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(54) **FLAVOR STICK, NON-COMBUSTION HEATING TYPE FLAVOR INHALER PRODUCT, AND PRODUCTION METHOD FOR FLAVOR STICK**

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(52) **U.S. Cl.**
CPC *A24C 5/1892* (2013.01)

(57) **ABSTRACT**

A flavor stick comprises: a flavor rod that is inserted into a heating chamber of a flavor inhaler device and is heated from the outer periphery thereof by an external heater disposed in the side periphery of the heating chamber; and a mouthpiece part connected to the rear end of the flavor rod. The flavor rod comprises a plurality of tightly wound rods and an outer winding paper that is wound around the plurality of tightly wound rods bundled together. Each of the plurality of tightly wound rods comprise an inner winding paper, and a flavor source and an aerosol-generating substrate that are disposed on the inner side of the inner winding paper.

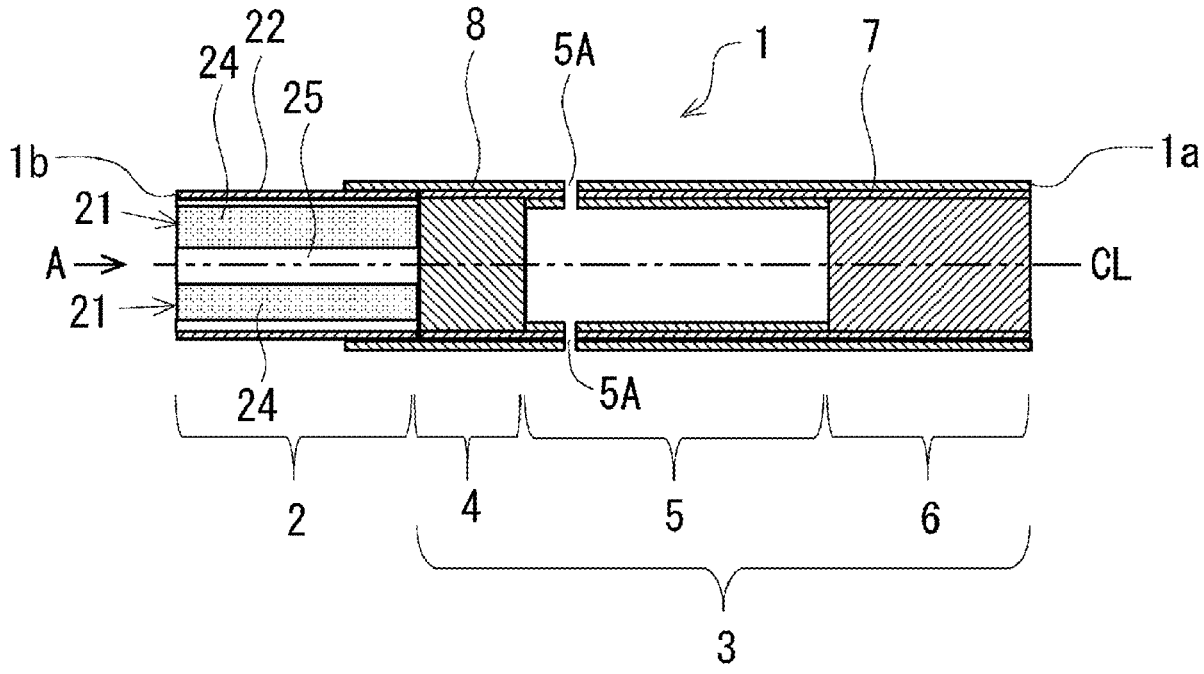


FIG. 1

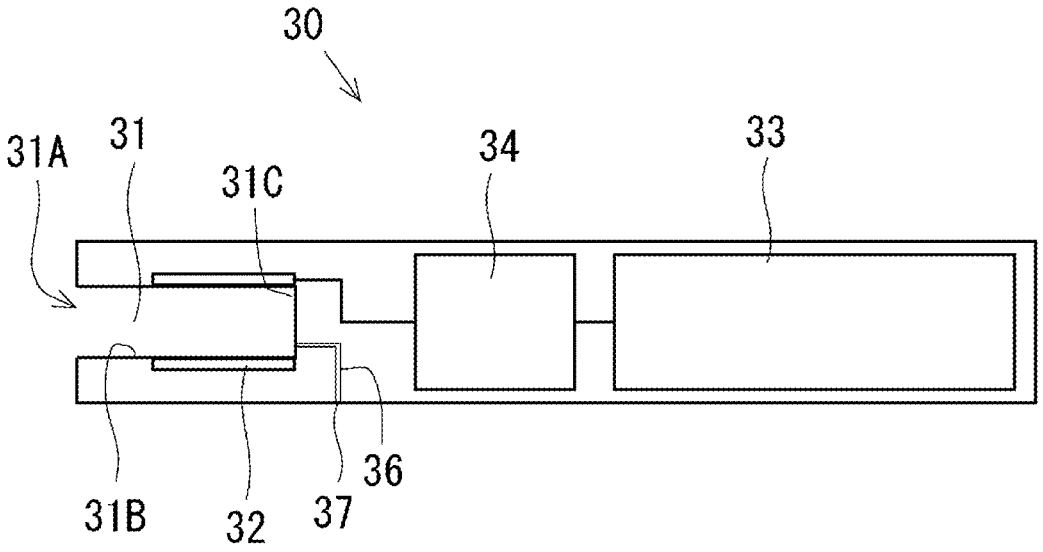

30
31A
31
31C
34
33
31B
32
37
36

FIG. 2

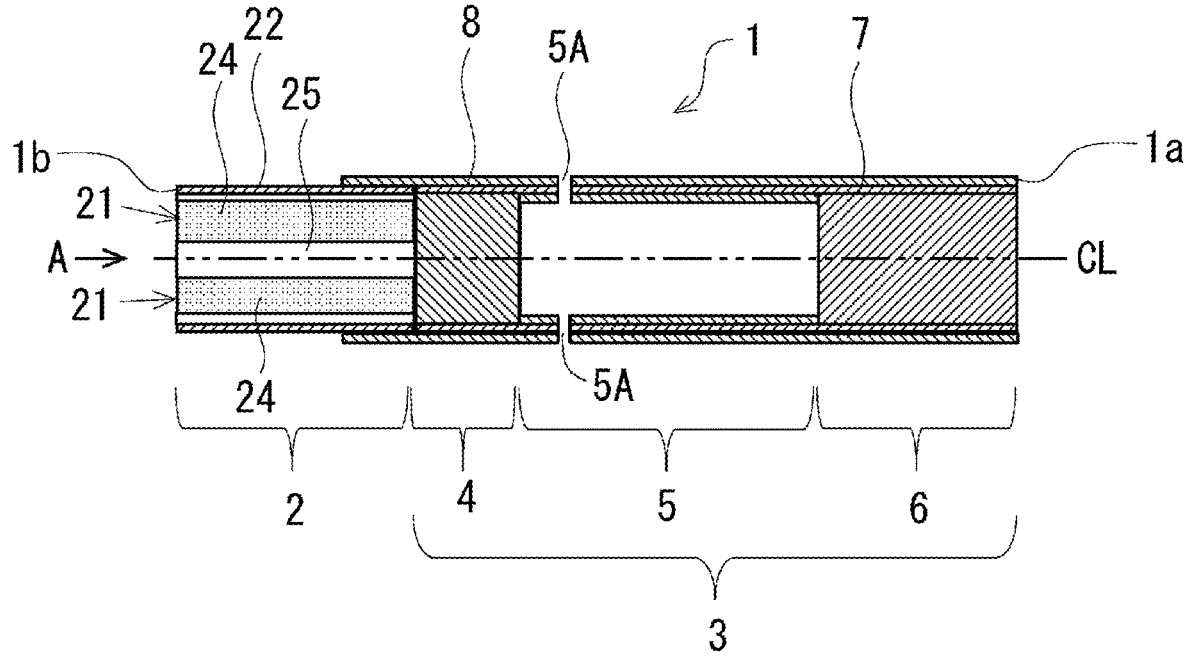

22
24
25
8
5A
1
7
1b
1a
21
A
21
CL
24
5A
2
4
5
6
3

FIG. 3

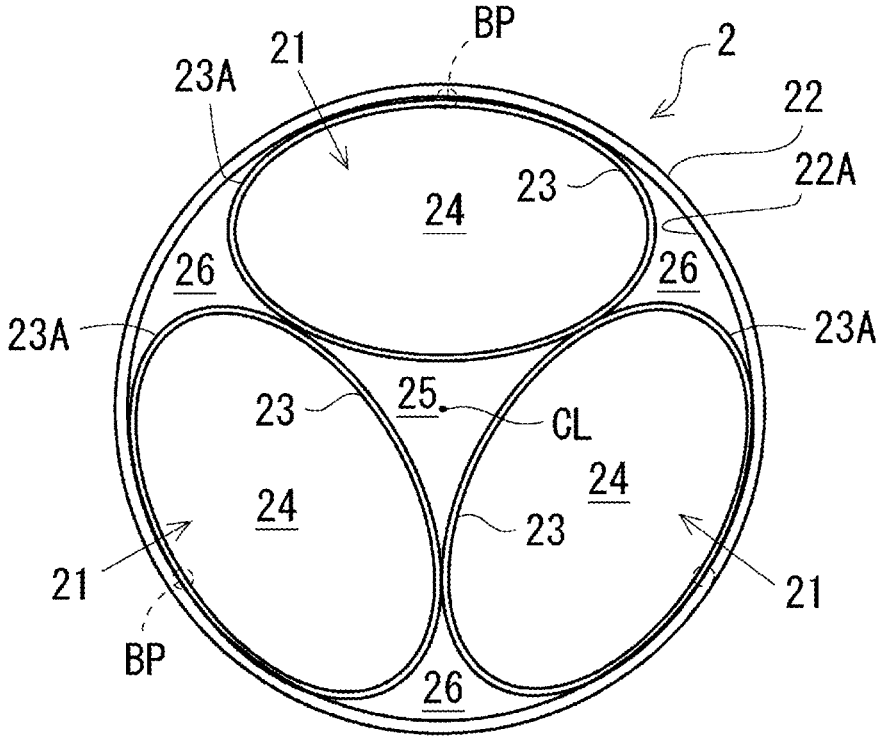

BP
21
2
23A
22
22A
23
24
26
26
23A
23A
23
25
CL
24
24
23
21
21
BP
26

FIG. 4

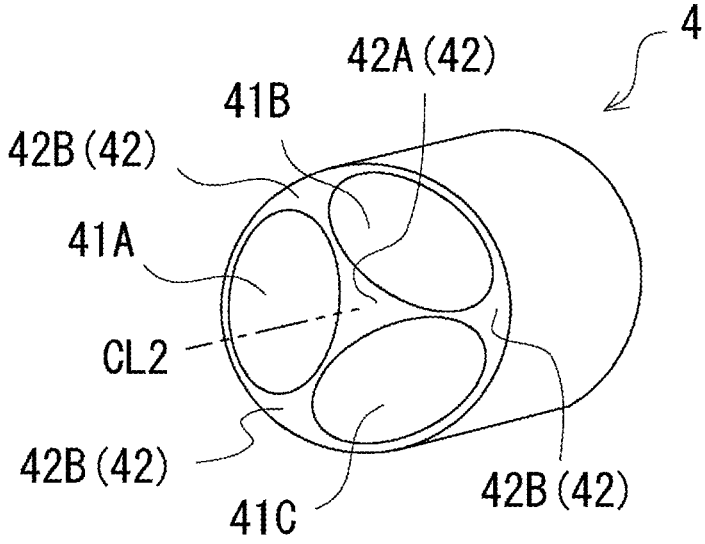

4
42A (42)
41B
42B (42)
41A
CL2
42B (42)
41C
42B (42)

