



(11) **EP 4 205 565 A1**

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
05.07.2023 Bulletin 2023/27

(21) Application number: **21861017.8**

(22) Date of filing: **13.07.2021**

(51) International Patent Classification (IPC):
A24B 15/167 ^(2020.01) **A24B 15/38** ^(2006.01)
A24D 1/20 ^(2020.01) **A24D 3/17** ^(2020.01)
A24F 47/00 ^(2020.01) **A24F 40/20** ^(2020.01)
C11B 9/00 ^(2006.01)

(52) Cooperative Patent Classification (CPC):
A24B 15/167; A24B 15/38; A24D 1/20; A24D 3/17;
A24F 40/20; A24F 47/00; C11B 9/00

(86) International application number:
PCT/JP2021/026330

(87) International publication number:
WO 2022/044587 (03.03.2022 Gazette 2022/09)

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(30) Priority: **26.08.2020 JP 2020142545**

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(54) **TOBACCO FILLING MATERIAL AND TOBACCO PRODUCT**

(57) This improved tobacco product comprises at least one smell component selected from among: a first smell component group in which the smell quality is classified as Nutty-Roast; a second smell component group in which the smell quality is classified as Burnt; and a third smell component group in which the smell quality is classified as Sour.

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Description

FIELD

5 **[0001]** The present invention relates to a tobacco filler and a tobacco product.

BACKGROUND

10 **[0002]** There is known a heating-type flavor inhaler which provides a user with a tobacco flavor by heating a tobacco filler such as cut tobacco without burning the tobacco filler (e.g., Patent Literature 1). A unique odor generated when a tobacco filler is heated in such a heating-type flavor inhaler has been a problem. This unique odor is herein referred to as "a heated tobacco odor". The heated tobacco odor is a damp odor of leaf tobacco, and a similar odor is generated in the step of processing leaf tobacco in a factory.

15 **[0003]** At the time when the present application was filed, the heated tobacco odor was and had been perceived as unpleasant by both users and non-users of a heating-type flavor inhaler. Non-Patent Literature 1 describes the heated tobacco odor as a "straw taste", "a tea taste", and "a popcorn taste". Philip Morris, a manufacturer of heating-type flavor inhalers, also acknowledged the problem of the heated tobacco odor at the presentation of a new product in October 2018 in Japan.

20 CITATION LIST

PATENT LITERATURE

25 **[0004]** Patent Literature 1: International Publication No. 2017/198838

NON-PATENT LITERATURE

[0005] Non-Patent Literature 1: Queloz and Etter BMC Public Health (2019) 19: 642

30 SUMMARY

TECHNICAL PROBLEM

35 **[0006]** An object of the present invention is to provide a technique relating to a tobacco product, particularly a heating-type flavor inhaler, providing an excellent flavor.

SOLUTION TO PROBLEM

40 **[0007]** According to one aspect, there is provided an improved tobacco product which includes at least one kind of smell component selected from a first smell component group having a smell quality classified as nutty-roast, a second smell component group having a smell quality classified as burnt, and a third smell component group having a smell quality classified as sour.

45 **[0008]** According to another aspect, there is provided an improved tobacco filler which includes at least one kind of smell component selected from a first smell component group having a smell quality classified as nutty-roast, a second smell component group having a smell quality classified as burnt, and a third smell component group having a smell quality classified as sour.

[0009] According to still another aspect, there is provided a tobacco stick which includes the improved tobacco filler described above and cigarette paper wrapped around at least the tobacco filler.

50 **[0010]** According to still another aspect, there is provided a tobacco refill which includes the improved tobacco filler described above and a heat-resistant container containing the tobacco filler.

[0011] According to still another aspect, there is provided a tobacco product which includes the above-described improved tobacco filler.

[0012] According to still another aspect, there is provided a heating-type flavor inhaler which includes the tobacco stick described above and a heating device for heating the tobacco stick.

55 **[0013]** According to still another aspect, there is provided a heating-type flavor inhaler which includes the tobacco refill described above and a heating device for heating the tobacco refill.

[0014] According to still another aspect, there is provided a method of manufacturing an improved tobacco filler, the method including adding to a tobacco filler a smell composition containing at least one kind of smell component selected

from a first smell component group having a smell quality classified as nutty-roast, a second smell component group having a smell quality classified as burnt, and a third smell component group having a smell quality classified as sour.

5 [0015] According to still another aspect, there is provided a method of manufacturing an improved tobacco product, the method including incorporating into a tobacco product a smell composition containing at least one kind of smell component selected from a first smell component group having a smell quality classified as nutty-roast, a second smell component group having a smell quality classified as burnt, and a third smell component group having a smell quality classified as sour.

10 ADVANTAGEOUS EFFECTS OF INVENTION

[0016] According to the present invention, it is possible to provide a technique relating to a tobacco product, particularly a heating-type flavor inhaler, providing an excellent flavor.

15 BRIEF DESCRIPTION OF THE DRAWINGS

[0017]

FIG. 1 is a schematic cross-sectional view showing an example of a heating-type flavor inhaler before heating.

FIG. 2 is a schematic cross-sectional view showing an example of the heating-type flavor inhaler during heating.

20 FIG. 3 is a schematic cross-sectional view showing an example of a tobacco stick.

FIG. 4 is a partially cutaway view showing another example of the heating-type flavor inhaler.

DETAILED DESCRIPTION

25 [0018] Hereinafter, the present invention will be described in detail; however, the description below is intended to provide a detailed description of the present invention, and is not intended to limit the present invention.

[0019] According to one aspect, there is provided an improved tobacco product which includes at least one kind of smell component selected from a first smell component group having a smell quality classified as nutty-roast, a second smell component group having a smell quality classified as burnt, and a third smell component group having a smell quality classified as sour.

30 [0020] According to another aspect, there is provided an improved tobacco filler which includes at least one kind of smell component selected from a first smell component group having a smell quality classified as nutty-roast, a second smell component group having a smell quality classified as burnt, and a third smell component group having a smell quality classified as sour.

35 [0021] If the "at least one kind of smell component" described above is included in a tobacco product or a tobacco filler, the advantageous effects of the invention are achieved; however, the "at least one kind of smell component" is preferably added to a tobacco product or a tobacco filler in the form of a liquid composition containing the at least one kind of smell component and a solvent (hereinafter, the liquid composition will be referred to as "a smell composition").

[0022] Thus, according to a preferred embodiment, there is provided an improved tobacco product which includes:

40 a tobacco product; and

a smell composition containing at least one kind of smell component selected from a first smell component group having a smell quality classified as nutty-roast, a second smell component group having a smell quality classified as burnt, and a third smell component group having a smell quality classified as sour.

45 [0023] According to another preferred embodiment, there is provided an improved tobacco filler which includes:

a tobacco filler; and

50 a smell composition containing at least one kind of smell component selected from a first smell component group having a smell quality classified as nutty-roast, a second smell component group having a smell quality classified as burnt, and a third smell component group having a smell quality classified as sour.

<1. Smell Composition>

55 [0024] A smell composition used in the present invention contains, as an active ingredient, at least one kind of smell component selected from a first smell component group having a smell quality classified as nutty-roast, a second smell component group having a smell quality classified as burnt, and a third smell component group having a smell quality classified as sour. The smell composition can reduce a heated tobacco odor generated during use of a tobacco product,

particularly during use of a heating-type flavor inhaler. Thus, the smell composition can be referred to as "a smell composition for reducing a heated tobacco odor".

(Heated Tobacco Odor)

[0025] First, the "heated tobacco odor" will be described. The "heated tobacco odor" is a unique odor generated when a tobacco filler such as cut tobacco is heated in a heating-type flavor inhaler, as described in the BACKGROUND. Herein, the heating-type flavor inhaler refers to a flavor inhaler which provides a user with a tobacco flavor by heating a tobacco filler such as cut tobacco without burning the tobacco filler. Also, the heated tobacco odor is described as "a straw taste", "a tea taste", and "a popcorn taste" in Non-patent Literature 1, as described in the BACKGROUND.

[0026] Therefore, the "heated tobacco odor" can be defined as "an odor generated when a tobacco filler such as cut tobacco is heated at a temperature in a range of 40 to 400 °C and having a smell quality of hay, a smell quality of tea, or a smell quality of popcorn".

[0027] Among components included in leaf tobacco and tobacco smoke, the following smell components, for example, are known as smell components having a smell quality classified as hay (Refer to: THE CHEMICAL COMPONENTS OF TOBACCO AND TOBACCO SMOKE, by Alan Rodgman and Thomas A. Perfetti, CRC Press; TOBACCO FLAVORING FOR SMOKING PRODUCTS, by John C. Leffingwell, Harvey J. Young, and Edward Bernasek, R. J. REYNOLDS TOBACCO COMPANY; and The Good Scents Company Information System (<http://www.thegoodscentscompany.com/odor/hay.html>)).

[Table A]

Hay	CAS No.
3-Phenylpropionic acid	501-52-0
Tetrahydrofurfuryl alcohol	97-99-4
p-Methoxybenzaldehyde	123-11-5
2,4-Dimethoxybenzaldehyde	613-45-6
α -Methylcinnamaldehyde	101-39-3
Dimethylmaleic anhydride	766-39-2
Acetanisole	100-06-1
1-(p-Methoxyphenyl)-2-propanone	122-84-9
p-Methylacetophenone	122-00-9
1,2-Benzodihydropyrone	119-84-6
γ -Heptalactone	105-21-5
6-Methylbenzopyrone	92-48-8
Propyl benzoate	2315-68-6
5-hydroxymethyl furfural	67-47-0
cherry propanol	1197-01-9
para-dimethyl hydroquinone	150-78-7
alpha-angelica lactone	591-12-8
alpha-farnesene	502-61-4
tolualdehydes (mixed o,m,p)	1334-78-7
phenethyl phenyl acetate	102-20-5
hawthorn carbinol	536-50-5

[0028] Among components included in leaf tobacco and tobacco smoke, the following smell components, for example, are known as smell components having a smell quality classified as tea (Refer to: THE CHEMICAL COMPONENTS OF TOBACCO AND TOBACCO SMOKE, by Alan Rodgman and Thomas A. Perfetti, CRC Press; TOBACCO FLAVORING

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FOR SMOKING PRODUCTS, by John C. Leffingwell, Harvey J. Young, and Edward Bernasek, R. J. REYNOLDS TOBACCO COMPANY; and The Good Scents Company Information System (<http://www.thegoodscentscompany.com/odor/tea.html>).

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[Table B]

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Tea	CAS No
beta-Damascone	35044-68-9
beta-Damasconone	23696-85-7
2,4-dimethyl thiazole	541-58-2
menthyl acetate racemic	16409-45-3
6-acetoxydihydrotheaspirane	57893-27-3
benzyl formate	104-57-4
4-methyl-2-pentenoic acid	10321-71-8
ketoisophorone	1125-21-9
tetrahydrolinalool	78-69-3
(E)-alpha-methyl ionone	127-42-4

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[0029] Among components included in leaf tobacco and tobacco smoke, the following smell components, for example, are known as smell components having a smell quality classified as popcorn (Refer to: THE CHEMICAL COMPONENTS OF TOBACCO AND TOBACCO SMOKE, by Alan Rodgman and Thomas A. Perfetti, CRC Press; TOBACCO FLAVORING FOR SMOKING PRODUCTS, by John C. Leffingwell, Harvey J. Young, and Edward Bernasek, R. J. REYNOLDS TOBACCO COMPANY; and The Good Scents Company Information System (<http://www.thegoodscentscompany.com/odor/popcom.html>)).

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[Table C]

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Popcorn	CAS No
2-acetylpyrroline	85213-22-5
2-acetyl-6-methylpyrazine	22047-26-3
2-acetylpyrazine	22047-25-2
2-acetyl-5-methyl pyrazine	22047-27-4
2-acetyl pyridine	1122-62-9
2-acetyl-1 -pyrroline	85213-22-5
2-acetyl thiazole	24295-03-2
ethyl dimethyl pyrazine	15707-34-3
popcorn pyrimidine	36267-71-7
2-acetyl-6-methyl pyrazine	22047-26-3
3-acetyl pyridine	350-03-8

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[0030] The heated tobacco odor is notably generated when a tobacco filler is heated during use of a heating-type flavor inhaler; however, the heated tobacco odor is also generated from a tobacco filler when any tobacco product containing the tobacco filler is exposed to high-temperature and high-humidity conditions during manufacture or storage. Thus, the smell composition can exert the effect of reducing the heated tobacco odor when it is incorporated into any tobacco product containing a tobacco filler, and can particularly remarkably exert the effect of reducing the heated tobacco odor when it is incorporated into a heating-type flavor inhaler.

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(Smell Composition)

[0031] The smell composition is preferably a liquid composition containing the active ingredient described above and a solvent. The solvent may be an organic solvent approved for use in food applications, such as ethanol, or may be an aerosol source used in heating-type flavor inhalers, such as glycerin, propylene glycol, or mixtures thereof.

[0032] The active ingredient contained in the smell composition (hereinafter, also simply referred to as "an active ingredient") will be described below.

