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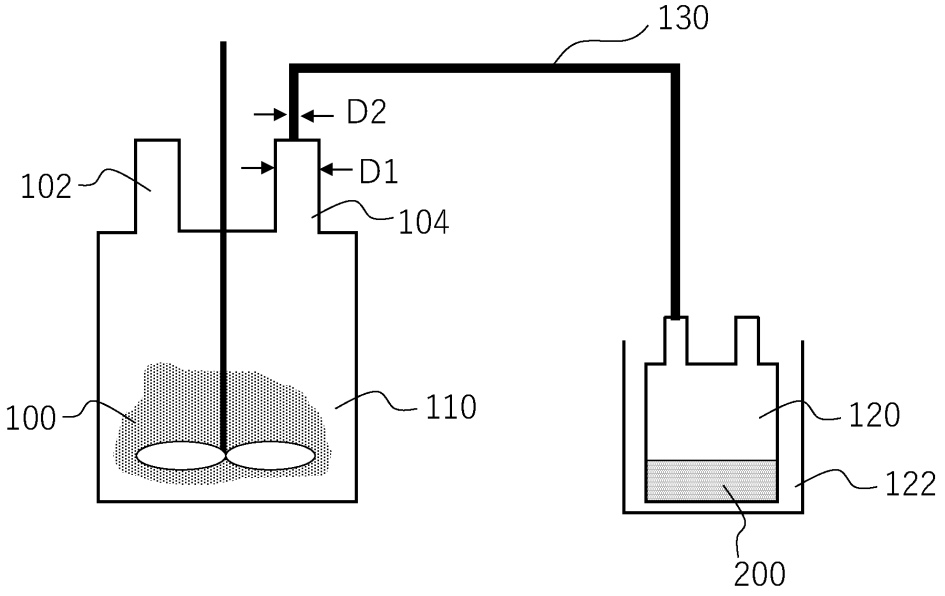
(54) **TOBACCO EXTRACT COMPOSITION AND PRODUCTION METHOD THEREFOR**

(57) A production method for a tobacco extract composition, comprising: a heating step for heating a tobacco starting material such that the temperature of the starting material is 100-270°C; and a recovery step for recovering volatile components generated in the heating step.

Fig. 1



EP 4 501 139 A1

Description

TECHNICAL FIELD

[0001] The present invention relates to a tobacco extract composition and a production method therefor.

BACKGROUND ART

[0002] In recent years, non-combustion-type flavor inhalation articles have been developed. In the articles, an aerosol-generating substrate is heated to generate aerosol. Regarding a production method for producing a pre-vapor formulation used for such an electronic vaping device, PTL 1 discloses a production method including steps of heating a tobacco material, recovering volatile components, and combining the volatile components with a pre-vapor formulation.

CITATION LIST

PATENT LITERATURE

[0003] PTL 1: Japanese Unexamined Patent Application Publication (Translation of PCT Application) No. 2019-507592

SUMMARY OF INVENTION

TECHNICAL PROBLEM

[0004] The inventors have preliminarily examined the method described in PTL 1 and found that the method had room for improvement particularly in flavor smoke taste. Against the background, an object of the present invention is to provide a tobacco extract composition that provides better flavor smoke taste.

SOLUTION TO PROBLEM

[0005] The inventors have found that the above problem can be solved by heating a tobacco raw material at a specific temperature. That is, the above problem can be solved by the present invention described below.

Aspect 1

[0006] A production method for producing a tobacco extract composition, comprising:

a heating step of heating a tobacco raw material so that a temperature of the raw material becomes 100 to 270°C; and
a recovery step of recovering volatile components generated in the heating step.

Aspect 2

[0007] The production method according to aspect 1, wherein the temperature is 200 to 250°C.

Aspect 3

[0008] The production method according to aspect 1 or 2, wherein a particle size of the tobacco raw material measured in accordance with ASTM E11-95 is 0.5 to 2 mm.

Aspect 4

[0009] The production method according to any one of aspects 1 to 3, wherein the tobacco raw material is selected from burley tobacco, flue-cured tobacco, or a combination of burley tobacco and flue-cured tobacco.

Aspect 5

[0010] The production method according to any one of aspects 1 to 4,
wherein

$$D2/D1 \leq 0.17,$$

where D1 is a diameter of a pipe from which the volatile components are discharged in the heating step, and D2 is a diameter of a pipe into which the volatile components are introduced in the recovery step.