FIG. 5

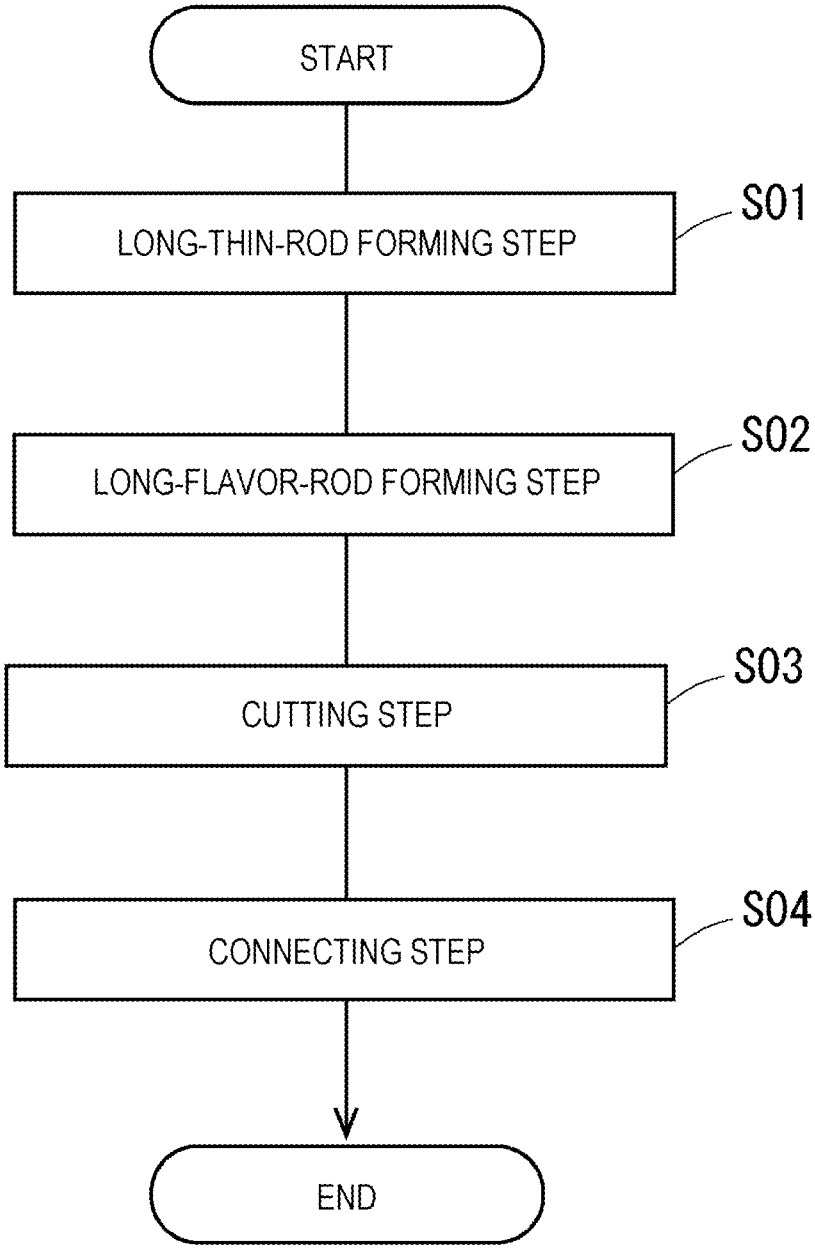

START
LONG-THIN-ROD FORMING STEP
S01
LONG-FLAVOR-ROD FORMING STEP
S02
CUTTING STEP
S03
CONNECTING STEP
S04
END

FIG. 6

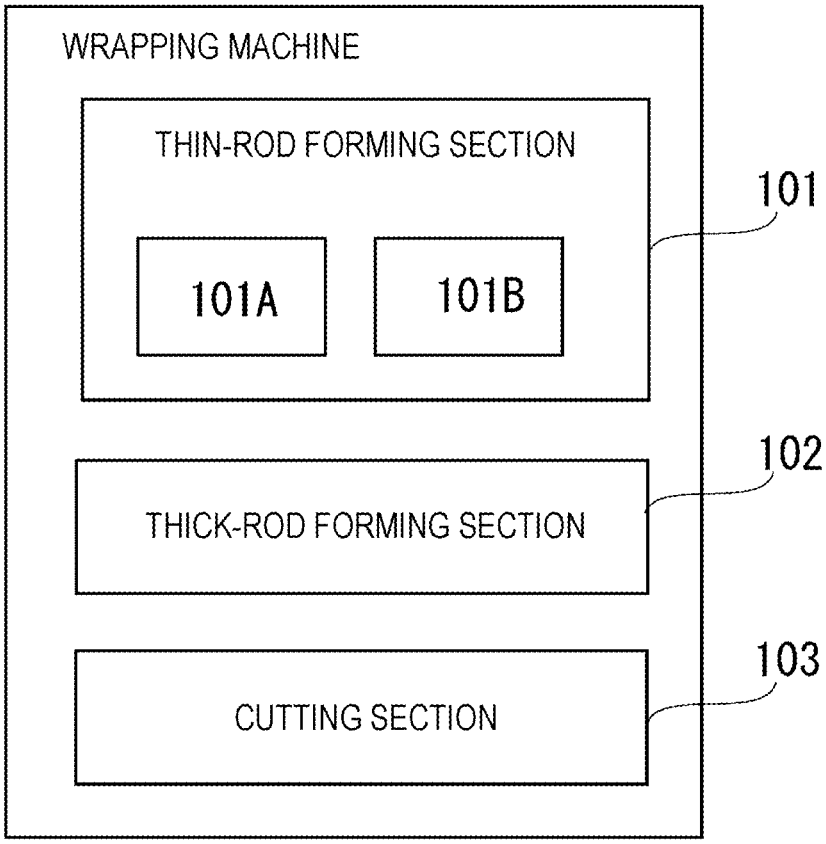

WRAPPING MACHINE
THIN-ROD FORMING SECTION
101A
101B
101
THICK-ROD FORMING SECTION
102
CUTTING SECTION
103

FIG. 7

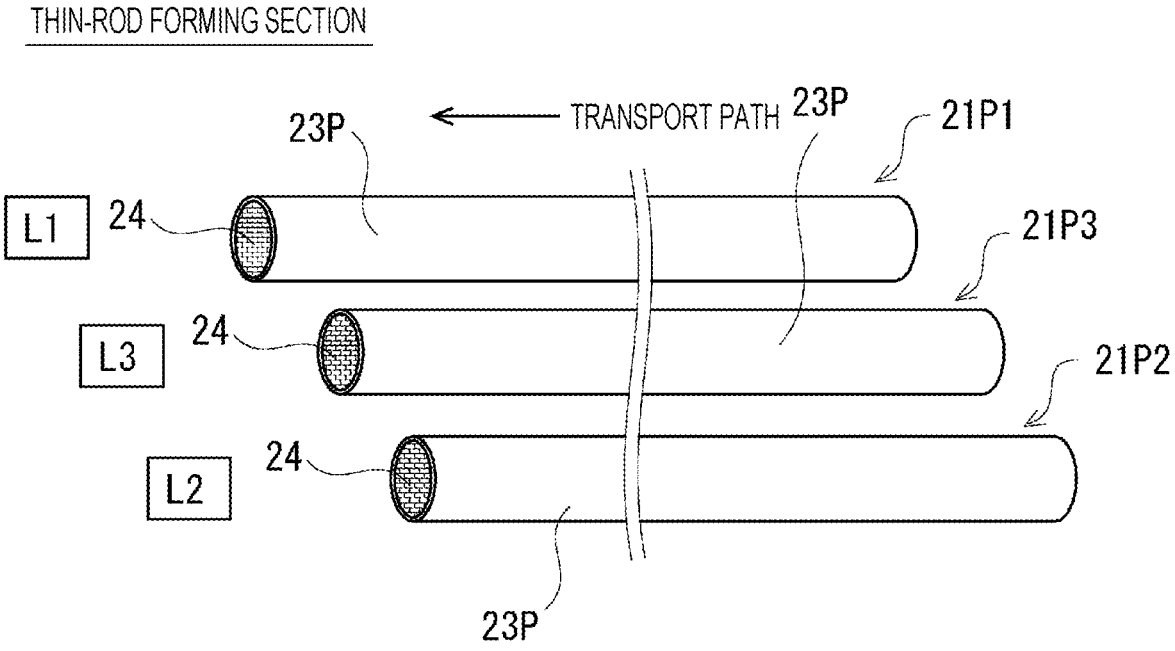

THIN-ROD FORMING SECTION
TRANSPORT PATH
23P
23P
21P1
L1
24
21P3
L3
24
21P2
L2
24
23P

FIG. 8

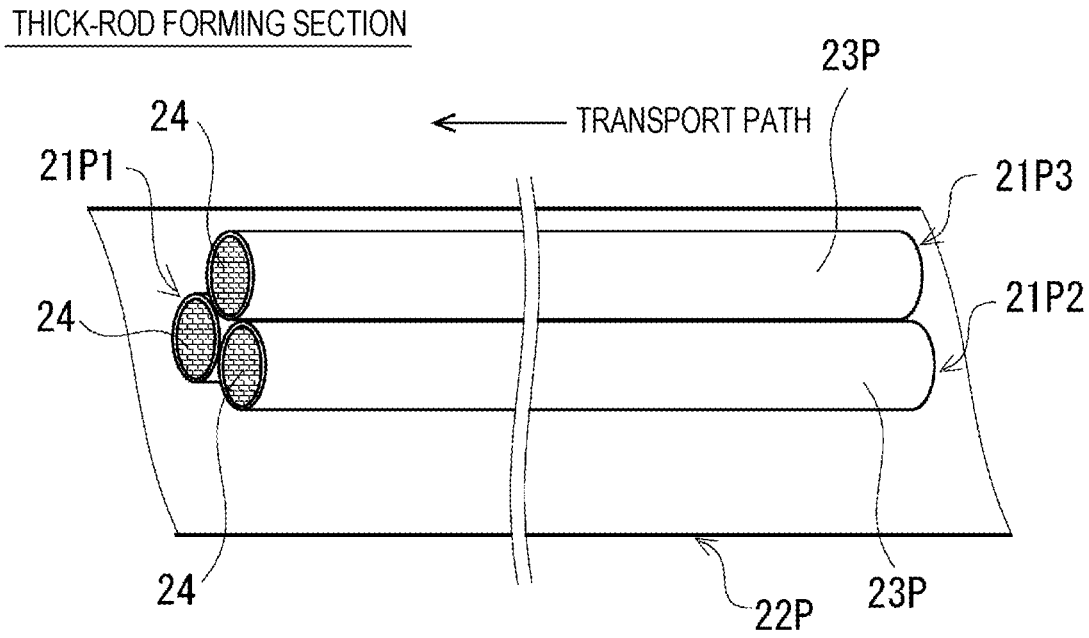

THICK-ROD FORMING SECTION
23P
TRANSPORT PATH
24
21P1
21P3
24
21P2
24
22P
23P

FIG. 9

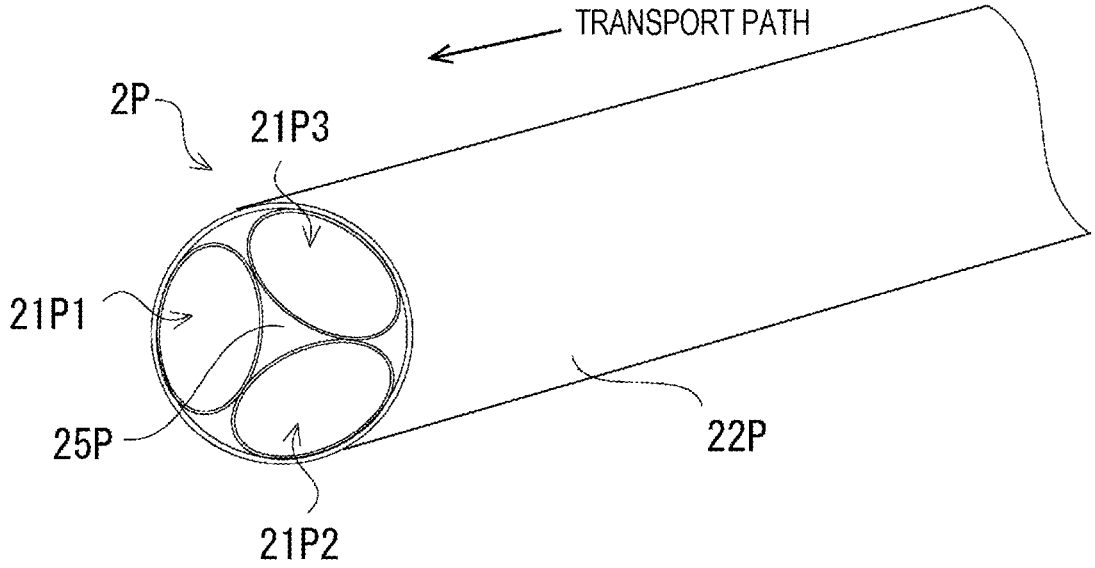

TRANSPORT PATH
2P
21P3
21P1
25P
22P
21P2

FIG. 10

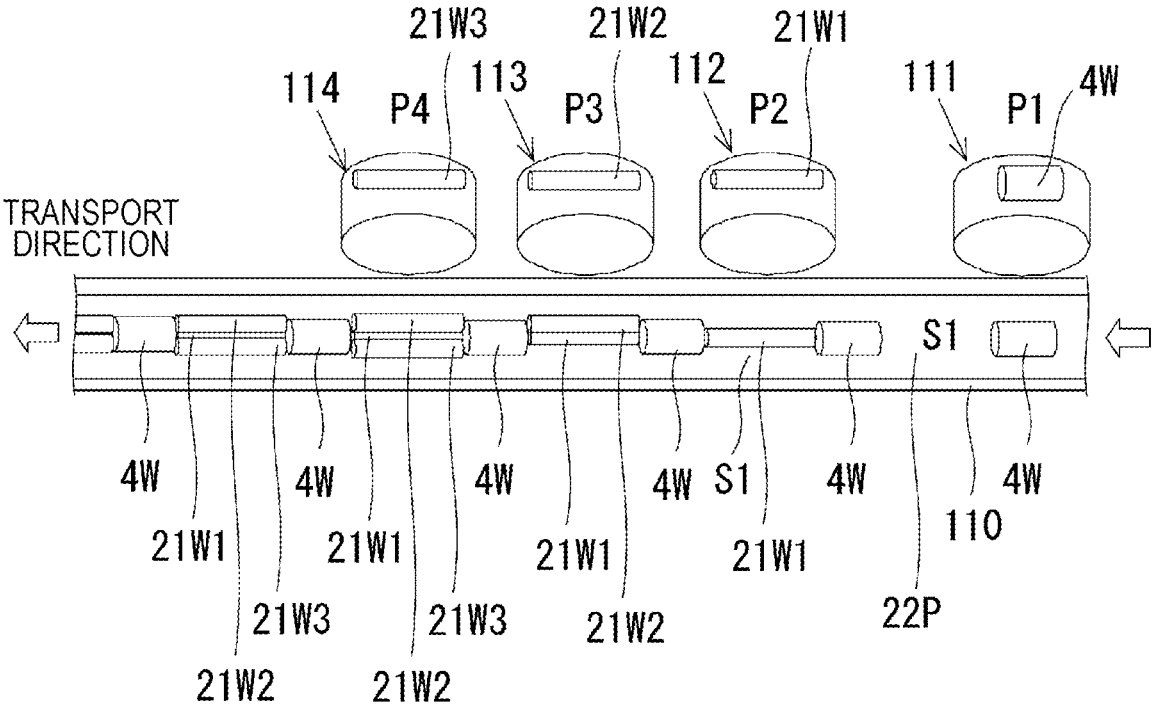

21W3
21W2
21W1
114
P4
113
P3
112
P2
111
P1
4W
TRANSPORT DIRECTION
S1
4W
21W1
21W2
21W3
4W
21W1
21W3
21W2
4W
21W1
21W2
4W
S1
21W1
4W
22P
110
4W

