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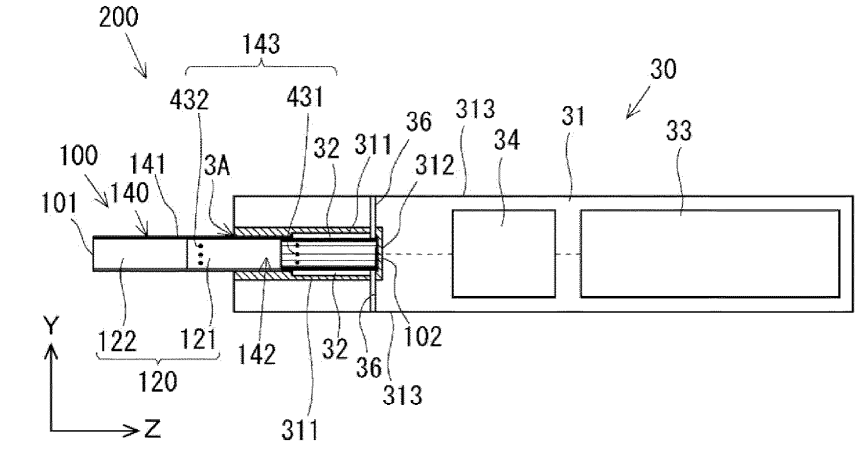
(54) FLAVOR STICK AND NON-COMBUSTION TYPE FLAVOR INHALATION SYSTEM

(57) This flavor stick is accommodated, such that insertion and removal is possible, in an accommodation portion of a non-combustion type flavor inhalation device and is heated in the state of being accomodated in the accomodation portion. The flavor stick inlcudes a flavor filling containing a flavor source and an aerosol-generating substrate, and a cylindrical member to be at least partially filled with the flavor filling. One end of the cylindrical member is the distal end and the other end thereof is an inhalation port end, and the cylindrical member is provided, on the peripheral wall faming the cylindrical member, with a ventilation portion that allows air to flow from the outside into an internal space thereof. The distal end, the ventilation portion, and the inhalation portend are communicated with each other such that when inhalation is performed from the inhalation port end side, air flowing in from the distal end and the ventilation portion is sucked out from the inhalation port end. The ventilation portion includes a first ventilation portion in which inflow of air is restricted by an inner wall of the accommodation portion when the distal end side of the flavor stick is accommodated in a prescribed state in the accommodation portion, and a second ventilation portion located closer to the inhalation port end side than the first ventilation portion, and through which inflow of air is not restricted by the inner wall of the accommodation portion when the distal end side of the flavor stick is accommodated in the prescribed state in the accommodation portion.

[Figure 1A]



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Description

TECHNICAL FIELD

[0001] The present invention relates to a flavor stick and a heat-not-bum inhalation system.

BACKGROUND ART

[0002] Heat-not-bum inhalation systems have been proposed as an alternative to conventional combusted cigarettes, which are smoked by buming tobacco leaf. For example, known heat-not-bum tobacco products comprise an electrically heated device that has: a heater assembly; a battery unit serving as a power source for the heater assembly, and a control unit for controlling the heating element of the heater assembly.

[0003] As heat-not-bum tobacco sticks outwardly appear to be similar to conventional combusted cigarettes, it is conceivable that users may mistakenly try to light and smoke them in the same way as conventional combusted cigarettes. However, heat-not-bum tobacco sticks are not flame buming, but are built to be smoked as desired via the inhalation of aroma or an aerosol that is generated when heated by a heater, and cannot be smoked as a user would expect when lit like a combusted cigarette. PTL 1 therefore proposes an aerosol-generating article that comprises an aerosol-forming substrate radially encircled by a sheet of thermally-conductive material such as metal foil, thereby reducing the risk of the acrosol forming substrate igniting if a user applies a flame to an acrosol-generating article. However, the use of metal foil as rolling paper results in problems such as the inability to use microwave-based weight cortrol, poor flexibility and a tendency to result im wrinkling or crumpling, and higher costs, thereby resulting in limited production, more difficult production, and a greater environmental impact.

[0004] PTL 2 also proposes a heated acrosol-generating articke for use with an aerosol-generating device, wherein the heated acrosol-generating article defines: a first air-flow path in which air drawn in through the mouth end passes through the aerosol-forming substrate; and a second air-flow path in which the air drawn in does not pass through the acrosd-forming substrate. If a user draws on the mouth end without engaging the heated aerosol-generating article with an aerosol-generating device, the air passes through the second air-flow path and not through the aerosal- generating substrate. Thus, if a user attempts to light the article by holding a flame to the distal end of the rod in the same manner as a conventional cigarette, no air will flow through the acrosokfonring substrate, making it difficult to ignite the aerosolforming substrate.

CITATION LIST

PATENT LITERATURE

[0005]

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PTL2:JP6707447B2
PTL3:WO20211/233914A1
PIL4:WO2021/233916A1
PIL5:WO2021/233918A1
PTL6:WO2022/002455A1

SUMMARY OF INVENTION

TECHNICAL PROBLEM

[0006] As disclosed inPTL 2, in configurations where ignition is prevented because the air drawn in through the mouth end does net pass trough the aerosol-forming substrate when a heated aerosol-generating article is not engaged with an aerosol-generating device, the path of the air drawn through the mouth end is limited to the first air-flow path when the heated aerosol-generating article is engaged with the aerosol-generating device, and a resulting problem is that the air that passes through the aerosol-forming substrate cannot be cooled by external air, making it difficult to configure a device that can be smoked properly.

[0007] In view of the circumstances noted above, an object of the technique disclosed herein is to provide a technique in which a flavor stick that is heated and smoked using a heat-not-bum flavor inhalation device can be property smoked, yet can be prevented from igniting if an attempt is made to light it

SOLUTION TO PROBLEM

(Embodiment 1)

[0008] To solve the above problems, the flavor stick disclosed herein comprises:

a flavor stick thet is insertably and removably housed in the housing portion of a heat-not-bum flavor inhalation device, and that is heated while housed in said housing postion,
said flavor stick comprising:

flavor filler comprising a flavor source and an acrosol-generating substrate; and
acylindrical member that is at least partially filled with the flavor filler,
wherein the cylindrical member is such that one end is the tip, and the other end is the drawing end,
ventilation portions, through which air is introduced from the outside into the interior space, are provided in the peripheral wall that forms the cylindrical member,

the tip, the ventilation portions, and the drawing end are in communication with each other in such a way thet, when drawn through the drawing end, the air flowing in from the tip and the ventilation portions is drawn out through the drawing end, and
the ventilation portions have:

first ventilation portions in which the influx of air is restricted by the inner wall of the housing portion when the tip of the flavor stick is housed, while in a specified state,in the housing portion; and
second ventilation portions, located closer than the first ventilation portion to the drawing end, in which the influx of air is not restricted by the inner wall of the housing portion when the tip of the flavor stick is housed, while in a specified state, in the housing portion.

(Embodiment 2)

[0009] When air is drawn through the drawing end while the flavor stick according to Embodiment 1 is not housed in the housing portion, the tip ventilation volume of the air flowing in through the tip is less then 18.9% by volume relative to the ventilation volume of the air drawn through the drawing end, wherein the percent by volume may be determined perISO9512.

(Embodiment 3)

[0010] In the flavor stick according to Embodiment 1 or 2, the ventilation portions may be openings provided in the peripheral wall of the cylindrical member, or may be portions of the peripheral wall that are formed of a breathable member.

(Embodiment 4)

[0011] The flavor stick according to any of Embodiments 1 through 3 comprises: a flavorrod portion that is filled with the flavor filler; and amouth piece portion disposed on the drawing end side from the flavor rod portion; and
the first ventilation portion may be provided in the flavor rod and/or the mouth piece portion.

(Embodiment 5)

[0012] In the flavor stick according to Embodiment 4, the first ventilation portion may be provided in the flavor rod portion.

(Embodiment 6)

[0013] While the flavor stick according to any of Embodiments 1 through 5 is not housed in the housing partion, the ventilation resistance from the tip to the drawing end is 45mmWG or less, wherem the ventilation resistance may be determined per ISO9512.

(Embodiment 7)

[0014] While the flavor stick according to Embodiment 6 is not housed in the housing partion, the ventilation resistance from the tip to the drawing end may be 10mmWG or more.

(Embodiment 8)

[0015] To solve the above problems, the heat-not-bum flavor inhalation system disclosed herein comprises:
the flavor stick according to any of Embodiments 1 through 7; and a heat-not-bum flavor inhalation device for heating a flavor stick; wherein the heat-not-bum flavor inhalation device comprises:
a housing portion that is capable of housing the flavor stick; and that has an inner wall that limits ventilation in the ventilation portion when the flavor stick is housed therein; and a heating portion for heating the flavor stick housed in the housing portion

(Embodiment 9)

[0016] In the heat-not-bum flavor inhalation system according to Embodiment 8, the heating portion may have: an electric heater for generating heat upon being supplied with electrical power; and an induction coil for heating a heating element disposed inside or around the flavor stick via electromagnetic induction, or a microwave generator for heating the flavor stick via the application of microwaves.

[0017] The means for solving these problems can also be combined, when possible.

ADVANTAGEOUS EFFECTS OF INVENTION

[0018] According to the technique disclosed herein, a technique can be provided in which a flavor stick that is heated and smoked using a heat-not-bum flavor inhalation device can be properly smoked, yet can be prevented from igniting if an attempt is made to light it

BRIEF DESCRIPTION OF DRAWINGS

[0019]

[FIG. 1A] Fig. 1A is a schematic diagram of a heat-not-bum flavor inhalation system according to the presert embodiment.
[FIG.1B] Fig. 1B is a schematic diagram of a heat-not-bum flavor inhalation system, the structure of which is different from that in Fig. 1A in that the heater is an internal heating type.

[FIG.2] Fig 2 is a perspective view of the tobacco stick according to the presert embodiment.
[FIG. 3] Fig. 3 is diagram illustrating the internal structure of the tobacco stick according to the present embodiment.
[FIG.4] Fig.4 is a schernatic diagram illustrating the relationship of the ventilation involved in the tobacco stick.
[FIG.5] Fig.5 shows wrapping paper specifications.
[FIG. 6] Fig. 6 shows, for example, the ventilation resistance in Examples and Comparative Examples of the tobacco stick.
[FIG. 7] Fig. 7 is a graph illustrating the relationship between the following, as determined per ISO 9512, when tobacco sticks were not housed in the housing portion of an inhalation device in the examples and comparative examples: the percent by volume of the tip ventilation volume (of the air flowing in through the tip) relative to the ventilation volume of the air drawn through the drawing end of a tobacco stick; and the amount of carbon monoxide contained in the air drawn through the drawing end affer 3 puffs per cigarette lit and smoked under CIR conditions.
[FIG. 8] Fig. 8 is a graph illustrating the relationship between the following, as determined per ISO 9512, when tobacco sticks were not housed in the housing portion of an inhalation device in the examples and comparative examples: the ventilation resistance; and the amount of carbon monoxide contained in the air drawn through the drawing end after 3 puffs per cigarette lit and smoked under CIR conditions.
[FIG. 9] Fig. 9 is a table showing the following, as determined per ISO9512, when tobacco sticks were not housed in the housing partion of an inhalation device in the examples and comparative examples: tip ventilation volume (Vt); percent by volume of air flowing in through a first opening partion (V1) and a second opening portion (V2); ventilation resistance; and the amount of carbon monoxide contained in the air drawn through the drawing end afer 3 puffs per cigarette lit and smoked under CIR conditions.
[FIG. 10] Fig. 10 illustrates a modified example of the heat-not-bum flavor inhalation device according to Modified Example 1.
[FIG. 11]Fig. 11 illustrates the influx path of air flowing into a tobacco stick while the tobacco stick is housed int he heat-not-bum flavor inhalation device according to Modified Example 1.
[FIG. 12] Fig. 12 illustrates a modified example of the heat-not-bum flavor inhalation device according to Modified Example 2

DESCRIPTION OF EMBODIMENTS

[0020] Embodiments of a flavor stick and a heat-not-bum flavor inhalation system according to the present invertion will now be described on the basis of the dawings. The dimensions, materials, shapes, and relative positions, for example, of the components described in the present embodiment are examples. For example, in the present embodiment, a flavor stick (also referred to below as a "tobacco stick") comprising tobacoo filler as a flavor source will be described as an example of a flavor stick, but the flavor stick may contain other flavor components without containing tobacco filler.

<First Embodiment

[0021] Fig. 1A is a schematic diagram of a heat-not-bum flavor inhalation system 200 according to the embodiment, and Fig. 1B is a schematic diagram of a heat-not-bum flavor inhalation system 200, the structure of which is different from that in Fig. 1A in that the heater is an internal heating type. Fig. 2 is an oblique view of a tobacco stick 100according to the embodiment, and Fig. 3 is a diagram illustrating the internal structure of the tobacco stick 100 according to the embodiment. In Figs. 1 through 3, the horizontal is shown as the X direction, the vertical direction is shown as the Y direction, and the depthwise direction is shown the Z direction. The same is true of the subsequent drawings. These directions are merely examples given for convenience of description and do not limit the elements of the heat-not-bum inhalation system 200. For example, the elements of the heat-not-bum flaver inhalation system 200 are not limited to the arrangement in the directions shown in the drawings.

<Schematic Framework>

[0022] The heat-not-flavor inhalation system 200 comprises: a tobacco stick 100; and a heat-not-bum flavor inhalation device 30 in which a partion of the tobacco stick 100 is heated while housed therein. The tobacco stick 100 is insertably and removably housed in the housing partion 35 by way of the insertion port 3A of the heat-not-bum flavor inhalation device 30. The tobacco stick 100 of the present embodiment comprises: tobacco filler (flavor filler) containing a flavor source and an aerosol-generating substrate; and a cylindrical member 140 that is at least partially filled with the tobacco filler. The partion of the cylindrical member 140 that is filled with the tobacco filler is also referred to as the tobacco rod portion (flavor rod portion) 110, and the portion on the drawing end 101 side from the tobacco rod portion 110 is also referred to as the mouthpiece portion 120. Specifically, the tobacco stick 100 comprises a tobacco rod portion 110 and a mouth piece portion 120.