Aspect 6

[0011] A tobacco extract composition produced by using the production method according to any one of aspects 1 to 5.

Aspect 7

[0012] The tobacco extract composition according to aspect 6, wherein, when a concentration of a polyol component is 15 to 35% by weight, a turbidity (OD660) of the tobacco extract composition measured by using a spectrophotometer is 0.90 to 1.80.

ADVANTAGEOUS EFFECTS OF INVENTION

[0013] With the present invention, it is possible to provide a tobacco extract composition that provides better flavor smoke taste.

BRIEF DESCRIPTION OF DRAWINGS

[0014]

[Fig. 1] Fig. 1 is a conceptual view of a production apparatus for producing a tobacco extract composition.
[Fig. 2] Fig. 2 is a schematic sectional view illustrating an example of a non-combustion-indirect-heating-type smoking article.

DESCRIPTION OF EMBODIMENTS

[0015] Hereafter, the present invention will be described in detail. In the present invention, "X to Y" includes X and Y, which are end values thereof.

1. Production Method

[0016] A production method for producing a tobacco extract composition according to the present embodiment includes: a heating step of heating a tobacco raw material so that a temperature of the raw material becomes 100 to 270°C; and a recovery step of recovering volatile components generated in the heating step. A tobacco extract composition is a composition extracted from a tobacco raw material and having flavor. Fig. 1 illustrates one aspect of the production method according to the present embodiment. In the figure, a tobacco raw material 100, a container 110, an air introduction pipe 102, a gas discharge pipe 104, a tobacco extract composition 200, a collection container 120, an ice water bath 122, and a pipe 130 are illustrated.

(1) Heating Step

1) Tobacco Raw Material

[0017] Various materials can be used as the tobacco raw material 100, and, for example, flue-cured tobacco, burley tobacco, oriental tobacco, domestic tobacco, other types belonging to Nicotiana tabacum or Nicotiana rustica, and a mixture of these can be used. As the mixture, a blend of the above types appropriately blended to have an intended flavor smoke taste can be used. Materials of any origins can be selected so that a tobacco extract composition according to the present embodiment has a desirable flavor smoke taste. For example, when a tobacco extract composition according to the present embodiment is to be used for a product having a high nicotine content, it is preferable that the tobacco extract composition be produced from a highnicotine-content type having a nicotine content of 6% by weight or more. As an example of such a type and origin, Japanese burley tobacco or Philippine sun-cured tobacco can be used. Details of the tobacco types are disclosed in "Encyclopedia of Tobacco, Tobacco Academic Studies Center, 2009.3.31". As described in WO2021/070932, it is also possible to use leaves having a high nicotine content obtained by specific fertilization and harvesting. To be specific, the leaves are obtained by, in cultivation of burley tobacco, applying a fertilizer by 6 to 15 kg/10 a

as the amount of nitrogen during the period from one week before pinching to one week after pinching; carrying out pinching deeper by one to two leaves than a normal position; harvesting and removing unnecessary leaves early; harvesting leaves after making the period from pinching to harvesting longer than usual by one to two weeks; and air-curing the leaves. Alternatively, known alkali treatment may be performed on the tobacco raw material.

[0018] The tobacco raw material 100 may be a shredded or pulverized tobacco raw material (hereafter, "raw material pieces"). In such a case, if the particle size is excessively large, mixing efficiency may decrease in the present step. On the other hand, if the particle size is excessively small, it may be difficult to form the material into a compact or the like. From such a viewpoint, it is preferable that the particle size of the raw material pieces measured in accordance with ASTM E11-95 be 0.5 to 2 mm. Having the particle size means that the raw material pieces do not pass through a sieve having an aperture size of 0.5 mm (> 0.5 mm) and pass through a sieve having an aperture size of 2.36 mm (< 2.5 mm). It is preferable that this measurement be performed by using cured raw material pieces and a mechanical shaking method.