FIG. 11

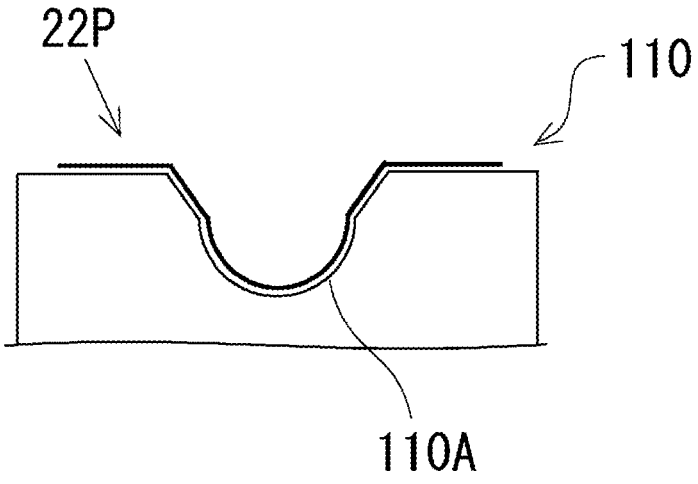

22P
110
110A

FIG. 12

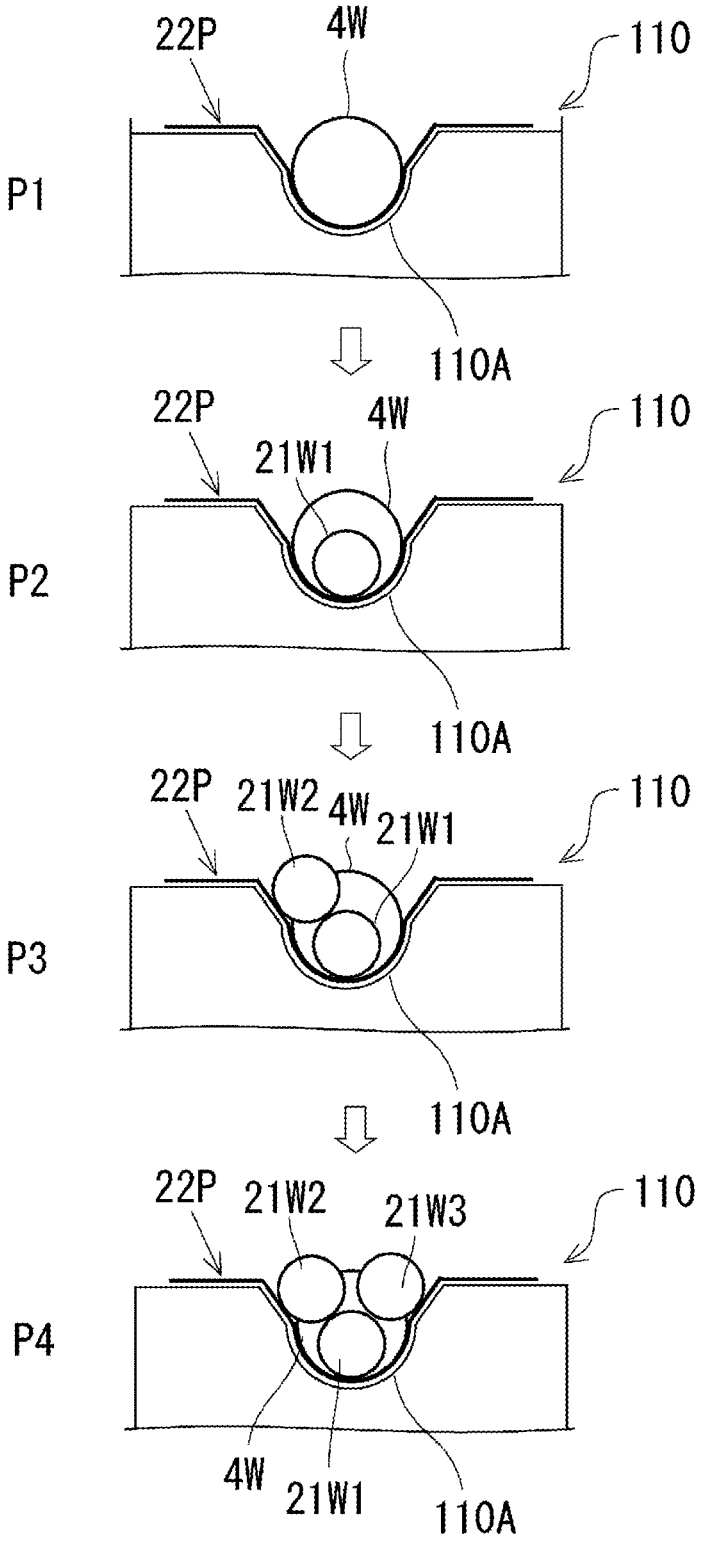

22P
4W
110
P1
110A
22P
4W
21W1
110
P2
110A
22P
21W2
4W
21W1
110
P3
110A
22P
21W2
21W3
110
P4
4W
21W1
110A

FIG. 13

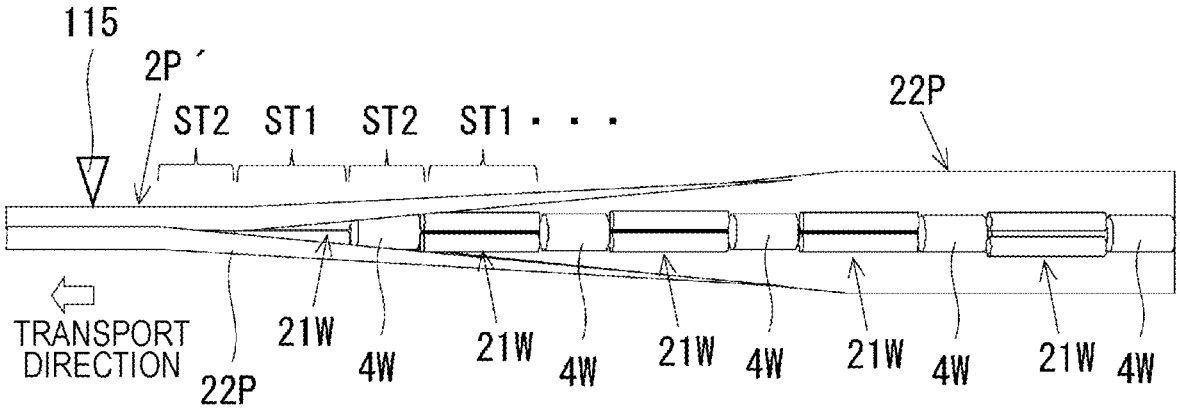

115
2P´
ST2
ST1
ST2
ST1 · · ·
22P
TRANSPORT DIRECTION
22P
21W
4W
21W
4W
21W
4W
21W
4W
21W
4W

FIG. 14

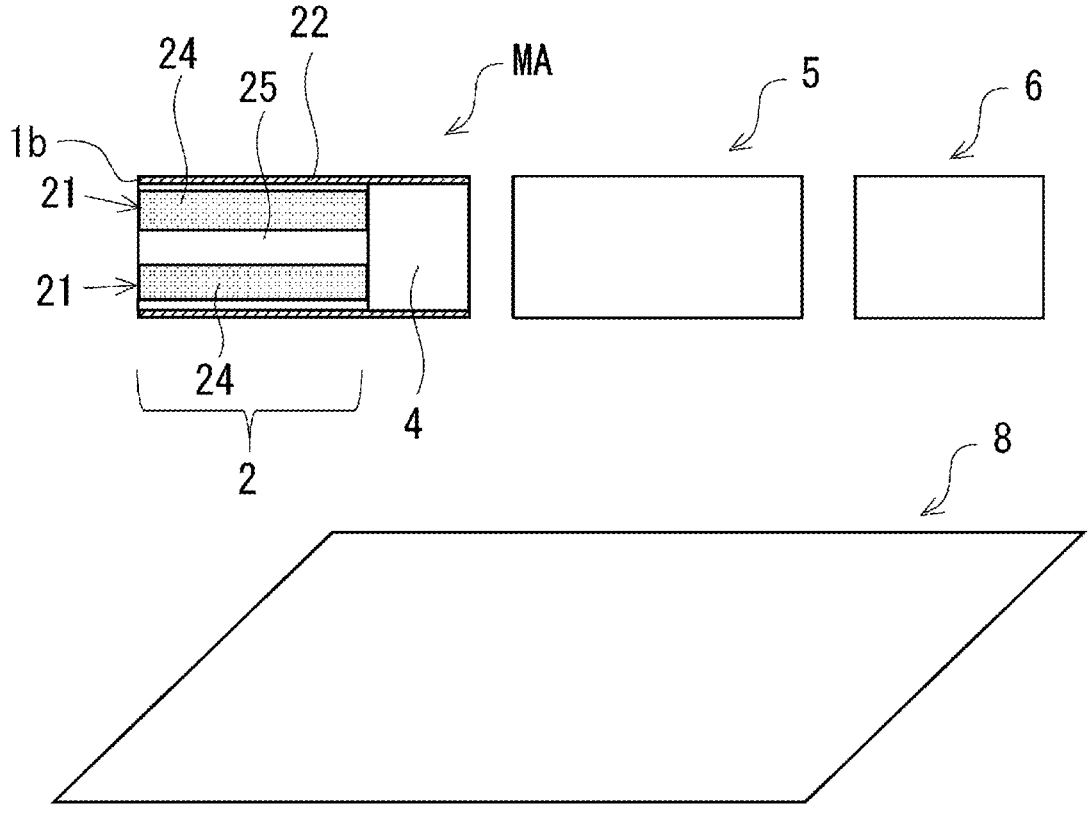

24
22
25
MA
5
6
1b
21
21
24
4
2
8

FIG. 15

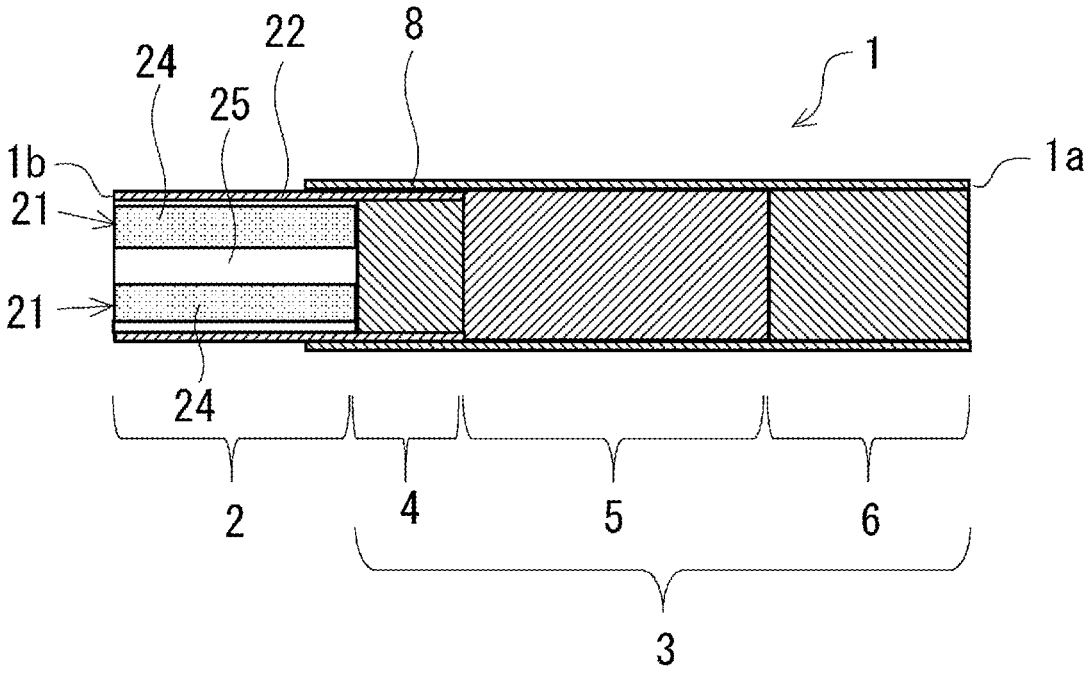


FIG. 16

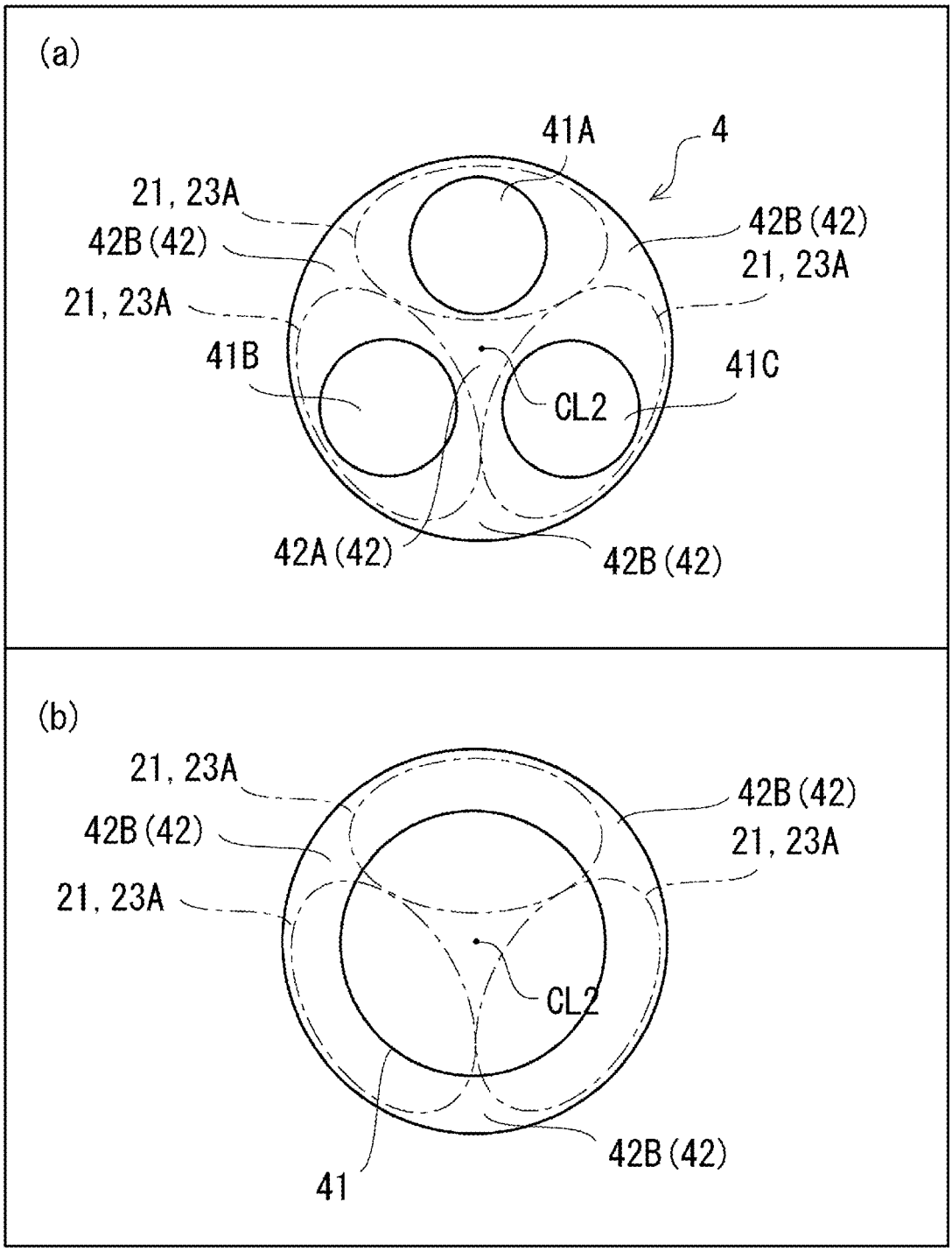

(a)
41A
4
21, 23A
42B (42)
42B (42)
21, 23A
21, 23A
41B
41C
CL2
42A (42)
42B (42)
(b)
21, 23A
42B (42)
42B (42)
21, 23A
21, 23A
CL2
41
42B (42)

