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(54) **PRODUCTION METHOD FOR TOBACCO FLAVORED LIQUID, TOBACCO FLAVORED LIQUID, RECONSTITUTED TOBACCO MATERIAL, AND FLAVOR INHALER**

(57) Provided is a production method for a tobacco flavored liquid for use in a flavor inhaler that generates aerosols, said production method comprising: heating a tobacco material to vaporize a flavor component from the tobacco material; dissolving, in a first liquid as an aerosol source, a gas containing the flavor component to obtain a flavor component-containing liquid; and distilling the flavor component-containing liquid at a temperature lower than the boiling point of the first liquid to obtain a tobacco flavored liquid.

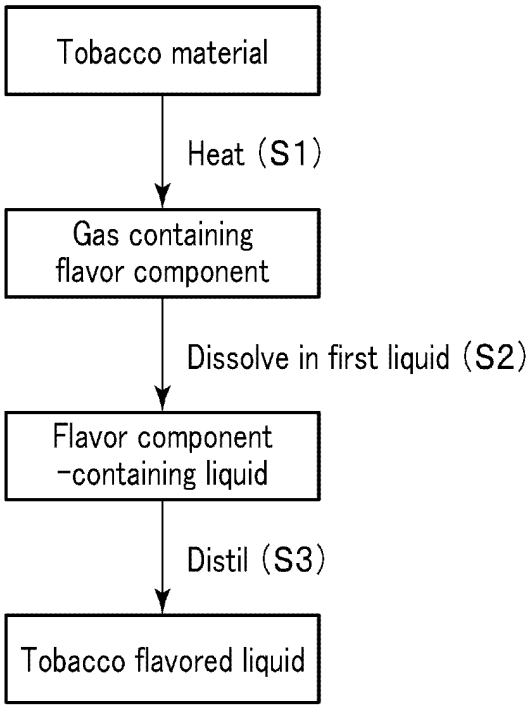

FIG. 1

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Description

FIELD

[0001] The present invention relates to a production method for a tobacco flavored liquid, a tobacco flavored liquid, a reconstituted tobacco material, and a flavor inhaler.

BACKGROUND

[0002] Obtaining a flavor component-containing liquid by heating a tobacco material and dissolving a thus-generated flavor component-containing gas in a liquid, and using such a flavor component-containing liquid as a tobacco flavor source in a flavor inhaler have been known (see, for example, Patent Document 1).

CITATION LIST

PATENT LITERATURE

[0003] Patent Document 1: International Publication No. 2017/144705

SUMMARY

TECHNICAL PROBLEM

[0004] The aforementioned flavor component-containing liquid provides an excellent smoking flavor when used in a flavor inhaler, but it turns black over time, which is not preferred from the viewpoint of appearance. Also, an over-time change in color of the flavor component-containing liquid is a sign of alteration in the contained components. As such, a flavor component-containing liquid that has undergone storage may no longer stably conserve the smoking flavor.

[0005] Objects of the present invention therefore include providing a technique for suppressing an over-time color change of a tobacco flavored liquid for use in an aerosol-generating flavor inhaler.

SOLUTION TO PROBLEM

[0006] According to one aspect, there is provided a production method for a tobacco flavored liquid for use in an aerosol-generating flavor inhaler, the method comprising:

heating a tobacco material to vaporize flavor components from the tobacco material;
dissolving a gas containing the flavor components in a first liquid which serves as an aerosol source to obtain a flavor component-containing liquid; and
distilling the flavor component-containing liquid at a temperature below a boiling point of the first liquid to obtain the tobacco flavored liquid.

[0007] According to another aspect, there is provided the tobacco flavored liquid obtainable by the above-mentioned method.

[0008] According to further another aspect, there is provided a flavor inhaler comprising the above-mentioned tobacco flavored liquid.

[0009] According to further another aspect, there is provided a reconstituted tobacco material comprising:

the tobacco flavored liquid obtainable by the above-mentioned method; and
a post-heating tobacco material obtainable at the time of obtaining the gas containing the flavor components in the above-mentioned method.

[0010] According to further another aspect, there is provided a flavor inhaler comprising the above-mentioned reconstituted tobacco material.

ADVANTAGEOUS EFFECTS OF INVENTION

[0011] According to the present invention, a technique for suppressing an over-time color change of a tobacco flavored liquid for use in an aerosol-generating flavor inhaler is provided.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012]

FIG. 1 is a flowchart showing an exemplary production method for a tobacco flavored liquid.
FIG. 2 is a schematic diagram showing an exemplary heating device.
FIG. 3 is a schematic diagram showing an exemplary dissolving device.
FIG. 4 is a perspective view showing an exemplary heating-type flavor inhaler.
FIG. 5 is a perspective view of a power supply unit in the heating-type flavor inhaler shown in FIG. 4.
FIG. 6 is a sectional view of the heating-type flavor inhaler shown in FIG. 4.
FIG. 7 is a block diagram showing a configuration of the main part of the power supply unit in the heating-type flavor inhaler shown in FIG. 4.
FIG. 8A is a schematic front view showing an exemplary aerosol generating device.
FIG. 8B is a schematic top view of the aerosol generating device shown in FIG. 8A.
FIG. 8C is a schematic bottom view of the aerosol generating device shown in FIG. 8A.
FIG. 9 is a schematic sectional side view showing an exemplary flavor generating article.
FIG. 10 is a sectional view of the aerosol generating device taken along the line III-III shown in FIG. 8B.
FIG. 11 is a graph showing a magnitude of color change of a tobacco flavored liquid.
FIG. 12 is a graph showing a content of a sulfur-containing component in the tobacco flavored liquid.

DETAILED DESCRIPTION

[0013] The present invention will be described in detail with the intention of allowing the invention to be understood, not limiting the invention.

<1. Production Method for Tobacco Flavored Liquid>

[0014] A production method for a tobacco flavored liquid includes:

heating a tobacco material to vaporize flavor components from the tobacco material;
dissolving a gas containing the flavor components in a first liquid which serves as an aerosol source to obtain a flavor component-containing liquid; and
distilling the flavor component-containing liquid at a temperature below a boiling point of the first liquid to obtain the tobacco flavored liquid.

[0015] The "tobacco flavored liquid" produced by this method is used in a flavor inhaler which generates aerosol. The "tobacco flavored liquid" contains the first liquid serving as an aerosol source and various flavor components derived from the tobacco material. Once the tobacco flavored liquid is incorporated into the flavor inhaler and atomized, the first liquid serving as an aerosol source is vaporized and the flavor components move into the vapor, thereby generating aerosol (tobacco vapor).

[0016] As used herein, the term "aerosol source" refers to a source (liquid) for generating vapor (gas) when a tobacco flavored liquid is incorporated into a flavor inhaler and atomized. The term "aerosol source" refers to a source (liquid) for generating a dispersion medium (gas) for aerosol (tobacco vapor), and does not include fine particles (such as flavor components) in the aerosol.

[0017] The production method for a tobacco flavored liquid will be described with reference to FIG. 1, in the order of a "heating step (S1)", a "step of dissolving in first liquid (S2)", and a "distilling step (S3)". FIG. 1 shows, in the form of a flowchart, one example of the production method for a tobacco flavored liquid.

[Heating Step (S1)]

[0018] The heating step (S1) heats the tobacco material to vaporize the flavor components from the tobacco material. By the heating step (S1), a gas containing the flavor components is obtained (see FIG. 1).

[0019] As the "tobacco material", cut tobacco which is ready to be incorporated into a tobacco product, such as a combustion-type or heating-type flavor inhaler, may be used. The "cut tobacco which is ready to be incorporated into a tobacco product" refers to cut tobacco which has become ready to be incorporated into a tobacco product by going through various processes including drying in a farm house, subsequent long-term aging in a leaf processing facility for one to several years, and subsequent blending and cutting in a manufacturing facility.

[0020] The cut tobacco consists of cut pieces of leaf tobacco. The cut tobacco may be any of cut pieces of stemmed

leaves, cut pieces of midrib, and cut pieces of reconstituted tobacco (i.e., a tobacco material obtained by processing leaf scraps, cut tobacco scraps, midrib scraps, fine powder, etc., produced in the facility processes into a reusable shape), or a mixture thereof. The cut tobacco may be pulverized and the resulting pulverized product may be applied to the heating step (S1). Use of the pulverized product of the cut tobacco as a tobacco material can realize an enhanced efficiency in recovery of the flavor components from the tobacco material. This can increase the content of the flavor components in an eventually obtained tobacco flavored liquid.

[0021] As the cut tobacco, cut tobacco derived from any tobacco variety may be used and its examples include cut tobacco derived from flue-cured tobacco, Burley tobacco, Oriental tobacco, etc. As the cut tobacco, cut tobacco derived from a single variety, or a mixture of different varieties may be used.

[0022] The heating may be conducted at a temperature of, for example, 150 to 400 °C, preferably 160 to 230 °C. The heating may be conducted for a period of, for example, 5 to 60 minutes, preferably 10 to 30 minutes.

[0023] In one example, the heating may be conducted using a heating apparatus shown in FIG. 2. As shown in FIG. 2, this heating device 2 includes a container 2A for accommodating a tobacco material 2D, a sintered plate 2B arranged at the bottom of the container 2A, a preheater 2C for heating air sent to the container 2A, an air flow path 2E for sending air to the container 2A, a gas flow path 2F for discharging a gas generated by heating the tobacco material 2D from the container 2A, and an oven (not shown in the figure) for accommodating the container 2A.

[0024] A heating operation will be described. First, the tobacco material 2D is put in the container 2A. Air is heated by the preheater 2C and then sent through the air flow path 2E to a gas inlet provided at the bottom of the container 2A. The sintered plate 2B arranged at the bottom of the container 2A is a porous member. Accordingly, the high-temperature air entering the container 2A from the gas inlet is supplied throughout the tobacco material 2D via the sintered plate 2B. The tobacco material 2D is heated by the supplied high-temperature air.

[0025] The container 2A is accommodated in the oven (not shown in the figure). Thus, the tobacco material 2D is also heated from outside the container 2A.

[0026] By heating the tobacco material 2D in this manner, a flavor component-containing gas is generated from the tobacco material 2D and discharged from the gas outlet provided at the top of the container 2A and through the gas flow path 2F.

[0027] It is possible to change the composition of the flavor component-containing gas by changing the concentration of oxygen in the air sent to the container 2A. Thus, the oxygen concentration in the air sent to the container 2A may be controlled so as to change the composition of the flavor component-containing gas. For example, lowering the oxygen concentration in the air can reduce the content of harmful components in the flavor component-containing gas.

[0028] Note that the heating step is not limited to the use of the heating device shown in FIG. 2 as long as the flavor components are successfully vaporized from the tobacco material.

[0029] With the heating step described above, a flavor component-containing gas is obtained. On the other hand, the tobacco material remaining after the heating step (S1) may be used for the production of a reconstituted tobacco material. The reconstituted tobacco material will be described later.

[Step of Dissolving in First Liquid (S2)]

[0030] The dissolving step (S2) dissolves the flavor component-containing gas obtained in the heating step (S1) in the first liquid serving as an aerosol source. By this, a flavor component-containing liquid is obtained (see FIG. 1). In the disclosure herein, a solution obtained by dissolving the flavor component-containing gas in the first liquid is referred to as a "flavor component-containing liquid".

[0031] In the dissolving step (S2), the first liquid acts as a trapping medium for trapping the flavor components in the liquid. The first liquid also functions as an aerosol source in the state where the tobacco flavored liquid produced by the present method has been incorporated into a flavor inhaler.

[0032] As the first liquid, a liquid usable as an aerosol source in a flavor inhaler may be used. An example that may be used as the first liquid is propylene glycol, glycerin, 1,3-propanediol, diacetin, polyethylene glycol, or any mixture thereof. Preferably, the first liquid is propylene glycol, glycerin, or a mixture of propylene glycol and glycerin. For the case of adopting the mixture of propylene glycol and glycerin, the mass ratio between propylene glycol and glycerin is not particularly limited and may be set to, for example, 0.1 : 9.9 to 9.9 : 0.1.

[0033] The first liquid mentioned for the exemplary purpose has a lower polarity than water, and the flavor components have a relatively low polarity. Thus, the exemplary first liquid is suitable as a liquid for dissolving the flavor components. Also, the exemplary first liquid has a higher boiling point than water. As such, the exemplary first liquid is suitable for evaporating the flavor components without evaporating the first liquid in the subsequent distilling step.