[0019] The particle size of the raw material pieces can be adjusted to a desirable range by classification. For example, the particle size can be adjusted as follows. i) A sieve mesh L having an aperture size around the minimum particle diameter of the raw material pieces, a sieve mesh M having an aperture size around the maximum particle diameter of the raw material pieces, and several sieve meshes belonging between L and M are prepared. ii) By using these sieve meshes, classification is performed by screening the raw material pieces by using a dry and mechanical shaking method. iii) The classified fractions are appropriately collected to obtain raw material pieces having a desirable particle size. To be specific, raw material pieces having a particle size of 0.5 to 2 mm can be obtained by mixing fractions obtained by performing classification by using sieves having aperture sizes 2.36 mm, 2 mm, 1.7 mm, 1.4 mm, 1.18 mm, 1 mm, 0.85 mm, 0.71 mm, 0.6 mm, 0.5 mm, and 0.425 mm.

[0020] The average particle size can be calculated by: performing classification in accordance with i) to iii) described above; measuring the amounts of fractions that remain on the sieves meshes; and performing apportionment by weight. For example, the average particle size can be calculated by measuring the weights of fractions obtained by performing classification by using sieves having aperture sizes 2.36 mm, 2 mm, 1.7 mm, 1.4 mm, 1.18 mm, 1 mm, 0.85 mm, 0.71 mm, 0.6 mm, 0.5 mm, and 0.425 mm, and by performing apportionment by weight.

2) Temperature

[0021] It is preferable that the container 110 include a stirrer and the tobacco raw material 100 be stirred. In the present step, the tobacco raw material 100 is heated to have a temperature of 100 to 270°C. The temperature of the tobacco raw material 100 can be measured by disposing a temperature sensor in the container 110 to be in contact with the tobacco raw material 100. The temperature sensor may be a thermocouple. The temperature is preferably 200 to 250°C. Volatile components are generated as the tobacco raw material 100 is heated. It is also possible to provide the pipe 130 with a branch via a valve to prevent introduction, into the collection container 120, of volatile components generated before the temperature becomes the lower limit of the temperature and volatile components generated when the temperature exceeds the upper limit of the temperature.

3) Atmosphere

[0022] Although an atmosphere in which the tobacco raw material 100 is placed is not limited, it is preferable that the atmosphere be air-flowing atmosphere in view of increasing efficiency in discharging volatile components.

[0023] Although the tobacco raw material 100 can be heated in a bulk state without using a solvent, the tobacco raw material 100 can also be heated in a state of being immersed in a solvent. As the solvent, polyol such as glycerine, propylene glycol, or the like is preferable. It is possible to improve collection efficiency by pre-mixing the tobacco raw material and the solvent or by pre-immersing the tobacco raw material in the solvent before heat treatment, because heating is performed in a state in which the solvent and the raw material are sufficiently mixed. For example, the tobacco raw material 100 and the solvent can be mixed and placed for about 12 to 24 hours under harmonious conditions (relative humidity 60%, 23°C). Moreover, in the present step, it is also possible to form a solvent supply opening in the container 110 and to supply the solvent into the container from the supply opening.

(2) Recovery Step

[0024] The collection container 120 is connected to the container 110 via the pipe 130. Volatile components discharged from the container 110 are introduced into the collection container 120. The inside of the collection container 120 may be filled with a collection solvent. It is preferable that the collection container 120 form a hermetic space. To obtain an extract treated at a predetermined product temperature, a device for fractionating the extract in accordance with the product temperature may also be used.

[0025] Although the collection solvent is not limited as long as the solvent allows flavor components to be dissolved,

preferably, water or an aqueous organic solvent such as glycerine, ethanol, or the like can be used. The ambient temperature during collection or the temperature of the collection solvent, which is not limited, is preferably about -20 to 10°C in view of increase of collection efficiency. Therefore, the collection container 120 may be immersed in an ice water bath.

[0026] When D1 is the diameter of a pipe from which volatile components are discharged (also referred to as a "discharge pipe") in the heating step and D2 is the diameter of a pipe into which volatile components are introduced (also referred to as an "introduction pipe") in the recovery step, it is preferable that D1 and D2 satisfy the following relationship. When the relationship is satisfied, the efficiency in recovering volatile components increases, since the volatile components liquefy due to inertial collision. The diameter of the introduction pipe may be uniform through the pipe or may vary. If the diameter of the introduction pipe varies, D2 is the diameter of a portion connected to the discharge pipe.

$$D2/D1 \leq 0.17$$

[0027] When this relationship is satisfied, it is possible to simplify the steps, since it is possible to collect volatile components without the need for an additional step or equipment for bubbling, cooling, or the like.