FIG. 17

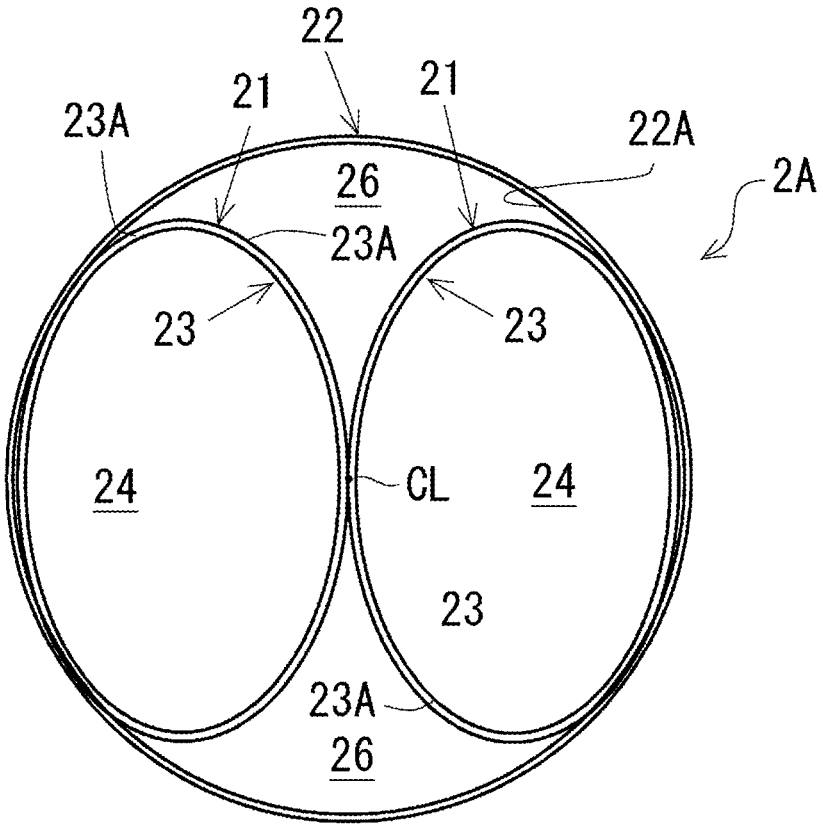


FIG. 18

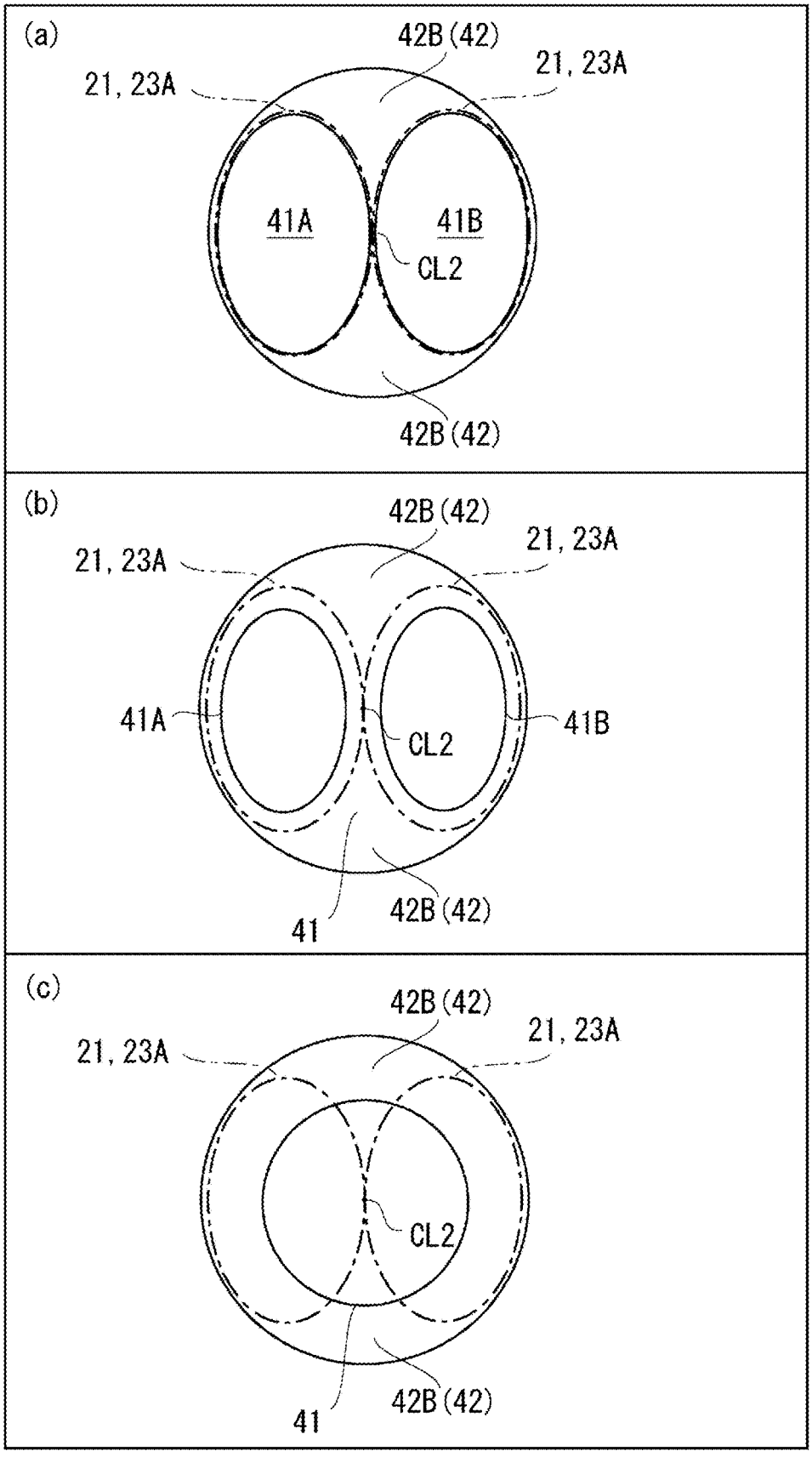

(a)
42B (42)
21, 23A
21, 23A
41A
41B
CL2
42B (42)
(b)
42B (42)
21, 23A
21, 23A
41A
CL2
41B
41
42B (42)
(c)
42B (42)
21, 23A
21, 23A
CL2
41
42B (42)

FIG. 19

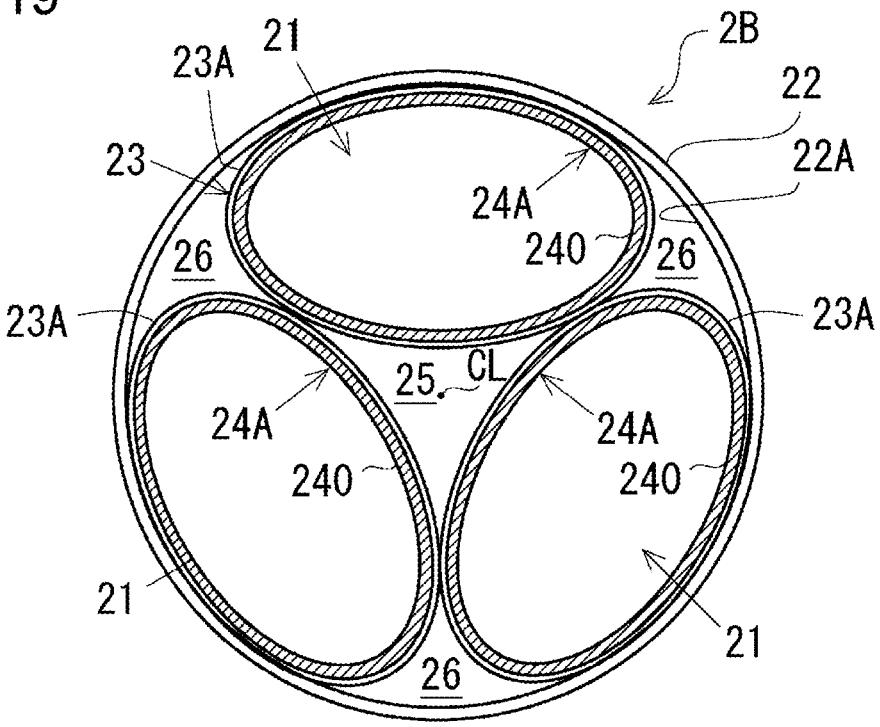

2B
21
23A
22
23
22A
24A
240
26
26
23A
23A
25
CL
24A
24A
240
240
21
21
26

FIG. 20

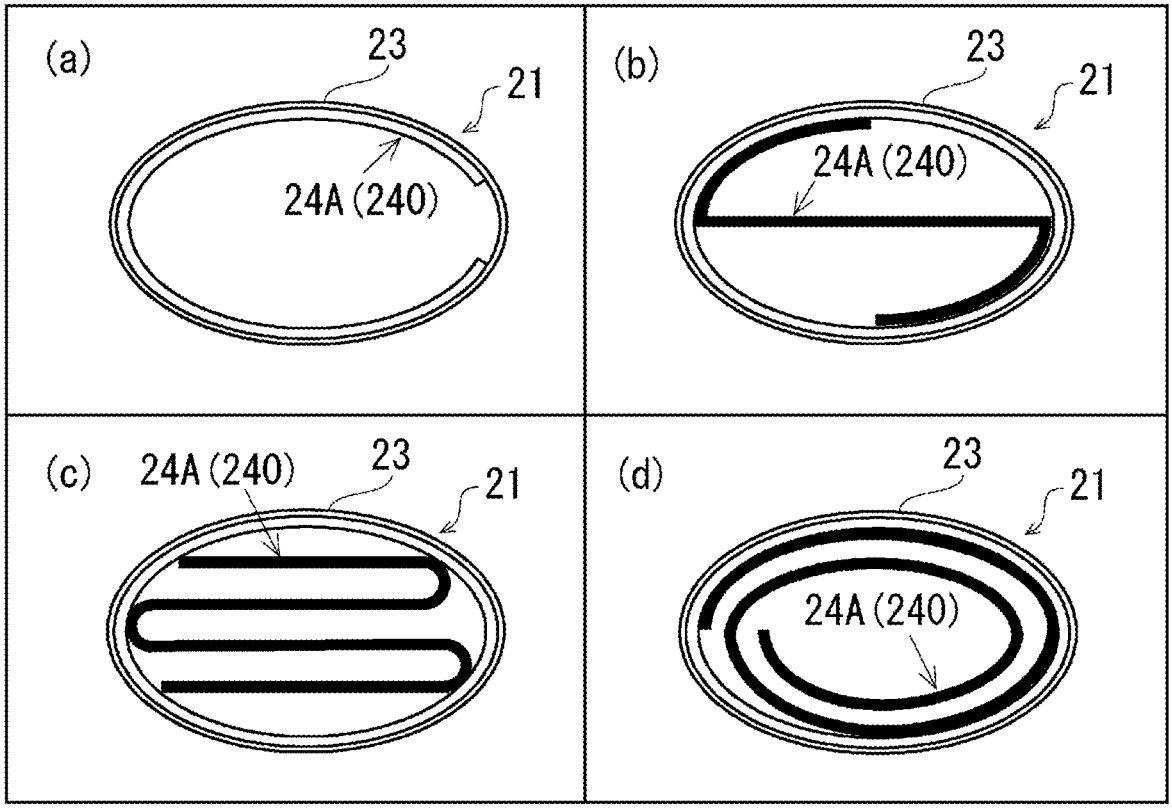
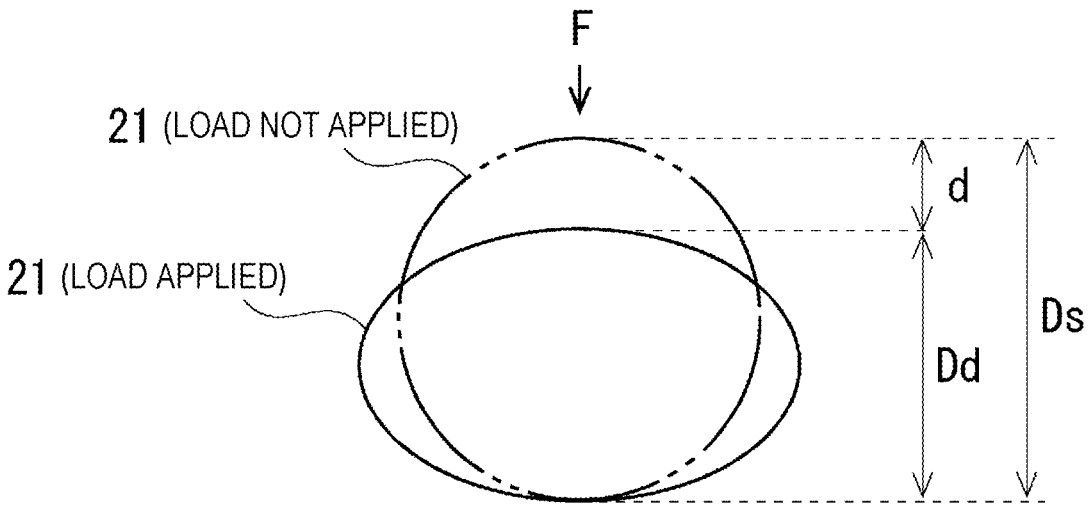

(a)
23
21
24A (240)
(b)
23
21
24A (240)
(c)
24A (240)
23
21
(d)
23
21
24A (240)

FIG. 21



FLAVOR STICK, NON-COMBUSTION HEATING TYPE FLAVOR INHALER PRODUCT, AND PRODUCTION METHOD FOR FLAVOR STICK

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application is a Continuation of PCT International Application No. PCT/JP2021/038783, filed on Oct. 20, 2021, which is hereby expressly incorporated by reference into the present application.

TECHNICAL FIELD

[0002] The present invention relates to a flavor stick, a non-combustion-heating-type flavor inhalation product, and a method for manufacturing the flavor stick.

BACKGROUND ART

[0003] Flavor sticks for use with a non-combustion-type flavor inhaler for inhaling flavor derived from a flavor source without combustion are known. An example of a known flavor stick includes a flavor rod and a mouthpiece disposed downstream of the flavor rod. The flavor rod is formed by filling a space inside wrapping paper with a filler including a flavor source, such as a tobacco material, and an aerosol-source material, such as glycerine or propylene glycol (see, for example, PTL 1).