[0034] The dissolving may preferably be conducted by causing bubbling in the first liquid with the flavor component-containing gas obtained in the heating step (S1). In the dissolving step, for example, the first liquid may be used in an amount of 3 to 20 mL per 10 g of the tobacco material.

[0035] In one example, the dissolving may be conducted using a dissolving device shown in FIG. 3. This dissolving

device 3 shown in FIG. 3 is connected to the heating device shown in FIG. 2 via the gas flow path 2F. As shown in FIG. 3, the dissolving device 3 includes an inner container 3A for accommodating the first liquid 3D, a sintered filter 3B as a bubbling nozzle, an outer container 3C for accommodating the inner container 3A, the gas flow path 2F for sending the flavor component-containing gas to the inner container 3A, and a discharge gas flow path 3G for discharging the gas present within the inner container 3A.

[0036] A dissolving operation will be described. The flavor component-containing gas obtained in the heating step (S1) is sent through the gas flow path 2F to the sintered filter 3B arranged at the end of the gas flow path 2F. The sintered filter 3B has a porous structure and is immersed in the first liquid 3D. The flavor component-containing gas thus causes bubbling in the first liquid 3D. The flavor component-containing gas is accordingly dissolved in the first liquid 3D.

[0037] The inner container 3A accommodates glass beads 3E in addition to the first liquid 3D. Conducting the bubbling under the presence of the glass beads 3E allows the first liquid 3D to more efficiently trap the flavor components.

[0038] Bubbling of the first liquid 3D with the flavor component-containing gas increases the temperature of the first liquid 3D. To cope with this, ice water 3F is accommodated in the outer container 3C. This can prevent a temperature rise of the first liquid 3D. The gas generated within the inner container 3A is discharged through the discharge gas flow path 3G.

[0039] Note that the dissolving step is not limited to the use of the dissolving device shown in FIG. 3 as long as the flavor component-containing gas obtained in the heating step is successfully dissolved in the first liquid.

[0040] With the dissolving step described above, the flavor component-containing gas is dissolved in the first liquid and the flavor component-containing liquid is thereby obtained. The flavor component-containing liquid generally takes on a reddish brown color.

[Distilling Step (S3)]

[0041] The distilling step (S3) distills the flavor component-containing liquid obtained in the dissolving step (S2) at a temperature below the boiling point of the first liquid. By this, a tobacco flavored liquid is obtained (see FIG. 1). In the disclosure herein, a separated liquid obtained by distilling the flavor component-containing liquid is referred to as a "tobacco flavored liquid". The distillation here refers to an operation of heating a distillation subject mixture liquid and condensing (liquefying) the obtained vapor to yield a separated liquid.

[0042] The distillation is conducted at a temperature below the boiling point of the first liquid. The distillation may preferably be conducted at a temperature above 100 °C and below the boiling point of the first liquid. More preferably, the distillation may be conducted at a temperature equal to or above the boiling point of the first liquid minus 40 °C and below the boiling point of the first liquid. The distillation may be conducted at a temperature in the range of, for example, 150 to 180 °C. The distillation may be conducted under, for example, atmospheric pressure.

[0043] Supposing that propylene glycol (boiling point: 188.2 °C) is used as the first liquid, then the distillation temperature is below 188.2 °C, or preferably above 100 °C and below 188.2 °C, or more preferably equal to or above 148.2 °C and below 188.2 °C.

[0044] With the distillation of the flavor component-containing liquid, the flavor components can be evaporated and separated from the flavor component-containing liquid while leaving a causative substance or substances responsible for color change in the flavor component-containing liquid. Accordingly, a tobacco flavored liquid which would hardly cause an over-time color change can be obtained. The tobacco flavored liquid generally takes on a pale yellow color.

[Optional Step]

[0045] The foregoing method may further include a step of adding a second liquid which serves as an aerosol source to the tobacco material prior to the heating step (S1).

[0046] Adding an aerosol source to the tobacco material prior to the heating step facilitates the vaporization of the flavor components from the tobacco material during the heating step, which can enhance the efficiency in recovery of the flavor components from the tobacco material. This can increase the content of the flavor components in the eventually obtained tobacco flavored liquid.

[0047] As the second liquid, a liquid usable as an aerosol source in a flavor inhaler may be used. Propylene glycol, glycerin, 1,3-propanediol, diacetin, polyethylene glycol, or any mixture thereof may be used as the second liquid. Preferably, the second liquid is propylene glycol, glycerin, or a mixture of propylene glycol and glycerin. For the case of adopting the mixture of propylene glycol and glycerin, the mass ratio between propylene glycol and glycerin is not particularly limited and may be set to, for example, 0.1 : 9.9 to 9.9 : 0.1.

[0048] The liquid mentioned for the exemplary purpose has a lower polarity than water, and the flavor components have a relatively low polarity. Thus, the exemplary liquid is suitable as a liquid for facilitating the vaporization of the flavor components from the tobacco material.

[0049] As the second liquid, a liquid of the same type as, or a different type from, the first liquid may be used. In this step, for example, the second liquid may be added in an amount of 0.1 to 20 mL per 10g of the tobacco material.

[Effects]

[0050] The tobacco flavored liquid obtained by the method described above hardly causes an over-time color change (see Example 1 set forth later). Therefore, incorporating this tobacco flavored liquid into a flavor inhaler can give a user a desirable appearance of the tobacco flavored liquid at the time of its replacement or refilling, even if time has passed since the production of the tobacco flavored liquid.

[0051] Also, the tobacco flavored liquid hardly causing an over-time color change means that the components contained therein would not easily involve an over-time alteration. Therefore, incorporating the tobacco flavored liquid into a flavor inhaler can give an excellent smoking flavor to a user even if time has passed since the production of the tobacco flavored liquid.

[0052] Moreover, the tobacco flavored liquid obtained by the above described method shows a low sulfur-containing component content immediately after the preparation, and the sulfur-containing component content decreases after storage (see Example 2 set forth later). Also in view of the content of the sulfur-containing component, incorporating the tobacco flavored liquid into a flavor inhaler can realize an excellent smoking flavor given to a user even if time has passed since the production of the tobacco flavored liquid.

<2. Tobacco Flavored Liquid>

[0053] According to another aspect, a tobacco flavored liquid obtained by the above described "production method for a tobacco flavored liquid" is provided.

[0054] As described above, the tobacco flavored liquid hardly causes an over-time color change, while securing an excellent smoking flavor even after storage. Thus, incorporating this tobacco flavored liquid into a flavor inhaler can give a user a desirable appearance of the tobacco flavored liquid at the time of its replacement or refilling, and also give the user an excellent smoking flavor at the time of use.

[0055] The tobacco flavored liquid obtained by the above described "production method for a tobacco flavored liquid" may be incorporated into an aerosol-generating flavor inhaler according to a known technique. Examples of the use of the tobacco flavored liquid will be described.

[0056] For example, the tobacco flavored liquid may be used as a tobacco flavor source in a liquid-atomizing-type flavor inhaler in such a manner that the tobacco flavored liquid is directly put into the flavor inhaler in the state of a liquid and is permitted to be atomized during use.

[0057] As another option, the tobacco flavored liquid may be added to the tobacco material (e.g., stemmed leaves, leaf tobacco, etc.), followed by drying of the obtained mixture, so that the resultant dried product is used as a tobacco flavor source in a flavor inhaler.

[0058] As still another option, the tobacco flavored liquid may be added to the tobacco material that remains after the heating step (S1) described above, and a tobacco molded body such as a sheet tobacco or tobacco granules may be prepared from the obtained mixture so that this tobacco molded body is used as a tobacco flavor source in a flavor inhaler.

[0059] As yet another option, the tobacco flavored liquid may be added to the tobacco material that remains after the heating step (S1) described above, a tobacco powder may be prepared by drying and pulverizing the obtained mixture, and this tobacco powder may be added to a tobacco material (e.g., stemmed leaves, leaf tobacco, etc.) so that the thus-resulting mixture is used as a tobacco flavor source in a flavor inhaler.

[0060] As yet another option, the tobacco flavored liquid may be added to the tobacco material that remains after the heating step (S1) described above, a tobacco powder may be prepared by drying and pulverizing the obtained mixture, a tobacco slurry may be prepared by suspending the tobacco powder in water, and this tobacco slurry may be added to a tobacco material (e.g., stemmed leaves, leaf tobacco, etc.) so that the thus-resulting mixture is used as a tobacco flavor source in a flavor inhaler.

[0061] As yet another option, the tobacco flavored liquid may be encapsulated according to a known technique so that the obtained flavor capsules are used as a tobacco flavor source in a flavor inhaler in such a manner that the flavor capsules are incorporated into a filter portion of the flavor inhaler and crushed at the time of use.

<3. Reconstituted Tobacco Material>

[0062] The tobacco flavored liquid, as described above, may be used in combination with the tobacco material remaining after the above described heating step (S1). Therefore, according to still another aspect, there is provided a reconstituted tobacco material containing:

a tobacco flavored liquid which is obtained by the above described "production method for a tobacco flavored liquid", and

a post-heating tobacco material which is obtained at the time of obtaining a flavor component-containing gas in the

course of the above described "production method for a tobacco flavored liquid" (namely, the tobacco material remaining after the heating step (S1)).

[0063] More specifically, there is provided a reconstituted tobacco material containing:

a tobacco flavored liquid obtained by the method including

heating a tobacco material to vaporize flavor components from the tobacco material,
dissolving a gas containing the flavor components in a first liquid which serves as an aerosol source to obtain a flavor component-containing liquid, and
distilling the flavor component-containing liquid at a temperature below a boiling point of the first liquid to obtain the tobacco flavored liquid; and

a post-heating tobacco material obtained at the time of obtaining the gas containing the flavor components (namely, the tobacco material remaining after the heating step).

[0064] Specific examples of the reconstituted tobacco material will be described.

[0065] For example, the reconstituted tobacco material may be a product obtained by drying a mixture of the tobacco flavored liquid and the tobacco material that remains after the heating step (S1). This product may be used as a tobacco flavor source in a flavor inhaler.

[0066] As another option, the reconstituted tobacco material may be a tobacco molded body obtained by molding a mixture of the tobacco flavored liquid and the tobacco material that remains after the heating step (S1) into a particular shape such as a sheet or granules. The tobacco molded body may be used as a tobacco flavor source in a flavor inhaler.

[0067] As still another option, the reconstituted tobacco material may be a tobacco powder obtained by drying a mixture of the tobacco flavored liquid and the tobacco material that remains after the heating step (S1) and pulverizing the dried mixture into a powder form. Addition of this tobacco powder to a tobacco material (e.g., stemmed leaves, leaf tobacco, etc.) can endow the tobacco material with an enhanced flavor. The flavor-enhanced tobacco material may be used as a tobacco flavor source in a flavor inhaler.

[0068] As yet another option, the reconstituted tobacco material may be a tobacco slurry obtained by drying a mixture of the tobacco flavored liquid and the tobacco material that remains after the heating step (S1), pulverizing the dried mixture into a powder form, and suspending the obtained powder in water. Addition of the tobacco slurry to a tobacco material (e.g., stemmed leaves, leaf tobacco, etc.) can endow the tobacco material with an enhanced flavor. The flavor-enhanced tobacco material may be used as a tobacco flavor source in a flavor inhaler.

[0069] The reconstituted tobacco material may contain additives such as a binder, a pH adjuster, a preservative, and an antioxidant, as necessary.

[Effects]

[0070] The above described tobacco flavored liquid hardly causes an over-time color change. Accordingly, if the above described tobacco flavored liquid is used to produce a reconstituted tobacco material and the reconstituted tobacco material is incorporated into a flavor inhaler, a substance responsible for the color change would not be easily produced and a member (e.g., wrapping paper) wrapping around the reconstituted tobacco material would be kept from being stained, even after placement in storage.

[0071] Moreover, the above described tobacco flavored liquid hardly causes an over-time alteration in the contained components, while securing an excellent smoking flavor even after storage. Accordingly, if the above described tobacco flavored liquid is used to produce a reconstituted tobacco material and the reconstituted tobacco material is incorporated into a flavor inhaler, an excellent smoking flavor can be provided to a user even after storage.