[0033] The active ingredient is at least one kind of smell component selected from:

- a first smell component group having a smell quality classified as nutty-roast;
- a second smell component group having a smell quality classified as burnt; and
- a third smell component group having a smell quality classified as sour.

[0034] For example, the following smell components are known as the first smell component group having a smell quality classified as nutty-roast (Refer to: TOBACCO FLAVORING FOR SMOKING PRODUCTS, by John C. Leffingwell, Harvey J. Young, and Edward Bernasek, R. J. REYNOLDS TOBACCO COMPANY; and The Good Scents Company Information System (<http://www.thegoodscentscompany.com/flavor/nutty.html>) and (<http://www.thegoodscentscompany.com/odor/nutty.html>)).

[Table D]

Nutty-Roast	CAS No.
2,3,5-trimethylpyrazine	14667-55-1
2-ethyl-3,5-dimethylpyrazine	13925-07-0
2,5-dimethyl pyrazine	123-32-0
2,6-dimethyl pyrazine	108-50-9
2-ethyl pyrazine	13925-00-3
2,3-dimethyl pyrazine	5910-89-4
2-acetyl thiazole	24295-03-2
3 -Methyl-2-cyclopenten-1 -one	2758-18-1
2-Ethyl-5(6)-methyl pyrazine	36731-41-6
2-Ethyl-3,6-dimethyl pyrazine	13360-65-1
2,3-Diethyl-5-methyl pyrazine	18138-04-0
2-Ethyl-6-methyl pyrazine	13925-03-6
isopropenyl pyrazine	38713-41-6
2-, 5- or 6-Methoxy-3-methylpyrazine	2847-30-5
2-Methyl-3 -ethylpyrazine	25680-58-4
2-acetyl-3,5-dimethyl pyrazine	54300-08-2
2,4-dimethyl-5-ethyl thiazole	38205-61-7
1-ethyl-2-acetyl pyrrole	39741-41-8
2-ethyl-2,5-dihydro-4-methyl thiazole	41803-21-8
2-methyl-5-ethoxypyrazine	67845-34-5
2-methyl-6-ethoxypyrazine	53163-97-6
2-methyl-3-,5 or 6-(furfuryl thio) pyrazine	65530-53-2
2-acetyl-2-pyrroline	1314926-27-6
2-tert-butyl pyrazine	32741-11-0

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[0035] Preferred examples of the first smell component group having a smell quality classified as nutty-roast include 2-acetyl thiazole, 3-methyl-2-cyclopenten-1-one, 2,5-dimethyl pyrazine, 2,6-dimethyl pyrazine, 2,3-dimethyl pyrazine, 2,3,5-trimethyl pyrazine, 2-ethyl-5(6)-methyl pyrazine, 2-ethyl-3,6-dimethyl pyrazine, 2-ethyl-3,5-dimethyl pyrazine, 2,3-diethyl-5-methyl pyrazine, 2-ethyl pyrazine, and 2-ethyl-6-methyl pyrazine.

[0036] The above smell components can be contained, for example, at the concentrations listed below, in a constituent member (e.g., a tobacco filler, cigarette paper, or a filter) to which the smell components are added. If the smell components are added to a constituent member of a tobacco product in the form of a smell composition, the concentrations of the smell components in the constituent member can be calculated by the following formula:

$$\text{Concentration of smell component [ppm by mass]} = \left\{ \frac{\text{mass of smell component}}{\text{mass of smell composition} + \text{mass of constituent member}} \right\} \times 10^6$$

[0037] Throughout the entire specification, ppm refers to "ppm by mass".

2-acetyl thiazole	0.0029 to 9180 ppm
3-methyl-2-cyclopenten-1-one	0.00126 to 9180 ppm
2,5-dimethyl pyrazine	0.136 to 9180 ppm
2,6-dimethyl pyrazine	0.340 to 9180 ppm
2,3-dimethyl pyrazine	0.117 to 9180 ppm
2,3,5-trimethyl pyrazine	0.136 to 9180 ppm
2-ethyl-5(6)-methyl pyrazine	0.232 to 9180 ppm
2-ethyl-3,6-dimethyl pyrazine	0.102 to 9180 ppm
2-ethyl-3,5-dimethyl pyrazine	0.188 to 9180 ppm
2,3-diethyl-5-methyl pyrazine	0.0008 to 9180 ppm
2-ethyl pyrazine	0.00578 to 9180 ppm
2-ethyl-6-methyl pyrazine	0.00569 to 9180 ppm

[0038] For example, the following smell components are known as the second smell component group having a smell quality classified as burnt (Refer to: TOBACCO FLAVORING FOR SMOKING PRODUCTS, by John C. Leffingwell, Harvey J. Young, and Edward Bernasek, R. J. REYNOLDS TOBACCO COMPANY; and The Good Scents Company Information System (<http://www.thegoodscentscompany.com/flavor/bumt.html>) and (<http://www.thegoodscentscompany.com/odor/bumt.html>)).

[Table E]

Burnt	CAS No.
Pyridine	110-86-1
2-Methyl pyridine	109-06-8
3-Methyl pyridine	108-99-6
4-Methyl pyridine	108-89-4
2,4-Dimethyl pyridine	108-47-4
2-Ethyl-4-Methyl thiazole	15679-12-6
2,4,5-trimethyl thiazole	13623-11-5
2,3-Dimethyl pyridine	583-61-9
2,5-Dimethyl pyridine	589-93-5
2,6-Dimethyl pyridine	108-48-5
2-Isobutyl pyridine	6304-24-1
2-Isobutyl-4-methyl pyridine	85665-88-9
3-Butyl pyridine	539-32-2

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(continued)

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Burnt	CAS No.
5-Ethyl-2-methyl pyridine	104-90-5
3-Vinyl pyridine	1121-55-7
3-Methyl-2-cyclohexenone	1193-18-6
3-Ethyl pyridine	536-78-7
5-Methyl-2-furan carboxaldehyde	620-02-0
Methylethylmaleic anhydride	Unknown
Geranyl butyrate	106-29-6
1,2,3-Trimethoxybenzene	634-36-6
Carvacrol	499-75-2
Phenol	108-95-2
Thymol	89-83-8
2-acetyl-5-methyl thiazole	59303-17-2
4-acetyl pyridine	1122-54-9
bacon dithiazine	74595-94-1
2,4-dimethyl thiophenol	13616-82-5
3,4-dimethyl thiophenol	18800-53-8
ethyl 2-furoate	614-99-3

[Table F]

Burnt	CAS No.
5-ethyl-2-methyl thiazole	19961-52-5
4-ethyl-2-methyl thiophene	66577-04-6
1-ethyl pyrrole	617-92-5
furfuryl alcohol	98-00-0
1-furfuryl-2-pyrrole carbaldehyde	13788-32-4
1-(2-furfuryl thio) propanone	58066-86-7
1,6-hexane dithiol	1191-43-1
2-hydroxythiophenol	1121-24-0
2-(1-mercaptoethyl) furan	96631-04-8
2-mercaptopyridine	2637-34-5
2-methoxypyridine	1628-89-3
methyl phenyl disulfide	14173-25-2
3-methyl-2-propionyl-thiophene	59303-03-6
2-methyl-6-propyl pyrazine	29444-46-0
2-methyl quinoxaline	7251-61-8
6-methyl quinoxaline	6344-72-5
isopropenyl pyrazine	38713-41-6

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(continued)

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Burnt	CAS No.
4-isopropyl phenol	99-89-8
propyl 2-thenoate	59303-19-4
rum ether	8030-89-5
shoyu furanone	27538-09-6
tea pyrrole	2167-14-8
5-thenyl-thiophene-2-aldehyde	35250-77-2
gamma-thiobutyrolactone	1003-10-7
meta-thiocresol	108-40-7
para-thiocresol	106-45-6
2,4,5-trimethyl oxazole	20662-84-4
2,3,5-trimethyl phenol	697-82-5
2-vinyl benzofuran	7522-79-4
2,4-xyleneol	105-67-9

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[Table G]

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Burnt	CAS No.
2-acetyl-4-methyl thiazole	7533-07-5
butyl 2-thenoate	56053-84-0
2,3-dimethyl benzofuran	3782-00-1
3-ethyl phenol	620-17-7
2-furyl acetone	6975-60-6
hexyl mercaptan	111-31-9
2-hydroxisophorone	4883-60-7
2-hydroxymethyl-6-methyl-pyridine	1122-71-0
2-methyl benzofuran	4265-25-2
4-methyl-2-propionyl thiazole	13679-83-9
methyl 2-thenoate	5380-42-7
2-(1-propenyl) pyridine	17618-94-9
propyl 2-furoate	615-10-1
2-propyl pyrazine	18138-03-9
pyroligneous acids	8030-97-5
2-vinyl pyrazine	4177-16-6
2,6-xyleneol	576-26-1
acetone alcohol	116-09-6
2,5-diethyl-3-methyl pyrazine	32736-91-7
furfuryl mercaptan	98-02-2
lepidine	491-35-0

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(continued)

Burnt	CAS No.
3-mercapto-2-methyl pentanol	227456-27-1
methyl furfuryl thiol	59303-05-8
phenyl mercaptan	108-98-5
caramel pentadione	13494-06-9
ortho-methyl acetophenone	577-16-2
methyl benzoxole	95-21-6
roasted butanol (3-(3-sulfanylbutan-2-ylsulfanyl)butan-2-ol)	54957-02-7
2-isopropyl phenol	88-69-7
furfural	98-01-1
mango furanone	14400-67-0

[0039] Preferred examples of the second smell component group having a smell quality classified as burnt include 2-methyl pyridine, 3-methyl pyridine, 4-methyl pyridine, 2,4-dimethyl pyridine, 2-ethyl-4-methyl thiazole, 2,4,5-trimethyl thiazole, 2,3-dimethyl pyridine, 2,5-dimethyl pyridine, 2,6-dimethyl pyridine, 2-isobutyl pyridine, 2-isobutyl-4-methyl pyridine, 3-butyl pyridine, 5-ethyl-2-methyl pyridine, 3-vinyl pyridine, 3-methyl-2-cyclohexenone, 3-ethyl pyridine, 5-methyl-2-furan carboxaldehyde, and pyridine.

[0040] The above smell components can be contained, for example, at the concentrations listed below, in a constituent member (e.g., a tobacco filler, cigarette paper, or a filter) to which the smell components are added. If the smell components are added to a constituent member of a tobacco product in the form of a smell composition, the concentrations of the smell components in the constituent member can be calculated by the following formula:

$$\text{Concentration of smell component [ppm by mass]} = \left\{ \frac{\text{mass of smell component}}{\text{mass of smell composition} + \text{mass of constituent member}} \right\} \times 10^6$$

2-methyl pyridine	0.00015 to 9180 ppm
3-methyl pyridine	0.0008 to 9180 ppm
4-methyl pyridine	0.00014 to 9180 ppm
2,4-dimethyl pyridine	0.00001 to 9180 ppm
2-ethyl-4-methyl thiazole	0.00055 to 9180 ppm
2,4,5-trimethyl thiazole	0.00176 to 9180 ppm
2,3-dimethyl pyridine	0.0041 to 9180 ppm
2,5-dimethyl pyridine	0.0049 to 9180 ppm
2,6-dimethyl pyridine	0.0031 to 9180 ppm
2-isobutyl pyridine	0.0195 to 9180 ppm
2-isobutyl-4-methyl pyridine	0.0453 to 9180 ppm
3-butyl pyridine	0.0824 to 9180 ppm
5-ethyl-2-methyl pyridine	0.0400 to 9180 ppm
3-vinyl pyridine	0.962 to 9180 ppm
3-methyl-2-cyclohexenone	0.0674 to 9180 ppm
3-ethyl pyridine	0.00023 to 9180 ppm
5-methyl-2-furan carboxaldehyde	0.0009 to 9180 ppm
pyridine	0.5 to 9180 ppm

[0041] For example, the following smell components are known as the third smell component group having a smell quality classified as sour (Refer to: TOBACCO FLAVORING FOR SMOKING PRODUCTS, by John C. Leffingwell, Harvey J. Young, and Edward Bernasek, R. J. REYNOLDS TOBACCO COMPANY; and The Good Scents Company

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Information System (<http://www.thegoodscentscompany.com/fluor/sour.html>) and (<http://www.thegoodscentscompany.com/odor/sour.html>).

[Table H]

Sour	CAS No.
Acetic acid	64-19-7
Isovaleric acid	503-74-2
Heptanoic acid	111-14-8
Phenyl propionic acid	501-52-0
2-Methyl butanal	96-17-3
2-Methyl butanoic acid	116-53-0
3-Methyl pentanoic acid	105-43-1
Adipic acid	124-04-9
Butter acids	85536-25-0
Cyclopentanecarboxylic acid	3400-45-1
2-Methylvaleric acid	97-61-0
4-Aminobutyric acid	56-12-2
L-Threonine	72-19-5
Butyl alcohol	71-36-3
1-Carvyl acetate	7053-79-4
Geranyl phenylacetate	102-22-7
Isobomyl acetate	125-12-2
laevo-arginine	74-79-3
2,4-dimethyl-2-pentenoic acid	66634-97-7
3-hydroxy-5-methyl-2-hexanone	163038-04-8
lactic acid	50-21-5
laevo-lactic acid	79-33-4
2-methyl-2-pentenoic acid	3142-72-1
(E)-2-pentenoic acid	13991-37-2
succinic acid	110-15-6
butyric acid	107-92-6
isobutyric acid	79-31-2
ethyl 2-thenoate	2810-04-0
pyruvic acid	127-17-3
2-ethyl thiopyridine	6313-76-4

[0042] Preferred examples of the third smell component group having a smell quality classified as sour include heptanoic acid, phenyl propionic acid, acetic acid, 3-methyl butanal, 2-methyl butanal, 2-methyl butanoic acid, 3-methyl butanoic acid, and 3-methyl pentanoic acid.