[0004] This type of flavor stick is used together with a flavor inhalation device for inhalation. Typically, the flavor rod of the flavor stick is inserted into a heating chamber of the flavor inhalation device, and a heater included in the flavor inhalation device heats the flavor source of the flavor rod without combustion. The non-combustion heating causes the flavor source to release an aerosol containing a flavor component, and a user inhales the aerosol through the mouthpiece disposed downstream of the flavor rod.

[0005] An example of a known heating method used in the flavor inhalation device is an external heating method in which a heater (external heater) disposed on a peripheral wall surface that defines the heating chamber heats the flavor source of the flavor rod from the outer periphery.

CITATION LIST

Patent Literature

[0006] PTL 1: International Publication No. 2017-198838

[0007] PTL 2: Japanese Unexamined Patent Application Publication No. 7-184625

[0008] PTL 3: Japanese Patent No. 5220762

SUMMARY OF INVENTION

Technical Problem

[0009] The flavor rod included in the flavor stick according to the related art is formed simply by wrapping a single sheet of wrapping paper around the outer periphery of the flavor source. Therefore, the filler that fills the space inside the wrapping paper easily falls from the front end of the flavor rod.

[0010] The present invention has been made in light of the above-described circumstances, and its object is to provide a technology that relates to a flavor stick for inhalation using a flavor inhalation device based on an external heating method, and with which a flavor source that fills the space inside wrapping paper does not easily fall from the front end of a flavor rod.

Solution to Problem

[0011] To achieve the above-described object, a flavor stick according to the present invention includes: a flavor rod configured to be inserted into a heating chamber of a flavor inhalation device and heated from an outer periphery by an external heater disposed in or on a side peripheral portion of the heating chamber; and a mouthpiece connected to a rear end of the flavor rod. The flavor rod includes a plurality of thin rods and outer wrapping paper with which the plurality of thin rods are bundled and wrapped. Each of the plurality of thin rods includes inner wrapping paper, a flavor source, and an aerosol-source material, the flavor source and the aerosol-source material being disposed inside the inner wrapping paper.

[0012] The inner wrapping paper of each of the plurality of thin rods may be bonded to the outer wrapping paper.

[0013] The mouthpiece may include a leakage-suppressing portion in a front end section thereof, the leakage-suppressing portion being connected to a rear end of the flavor rod and including an aerosol flow path and a blocking portion, the aerosol flow path extending in the axial direction and allowing an aerosol generated in the plurality of thin rods to flow therethrough, the blocking portion blocking a rear end of a gap formed between the outer wrapping paper and the plurality of thin rods.

[0014] The gap may include an outer peripheral gap formed adjacent to an outer periphery of the flavor rod in cross-section, and the leakage-suppressing portion may include an outer peripheral blocking portion that faces the outer peripheral gap.

[0015] The gap may include a central gap formed in a central region of the flavor rod in cross-section, and the leakage-suppressing portion may include a central blocking portion that faces the central gap.

[0016] The aerosol flow path may face rear ends of the plurality of thin rods.

[0017] A rear end of each of the plurality of thin rods may extend along the blocking portion and the aerosol flow path. The blocking portion may serve as a stopper in regions in which the blocking portion faces the rear ends of the thin rods, the stopper restraining the thin rods from being displaced when the flavor rod is inserted into the heating chamber.

[0018] The present invention may be applied to a non-combustion-type flavor inhalation product. A non-combustion-type flavor inhalation product according to the present invention includes the above-described flavor stick and a flavor inhalation device used for inhalation from the flavor stick, the flavor inhalation device including a heating chamber that allows insertion of the flavor rod of the flavor stick and an external heater disposed in or on a side peripheral portion of the heating chamber.

[0019] The present invention may also be applied to a method for manufacturing a flavor rod configured to be inserted into a heating chamber of a flavor inhalation device and heated from an outer periphery by an external heater disposed in or on a side peripheral portion of the heating chamber. The method for manufacturing a flavor rod accord-

ing to the present invention includes: a long-thin-rod forming step in which a plurality of long thin rods are formed in parallel with each other along a transport direction of a wrapping machine by wrapping the flavor source with long-sheet-shaped thin-rod wrapping paper continuously in a longitudinal direction; a long-flavor-rod forming step in which the plurality of long thin rods are joined and wrapped together with long outer wrapping paper to form a long flavor rod; and a cutting step in which the long flavor rod is cut to a predetermined length to form the flavor rod.

[0020] The solutions to the problem according to the present invention may be applied in any possible combinations.

Advantageous Effects of Invention

[0021] The present invention provides a technology that relates to a flavor stick for inhalation using a flavor inhalation device based on an external heating method, and with which a flavor source that fills the space inside wrapping paper does not easily fall from the front end of a flavor rod.

BRIEF DESCRIPTION OF DRAWINGS

[0022] FIG. **1** is a schematic diagram illustrating a flavor inhalation device for non-combustion heating of a flavor stick according to a first embodiment.

[0023] FIG. **2** is a schematic diagram illustrating the internal structure of the flavor stick according to the first embodiment.

[0024] FIG. **3** illustrates the structure viewed in the direction of arrow A in FIG. **2**.

[0025] FIG. **4** is a perspective view of a leakage-suppressing portion according to the first embodiment.

[0026] FIG. **5** illustrates the steps for manufacturing a flavor rod according to the first embodiment.

[0027] FIG. **6** illustrates a wrapping machine used to manufacture the flavor rod according to the first embodiment.

[0028] FIG. **7** illustrates a step for manufacturing the flavor rod according to the first embodiment.

[0029] FIG. **8** illustrates another step for manufacturing the flavor rod according to the first embodiment.

[0030] FIG. **9** illustrates another step for manufacturing the flavor rod according to the first embodiment.

[0031] FIG. **10** illustrates a long-flavor-rod forming step of a second manufacturing method.

[0032] FIG. **11** illustrates the shape of a conveyor in cross-section orthogonal to a transport direction.

[0033] FIG. **12** illustrates the manner in which a leakage-suppressing-component supply drum and thin-rod supply drums supply respective components at first to fourth positions.

[0034] FIG. **13** illustrates the long-flavor-rod forming step of the second manufacturing method.

[0035] FIG. **14** illustrates an intermediate assembly formed in a step of forming the flavor rod, and also illustrates a cooling portion, a filter portion, and tipping paper that are separately prepared.

[0036] FIG. **15** illustrates a flavor stick manufactured by the second manufacturing method.

[0037] FIG. **16** illustrates modifications of the leakage-suppressing portion.

[0038] FIG. **17** illustrates a cross-section of a flavor rod according to a second embodiment.

[0039] FIG. **18** illustrates cross-sections of leakage-suppressing portions according to the second embodiment.

[0040] FIG. **19** illustrates a cross-section of a flavor rod according to a third embodiment.

[0041] FIG. **20** illustrates variants of the flavor source included in the thin rod according to the third embodiment.

[0042] FIG. **21** is a schematic diagram illustrating the measurement of the hardness of a thin rod.

DESCRIPTION OF EMBODIMENTS

[0043] A flavor stick and a non-combustion-type flavor inhalation product according to an embodiment of the present invention will now be described with reference to the drawings. The dimensions, materials, shapes, relative arrangements, etc., of structural elements described in the embodiment are not intended to limit the technical scope of the present invention only thereto unless specified otherwise.

First Embodiment

[0044] FIG. **1** is a schematic diagram illustrating a flavor inhalation device **30** for non-combustion heating of a flavor stick according to a first embodiment. FIG. **2** is a schematic diagram illustrating the internal structure of a flavor stick **1** according to the first embodiment. The flavor inhalation device **30** is an inhalation device used for inhalation from the flavor stick **1**. The flavor stick **1** and the flavor inhalation device **30** constitute a non-combustion-type flavor inhalation product.

[0045] The flavor inhalation device **30** includes a heating chamber **31** capable of receiving a flavor rod **2** of the flavor stick **1** and having an insertion opening **31**A through which the flavor rod **2** can be inserted and extracted. The heating chamber **31** of the flavor inhalation device **30** includes a chamber side peripheral wall **31**B (side peripheral portion) in which an electric external heater **32** for heating the flavor rod **2** from the outer periphery thereof is disposed.

[0046] The flavor stick **1** includes the flavor rod **2** and a mouthpiece **3**. The flavor rod **2** is inserted into the heating chamber **31** of the flavor inhalation device **30** and heated by the external heater **32**. The mouthpiece **3** is connected to a rear end of the flavor rod **2**. In the present embodiment, for example, the flavor stick **1** has a cylindrical rod shape that extends in one direction. In FIG. **2**, reference sign CL denotes a central axis of the flavor stick **1**. The flavor rod **2** and the mouthpiece **3** are arranged coaxially, and therefore the central axis CL is also the central axis of the flavor rod **2** and the mouthpiece **3**.

[0047] The cylindrical-rod-shaped flavor rod **2** and the mouthpiece **3** are arranged coaxially, and are connected together by being coaxially wrapped with tipping paper **8**. Reference sign **1***a* denotes a mouthpiece end **1***a* formed at the rear end of the flavor stick **1**, and **1***b* denotes the front end of the flavor stick **1**. The flavor stick **1** is inserted into the heating chamber **31** of the flavor inhalation device **30** from the front end **1***b*.

[0048] The flavor rod **2** includes plural thin rods **21** and outer wrapping paper **22** with which the thin rods **21** are bundled and wrapped. FIG. **3** illustrates the structure viewed in the direction of arrow A in FIG. **2**. FIG. **3** is a front view of the flavor stick **1** (flavor rod **2**) viewed from the front-end-**1***b* side. Each of the thin rods **21** that constitute the flavor rod **2** includes inner wrapping paper **23**, and also

includes a flavor source and an aerosol-source material disposed inside the inner wrapping paper **23**. Although the flavor rod **2** includes three thin rods **21** in the example illustrated in FIG. **3**, the number of thin rods **21** is not particularly limited as long as two or more thin rods **21** are provided. Each thin rod **21** has a central axis extending parallel to the central axis CL of the flavor stick **1**, and extends over the entire length of the flavor rod **2**. In FIG. **3**, reference sign **24** denotes the flavor source containing the aerosol-source material. Here, an example in which a tobacco filler is used as the flavor source will be described.

[0049] When the flavor inhalation device **30** is used for inhalation from the flavor stick **1**, the external heater **32** is activated while the flavor rod **2** of the flavor stick **1** is inserted in the heating chamber. As a result, the flavor source **24** (tobacco filler) containing the aerosol-source material is heated in each thin rod **21**, so that an aerosol containing a flavor component (for example, a tobacco component) is released. The aerosol containing the flavor component (for example, the tobacco component) generated in the flavor rod **2** is transmitted to the mouthpiece end **1***a* through the mouthpiece **3** and inhaled by a user.

[0050] The tobacco filler used as the flavor source **24** may contain shredded tobacco. The material of the shredded tobacco contained in the tobacco filler is not particularly limited, and a known material, such as lamina and midrib, may be used. The material may be obtained by crushing dried tobacco leaves into crushed tobacco, uniformizing the crushed tobacco into a sheet (hereinafter also referred to simply as a "uniformized sheet"), and shredding the uniformized sheet. There are plural known methods for manufacturing the uniformized sheet, that is, for crushing tobacco leaves into pieces and forming the pieces into a uniformized sheet. The first method is to produce a sheet by using a papermaking process (sheet-making method). The second is a method of mixing a suitable solvent, such as water, and crushed tobacco leaves into a uniform mixture, casting the uniform mixture on a metal plate or a metal-plate belt, and performing a drying process to produce a cast sheet (slurry method). The third is a method of mixing a suitable solvent, such as water, and crushed tobacco leaves into a uniform mixture and forming the uniform mixture into a sheet shape by extrusion molding to produce a rolled sheet (rolling method).

[0051] Alternatively, the tobacco filler may be tobacco strands obtained by cutting the above-described uniformized sheet. The tobacco strands are about as long as the thin rods **21** in the axial direction, and the space inside the inner wrapping paper **23** may be filled with the tobacco strands arranged such that the longitudinal directions thereof coincide with the axial direction of the thin rods **21**. It is, of course, not necessary that all the tobacco strands included in each thin rod **21** be arranged to extend in the axial direction of the thin rods **21**, and some of the tobacco strands (for example, 50% or more of the total amount of tobacco strands) may be arranged to extend in the axial direction of the thin rods **21**. Alternatively, the tobacco filler may be the above-described uniformized sheet folded in a gathered form.

[0052] Various types of tobacco may be used to form the tobacco filler. For example, flue-cured tobacco, burley tobacco, orient tobacco, domestic tobacco, other types of *Nicotiana tabacum* or nicotiana rustica, or a mixture thereof may be used.