2. Tobacco Extract Composition

[0028] The tobacco extract composition 200 is produced as described above. A tobacco extract composition includes, at least, a nicotine component that is an indicator of a flavor component. The tobacco extract composition 200 further includes a component that can provide tobacco-like astringency, fragrance, and sweetness that have not been achieved by existing flavoring agents. It is conjectured that the component is attributable to generation of volatile components at the aforementioned temperature.

[0029] The tobacco extract composition has a characteristic such that, when the concentration of a polyol component included in the tobacco extract composition is 15 to 35% by weight, the turbidity (OD660) measured by using a spectrophotometer is about 0.90 to 1.80. When a tobacco extract composition having a low turbidity is used as a smoking article, a char component is not generated easily. Turbidity is measured with reference to JIS K 0101.

3. Smoking Article

[0030] A tobacco extract composition according to the present embodiment is preferable for a smoking article. For example, the tobacco extract composition is useful as an aerosol source of a non-combustion-indirect-heating-type flavor inhalation article illustrated in Fig. 2. Moreover, the tobacco extract composition is useful as a flavor-imparting agent for a flavor source, a filter, or the like of a combustion-type smoking article or a non-combustion-direct-heating-type smoking article. In particular, since the tobacco extract composition is useful as an aerosol source of the non-combustion-indirect-heating-type flavor inhalation article illustrated in Fig. 2, the article will be described below as an example.

[0031] Figs. 2(1) and (2) illustrate a preferred aspect of a non-combustion flavor inhalation article and a non-combustion flavor inhalation system. In the figures, a non-combustion flavor inhalation article 10, a capsule 1c that is a flavor generating segment, an atomizer 2, an aerosol source 4, an aerosol generating segment 40, a mouthpiece 5, a housing 6, and a power source 8 are illustrated. A non-combustion flavor inhalation article according to the present aspect, which indirectly heats a capsule, is also referred to as a "non-combustion-indirect-heating-type flavor inhalation article". The article is an article that generates flavor by generating aerosol from an aerosol-generating source that is disposed upstream of a flavor generating segment and by causing the aerosol to bear a flavor component from the flavor generating segment.

1) Capsule

[0032] The capsule 1c is sealed in such a way that a gas can flow between the outside and the inside. The capsule 1c is sealed in such a way that aerosol generated from the aerosol source 4 is introduced into the container and the aerosol can pass from the container toward an inhalation port end. Therefore, preferably, openings are formed in both end portions of the container in the longitudinal direction. The inside of the container is filled with a flavor source. The flavor source is, for example, a known tobacco material. The shape of the tobacco material, which is not limited, is preferably granular.

2) Aerosol Source

[0033] The aerosol source 4 can be configured by causing a porous body, which is fibrous filler or the like, to bear the aforementioned aerosol generating substrate. The length of the aerosol source 4, which is not limited, is preferably 10 to 25 mm. It is possible to use a tobacco extract composition according to the present embodiment as an aerosol source by causing the porous body to bear the tobacco extract composition.

3) Atomizer

[0034] It is preferable that the atomizer 2 can electrically heat the aerosol source 4 to about 200 to 300°C. Aerosol is generated by the heating, the aerosol is introduced into the capsule 1c, passes while causing the filler to be in an atmosphere of 30 to 80°C, bears a flavor component, and is inhaled by a user. A combination of a non-combustion flavor inhalation article and a power source is also referred to as a non-combustion flavor inhalation system. The atomizer 2 may be, for example, a coil, and can generate aerosol by using electricity supplied from the power source 8 as illustrated in Fig. 2(2). Such a system 10s is disclosed, for example, in International Publication No. 2016/075749.

4) Mouthpiece

[0035] The mouthpiece 5 may include a filter.

5) Housing

[0036] The housing 6, which may be made of a known material, is preferably made of, for example, a polymer.

EXAMPLES

[Example 1]

[0037] Brazilian burley leaf shreds and Brazilian flue-cured leaf shreds were mixed with a weight ratio 1:1. The particle size of each shred measured in accordance with ASTM E11-95 was 0.5 to 1.18 mm. A mixture was produced by adding glycerine in an amount of 16% by weight for the total weight of the mixed shreds. 50 g of the mixture was fractionated, and put into a 1000 mL separable flask including a stirrer. To the flask, an air introduction pipe and a pipe for discharging volatile components from the inside of flask were connected. A thermocouple was disposed inside of the flask at a position in contact with the shreds.