[0043] The above smell components can be contained, for example, at the concentrations listed below, in a constituent member (e.g., a tobacco filler, a cigarette paper, or a filter) to which the smell components are added. If the smell components are added to a constituent member of a tobacco product in the form of a smell composition, the concentrations of the smell components in the constituent member can be calculated by the following formula:

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Concentration of smell component [ppm by mass] = {mass of smell component / (mass of smell composition + mass of constituent member)} × 10⁶

5	heptanoic acid	0.217 to 9180 ppm
	phenyl propionic acid	0.0373 to 9180 ppm
	acetic acid	79.17 to 9180 ppm
10	3-methyl butanal	4.755 to 9180 ppm
	2-methyl butanal	4.086 to 9180 ppm
	2-methyl butanoic acid	1.649 to 9180 ppm
	3-methyl butanoic acid	1.845 to 9180 ppm
15	3-methyl pentanoic acid	1.601 to 9180 ppm

[0044] In a preferred embodiment, the active ingredient can be multiple kinds of smell components selected from:

the first smell component group having a smell quality classified as nutty-roast;
the second smell component group having a smell quality classified as burnt; and
20 the third smell component group having a smell quality classified as sour.

[0045] The multiple kinds of smell components may be selected from the same smell component group or may be selected from different smell component groups. If multiple kinds of smell components are used as active ingredients, the effect of reducing the heated tobacco odor can be further improved as compared with the case where one kind of smell component is used.

[0046] In a preferred embodiment, the active ingredient can be:

a combination of at least one kind of smell component selected from the first smell component group having a smell quality classified as nutty-roast and at least one kind of smell component selected from the second smell component group having a smell quality classified as burnt;

a combination of at least one kind of smell component selected from the first smell component group having a smell quality classified as nutty-roast and at least one kind of smell component selected from the third smell component group having a smell quality classified as sour;

a combination of at least one kind of smell component selected from the second smell component group having a smell quality classified as burnt and at least one kind of smell component selected from the third smell component group having a smell quality classified as sour; and

a combination of at least one kind of smell component selected from the first smell component group having a smell quality classified as nutty-roast, at least one kind of smell component selected from the second smell component group having a smell quality classified as burnt, and at least one kind of smell component selected from the third smell component group having a smell quality classified as sour.

[0047] If multiple kinds of smell components are selected from different smell component groups (i.e., a combination of smell components derived from different smell component groups), as described above, the effect of reducing the heated tobacco odor can be further improved as compared with the case where one kind of smell component is used.

[0048] In a more preferred embodiment, the active ingredient can be a combination of at least one kind of smell component selected from the first smell component group having a smell quality classified as nutty-roast and at least one kind of smell component selected from the third smell component group having a smell quality classified as sour.

[0049] In a particular embodiment, the active ingredient can be:

(A) a mixed component A consisting of 2-acetyl thiazole, 3-methyl-2-cyclopenten-1-one, 2,5-dimethyl pyrazine, 2,6-dimethyl pyrazine, 2,3-dimethyl pyrazine, 2,3,5-trimethyl pyrazine, 2-ethyl-5(6)-methyl pyrazine, 2-ethyl-3,6-dimethyl pyrazine, 2-ethyl-3,5-dimethyl pyrazine, 2,3-diethyl-5-methyl pyrazine, 2-ethyl pyrazine, and 2-ethyl-6-methyl pyrazine;

(B) a mixed component B consisting of 2-methyl pyridine, 3-methyl pyridine, 4-methyl pyridine, 2,4-dimethyl pyridine, 2-ethyl-4-methyl thiazole, 2,4,5-trimethyl thiazole, 2,3-dimethyl pyridine, 2,5-dimethyl pyridine, 2,6-dimethyl pyridine, 2-isobutyl pyridine, 2-isobutyl-4-methyl pyridine, 3-butyl pyridine, 5-ethyl-2-methyl pyridine, 3-vinyl pyridine, 3-methyl-2-cyclohexenone, 3-ethyl pyridine, and 5-methyl-2-furan carboxaldehyde;

(C) a mixed component C consisting of heptanoic acid, phenyl propionic acid, acetic acid, 3-methyl butanal, 2-methyl butanal, 2-methyl butanoic acid, 3-methyl butanoic acid, and 3-methyl pentanoic acid; or any combination of the mixed component A, the mixed component B, and the mixed component C.

[0050] Herein, "any combination of the mixed component A, the mixed component B, and the mixed component C" refers to a combination of the mixed component A and the mixed component B, a combination of the mixed component A and the mixed component C, a combination of the mixed component B and the mixed component C, or a combination of the mixed component A, the mixed component B, and the mixed component C.

[0051] In a particular embodiment, the active ingredient can be:

a mixed component a consisting of 2,5-dimethyl pyrazine, 2,6-dimethyl pyrazine, 2,3-dimethyl pyrazine, 2,3,5-trimethyl pyrazine, 2-ethyl-3,5-dimethyl pyrazine, and 2-ethyl pyrazine;

a single component b consisting of pyridine;

a mixed component c consisting of acetic acid, 3-methyl butanal, 2-methyl butanal, 2-methyl butanoic acid, 3-methyl butanoic acid, and 3-methyl pentanoic acid; or

any combination of the mixed component a, the single component b, and the mixed component c.

[0052] Herein, "any combination of the mixed component a, the single component b, and the mixed component c" refers to a combination of the mixed component a and the single component b, a combination of the mixed component a and the mixed component c, a combination of the single component b and the mixed component c, or a combination of the mixed component a, the single component b, and the mixed component c.

[0053] It is considered that the above active ingredients can reduce the heated tobacco odor with a masking effect.

<2. Tobacco Product Including Smell Composition>

[0054] The smell composition described above can be incorporated into any constituent member of a tobacco product, provided that it can reduce the heated tobacco odor. The smell composition can be incorporated into, for example, a tobacco filler, cigarette paper, a filter, or the like. Thus, according to one aspect, there is provided a tobacco product which includes the smell composition. Herein, the tobacco product which includes the smell composition is also referred to as "an improved tobacco product" to distinguish it from a tobacco product which does not include the smell composition.

[0055] The tobacco product may be any tobacco product that generates a heated tobacco odor derived from a tobacco filler. As described above, the heated tobacco odor is notably generated when a tobacco filler is heated during use of a heating-type flavor inhaler; however, the heated tobacco odor is also generated from a tobacco filler when any tobacco product containing the tobacco filler is exposed to high-temperature and high-humidity conditions during manufacture or storage. Thus, the tobacco product includes any products such as a flavor inhaler with which a user tastes a tobacco flavor through inhalation and smokeless tobacco with which a user tastes a tobacco flavor by introducing the product directly into the nasal cavity or oral cavity. Specific examples of the flavor inhaler include a combustion-type smoking article which provides a user with a tobacco flavor by burning a tobacco filler, and a heating-type flavor inhaler which provides a user with a tobacco flavor by heating a tobacco filler without burning the tobacco filler. Specific examples of the smokeless tobacco include snuff tobacco and chewing tobacco.

[0056] The tobacco product is preferably a heating-type flavor inhaler. Since the heated tobacco odor is notably generated when a tobacco filler is heated by a heating-type flavor inhaler, as described above, the effect of reducing the heated tobacco odor can be particularly remarkably exhibited when a heating-type flavor inhaler is used.

[0057] The smell composition described above can be incorporated into the tobacco product in an amount suitable for reducing the heated tobacco odor. For example, the smell composition can be incorporated into the tobacco product so that the active ingredients are included in a constituent member (e.g., a tobacco filler, cigarette paper, or a filter) of the tobacco product at the concentrations described above. The smell composition can be added to a single tobacco product in an amount of, for example, 5 to 20 mg.

<3. Tobacco Filler Including Smell Composition>

[0058] Preferably, the smell composition described above can be incorporated into a tobacco filler. Thus, according to one aspect, there is provided a tobacco filler which includes the smell composition. Herein, the tobacco filler which includes the smell composition is also referred to as "an improved tobacco filler" to distinguish it from a tobacco filler which does not include the smell composition. If the smell composition is incorporated into a tobacco filler, the heated tobacco odor derived from the tobacco filler can be effectively reduced.

[0059] A tobacco filler is a tobacco material which functions as a tobacco flavor source in a tobacco product. The tobacco filler is, for example, cut tobacco, sheet tobacco, tobacco granules, or a combination thereof. Cut tobacco refers

to cut pieces of leaf tobacco (dried tobacco leaves) that are ready to be incorporated into a tobacco product. Sheet tobacco refers to a tobacco molded body obtained by molding a tobacco material, such as cut tobacco or waste leaf tobacco (such as leaf scrap or cut tobacco scrap) generated in leaf processing facilities or manufacturing facilities, into a sheet shape, or cut pieces of the tobacco molded body. Tobacco granules refer to a tobacco molded body obtained

by molding a tobacco material, such as cut tobacco or waste leaf tobacco (such as leaf scrap or cut tobacco scrap) generated in leaf processing facilities or manufacturing facilities, into a granular shape.

[0060] The smell composition described above can be incorporated into a tobacco filler in an amount suitable for reducing the heated tobacco odor. For example, the smell composition can be incorporated into a tobacco filler so that the active ingredients are included in the tobacco filler at the concentrations described above. The smell composition can be added in an amount of, for example, 3 to 100 mg with respect to 100 mg of a tobacco filler.

[0061] The tobacco filler may further include an aerosol source. Examples of the aerosol source include glycerin, propylene glycol, triethyl citrate, triacetin, 1,3-butanediol, and mixtures thereof.

<4. Tobacco Product Including Tobacco Filler Including Smell Composition>

[0062] The tobacco filler which includes the smell composition described above can be incorporated into any tobacco product. Thus, according to one aspect, there is provided a tobacco product which includes the tobacco filler including the smell composition.

[0063] The tobacco product may be any tobacco product that generates a heated tobacco odor derived from a tobacco filler. As described above, the heated tobacco odor is notably generated when a tobacco filler is heated during use of a heating-type flavor inhaler; however, the heated tobacco odor is also generated from a tobacco filler when any tobacco product containing the tobacco filler is exposed to high-temperature and high-humidity conditions during manufacture or storage. Thus, the tobacco product includes a flavor inhaler with which a user tastes a tobacco flavor through inhalation and smokeless tobacco with which a user tastes a tobacco flavor by introducing the product directly into the nasal cavity or oral cavity. Specific examples of the flavor inhaler include a combustion-type smoking article which provides a user with a tobacco flavor by burning a tobacco filler, and a heating-type flavor inhaler which provides a user with a tobacco flavor by heating a tobacco filler without burning the tobacco filler. Specific examples of the smokeless tobacco include snuff tobacco and chewing tobacco.

[0064] The tobacco product is preferably a heating-type flavor inhaler. Since the heated tobacco odor is notably generated when a tobacco filler is heated by a heating-type flavor inhaler, as described above, the effect of reducing the heated tobacco odor can be particularly remarkably exhibited when a heating-type flavor inhaler is used.

[0065] More specifically, the tobacco filler which includes the smell composition can be incorporated into a heating-type flavor inhaler by directly filling an inhaler body of the heating-type flavor inhaler with the tobacco filler. Alternatively, the tobacco filler which includes the smell composition can be incorporated into a heating-type flavor inhaler in the form of a tobacco stick that includes the tobacco filler and cigarette paper wrapped around at least the tobacco filler. Alternatively, the tobacco filler which includes the smell composition can be incorporated into a heating-type flavor inhaler in the form of a tobacco refill that includes the tobacco filler and a heat-resistant container containing the tobacco filler.

[0066] Thus, according to one aspect, there is provided a tobacco stick which includes: the tobacco filler including the smell composition; and cigarette paper wrapped around at least the tobacco filler. The "cigarette paper wrapped around at least the tobacco filler" may envelop other portions, provided that it envelopes the tobacco filler, as the words indicate. The "cigarette paper wrapped around at least the tobacco filler" may be, for example, cigarette paper wrapped around the tobacco filler or cigarette paper wrapped around the tobacco filler and a portion adjacent thereto. According to another aspect, there is provided a heating-type flavor inhaler which includes the above-described tobacco stick and a heating device for heating the tobacco stick.

[0067] Alternatively, according to one aspect, there is provided a tobacco refill which includes: the tobacco filler including the smell composition; and a heat-resistant container containing the tobacco filler. According to another aspect, there is provided a heating-type flavor inhaler which includes the above-described tobacco refill and a heating device for heating the tobacco refill.