[0023] When a user uses the heat-rut-bum flavor inhalation device 30, the stick 100 is inserted into the housing portion 35, during which the tobacco rod portion 110 of the tobacco stick 100 is heated to generate a tobacco component-containing aerosol, which is then inhaled by the user.

[0024] One end of the cylindrical member 140 is the tip 102, and the other end is the drawing end 101, and a ventilation portion 143, through which air is introduced

from the outside into the interior space 142, is provided in the peripheral wall 141 that forms the cylindrical member 140. The cylindrical member 140 is such that the tip 102, ventilation portion 143, and drawing end 101 are in communication with each other in such a way that, when drawn through drawing end 101, the air flowing in from the tip 102 and the ventilation portion 143 is drawn out through the drawing end 101.

[0025] The ventilation portion 143 has first ventilation portions 431 disposed on the tip 102 side of the tobacco stick 100; and second ventilation portions 432 disposed on the drawing end 101 side. If a user mistakes the tobacco stick 100 for a conventional cigarette and attempts to smoke it by lighting the tip 102 without inserting it into a heat-not-bum flavor inhalation device 30, the air drawn info the tobacco stick 100 will flow not only through the tip 102 but also through the ventilation portions 143. As a result, less air will flow in through the tip 102 of the tobacco stick 100 than would in a conventional cigarette, and the flame will not spread, thus preventing accidental ignition.

[0026] When used comedy, on the other hand, the tip 102 side of the tobacco stick 100 is inserted by the user into the housing portion 35 of a heat-not-bum flavor inhalation device 30. Specifically, a portion of the tobacco stick 100 on the tip 102 side is housed in the housing portion 35 of the heat-not-bum flavor inhalation device 30. The state in which the tobacco stick 100 is properly housed in the housing portion 35 is also referred to below as the specified state or the specified housed state. The specified state may also mean: a state in which the tip 102 of the tobacco stick 100 has been inserted until up agaist the wall of the housing portion 35 (the distal wall 312 described below) or a state in which the tobacco stick 100 of the present embodiment has been inserted as designed for a heat-not-bum flavor inhalation device 30.

[0027] The first ventilation portions 431 of the ventilation portions 143 are disposed inside the housing portion 35 in the specified housed state, and the second ventilation portions 432 are disposed outside the housing portion 35 in the specified state. Thus, when the tobacco stick 100 is housed, while in the specified state, in a heat-not-bum flavor inhalation device 30, the influx of air is restricted by the inner wall of the housing portion 35 in the first ventilation portions 431 of the ventilation portions 143, and the influx of air is not restricted by the inner wall of the housing portion 35 in the second vertilation portions 432. When drawn through the drawing end 101 in this state, the air (the influx of which through the first ventilation portions 431 is restricted) flows in through the tip 102 of the tobacco stick 100, ensuring that a predetermined volume of air flows in through the tip 102 of the tobacco stick 100 and passes though the tobacco rod portion 110. Also, as described below, the air that has passed through the tobacco rod pation 110 and the air that has flowed in through the second ventilation portions 432 are mixed and drawn through the drawing end 101. This allows the air that has passed tobacco rod portion 110 and the air that has flowed in through the second ventilation potions 432 to be mixed in a well-balanced manner, allowing the flavor to be appropriately inhaled (smoked). Specifically, the heat-not-bum flavor inhalation system 200 of the present embodiment is built to prevent accidental ignition while the tobacco stick 100 is not housed in a heat-not-bum flavor inhalation device 30, and to allow the stick tobe property smoking while in the specified housed state.

[0028] The elements constituting the heat-not-bum flavor inhalation system 200 are described in detail below.

<Tobacco stick>

[0029] The tobacco stick 100 according to the present embodiment is in the form of a substantially cylindrical rod. In the example illustrated in Figs. 2 and 3, the tobacco stick 100 includes a tobacco rod portion 110, a mouthpiece portion 120, and tipping paper 130 that integrally joins these together. The mouthpiece portion 120 is coaxially joined to the tobacco rod portion 110 by being wrapped together with the tobacco rod portion 110 by the tipping paper 130.

[0030] The tobacoo rod portion 110 is disposed on the tip 102 side of the tobacco stick 100. The tobacco rod portion 110is not limited to being disposed at the very tip of the tobacco stick 100. For example, a member similar to a filter segment (described below) may be disposed on the tip 102 side of the tobacco rod portion 110.

[0031] The tobacco stick 100 illustrated in Figs. 2 and 3 has a substantially constant diameter over the entire length in the longitudinal direction (also referred to below as the axial direction or Z direction) from the drawing end 101 to the tip 102.

[Tipping paper]

[0032] There is no particular restriction on the material of the tipping paper 130, and it is possible to employ paper made of common vegetable fibers (pulp), a sheet made from polymer-based (polypropylene, polyethylene, nylon, etc.) chemical fibers, a polymer-based sheet, metal foil, ora composite material combining the above. For example, the tipping paper 130 may be fabricated from acomposite material in which a polymer-based sheet is laminated on to a paper substrate. It should be noted that the tipping paper 130 refered to here refers to a sheet-like material that connects a plurality of segments of the tobacco stick 100, such as, for example, linking the tobacco rod portion 110 and the mouthpiece portion 120.

[0033] The basis weight of the tipping paper 130 is not particularly limited, but is usually 32 gsm to 60 gsm, preferably 33 gsm to 50gsm, and more preferably 34 gsm to 40 gsm. There is no particular restriction on the air permeability of the tipping paper 130, which is normally 0 CORESTA units to 30,000 CORESTA units, and preferably greater than 0 CORESTA units and no greater than

10,000 CORESTA units. The air permeability is a value measured in accordance with ISO 2965:2009, and is expressed as the flow rate (cm^3) of a gas passing through a surface area of 1 cm^2 per minute at a differential pressure of 1 kPa on both surfaces of the paper. One CORESTA unit (1 CORESTA unit: 1 CU)is $cm^3/(min \cdot cm^2)$ at 1 kPa.

[0034] The tipping paper 130 may contain filler in addition to the above-described pulp, examples of which can include metal carbonates such as calcium carbonate and magnesium carbonate, metal oxides such as titanium oxide, titanium dioxide and aluminum oxide, metal sulfates such as barium sulfate and calcium sulfate, metal sulfides such as zinc sulfide, quartz, kaolin, talc, diatomaceous earth, gypsum and the like, and calcium carbonate is preferably included in particular from the viewpoint of improving whiteness and opacity and increasing the heating rate. These filler materials may be used alone, or in combinations of two or more.

[0035] Various aids other than the pulp and filler may also be added to the tipping paper 130; for example, the paper may comprise a water-resistance improving agent to improve water resistance. Water-resistance improving agens include wet-strength agents (WS agent) and sizing agents. Examples of wet strength agents include urea formaldehyde resins, melamine formaldehyde resins, polyamide epichlorotrydrin (PAE), and the like. Furthermore, examples of sizing agents include rosin soap, alkyl ketene dimer (AKD), alkenyl succinic anhydride (ASA), and highly saponified polyvinyl alcohol having a saponification degree of 90% or more.

[0036] A coating agent may be added to at least one of the two surfaces of the tipping paper 130, namely the front surface and the rear surface. There is no particular restriction on the coating agent, but a coating agent that can form a film on the surface of the paper and reduce the permeability of liquids is preferred.

[0037] There is no paticular restridion on the method for manufactuing the tipping paper 130, and general methods can be applied; for example, in the case of an embodiment in which pulp is the main component, a method that uses pulp can be cited, in which the texture is adjusted and homogenized in a papermaking process employing a Fourdrinier papermaking machine, a cylinder mould paper making machine, or a round-short combined paper making machine, etc. Wet strength agents can also be added to impart water resistance, and sizing agents can be added fo adjust printing quality, as needed

<Tobacco rod portion>

[0038] The configuration of the tobacco rod portion 110 is not particulary limited, and can be in the form of a commonly used embodiment. For example, tobacco filler 111 wrapped in wrapping paper 112 can be used.

[0039] The axial length of the tobacco rod portion 110can be modified, as appropriate, depending on the size of the product, but can be, for example, 5 mm or more, preferably 10mm or more, more preferably 12 mm or more, and even more preferably 14 mm or more, and is usually 70mm or less, preferably 50mm or less, more preferably 30 mm or less, and even more preferably 25 mm or less.

[Tobacco filler]

[0040] In the present embodiment, the tobacco filler 111 includes cut tobacco. Th.ere is no particular restriction on the material of the cut tobacco included in the tobacco filler 111, and well-known materials such as lamina and midrib can be used. Furthermore, ground tobacco may be formed by grinding dried tobacco leaves to an average particle size of 20 μm-200 μm,then the material which has been homogenized may be processed into a sheet (also referred to below simply as a "homogenized sheet") which is shredded. What is referred to as the strand type may also be used, which is made by filling the tobacco rod with a homogenized sheet (measurement) that has been cut generally horizontal to the longitudinal direction of the tobacco rod. The width of the aut tobacco is preferably 0.5 mm to 2.0 mm in order to fill the tobacoo rod portion 110. The content of dried tobacco leaves contained in the tobacco rod portion 110 is also not particulary limited, but can be 200 mg/rod portion to 800mg/rod portion, and is preferably 250 mg/rod portion to 600 mg/rod portion. This range is particulary suitable if the tobacco rod portion 110 has a circumference of 22 mm and a length of 20 mm.

[0041] Various types of tobacco used can be used for the tobacco leaves used in the production of the shredded tobacco and the homogenized sheet. Examples that may be cited include yellow, Budey, orient, or native type, and other Nicotiana tabacum and Nicotiana rustica varieties, and mixtures thereof. A suitable blend of the above mentioned varieties may be used in the form of a mixture to achieve the intended taste. Details on tobacco varieties are disclosed in "Dictionary of Tobacco, Tobacco Academic Studies Center, March 31,2009". There are several conventional methods for producing the homogenized sheet, that is, methods for grinding tobacco leaves and processing them in to a homogenized sheet. According to a first method, a paper sheet is produced by using a paper making process. According to a second method, a suitable solvent such as water is mixed with ground tobaooo leaves and homogenized, after which the homogenized material is thinly cast on a metal plate or a metal plate belt and dried, to produce a cast sheet. According to a third method, a suitable solvent such as water is mixed with ground tobacco leaves and homogenized, and the homogenized material is extruded into the form of a sheet and shaped to produce a calendered sheet. Details on types of homogenized sheets are disclosed in "Dictionary of Tobacco, Tobacco Academic Studies Center, March 31,2009".

[0042] The moisture contert of the tobacoo filler 111 can be 10% by weight to 15% by weight, and is preferably

11% by weight to 13% by weight, relative to the total weight of the tobacco filler 111. A moisture content such as this will prevert wrapping stains and will result in more suitable wrapping during the production of the tobacco rod portion 110. There is no paticular restriction on the size of, or the method for preparing, the cut tobacco contained in the tobacco filler 111. For example, a material obtained by cutting dried tobacco leaves to a width of 0.5 mm or more and 20mm or less may be used. Furthermore, when ground material is used in the homogenized sheet, a sheet may be formed by grinding dried tobacco leaves to an average particle size of approximately 20 μm to 200 μm and then homogenizing the ground tobacco, and the homogenized sheet may be shredded to a widh of 0.5 mm or more and 20mm or less for use.

[0043] The tobacco filler 111 may comprise an aerosol base material for generating aerosol smoke. There is no particular restriction on the type of aerosol base material, and extracts from various types of natural products and/or components there of may be selected in accordance with the application. Aerosol base materials which may be cited indude glycerol, propylene glycol, triacetin, 1,3-butanediol, and mixtures thereof. The content of the aerosol base material in the tobacco filler 111 is not particulary limited, but is normally 5% by weight or more, and preferably 10% by weight or more, and nomally 50% by weight or less, and preferably 15 to 25% by weight, relative to the total amount of tobacco filler, in the interests of generating sufficient aerosol and ensuring good flavor.

