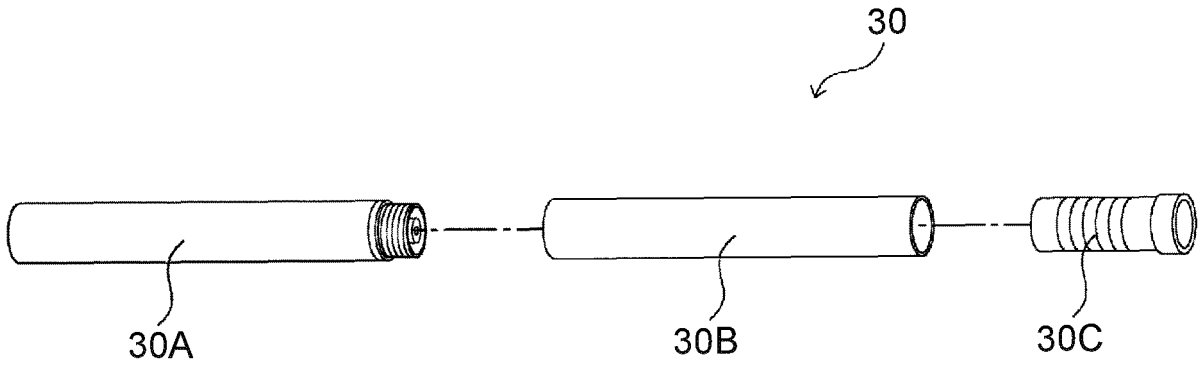

FIG. 7

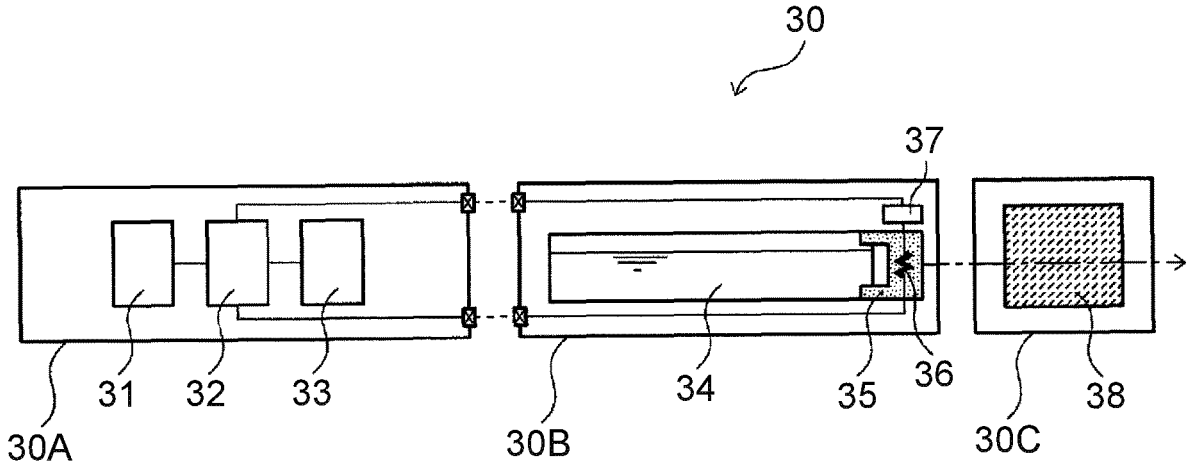

FIG. 8

Sheet front surface

Sheet back surface

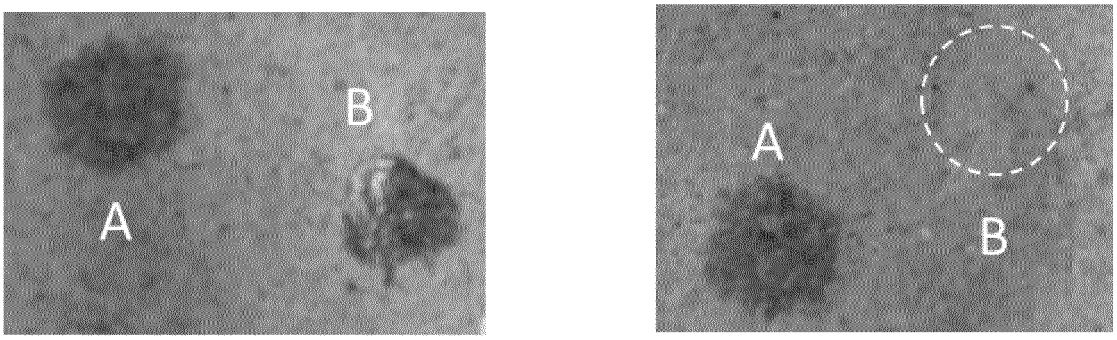

FIG. 9

Sheet front surface

Sheet back surface

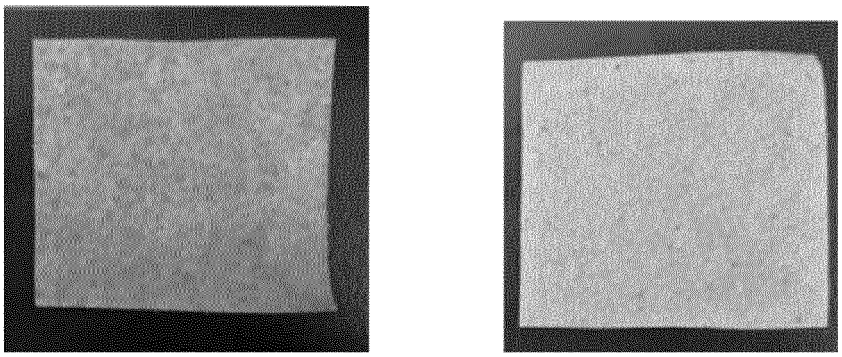