<4. Flavor Inhaler>

[0072] The "tobacco flavored liquid" or the "reconstituted tobacco material" described above may be incorporated into any flavor inhaler which generates aerosol. That is, according to another aspect, a flavor inhaler including the above described "tobacco flavored liquid" is provided. According to yet another aspect, a flavor inhaler including the above described "reconstituted tobacco material" is provided. A combustion-type flavor inhaler, a heating-type flavor inhaler, and a non-heating-type flavor inhaler may each be used as the flavor inhaler.

[0073] According to a preferred embodiment, a flavor inhaler including the above described "tobacco flavored liquid" and an atomization unit which atomizes the tobacco flavored liquid is provided. The flavor inhaler is more preferably a heating-type flavor inhaler. According to a more preferred embodiment, a flavor inhaler including the above described "tobacco

flavored liquid" and an atomization unit which heats the tobacco flavored liquid to atomize the tobacco flavored liquid is provided.

[0074] According to a preferred embodiment, a flavor inhaler including the above described "reconstituted tobacco material" and an atomization unit which atomizes a liquid component contained in the reconstituted tobacco material is provided. The flavor inhaler is more preferably a heating-type flavor inhaler. According to a more preferred embodiment, a flavor inhaler including the above described "reconstituted tobacco material" and an atomization unit which heats the reconstituted tobacco material to atomize a liquid component contained in the reconstituted tobacco material is provided.

[0075] The "combustion-type flavor inhaler" refers to a flavor inhaler which provides a tobacco flavor to a user by burning a tobacco filler (cut tobacco, a tobacco molded body, or the like). Examples of the combustion-type flavor inhaler include a cigarette, a pipe, a kiseru (i.e., a traditional Japanese pipe for fine cut tobacco), a cigar, and a cigarillo.

[0076] The "heating-type flavor inhaler" refers to a flavor inhaler which provides a tobacco flavor to a user by heating a tobacco flavor source such as a tobacco filler or a tobacco flavored liquid without burning the tobacco flavor source. Examples of the heating-type flavor inhaler include:

a carbon heat source-type flavor inhaler which heats a tobacco filler with combustion heat of a carbon heat source (see, for example, WO 2006/073065);
an electric heating-type flavor inhaler which includes a tobacco stick containing a tobacco filler and a heating device for electrically heating the tobacco stick (see, for example, WO 2010/110226); and
a liquid atomizing-type flavor inhaler which heats a liquid aerosol source with a heater to generate aerosol and permits a flavor from a tobacco filler to be inhaled together with the aerosol (see, for example, WO 2015/046385).

[0077] The "non-heating-type flavor inhaler" refers to a flavor inhaler which provides a tobacco flavor to a user without burning or heating a tobacco flavor source such as a tobacco filler or a tobacco flavored liquid. An example of the non-heating-type flavor inhaler may be a liquid atomizing-type flavor inhaler which includes a tobacco flavored liquid and an atomization unit for atomizing the tobacco flavored liquid using surface acoustic waves (see, for example, WO 2017/167521).

[Representative Example 1 of Flavor Inhaler]

[0078] One example of the heating-type flavor inhaler including the above described "tobacco flavored liquid" will be described with reference to FIGS. 4 to 7. FIG. 4 is a perspective view showing an exemplary heating-type flavor inhaler. FIG. 5 is a perspective view of a power supply unit in the heating-type flavor inhaler shown in FIG. 4. FIG. 6 is a sectional view of the heating-type flavor inhaler shown in FIG. 4. FIG. 7 is a block diagram showing a configuration of the main part of the power supply unit in the heating-type flavor inhaler shown in FIG. 4.

[0079] This heating-type flavor inhaler 1 shown in FIGS. 4 to 7 has a rod shape extending along a predetermined direction (hereinafter referred to as a longitudinal direction A). The heating-type flavor inhaler 1 includes, as shown in FIG. 4, a power supply unit 10, a first cartridge 20, and a second cartridge 30 in this order along the longitudinal direction A. The first cartridge 20 is detachable from the power supply unit 10, and the second cartridge 30 is detachable from the first cartridge 20. In other words, the first cartridge 20 and the second cartridge 30 are each replaceable.

(Power Supply Unit)

[0080] The power supply unit 10 accommodates, as shown in FIGS. 5 and 6, a power supply 12, a charger 13, a control part 50, various sensors, etc., inside a cylindrical power supply unit case 11. The power supply 12 is a rechargeable secondary battery which is preferably a lithium ion secondary battery.

[0081] A discharge terminal 41 is provided at a top portion 11a located on one end side in the longitudinal direction A (i.e., the first cartridge 20 side) of the power supply unit case 11. The discharge terminal 41 is provided in such a form as to protrude from the upper surface of the top portion 11a toward the first cartridge 20 and is configured to be electrically connectable to a load 21 in the first cartridge 20.

[0082] Also at the upper surface of the top portion 11a, an air supply part 42 for supplying air to the load 21 in the first cartridge 20 is provided in the vicinity of the discharge terminal 41.

[0083] A charge terminal (not shown in the figure) electrically connectable to an external power source that can charge the power supply 12 is provided at a bottom portion 11b located on the other end side in the longitudinal direction A (the side opposite to the first cartridge 20) of the power supply unit case 11.

[0084] A user-operable operation part 14 is provided at the side surface of the top portion 11a of the power supply unit case 11. The operation part 14 is constituted by a button switch, a touch panel, or the like, and is used for activating/shutting off the control part 50 and the various sensors in response to the intention of a user for use.

[0085] The control part 50 is, as shown in FIG. 7, connected to the charger 13, the operation part 14, various sensor

devices such as an inhalation sensor 15 for detecting a puff (inhalation) action, a voltage sensor 16 for measuring a voltage of the power supply 12, and a temperature sensor 17 for detecting a temperature, and a memory 18 for storing the number of puff actions, the time of current application to the load 21, etc., and is adapted to perform various controls for the heating-type flavor inhaler 1. The inhalation sensor 15 may be constituted by a condenser microphone, a pressure sensor, etc. A concrete form of the control part 50 is a processor (micro-controller unit (MCU)). The structure of this processor is, in more concrete terms, electric circuitry formed of a combination of circuit elements such as semiconductor elements.

(First Cartridge)

[0086] The first cartridge 20 includes, as shown in FIG. 6, a reservoir 23 for retaining a "tobacco flavored liquid" 22 which is as described above, the electric load 21 for atomizing the tobacco flavored liquid 22, a wick 24 for drawing the tobacco flavored liquid from the reservoir 23 to the load 21, an aerosol flow path 25 for the aerosol generated by the atomization of the tobacco flavored liquid 22 to flow toward the second cartridge 30, and an end cap 26 for accommodating a part of the second cartridge 30 inside a cylindrical cartridge case 27.

[0087] The reservoir 23 is delimited so as to surround the aerosol flow path 25 and retains the tobacco flavored liquid 22. The reservoir 23 may enclose a porous member such as a resin web or cotton, in which the tobacco flavored liquid 22 may be impregnated. The reservoir 23 may keep only the tobacco flavored liquid 22 without enclosing a porous member such as a resin web or cotton.

[0088] The wick 24 is a liquid holding member which draws the tobacco flavored liquid 22 from the reservoir 23 to the load 21 by utilizing capillary action, and is made of, for example, glass fiber or porous ceramic.

[0089] The load 21 atomizes, without entailing combustion, the tobacco flavored liquid 22 using an electric power supplied from the power supply 12 via the discharge terminal 41. The load 21 is constituted by a heating wire (coil) wound at a predetermined pitch. Note that the load 21 may be any element as long as it is capable of atomizing the tobacco flavored liquid 22 to generate aerosol, and may be, for example, a heater element or an ultrasound generator. Examples of the heater element include a heat-generating resistor, a ceramic heater, an induction heating-type heater, etc.

[0090] The aerosol flow path 25 is provided on the downstream side of the load 21 and arranged on a center line L of the power supply unit 10.

[0091] The end cap 26 includes a cartridge accommodation portion 26a for accommodating a part of the second cartridge 30, and a communication path 26b for connecting between the aerosol flow path 25 and the cartridge accommodation portion 26a.

(Second Cartridge)

[0092] The second cartridge 30 retains, as shown in FIG. 6, a flavor source 31. The second cartridge 30 is detachably accommodated in the cartridge accommodation portion 26a in the end cap 26 of the first cartridge 20. The end of the second cartridge 30 opposite to the first cartridge 20 constitutes a mouthpiece 32 for a user. Note that the mouthpiece 32 is not limited to a configuration integral with the second cartridge 30, and may have a configuration detachable from the second cartridge 30. If the mouthpiece 32 is formed as a separate member from the power supply unit 10 and the first cartridge 20 in this way, the mouthpiece 32 can be kept sanitary.

[0093] The second cartridge 30 gives additional flavor to the aerosol, generated from the tobacco flavored liquid 22 atomized by the load 21, by letting the aerosol pass through the flavor source 31. As the flavor source 31, a tobacco filler such as sheet tobacco or tobacco granules may be used. The above described "reconstituted tobacco material" may be incorporated into the flavor source 31. A flavoring agent such as menthol may also be added to the flavor source 31.

[0094] In the heating-type flavor inhaler 1, generation of aerosol with additional flavor is enabled by the tobacco flavored liquid 22, the flavor source 31, and the load 21. That is, the tobacco flavored liquid 22 and the flavor source 31 may be construed as an aerosol generation source for generating aerosol.

[0095] The heating-type flavor inhaler 1 has a configuration in which the tobacco flavored liquid 22 and the flavor source 31 are separate from each other, but it may have a configuration in which the tobacco flavored liquid 22 and the flavor source 31 are integral with each other. As another option, the heating-type flavor inhaler 1 is not required to include the second cartridge 30. In the case where the heating-type flavor inhaler 1 omits the second cartridge 30 here, only the aerosol generated by the atomization of the tobacco flavored liquid 22 is supplied to the mouthpiece.

[0096] In the heating-type flavor inhaler 1, air flowing in from an air intake port (not shown in the figure) provided in the power supply unit case 11 passes through the air supply part 42 and then the vicinity of the load 21 in the first cartridge 20, as shown in FIG. 6, arrow B. The load 21 atomizes the tobacco flavored liquid 22 drawn or moved by the wick 24 from the reservoir 23. The aerosol generated by the atomization flows through the aerosol flow path 25 together with the air flowing in from the air intake port, and is supplied to the second cartridge 30 via the communication path 26b. The aerosol supplied to the second cartridge 30 is given additional flavor by passing through the flavor source 31 and is then supplied to the mouthpiece 32.

[0097] The heating-type flavor inhaler 1 also includes a notification part 45 for giving notifications of various information sets. The notification part 45 may be constituted by a light emitting element, a vibrating element, or a sound outputting element. The notification part 45 may be a combination of two or more of a light emitting element, a vibrating element, and a sound outputting element. The notification part 45 may be provided at any of the power supply unit 10, the first cartridge 20, and the second cartridge 30, but it is preferable that the notification part 45 be provided at the power supply unit 10 so as to keep the conductive line from the power supply 12 short. For example, the notification part 45 may be provided to surround the operation part 14 with such a configuration that the periphery of the operation part 14 is translucent and a light emitting element such as an LED emits light.

[Representative Example 2 of Flavor Inhaler]

[0098] One example of the heating-type flavor inhaler including the above described "reconstituted tobacco material" will be described with reference to FIGS. 8A, 8B, 8C, 9, and 10. In this example, a non-combustion heating-type flavor inhaler is constituted by an aerosol generating device 100 and a flavor generating article 200. FIG. 8A is a schematic front view of one example of the aerosol generating device. FIG. 8B is a schematic top view of the aerosol generating device shown in FIG. 8A. FIG. 8C is a schematic bottom view of the aerosol generating device shown in FIG. 8A. FIG. 9 is a schematic sectional side view of one example of the flavor generating article. FIG. 10 is a sectional view of the aerosol generating device taken along the line III-III shown in FIG. 8B.

[0099] The drawings may give an X-Y-Z orthogonal coordinate system for the sake of description. In this coordinate system, the Z axis is directed vertically upward, the X-Y plane is disposed as if cutting the aerosol generating device 100 in the horizontal direction, and the Y axis is disposed as if extending from the front surface to the rear surface of the aerosol generating device 100. The Z axis may also be referred to as an insertion direction of the flavor generating article for accommodation in a chamber 150 of a later described atomization unit 130, or an axial direction of the chamber 150. Also, the X axis may be referred to as a direction orthogonal to the Y axis and the Z axis, and the X axis and the Y axis may each be referred to as a radial direction orthogonal to the axial direction of the chamber 150 or a radial direction of the chamber 150.