[0068] Hereinafter, an example of a heating-type flavor inhaler which includes the above tobacco stick and a heating device for heating the tobacco stick will be described with reference to FIGS. 1 to 3. An example of a heating-type flavor inhaler which includes the above tobacco refill and a heating device for heating the tobacco refill will also be described with reference to FIG. 4.

(Example of Heating-type Flavor Inhaler Including Tobacco Stick)

[0069] FIGS. 1 and 2 are schematic cross-sectional views showing an example of a heating-type flavor inhaler. FIG. 1 shows a state before a tobacco stick 20 is inserted into a heating device 10, and FIG. 2 shows a state in which the tobacco stick 20 is inserted into the heating device 10 and heated. FIG. 3 is a cross-sectional view of the tobacco stick 20.

[0070] As shown in FIGS. 1 and 2, the heating-type flavor inhaler includes the tobacco stick 20, and the heating device 10 which heats a tobacco-containing segment 20A of the tobacco stick 20 from outside. The heating-type flavor inhaler is not limited to the configurations shown in FIGS. 1 and 2, provided that the heating-type flavor inhaler includes the tobacco stick 20 and the heating device 10 which heats the tobacco stick 20.

[0071] The heating device 10 shown in FIGS. 1 and 2 includes a body 11, a heater 12, a metal tube 13, a battery unit 14, and a control unit 15. The body 11 includes a tubular recess 16, and the heater 12 and the metal tube 13 are arranged on an inner side surface of the recess 16 at a position corresponding to the tobacco-containing segment 20A of the tobacco stick 20 inserted into the recess 16. The body 11 further includes a ventilation hole 17, and the ventilation hole 17 allows the outside of the body 11 to communicate with the recess 16 to supply air to the tobacco stick 20 put into the recess 16.

[0072] The heater 12 may be an electrical resistance-based heater, and heating of the heater 12 is performed through electric power supplied from the battery unit 14 in accordance with an instruction from the control unit 15 that performs temperature control.

[0073] The heat generated from the heater 12 is conveyed to the tobacco-containing segment 20A of the tobacco stick 20 through the metal tube 13 having a high thermal conductivity.

[0074] Since the view shown in FIG. 2 is schematic, there is a gap between an outer periphery of the tobacco stick 20 and an inner periphery of the metal tube 13; in actuality, however, it is desirable that no gap be provided between the outer periphery of the tobacco stick 20 and the inner periphery of the metal tube 13 for the purpose of efficient heat transfer.

[0075] The heating device 10 heats the tobacco-containing segment 20A of the tobacco stick 20 from the outside, but may heat it from the inside.

[0076] The heating temperature of the heating device 10 is not particularly limited, but is preferably 400 °C or lower, more preferably 150 °C or higher and 400 °C or lower, and even more preferably 200 °C or higher and 350 °C or lower. The heating temperature refers to a temperature of the heater 12 of the heating device 10.

[0077] As shown in FIG. 3, the tobacco stick 20 has a cylindrical shape. The circumference of the tobacco stick 20 is preferably 16 mm to 27 mm, more preferably 20 mm to 26 mm, and even more preferably 21 mm to 25 mm. A full length (horizontal length) of the tobacco stick 20 is not particularly limited, but is preferably 40 mm to 90 mm, more preferably 50 mm to 75 mm, and even more preferably 50 mm to 60 mm.

[0078] The tobacco stick 20 is composed of the tobacco-containing segment 20A filled with a tobacco filler 21, a filter part 20C constituting a mouthpiece, and a connecting part 20B connecting the tobacco-containing segment 20A and the filter part 20C.

[0079] The tobacco-containing segment 20A has a cylindrical shape. A full length (axial length) of the tobacco-containing segment 20A is, for example, preferably 20 to 70 mm, more preferably 20 to 50 mm, and even more preferably 20 to 30 mm. A cross-sectional shape of the tobacco-containing segment 20A is not particularly limited, but may be, for example, a circle, an ellipse, or a polygon.

[0080] The tobacco-containing segment 20A includes a tobacco filler 21, and cigarette paper 22 wrapped around the tobacco filler 21. The tobacco filler 21 is, for example, cut tobacco, sheet tobacco, tobacco granules, or a combination thereof. The tobacco filler 21 can include the above-described "smell composition".

[0081] The tobacco filler 21 may include an aerosol source. Examples of the aerosol source include glycerin, propylene glycol, triethyl citrate, triacetin, and 1,3-butanediol. These may be used either alone or in combination of two or more.

[0082] The filter part 20C has a cylindrical shape. The filter part 20C includes a rod-shaped first segment 25 formed by being filled with cellulose acetate fibers and a rod-shaped second segment 26 formed by being likewise filled with cellulose acetate fibers. The first segment 25 is located closer to the tobacco-containing segment 20A. The first segment 25 may include a hollow part. The second segment 26 is located closer to the mouthpiece. The second segment 26 is solid. The first segment 25 is composed of a first filling layer (cellulose acetate fibers) 25a and an inner plug wrapper 25b wrapped around the first filling layer 25a. The second segment 26 is composed of a second filling layer (cellulose acetate fibers) 26a and an inner plug wrapper 26b wrapped around the second filling layer 26a. The first segment 25 and the second segment 26 are connected by an outer plug wrapper 27. The outer plug wrapper 27 is bonded to the first segment 25 and the second segment 26 by a vinyl acetate emulsion adhesive or the like.

[0083] The length of the filter part 20C may be, for example, 10 to 30 mm, the length of the connecting part 20B may be, for example, 10 to 30 mm, the length of the first segment 25 may be, for example, 5 to 15 mm, and the length of the second segment 26 may be, for example, 5 to 15 mm. The lengths of these individual segments are an example, and may be suitably varied according to the production suitability, the required quality, the length of the tobacco-containing segment 20A, etc.

[0084] For example, the first segment 25 (center hole segment) is composed of a first filling layer 25a including one or more hollow parts, and an inner plug wrapper 25b that covers the first filling layer 25a. The first segment 25 has a function of increasing the strength of the second segment 26. The first filling layer 25a of the first segment 25 is filled with, for example, cellulose acetate fibers at a high density. The cellulose acetate fibers are cured through addition of,

for example, 6 to 20% by mass of a triacetin-containing plasticizer with respect to the mass of cellulose acetate. The hollow part of the first segment 25 has an inner diameter of, for example, $\phi 1.0$ to $\phi 5.0$ mm.

[0085] For example, the fiber filling density of the first filling layer 25a of the first segment 25 may be relatively high, or equivalent to the fiber filling density of the second filling layer 26a of the second segment 26 to be described below. Therefore, at the time of inhalation, air or aerosol flows only through the hollow part, and almost no air or aerosol flows through the first filling layer 25a. For example, if it is desired to diminish a decrease in the aerosol components in the second segment 26 due to filtration, the second segment 26 may be shortened, and the first segment 25 may be lengthened accordingly.

[0086] Replacing the shortened second segment 26 with the first segment 25 is effective in increasing the delivery amount of the aerosol components. Since the first filling layer 25a of the first segment 25 is a fiber-filled layer, the touch feeling from the outside during use does not cause a sense of discomfort to the user.

[0087] The second segment 26 is composed of the second filling layer 26a and an inner plug wrapper 26b covering the second filling layer 26a. The second segment 26 (filter segment) is filled with cellulose acetate fibers at a general density, and has filtration properties of general aerosol components.

[0088] The first segment 25 and the second segment 26 may have different filtration properties for filtering aerosol (mainstream smoke) released from the tobacco-containing segment 20A. At least one of the first segment 25 or the second segment 26 may include a flavorant. The filter part 20C may take any structure, and may be a structure including a plurality of segments, as described above, or may be composed of a single segment.

[0089] The connecting part 20B has a cylindrical shape. The connecting part 20B has a paper tube 23 formed in a cylindrical shape using, for example, thick paper.

[0090] The lining paper 28 is wrapped in a cylindrical shape around the outside of the tobacco-containing segment 20A, the connecting part 20B, and the filter part 20C so as to connect them integrally. A vinyl acetate emulsion adhesive is applied onto the entire surface or substantially the entire surface of one surface (inner surface) of the lining paper 28 except in the vicinity of ventilation opening parts 24. The ventilation opening parts 24 are formed by performing laser processing from the outside, after the tobacco-containing segment 20A, the connecting part 20B, and the filter part 20C are integrally formed by the lining paper 28.

[0091] The ventilation opening part 24 has two or more through holes that penetrate the connecting part 20B in the thickness direction. The two or more through holes are formed so as to be arranged radially when viewed from an extension of the central axis of the tobacco stick 20. In the present embodiment, the ventilation opening part 24 is provided in the connecting part 20B, but may be provided in the filter part 20C. In the present embodiment, two or more through holes of the ventilation opening part 24 are provided side by side in a single row at regular intervals on one ring; however, they may be provided side by side in two rows at regular intervals on two rings, or one or two rows of the ventilation opening part 24 may be provided side by side in a discontinuous or irregular manner. When the user holds a mouthpiece to inhale, the outside air is taken into the mainstream smoke via the ventilation opening part 24.

(Example of Heating-type Flavor Inhaler Including Tobacco Refill)

[0092] Next, another example of the heating-type flavor inhaler will be described with reference to FIG. 4. FIG. 4 is a partially cutaway view showing another example of the heating-type flavor inhaler. A heating-type flavor inhaler 100 shown in FIG. 4 is an electrical heating-type inhaler that heats a tobacco filler with electrical heat to generate aerosol.

[0093] The heating-type flavor inhaler 100 includes a main body 110 and a mouthpiece 120. The heating-type flavor inhaler 100 has a shape extending along a direction in which the main body 110 and the mouthpiece 120 are connected, and includes a non-mouthpiece end (end of the main body 110 side) and a mouthpiece end (end of the mouthpiece 120 side).

[0094] In the following description, when a "non-mouthpiece end side" is referred to for a certain part, the position specified by this "non-mouthpiece end side" is the position of the end of the part closer to the non-mouthpiece end of the heating-type flavor inhaler 100. Also, in the following description, when a "mouthpiece end side" is referred to for a certain part, the position specified by this "mouthpiece end side" is the position of the end of the part closer to the mouthpiece end of the heating-type flavor inhaler 100.

[0095] The main body 110 includes a tubular body 111, a battery 112, a control circuit 113, and a heater 114.

[0096] The tubular body 111 is a tubular body with a bottom, and is open on the mouthpiece end side so that a later-described tobacco refill 130 can be replaced. The tubular body 111 may be a circular section tubular body or a polygonal section tubular body. The non-mouthpiece end of the tubular body 111 is provided with a charging part (not shown) for charging the battery 112. A side wall of the tubular body 111 is provided with a power supply button (not shown) to turn on or off the heating-type flavor inhaler 100.

[0097] The battery 112 is placed inside the tubular body 111. The battery 112 is, for example, a lithium ion secondary battery. The battery 112 supplies the power necessary to operate the heating-type flavor inhaler 100 to the electrical and electronic parts included in the heating-type flavor inhaler 100. For example, the battery 112 supplies the power to

the control circuit 113 and the heater 114.

[0098] The control circuit 113 is placed in the tubular body 111 between its opening and the battery 112. The control circuit 113 may be placed at another position in the tubular body 111. The control circuit 113 controls the operation of the heating-type flavor inhaler 100. Specifically, the control circuit 113 controls the power supplied to the heater 114 based on a value output by a temperature sensor placed in the vicinity of the heater 114.

[0099] The heater 114 is placed on the mouthpiece end side in the tubular body 111. Specifically, the heater 114 is placed in the tubular body 111 between its opening and the control circuit 113. The heater 114 has a cup shape allowing the tobacco refill 130 to be accommodated. The heater 114 is electrically connected to the battery 112 and the control circuit 113. The temperature of the heater 114 is controlled by the control circuit 113. It is preferable that the heater 114 be surrounded by an insulator to avoid transmission of its heat to the tubular body 111, the battery 112, the control circuit 113, etc.

[0100] The main body 110 may further include a light-emitting device on a side wall of the tubular body 111, for example, to notify a user of a heating state of the tobacco refill 130 or a remaining amount of the battery 112.

[0101] Herein, the tobacco refill 130 will be described.

[0102] The tobacco refill 130 is placed in the main body 110 to be surrounded by the heater 114. The tobacco refill 130 is replaced by the user after inhalation is performed a predetermined number of times.

[0103] The tobacco refill 130 includes a heat-resistant container 131 and a tobacco filler 132. The heat-resistant container 131 is made of, for example, a metal (e.g., aluminum).

[0104] The tobacco filler 132 is contained in the heat-resistant container 131. The tobacco filler 132 is, for example, cut tobacco, sheet tobacco, tobacco granules, or a combination thereof. The tobacco filler 132 can include the above-described "smell composition".

[0105] The tobacco filler 132 may include an aerosol source. The aerosol source is a liquid for generating aerosol through heating, and examples thereof include glycerin, propylene glycol, triethyl citrate, triacetin, and 1,3-butanediol. These may be used either alone or in combination of two or more.

[0106] Before being attached to the main body 110, the tobacco refill 130 is sealed with an aluminum foil lid. When attached to the main body 110, the tobacco refill 130 is unsealed so that the tobacco flavor from the tobacco filler 132 can be inhaled.