FIG. 10

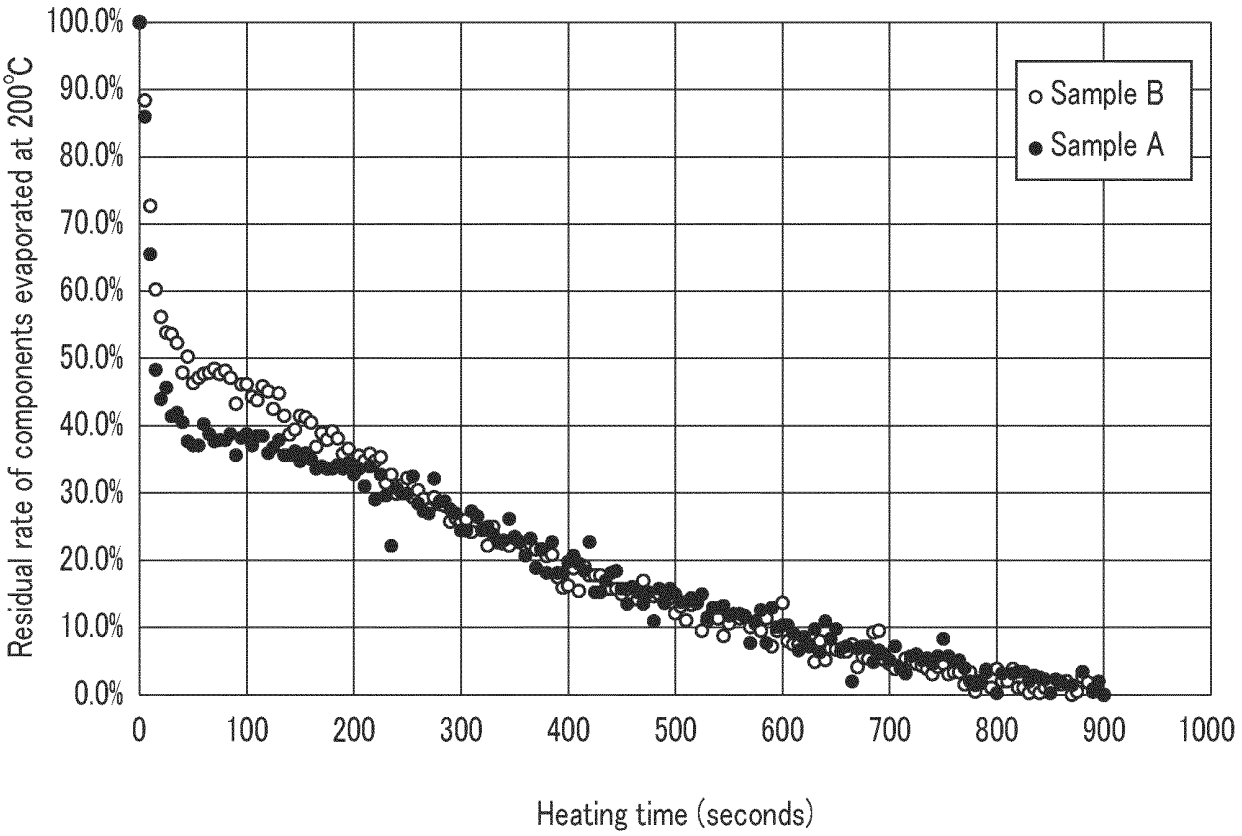
100.0%
90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
Residual rate of components evaporated at 200°C
0
100
200
300
400
500
600
700
800
900
1000
Heating time (seconds)
Sample B
Sample A