[0100] The aerosol generating device 100 is configured to generate flavor-containing aerosol by heating a stick-type flavor generating article having a flavor source containing the above described "reconstituted tobacco material".

[0101] As shown in FIGS. 8A to 8C, the aerosol generating device 100 includes an outer housing 101 (corresponding to an example of a casing), a slide cover 102, and a switch part 103. The outer housing 101 constitutes the outermost housing of the aerosol generating device 100 and has a size to fit in the hand of a user. For the user to use the flavor inhaler, the user can hold the aerosol generating device 100 with its hand and inhale the aerosol. The outer housing 101 may be constituted by an assembly of multiple members. The outer housing 101 is, in one example, made of a resin such as, in particular, polycarbonate (PC), an acrylonitrile-butadiene-styrene (ABS) resin, polyether ether ketone (PEEK), or a polymer alloy containing multiple kinds of polymers, or may be made of a metal such as aluminum.

[0102] The outer housing 101 has an opening (not shown in the figure) for receiving the flavor generating article, and the slide cover 102 is slidably attached to the outer housing 101 to close the opening. More specifically, the slide cover 102 is configured to be movable along an outer surface of the outer housing 101 between a closed position (the position shown in FIGS. 8A and 8B) where it closes the opening of the outer housing 101 and an open position (the position shown in FIG. 10) where it exposes the opening. For example, the user may manually operate the slide cover 102 so that the slide cover 102 moves between the closed position and the open position. This can permit or restrict the access of the flavor generating article to the inside of the aerosol generating device 100.

[0103] The switch part 103 is used to switch ON and OFF an operation of the aerosol generating device 100. For example, the user may operate the switch part 103 in a state where the flavor generating article is inserted into the aerosol generating device 100, and thereby electric power can be supplied from the power source (cf. reference sign 121 in FIG. 10) to a heater (cf. reference sign 140 in FIG. 10) to heat the flavor generating article without burning it. Note that the switch part 103 may be a switch provided outside the outer housing 101 or may be a switch located inside the outer housing 101. If the switch is located inside the outer housing 101, the switch is indirectly pressed down by the switch part 103 at the surface of the outer housing 101 being pressed down. For this example, the description will assume that the switch of the switch part 103 is located inside the outer housing 101.

[0104] The aerosol generating device 100 may further include a terminal (not shown in the figure). The terminal may be an interface for connecting the aerosol generating device 100 to, for example, an external power source. If the aerosol generating device 100 includes a rechargeable battery as its power source, an external power source may be connected to the terminal so that the external power source can flow currents to the power source and charge the power source. Also, data associated with operations of the aerosol generating device 100 may be transmitted to an external device through connection of the terminal with a data transmission cable.

[0105] Next, the flavor generating article for use in the aerosol generating device 100 will be described. FIG. 9 is a schematic sectional side view of one example of the flavor generating article 200. This example assumes that the aerosol generating device 100 and the flavor generating article 200 constitute a flavor inhaler. As shown in FIG. 9, the flavor

generating article 200 includes a smokable material 201, a tubular member 204, a hollow filter portion 206, and a filter portion 205.

[0106] The smokable material 201 is wrapped by a first wrapping paper 202. The tubular member 204, the hollow filter portion 206, and the filter portion 205 are wrapped by a second wrapping paper 203 differing from the first wrapping paper 202. The second wrapping paper 203 also wraps a part of the first wrapping paper 202 that wraps the smokable material 201. This couples the tubular member 204, the hollow filter portion 206, and the filter portion 205 to the smokable material 201. Note that the second wrapping paper 203 may be omitted, and the tubular member 204, the hollow filter portion 206, and the filter portion 205 may be coupled to the smokable material 201 using the first wrapping paper 202. A lip release agent 207 for facilitating the separation of the lip of a user from the second wrapping paper 203 is applied to the outer surface of the second wrapping paper 203 around the end portion on the filter portion 205 side. The portion of the flavor generating article 200 to which the lip release agent 207 is applied functions as a mouthpiece of the flavor generating article 200.

[0107] The smokable material 201 includes the above described "reconstituted tobacco material" as a tobacco flavor source. Also, the first wrapping paper 202 for wrapping the smokable material 201 may be an air-permeable sheet member. The tubular member 204 may be a paper pipe or a hollow filter. This example assumes that the flavor generating article 200 includes the smokable material 201, the tubular member 204, the hollow filter portion 206, and the filter portion 205, but the flavor generating article 200 is not limited to such a configuration. For example, the hollow filter portion 206 may be omitted, and the tubular member 204 and the filter portion 205 may be disposed adjacent to each other.

[0108] Next, an internal structure of the aerosol generating device 100 will be described. FIG. 10 is a sectional view of the aerosol generating device 100 taken along the line III-III shown in FIG. 8B. As shown in FIG. 10, an inner housing 110 (corresponding to an example of a casing) is provided inside the outer housing 101 of the aerosol generating device 100. The inner housing 110 is, in one example, made of a resin such as, in particular, polycarbonate (PC), an acrylonitrile-butadiene-styrene (ABS) resin, polyether ether ketone (PEEK), or a polymer alloy containing multiple kinds of polymers, or may be made of a metal such as aluminum. Note that the inner housing 110 is preferably made of PEEK from the viewpoint of heat resistance and strength. A power source unit 120 and the atomization unit 130 are provided in the internal space of the inner housing 110.

[0109] The power source unit 120 includes a power source 121. The power source 121 may be, for example, a rechargeable battery or a non-rechargeable battery. The power source 121 is electrically connected to the atomization unit 130. The power source 121 is thus able to supply power to the atomization unit 130 so as to appropriately heat the flavor generating article 200.

[0110] The atomization unit 130 includes, as shown in FIG. 10, a metal chamber 150 (corresponding to an example of a tubular portion) extending in the insertion direction of the flavor generating article 200 (in the Z-axis direction), a heater 140 covering a part of the chamber 150, a heat insulating portion 132, and a substantially tubular insertion guide member 134 (corresponding to an example of a guide portion) adjacent to an opening of the chamber 150. The chamber 150 is formed in such a configuration as to surround the periphery of the flavor generating article 200. The heater 140 is formed to include a heating portion which contacts the outer circumferential surface of the chamber 150 and heats the flavor generating article 200 inserted into the chamber 150.

[0111] Also, as shown in FIG. 10, a bottom member 136 (corresponding to an example of an abutting portion) is provided at the bottom of the chamber 150. The bottom member 136 may function as a stopper for positioning the flavor generating article 200, by abutting the flavor generating article 200 inserted into the chamber 150 in the insertion direction of the flavor generating article 200. Here, the chamber 150 and the bottom member 136 constitute an accommodating portion for accommodating at least a part of the flavor generating article 200. The bottom member 136 may be formed of, for example, a resin material. The bottom member 136 may have an irregularity in its surface that contacts the flavor generating article 200, so that a first air flow path for supplying air to an air inlet of the flavor generating article 200 (namely, an air flow path communicating with the flavor generating article 200 accommodated in the accommodating portion) is defined. The bottom member 136 is, in one example, made of a resin such as, in particular, polycarbonate (PC), an acrylonitrile-butadiene-styrene (ABS) resin, polyether ether ketone (PEEK), or a polymer alloy containing multiple kinds of polymers, or may be made of a metal such as aluminum. Note, however, that the bottom member 136 is preferably made of a material with a low thermal conductivity in order to prevent heat from being transferred to the heat insulating portion 132, etc.

[0112] The heat insulating portion 132 has a substantially tubular shape as a whole and is disposed to cover the chamber 150. The heat insulating portion 132 may include, for example, an aerogel sheet. The insertion guide member 134 is provided between the slide cover 102 at the closed position and the chamber 150. The insertion guide member 134 is, in one example, made of a resin such as, in particular, polycarbonate (PC), an acrylonitrile-butadiene-styrene (ABS) resin, polyether ether ketone (PEEK), or a polymer alloy containing multiple kinds of polymers. The insertion guide member 134 may be formed of metal, glass, ceramic, or the like. From the viewpoint of heat resistance, the insertion guide member 134 is preferably made of PEEK. The insertion guide member 134 communicates with the outside of the aerosol generating device 100 while the slide cover 102 is located at the open position, and guides the flavor generating article 200 for insertion into the chamber 150 by inserting the flavor generating article 200 into the insertion guide member 134. With the insertion

guide member 134, easy insertion of the flavor generating article 200 into the chamber 150 is enabled.

[0113] The aerosol generating device 100 further includes a first holding portion 137 and a second holding portion 138 for holding both ends of the chamber 150 and the heat insulating portion 132. The first holding portion 137 is disposed so as to hold the end portions of the chamber 150 and the heat insulating portion 132 on the z-axis negative direction side. The second holding portion 138 is disposed so as to hold the end portions of the chamber 150 and the heat insulating portion 132 on the slide cover 102 side (on the Z-axis positive direction side).

<5. Preferred Embodiments>

[0114] A collection of preferred embodiments will be set forth.

[0115] [A1] A production method for a tobacco flavored liquid for use in an aerosol-generating flavor inhaler, the method including:

heating a tobacco material to vaporize flavor components from the tobacco material;
dissolving a gas containing the flavor components in a first liquid which serves as an aerosol source to obtain a flavor component-containing liquid; and
distilling the flavor component-containing liquid at a temperature below a boiling point of the first liquid to obtain the tobacco flavored liquid.

[0116] [A2] The method according to [A1], wherein the distilling is conducted at a temperature higher than 100 °C.

[0117] [A3] The method according to [A1] or [A2], wherein the distilling is conducted at a temperature equal to or above the boiling point of the first liquid minus 40 °C.

[0118] [A4] The method according to any one of [A1] to [A3], wherein the first liquid is propylene glycol, glycerin, 1,3-propanediol, diacetin, polyethylene glycol, or any mixture thereof.

[0119] [A5] The method according to any one of [A1] to [A4], wherein the first liquid is propylene glycol, glycerin, or a mixture of propylene glycol and glycerin.

[0120] [A6] The method according to any one of [A1] to [A5], wherein the distilling is conducted at a temperature in a range of 150 to 180 °C.

[0121] [A7] The method according to any one of [A1] to [A6], wherein the distilling is conducted under atmospheric pressure.

[0122] [A8] The method according to any one of [A1] to [A7], further including adding a second liquid which serves as an aerosol source to the tobacco material before the heating.

[0123] [A9] The method according to [A8], wherein the second liquid is propylene glycol, glycerin, 1,3-propanediol, diacetin, polyethylene glycol, or any mixture thereof.

[0124] [A10] The method according to [A8] or [A9], wherein the second liquid is propylene glycol, glycerin, or a mixture of propylene glycol and glycerin.

[0125] [A11] The method according to any one of [A8] to [A10], wherein the second liquid is added in an amount of 0.1 to 20 mL per 10 g of the tobacco material.

[0126] [A12] The method according to any one of [A1] to [A11], wherein the heating is conducted at a temperature of 150 to 400 °C.

[0127] [A13] The method according to any one of [A1] to [A12], wherein the heating is conducted at a temperature of 160 to 230 °C.

[0128] [A14] The method according to any one of [A1] to [A13], wherein the heating is conducted for 5 to 60 minutes, preferably 10 to 30 minutes.

[0129] [A15] The method according to any one of [A1] to [A14], wherein the heating is conducted by supplying heated air to the tobacco material.

[0130] [A16] The method according to any one of [A1] to [A15], wherein the heating is conducted by supplying heated air to the tobacco material via a porous member (preferably a porous plate).

[0131] [A17] The method according to any one of [A1] to [Al6], wherein the dissolving is conducted by causing bubbling of the gas containing the flavor components in the first liquid.

[0132] [A18] The method according to any one of [A1] to [A17], wherein the dissolving is conducted by causing bubbling of the gas containing the flavor components in the first liquid via a porous member (preferably a porous filter).

[0133] [A19] The method according to any one of [A1] to [A18], wherein the dissolving is conducted by causing bubbling of the gas containing the flavor components in the first liquid in which multiple beads are dispersed.

[0134] [A20] The method according to [A19], wherein the beads have a diameter of 1 to 5 mm.

[0135] [A21] The method according to any one of [A1] to [A20], wherein the tobacco material is cut tobacco.

[0136] [B1] The tobacco flavored liquid obtainable by the method according to any one of [A1] to [A21].