[0038] The flask was heated by using a heating mantle (set temperature: 250°C), and air was introduced into the flask with a flow rate of 5 L/min. Since the temperature measured by the thermocouple became 100°C in about 6 minutes after heating was started, volatile components discharged from the gas discharge pipe was introduced into the collection container. The collection container was immersed in an ice water bath at 0°C. The temperature of the thermocouple continued to increase thereafter, and reached 184°C in about 11 minutes after heating was started. At this time, collection was finished. The temperature profile is shown in the table below.

[Table 1]

Elapsed Time (min)	Heater Set Temperature (°C)	Thermocouple Temperature (°C)
0	28.1	31.7
1	80.6	34.6
2	133.9	48.5
3	169.6	62.7
4	197.0	73.6
5	221.9	86.9
6	237.7	105.5
7	245.3	130.6
8	250.4	155.7
9	253.2	174.8
10	254.1	182.1
11	253.9	184.3
12	253.4	187.3
13	252.6	194.2
14	252.4	201.3

(continued)

Elapsed Time (min)	Heater Set Temperature (°C)	Thermocouple Temperature (°C)
15	251.9	211.8

[0039] By using a solvent obtained by mixing glycerine/propylene glycol by 7/3 (weight ratio), the collected liquid obtained as described above was diluted by a factor of 2. The cartridge of the non-combustion-indirect-heating-type smoking article illustrated in Fig. 2 was filled with a tobacco extract composition obtained in this way. The product was subjected to a smoking test by five well-trained panelists. As a result, it became clear that the product had flavor smoke taste that had not been achieved by existing flavoring agents. Specific evaluation comments were as follows.

[0040] Tobacco-like astringency, fragrance, and sweetness that had not been reproduced by existing flavoring agents or the like were reproduced.

[0041] Flavor smoke taste that raised tobacco feel that had not existed before was obtained.

[0042] The quality of smoke was good, inhalation was satisfactory with little feeling of inhibition, and the smoke quality was close to that of a non-combustion-direct-heating-type smoking article.

[Examples 2 to 5]

[0043] Except that the following shreds were used instead the aforementioned mixed shreds, tobacco extract compositions were produced by using the same method as Example 1 and evaluated. As a result, evaluations similar to those of Example 1 were obtained.

Example 2: Brazilian burley leaf shreds (unmixed)
Example 3: Brazilian flue-cured leaf shreds (unmixed)
Example 4: oriental leaf shreds (unmixed)
Example 5: leaf shreds obtained by using the following method (unmixed)

[0044] In cultivation of burley tobacco, a fertilizer including a nitrogen amount of 6 to 15 kg/10 a was applied during a period from one week before pinching to one week after pinching. Pinching deeper by one to two leaves than a normal position was carried out, and unnecessary leaves were harvested and removed early. The leaves were harvested after making the period from pinching to harvesting longer than usual by one to two weeks. The leaves were air-cured to obtain leaves.

REFERENCE SIGNS LIST

[0045]

1c capsule (flavor generating segment)
2 atomizer
4 aerosol source
40 aerosol generating segment
5 mouthpiece
6 housing
8 power source
10 non-combustion flavor inhalation article
30 heating device
31 body
32 heater
33 metal pipe
34 battery unit
35 control unit
36 recess
37 vent hole
100 tobacco raw material
110 container
102 air introduction pipe
104 gas discharge pipe

200 tobacco extract composition
120 collection container
122 ice water bath
130 pipe

Claims

1. A production method for producing a tobacco extract composition, comprising:

   a heating step of heating a tobacco raw material so that a temperature of the raw material becomes 100 to 270°C; and
   a recovery step of recovering volatile components generated in the heating step.

2. The production method according to claim 1, wherein the temperature is 200 to 250°C.

3. The production method according to claim 1 or 2, wherein a particle size of the tobacco raw material measured in accordance with ASTM E11-95 is 0.5 to 2 mm.

4. The production method according to any one of claims 1 to 3, wherein the tobacco raw material is selected from burley tobacco, flue-cured tobacco, or a combination of burley tobacco and flue-cured tobacco.