[0053] The tobacco filler may contain a flavoring agent. The type of the flavoring agent contained in the tobacco filler is not particularly limited. The flavoring agent may be, for example, acetanisole, acetophenone, acetylpyrazine, 2-acetylthiazole, alfalfa extract, amyl alcohol, amyl butyrate, trans-anethole, star anise oil, apple juice, Peru balsam oil, beeswax absolute, benzaldehyde, benzoin resinoid, benzyl alcohol, benzyl benzoate, benzyl phenylacetate, benzyl propionate, 2,3-butanedione, 2-butanol, butyl butyrate, butyric acid, caramel, cardamom oil, carob absolute, β-carotene, carrot juice, L-carvone, β-caryophyllene, cassia bark oil, cedarwood oil, celery seed oil, chamomile oil, cinnamaldehyde, cinnamic acid, cinnamyl alcohol, cinnamyl cinnamate, citronella oil, DL-citronellol, clary sage extract, cocoa, coffee, cognac oil, coriander oil, cuminaldehyde, davana oil, 5-decalactone, γ-decalactone, decanoic acid, dill herb oil, 3,4-dimethyl-1,2-cyclopentanedione, 4,5-dimethyl-3-hydroxy-2,5-dihydrofuran-2-one, 3,7-dimethyl-6-octenoic acid, 2,3-dimethylpyrazine, 2,5-dimethylpyrazine, 2,6-dimethylpyrazine, ethyl 2-methylbutyrate, ethyl acetate, ethyl butyrate, ethyl hexanoate, ethyl isovalerate, ethyl lactate, ethyl laurate, ethyl levulinate, ethyl maltol, ethyl octanoate, ethyl oleate, ethyl palmitate, ethyl phenylacetate, ethyl propionate, ethyl stearate, ethyl valerate, ethyl vanillin, ethyl vanillin glucoside, 2-ethyl-3, (5 or 6)-dimethylpyrazine, 5-ethyl-3-hydroxy-4-methyl-2(5H)-furanone, 2-ethyl-3-methylpyrazine, eucalyptol, fenugreek absolute, genet absolute, gentian root infusion, geraniol, geranyl acetate, grape juice, guaiacol, guava extract, γ-heptalactone, γ-hexalactone, hexanoic acid, cis-3-hexen-1-ol, hexyl acetate, hexyl alcohol, hexyl phenylacetate, honey, 4-hydroxy-3-pentenoic acid lactone, 4-hydroxy-4-(3-hydroxy-1-butenyl)-3,5,5-trimethyl-2-cyclohexen-1-one, 4-(para-hydroxyphenyl)-2-butanone, sodium 4-hydroxyundecanoate, immortelle absolute, β-ionone, isoamyl acetate, isoamyl butyrate, isoamyl phenylacetate, isobutyl acetate, isobutyl phenylacetate, jasmine absolute, kola nut tincture, labdanum oil, terpeneless lemon oil, licorice extract, linalool, linalyl acetate, lovage root oil, maltol, maple syrup, menthol, menthone, L-menthyl acetate, para-methoxybenzaldehyde, methyl-2-pyrrolyl ketone, methyl anthranilate, methyl phenylacetate, methyl salicylate, 4'-methylacetophenone, methylcyclopentenolone, 3-methylvaleric acid, mimosa absolute, molasses, myristic acid, nerol, nerolidol, γ-nonalactone, nutmeg oil, δ-octalactone, octanal, octanoic acid, orange flower oil, orange oil, orris root oil, palmitic acid, ω-pentadecalactone, peppermint oil, petitgrain Paraguay oil, phenethyl alcohol, phenethyl phenylacetate, phenylacetic acid, piperonal, plum extract, propenyl guaethol, propyl acetate, 3-propylidene phthalide, prune juice, pyruvic acid, raisin extract, rose oil, rum, sage oil, sandalwood oil, spearmint oil, styrax absolute, marigold oil, tea distillate, α-terpineol, terpinyl acetate, 5,6,7,8-tetrahydroquinoxaline, 1,5,5,9-tetramethyl-13-oxacyclo (8.3.0.0(4.9))tridecane, 2,3,5,6-tetramethylpyrazine, thyme oil, tomato extract, 2-tridecanone, triethyl citrate, 4-(2,6,6-trimethyl-1-cyclohexenyl)2-buten-4-one, 2,6,6-trimethyl-2-cyclohexene-1,4-dione, 4-(2,6,6-trimethyl-1,3-cyclohexadienyl)2-buten-4-one, 2,3,5-trimethylpyrazine, γ-undecalactone, γ-valerolactone, vanilla extract, vanillin, veratraldehyde, violet leaf absolute, N-ethyl-p-menthane-3-carboxamide (WS-3), and ethyl-2-(p-menthane-3-carboxamide)acetate (WS-5). Menthol is particularly preferred. These flavors may be used alone or in combination of two or more. The size of the shredded

tobacco contained in the tobacco filler and the water content of the flavor source **24** are not particularly limited.

[0054] The flavor source **24** included in each thin rod **21** may contain no tobacco material. This type of flavor source **24** may be a plant material containing no tobacco component. In other words, each thin rod **21** may contain one or more selected from mesophyll, vein, stem, root, flower, seed, and pulp of a plant containing no tobacco component. A herbal material is a plant material containing no tobacco component suitable for use as the flavor source. Examples of the herbal material include allspice, allspice, black pepper, northern bugweed, calamus root, catmint, catuaba, cayenne pepper, chaga, chervil, cinnamon, Chinese ginseng, St. John's wort, green tea, black tea, black cohosh, cayenne, chamomile, amsonia, cocoa, honeybush, echinacea, feverfew, ginger, goldenseal, lavender, licorice, sweet marjoram, milk thistle, mint (menthe), oolong tea, oregano, pennyroyal, peppermint, red clover, rooibos (red or green), rosehip, rosemary, sage, clary sage, savory, spearmint, gotu kola, thyme, turmeric, valerian, wintergreen, yellow dock, yerba mate, yerba santa, bacopa monniera, ashwagandha, capsicum, Chinese lantern plant, and marian thistle.

[0055] The flavor source included in each thin rod **21** may, of course, contain a mixture of the tobacco material and the above-described herbal material.

[0056] The aerosol-source material is a substance that is volatilized when heated by the heater of the flavor inhalation device **30** and releases a volatile substance that generates an aerosol when cooled. The aerosol-source material is, for example, liquid. The type of the aerosol-source material is not particularly limited, and extracts from various natural products and/or components thereof can be selected depending on the intended use. Examples of the aerosol-source material include glycerol, propylene glycol, triacetin, 1,3-butanediol, and mixtures thereof.

[0057] In the example illustrated in FIG. **3**, each thin rod **21** has an elliptical cross-sectional shape with a minor axis extending in a radial direction of the flavor rod **2**. More specifically, the minor axis of each thin rod **21** extends radially from the central axis CL of the flavor rod **2**. In FIG. **3**, reference sign BP denotes bonding portions at which the outer surfaces **23**A of the inner wrapping paper **23** of the thin rods **21** are bonded to the inner surface **22**A of the outer wrapping paper **22**. The outer surfaces **23**A of the inner wrapping paper **23** are surfaces opposite to the surfaces (inner surfaces) facing the flavor source **24**. Each thin rod **21** may have a shape other than the elliptical shape.

[0058] The mouthpiece **3** will now be described. The mouthpiece **3** includes a leakage-suppressing portion **4**, a cooling portion **5**, and a filter portion **6** arranged in that order from the front end. The leakage-suppressing portion **4**, the cooling portion **5**, and the filter portion **6** of the mouthpiece **3** are arranged coaxially, and wrapped together with wrapping paper **7**. The wrapping paper **7** may be omitted, and the flavor rod **2**, the leakage-suppressing portion **4**, the cooling portion **5**, and the filter portion **6** may be wrapped together with the tipping paper **8**.

[0059] FIG. **4** is a perspective view of the leakage-suppressing portion **4** according to the first embodiment. The leakage-suppressing portion **4** is positioned immediately behind the flavor rod **2**, and is disposed in contact with the rear end of the flavor rod **2**. Reference sign CL**2** denotes a central axis of the leakage-suppressing portion **4**. The leakage-suppressing portion **4** has a rod shape in which a plurality of through holes serving as aerosol flow paths **41**A to **41**C are formed along the central axis CL**2**. The cross-sections of the aerosol flow paths **41**A to **41**C are, for example, congruent with the cross-sectional areas of the respective thin rods **21** of the flavor rod **2**, and the aerosol flow paths **41**A to **41**C are arranged such that the front ends thereof face the rear ends of the respective thin rods **21**. In other words, the aerosol flow paths **41**A to **41**C are connected to the respective thin rods **21** along the central axis CL of the flavor stick **1**. Thus, the aerosols generated in the thin rods **21** of the flavor rod **2** can individually flow into the aerosol flow paths **41**A to **41**C disposed downstream of the thin rods **21**.

[0060] A gap may be formed along the central axis CL**2** in a region between the outer wrapping paper **22** of the flavor rod **2** and the inner wrapping paper **23** of each thin rod **21**. In the example illustrated in FIG. **3**, a central gap **25** is formed in a central region surrounded by the three thin rods **21** in cross-section of the flavor rod **2**. In FIG. **3**, the central gap **25** has a shape similar to a triangular shape in cross-section. However, the shape and size of the central gap **25** vary depending on the number, size, shape, arrangement, etc., of the thin rods **21** included in the flavor rod **2**. The thin rods **21** may be arranged such that no central gap **25** is formed.

[0061] In the example illustrated in FIG. **3**, outer peripheral gaps **26** are formed adjacent to the outer periphery of the flavor rod **2** in cross-section. In a cross-section of the flavor rod **2**, the outer peripheral gaps **26** are gaps formed in an outer peripheral region adjacent to and inside the outer wrapping paper **22**. In the example illustrated in FIG. **3**, the outer peripheral gaps **26** are gaps formed between the thin rods **21** that are adjacent to each other in the circumferential direction of the flavor rod **2**, and are formed at intersecting positions between the major axes of the thin rods **21** that are adjacent to each other in the circumferential direction of the flavor rod **2**. However, the shape and size of the outer peripheral gaps **26** vary depending on the number, size, shape, arrangement, etc., of the thin rods **21** included in the flavor rod **2**. The thin rods **21** may be arranged such that no outer peripheral gaps **26** are formed.

[0062] The above-described central gap **25** and the outer peripheral gaps **26** extend along the central axis CL from the front end **1***b* to the rear end of the flavor rod **2**.

[0063] During inhalation from the flavor stick **1**, air is introduced into the flavor rod **2** from the front end **1***b* and distributed between the thin rods **21**. At this time, if the air introduced from the front end **1***b* of the flavor rod **2** passes through the central gap **25** and the outer peripheral gaps **26**, the air flows into the mouthpiece **3** without passing through the flavor source **24** and serves as leakage air. Therefore, in the present embodiment, the leakage-suppressing portion **4** is disposed downstream of the flavor rod **2** to suppress or reduce the leakage of air through the outer peripheral gaps **26** in the flavor rod **2**.

[0064] In FIG. **4**, reference sign **42** denotes a blocking surface (blocking portion) formed at the front end of the leakage-suppressing portion **4**. The leakage-suppressing portion **4** has the blocking surface **42** (blocking portion) facing the central gap **25** and the outer peripheral gaps **26** in the flavor rod **2**, thereby blocking the rear ends of the central gap **25** and the outer peripheral gaps **26**. In the structure illustrated in FIG. **4**, the blocking surface **42** includes a central blocking portion **42**A and outer peripheral blocking

portions **42**B. The central blocking portion **42**A faces the above-described central gap **25** to block the rear end of the central gap **25**. The outer peripheral blocking portions **42**B face the above-described outer peripheral gaps **26** to block the outer peripheral gaps **26**. As a result, during inhalation from the flavor stick **1**, the air introduced into the flavor rod **2** from the front end **1***b* can be restrained from leaking downstream through the central gap **25** and the outer peripheral gaps **26**. Accordingly, the air introduced from the front end **1***b* during inhalation from the flavor stick **1** can be efficiently distributed to the flavor source **24** of each thin rod **21** and contribute to the generation of the aerosol. The leakage-suppressing portion **4** also functions as a spacer that separates the cooling portion **5** from the flavor rod **2**.

[0065] The leakage-suppressing portion **4** may be formed of various materials. The leakage-suppressing portion **4** may be, for example, a hollow cellulose acetate tube. In other words, the leakage-suppressing portion **4** may be a cylindrical cellulose acetate fiber bundle having a center hole extending therethrough at the center thereof in cross-section. However, the material of the leakage-suppressing portion **4** is not particularly limited. It is not necessary that the material of the leakage-suppressing portion **4** have complete air impermeability as long as the ventilation resistance of the blocking surface **42** of the leakage-suppressing portion **4** is higher than that of the flavor source **24** in each thin rod **21**. Since air passes through regions where the ventilation resistance is relatively low, the leakage-suppressing portion **4** having the above-described structure functions effectively.

[0066] The cooling portion **5** is positioned immediately downstream of the leakage-suppressing portion **4** and is disposed in contact with the rear end of the leakage-suppressing portion **4**. During inhalation from the flavor stick **1**, the volatile substance released from the flavor rod **2** (flavor source **24**) flows downstream through the cooling portion **5**. The volatile substance released from the flavor rod **2** (flavor source **24**) accelerates the generation of the aerosol when cooled in the cooling portion **5**. In the structure illustrated in FIG. **2**, the cooling portion **5** is composed of a hollow paper tube having vent holes **5**A that allow the introduction of outside air. It is not necessary that the cooling portion **5** have the vent holes **5**A. The cooling portion **5** may be formed of a paper tube in which a cooling enhancement material, such as a polylactic acid sheet, is disposed to enhance the cooling of the volatile substance released from the flavor source **24**. The cooling portion **5** may include a heat-absorbing agent disposed so as not to impede the flow of the volatile substance and the aerosol. For example, the cooling portion **5** may include a filter material having many flow paths (through holes) extending in the longitudinal direction (axial direction) of the mouthpiece **3**.

[0067] The filter portion **6** is a segment positioned at the rear end of the mouthpiece **3**, that is, adjacent to the mouthpiece end **1***a*. The filter portion **6** may be positioned immediately downstream of the cooling portion **5** and disposed in contact with the rear end of the cooling portion **5**. In the structure illustrated in FIG. **2**, the filter portion **6** may include, for example, a filter material that captures predetermined components of the aerosol. The type of the filter material included in the filter portion **6** is not particularly limited. For example, the filter portion **6** may include a filter material formed of cellulose acetate fibers shaped in a cylindrical shape. Alternatively, the filter portion **6** may be a center hole filter formed of cellulose acetate fibers shaped in a cylindrical shape and having a center hole extending along the axial direction. The filter portion **6** may also be a paper filter filled with cellulose fibers, or a paper tube including no filter element. The filter portion **6** may also be formed by selectively combining a solid filter material having a filter element, a center hole filter, a paper filter, and a paper tube including no filter element.

[0068] A method for manufacturing the flavor stick **1** according to the present embodiment will now be described. The method for manufacturing the flavor stick **1** includes: a step of forming the flavor rod by bundling plural thin rods, in each of which a flavor source containing an aerosol-source material is wrapped with inner wrapping paper, and wrapping the thin rods together with outer wrapping paper; and a connecting step in which the flavor rod and a mouthpiece are arranged in series and wrapped together with tipping paper. Here, the step of forming the flavor rod includes a long-thin-rod forming step in which plural long thin rods are formed in parallel with each other along a transport direction of a wrapping machine by wrapping the flavor source containing the aerosol-source material with long-sheet-shaped thin-rod wrapping paper continuously in a longitudinal direction; a long-flavor-rod forming step in which the long thin rods are joined and wrapped together with long outer wrapping paper to form a long flavor rod; and a cutting step in which the long flavor rod is cut to a predetermined length to form the flavor rod. This method will be described with reference to FIGS. **5** to **9**.