[0137] [C1] A flavor inhaler including the tobacco flavored liquid according to [B1].

[0138] [C2] A flavor inhaler including the tobacco flavored liquid according to [B1] and an atomization unit for atomizing the tobacco flavored liquid.

[0139] [C3] A flavor inhaler including the tobacco flavored liquid according to [B1] and an atomization unit for heating the tobacco flavored liquid to atomize the tobacco flavored liquid.

[0140] [D1] A reconstituted tobacco material including:

the tobacco flavored liquid obtainable by the method according to any one of [A1] to [A21], and
a post-heating tobacco material obtainable at the time of obtaining the gas containing the flavor components in the method according to any one of [A1] to [A21].

[0141] [D2] The reconstituted tobacco material according to [D1], wherein the reconstituted tobacco material is a tobacco molded body obtained by molding a material containing the tobacco flavored liquid and the post-heating tobacco material.

[0142] [D3] The reconstituted tobacco material according to [D2], wherein the tobacco molded body is sheet tobacco or tobacco granules.

[0143] [E1] A flavor inhaler including the reconstituted tobacco material according to any one of [D1] to [D3].

[0144] [E2] A flavor inhaler including the reconstituted tobacco material according to any one of [D1] to [D3] and an atomization unit for atomizing a liquid component contained in the reconstituted tobacco material.

[0145] [E3] A flavor inhaler including the reconstituted tobacco material according to any one of [D1] to [D3] and an atomization unit for heating a liquid component contained in the reconstituted tobacco material to atomize the liquid component.

[Examples]

[Example 1]

[0146] In Example 1, over-time changes in the color of the tobacco flavored liquid were examined.

1-1. Preparation of Tobacco Flavored Liquid

(Heating Step)

[0147] Glycerin was added to a tobacco material (cut tobacco) in an amount of 10 mass% based on the tobacco material. The obtained tobacco material was heated at 180 °C for 10 minutes using a heating device as shown in FIG. 2. A "flavor component-containing gas" was thus obtained.

(Dissolving Step)

[0148] Using a dissolving device as shown in FIG. 3, bubbling of the flavor component-containing gas in polyethylene glycol was conducted. Here, 32 g of glass beads (particle size: 3 mm, density: 2.5 g/cm^3) were added to 5 mL of polyethylene glycol. A "flavor component-containing liquid" was thus obtained.

(Distilling Step)

[0149] The flavor component-containing liquid was distilled at 170 °C. The distillation was conducted under atmospheric pressure. The distillation yielded a "tobacco flavored liquid". It was confirmed that the obtained tobacco flavored liquid had an equivalent smoking flavor to that of the flavor component-containing liquid.

1-2. Color Evaluation Method

[0150] The tobacco flavored liquid was put in a vial container and stored for 2 months at 40 °C and under atmospheric pressure. As a control, the flavor component-containing liquid was stored using the same conditions.

[0151] The color of the tobacco flavored liquid was evaluated by measuring absorbance over a range of 570 to 690 nm. More specifically, absorbance was measured for each of the tobacco flavored liquid before storage, the tobacco flavored liquid after storage, the flavor component-containing liquid before storage, and the flavor component-containing liquid after storage. The magnitude of change was calculated using the following formula based on measured absorbance values.

(Formula 1)

$$\frac{\left[\frac{I - II}{II}\right] \times 100}{\left[\frac{III - IV}{IV}\right] \times 100}$$

I: Absorbance of flavor component-containing liquid after storage
II: Absorbance of flavor component-containing liquid before storage
III: Absorbance of tobacco flavored liquid after storage
IV: Absorbance of tobacco flavored liquid before storage

1-3. Results

[0152] The results are shown in FIG. 11. In FIG. 11, the horizontal axis represents the wavelengths from 570 to 690 nm, and the vertical axis represents the magnitude of change. The wavelengths of 570 to 690 nm correspond to wavelengths from near yellow to near red, and they are assumed to be a band of wavelengths that affects the color changes of the flavor component-containing liquid and the tobacco flavored liquid. A value of the magnitude of change being closer to 1 indicates that the change in color of the tobacco flavored liquid is more comparable with that of the flavor component-containing liquid. A value of the magnitude of change being beyond 1 and greater indicates that the change in color of the tobacco flavored liquid is smaller than that of the flavor component-containing liquid.

[0153] As shown in FIG. 11, the tobacco flavored liquid did not show color changes after storage as compared to the flavor component-containing liquid. The results demonstrate that the causative substances responsible for color change were removed from the flavor component-containing liquid by the distillation, and the tobacco flavored liquid contained almost no such causative substances for color change. It was also suggested that the tobacco flavored liquid would hardly cause an over-time alteration of the contained components and that the smoking flavor has been stably conserved.

[Example 2]

[0154] In Example 2, the content of a sulfur-containing component in the tobacco flavored liquid after storage was examined.

2-1. Preparation of Tobacco Flavored Liquid

[0155] A tobacco flavored liquid was prepared in the same manner as in Example 1.

2-2. Sulfur-Containing Component Measurement Method

[0156] The tobacco flavored liquid was put in a vial container and stored for 1 month or 2 months at 40 °C and under atmospheric pressure. As a control, the flavor component-containing liquid was stored using the same conditions.

[0157] A methanethiol content and a dimethyl trisulfide content were measured for each of the tobacco flavored liquid before storage, the tobacco flavored liquid after 1-month storage, the tobacco flavored liquid after 2-month storage, the flavor component-containing liquid before storage, the flavor component-containing liquid after 1-month storage, and the flavor component-containing liquid after 2-month storage.

[0158] More specifically, GC-MS (Agilent, 5977B) was employed for the measurement. Samples were introduced using a thermal desorption introduction system (GERSTEL TDS3). An area ratio of methanethiol to the internal standard material and an area ratio of dimethyl trisulfide to the internal standard substance were summed, and the obtained total value was adopted as the "content of the sulfur-containing component".

2-3. Results

[0159] The results are shown in FIG. 12. In FIG. 12, "0M" represents before storage, "1M" represents after 1-month storage, and "2M" represents after 2-month storage. The vertical axis in FIG. 12 represents the content of the sulfur-

containing component by a relatively expressed value on the assumption that the content of the sulfur-containing component in the flavor component-containing liquid before storage is 1. The sulfur-containing component is not a causative substance responsible for color change, but since it gives an undesirable aroma, its content should preferably be kept low.

[0160] As shown in FIG. 12, the tobacco flavored liquid before storage had a smaller content of the sulfur-containing component than the flavor component-containing liquid before storage. Moreover, while the flavor component-containing liquid after storage showed an increased content of the sulfur-containing component, the tobacco flavored liquid after storage showed a reduced content of the sulfur-containing component. It can be seen from these results that the tobacco flavored liquid involves a smaller amount of the sulfur-containing component after storage as well and it can provide an excellent smoking flavor to users.

REFERENCE SIGNS LIST

[0161]

2	Heating device
2A	Container
2B	Sintered plate
2C	Preheater
2D	Tobacco material
2E	Air flow path
2F	Gas flow path
3	Dissolving device
3A	Inner container
3B	Sintered filter
3C	Outer container
3D	First liquid
3E	Glass bead
3F	Ice water
3G	Discharge gas flow path
1	Heating-type flavor inhaler
10	Power supply unit
20	First cartridge
30	Second cartridge
11	Power supply unit case
11a	Top portion
11b	Bottom portion
12	Power supply
13	Charger
14	Operation part
15	Inhalation sensor
16	Voltage sensor
17	Temperature sensor
18	Memory
21	Load
22	Tobacco flavored liquid
23	Reservoir
24	Wick
25	Aerosol flow path
26	End cap
26a	Cartridge accommodation portion
26b	Communication path
27	Cartridge case
31	Flavor source
32	Mouthpiece
41	Discharge terminal
42	Air supply part
45	Notification part

50 Control part
100 Aerosol generating device
101 Outer housing
102 Slide cover
103 Switch part
110 Inner housing
120 Power source unit
121 Power source
130 Atomization unit
132 Heat insulating portion
134 Insertion guide member
136 Bottom member
137 First holding portion
138 Second holding portion
140 Heater
150 Chamber
200 Flavor generating article
201 Smokable material
202 First wrapping paper
203 Second wrapping paper
204 Tubular member
205 Filter portion
206 Hollow filter portion
207 Lip release agent

Claims

1. A production method for a tobacco flavored liquid for use in an aerosol-generating flavor inhaler, the method comprising:

heating a tobacco material to vaporize flavor components from the tobacco material;
dissolving a gas containing the flavor components in a first liquid which serves as an aerosol source to obtain a flavor component-containing liquid; and
distilling the flavor component-containing liquid at a temperature below a boiling point of the first liquid to obtain the tobacco flavored liquid.

2. The method according to claim 1, wherein the distilling is conducted at a temperature higher than 100 °C.

3. The method according to claim 1 or 2, wherein the distilling is conducted at a temperature equal to or above the boiling point of the first liquid minus 40 °C.

4. The method according to any one of claims 1 to 3, wherein the first liquid is propylene glycol, glycerin, or a mixture of propylene glycol and glycerin.

5. The method according to claim 4, wherein the distilling is conducted at a temperature in a range of 150 to 180 °C.

6. The method according to any one of claims 1 to 5, further comprising adding a second liquid which serves as an aerosol source to the tobacco material before the heating.

7. The method according to claim 6, wherein the second liquid is propylene glycol, glycerin, or a mixture of propylene glycol and glycerin.

8. The method according to any one of claims 1 to 7, wherein the heating is conducted at a temperature of 150 to 400 °C.

9. The tobacco flavored liquid obtainable by the method according to any one of claims 1 to 8.

10. A flavor inhaler comprising the tobacco flavored liquid according to claim 9.

11. A flavor inhaler comprising the tobacco flavored liquid according to claim 9 and an atomization unit for atomizing the tobacco flavored liquid.

12. A reconstituted tobacco material comprising:

the tobacco flavored liquid obtainable by the method according to any one of claims 1 to 8; and
a post-heating tobacco material obtainable at the time of obtaining the gas containing the flavor components in the method according to any one of claims 1 to 8.

13. A flavor inhaler comprising the reconstituted tobacco material according to claim 12.

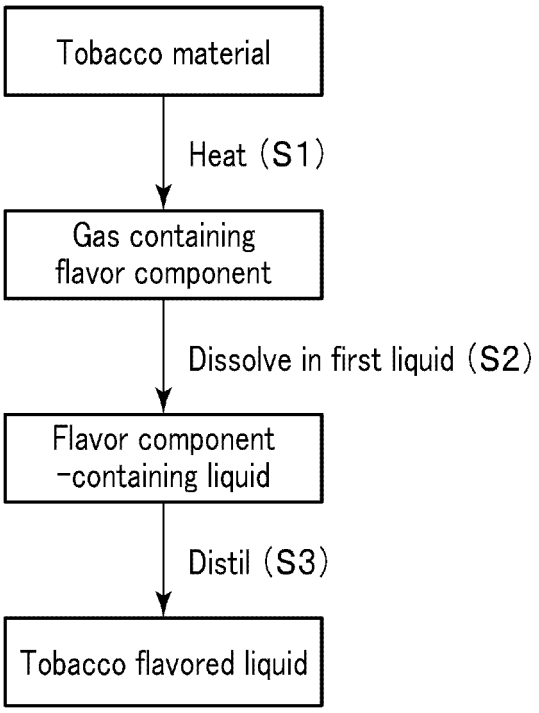
Tobacco material
Heat (S1)
Gas containing flavor component
Dissolve in first liquid (S2)
Flavor component -containing liquid
Distil (S3)
Tobacco flavored liquid