[0107] The mouthpiece 120 is provided on the mouthpiece end side of the main body 110 in a detachable manner. The mouthpiece 120 is removed from the main body 110 by the user when the tobacco refill 130 is replaced.

[0108] The mouthpiece 120 includes a protrusion on its non-mouthpiece end side. When the mouthpiece 120 is attached to the main body 110, this protrusion penetrates the lid of the tobacco refill 130 to open the tobacco refill 130. The mouthpiece 120 may not include a protrusion. In this case, the tobacco refill 130 is opened by the user's hand, for example, right before being attached to the main body 110.

[0109] The mouthpiece 120 includes a first gas flow path that leads the air outside the heating-type flavor inhaler 100 into a space in the tobacco refill 130. The first gas flow path has a gas flow inlet, for example, in the vicinity of the connection between the mouthpiece 120 and the main body 110. The mouthpiece 120 also includes a second gas flow path that connects the space in the tobacco refill 130 and the external space of the heating-type flavor inhaler 100 so that the user can inhale the tobacco flavor from the tobacco filler 132. The second gas flow path has a gas flow outlet, for example, on the mouthpiece end of the mouthpiece 120.

<5. Another Aspect>

[0110] According to another aspect, there is provided a method of manufacturing an improved tobacco filler, the method including adding to a tobacco filler a smell composition containing at least one kind of smell component selected from a first smell component group having a smell quality classified as nutty-roast, a second smell component group having a smell quality classified as burnt, and a third smell component group having a smell quality classified as sour.

[0111] The above method can be performed by referring to the description in <1. Smell Composition>, the description in <2. Tobacco Product Including Smell Composition>, the description in <3. Tobacco Filler Including Smell Composition>, and the description in <4. Tobacco Product Including Tobacco Filler Including Smell Composition>. An improved tobacco filler manufactured by this method can reduce the heated tobacco odor.

[0112] According to another aspect, there is provided a method of manufacturing an improved tobacco product, the method including incorporating into a tobacco product a smell composition containing at least one kind of smell component selected from a first smell component group having a smell quality classified as nutty-roast, a second smell component group having a smell quality classified as burnt, and a third smell component group having a smell quality classified as sour.

[0113] Likewise, the above method can be performed by referring to the description in <1. Smell Composition>, the description in <2. Tobacco Product Including Smell Composition>, the description in <3. Tobacco Filler Including Smell Composition>, and the description in <4. Tobacco Product Including Tobacco Filler Including Smell Composition>. An improved tobacco product manufactured by this method can reduce the heated tobacco odor.

<6. Preferred Embodiments>

[0114] Hereinafter, the preferred embodiments will be described.

[0115] [A1] An improved tobacco product including:

a tobacco product; and
 a smell composition containing at least one kind of smell component selected from a first smell component group having a smell quality classified as nutty-roast, a second smell component group having a smell quality classified as burnt, and a third smell component group having a smell quality classified as sour.

[0116] [A2] The improved tobacco product according to [A1], wherein

the first smell component group consists of 2-acetyl thiazole, 3-methyl-2-cyclopenten-1-one, 2,5-dimethyl pyrazine, 2,6-dimethyl pyrazine, 2,3-dimethyl pyrazine, 2,3,5-trimethyl pyrazine, 2-ethyl-5(6)-methyl pyrazine, 2-ethyl-3,6-dimethyl pyrazine, 2-ethyl-3,5-dimethyl pyrazine, 2,3-diethyl-5-methyl pyrazine, 2-ethyl pyrazine, and 2-ethyl-6-methyl pyrazine,

the second smell component group consists of 2-methyl pyridine, 3-methyl pyridine, 4-methyl pyridine, 2,4-dimethyl pyridine, 2-ethyl-4-methyl thiazole, 2,4,5-trimethyl thiazole, 2,3-dimethyl pyridine, 2,5-dimethyl pyridine, 2,6-dimethyl pyridine, 2-isobutyl pyridine, 2-isobutyl-4-methyl pyridine, 3-butyl pyridine, 5-ethyl-2-methyl pyridine, 3-vinyl pyridine, 3-methyl-2-cyclohexenone, 3-ethyl pyridine, 5-methyl-2-furan carboxaldehyde, and pyridine, and

the third smell component group consists of heptanoic acid, phenyl propionic acid, acetic acid, 3-methyl butanal, 2-methyl butanal, 2-methyl butanoic acid, 3-methyl butanoic acid, and 3-methyl pentanoic acid.

[0117] [A3] The improved tobacco product according to [A1] or [A2], wherein the at least one kind of smell component is:

a combination of at least one kind of smell component selected from the first smell component group and at least one kind of smell component selected from the second smell component group;

a combination of at least one kind of smell component selected from the first smell component group and at least one kind of smell component selected from the third smell component group;

a combination of at least one kind of smell component selected from the second smell component group and at least one kind of smell component selected from the third smell component group; or

a combination of at least one kind of smell component selected from the first smell component group, at least one kind of smell component selected from the second smell component group, and at least one kind of smell component selected from the third smell component group.

[0118] [A4] The improved tobacco product according to any one of [A1] to [A3], wherein the at least one kind of smell component is a combination of at least one kind of smell component selected from the first smell component group and at least one kind of smell component selected from the third smell component group.

[0119] [A5] The improved tobacco product according to [A1] or [A2], wherein the at least one kind of smell component is:

a mixed component consisting of 2-acetyl thiazole, 3-methyl-2-cyclopenten-1-one, 2,5-dimethyl pyrazine, 2,6-dimethyl pyrazine, 2,3-dimethyl pyrazine, 2,3,5-trimethyl pyrazine, 2-ethyl-5(6)-methyl pyrazine, 2-ethyl-3,6-dimethyl pyrazine, 2-ethyl-3,5-dimethyl pyrazine, 2,3-diethyl-5-methyl pyrazine, 2-ethyl pyrazine, and 2-ethyl-6-methyl pyrazine;

a mixed component consisting of 2-methyl pyridine, 3-methyl pyridine, 4-methyl pyridine, 2,4-dimethyl pyridine, 2-ethyl-4-methyl thiazole, 2,4,5-trimethyl thiazole, 2,3-dimethyl pyridine, 2,5-dimethyl pyridine, 2,6-dimethyl pyridine, 2-isobutyl pyridine, 2-isobutyl-4-methyl pyridine, 3-butyl pyridine, 5-ethyl-2-methyl pyridine, 3-vinyl pyridine, 3-methyl-2-cyclohexenone, 3-ethyl pyridine, and 5-methyl-2-furan carboxaldehyde;

a mixed component consisting of heptanoic acid, phenyl propionic acid, acetic acid, 3-methyl butanal, 2-methyl butanal, 2-methyl butanoic acid, 3-methyl butanoic acid, and 3-methyl pentanoic acid; or

any combination of the above mixed components.

[0120] [A6] The improved tobacco product according to [A1] or [A2], wherein the at least one kind of smell component is:

a mixed component consisting of 2,5-dimethyl pyrazine, 2,6-dimethyl pyrazine, 2,3-dimethyl pyrazine, 2,3,5-trimethyl pyrazine, 2-ethyl-3,5-dimethyl pyrazine, and 2-ethyl pyrazine;

a single component consisting of pyridine;

a mixed component consisting of acetic acid, 3-methyl butanal, 2-methyl butanal, 2-methyl butanoic acid, 3-methyl

butanoic acid, and 3-methyl pentanoic acid; or
any combination of the above mixed components and the above single component.

5 **[0121]** [A7] The improved tobacco product according to any one of [A1] to [A6], wherein the tobacco product is a heating-type flavor inhaler.

[0122] [A8] The improved tobacco product according to any one of [A1] to [A7], wherein the smell composition is incorporated into a tobacco filler included in the tobacco product.

[0123] [A9] The improved tobacco product according to [A8], wherein the tobacco filler is cut tobacco or a tobacco molded body.

10 **[0124]** [B1] An improved tobacco filler including:

a tobacco filler; and

a smell composition containing at least one kind of smell component selected from a first smell component group having a smell quality classified as nutty-roast, a second smell component group having a smell quality classified as burnt, and a third smell component group having a smell quality classified as sour.

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[0125] [B2] The improved tobacco filler according to [B1], wherein

20 the first smell component group consists of 2-acetyl thiazole, 3-methyl-2-cyclopenten-1-one, 2,5-dimethyl pyrazine, 2,6-dimethyl pyrazine, 2,3-dimethyl pyrazine, 2,3,5-trimethyl pyrazine, 2-ethyl-5(6)-methyl pyrazine, 2-ethyl-3,6-dimethyl pyrazine, 2-ethyl-3,5-dimethyl pyrazine, 2,3-diethyl-5-methyl pyrazine, 2-ethyl pyrazine, and 2-ethyl-6-methyl pyrazine,

the second smell component group consists of 2-methyl pyridine, 3-methyl pyridine, 4-methyl pyridine, 2,4-dimethyl pyridine, 2-ethyl-4-methyl thiazole, 2,4,5-trimethyl thiazole, 2,3-dimethyl pyridine, 2,5-dimethyl pyridine, 2,6-dimethyl pyridine, 2-isobutyl pyridine, 2-isobutyl-4-methyl pyridine, 3-butyl pyridine, 5-ethyl-2-methyl pyridine, 3-vinyl pyridine, 3-methyl-2-cyclohexenone, 3-ethyl pyridine, 5-methyl-2-furan carboxaldehyde, and pyridine, and

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the third smell component group consists of heptanoic acid, phenyl propionic acid, acetic acid, 3-methyl butanal, 2-methyl butanal, 2-methyl butanoic acid, 3-methyl butanoic acid, and 3-methyl pentanoic acid.

30 **[0126]** [B3] The improved tobacco filler according to [B1] or [B2], wherein the at least one kind of smell component is:

a combination of at least one kind of smell component selected from the first smell component group and at least one kind of smell component selected from the second smell component group;

a combination of at least one kind of smell component selected from the first smell component group and at least one kind of smell component selected from the third smell component group;

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a combination of at least one kind of smell component selected from the second smell component group and at least one kind of smell component selected from the third smell component group; or

a combination of at least one kind of smell component selected from the first smell component group, at least one kind of smell component selected from the second smell component group, and at least one kind of smell component

40 selected from the third smell component group.

[0127] [B4] The improved tobacco filler according to any one of [B1] to [B3], wherein the at least one kind of smell component is a combination of at least one kind of smell component selected from the first smell component group and at least one kind of smell component selected from the third smell component group.

45 **[0128]** [B5] The improved tobacco filler according to [B1] or [B2], wherein the at least one kind of smell component is:

a mixed component consisting of 2-acetyl thiazole, 3-methyl-2-cyclopenten-1-one, 2,5-dimethyl pyrazine, 2,6-dimethyl pyrazine, 2,3-dimethyl pyrazine, 2,3,5-trimethyl pyrazine, 2-ethyl-5(6)-methyl pyrazine, 2-ethyl-3,6-dimethyl pyrazine, 2-ethyl-3,5-dimethyl pyrazine, 2,3-diethyl-5-methyl pyrazine, 2-ethyl pyrazine, and 2-ethyl-6-methyl pyrazine;

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a mixed component consisting of 2-methyl pyridine, 3-methyl pyridine, 4-methyl pyridine, 2,4-dimethyl pyridine, 2-ethyl-4-methyl thiazole, 2,4,5-trimethyl thiazole, 2,3-dimethyl pyridine, 2,5-dimethyl pyridine, 2,6-dimethyl pyridine, 2-isobutyl pyridine, 2-isobutyl-4-methyl pyridine, 3-butyl pyridine, 5-ethyl-2-methyl pyridine, 3-vinyl pyridine, 3-methyl-2-cyclohexenone, 3-ethyl pyridine, and 5-methyl-2-furan carboxaldehyde;

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a mixed component consisting of heptanoic acid, phenyl propionic acid, acetic acid, 3-methyl butanal, 2-methyl butanal, 2-methyl butanoic acid, 3-methyl butanoic acid, and 3-methyl pentanoic acid; or

any combination of the above mixed components.

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[0129] [B6] The improved tobacco filler according to [B1] or [B2], wherein the at least one kind of smell component is:

a mixed component consisting of 2,5-dimethyl pyrazine, 2,6-dimethyl pyrazine, 2,3-dimethyl pyrazine, 2,3,5-trimethyl pyrazine, 2-ethyl-3,5-dimethyl pyrazine, and 2-ethyl pyrazine;

a single component consisting of pyridine;

a mixed component consisting of acetic acid, 3-methyl butanal, 2-methyl butanal, 2-methyl butanoic acid, 3-methyl butanoic acid, and 3-methyl pentanoic acid; or

any combination of the above mixed components and the above single component.

[0130] [B7] The improved tobacco filler according to any one of [B1] to [B6], wherein the tobacco filler is cut tobacco or a tobacco molded body.

[0131] [C1] A tobacco stick including: the improved tobacco filler according to any one of [B1] to [B7]; and cigarette paper wrapped around at least the tobacco filler.

[0132] [C2] A tobacco refill including: the improved tobacco filler according to any one of [B1] to [B7]; and a heat-resistant container containing the tobacco filler.