FIG. 11

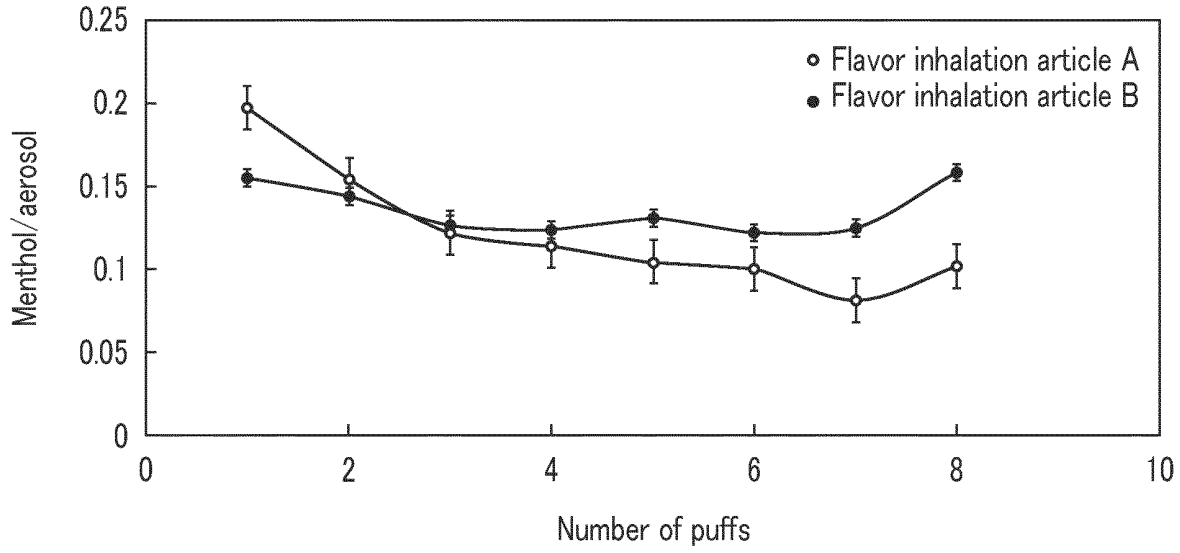
0.25
0.2
0.15
0.1
0.05
0
Menthol/aerosol
0
2
4
6
8
10
Number of puffs
Flavor inhalation article A
Flavor inhalation article B