[0069] FIG. **5** illustrates the steps for manufacturing the flavor stick **1** according to the first embodiment. FIG. **6** illustrates sections of a wrapping machine used to manufacture the flavor rod **2** according to the first embodiment. FIGS. **7** to **9** illustrate steps for manufacturing the flavor rod **2** according to the first embodiment. In an example described below, the flavor rod **2** including three thin rods **21** as illustrated in FIG. **3** is manufactured. The flavor rod **2** can be manufactured by using a known wrapping machine, such as the wrapping machine disclosed in Japanese Unexamined Patent Application Publication No. 7-184625.

[0070] First, in a thin-rod forming section **101** of the wrapping machine, long thin rods **21**P**1** to **21**P**3** that are long and have a cylindrical cross-sectional shape are formed by wrapping the flavor source **24** with long-sheet-shaped thin-rod wrapping paper **23**P in a tubular shape continuously in the longitudinal direction (long-thin-rod forming step). The long thin rods **21**P**1** to **21**P**3** are long, and are finally cut to a predetermined length to form each thin rod **21**.

[0071] FIG. **7** illustrates the long thin rods **21**P**1** to **21**P**3** formed in the thin-rod forming section **101**. The thin-rod forming section **101** includes three parallel wrapping lines L**1** to L**3** that respectively wrap the long thin rods **21**P**1** to **21**P**3** in parallel with each other. The long thin rods **21**P**1** to **21**P**3** are wrapped in parallel with each other while moving along the lines in parallel with each other.

[0072] In the thin-rod forming section **101**, each of the wrapping lines L**1** to L**3** has a flavor-source supply unit **101**A and a shaping unit **101**B positioned downstream of the flavor-source supply unit **101**A. The flavor-source supply unit **101**A of each of the wrapping lines L**1** to L**3** continuously supplies the flavor source **24** to the long inner wrapping paper **23**P having a long strip shape transported along a transport path. The type of the flavor source **24** supplied from the flavor-source supply unit **101**A to the long inner wrapping paper **23**P may be the same or different between

the wrapping lines L1 to L3. The shaping unit **101**B of each of the wrapping lines L1 to L3 forms the long inner wrapping paper **23**P into a tubular shape by gradually curling the long inner wrapping paper **23**P inward after the flavor source **24** is applied thereto.

[0073] The shaping unit **101**B causes the long inner wrapping paper **23**P and the flavor source **24** to pass through a guide member having a tubular guide inner wall surface, thereby forming the long inner wrapping paper **23**P into a tubular shape while the flavor source **24** is wrapped therewith. This type of guide member is commonly known. For example, a tongue disclosed in Japanese Unexamined Patent Application Publication No. 7-184625 may be used. For example, the tubular guide inner wall surface of the guide member has a diameter that gradually decreases toward the downstream side along the transport path, and the long inner wrapping paper **23**P passes through the guide member while being guided by the tubular guide inner wall surface. As a result, the long inner wrapping paper **23**P is formed into a U-shape in cross-section, and then into a tubular shape. When the long inner wrapping paper **23**P is formed into a tubular shape, the flavor source **24** disposed inside the long inner wrapping paper **23**P is appropriately compressed by the tubular guide inner wall surface. Thus, the long inner wrapping paper **23**P is formed into a tubular shape, and end portions of the long inner wrapping paper **23**P in the width direction are caused to overlap and bonded together. As a result, as illustrated in FIG. **7**, the long thin rods **21**P1 to **21**P3 having a long cylindrical shape are obtained.

[0074] Next, in a thick-rod forming section **102** of the wrapping machine, the long thin rods **21**P1 to **21**P3 transported along the transport path are joined and wrapped together with long outer wrapping paper **22**P to form a long flavor rod **2**P that is long and has a cylindrical cross-sectional shape (long-flavor-rod forming step).

[0075] FIG. **8** illustrates the long thin rods **21**P1 to **21**P3 stacked on the long outer wrapping paper **22**P having a long strip shape transported along the transport path in the thick-rod forming section **102**. In the thick-rod forming section **102**, the long outer wrapping paper **22**P is formed into a tubular shape while the long thin rods **21**P1 to **21**P3 are stacked on the long outer wrapping paper **22**P as illustrated in FIG. **8**, and end portions of the long outer wrapping paper **22**P in the width direction are caused to overlap and bonded together. As a result, as illustrated in FIG. **9**, the long flavor rod **2**P that is long and has a cylindrical cross-sectional shape is obtained.

[0076] Also when the long flavor rod **2**P is formed in a cylindrical cross-sectional shape in the thick-rod forming section **102**, a guide member similar to the above-described guide member used in the shaping unit **101**B (for example, the tongue disclosed in Japanese Unexamined Patent Application Publication No. 7-184625) may be used. When the long outer wrapping paper **22**P is formed into a tubular shape by the guide member, the long thin rods **21**P1 to **21**P3 positioned inside the long outer wrapping paper **22**P are appropriately compressed by the tubular guide inner wall surface of the guide member. As a result, the cross-sectional shape of each of the long thin rods **21**P1 to **21**P3 can be changed from the initial circular shape (substantially perfectly circular shape) to an elliptical shape. The long thin rods **21**P1 to **21**P3 may have the same diameter or different diameters before the compression. When the long thin rods **21**P1 to **21**P3 have the same diameter, the diameter of the long thin rods **21**P1 to **21**P3 before the compression may be set to about 3.5 mm to about 4 mm if, for example, the diameter of the flavor rod is 7 mm.

[0077] In the long-flavor-rod forming step, glue (referred to as "rail glue" in the technical field) is used to bond the long inner wrapping paper **23**P of each of the long thin rods **21**P1 to **21**P3 to the long outer wrapping paper **22**P for bundling the long thin rods **21**P1 to **21**P3. The glue is applied to the inner surface of the long outer wrapping paper **22**P along lines extending in the longitudinal direction of the long outer wrapping paper **22**P. Then, the long thin rods **21**P1 to **21**P3 are wrapped with the long outer wrapping paper **22**P. Thus, the long thin rods **21**P1 to **21**P3 can be bonded to the long outer wrapping paper **22**P. The positions at which the long thin rods **21**P1 to **21**P3 are bonded to the long outer wrapping paper **22**P correspond to the above-described bonding portions BP.

[0078] As described above, the long thin rods **21**P1 to **21**P3 are compressed from the outside and wrapped together with the long outer wrapping paper **22**P to form the long flavor rod **2**P. The long flavor rod **2**P includes the long thin rods **21**P1 to **21**P3 having an elliptical cross-section inside the long outer wrapping paper **22**P. In the above-described long-flavor-rod forming step, the long thin rods **21**P1 to **21**P3 may be wrapped with the long outer wrapping paper **22**P while being in tight contact with each other so that the central gap **25** is not formed in the central area of the long flavor rod **2**P in cross-section or so that the cross-sectional area of the central gap **25** is reduced.

[0079] Next, in a cutting section **103** of the wrapping machine, the long flavor rod **2**P that is long and transported in the transport direction is sequentially cut to a predetermined length, for example, to the length corresponding to a single flavor rod (cutting step). As a result, the flavor rod **2** having the predetermined length is obtained. After the long flavor rod **2**P is cut to the predetermined length, the cross-sectional shape of the flavor rod **2** may be checked, and feedback control may be performed to adjust the positions of the thin rods **21** in cross-section and the amount of the flavor source **24**, for example.

[0080] To form the flavor stick **1**, the mouthpiece **3** is separately prepared, and the flavor rod **2** and the mouthpiece **3** are connected by being wrapped together with the tipping paper **8** (connecting step). Thus, the flavor stick **1** illustrated in FIG. **2** is obtained.

[0081] The manufacturing method described above with reference to FIGS. **5** to **9** is hereinafter referred to as a "first manufacturing method". A manufacturing method (second manufacturing method) that differs from the first manufacturing method will now be described. FIGS. **10** to **15** illustrate the second manufacturing method of the flavor stick **1**. The second manufacturing method of the flavor stick **1** includes a step of forming the flavor rod and a connecting step. The step of forming the flavor rod includes a long-flavor-rod forming step and a cutting step. The step of forming the flavor rod of the second manufacturing method can be performed by using, for example, a known dual filter wrapping machine. FIG. **10** illustrates a front half of the long-flavor-rod forming step of the second manufacturing method. In FIG. **10**, reference sign **110** denotes a conveyor that transports various materials used to manufacture the flavor stick **1** in the direction shown by the empty arrow in FIG. **10** (transport direction). As illustrated in FIG. **10**, the long outer wrapping paper **22**P is transported on the con-

veyor **110**. FIG. **11** illustrates the shape of the conveyor **110** in cross-section orthogonal to the transport direction. The conveyor **110** has a concave groove **110**A extending in the transport direction, and transports the long outer wrapping paper **22**P and various other materials disposed in the groove **110**A. For example, the groove **110**A of the conveyor **110** has suction holes for applying suction to the long outer wrapping paper **22**P at the bottom thereof, and the long outer wrapping paper **22**P is transported while being deformed along the wall surface of the groove **110**A.

[0082] In the second manufacturing method, various components used to form an intermediate assembly MA of the flavor stick **1** are supplied to the long outer wrapping paper **22**P transported by the conveyor **110** of the wrapping machine. Reference sign **111** denotes a leakage-suppressing-component supply drum that supplies double-length leakage-suppressing members **4**W to the long outer wrapping paper **22**P on the transport path. Each double-length leakage-suppressing member **4**W is cut by a cutting knife into two halves at the center thereof in the length direction, and is thereby divided into two leakage-suppressing portions **4**. In other words, each double-length leakage-suppressing member **4**W is a member obtained by increasing the length of the leakage-suppressing portion **4** to twice the ordinary length (length of the leakage-suppressing portion **4** in a final shape included in the flavor stick **1**). The leakage-suppressing portion **4** corresponds to a "first component" that constitutes a portion of the mouthpiece **3**. The first component may be a structural member disposed at the front end of the mouthpiece **3**. The double-length leakage-suppressing members **4**W, which are twice as long as the leakage-suppressing portion **4** (first component), correspond to "double-length first components".

[0083] Reference signs **112** to **114** denote first to third thin-rod supply drums that supply double-length thin rods **21**W**1** to **21**W**3** to the long outer wrapping paper **22**P transported by the conveyor **110**. Each of the double-length thin rods **21**W**1** to **21**W**3** is cut by a cutting knife into two halves at the center thereof in the length direction, and is thereby divided into two thin rods **21**. In other words, the double-length thin rods **21**W**1** to **21**W**3** are members obtained by increasing the length of the thin rods **21** to twice the ordinary length (length of the thin rods **21** in a final shape included in the flavor stick **1**). In other words, each of the double-length thin rods **21**W**1** to **21**W**3** is substantially identical to a thin rod formed by wrapping the flavor source **24** with the inner wrapping paper **23** that is twice as long as the ordinary length.

[0084] As illustrated in FIG. **10**, the leakage-suppressing-component supply drum **111** and the first to third thin-rod supply drums **112** to **114** are arranged in that order (at a first position P**1** to a fourth position P**4**) from the upstream side along the transport path of the conveyor **110**. The leakage-suppressing-component supply drum **111** and the first to third thin-rod supply drums **112** to **114** are, for example, positioned above the conveyor **110**, and have drum rotational axes orthogonal to the transport direction of the conveyor **110**. The leakage-suppressing-component supply drum **111** and the first to third thin-rod supply drums **112** to **114** rotate while components to be supplied to the long outer wrapping paper **22**P transported by the conveyor **110** are retained thereon by suction, and successively supply the components to be supplied to the long outer wrapping paper **22**P at a predetermined timing. The supply drums **111** to **114** successively receive various materials from, for example, hoppers and intermediate drums (not illustrated).

[0085] As illustrated in FIG. **10**, the leakage-suppressing-component supply drum **111** at the first position P**1** supplies the double-length leakage-suppressing members **4**W to the long outer wrapping paper **22**P at regular intervals. The intervals between the double-length leakage-suppressing members **4**W supplied to the long outer wrapping paper **22**P are substantially equal to the length of the double-length thin rods **21**W**1** to **21**W**3**, and serve as rod-receiving spaces S**1** in which the double-length thin rods **21**W**1** to **21**W**3** are to be placed. The first to third thin-rod supply drums **112** to **114** at the second to fourth positions P**2** to P**4** successively supply the double-length thin rods **21**W**1** to **21**W**3** to the rod-receiving spaces S**1** between the double-length leakage-suppressing members **4**W.

[0086] FIG. **12** illustrates the manner in which the leakage-suppressing-component supply drum **111** and the thin-rod supply drums **112** to **114** supply the respective components at the first to fourth positions P**1** to P**4**. As described above, the double-length leakage-suppressing members **4**W and the double-length thin rods **21**W**1** to **21**W**3** are successively supplied to the long outer wrapping paper **22**P transported by the conveyor **110**. When the double thin rod **21**W**3** is supplied to each rod-receiving space S**1** at the fourth position P**4**, the three double thin rods **21**W**1** to **21**W**3** are bundled, and the bundles and the double-length leakage-suppressing members **4**W are arranged in series on the long outer wrapping paper **22**P (see, for example, FIGS. **10** and **12**). Here, the term "bundle" means any arrangement in which the double-length thin rods **21**W**1** to **21**W**3** are parallel and close to each other.

[0087] FIG. **13** illustrates a second half of the long-flavor-rod forming step of the second manufacturing method. In the second half of the long-flavor-rod forming step, the double-length leakage-suppressing members **4**W (double-length first components) and the bundles (denoted by reference sign **21**W in FIG. **13**) of the double-length thin rods **21**W**1** to **21**W**3** (double-length thin rods) arranged in series with the double-length leakage-suppressing members **4**W are wrapped together with the long outer wrapping paper **22**P. As a result, the bundles of the double-length thin rods **21**W**1** to **21**W**3** and the double-length leakage-suppressing members **4**W are alternately arranged in the longitudinal direction and wrapped together with the long outer wrapping paper **22**P to form a long flavor rod **2**P' having a long rod shape. The long flavor rod **2**P' includes sections referred to as "thin-rod sections ST**1**" in which the bundles of the double-length thin rods **21**W**1** to **21**W**3** are disposed and sections referred to as "leakage-component sections ST**2**" in which the double-length leakage-suppressing members **4**W are disposed.

[0088] Similarly to the long-flavor-rod forming step of the first manufacturing method, the known tongue (guide member) described in Japanese Unexamined Patent Application Publication No. 7-184625 may be used to wrap the bundles of the double-length thin rods **21**W**1** to **21**W**3** and the double-length leakage-suppressing members **4**W with the long outer wrapping paper **22**P. Thus, the double-length thin rods **21**W**1** to **21**W**3** can be compressed from the outside and wrapped with the long outer wrapping paper **22**P. As a result, the long flavor rod **2**P' is obtained. The long flavor rod **2**P'

is rod-shaped and includes the double-length thin rods **21**W**1** to **21**W**3** having an elliptical cross-sectional shape in the thin-rod sections ST**1**.