[0044] The tobacoo filler 111 may contain flavoring. There is no particular limitation as to the type of flavoring material, and, from the point of view of imparting a pleasant flavor, there maybe cited acetanisole, acetophenone, acetylpyrazine, 2-acetylthiazole, alfalfa extract, amyl alcohol, amyl butyate, trans-anethole, staranise oil, apple juice, Peru Balsam oil, beeswax absolute, berzaldehyde, benzoin resinoid, benzyl alcohol, benzyl benzoate, benzyl phenylacetate, benzyl propionate, 23-butanedione, 2-butanol, butyl butyrate, butyric acid, caramel, cardamom oil, carob absolute, β-carotene, carrot juice, L-carvone, β-caryophyllene, cassia bark oil, cedar woodoil, celery seed oil, chamomile oil, cinnamaldehyde, cinnamic acid, cinnamyl alcohol, cinnamyl cinnamate, citronella oil, DL-citronellol, clary sage extract, cocoa, coffee, cognac oil, coriander oil, cuminaldehyde, davana oil, δ-decalactone, γ-decalactone, decanoic acid, dill herb oil, 3,4-dimethyl-1,2-cyclopentanedione, 4,5-dimethyl-3-hydroxy- 2,5-dihydrofuran-2-one, 3,7-dimethyl-6-octenoic acid, 2,3-dimethylpyrazine, 2,5-dimethylpyrazine, 2,6-dimethylpyrazine, 2-ethyl methylbutyrate, ethyl acetate, ethyl butyrate, ethyl hexanoate, ethyl isovalerate, eftyl lactate, eftryl laurate,ethyl levulinate,ethyl maltol,ethyl octanoate, ethyl oleate, ethyl palmitate, ethyl phenylacetate, ethyl propionate, ethyl stearate,ethyl valerate,ethyl vanillin, ethyl vanillin glucoside,2-ethyl-3,(5 or 6) dimethylpyrazine, 5-ethyl-3-ydroxy-4-methyt-2(5H)-furanone,2-ethyl-3-methylpyrazine,eucalyptol, fenugreek absolute, genet absolue, gentian root infusion, geraniol, geranyl acetate, grape juice, guaiacol, guava extract,γ-heptalactne,γ-hexalactone, hexanoic acid, cs-3-hexen-l-ol, hexyl acetate, hexyl alcohol, hexyl phenylacetate,honey, 4-hydoxy-3-pentenoic acid lactone, 4hydroxy-4-(3-hydroxy-1-butenyl)-3,5,5-trimethyl-2-cyclohexen-1-one, 4(para-hydroxyphenyl)-2-butanone, 4-hydroxyundecanoic acid sodium, immortelle absolute, β-ionone, isoamyl acetate, isoamyl butyrate, isoamyl phenylacetete isobutyl acetate, isobutyl phenylacetate,jasmine absolute, kola nut tincture, labdanum oil, lemon terpeneless oil, glycynthiza extract, linalool, linalyl acetate, lovage root oil, maltol, maple syrup, menthol, merthone, acetic acid L-menthyl, paramethoxybenzaldettyce, methyl-2-pyrrolyl ketone, methyl anthranilate, methyl phenylacetate methyl salicylate, 4'-methylacetophenone, methyloycloperenolone, 3-methylvaleric acid, mimosa absolute, molasses, myristic acid, nerol, nerolidol, γ-nonalactone, nutmeg oil, δ-octalactone, octanal, octanoic acid, orange flower oil, orange oil, orris root oil, palmitic acid, ω-pentadecalactone; peppermint oil, petitgrainParaguayoil, phenethyl alcohol, phenethyl phenylacetate, phenylacetic acid, piperonal, plum extract, propenyl guethol, propyl acetate, 3-propylidene phthalide, prune juice, pyruvic acid, raisin extract, rose oil, rum, sage oil, sandalwood oil, spearmint oil, styrax absolute, merigold oil tea distilate, α-terpineol,terpinyl acetate, 5,6,7,8-tetrahydroquinoxaline, 1,5,5,9-tetramethyl-13-oxacyclo(8.3.0.0(4.9)) tridecane, 2,3,5,6-tetramethylpyrazine, tyme oil tomato extract, 2-tridecanone, triethyl citrate, 4(2,6,6-trimethyl-1-cyclohexenyl)-2-buten-4-one, 2,6,6-trimethyl-2-cyclohexen-1,4dione, 4-(2,6,6-trimethyl-1,3-cyclohexadienyl)-2-buten-4-one, 2,3,5-trimethylpyrazin, γ-undecalactone, γ-valerolactone, vanilla extract, vanillin, veratraldetryde, violet leaf absolute, N-ethyl-p-menthane-3-carboamide (WS-3), and ethyl-2-(p-menthane-3-carboxamide) acetate (WS-5), with menthol being especially prefered. These flavoring materials may be used alone, or in combinations of two or more.

[0045] There is no particular restriction on the amount of flavoring contained in the tobacco filler 111, and, from the point of view of imparting a good flavor, the content is normally 10,000 ppm or greater; preferably 20,000 ppm or greater, and more preferably 25,000 ppm or greater; and is normally 70,000 ppm or less, preferably 50000 ppm or less, more preferably 40000 ppm or less, and even more preferably 33,000 ppm or less.

[Wrapping paper]

[0046] The wrapping paper 112 is a sheet material for wrapping the tobacco filling material 111, there being no particular restriction on the composition thereof, and a common wrapping paper can be used. For example, cellulose fiber paper can be used as the base paper for the wrapping paper 112; more specifically, hemp or wood, or mixtures thereof, can be cited. The besis weight

of the base paper in the wrapper 112 is, for example, 10 gsm or more, and preferably 25 gsm or more. Meanwhile, the bessis weight is normally 65 gsm or less, preferably 50 gsm or less, and even more preferably 45 gsm or less. There is no particular imitation as to the thickness of the wrapping paper 112 having the characteristics above, but it is normally 10 μm or greater, preferably 20 μm or greater, and more preferably 30 μm or greater; and furthermore is normally 100 μm or less, preferably 75 μm or less, and more preferably 50 μm ores, from the viewpoint of rigidity and air permeability, and ease of making adjustments during papermaking,

[0047] The shape of the wrapping paper 112 for the tobacco rod partion 110 (tobacco filler 111) may be square or rectangular, for example. When used as wrapping paper 112 for wrapping tobecoo filler 111 (for producing the tobacco rod portion 110), the paper can have length of 6 mm to 70 mm on one side, and a length of 15mm to 28 mm on the other side, but more preferably 22 mm to 24mm, and even more preferably about 23 mm, on the other side.

[0048] The wrapping paper 112 may include filler, in addition to the above pulp. The content of the filler can be 0% by weight to less than 60% by weight, and preferably 45% by weight or less, relative to the total weight of the wrappingpaper 112. Calcium carbonate, titanium dioxide, or kaolin, etc. may be used as the filler, but calcium carbonate is preferably used from the point of view of improving flavour and whiteness, etc.

[0049] A variety of aids other than the base paper or filler may also be added to the wrapping paper 112. For example, a wrapping paper combustion improver may be added as an aid, examples of which include sodium citrate and potassium citrate. A paper strengthening agent may also be added as an aid, examples of which include polyacrylamide, cationic starch, oxidized starch, CMC, polyamide epichlorohydrin resin, and polyvinyl alcohol Using a minute amount of oxidized starch in particular is known to improve air permeability (e.g, see JP 2017-218699A).

[0050] A coating agent may be added to at least one of the two surfaces of the wrapping paper 112, namely the front surface and the rear surface. There is no particular restriction on the coating agent, but a coating agent that can form a film on the surface of the paper and reduce the permeability of liquids is preferred. Examples include polysaccharides, such as alginic acid and salts thereof (such as sodium salts), gum arabic, guar gum, and pectin; cellulose derivatives such as ethyl cellulose, methyl cellulose, carboxymethyl cellulose, and nitrocellulose; and starch and derivatives thereof (ether derivatives such as carboxymethyl starch, hydoxyakyl starch, and cationic starch; and ester derivatives such as starch acetate, starch phosphate, and starch octenyl succinate).

[0051] The wrapping paper 112 in this embodiment is provided with a first ventilation portion 431 through which air flows in from the outside to the inside when the tobacco filler 111 is wrapped. The first ventilation portion 431 is a through hole passing from the outer surface into the inner surface of the wrapping paper 112 wrapped around the tobacco filler 111. The number and shape of the hokes in the first ventilation portion 43 1 provided inthe wrapping paper 112 are not particulary limited. In the present embodiment, a plurality of first ventilation potions 431 are disposed at regular intervals in the circumferential direction of the tobacco rod portion 110. A plurality of groups of first ventilation portions 431 disposed in the circumferential direction of the tobacco rod portion 110 may be formed along the axial direction of the tobacco rod portion 110: The first ventilation portions 431 also are not limited to through holes, and the wrapping paper 112 may be formed of a breathable member such as nonwoven fabric or mesh (also referred to below as breathable material) to allow air to flow from the outside into the interior space. The first ventilation portions 431 may also be a configuration combing through holes and a breathable material

<Mouthpiece portion>

[0052] The configuration of the mouthpiece portion 120 is not particulary limited, and can be in the form of a commonly used embodiment. In the embodiment illustrated Fig. 1, the mouthpiece portion 120 includs two segments (partitions), for example: a cooling segment 121 and a filter segment 122. The cooling segment 121 is disposed so as to be interposed between, while in contact with, the tobacco rod portion 110 and the filter segment 122 while in another embodiment, gaps may be formed between the tobacco rod portion 110 and the cooling segment 121 as well as between the tobacco rod portion 110 and the filter segment 122 The mouthpiece portion120 may also be formed of a single segment

[Cooling segment]

[0053] There is no particular restriction on the configuration of the cooling segment 121, provided that it has the fuction of cooling tobacco mainstream smoke, and cardboard processed into a cylindrical shape can be cited, for example. In this case, the inside of the cylinder is a cavity, and vapor containing the aerosol-generating substrate and tobaccco flavor component is cooled by coming info contact with air in the cavity. Structurally, the cooling componert 121 may be a hollow filter matenal such as breathable paper or cellulose acetate.

[0054] In one embodiment, the cooling segment 121 may be a paper tube that has been obtained by processing a sgle sheet of paper, or paper made of a plurality of sheets of paper laminated together, mo acylindrical shape. Through holes (second ventilation portions) 432 for introducing ouside air are also circumferentially provided around the paper tube in order to allow room temperature outside air to come info contact with high temperature steam, enhancing the cooling effect The

number of second ventilation portions 432 in the cooling segment 121 is not particularly limited. In the present embodiment, a plurality of second ventilation portions 432 are disposed at regular intervals in the circumferential direction of the cooling segment 121. A plurality of groups of second ventilation partions 432 circumferentially disposed around the cooling segment 121 may be formed along the axial direction of the cooling segment 121. Providing second ventilation portions 432 in the cooling segment 121 will allow low-temperature air to flow from the outside into the cooling segment 121 when the tobaccostick 100 is drawn, thereby lowering the temperature of the volatile components and air flowing in though the tobacco rod portion 110. The vapor containing the aerosol-generating substrate and the tobacco flavor component is also condensed by being cooled by the low-temperature air that has been introduced thtough the second ventilation portion 432 into the coding segment 121.This facilitates aerosol generation and allows the size of aerosol particles to be controlled The cooling effect can also be enhanced by coating the inner surface of the paper tube with a polymer, such as polyvinyl alcohol, ar a polysaccharide, such as pectin, to thereby exploit the heat of dissolution associated with the change in phase or heat absorption of the coating. The ventilation resistance of the cylindrical cooling segment is 0 mmH_2O.

[0055] When the coding segment 121 isfilled wih, for example, a sheet for cooling the volatile components and air flowing through the tobacco rod portion 110 into the cooling segment 121, the total surface area of the cooling segment 121 is not particularly limited, and may be, for example, 300 mm^2/mm to 1000 mm^2/mm. This surface area is the surface area per length (mm) of the cooling segment 121 in the air flow direction.The total surface area of the cooling segment 121 is preferably 400 mm^2/mm or more, and more prefarably 450 mmm or more, yet is preferably 600 mm^2/mm or less, and more preferably 550 mm^2/mm or less.

[0056] The internal structure of the cooling segment 121 preferably has a large surface area Accordingly, in a preferred embodiment, the cooling segment 121 may be formed by a sheet which is a thin material that is creased and then fluted, gathered and folded in order to form channels. The more folds ar flutes within a given volume of the element, the greater the total surface area of the cooling segment 121. The thickness of the structural material of the cooling segment 121 is not particulary limited, and may be, for example, 5 μm to 500 μm, or 10 μm to 250 μm

[0057] It is also desirable to use paper as the material of the cooling sheet member from the perspective of reducing the environmental burden. The paper serving as the cooling sheet material preferably has a basis weight of 30 to 100 g/m^2 and a thickness of 201 to 100 μm. From the perspective of reducing removal of the flavor source component and aerosol base material component in the cooling segment, the paper serving as the cooling sheet material preferably has low air penneability, and preferably an air permeability of 10 CORESTA units or less. The cooling effect on also be enhanced by coating the paper saving as the cooling sheet material with a polymer, such as polyvinyl alcohol, or a polysaccharide, such as pectin, to thereby exploit the heat of dissolution associated with the change in phase or heat absorption of the coating,

[0058] The second vertilation portions 432 in the cooling segment 121 are preferably disposed at locations that are at least 4mm apart from the boundary between the cooling segment 121 and the filter segment 122. This makes it possible to not only enhance the cooling capacity of the cooling segment 121, but to also prevent heat-generated components from accumulating inside the cooling segment 121, and to allow more of such components to be delivered. The second ventilation portions 432 provided inthe cooling segment 121 communicate with the second ventilation portions 432 provided in the tipping paper 130, and are formed to allow air to flow form the outside to the inside of the tobacco stick 100. For example, in the tipping paper 130, openings are provided immediately above (a positions overlapping in the radial direction with) the second ventilation portions 432 provided in the cooling segment 121. The cooling segment 121 and the tipping paper 130 of the present embodiment thus form a portion of the cylindicalnunber 140. The second ventilation portions 432 also are not limited to through holes; the coding segment 121 may be formed of a highly breathable material, such as nonwoven fabric or mesh, to allow air to flow from the aussice into the interior space. The second ventilation partions 432 may also be a configuration combining through holes and a breathable material.

[0059] There is no particular limitation as to the length of the cooling segment 121 inthe axial direction (air flow direction), but is normally 10mm or greater and preferably 15 mm or greater, and furthermore is normally 40 mm or less, preferably 35 mm or less, and mare preferably 30 mm or less. The axial length of the cooling segment 121 is particularly preferably 20 mm. It is possible to ensure a sufficient cooling effect and to obtain a pleasant flavor by setting the axial length of the cooling segment 121 at no less than the above mentioned lower limit. Furthermore, by setting the axial length of the cooling segment 121 a no greater than the above mentioned upper limit, it is possible to inhibit loss caused by adhesion of the vapor and aerosol generated during use to the inner wall of the cooling segment 121.

[Filter segment]

[0060] The configuration of the filter segment 122 is not particulary limited provided that the filter segment functions a general filter, and can cellulose acetate tow that has been processed into a cylindrical shape, for example. There is no particular imitation on the single-yam fineness ar the total fineness of the cellulose acetate tow, but

in the case of a filter segment 122 having a circumference of 22 mm, the single-yam fineness is preferably 5 to 20 g/9000m, and the total fineness is preferably 12,000 to 30,000g/9000m. The cross-sectional shape of the fibers of cellulose acetate tow may be either a Y cross section or an R cross section. When the filter segment 122 is formed by being filled with cellulose acetate tow, triacetin may be aded in an anamount of 5 to 10 wt% with respect to the weight of the odlulose acetate tow in order to improve the filter hardness. In the example illustrated in Fig 2, the filter segment 122 is configured from a single segment, but the filter segment 122 may be configured from a plurality of segments. When the filter segment 122 is composed of a plurality of segments, a hollow segment such as a center hole may be disposed, for example, on the upstream side (tobacco rod portion 110 side), and an acetate filter (the mouthpiece cross section of which is filled with cellulose acetate tow) may be disposed as a segment on the downstream side (the drawing end 101 side). Such an embodiment can prevert needless loss of generated aerosol and can produce a more attractive looking tobacco stick 100. In another embodiment, an acetate filter may be disposed upstream (on the tobacco rod portion 110 side), and a hollow segment such as a center hole may be disposed downstream (on the drawing end 101 side) in the interests of a different satisfying draw or a comfortable fit in the mouth. In another embodimert of the fitter segment 122, another alternative filter material such as a paper filter that has been filled with a sheet of pulp paper can be used instead of an acetate filter.