[0133] [D1] A tobacco product including the improved tobacco filler according to any one of [B1] to [B7].

[0134] [D2] The tobacco product according to [D1], wherein the tobacco product is a heating-type flavor inhaler.

[0135] [D3] A heating-type flavor inhaler including: the tobacco stick according to [C1]; and a heating device for heating the tobacco stick.

[0136] [D4] A heating-type flavor inhaler including: the tobacco refill according to [C2]; and a heating device for heating the tobacco refill.

[Examples]

[Example 1]

<1-1. Preparation of tobacco filler and tobacco refill>

Sample 1A: Nutty-Roast

[0137] All the compounds shown in Table 1 were added to a mixed solution of glycerin and propylene glycol (mass ratio 1:1) so that the final concentrations in a tobacco filler 1A would be the concentrations shown in Table 1, whereby a smell composition 1A was prepared. The compounds shown in Table 1 are smell components having a smell quality classified as nutty-roast.

[Table 1]

Nutty-Roast	ppm
2-acetyl thiazole	0.058
3-methyl-2-cyclopenten-1-one	0.025
2,5-dimethyl pyrazine	2.723
2,6-dimethyl pyrazine	6.793
2,3-dimethyl pyrazine	2.337
2,3,5-trimethyl pyrazine	2.729
2-ethyl-5(6)-methyl pyrazine	4.659
2-ethyl-3,6-dimethyl pyrazine	2.040
2-ethyl-3,5-dimethyl pyrazine	3.768
2,3-diethyl-5-methyl pyrazine	0.015
2-ethyl pyrazine	0.116
2-ethyl-6-methyl pyrazine	0.114

[0138] The smell composition 1A in an amount of 100 mg was added to 100 mg of a tobacco material (cut tobacco),

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whereby the tobacco filler 1A was prepared. The concentrations [ppm by mass] shown in Table 1 indicate the concentrations of the respective compounds in the tobacco filler 1A, that is, a value calculated by the following formula:

$$\text{Concentration of compound [ppm by mass]} = \{ \text{mass of compound} / (\text{mass of smell composition 1A} + \text{mass of tobacco material}) \} \times 10^6$$

[0139] The concentrations of the compounds employed in the examples vary depending on the types of the compounds, because the concentrations were determined based on the content of each compound in the cigarette smoke.

[0140] The tobacco materials used in all the examples generate a strong heated tobacco odor when heated with a heating-type flavor inhaler. A dedicated pot of the heating-type flavor inhaler shown in FIG. 4 was filled with 200 mg of the tobacco filler 1A, whereby a tobacco refill 1A was prepared.

Sample 1B: Burnt

[0141] All the compounds shown in Table 2 were added to a mixed solution of glycerin and propylene glycol (mass ratio 1:1) so that the final concentrations in a tobacco filler 1B would be the concentrations shown in Table 2, whereby a smell composition 1B was prepared. The compounds shown in Table 2 are smell components having a smell quality classified as burnt.

[Table 2]

Burnt	ppm
2-methyl pyridine	0.003
3-methyl pyridine	0.016
4-methyl pyridine	0.003
2,4-dimethyl pyridine	0.002
2-ethyl-4-methyl thiazole	0.011
2,4,5-trimethyl thiazole	0.035
2,3-dimethyl pyridine	0.083
2,5-dimethyl pyridine	0.098
2,6-dimethyl pyridine	0.063
2-isobutyl pyridine	0.391
2-isobutyl-4-methyl pyridine	0.906
3-butyl pyridine	1.648
5-ethyl-2-methyl pyridine	0.799
3-vinyl pyridine	19.232
3-methyl-2-cyclohexenone	1.348
3-ethyl pyridine	0.005
5-methyl-2-furan carboxaldehyde	0.019

[0142] The smell composition 1B in an amount of 100 mg was added to 100 mg of a tobacco material, whereby the tobacco filler 1B was prepared. The concentrations [ppm by mass] shown in Table 2 indicate the concentrations of the respective compounds in the tobacco filler 1B, that is, a value calculated by the following formula:

$$\text{Concentration of compound [ppm by mass]} = \{ \text{mass of compound} / (\text{mass of smell composition 1B} + \text{mass of tobacco material}) \} \times 10^6$$

[0143] A dedicated pot of the heating-type flavor inhaler shown in FIG. 4 was filled with 200 mg of the tobacco filler

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1B, whereby a tobacco refill 1B was prepared.

Sample 1C: Sour

5 **[0144]** All the compounds shown in Table 3 were added to a mixed solution of glycerin and propylene glycol (mass ratio 1:1) so that the final concentrations in a tobacco filler 1C would be the concentrations shown in Table 3, whereby a smell composition 1C was prepared. The compounds shown in Table 3 are smell components having a smell quality classified as sour.

10 [Table 3]

Sour	ppm
3-methyl butanoic acid	36.908
heptanoic acid	4.345
phenyl propionic acid	0.746
acetic acid	1583.400
3-methyl butanal	95.091
2-methyl butanal	81.722
2-methyl butanoic acid	32.986
3-methyl pentanoic acid	32.020

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25 **[0145]** The smell composition 1C in an amount of 100 mg was added to 100 mg of a tobacco material, whereby the tobacco filler 1C was prepared. The concentrations [ppm by mass] shown in Table 3 indicate the concentrations of the respective compounds in the tobacco filler 1C, that is, a value calculated by the following formula:

30 Concentration of compound [ppm by mass] = {mass of compound / (mass of smell composition 1C + mass of tobacco material)} × 10⁶

35 **[0146]** A dedicated pot of the heating-type flavor inhaler shown in FIG. 4 was filled with 200 mg of the tobacco filler 1C, whereby a tobacco refill 1C was prepared.

Sample 1D: Control

40 **[0147]** Using a tobacco material as a tobacco filler 1D with no smell composition added thereto, a tobacco refill 1D was prepared in a manner similar to samples 1A to 1C.

<1-2. Evaluation>

45 **[0148]** The tobacco refills 1A to 1D were placed in the heating-type flavor inhaler and heated to 180 °C, and the tobacco flavor was inhaled. When the tobacco refills 1A to 1C were used, the heated tobacco odor was obviously reduced as compared with the case where the tobacco refill 1D (control) was used. This result shows that all of the smell components having a smell quality classified as nutty-roast, the smell components having a smell quality classified as burnt, and the smell components having a smell quality classified as sour can reduce the heated tobacco odor.

50 [Example 2]

<2-1. Preparation of tobacco filler and tobacco stick>

Sample 2A: Nutty-Roast

55 **[0149]** All the compounds shown in Table 4 were added to ethanol so that the final concentrations in a tobacco filler 2A would be the concentrations shown in Table 4, whereby a smell composition 2A was prepared. The compounds shown in Table 4 are smell components having a smell quality classified as nutty-roast.

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[Table 4]

Nutty-Roast	ppm
2,3,5-trimethyl pyrazine	90.97
2-ethyl-3,5-dimethyl pyrazine	62.79
2,5-dimethyl pyrazine	88.97
2,6-dimethyl pyrazine	226.42
2-ethyl pyrazine	3.86
2,3-dimethyl pyrazine	77.90

[0150] The smell composition 2A in an amount of 5 μL was added to 100 mg of a tobacco material (cut tobacco) or 100 mg of cut pieces of sheet tobacco, whereby the tobacco filler 2A was prepared. The concentrations [ppm by mass] shown in Table 4 indicate the concentrations of the respective compounds in the tobacco filler 2A, that is, a value calculated by the following formula:

Concentration of compound [ppm by mass] = {mass of compound / (mass of smell composition 2A + mass of tobacco material or cut pieces of sheet tobacco)} $\times 10^6$

[0151] On the other hand, the smell composition 2A in an amount of 10 μL was added to the tobacco filler portion of the tobacco stick shown in FIG. 3, whereby a tobacco stick 2A was prepared.

Sample 2B: Burnt

[0152] The compound shown in Table 5 was added to ethanol so that the final concentration in a tobacco filler 2B would be the concentration shown in Table 5, whereby a smell composition 2B was prepared. The compound shown in Table 5 is a smell component having a smell quality classified as burnt.

[Table 5]

Burnt	ppm
pyridine	100.00

[0153] The smell composition 2B in an amount of 5 μL was added to 100 mg of a tobacco material or 100 mg of cut pieces of sheet tobacco, whereby the tobacco filler 2B was prepared. The concentration [ppm by mass] shown in Table 5 indicates the concentration of the compound in the tobacco filler 2B, that is, a value calculated by the following formula:

Concentration of compound [ppm by mass] = {mass of compound / (mass of smell composition 2B + mass of tobacco material or cut pieces of sheet tobacco)} $\times 10^6$

[0154] On the other hand, the smell composition 2B in an amount of 10 μL was added to the tobacco filler portion of the tobacco stick shown in FIG. 3, whereby a tobacco stick 2B was prepared.

Sample 2C: Sour

[0155] All the compounds shown in Table 6 were added to ethanol so that the final concentrations in a tobacco filler 2C would be the concentrations shown in Table 6, whereby a smell composition 2C was prepared. The compounds shown in Table 6 are smell components having a smell quality classified as sour.

[Table 6]

Sour	ppm
3-methyl butanal	3169.71

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(continued)

Sour	ppm
2-methyl butanal	2724.08
acetic acid	52780.00
2-methyl butanoic acid	1099.53
3-methyl butanoic acid	1230.28
3-methyl pentanoic acid	1035.32

[0156] The smell composition 2C in an amount of 5 μL was added to 100 mg of a tobacco material or 100 mg of cut pieces of sheet tobacco, whereby the tobacco filler 2C was prepared. The concentrations [ppm by mass] shown in Table 6 indicate the concentrations of the respective compounds in the tobacco filler 2C, that is, a value calculated by the following formula:

Concentration of compound [ppm by mass] = {mass of compound / (mass of smell composition 2C + mass of tobacco material or cut pieces of sheet tobacco)} $\times 10^6$

[0157] On the other hand, the smell composition 2C in an amount of 10 μL was added to the tobacco filler portion of the tobacco stick shown in FIG. 3, whereby a tobacco stick 2C was prepared.

Sample 2D: Nutty-Roast + Sour

[0158] All the compounds shown in Tables 4 and 6 were added to ethanol so that the final concentrations in a tobacco filler 2D would be the concentrations shown in Tables 4 and 6, whereby a smell composition 2D was prepared. The smell composition 2D contains a combination of the smell components having a smell quality classified as nutty-roast and the smell components having a smell quality classified as sour.

[0159] The smell composition 2D in an amount of 5 μL was added to 100 mg of a tobacco material or 100 mg of cut pieces of sheet tobacco, whereby the tobacco filler 2D was prepared. The concentrations [ppm by mass] shown in the tables indicate the concentrations of the respective compounds in the tobacco filler 2D, that is, a value calculated by the following formula:

Concentration of compound [ppm by mass] = {mass of compound / (mass of smell composition 2D + mass of tobacco material or cut pieces of sheet tobacco)} $\times 10^6$

[0160] On the other hand, the smell composition 2D in an amount of 10 μL was added to the tobacco filler portion of the tobacco stick shown in FIG. 3, whereby a tobacco stick 2D was prepared.

Sample 2E: All mixed

[0161] All the compounds shown in Tables 4 to 6 were added to ethanol so that the final concentrations in a tobacco filler 2E would be the concentrations shown in Tables 4 to 6, whereby a smell composition 2E was prepared. The smell composition 2E contains a combination of the smell components having a smell quality classified as nutty-roast, the smell components having a smell quality classified as burnt, and the smell components having a smell quality classified as sour.

[0162] The smell composition 2E in an amount of 5 μL was added to 100 mg of a tobacco material or 100 mg of cut pieces of sheet tobacco, whereby the tobacco filler 2E was prepared. The concentrations [ppm by mass] shown in the tables indicate the concentrations of the respective compounds in the tobacco filler 2E, that is, a value calculated by the following formula:

Concentration of compound [ppm by mass] = {mass of compound / (mass of smell composition 2E + mass of tobacco material or cut pieces of sheet tobacco)} $\times 10^6$

[0163] On the other hand, the smell composition 2E in an amount of 10 μL was added to the tobacco filler portion of the tobacco stick shown in FIG. 3, whereby a tobacco stick 2E was prepared.

Sample 2F: Control

[0164] A tobacco material or cut pieces of sheet tobacco was/were used as a tobacco filler 2F with no smell composition added thereto. On the other hand, using a tobacco material or cut pieces of sheet tobacco as a tobacco filler 2F with no smell composition added thereto, a tobacco stick 2F was prepared in a manner similar to samples 2A to 2E.

<2-2. Evaluation>

[0165] A heating-type flavor inhaler having an inhaler body directly filled with a tobacco filler was filled with the tobacco fillers 2A to 2F, and heated to 180 °C, and the tobacco flavor was inhaled. When the tobacco fillers 2A to 2E were used, the heated tobacco odor was obviously reduced as compared with the case where the tobacco filler 2F (control) was used. Especially when the tobacco fillers 2D and 2E were used, the effect of reducing the heated tobacco odor was high.