FIG. 1

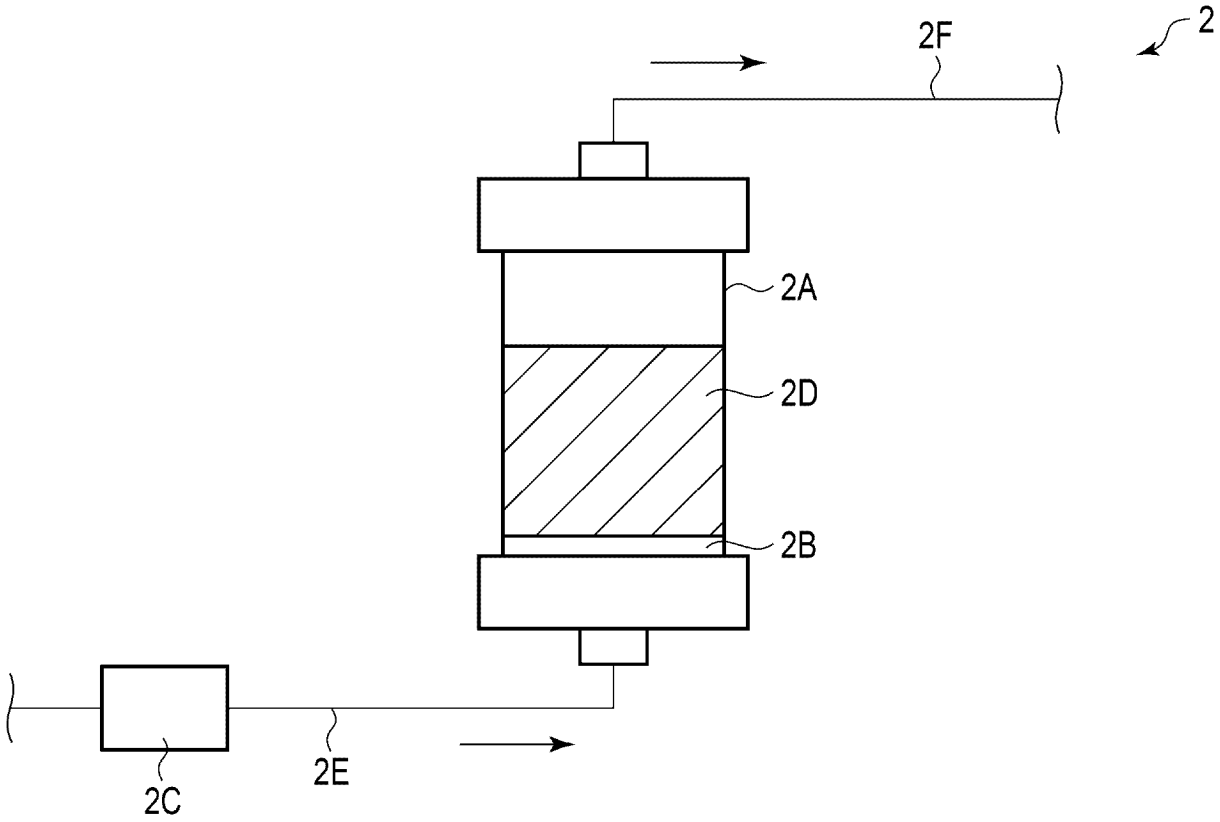

FIG. 2

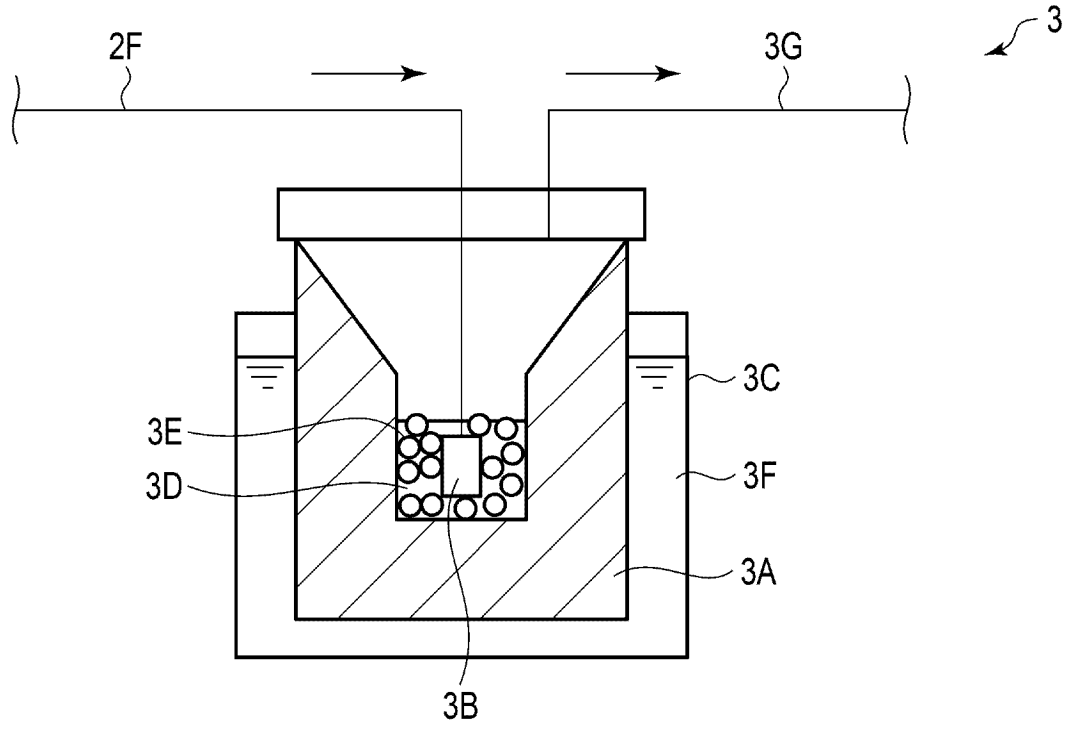

FIG. 3

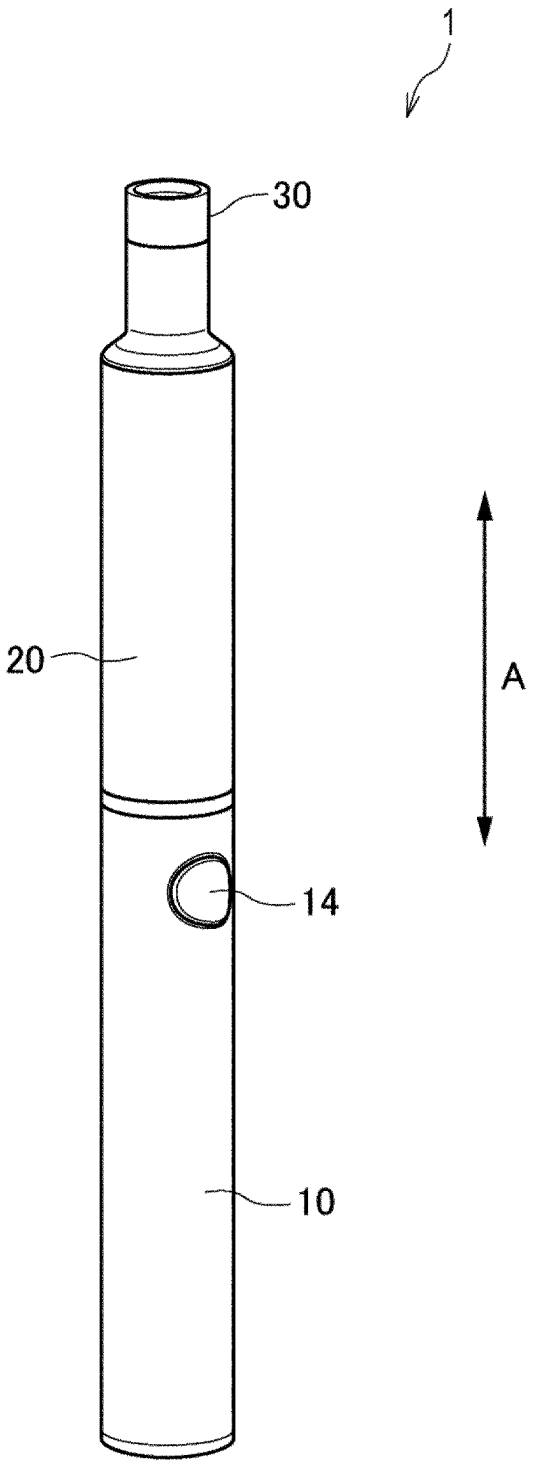

FIG. 4

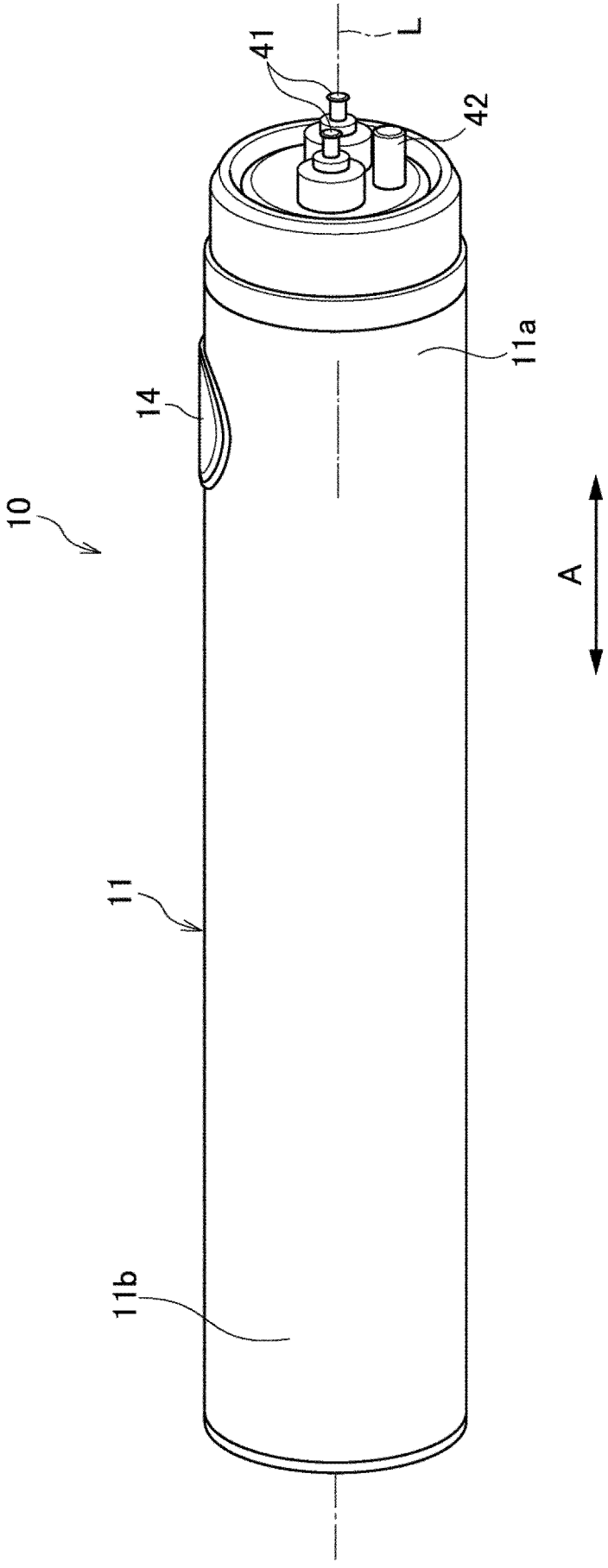

FIG. 5

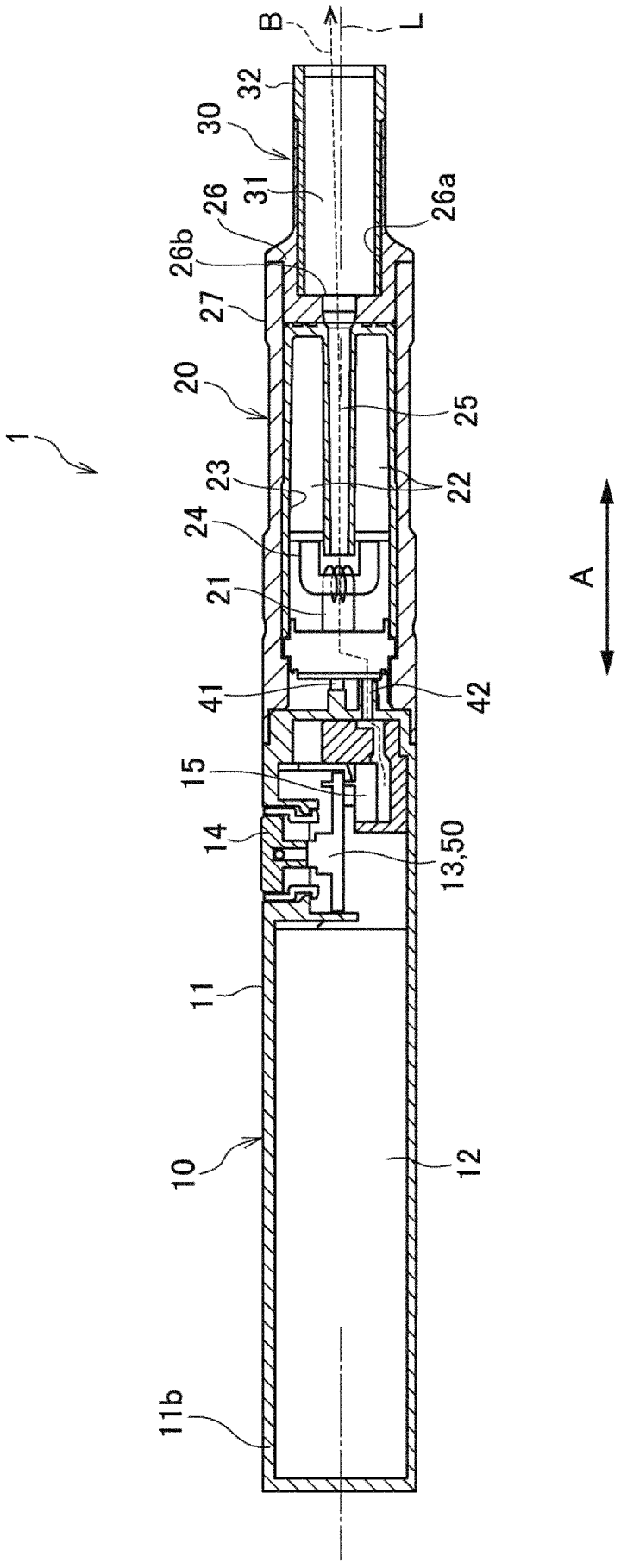
B
L
32
30
31
26
26a
26b
27
20
25
1
23
22
24
21
A
41
42
15
14
13,50
11
10
12
11b