5. The production method according to any one of claims 1 to 4,
   wherein

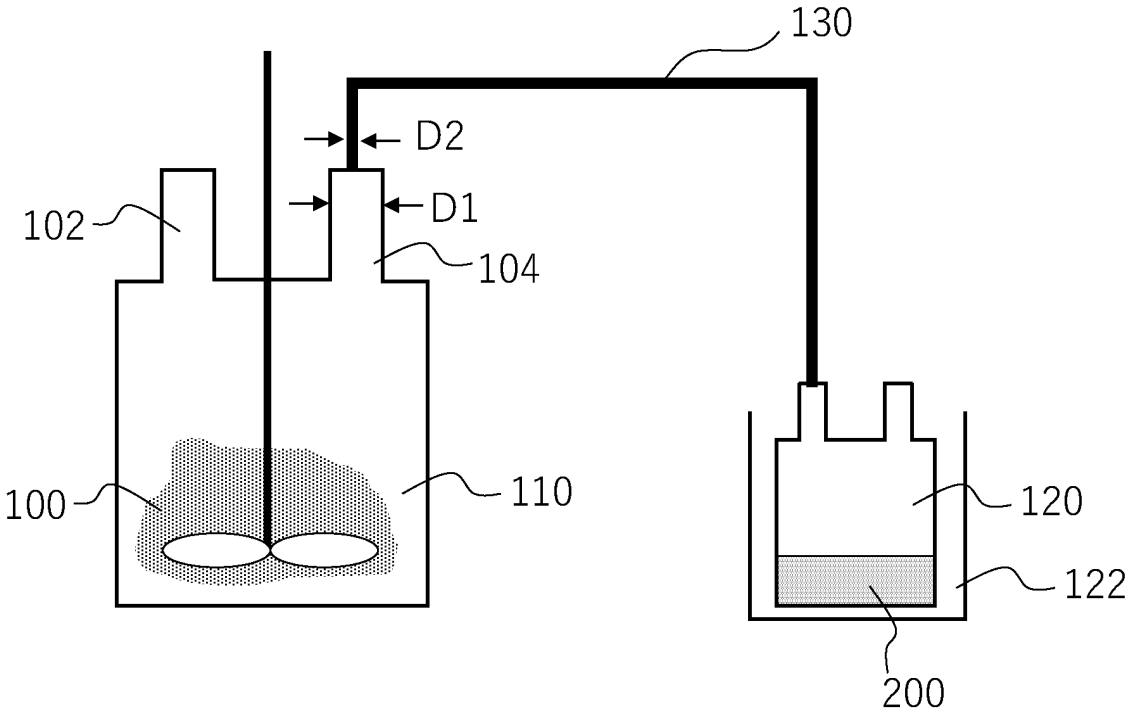
$$D2/D1 \leq 0.17,$$

   where D1 is a diameter of a pipe from which the volatile components are discharged in the heating step, and D2 is a diameter of a pipe into which the volatile components are introduced in the recovery step.

6. A tobacco extract composition produced by using the production method according to any one of claims 1 to 5.

7. The tobacco extract composition according to claim 6, wherein, when a concentration of a polyol component is 15 to 35% by weight, a turbidity (OD660) of the tobacco extract composition measured by using a spectrophotometer is 0.90 to 1.80.