[0166] On the other hand, the tobacco sticks 2A to 2F were inserted into the heating device shown in FIGS. 1 and 2, and heated to 210 °C, and the tobacco flavor was inhaled. When the tobacco sticks 2A to 2E were used, the heated tobacco odor was obviously reduced as compared with the case where the tobacco stick 2F (control) was used. Especially when the tobacco sticks 2D and 2E were used, the effect of reducing the heated tobacco odor was high.

[0167] These results show that all of the smell components having a smell quality classified as nutty-roast, the smell components having a smell quality classified as burnt, and the smell components having a smell quality classified as sour can reduce the heated tobacco odor. These results also show that the effect of reducing the heated tobacco odor can be enhanced when a combination of at least two kinds of smell components, selected from the smell components having a smell quality classified as nutty-roast, the smell components having a smell quality classified as burnt, and the smell components having a smell quality classified as sour, is used.

Claims

1. An improved tobacco product comprising at least one kind of smell component selected from a first smell component group having a smell quality classified as nutty-roast, a second smell component group having a smell quality classified as burnt, and a third smell component group having a smell quality classified as sour.

2. The tobacco product according to claim 1, wherein

the first smell component group consists of 2-acetyl thiazole, 3-methyl-2-cyclopenten-1-one, 2,5-dimethyl pyrazine, 2,6-dimethyl pyrazine, 2,3-dimethyl pyrazine, 2,3,5-trimethyl pyrazine, 2-ethyl-5(6)-methyl pyrazine, 2-ethyl-3,6-dimethyl pyrazine, 2-ethyl-3,5-dimethyl pyrazine, 2,3-diethyl-5-methyl pyrazine, 2-ethyl pyrazine, and 2-ethyl-6-methyl pyrazine,

the second smell component group consists of 2-methyl pyridine, 3-methyl pyridine, 4-methyl pyridine, 2,4-dimethyl pyridine, 2-ethyl-4-methyl thiazole, 2,4,5-trimethyl thiazole, 2,3-dimethyl pyridine, 2,5-dimethyl pyridine, 2,6-dimethyl pyridine, 2-isobutyl pyridine, 2-isobutyl-4-methyl pyridine, 3-butyl pyridine, 5-ethyl-2-methyl pyridine, 3-vinyl pyridine, 3-methyl-2-cyclohexenone, 3-ethyl pyridine, 5-methyl-2-furan carboxaldehyde, and pyridine, and

the third smell component group consists of heptanoic acid, phenyl propionic acid, acetic acid, 3-methyl butanal, 2-methyl butanal, 2-methyl butanoic acid, 3-methyl butanoic acid, and 3-methyl pentanoic acid.

3. The tobacco product according to claim 1 or 2, wherein the at least one kind of smell component is:

a combination of at least one kind of smell component selected from the first smell component group and at least one kind of smell component selected from the second smell component group;

a combination of at least one kind of smell component selected from the first smell component group and at least one kind of smell component selected from the third smell component group;

a combination of at least one kind of smell component selected from the second smell component group and at least one kind of smell component selected from the third smell component group; or

a combination of at least one kind of smell component selected from the first smell component group, at least one kind of smell component selected from the second smell component group, and at least one kind of smell component selected from the third smell component group.

4. The tobacco product according to any one of claims 1 to 3, wherein the at least one kind of smell component is a combination of at least one kind of smell component selected from the first smell component group and at least one kind of smell component selected from the third smell component group.

5 5. The tobacco product according to claim 1 or 2, wherein the at least one kind of smell component is:

a mixed component consisting of 2-acetyl thiazole, 3-methyl-2-cyclopenten-1-one, 2,5-dimethyl pyrazine, 2,6-dimethyl pyrazine, 2,3-dimethyl pyrazine, 2,3,5-trimethyl pyrazine, 2-ethyl-5(6)-methyl pyrazine, 2-ethyl-3,6-dimethyl pyrazine, 2-ethyl-3,5-dimethyl pyrazine, 2,3-diethyl-5-methyl pyrazine, 2-ethyl pyrazine, and 2-ethyl-6-methyl pyrazine;

10 a mixed component consisting of 2-methyl pyridine, 3-methyl pyridine, 4-methyl pyridine, 2,4-dimethyl pyridine, 2-ethyl-4-methyl thiazole, 2,4,5-trimethyl thiazole, 2,3-dimethyl pyridine, 2,5-dimethyl pyridine, 2,6-dimethyl pyridine, 2-isobutyl pyridine, 2-isobutyl-4-methyl pyridine, 3-butyl pyridine, 5-ethyl-2-methyl pyridine, 3-vinyl pyridine, 3-methyl-2-cyclohexenone, 3-ethyl pyridine, and 5-methyl-2-furan carboxaldehyde;

15 a mixed component consisting of heptanoic acid, phenyl propionic acid, acetic acid, 3-methyl butanal, 2-methyl butanal, 2-methyl butanoic acid, 3-methyl butanoic acid, and 3-methyl pentanoic acid; or any combination of the above mixed components.

20 6. The tobacco product according to claim 1 or 2, wherein the at least one kind of smell component is:

a mixed component consisting of 2,5-dimethyl pyrazine, 2,6-dimethyl pyrazine, 2,3-dimethyl pyrazine, 2,3,5-trimethyl pyrazine, 2-ethyl-3,5-dimethyl pyrazine, and 2-ethyl pyrazine;

a single component consisting of pyridine;

25 a mixed component consisting of acetic acid, 3-methyl butanal, 2-methyl butanal, 2-methyl butanoic acid, 3-methyl butanoic acid, and 3-methyl pentanoic acid; or

any combination of the above mixed components and the above single component.

7. The tobacco product according to any one of claims 1 to 6, wherein the tobacco product is a heating-type flavor inhaler.

30 8. An improved tobacco filler comprising at least one kind of smell component selected from a first smell component group having a smell quality classified as nutty-roast, a second smell component group having a smell quality classified as burnt, and a third smell component group having a smell quality classified as sour.

35 9. The tobacco filler according to claim 8, wherein

the first smell component group consists of 2-acetyl thiazole, 3-methyl-2-cyclopenten-1-one, 2,5-dimethyl pyrazine, 2,6-dimethyl pyrazine, 2,3-dimethyl pyrazine, 2,3,5-trimethyl pyrazine, 2-ethyl-5(6)-methyl pyrazine, 2-ethyl-3,6-dimethyl pyrazine, 2-ethyl-3,5-dimethyl pyrazine, 2,3-diethyl-5-methyl pyrazine, 2-ethyl pyrazine, and 2-ethyl-6-methyl pyrazine,

40 the second smell component group consists of 2-methyl pyridine, 3-methyl pyridine, 4-methyl pyridine, 2,4-dimethyl pyridine, 2-ethyl-4-methyl thiazole, 2,4,5-trimethyl thiazole, 2,3-dimethyl pyridine, 2,5-dimethyl pyridine, 2,6-dimethyl pyridine, 2-isobutyl pyridine, 2-isobutyl-4-methyl pyridine, 3-butyl pyridine, 5-ethyl-2-methyl pyridine, 3-vinyl pyridine, 3-methyl-2-cyclohexenone, 3-ethyl pyridine, 5-methyl-2-furan carboxaldehyde, and pyridine, and

45 the third smell component group consists of heptanoic acid, phenyl propionic acid, acetic acid, 3-methyl butanal, 2-methyl butanal, 2-methyl butanoic acid, 3-methyl butanoic acid, and 3-methyl pentanoic acid.

10. The tobacco filler according to claim 8 or 9, wherein the at least one kind of smell component is:

50 a combination of at least one kind of smell component selected from the first smell component group and at least one kind of smell component selected from the second smell component group;

a combination of at least one kind of smell component selected from the first smell component group and at least one kind of smell component selected from the third smell component group;

55 a combination of at least one kind of smell component selected from the second smell component group and at least one kind of smell component selected from the third smell component group; or

a combination of at least one kind of smell component selected from the first smell component group, at least one kind of smell component selected from the second smell component group, and at least one kind of smell component selected from the third smell component group.

11. The tobacco filler according to any one of claims 8 to 10, wherein the at least one kind of smell component is a combination of at least one kind of smell component selected from the first smell component group and at least one kind of smell component selected from the third smell component group.

5 12. The tobacco filler according to claim 8 or 9, wherein the at least one kind of smell component is:

a mixed component consisting of 2-acetyl thiazole, 3-methyl-2-cyclopenten-1-one, 2,5-dimethyl pyrazine, 2,6-dimethyl pyrazine, 2,3-dimethyl pyrazine, 2,3,5-trimethyl pyrazine, 2-ethyl-5(6)-methyl pyrazine, 2-ethyl-3,6-dimethyl pyrazine, 2-ethyl-3,5-dimethyl pyrazine, 2,3-diethyl-5-methyl pyrazine, 2-ethyl pyrazine, and 2-ethyl-6-methyl pyrazine;

a mixed component consisting of 2-methyl pyridine, 3-methyl pyridine, 4-methyl pyridine, 2,4-dimethyl pyridine, 2-ethyl-4-methyl thiazole, 2,4,5-trimethyl thiazole, 2,3-dimethyl pyridine, 2,5-dimethyl pyridine, 2,6-dimethyl pyridine, 2-isobutyl pyridine, 2-isobutyl-4-methyl pyridine, 3-butyl pyridine, 5-ethyl-2-methyl pyridine, 3-vinyl pyridine, 3-methyl-2-cyclohexenone, 3-ethyl pyridine, and 5-methyl-2-furan carboxaldehyde;

a mixed component consisting of heptanoic acid, phenyl propionic acid, acetic acid, 3-methyl butanal, 2-methyl butanal, 2-methyl butanoic acid, 3-methyl butanoic acid, and 3-methyl pentanoic acid; or any combination of the above mixed components.

13. The tobacco filler according to claim 8 or 9, wherein the at least one kind of smell component is:

a mixed component consisting of 2,5-dimethyl pyrazine, 2,6-dimethyl pyrazine, 2,3-dimethyl pyrazine, 2,3,5-trimethyl pyrazine, 2-ethyl-3,5-dimethyl pyrazine, and 2-ethyl pyrazine;

a single component consisting of pyridine;

a mixed component consisting of acetic acid, 3-methyl butanal, 2-methyl butanal, 2-methyl butanoic acid, 3-methyl butanoic acid, and 3-methyl pentanoic acid; or

any combination of the above mixed components and the above single component.

14. A tobacco stick comprising: the tobacco filler according to any one of claims 8 to 13; and cigarette paper wrapped around at least the tobacco filler.

15. A tobacco refill comprising: the tobacco filler according to any one of claims 8 to 13; and a heat-resistant container containing the tobacco filler.

16. A tobacco product comprising the tobacco filler according to any one of claims 8 to 13.

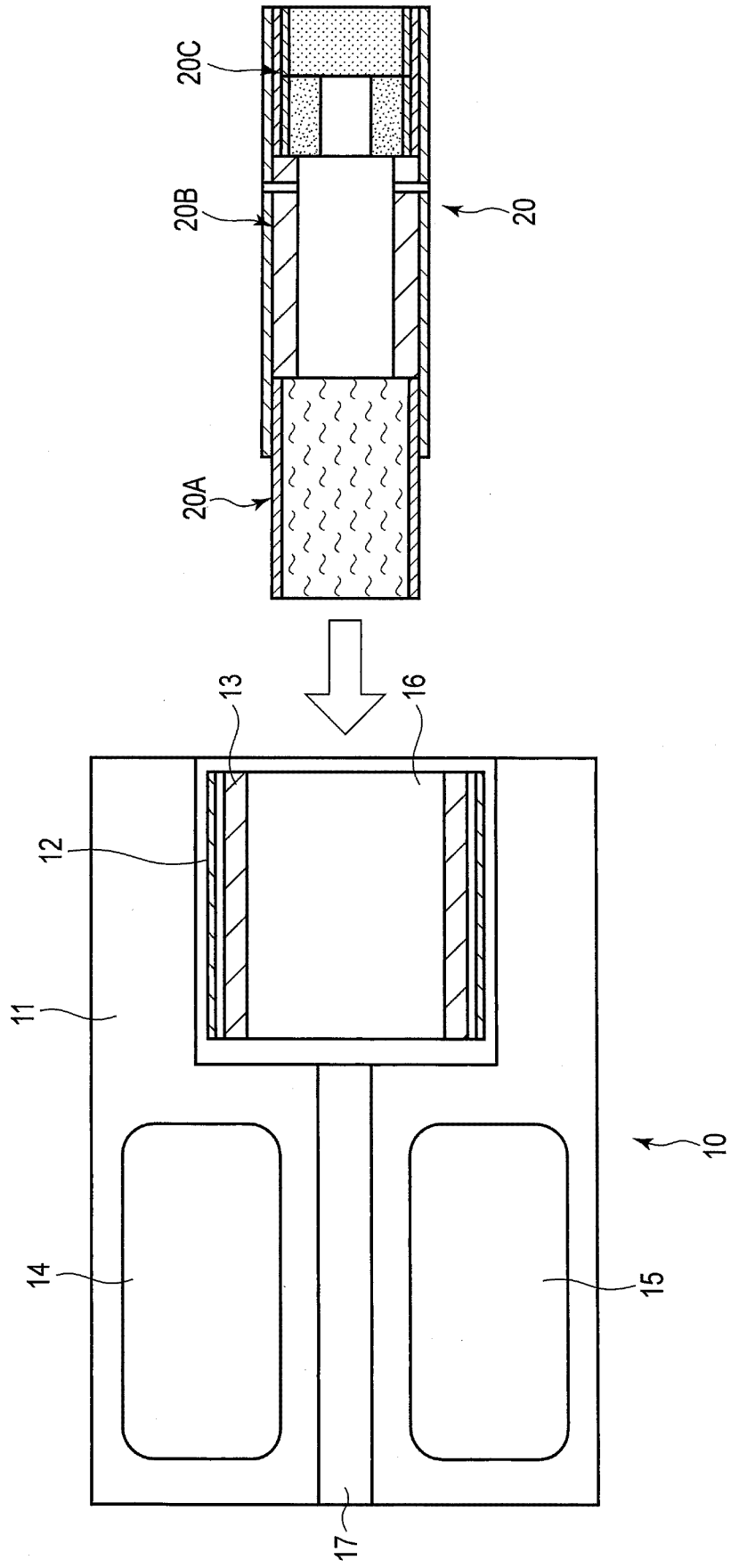
17. The tobacco product according to claim 16, wherein the tobacco product is a heating-type flavor inhaler.