[0061] Examples of common filter functions in the filter segment 122 indude adjusting the volume of air that is mixed when an aerosol, for example, is inhaled, producing a milder flavor, and mitigating nicotine or tar, but not all of these functions need necessarily be provided. Preventing tobacco filler from falling out as the filtration function is controlled is also another important function in electrically heated tobacco products, which generate fewer components and tend to have a lower tobacco filler filling rate then cigarettes.

[0062] The cross-sectionalshape of the filter segment 122 is substantiallycircular, and the circle diameter can be modified as appropiate, depending on the size of the product, but is usually 4.0 mm to 9.0 mm, preferably 4.5 mm to 8.5 mm, and more preferably 5.0 mm to 8.0 mm. It should be noted that when the cross section is non-circular, the above mentioned diameter is assumed for a circle having the same area as the area of the relevant cross section, and the diameter of that circle is applied. The circumferential length of the filter segment 122 can be modified, as appropriate, depending on the size of the product, but is usually 14.0mm to 27.0 mm, preferably 15.0 mm to 260 mm, and more preferably 16.0 mm to25.0mm. The axial length of the filter segment 122 can be modified, as appropriate, depending on the size of the product but is ususally 5 mm to 35 mm, and prefarably 100mm to 300mm. The shape and dimensions of the filter medium can be modified, as appropriate, to ensure that the shape and dimensions of the filter segment 122are within the above rages.

[0063] The ventilation resistance per 120mm of axial length of the filter segment 122 is not particulary limited, but is usually 40 mmH_2O to 300 mmH_2O to preferably 70 mmH_2O to 280 mmH_2O, and more preferably 30 mmH_2O to 260 mmH_2O. The ventilation ressstance is determined using a filter ventilation resistance analyzer by Cerulean, for example, per the ISO standard (ISO 6565). The ventilation resistance of the filter segment 122 refers to the air pressure difference between the first end face and the second end face when air is allowed to flow at a predetermined flow rate (17.5 oc/min) from one end face (first end face) to the other end face (second en_d face) while no air is passing through the side faces of the filter segment 122. The units of ventilation resistance are generally expressed in mmH_2O. The relation ship between the ventilation resistance of the filter segment 122 and the length of the filter segment 122 is known to be proportional in the normally used length range (length of 5 mm to 200 mm), where the ventilation resistance doubles as the length of filter segment 122 doubles.

[0064] The density of the filter medium in the filter segment 122 is not particulary limited, but is usually 0.10g/cm^3 to 0.25g/cm^3, preferably 0.11g/cm^3 to 0.24g/cm^3, and more preferably 0.12g/cm^3 to 0.23g/cm^3. In the interests of better strength and structural rigidity, the filter segment 122 may comprise wrapping paper for wrapping filter media (filter plug wrapping paper), for example. There is no particular restriction on the fam of the wrapping paper, which may include a seam including one or more ines of adhesive. The adhesive may comprise a hot-melt adhesive, and the hot-melt adhesive may furthermore comprise polyvinyl alcohol. When the filter segment 122consists of two or more segnerts, the wrapper pefeably wraps the two or more segments together. The material of wrapper in the filter segment 122 is not particularly limited, and any known material may be used and may contain filler such as calcium carbomate.

[0065] There is no particular restriction on the thickness of the wrapping paper, and it is normally 20 μm-140 μm, peferably 30 μm-130 μm, and more prefeably 30 μm-120 μm. There is no particular restriction on the basis weight of the wrapping paper, and it is normally 20 gsm 100 gsm, preferably 22 gsm-95 gsm, and more preferably 23 gsm 90 gsm Furthermore, the wrapping paper may be coated or uncoated, but is preferably coated with a desired material from the viewpoint of allowing functions other than strength and structural rigidity to be imparted.

[0066] When the filter segment 122 includes a center hole segment and filter media, the center hole segment and the filter media may be connected by an outer plug wrapper, for example. The outer plug wrapper can be cylindrical paper, for example. The tobacco rod portion 110 and the cooling segment 121 as well as the connected center hole segment and filter media may be

connected by mouthpiece lining paper, for example. They can be connected, for example, by applying a paste, such as vinyl acetate paste, to the inner surface of the mouthpiece lining paper, and then wrapping the paper around the inserted tobacco rod portion 110, cooling segment 121, and the connected center hole segment and filter material. The components may also be connected by multiple separate connections with a plurality of lining papers.

[0067] The filter media of the lilter segment 122 may include crushable additive-release containers (such as capsules), including crushable outer shells made of gelatin, for example. There is no particular restriction on the form of the capsule (also referred to as an "additive release container" in this technical field), and a well-known form may be adopted; for example, a crushable additive-release container comprising a crushable outer shell made of gelatin or the like can be used. The farm of the capsules is not particulary limited, and may be breakable capsules, for example, which are preferably spherical. Any of the additives noted above, and flavoring agents ar activated carbon in particular, may be included as additives in the capsules. One or more types of materials serving as a smoke-filtering aid may also be added as additives. The form of the additive is not particularly limited, but is nomally a liquid or a solid. The use of capsules containing additives is well known in this technical field. Breakable capsules and methods for producing them are well known in this technical field.

[0068] Examples of flavor agents include: menthol, spearmint, peppermint, fenugreek, or clove, and medium-chain fatty acid triglymides (MCT), or combinations thereof. In the present embodiment, the favoring agent is a menthol.

[0069] The filter media of the filter segment 122 may be flavored. Adding flavorto the filter material will allow more flavor to be delivered during use compared with the conventional technology in which flavor is added to the tobacco filler that forms the tobacco rod partion 110. The extent of the increase in flavor delivery will be even greater depending on where the openings are provided in the cooling segment 121. The way in which flavor is added to the filter media is not particularly limited, but flavor should be added so as to be generally dispersed to homogeneity in the filter media to which the flavor is being added. In one embodiment, flavor is added in portions of 10 to 100% by volume to the filter media. Flavor may be added to the filter media before or after the filter segment is formed. There is no particular limitation as to the type of flavor, but the same flavor as that contained in the tobacco filler 111 maybe used

[0070] The filter segment 122 includes filter media, and activated carbon may be added to at least sane of the filtamedia Activated carbon may be added to the filter media in an amount of 15.0 m^2/cm^2 to 80.0 m^2/cm^2 per tabacco stick, calculated as the specific surface area of activated carbon $\times$ weight of activated carbon/cross-sectional area of filter media in a direction perpendicular to the direction of the air flow. The above mentioned "specific surface area of activated carbon $\times$ weight of activated carbon/cross-sectional area of filter media in a direction perpendicular to the direction of the air flow" may also be expressed, for the sake of convenience, as "the surface area of the activated carbon per unit cross-sectional area." The surface area of activated carbon per unit cross-sectional area can be calaulated based on the specific surface area of activated carbon added to the filter media of one tobacco stick, the weight of the added activated carbon, and the cross-sectional area of the filter media. The activated carbon need not be uniformly dispersed in the filter mataial to which it is added, and it is not necessary for the range above to be satisfied over the entire cross section of the filter media (the cross section in a direction perpendicular to the direction of the air flow).

[0071] The surface area of activated carbon per unit cross-sectional area is mare preferably 17.0m^2/cm^2 or greater, and even more preferably 35.0m^2/cm^2 or greater. On the other hand, the surface area of activated carbon per unit cross-sectional area is more preferably 77.0 m^2/cm^2 or less, and even more preferably 73.0 m^2/cm^2 or less. The surface area of the activated carbon per unit cross-sectional area can be adjusted, for example, by adjusting the specific surface area of the activated carbon and the amount of activated carbon that is added, as well as the cross-sectional area of the filter media in a direction perpendicular to the direction of the air flow. The surface area of activated carbon per unit cross-sectional area is calculated on the basis of the filter material to which the activated charcoal is added. When the filter segment 122 is composed of a plurality of filter media, the cross-sectional area and length of only the filter media to which activated carbon has been added are used as the reference.

[0072] Examples of activated carbon include those based on wood, bamboo, coconut shell, walnut shell, or coal. Activated carbon having a BET specific area of 1100 m^2/g to 1600 m^2/g can also be used, activated carbon having a BET specific surface area of 1200 m^2/g to 1500 mg can preferably be used, and activated charcoal having a BET specific surface area of 1250m^2/g to 1380 m^2/g can more preferably be used The BET specific surface area may be determined by the nitrogen gas adsorpion method (BET multipoint method). Activated carbon having a pore volume of 400 μL/g to 800 μL/g can be used, activated carbon having a pore volume of 500 μL/g to 750μL/g can preferably be used, and activated carbon having a pore volume of 600 μL/g to 700 μL/g can more preferably be used. The pore volume may be calculated from the maximum adsorption obtained using the nitrogen gas absorption method. The amount of activated cabon added per unit length, in the direciton of the air flow, of the filter media is preferably 5 mg/cm to 50mg/cm, more preferably 8 mg/cm to 40 mg/cm, and even more preferably 10 mg/cm to 35 mg/cm. Ensuring that the surface area of the activated carbon and the amount in which the activated carbon is

added are within the above ranges will allow the surface area of activated carbon per unt cross-sectional area to be adjusted to the desired value.

[0073] The cumulative 10 vol% particle size (D10 particle size) of activated carbon particles is preferably 250 pm to 1200 pm. The cumulative 50 vol% particle size (D50 particle size) of activated carbon particles is preferably 350 μm to 1500 μm. The D10 and D50 particle sizes are determined by means of a laser scattering diffractometry. Examples of devices suitable for this analysis include the "LA-950 laser difffaction/scattering particle size distribution analyzer by HORIBA, Ltd. A powder is poured together with pure water info cells of the analyzer, and the perticle size is detected on the basis of particle light scattering data.

[0074] The conditions of analysis using this analyzer are as follows.

Analysis mode: manual flow mode-type cell analysis
Dispersionmedium: ion exchange water
Dispasion method: measurement after 1 minute of ultrasound irradiation
Refractive index: 1.92-0.00i (sample refractio-n)/1.33-0.00i(dispersion medium refractive index)
Number of measurements: two measurements with different samples

[0075] The way in which the activated carbon is added to the filter media of the filter segment 122 is not particulary limited, but the activated carbon should be added so as to be generally dispersed to homogeneity in the filter media to which the filter media is being added

[0076] In the tobacco stick 100 configured as described above, a portion of the outer surface of the tipping paper 130 may be coated with a lip release material. The lip release material means a material that is configured so as to help the contact between the lips and the tipping paper 130 to be released, essentially without any sticking, when the user holds the mouthpiece portion 120 of the tobacco stick 100 in the mouth. The lip-release material may comprise ethylcellulose or methylcellulose, for example. For example, the outer surface of the tipping paper 130 maybe coated with a lip-release material by applying an ethylcellulose-based or methylcellulose-based ink to the outer surface of the tipping paper 130.

[0077] In this embodiment, the lip release material of the tipping paper 130 is disposed in at least a predetermined mouthpiece area that comes info contact with the user's lips when the user holds the mouthpiece portion 120 in the mouth. More specifically, in the outer surface of the tipping paper 130, a lip release material arangement region R1 (see Figure 2) that has been coated with a lip release material is defined as an area located between the drawing end 101 of the mouthpiece portion 120 and the second ventilation portions 432.

[0078] The rod shaped tobacco stick 100 preferably has a columnar shape satisfying a shape in which the aspect ratio defined below is equal to or greater than 1.

$$\text{Aspect ratio} = h/w$$

[0079] The symbol w is the width of the tip 102 of the tobacco stick 100, and h is the length in the axial ditrction, and preferably j≥w. There is no particular restriction on the cross-sectional shape of the tobacco stick 100, and it can be polygonal, rounded-comer polygonal, circular, or elliptical, etc. The width w of the tobacco stick 100 is the diameter when the cross-sectional shape of the tobacco stick 100 is circular, the major diameter when the cross-sectional shape of the tobacco stick 100 is elliptical, or the diameter of a circumscribed circle or the major diameter of a circumscribed ellipse when the cross-sectional shape of the tobacco stick 100 is polygonal or rounded-corer polygonal. There is no particular restriction on the axial length of the tobacco stick 100, and it is normally 40 mm or greater, preferably 45 mm or greater, and more preferably 50mm or greater, for example. The axial length his also usually 100mm or less, preferably 90 mm ar less, and mare preferably 80 mm or less. The width w of the tip 102 of the tobacco stick 100 is not particulary limited, and is, for example, usually 5 mm or more, and preferably 5.5 mm or more. The width w is also usually 10 mm or kess, preferably 9 mim or less, and more preferably 8 mm or less. There is no particular restriction on the ratio between the lengths of the cooling segment 121 and the filter segment 122 (cooling segment : filter segment) in the length of the tobacco stick 100, but from the viewpoint of the amourt of flavoring delivered and the appropriate aerosol temperature, it is normally 0.60 to 1.40: 0.60 to 1.40, preferably 0.80 to 120: 0.80 to 1.20, more preferably 0.85 to 1.15 : 0.85 to 1.15, even more preferably 0.90 to 1.10 : 0.90 to 1.10, and particularly preferably 095 to 1.05 : 0.95 to 1.05. By setting the ratio between the lengths of the cooling segment 121 and the filter segment 122 within the above range, a balance is achieved between the cooling effect, the effect of suppressing losses due to adhesion of the generated vapor and aerosol to the inner wall of the cooling segment 121, and the function of the filter for adjusting the volume of air and the flavor, thereby making it possible to achieve a good flavor and flavor intensity.

<Heat-not-burn flavor inhalation device>

[0080] Aheatnat-bum flavor mhalation device 30 that is used together with the tobacco stick 100 will be described next. The heat-notbum flavor mhalation device 30 is an inhalation device for inhaling the tobacco stick 100, and is combined with the tobacco stick 100 to form a heat-not-burn flavor inhalation system 200.

[0081] The heat-not-burn flavor inhalation device 30 comprises an enclosure 31, a heating unit 32, a power source 33 that supplies power to the heating unit 32 to effect heating, and a control unit 34 that controls the power supplied to the heating unit 32. The enclosure 31 comprises a cylindrical housing portion 35, and com-

prises a heating portion 32 inside the housing portion 35.