FIG. 6

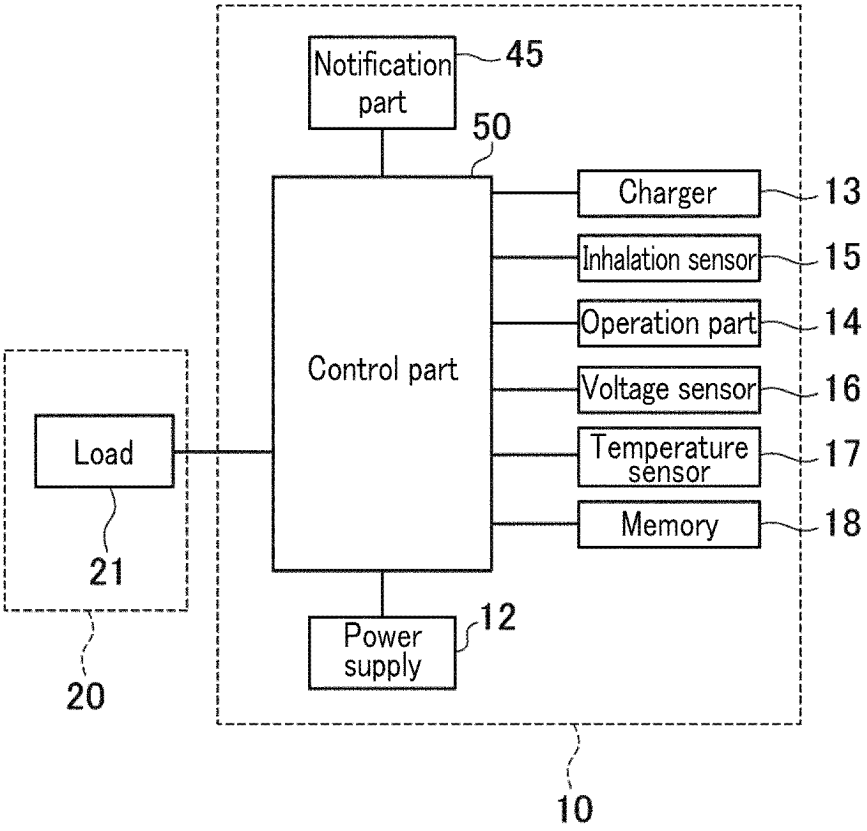
Notification part
45
50
Charger
13
Inhalation sensor
15
Operation part
14
Control part
Voltage sensor
16
Load
Temperature sensor
17
Memory
18
21
Power supply
12
20
10