Fig. 1


130
D2
D1
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104
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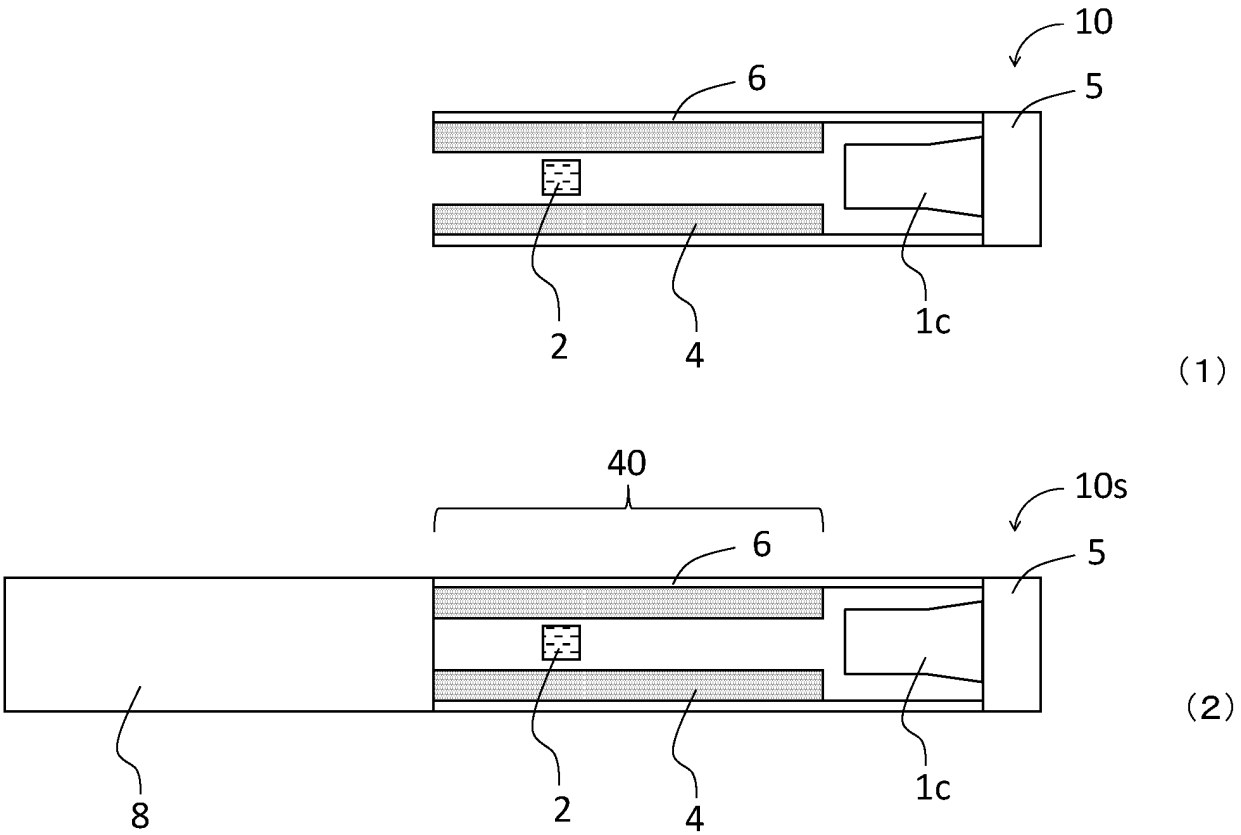
110
120
122
200

Fig. 2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INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2022/016722

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)

A24B1/00-15/42; 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 1971-2022
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.
X	WO 2022/030426 A1 (JAPAN TOBACCO INC.) 10 February 2022 (2022-02-10) paragraphs [0005], [0018]-[0019], [0026], [0038]-[0041], fig. 1	1-4, 6-7
A		5
X	JP 2019-507592 A (PHILIP MORRIS PRODUCTS S.A.) 22 March 2019 (2019-03-22) claims 1-4, paragraphs [0035]-[0036], [0038], [0041]-[0042], [0050], fig. 1-2	1-2, 4, 6-7
A		5
A	CN 112956731 A (CHINA TOBACCO HENAN INDUSTRIAL CO., LTD.) 15 June 2021 (2021-06-15) entire text, all drawings	1-7
A	CN 106318640 A (HUBEI CHINA TOBACCO INDUSTRY CO., LTD.) 11 January 2017 (2017-01-11) entire text, all drawings	1-7

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

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
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"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
06 May 2022	**24 May 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/JP2022/016722

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
WO 2022/030426 A1	10 February 2022	(Family: none)	
JP 2019-507592 A	22 March 2019	US 2017/0245543 A1 claims 1-4, paragraphs [0034]-[0035], [0037], [0040]-[0041], [0049], fig. 1-2 WO 2017/144705 A1 EP 3725169 A1 CA 3010875 A CN 108601390 A1 KR 10-2018-0115688 A	
CN 112956731 A	15 June 2021	(Family: none)	
CN 106318640 A	11 January 2017	(Family: none)	

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

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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- WO 2021070932 A **[0017]**
- WO 2016075749 A **[0034]**

Non-patent literature cited in the description

- Encyclopedia of Tobacco. *Tobacco Academic Studies Center*, 2009, vol. 3, 31 **[0017]**