FIG. 12

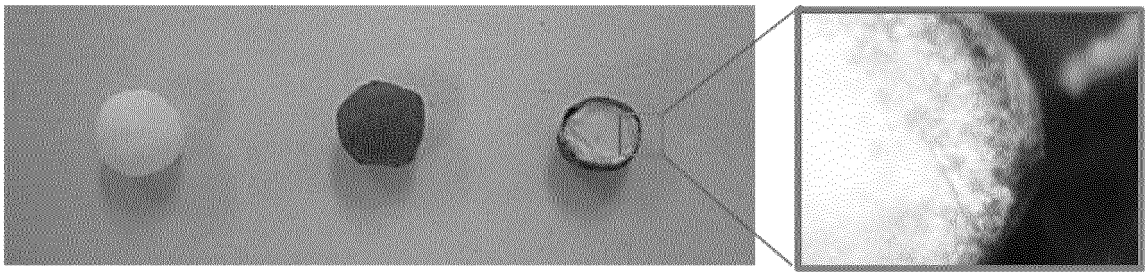

FIG. 13

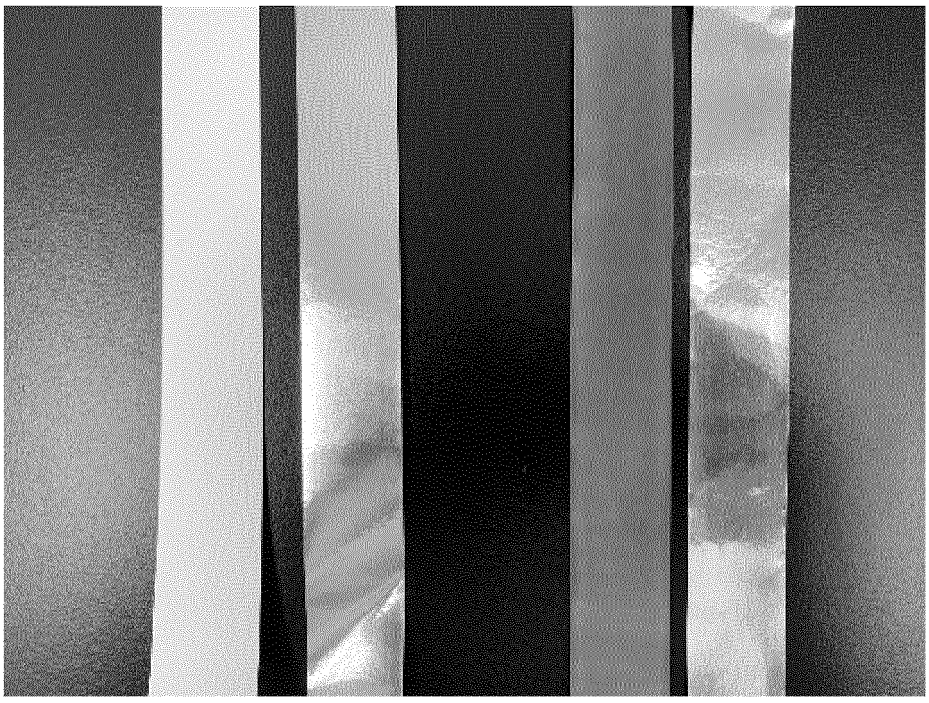

FIG. 14

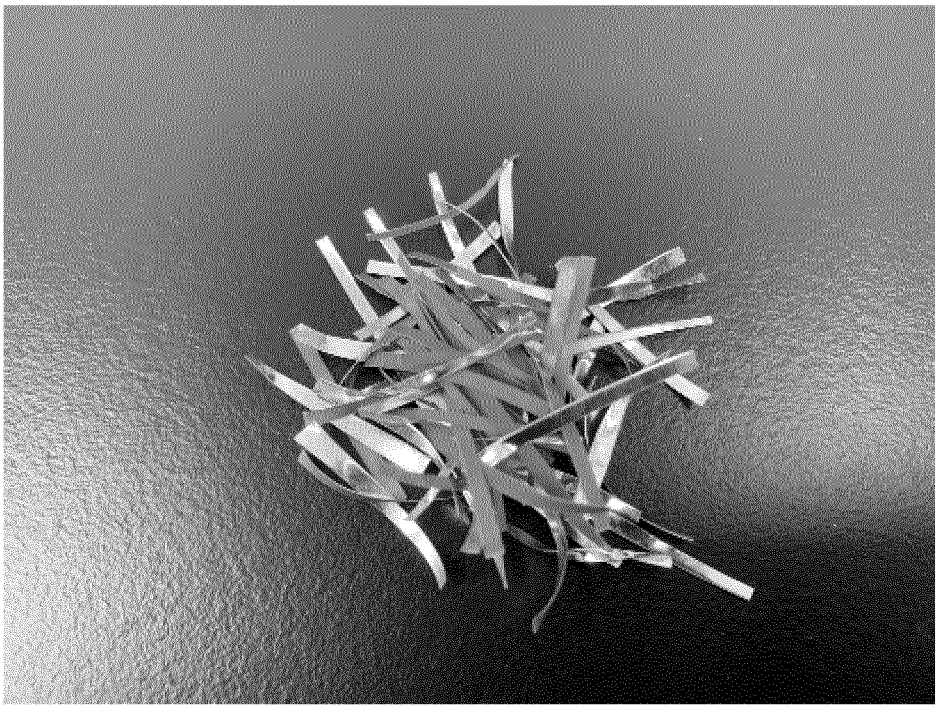

FIG. 15

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2021/005718

A. CLASSIFICATION OF SUBJECT MATTER
A24B 15/30(2006.01)i; A24D 1/02(2006.01)i; A24D 1/20(2020.01)i
FI: A24D1/02; A24D1/20; A24B15/30

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)
A24B15/30; A24D1/02; A24D1/20; A24F40/00

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	1971-2021
Registered utility model specifications of Japan	1996-2021
Published registered utility model applications of Japan	1994-2021

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2013/011899 A1 (JAPAN TOBACCO INC.) 24 January 2013 (2013-01-24) paragraphs [0013]-[0082], fig. 1-6	1-10, 13, 15, 17-26, 29, 31-32
Y		11-14, 16, 27-30, 33
Y	JP 5-146285 A. (PHILIP MORRIS PRODUCTS INC.) 15 June 1993 (1993-06-15) paragraphs [0014]-[0044]	11-12, 27-28
Y	JP 2009-502194 A. (R.J. REYNOLDS TOBACCO COMPANY) 29 January 2009 (2009-01-29) paragraph [0043]	13, 29
Y	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 63491/1986 (Laid-open No. 175896/1987) (EARTH CORPORATION) 09 November 1987 (1987-11-09) specification, page 1, line 9 to page 25, line 13, fig. 1-12	14, 16, 30, 33

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

* Special categories of cited documents:
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"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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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
21 April 2021 (21.04.2021)	11 May 2021 (11.05.2021)