[0082] The enclosure 31 has a generally cylindrical outer shape and is provided with a housing portion 35 at ane end. The housing portion 35 1s oriented from one end (also referred to below as the poximal end) of the enclosure 31 toward the other end (also reffered to below as the distal end), with a cylindrical interior space on the inside. An opening on the proximal end sice of the housing portion 35 serves as the insertion port 3A for the tobacco stick 100. The tobacco stick 100 can be inserted into and removed fiom the housing portion 35 by way of the insertion part 3A. Specifically, the housing partion 35 extends along the direction in which the tobacco stick 100 is inserted and removed (axial direction).

[0083] The housing portion 35 has a cylindrical peripheral wall 311 and a distal wall 312 that closes the distal end of the peripheral wall 311, wherein the peripheral wall 311 and the distal wall 312 define the internal space of the housing portion 35. An airflow path 36 passing from the housing portion 35 to the outer peripheral surface 313 of the enclosure 31 is provided in a portion of the peripheral wall 311 on the distal wall 312 side.

[0084] In the heat-not-burn flavor inhalation device 30, an operating switch, for example, disposed in the enclosure 31 may be started as a tigger to initiate heating. In the heat-not-burn flavor inhalation device 30, the insertion of a tobacco stick 100 into the housing portion 35 may also be sensed as a trigger to initiate heating, For example, the control unit 34 may be comprise a sensor that senses the insertion of the tobacco stick 100 into the housing portion 35, and heating may be initiated when the sensor detects that a tobacco stick 100 has been inserted.

[0085] The heating portion 32 is an electrical heating type of heater for heating the tobacco rod portion 110 of the tobacco stick 100 when activated. The heating portion 32 is, for example, an electrical heating heater that generates Joule heat when power is supplied from the power source 33. As shown in Fig. 1A, the heating portion 32 in the present embodiment is disposed on the inner peripheral side of the peripheral wall 311 of the housing portion 35. The heating portion 32 is generally cylindrical and is an external heating type in which the tobacco stick 100 inserted into the cylindrical interior is heated from the outside. The heating portion 32 is not imited to this, and may be an internal heating type as shown in Fig. 1B. The heating portion 32 in Fig. 1B is a blade-shaped or needle-shaped one that stands from the distal wall 312 toward the insertion port 3A inside the housing portion 35. When the tip 102 of the tobacco stick 100 is inserted info the heat-not-burn flavor inhalation device 30 of Fig. 1B until up against the distal wall 312 of the housing portion 35, the blade-shaped or needle-shaped heating portion 32 pierces the tobacco rod portion 110. While in this state, the heating portion 32 in Fig. 1B heats the tobacco stick 100 from the inside. The heating mode of the heating portion 32 is not particularly limited, and the heating portion 32 may also comprise, for example, an induction coil for heating a heating element disposed inside ar around the tobacco stick 100 via electromagnetic induction. The heating portion 32 may also comprise a microwave generator for heating the tobacco stick 100 via the application of microwaves.

[0086] The power supply 33 is a power supply for supplying operating power to the heating portion 32 and control unit 34, for example, and is electrically connected to these via electrical wiring. The power source 33 can be built with, for example, a lithium ion battery, nickel battery, or an alkaline battery. The control unit 34 is a computer that has a CPU and memory, for example, and controls the operation of the entire heat-not-burn flavor halation device 30. The control unit 34 may be, for example, a micro controller in which a CPU, memory, an input/output circuit, and a timer circuit, for example, are mounted on an IC chip. When the heat-not-burn flavor inhalation device 30 is operated, heating is controlled by the control unit 34, where power is supplied from the power source 33 to the heating portion 32, and the tobacco rod portion 110 of the tobacco stick 100 is heated by the heating portion 32.

EXAMPLES

[0087] As noted above, the tobacoo stick 100 of the present embodiment has first ventilation portions 431 and second ventilation portions 432, so if the user holds the drawing end 101 in the mouth and draws while the stick is not housed in the heat-not-burn flavor inhalation device 30, a large volume of air will flow in through the first ventilation portions 431 and second ventilation portions 432 while only a small volume of air will flow in through the tip 102, thus keeping any flame from spreading and preventing accidental ignition. Thus, when the tobacco stick 100 of the present embodiment is properly housed in the housing portion 35 of the heat-not-burn flavor inhalation device 30 (specified housed state), the air flowing in through the first ventilation portions 431 is restricted by the inner wall of the housing portion 35. When drawn through the drawing end 101 in this state, the air (the influx of which through the first ventilation portions 431 is restricted) flows in through the tip 102 of the tobacco stick 100. The relationship of the ventilation involved in the flow of air here is described below.

[0088] Fig 4 is a schematic diagram illustrating the relationship of the ventilation involved in the tobacco stick 100, Fig, 5 shows wrapping paper 112 specifications, and Fig. 6 shows, for example, the ventilation resistance in Examples and Comparative Examples of the tobacco stick Fig. 7 is a graph illustrating the relationship between the following, as determined per ISO9512, when tobacco sticks were not housed in the housing portion of an inhalation device in the examples and comparative examples: the percent by volume of the tip ventilation volume (of the air flowing in through the tip 102) relative to the ventilation volume of the air drawn through the drawing end 101 of a tobacco stick; and the amount of

carbon monoxide contained in the air drawn through the drawing end 101 when lit Fig. 8 is a graph illustrating the relationship between the following, as determined per ISO 9512, when tobacco sticks were not housed in the housing portion of an inhalation device in the examples and comparative examples: the ventilation resistance; and the amount of carbon monoxide contained in the air drawn through the drawing end 101 when lit. Fig. 9 is a table showing the following, as determined per ISO 9512, when tobacco sticks were not housed in the housing portion of an inhalation device in the examples and comparative examples: tip ventilation volume (Vt); percent by volume of air flowing in through a first opening portion (V1) and a second opening portion (V2); ventilation resistance; and the amount of carbon monoxide contained in the air drawn through the drawing end when lit. In Figures 7 to 9, "when lit" is the time when 3 puffs were taken per tobacco stick lit under CIR conditions.

[0089] In the tobacco stick 100 of the present embodiment, as illustrated in Fig 4, first ventilation portions 431 are provided in locations where the tobacco rod portion 110 is disposed, in the axial direction, and second ventilation portions 432 are provided in locations where the mouthpiece portion 120 is disposed, on the dawing end 101 side fiom the first ventilation portions 432.

[0090] In the present embodiment, the cross-sectional shape of the interior space of the housing portion 35 and the tobacco stick 100 are substantially the same, and the outer peripheral surface of the housed portion of the stick 100 that is housed in the housing portion 35 is in contact with the inner peripheral surface of the housing portion 35 along the entire periphery. The inner peripheral surface of the housing portion 35 thus closes the first ventilation portions 431 of the tobacco stick 100and restricts the air flowing in through the first ventilation portions 431. The first ventilation partions 431 are not limited to the location where the tobacco rod portion 1101s disposed, but may be a location where the tobacco stick 100 is housed in the housing portion 35 and thus restricts the air flowing in through the first ventilation portions 431. Specifically, in the present embodiment, it should be a location that is in contact with the inner wall of the housing portion 35 when the tobacco stick 100 is housed in the housing portion 35. Thus, for example, the first ventilation portions 431 may be provided at a location where the mouthpiece portion 120 is disposed, provided that it is a location where the first ventilation portions 431 are in contact with the inner wall of the storage portion 35 when the tobacco stick 100 is housed in the housing portion 35.

[0091] As also illustrated in Fig. 4, Vo represents the volume of air drawn out through the drawing end 101 of the tobacco stick 100, Vt represents the of air flowing in though the tip 102, V1 represents the volume of air flowing in through the first ventilation portions 431, and V2 represents the volume of air flowing in through the second ventilation portions 432. The first ventilation portions 431 are through holes provided in the wrapping paper 112 of the tobacco rod portion 110, and when the wrapping paper 112 is not a breathable material, the air volume V1 is approximately the volume of air thet passes through the through holes, but when the wrapping paper 112 is a breathable material, the air volume V1 is the total volume of air that has passed through the through holes and that has passed through the wrapping paper 112. The air volume Vo, Vt, V1, and V2 are expressed as percent by volume, for example, below. While the tobacco stick 1001s housed in the housing portion 35, the air flowing through the tip 102 of the tobacco stick 100 is introduced from outside the heat-not-burn inhalation device 30 primarily by way of the air flow path 36.

[0092] Fig. 5 shows the basis weight, air permeability, and thickness of the wrapping paper 112 used in the tobacco sticks of the comparative examples and examples. Aluminum laminated paper is made by laminating aluminum foil onto a base paper, and hes an air permeability of 0 CU. Paper material 1 through 3 are common pulp paper and are not particularly limited, but in the examples in Fig. 5, the basis weight is 43 to 55 g/m^2, the air permeability is 0 to 2 CU, and the thickness is 45 to 62 μm. Paper materials 1 through 3 have almost no breathability, but ventilation portions (through holes) 143 are provided to allow air to flow from outside the tobacco stick 100 into the interior space. On the other hand, the breathable material in Fig. 5 is a highly breathable material such as a coarse nonwoven fabric or mesh, and the breathability of this example in Fig. 5 is 32,000 CUL

[0093] In Fig. 6, Comparative Example 0 is a tobacco stick (obtained using aluminum-laminated paper) that served as the control. Different paper 112 in Comparative Examples 1 through 3, wine LPCP1 is used in Comparative Example 1, LPCP2 is used Comparative Example 2, and LPCP3 is used in Comparative Example 3. Comparative Examples 0 to 3 differ from the tobacco stick 100 of the present embodiment in that they do not have first ventilation portion 431, but are otherwise the same.

[0094] LPCP1 is used as the paper material for the wrapping paper 112 in Examples 1 through 3. A different number of holes were used in the first ventilation potions 431 of Examples 1 through 3, where 8 hokes were used in Example 1,6 holes were used in Example 2, and 4 holes were used in Example 3. LPCP2 was used as the paper material in Example 4, 8 holes were used in the first ventilation portions 431. LPCP3 was used as the paper material in Example 5, and 8 holes were used in the first ventilation portion 431. Breathable HPCP1 wes furthermore used in the wrapping paper 112 in Example 6. In this case, the first ventilation portions 431 are where air flows in through portions of the tipping paper 130 and wrapping paper 112 that were formed with the breathable HPCP1, rather than through specific through holes.

[0095] In Comparative Examples 0 through 3 and Examples 1 through 6, the volume of air drawn out through the drawing end 101, the volume of air flowing in through the tip 102, the volume of air flowing in through the first ventilation portions 431, and the volume of air flowing in

through the second ventilation portions 432 were measured per ISO 9512, and was the percent volume of air flowing in through the tip 102 (tip ventilation volume) relative to the ventilation volume of air drawn in through the drawing end 101 and the ventilation resistance from the tip 102 to the drawing end 101. The ventilation resistance is determined while air flowing in through the second ventilation portions 432 is restricted, specifically, while the second ventilation portions 432 are closed, as well as while air flowing in through the second ventilation portions 432 is not restricted, specifically, while the second ventilation portions 432 are open. Multiple tobacco sticks were produced for each of Comparative Examples 0 through 3 and Examples 0 through 6; Fig. 6 shows the percent by volume of the tip ventilation volume and the average ventilation resistance from the tip 102 to the drawing end 101 that were determined for these multiple tobacco sticks.

[ISO9512]

[0096] In the present embodiment, the percent by volume V1 of air flowing in through the first ventilation portion 431 and the percent by volume V2 of air flowing in through the second ventilation portion 432 can be determined per ISO 9512, as follows.

[0097] For example, the percent by volume V1 of the air flowing in through the first ventilation portions 431 was calculated by means of the following calculation formula 1 based on the percent by volume V2 of the air flowing in through the second ventilation portions 432 as well as the airflow resistance values of the tobacco rod portion 110 and the filter segment 122, where the percent by volume Vo of the air drawn through the dawing end 101 at 17.5 mL/sec by a wrapper quality analyer was 100% by volume. The percentage by volume and the airflow resistance can be determined using a wrapper quality analyzer (such as SODILINE by SODIM) according to a method based on ISO9512.

(Formula 1)

$$A1=A2*(L1/LA)*((100-V1-V2)/100)+A2*((L2/LA)*((100-V2)/100)+A3$$

Where

A1: ventilation resistance of tobacco stick 100
A2: ventilation resistance of tobacco rod portion110
A3: ventilation resistance of filter segment 122
L1: axial length from tip to first ventilation portions 431 of tobacco rod portion 110
L2: axial length from rear end to first ventilation portions of tobacco rod portion 110
LA:axial length of tobacco portion 110

[0098] The percent by volume the tip ventilation volume V1 may be determined by the following formula based on the percent by volume V1 of air flowing in through the first ventilation portions 431 and the percent by volume V2 of air flowing in through the second ventilation portions 432, where the ventilation volume of air drawn in through the drawing end 101 is 100.

(Formula 2)

$$Vt=100-V1-V2$$

[Ignitability Assessment]

[0099] In the Comparative Examples 0 through 3 and Examples 1 through 6, smoking tests (3 puffs per stick) were conducted under CIR conditions while the tobacco stick was not setup in a heat-not-burn flavor inhalation device 30, specifically, while the first ventilation portions 431 were open. Specifically, ignitability was assessed by holding an electrical heater against the tip 102 and drawing on the drawing end 101. When an electric heater is held against the tip 102 of a tobacco stick, and the tobacco filler 111, for example, begins to ignite, carbon monoxide is produced, and the air drawn out through the drawing end 101 contains carbon monoxide. Ignitability can therefore be assessed on the basis of the amount of carbon monoxide contained in the air that is drawn out though the drawing end 101 of the tobacco stick 100. Figs. 7 though 9 show the results of ignitability assessment in Comparative Examples 0 through 3 and Examples 1 through 6. In Figs. 7 through 9, the air volume Vt, V1, and V2 were determined per ISO 9512 while the tip 102, first ventilation portions 431, and second ventilation portions 432 of the tobacco stick 100 were not blocked. On the other hand, the amount of carbon monoxide in Figs. 7 through 9 was determined while the second ventilation portion 432 were blocked. Alternatively, the amount of carbon monoxide may also be determined while the second ventilation portions 432 are not blocked, and the air volume Vt, V1, and V2 may be set so as to avoid ignition.