FIG. 7

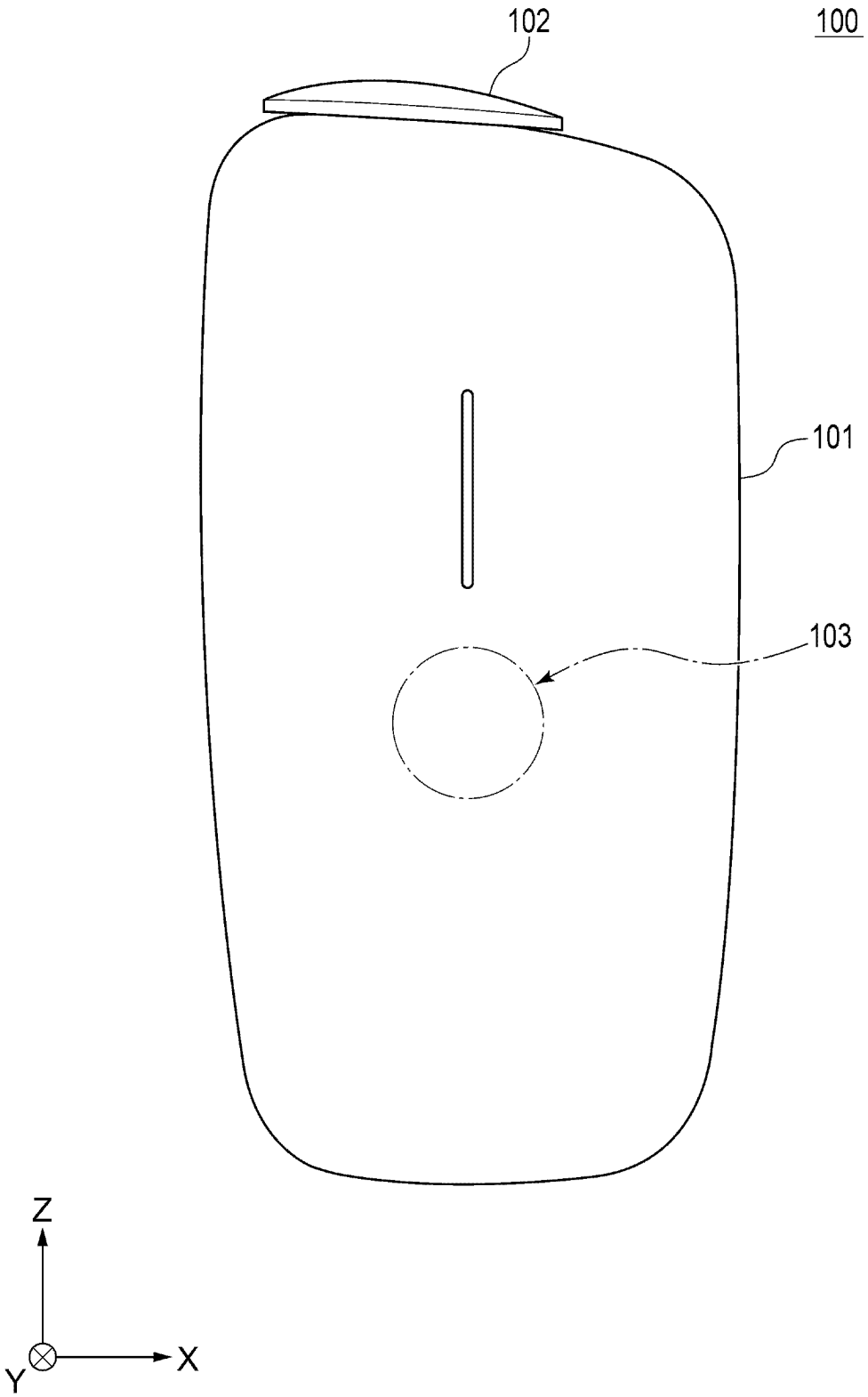

FIG. 8A

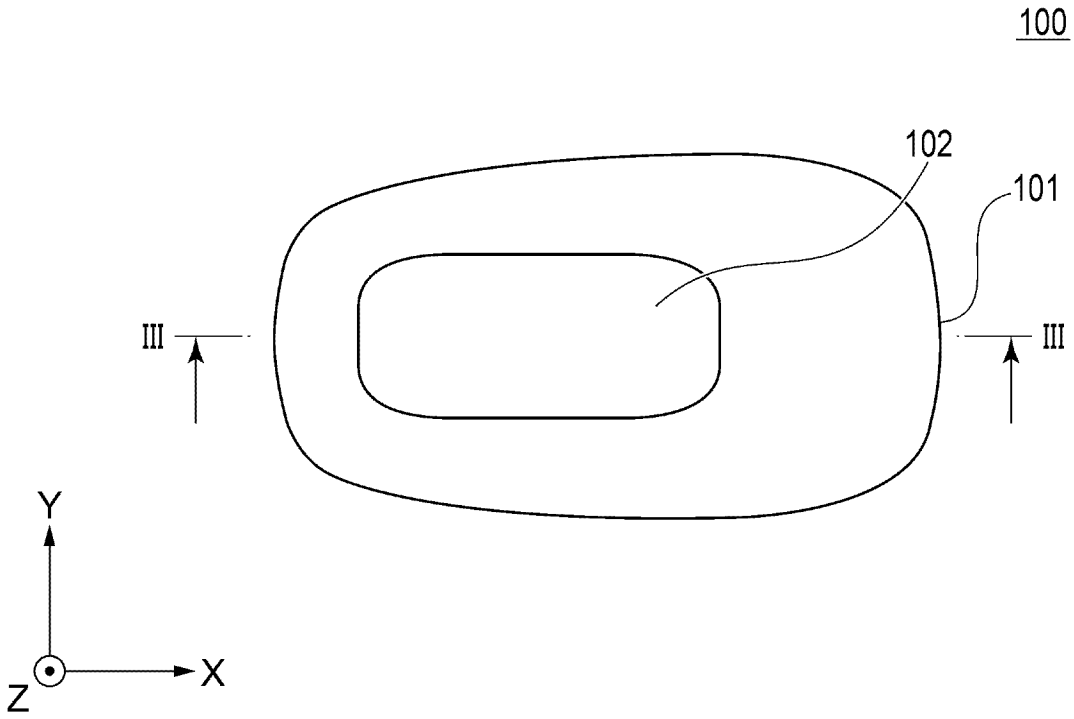

FIG. 8B

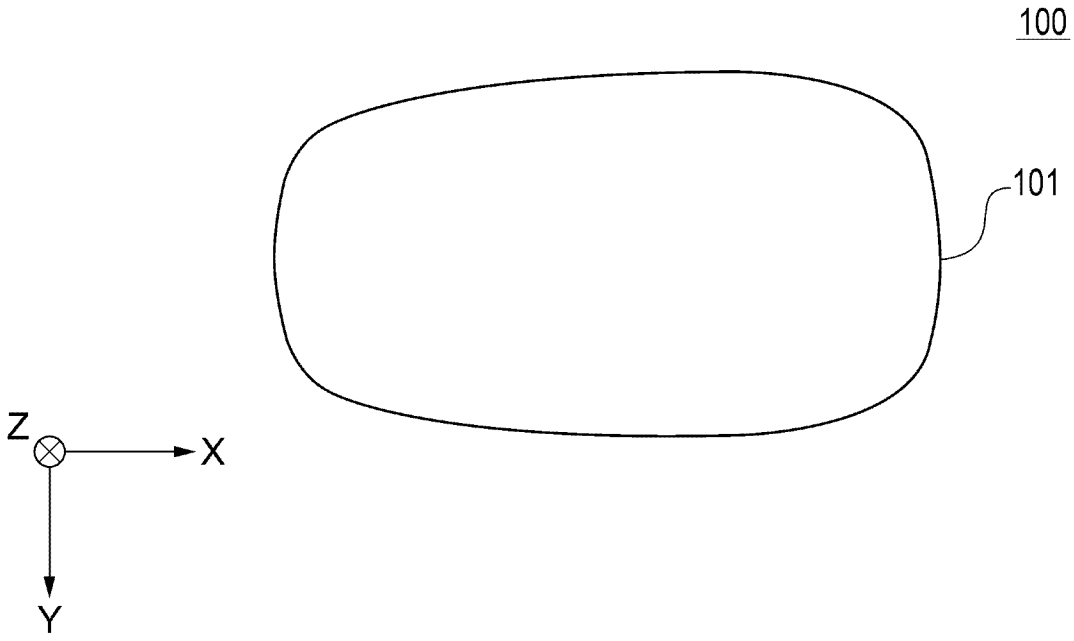

FIG. 8C

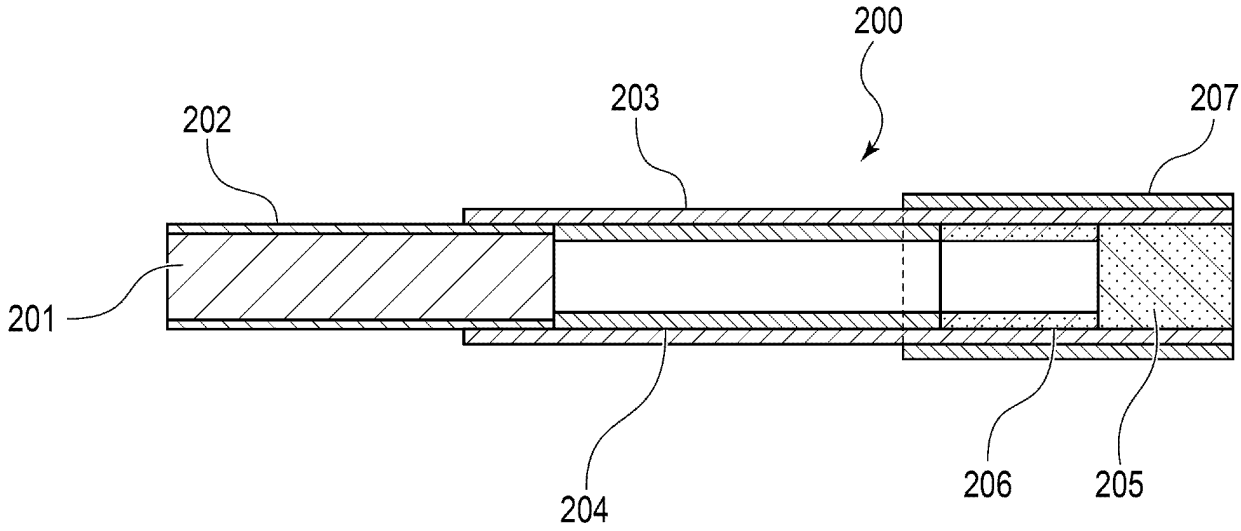

FIG. 9

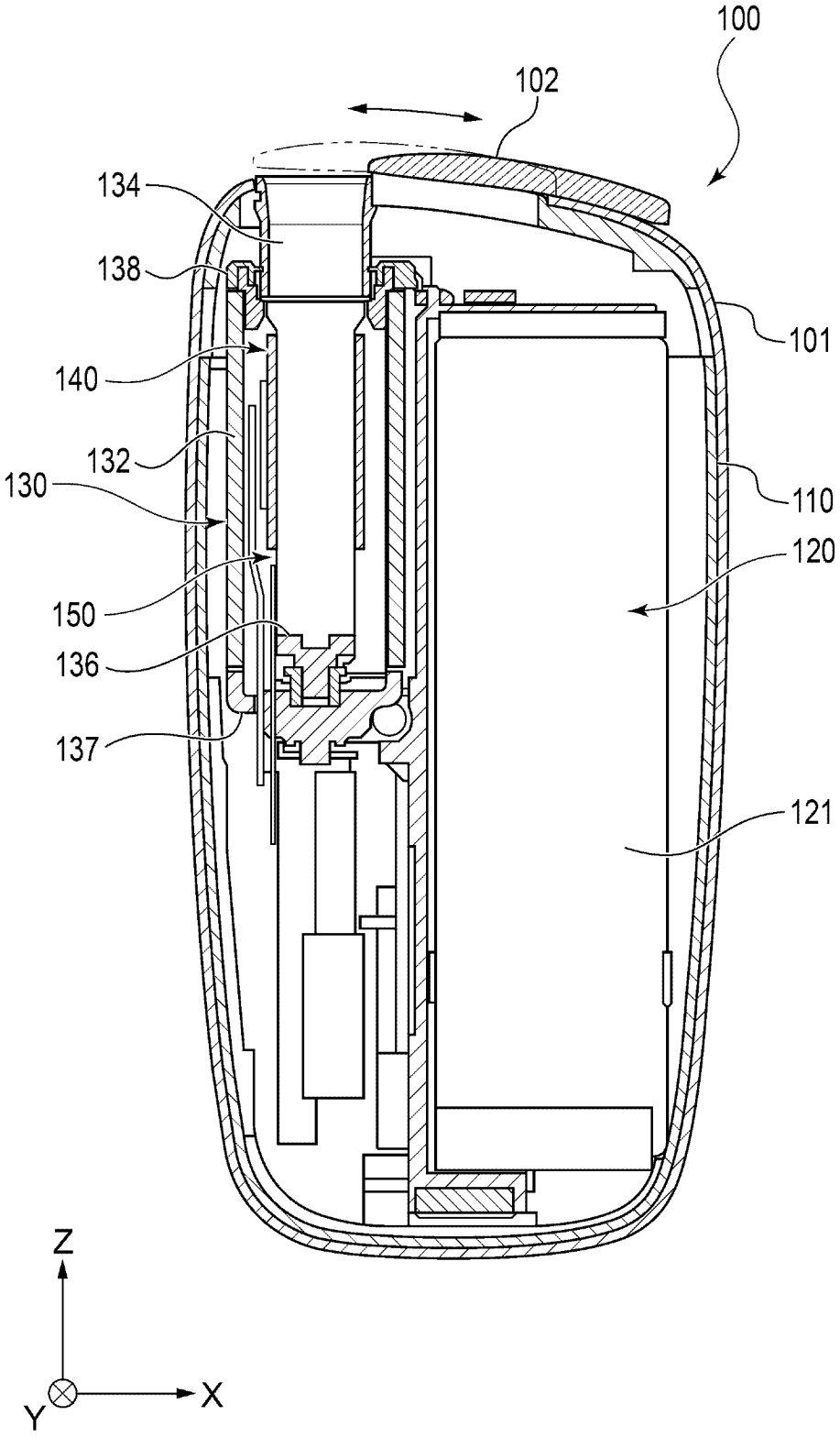

FIG. 10

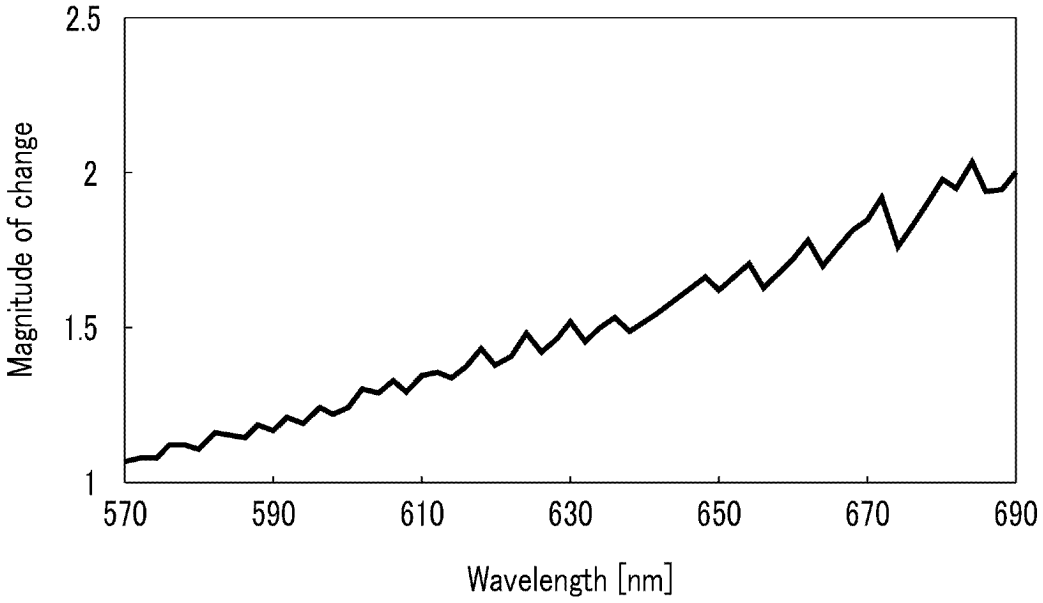
2.5
2
1.5
1
Magnitude of change
570
590
610
630
650
670
690
Wavelength [nm]

FIG. 11

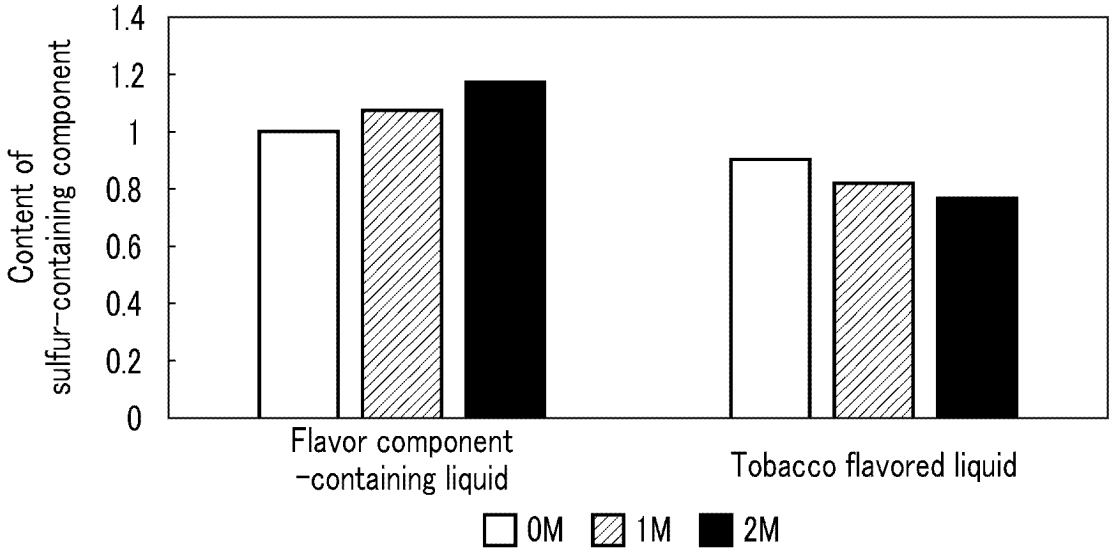
1.4
1.2
1
0.8
0.6
0.4
0.2
0
Content of sulfur-containing component
Flavor component -containing liquid
Tobacco flavored liquid
0M
1M
2M

FIG. 12

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2022/006703

A. CLASSIFICATION OF SUBJECT MATTER

A24B 15/24(2006.01)i
FI: A24B15/24

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A24B15/24

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 1971-2022
Registered utility model specifications of Japan 1996-2022
Published registered utility model applications of Japan 1994-2022

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.
Y	CN 111567850 A (YUNNAN REASCEND TOBACCO TECHNOLOGY (GROUP) CO., LTD.) 25 August 2020 (2020-08-25) in particular, see paragraphs [0020]-[0021]	1-13
Y	JP 2019-507592 A (PHILIP MORRIS PRODUCTS S.A.) 22 March 2019 (2019-03-22) in particular, claims 1-4, see paragraphs [0007], [0029]	1-13
Y	WO 2006/046517 A1 (JAPAN TOBACCO INC) 04 May 2006 (2006-05-04) in particular, see paragraph [0038]	12-13

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

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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
24 March 2022	**05 April 2022**

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

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

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/JP2022/006703

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN 111567850 A	25 August 2020	(Family: none)	
JP 2019-507592 A	22 March 2019	US 2017/0245543 A1 in particular, claims 1-4, see paragraphs [0005], [0028] WO 2017/144705 A1 CN 108601390 A KR 10-2018-0115688 A	
WO 2006/046517 A1	04 May 2006	US 2007/0193596 A1 in particular, see paragraph [0048] EP 1825766 A1 KR 10-2007-0064367 A CN 101072517 A	

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

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 2017144705 A **[0003]**
- WO 2006073065 A **[0076]**
- WO 2010110226 A **[0076]**
- WO 2015046385 A **[0076]**
- WO 2017167521 A **[0077]**