Name and mailing address of the ISA/	Authorized officer
Japan Patent Office 3-4-3, Kasumigaseki, Chiyoda-ku, Tokyo 100-8915, Japan	Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2021/005718

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2008/072627 A1 (JAPAN TOBACCO INC.) 19 June 2008 (2008-06-19) entire text, all drawings	1-33
A	JP 2019-6681 A (SAWAI PHARMACEUTICAL CO., LTD.) 17 January 2019 (2019-01-17) entire text, all drawings	1-33
A	JP 2014-159393 A (TAKATA SEIYAKU CO., LTD.) 04 September 2014 (2014-09-04) entire text, all drawings	1-33

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

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/JP2021/005718

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
WO 2013/011899 A1	24 Jan. 2013	EP 2733193 A1 paragraphs [0013]-[0081], fig. 1-6 CN 103649287 A CN 107034015 A KR 10-2014-0037953 A KR 10-2016-0035098 A TW 201307547 A RU 2014105579 A ES 2666365 T3	
JP 5-146285 A	15 Jun. 1993	US 5144964 A column 2, line 22 to column 5, line 43 EP 503795 A2 CA 2063025 A1	
JP 2009-502194 A	29 Jan. 2009	US 2007/0023056 A1 paragraph [0053] WO 2007/015735 A1 EP 1909604 A1 AT 451024 T	
JP 62-175896 U1	09 Nov. 1987	(Family: none)	
WO 2008/072627 A1	19 Jun. 2008	US 2009/0235941 A1 entire text, all drawings EP 2093276 A1 KR 10-2009-0089357 A CN 101558143 A HK 1133034 A1 CA 2671004 A1 TW 200848505 A RU 2405810 C1 ES 2396593 T3 MY 157908 A	
JP 2019-6681 A	17 Jan. 2019	(Family: none)	
JP 2014-159393 A	04 Sep. 2014	(Family: none)	

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

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 5320097 A **[0005]**
- WO 2014185103 A **[0005]**