[0100] In Comperative Example 0, no first ventilation portions 431 were provided, but aluminum-lamimated paper was used for the wrapping paper 112 to avoid accidental ignition. For example, when an electrical heater was held against the tip 102 of the tobacco stick in Comparative Example 0, the amount of carbon monoxide contained in the air drawn trough the drawing end 101 after 3 puffs per stick under CIR condition was 5.1 mg/cig. The value is considered to be sufficient to prevent ignition, and is used as a standard, where carbon monoxide levels that exceed this standard are rated NG (ignition not avoided/easily ignited), and carbon monoxide levels at or below the standard are rated OK (ignition avoided/difficult to ignite).

[0101] The results of assessment, as shown in Fig. 9, revealed that the levels of carbon monoxide in the air drawn through the drawing end 101 in Comparative Examples 1 through 3 exceeded the standard value, resulting in a rating of NG. The levels of carbon monoxide in the

air drawn through the drawing end 101 in Examples 1 through 6, on the other hand, were at or below the standard value, resulting in a rating of OK. As shown in Fig, 7, the carbon monoxide at this time is proportional to the percent by volume of the tip ventilation volume. Based on these results, it was determined that the tip ventilation volume should be less than 18.9% by volume in order to keep the carbon monoxide level at or below the standard.

[0102] As shown in FIG. 8, the carbon monoxide level is also proportional to the ventilation resistance when the tobacco stick is not housed in the heat-not-burn flavor inhalation device 30. In the interests of ease of smoking, it was determined that the ventilation resistance should be 4S mm WG or less. The ventilation resistance should furthermore be 10mmWG or more based on, for example, how the stick feels while used when smoking.

<Advantageous Effects of Embodiments

[0103] According to the present embodiment, the tobacco stick 100 has first ventilation portions 431 disposed on the tip 102 side, and second ventilation portions 432 disposed on the drawing end 101 side. If a user mistakes the tobacco stick 100 for a conventional cigarette and attempts to smoke it by lighting the tip 102 without it being housed in a heat-not-burn flavor inhalation device 30 (unhoused state), the air drawn into the tobacco stick 100 will flow net only through the tip 102 but also through the ventilation portions 143. Thus, less air will flow in through the tip 102 of the tobacco stick 100 of the present embodiment while unhoused that would in a conventional cigarette, and the flame will not spread, thus preventing accidental ignition.

[0104] When the tobacco stick 100 in the heat-not-burn flavor inhalation system 200 of the present embodiment is inserted, m the specified state, into the housing portion 35 of the heat-not-burn flavor inhalation device 30, the first ventilation portions 431 are located inside the housing portion 35, and the air flowing in through the first ventilation portions 431 is restricted by the inner wall of the housing portion 35. At this time, the air (the influx of which through the first ventilation portions 431 is restricted) flows in through the tip 102 of the tobacco stick 100, ensuring that a predetermined volume of air flows in through the tip 102 of the tobacco stick 100 and passes through the tobacco rod portion 110. The air that has passed through the tobacco rod portion 110 and the arr that has flowed in through the second ventilation portions 432 is mixed together and drawn through the drawing end 101. This allows the air that has passed through the tobacco rod portion 110 and the air that has flowed in through the second ventilation portions 432 to be mixed in a well balanced manner; allowing the flavor to be appropriately inhaled (smoked). Specifically, in the heat-not-burn flavor inhalation system 200 of the present embodiment, the tobacco stick 100 can be prevented from accidentally igniting while not housed in the heat-not-burn flavor inhalation device 30, and can be properly smoked while in the specified housed state.

<Modified Example 1>

[0105] Fig. 10 illustrates a modified example of the heat-not-burn flavor inhalation device 30A according to Modified Example 1. Fig. 10 shows a plane on the drawing end 101 side of the heat-not-burn flavor inhalation device 30A. Fig. 11 illustrates the influx path of air flowing into a tobacco stick 100 while the tobacco stick 100 is housed in the heat-not-burn flavor inhalation device according to Modified Example 130A. This modified example is structurally different from the above modified example in that the interior space of the housing portion 35A is elliptically cylindrical, but is otherwise the same. Elements that are the same will therefore be indicated by the same symbols without further elaboration.

[0106] As shown in Fig. 10, the peripheral wall 311 of the housing portion 35A of the heat-not-burn flavor inhalation device 30A in this modified example has an elliptically cylindrical shape. Specifically, the interior space of the housing portion 35A is such that the cross-sectional shape perpendicular to the direction in which the tobacco stick 100 is inserted (axial direction) is elliptical, where the width WB in the major axis direction is greater than the width WA in the minor axis direction. The dash-double dot line in Fig. 10 shows the contours of the tobacco stick 100 when the tobacco rod portion 110 is housed. The tobacco stick 100 is cylindrical as in the embodiments above, where its radial width is approximately the same as the width WA of the interior space in the housing portion 35A and is narrower than the width WB in the major axis direction. A gap 353 is thus formed between the mer peripheral surface of the housing portion 35A in the longitudinal direction and the outer peripheral surface of the tobacco stick 100. In the heat-not-burn flavor inhalation device 30A of this modified example, the gap 353 serves as an air influx path while the tobacco stick 100 is inserted in he specified state, as shown in Fig. 11.

[0107] In the embodiments above, as shown in Fig, 4, an ar flow path 36 passing from the outer peripheral surface of the enclosure 31 to the interior space of the housing portion 35 is provided in order to ensure that air flows through the tip 102 of the tobacco stick 100 inserted in the housing portion 35. By contrast, ion the heat-nonburn device 30A of this modified example, the gap 353 is formed between the inner peripheral surface of the housing portion 35A and the outer peripheral surface of the tobacco stick 100, and this gap 353 serves as the air flow path to the tip 102 of the tobacco stick 100, thus allowing the modified example to be simplified by eliminating the air flow path 36 used in the above embodiments. In this case, the first ventilation portions 431 facing the gap 353, specifically, the first ventilation portions 431 located in the major axis direction in the elliptical cross section of the storage portion 35A, do not restrict the influx of air, whereas the first ventilation portions 431 located in the

minor axis direction do come info contact with the inner surface of the housing portion 35A and restrict the flow of air. The percent by volume V1 values of the air volume flowing in through the first ventilation portions 431 while the tobacco stick 1001s and is not inserted in the housing portion 35A are thus set in the same manner as in the embodiments above to thereby allow the tobacco stick 100 to be prevented from being accidentally lit if mistaken for a conventional cigarette, and to be property smoked when inserted into the heat-not-burn flavor inhalation device 30A. As an alternative to omitting the air flow path 36, the air flow path 36 may be combined with the air flow path formed by the gap 353 to ensure air is consistently supplied to the tip 102 of the tobacco stick 100. In this modified example, the width WA in the short axis direction of the interior space of the housing portion 35A is approximately the same as the width of the tobacco stick 100, but as an alternative, the width of the tobacco stick 100 may be smaller than the width WA of the interior space, so that when the tobacco stick 100 is housed in the housing portion 35A, the tobacco stick 100 will be compressed, resulting in greater contact between the outer peripheral surface of the tobacco stick 100 and the inner peripheral surface of the housing portion 35A. In this case, the flatness of the elliptical cross section of the housing section 354, for example, may be set in such a way that an air flow path is secured by the gap 353 between the inner peripheral surface in the major axis direction in the interior space of the housing portion 35A and the outer peripheral surface of the tobacco stick 100.

[0108] In this modified example, when the tobacco stick 1001s housed in the housing portion 35A, air flows in through the first ventilation portions 431 disposed at the location where the gap 353 exists, whereas the first ventilation portions 431 in the short axis direction of the housing portion 35A are closed by the peripheral well 311, and the inflow of air is restricted, thus allowing the stick to be property smoked while in the specified housed state in the same manner as in the embodiments above.

<Modified Example 2>

[0109] Fig.12 illustrates a modified example of the heat-not-burn flavor inhalation device 30B according to Modified Example 2. This modified example is structurally the same as the embodiments above except that the area around the insertion part 3A in the interior space of the housing portion 35B is widened, and the second ventilation portions 432 of the tobacco stick 100 fit into this widened area. Elements that are the same will therefore be indicated by the same symbols with elaboration.

[0110] As shown in Fig. 12, the insertion port 3A of the housing portion 35B in this modified example is funnel shaped, and the interior space continuously widens from the tip side toward the insertion port 3A sick. The shape of the housing portion 35B is not limited to a funnel shape but should be a shape in which the interior space continuously widens, such as a tapered shape, toward the insertion port 3A.

[0111] In the embodiments above, when the tobacco stick 100 is inserted in the specified state, the second ventilation portions 432 are disposed outside the housing portion 35, but in this modified example, the second ventilation portions 432 are disposed within the widened portion 354 of the housing portion 35B. In this case as well, the widened portion 354 is wider than the tobacco stick 100, and the influx of air through the second ventilation portion 432 is thus not restricted while stick is in the specified inserted state. Specifically, the second ventilation portions 432 are not limited to being disposed outside the housing portion 35 while the stick is in the specified inserted state (embodiments above) but should be disposed in locations where the influx of air is not restricted while the stick is in the specified inserted state.

[0112] In this modified example, when the tobacco stick 100 is housed in the housing partion 35B, the second ventilation portions 432 are located in the housing portion 35B but are disposed in the widened portion 354, and the influx of air is not restricted, this allowing the stick tobe property smoked while in the specified housed state in the same manner as in the embodiments above:

<Other Embodimerts>

[0113] The above embodiments and the following embodiments can be combined, where possible, without departing from the objectives and technical concepts disclosed herein.

(Embodiment 1)

[0114] To solve the above problems, the flavor stick disclosed herein comprises:

a flavor stick that is insertably and removably housed in the housing portion of a heat-not-burn flavor inhalation device, and that is heated while housed in said housing portion,
said flavor stick comprising:

flavor filler comprising a flavor source and an acrosol-generating substrate; and
a cylindrical member that is at least partially filled with the flavor filler;
wherein the cylindrical member is such that
one end is the tip, and the other end is the drawing end,
vertilation portions, through which air is introduced from the outside into the interior space, are provided inthe peripheral wall that forms the cylindrical member,
the tip, the ventilation portions, and the drawing end are in communication with each other in such a way that, when drawn through the drawing end, the air flowing in from the tip and the ventilation portions is drawn out through the

drawing end, and
the ventilation portions have:

first ventilation portions in which the influx of air is restricted by the inner wall of the housing portion when the tip of the flavor stick is housed, while in a specified state, in the housing portion; and
second ventilation portions, located closer than the first ventilation portion to the drawing end, in which the influx of air is not restricted by the inner wall of the housing portion when the tip of the flavor stick is housed, while in a specified state, in the housing portion.

(Embodiment 2)

[0115] When air is drawn through the drawing end while the flavor stick according to Embodiment 1 is not housed in the housing portion, the tip ventilation volume (of the air flowing in through the tip) is less than 18.9% by volume relative to the ventilation volume of the air drawn through the drawing end, wherein the percent by volume may be determined perISO9512.

(Embodiment 3)

[0116] In the flavor stick according to Embodiment 1 or 2, the ventilation portions may be openings provided in the peripheral wall of the cylindrical member, or may be portions of the peripheral wall that are formed of a breathable member.

(Embodiment4)

[0117] The flavor stick according to ary of Embodiments 1 through 3 comprises: a flavor rod portion that is filled with the flavor filler; and a mouth piece portion disposed on the drawing end side from the flavor rod portion; and
the first ventilation portion may be provided in the flavor rod and/or the mouth piece portion.

(Embodiment 5)

[0118] In the flavor stick according to Embodiment 4, the first ventilation portion may be provided in the flavor rod portion.

(Embodiment 6)

[0119] While the flavor stick according to any of Embodiments 1 through 5 is nat housed inthe housing portion, the ventilation resistance from the tip to the drawing end is 45 mmWG or less, wherein the ventilation resistance may be determined per ISO 9512.

(Embodiment 7)

[0120] While the flavor stick according to Embodiment 6 is not housed in the housing partion, the ventilation resistance from the tip to the drawing end may be 10mmWG or more.

(Embodiment 8)

[0121] To solve the above problems, the heat-not-burn flavor inbelation system disclosed herein comprises:

the flavor stick according to any of Embodiments 1 through 7; and a heat-not-burn flavor inhalation device for heating a flavor stick; wherein
the heat-not-burn flavor inhalation device comprises:

a housing portion that is capable of housing the flavor stick; and that has an inner wall that limits ventilation in the vertilation portion when the flavor stick is housed therein; and
a heating portion for heating the flavor stick housed in the housing portion.

(Embodiment 9)

[0122] In the heat-not-burn flavor inhalation system according to Embodiment 8, the heating portion may have: an electric heater for generating heat upon being supplied with electrical power; and an induction coil for heating a heating element disposed inside or around the flavor stick via electromagnetic induction, or a microwave generator for heating the flavor stick via the application of microwaves.

REFERENCE SIGNS LIST

[0123]

1:Electrically heated type device
3A: Insertion port
30, 30A, 30B: Heat-not-burn flavor inhalation device
31: Enclosure
32: Heating portion
33: Power source
34: Control unit
35,35A,35B: Housing portions
36: Airflow path
100:Tobacco stick
101: Drawing end
102: Tip
110: Tobacco rod portion
111: Tobacco filler
112: Wrapping paper
120: Mouthpiece portion
121: Cooling segment
122: Filter segment

130: Tipping paper
140: Cylindrical member
141: Peripheral wall
142: Interior space
143: Ventilation portion
200: Heat-not-bum flavor inhalation system
311: Peripheral wall
312: Distal wall
313: Outer peripheral surface
353: Gap
354: Expanded portion
431: First ventilation portions
432: Second ventilation portions

Claims

1. A flavor stick that is insertably and removably housed in the housing portion of a heat-not-burn flavor inhalation device, and that is heated while housed in said housing portion, said flavor stick comprising:

flavor filler comprising a flavor source and an aerosol-generating substrate; and
a cylindrical member that is at least partially filled with the flavor filler;
wherein the cylindrical member is such that
one end is the tip, and the other end is the drawing end,
ventilation portions, through which air is introduced from the outside into the interior space, are provided in the peripheral wall that forms the cylindrical member,
the tip, the ventilation portions, and the drawing end are in communication with each other in sucha way that, when drawn through the drawing end, the air flowing in from the tip and the ventilation portions is drawn out through the drawing end, and
the ventilation portions have:

first ventilation portions in which the influx of air is restricted by the inner wall of the housing portion when the tip of the flavor stick is housed, while in a specified state, in the housing portion; and
a second ventilation portion, located closer than the first ventilation portion to the drawing end, in which the influx of air is not restricted by the inner wall of the housing portion when the tip of the flavor stick is housed, while in a specified state, in the housing portion.