18. A heating-type flavor inhaler comprising: the tobacco stick according to claim 14; and a heating device for heating the tobacco stick.

19. A heating-type flavor inhaler comprising: the tobacco refill according to claim 15; and a heating device for heating the tobacco refill.

20. A method of manufacturing an improved tobacco filler, the method comprising adding to a tobacco filler a smell composition containing at least one kind of smell component selected from a first smell component group having a smell quality classified as nutty-roast, a second smell component group having a smell quality classified as burnt, and a third smell component group having a smell quality classified as sour.

21. A method of manufacturing an improved tobacco product, the method comprising incorporating into a tobacco product a smell composition containing at least one kind of smell component selected from a first smell component group having a smell quality classified as nutty-roast, a second smell component group having a smell quality classified as burnt, and a third smell component group having a smell quality classified as sour.



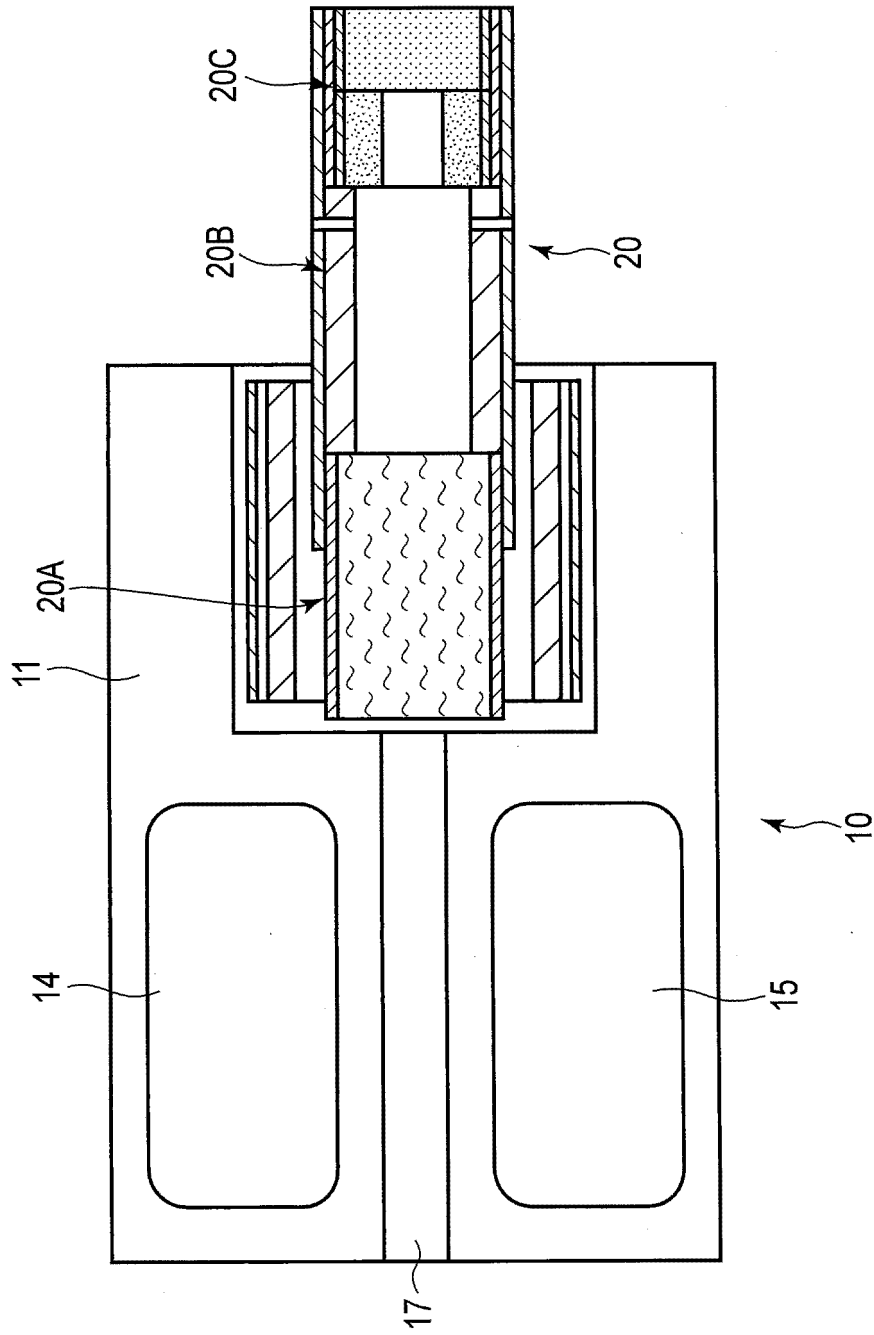


FIG. 2

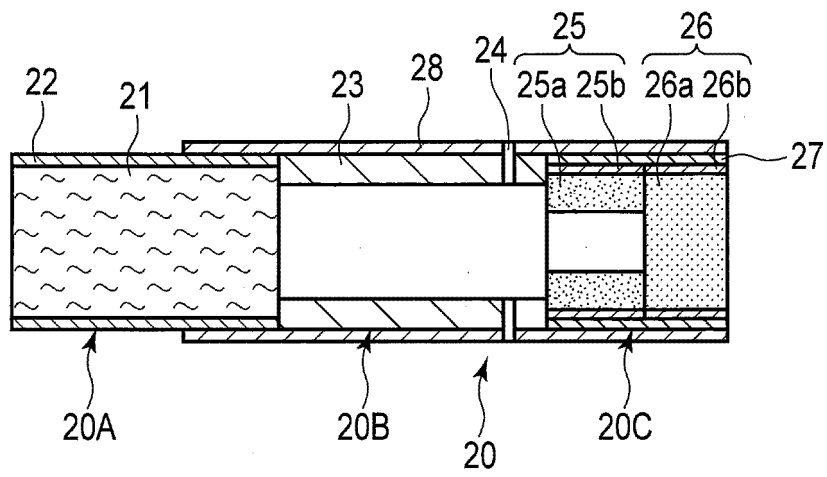


FIG. 3

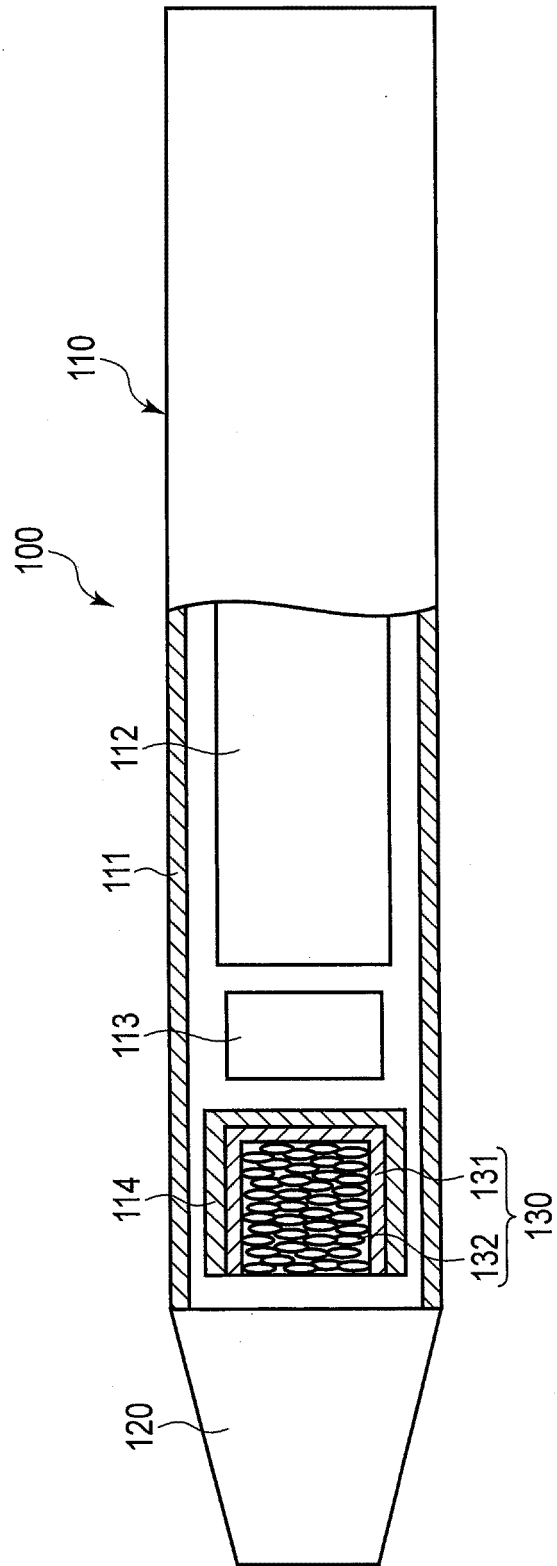


FIG. 4

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2021/026330

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A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl. A24B15/167(2020.01)i, A24B15/38(2006.01)i, A24D1/20(2020.01)i, A24D3/17(2020.01)i, A24F47/00(2020.01)i, A24F40/20(2020.01)i, C11B9/00(2006.01)i
 FI: A24B15/167, C11B9/00 N, C11B9/00 W, C11B9/00 J, C11B9/00 R, A24B15/38, A24D1/20, A24D3/17, A24F40/20, A24F47/00

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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)

Int. Cl. A24B15/167, A24B15/38, A24D1/20, A24D3/17, A24F47/00, A24F40/20, C11B9/00

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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Published examined utility model applications of Japan 1922-1996
 Published unexamined utility model applications of Japan 1971-2021
 Registered utility model specifications of Japan 1996-2021
 Published registered utility model applications of Japan 1994-2021

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

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 54-24866 A (INTERNATIONAL FLAVORS & FRAGRANCES INC.) 24 February 1979 (1979-02-24), in particular, p. 13, lower left column, lines 7-16,	1-2, 8-9, 14, 18, 20-21
Y	in particular, p. 13, lower left column, lines 7-16	3-7, 10-13, 15-17, 19

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

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Date of the actual completion of the international search
06.09.2021Date of mailing of the international search report
21.09.2021

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2021/026330

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Y		3-7, 10-13, 15-17, 19
X	JP 2007-532108 A (QUEST INTERNATIONAL B. V.) 15 November 2007 (2007-11-15), in particular, paragraphs [0002], [0044], [0049], [0050], in particular, paragraphs [0002], [0044], [0049], [0050]	1-2, 8-9, 14, 18, 20-21
Y		3-7, 10-13, 15-17, 19
X	JP 2003-509077 A (BRITISH AMERICAN TOBACCO (INVESTMENTS) LIMITED) 11 March 2003 (2003-03-11), in particular, paragraphs [0043], [0044], fig. 8, in particular, paragraphs [0043], [0044], fig. 8	1, 8, 14, 18
Y		7, 15-17, 19
Y	WO 2020/021599 A1 (JAPAN TOBACCO INC.) 30 January 2020 (2020-01-30), in particular, paragraphs [0069]-[0079], fig. 2	7, 15-17, 19

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No. PCT/JP2021/026330
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WO 2020/021599 A1	30.01.2020	WO 2001/021017 A1 CN 1376037 A KR 2002-0035612 A (Family: none)	

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

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- *The Good Scents Company Information System*, <http://www.thegoodscentscompany.com/flower/popcom.html>) and (<http://www.thegoodscentscompany.com/odor/popcom.html>) [0029]
- *The Good Scents Company Information System*, <http://www.thegoodscentscompany.com/flower/nutty.html>) [0034]
- *The Good Scents Company Information System*, <http://www.thegoodscentscompany.com/flower/bumt.html>) and (<http://www.thegoodscentscompany.com/odor/bumt.html>) [0038]
- *The Good Scents Company Information System*, <http://www.thegoodscentscompany.com/flower/sour.html>) and (<http://www.thegoodscentscompany.com/odor/sour.html>) [0041]