2. The flavor stick as claimed in claim 1, wherein, when air is drawn through the drawing end, the tip ventilation volume of the air flowing in through the tip is less than 18 P46 by volume relative to the ventilation volume of the air drawn through the drawing end, wherein the percent by volume is determined per ISO 9512.

3. The flavor stick as claimed in claim 1 or 2, wherein the ventilation portion is an opening provided in the peripheral wall of the cylindrical member, or is a portion of the peripheral wall that is formed of a breathable member.

4. The flavor stick as claimed in any of claims 1 through 3,

said flavor stick comprising: a flavor rod portion that is filled with the flavor filler; and a mouthpiece portion disposed on the drawing end side from the flavor rod portion;
and the first ventilation portion is provided in the flavor rod and/or the mouthpiece portion.

5. The flavor stick as claimed in claim 4, wherein the first ventilation portion is provided in the flavor rod partion.

6. The flavor stick as claimed in ary of claims 1 through 5, wheren, while the flavor stick is not housed inthe housing portion, the ventilation resistance from the tip to the drawing end is 45 mmWG or less, wherein the ventilation resistance is determined per ISO 9512.

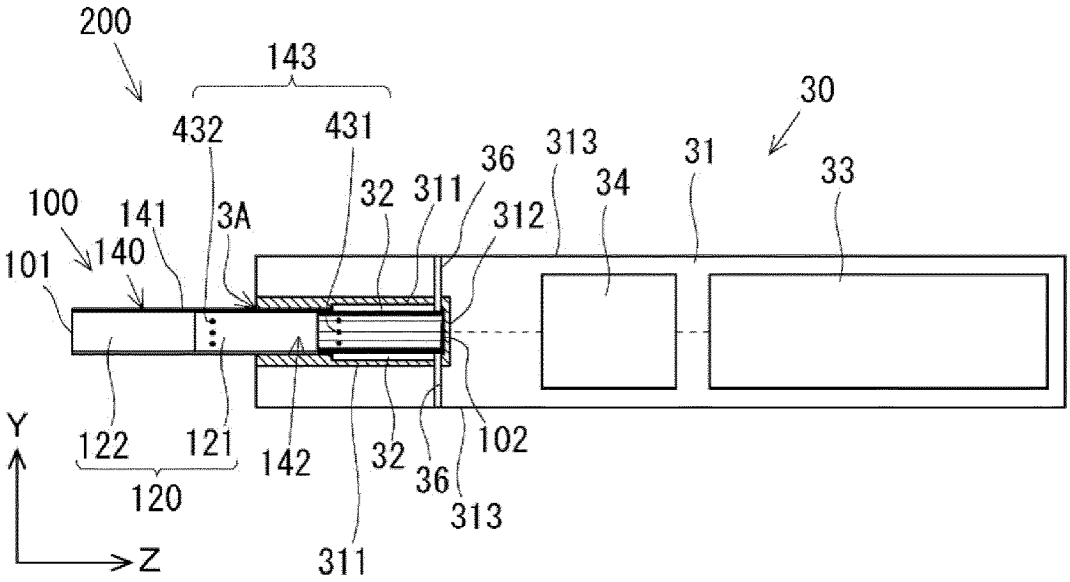
7. The flavor stick as claimed in claim 6 wherein, while the flavor stick is not housed in the housing portion, the ventilation resistance fram the tip to the drawing is 10mmWG or more.

8. A heat-not-burn flavor inhalation system, comprising:

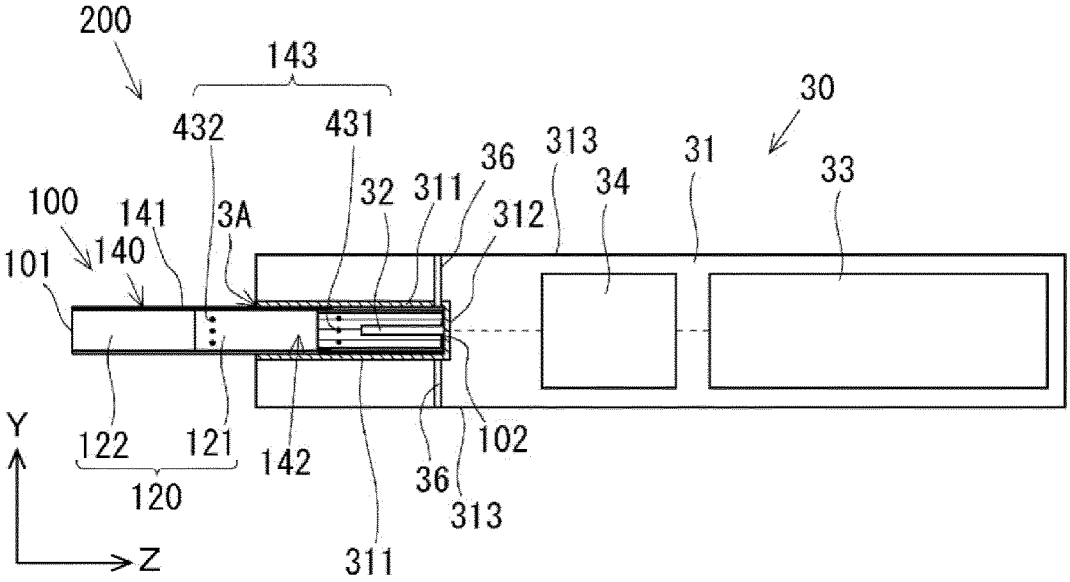
the flavor stick as claimed in any of claims 1 through 7; and a heat-no-burn flavor inhalation device for heating a flavor stick; wherein
the heat-not-burn flavor inhalation device comprises:
a housing portion that is capable of housing the flavor stick; and that has an inner wall that limits ventilation in the vertilation portion when the flavor stick is housed therein; and a heating portion for heating the flavor stick housed in the housing portion.

9. The heat-not-burn flavor inhalation system as claims in claim 8, wherein the heating portion has: an electric heater for generating heat up and an induction coil for heating a heating element disposed side ar around the flavor stick via electromagnetic induction, or a microwave generator for heating the flavor stick via the application of microwaves.

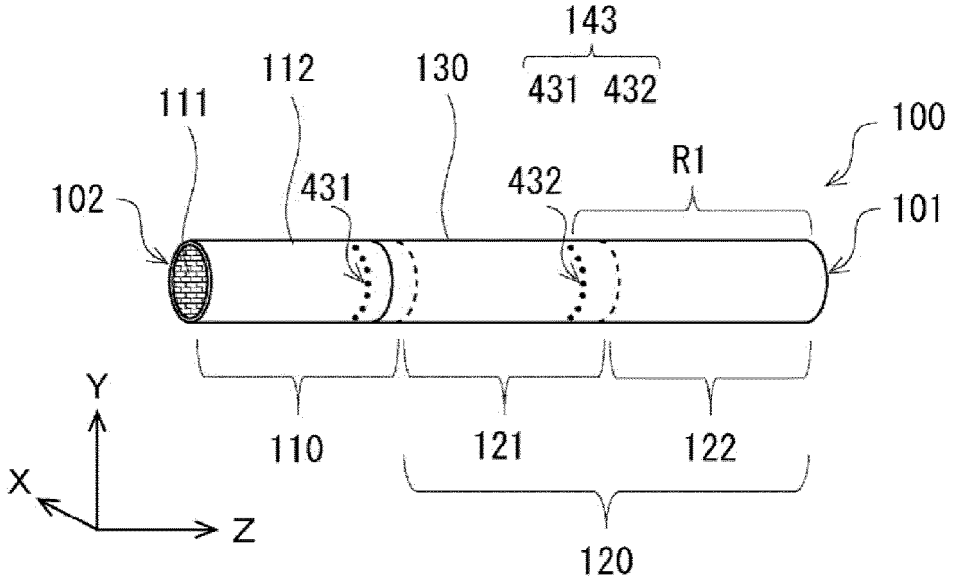
[Figure 1A]



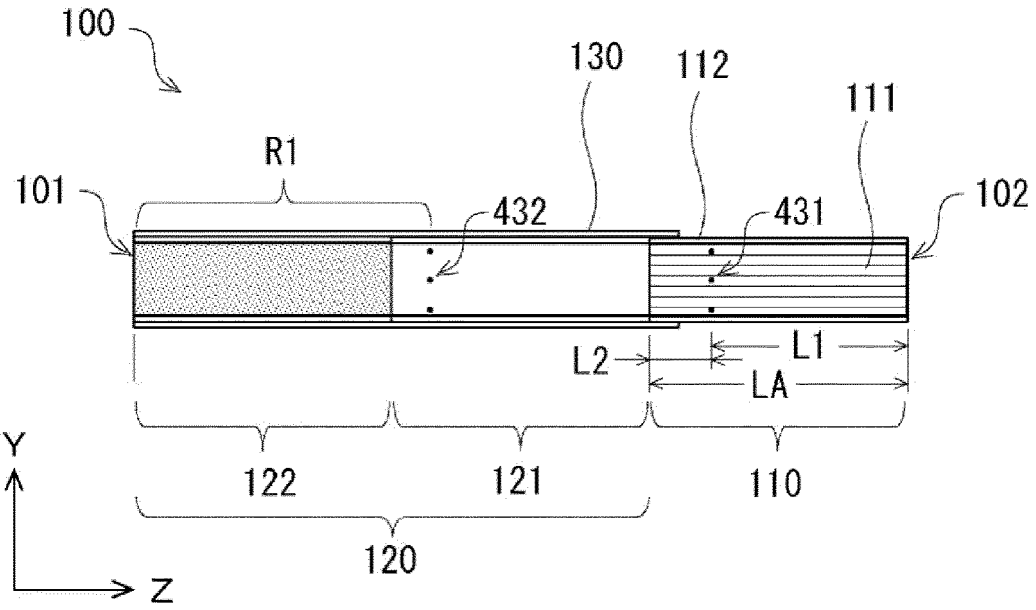
[Figure 1B]



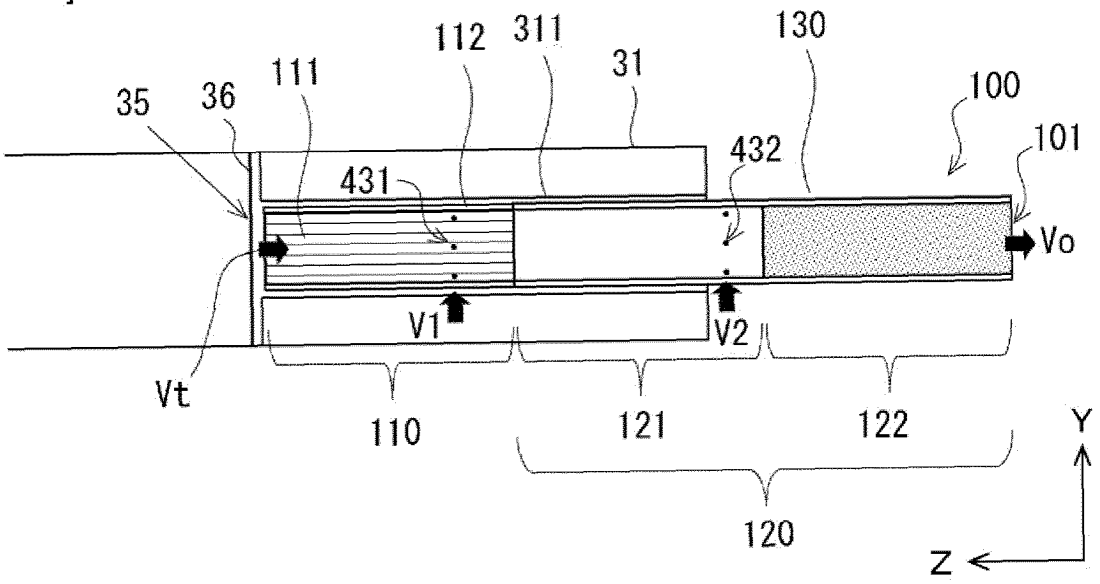
[Figure 2]



[Figure 3]



[Figure 4]



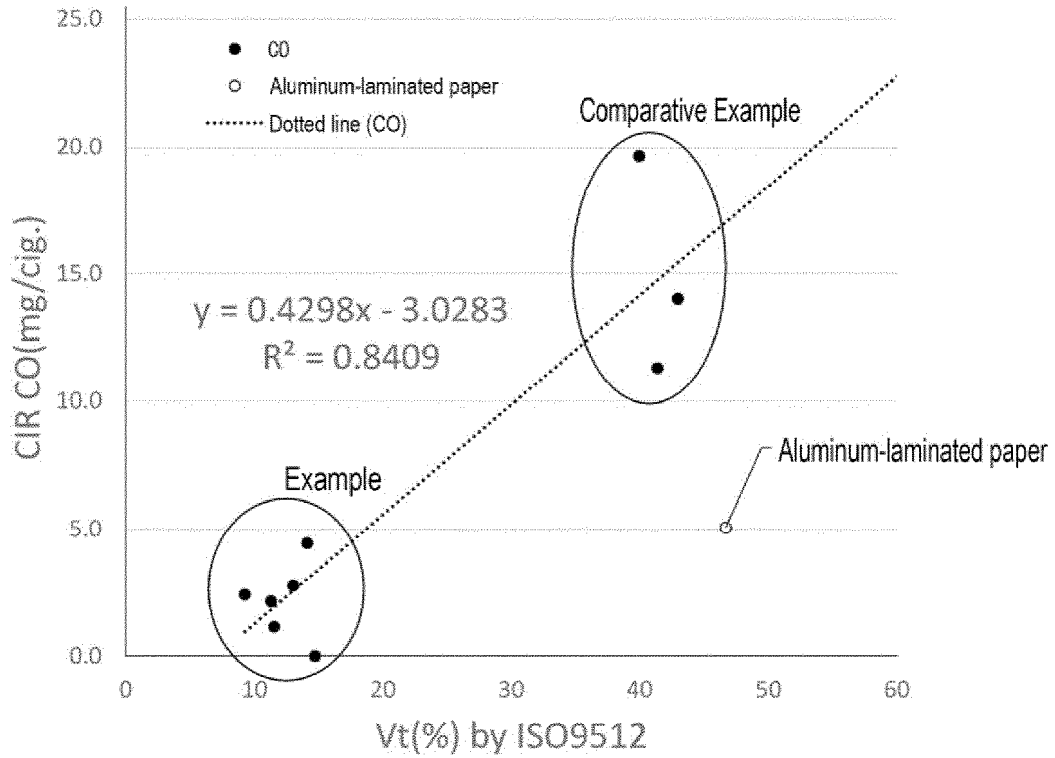
[Figure 5]

CP	Basis weight (g/m2)	Ventilation (CU)	Thickness (μm)	Type of pulp
Aluminum-laminated paper AluCP	47	0	47	wood
Paper material 1 LPCP1	51	2	62	wood
Paper material 2 LPCP2	43	0	45	wood
Paper material 3 LPCP3	55	2	62	wood
Breathable material HPCP1	13.5	32000	40	wood

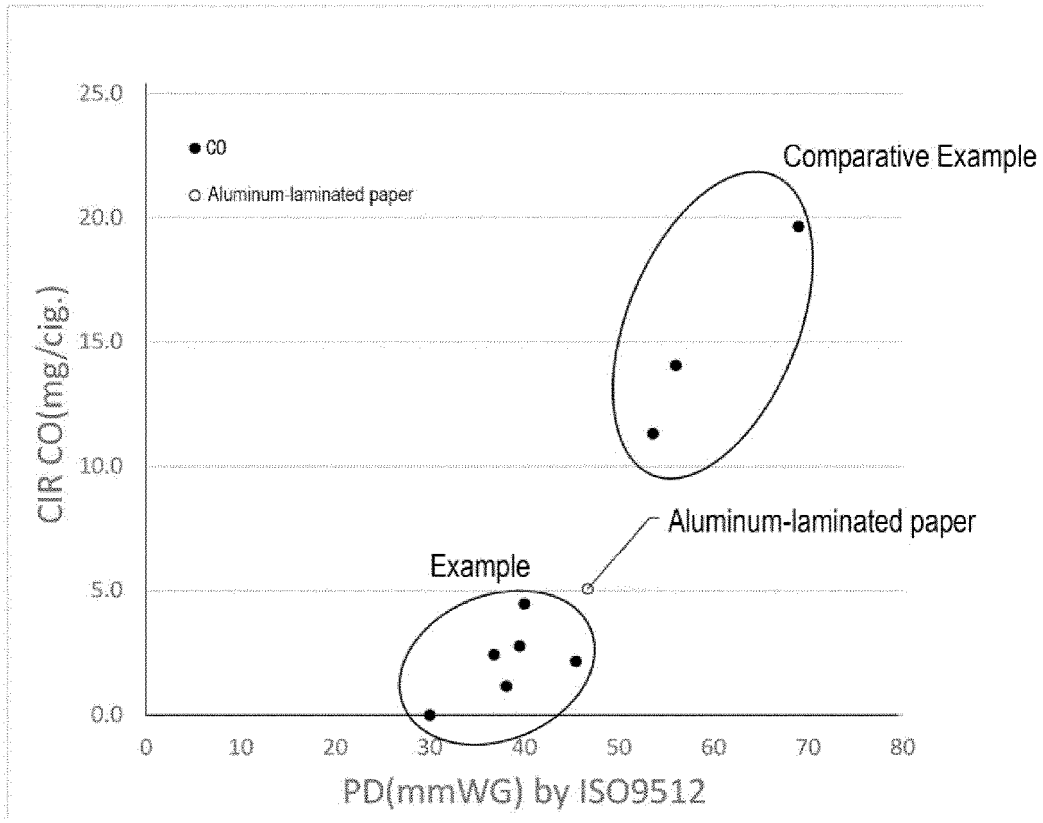
[Figure 6]

No.	Sample	Material	Number of holes	Tobacco stick				
				Weight	Circumference	Ventilation resistance [Open]	Ventilation resistance [Closed]	V2
				(mg/unit)	(mm)	(mmWG)	(mmWG)	(%)
1	Comparative Example 0	Aluminum-laminated paper	0	569.3	22.476	52	99	53
2	Comparative Example 1	LPCP1	0	541.3	22.195	54	117	59
3	Comparative Example 2	LPCP2	0	548.7	22.261	69	153	60
4	Comparative Example 3	LPCP3	0	539.9	22.196	56	112	57
5	Example 1	LPCP1	8	539.3	22.204	37	57	42
6	Example 2	LPCP1	6	542.5	22.196	40	63	42
7	Example 3	LPCP1	4	541.7	22.189	40	68	45
8	Example 4	LPCP2	8	546.2	22.269	45	74	43
9	Example 5	LPCP3	8	541.6	22.216	38	57	40
10	Example 6	HPCP1	–	566.8	22.311	30	47	37

[Figure 7]



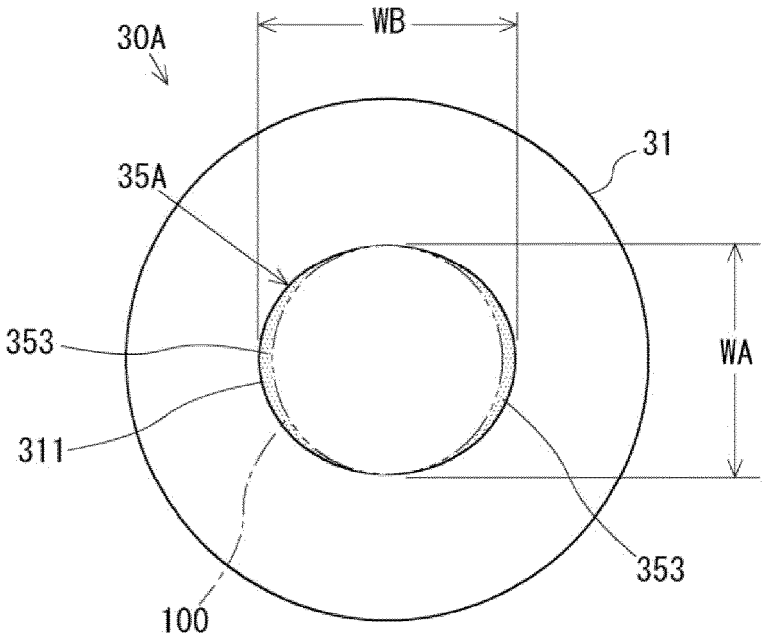
[Figure 8]


25.0
20.0
15.0
10.0
5.0
0.0
CO
Aluminum-laminated paper
CIR CO(mg/cig.)
Comparative Example
Aluminum-laminated paper
Example
0
10
20
30
40
50
60
70
80
PD(mmWG) by ISO9512

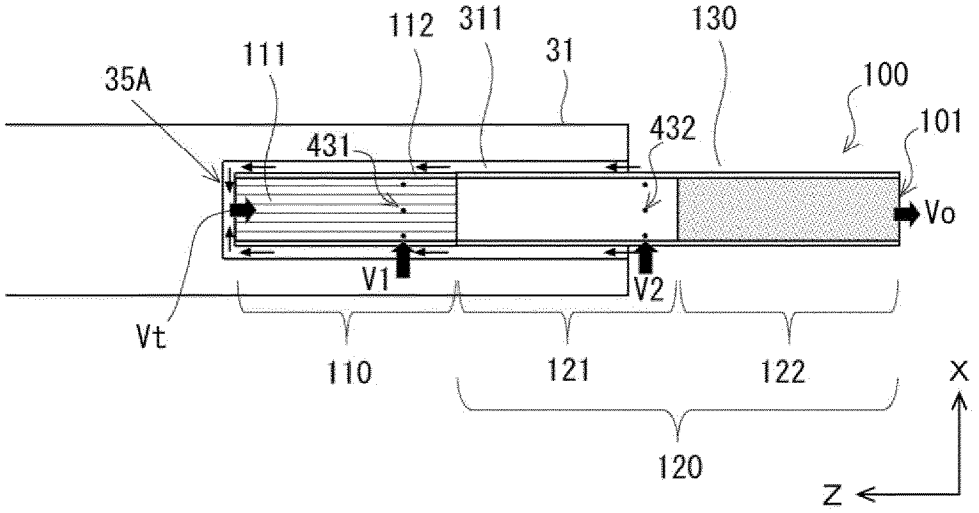
[Figure 9]

Sample	Ignitability	CO (mg/cig.)	Vt (%)	V1 (%)	V2 (%)	Ventilation resistance (mmWG)
Comparative Example 0 Aluminum-laminated paper	OK	5.1	47	0	53	52
Comparative Example 1 LPCP1	NG	11.3	41	0	59	54
Comparative Example 2 LPCP2	NG	19.7	40	0	60	69
Comparative Example 3 LPCP3	NG	14.0	43	0	57	56
Example 1 LPCP1	OK	2.4	9	49	42	37
Example 2 LPCP1	OK	2.8	13	45	42	40
Example 3 LPCP1	OK	4.5	14	41	45	40
Example 4 LPCP2	OK	2.2	11	46	43	45
Example 5 LPCP3	OK	1.2	12	49	40	38
Example 6 HPCP1	OK	0.0	15	48	37	30

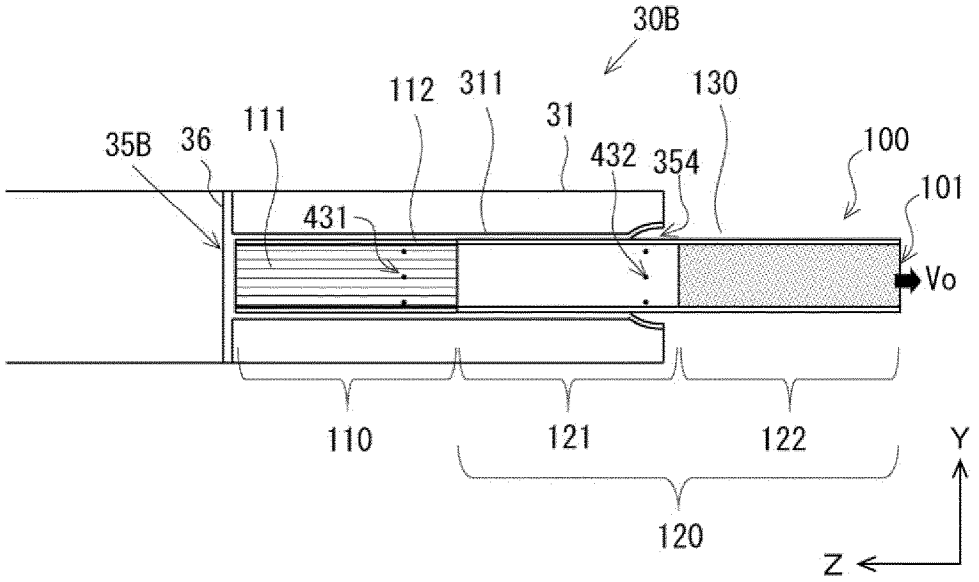
[Figure 10]



[Figure 11]



[Figure 12]



INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2023/009584

A. CLASSIFICATION OF SUBJECT MATTER

A24D 1/20(2020.01)i; ***A24F 40/20***(2020.01)i
FI: A24D1/20; A24F40/20

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)

A24D1/00-3/18; A24F40/00-47/00

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 1971-2023
Registered utility model specifications of Japan 1996-2023
Published registered utility model applications of Japan 1994-2023

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.
A	KR 10-2020-0061290 A (KT & G CORPORATION) 02 June 2020 (2020-06-02) paragraphs [0086]-[0090], [0111], [0122]-[0124], fig. 3, 5	1-9
A	WO 2020/230577 A1 (JAPAN TOBACCO INC.) 19 November 2020 (2020-11-19) entire text, all drawings	1-9
A	JP 2021-532765 A (NICOVENTURES TRADING LTD.) 02 December 2021 (2021-12-02) entire text, all drawings	1-9
A	WO 2022/128827 A1 (PHILIP MORRIS PRODUCTS SA) 23 June 2022 (2022-06-23) entire text, all drawings	1-9
A	JP 2003-527127 A (PHILIP MORRIS PRODUCTS INCORPORATED) 16 September 2003 (2003-09-16) entire text, all drawings	1-9

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Date of the actual completion of the international search	Date of mailing of the international search report
25 April 2023	**16 May 2023**
Name and mailing address of the ISA/JP **Japan Patent Office (ISA/JP)** **3-4-3 Kasumigaseki, Chiyoda-ku, Tokyo 100-8915** **Japan**	Authorized officer Telephone No.

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/JP2023/009584

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
KR 10-2020-0061290 A	02 June 2020	(Family: none)	
WO 2020/230577 A1	19 November 2020	EP 3971345 A1 entire text, all drawings CN 113840961 A TW 202100034 A	
JP 2021-532765 A	02 December 2021	US 2021/0298347 A1 entire text, all drawings WO 2020/025729 A1 EP 3829337 A1 KR 10-2021-0032513 A CN 112955028 A	
WO 2022/128827 A1	23 June 2022	(Family: none)	
JP 2003-527127 A	16 September 2003	US 2002/0005207 A1 entire text, all drawings WO 01/070054 A1 EP 1265504 A1 KR 2002-0080005 A	

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

REFERENCES CITED IN THE DESCRIPTION

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- JP 6707447 B **[0005]**
- WO 20211233914 A1 **[0005]**
- WO 2021233916 A1 **[0005]**
- WO 2021233918 A1 **[0005]**
- WO 2022002455 A1 **[0005]**
- JP 2017218699 A **[0049]**