[0089] The cutting step of the second manufacturing method will now be described. In FIG. **13**, the conveyor **110** is omitted. In FIG. **13**, reference sign **115** denotes a cutting knife of the wrapping machine. The cutting knife **115** cuts the long flavor rod **2**P' at the center of each double-length leakage-suppressing member **4**W in the length direction and at the center of each of the double-length thin rods **21**W**1** to **21**W**3** in the length direction. In other words, in the cutting step, the long flavor rod **2**P' is cut at the center of each thin-rod section ST**1** and at the center of each leakage-component section ST**2**. As described above, each of the double-length thin rods **21**W**1** to **21**W**3** is divided into two thin rods **21** by being cut at the center thereof in the length direction. Each of the double-length leakage-suppressing members **4**W is divided into two leakage-suppressing portions **4** by being cut at the center thereof in the length direction. As a result of the above-described cutting step, the intermediate assembly MA (see FIG. **14**), in which the leakage-suppressing portion **4** is connected to the rear end of the flavor rod **2** including the bundle of the thin rods **21**, is formed. In the above-described example, one cutting knife **115** is used to cut the long flavor rod **2**P' in the cutting step. However, plural cutting knives **115** may be used to cut the long flavor rod **2**P'. For example, a first cutting knife and a second cutting knife may be disposed at different positions along the transport direction of the conveyor **110**. The first cutting knife may be used to cut the thin-rod sections ST**1**, and the second cutting knife may be used to cut the leakage-component sections ST**2**. Either the first cutting knife or the second cutting knife may be disposed upstream of the other in the transport direction of the conveyor **110**.

[0090] FIG. **14** illustrates the intermediate assembly MA formed in the step of forming the flavor rod, and also illustrates the cooling portion **5**, the filter portion **6**, and the tipping paper **8** that are separately prepared. In FIG. **14**, portions such as the leakage-suppressing portion **4**, the cooling portion **5**, and the filter portion **6** are simplified. The cooling portion **5** and the filter portion **6** correspond to "second components" that constitute a portion of the mouthpiece **3**. The cooling portion **5** and the filter portion **6**, which correspond to the second components, can also be regarded as components of the mouthpiece **3** other than the leakage-suppressing portion **4**, which corresponds to the first component. The second manufacturing method of the flavor stick **1** includes the connecting step. In the connecting step of the second manufacturing method, the intermediate assembly MA and one or more second components that constitute a portion of the mouthpiece **3** are wrapped together with the tipping paper **8** while the one or more second components are arranged in series with the leakage-suppressing portion **4** of the intermediate assembly MA that corresponds to the first component. In this example, the cooling portion **5** and the filter portion **6** correspond to the second components. Therefore, as illustrated in FIG. **14**, the cooling portion **5** and the filter portion **6** are arranged in series in that order from the rear end of the leakage-suppressing portion **4** of the intermediate assembly MA. In this state, the intermediate assembly MA, the cooling portion **5**, and the filter portion **6** are connected together by being wrapped with the tipping paper **8**. As a result, the flavor stick **1** is completed as illustrated in FIG. **15**. In FIG. **15**, the internal structures of the leakage-suppressing portion **4**, the cooling portion **5**, and the filter portion **6** are not illustrated.

[0091] The flavor inhalation device **30** illustrated in FIG. **1** is used for inhalation from the flavor stick **1** having the above-described structure. As illustrated in FIG. **1**, the flavor inhalation device **30** includes the heating chamber **31**, the external heater **32**, a power supply unit **33** that activates the external heater **32** by supplying electric power thereto, and a controller **34** that controls the electric power supplied to the external heater **32**. The heating chamber **31** is a roughly cylindrical hollow portion defined by a chamber side peripheral wall **31**B and a chamber bottom wall **31**C, which constitute a portion of a housing of the flavor inhalation device **30**. When the flavor stick **1** is inserted into the heating chamber **31**, the flavor rod **2** is inserted through the insertion opening **31**A from the front end **1***b*.

[0092] The external heater **32** is a heat-producing device, such as a metal-thin-film heater or a film heater, that produces heat from electric power supplied from the power supply unit **33**. The metal thin film heater is a planar heater that is flexible and includes a metal thin film as a heat-producing body. The film heater is composed of, for example, a stack of layers including a layer made of an electrical insulating material and a layer made of a heating track, which is an example of a heating element. However, the type of the external heater **32** is not particularly limited as long as the flavor rod **2** inserted into the heating chamber **31** can be heated from the outer periphery. For example, the external heater **32** may be provided to face the outer peripheral surface of the flavor rod **2** inserted into the heating chamber **31** from the front end to the rear end thereof.

[0093] The flavor inhalation device **30** has an airflow path **35** that communicates with the chamber bottom wall **31**C at one end thereof. The airflow path **35** communicates with an air inlet **37** formed in the housing of the flavor inhalation device **30** at the other end thereof.

[0094] The flavor inhalation device **30** may start the heating operation in response to a starting operation performed on, for example, an operation switch disposed on the housing. Alternatively, the flavor inhalation device **30** may start the heating operation in response to a detection of the insertion of the flavor stick **1** (flavor rod **2**) into the heating chamber **31**. For example, the controller **34** may include a sensor that detects the insertion of the flavor stick **1** (flavor rod **2**) into the heating chamber **31**, and start the heating operation in response to the detection of the insertion of the flavor stick **1** (flavor rod **2**) by the sensor.

[0095] The power supply unit **33** is a power supply that supplies electric power for heating to the external heater **32** through the controller **34**. The controller **34** receives a request to start the heating operation in response to, for example, the operation on the operation switch or the detection of the insertion of the flavor stick **1** into the heating chamber **31**, and causes the power supply unit **33** to supply the electric power to the external heater **32**.

[0096] The controller **34** may include a temperature sensor for detecting the temperature in the heating chamber **31** or the temperature of the flavor rod **2** and adjust the amount of current supplied from the power supply unit **33** to the external heater **32** based on the temperature detected by the temperature sensor.

[0097] In the flavor stick **1** having the above-described structure, the flavor source **24** of each thin rod **21** is heated when the external heater **32** is activated while the flavor rod

2 is inserted in the heating chamber 31 of the flavor inhalation device 30. As a result, the aerosol-source material contained in the flavor source 24 is volatilized, and the flavor source 24 releases a flavor component, so that an aerosol containing the flavor component is generated. The aerosol containing the flavor component flows through each thin rod 21 toward the mouthpiece 3 (downstream), and enters the mouthpiece 3 from the rear end of each thin rod 21. The aerosol containing the flavor component successively flows through each of the aerosol flow paths 41A to 41C in the leakage-suppressing portion 4 at the front end of the mouthpiece 3, the cooling portion 5, and the filter portion 6, and is finally inhaled into the oral cavity of the user from the mouthpiece end 1*a*.

[0098] The flavor rod 2 according to the present embodiment is formed by bundling the thin rods 21, in each of which the flavor source 24 is wrapped with the inner wrapping paper 23, together with the outer wrapping paper 22. In other words, in the flavor rod 2 according to the present embodiment, the flavor source 24 in each of the thin rods 21 is individually wrapped with the inner wrapping paper 23. Accordingly, the flavor source 24 and the wrapping paper (inner wrapping paper 23) that wraps the flavor source 24 are in contact over a sufficiently large area in the flavor rod 2. Thus, the flavor source 24 in each thin rod 21 can be restrained from falling (spilling) from the front end 1*b*.

[0099] In addition, in the flavor rod 2 of the present embodiment, each thin rod 21 has the inner wrapping paper 23 thereof bonded to the outer wrapping paper 22 at the corresponding bonding portion BP. Therefore, even when insertion resistance occurs due to friction between the chamber side peripheral wall 31B of the heating chamber 31 and the outer wrapping paper 22 upon insertion (attachment) of the flavor rod 2 into the heating chamber 31, the thin rods 21 disposed inside the outer wrapping paper 22 are not easily pushed and displaced toward the mouthpiece 3 (toward the rear end). In addition, each thin rod 21 of the flavor rod 2 has an elliptical cross-sectional shape with a minor axis extending in a radial direction of the flavor rod 2. Accordingly, each thin rod 21 can be easily disposed so that the major axis thereof extends along the circumferential direction of the flavor rod 2, and the area of the outer peripheral gaps 26 can be reduced.

[0100] The flavor stick 1 includes the leakage-suppressing portion 4 disposed in a front end section of the mouthpiece 3. The leakage-suppressing portion 4 has the aerosol flow paths 41A to 41C extending in the axial direction to allow the aerosols generated in the thin rods 21 to flow therethrough, and includes the central blocking portion 42A and the outer peripheral blocking portions 42B that respectively face the central gap 25 and the outer peripheral gaps 26 in the flavor rod 2. Thus, during inhalation from the flavor stick 1, the air introduced into the flavor rod 2 from the front end 1*b* can be restrained from leaking downstream through the central gap 25 and the outer peripheral gaps 26. The position, size, number, etc., of the aerosol flow paths in the leakage-suppressing portion 4 are not particularly limited as long as the aerosol from each thin rod 21 can flow downstream. The leakage-suppressing portion 4 may be omitted as long as air leakage through the central gap 25 and the outer peripheral gaps 26 is allowable.

[0101] FIG. 16 illustrates modifications of the leakage-suppressing portion 4 according to the first embodiment. FIG. 16 shows cross-sections of the modifications of the leakage-suppressing portion 4. In FIG. 16, the dashed lines show the outer shapes of the thin rods 21 in cross-section, that is, the positions of the outer surfaces 23A of the inner wrapping paper 23. In the modification illustrated in (a), the aerosol flow paths 41A to 41C are disposed to face the rear ends of the respective thin rods 21. As illustrated in (a), the cross-sectional area of the aerosol flow paths 41A to 41C is smaller than that of the thin rods 21. The rear end of each thin rod 21 extends along the blocking surface 42 (the central blocking portion 42A and the outer peripheral blocking portions 42B) of the leakage-suppressing portion 4 and the corresponding one of the aerosol flow paths 41A to 41C.

[0102] In the above-described structure, the rear end of each thin rod 21 partially faces the corresponding one of the aerosol flow paths 41A to 41C, and is partially supported from behind by being in contact with the blocking surface 42 (the central blocking portion 42A and the outer peripheral blocking portions 42B). As a result, the blocking surface 42 (the central blocking portion 42A and the outer peripheral blocking portions 42B) of the leakage-suppressing portion 4 serves as a stopper in regions in which the blocking surface 42 faces (is in contact with) the rear ends of the thin rods 21, the stopper restraining the thin rods 21 from being displaced when the flavor rod 2 is inserted into the heating chamber 31. Accordingly, even when insertion resistance occurs due to friction between the chamber side peripheral wall 31B of the heating chamber 31 and the outer wrapping paper 22 upon insertion (attachment) of the flavor rod 2 into the heating chamber 31, the thin rods 21 disposed inside the outer wrapping paper 22 are not easily pushed and displaced toward the mouthpiece 3 (toward the rear end). When the blocking surface 42 of the leakage-suppressing portion 4 partially supports the rear ends of the thin rods 21 to serve as a stopper (support portion) that restrains displacements of the thin rods 21, the inner wrapping paper 23 of each thin rod 21 does not need to be bonded to the outer wrapping paper 22.

[0103] In the modification illustrated in (b), the leakage-suppressing portion 4 has a single aerosol flow path 41 extending along the rear ends of the thin rods 21 in a central region of the leakage-suppressing portion 4 in cross-section. In other words, the single aerosol flow path 41 partially faces the rear ends of the thin rods 21. In the example illustrated in (b), the aerosol flow path 41 faces the rear end of the central gap 25 in the flavor rod 2. However, the structure illustrated in (b) may be employed as long as the air leakage through the central gap 25 is allowable.

[0104] The flavor rod 2 according to the present embodiment may have a diameter set so that the flavor rod 2 is compressed by the chamber side peripheral wall 31B upon insertion into the heating chamber 31. For example, the diameter of the heating chamber 31 in cross-section (cross-section orthogonal to the direction of insertion and extraction of the flavor rod 2) may be less than that of the flavor rod 2. In this case, when the flavor rod 2 is inserted into the heating chamber 31, the chamber side peripheral wall 31B compresses the flavor rod 2 from the outer periphery, thereby making the central gap 25 and the outer peripheral gaps 26 smaller or reducing the cross-sectional areas thereof. Thus, the leakage of air through the central gap 25 and the outer peripheral gaps 26 can be more easily restrained during inhalation from the flavor stick 1.

[0105] The thin rods 21 included in the flavor rod 2 may include the flavor source 24 of the same type or different

types. When the thin rods **21** include the flavor source **24** of different types, a first one of the thin rods **21** included in the flavor rod **2** may, for example, include the flavor source **24** that fills the space inside the inner wrapping paper **23** in the form of a uniformized sheet folded in a gathered form. A second one of the thin rods **21** may, for example, include the flavor source **24** that fills the space inside the inner wrapping paper **23** in the form of shredded tobacco. A third one of the thin rods **21** may, for example, include a plant material (for example, a herbal material) containing no tobacco component that fills the space inside the inner wrapping paper **23** as the flavor source **24**. The above-described combination is, of course, an example. When at least one of the thin rods **21** included in the flavor rod **2** includes the flavor source **24** of the type different from that in the other thin rods **21**, the flexibility in designing smoke flavor and taste can be increased, and rich smoke flavor and taste can be more easily produced.

[0106] When the thin rods **21** of the flavor rod **2** contain the flavor source **24** of different types as described above, the thin rods **21** may have different cross-sectional areas. In such a case, the content of the flavor source **24** can be easily controlled based on the type of the flavor source **24**.

[0107] The outer periphery of the flavor source **24** of each of the thin rods **21** included in the flavor rod **2** is covered by the inner wrapping paper **23**. Therefore, the aerosol containing the flavor component released from the flavor source **24** of each thin rod **21** is basically introduced into the mouthpiece **3** without being mixed with the other aerosols. Accordingly, when the thin rods **21** include the flavor source **24** of different types, the different types of flavor source **24** can release aerosols containing flavor components with more distinct flavors. In this regard, the mouthpiece **3** may have a flow path structure that guides the aerosols from the thin rods **21** individually to the mouthpiece end **1***a*. For example, the leakage-suppressing portion **4** is capable of causing aerosols from the thin rods **21** to individually flow through the aerosol flow paths **41**A to **41**C illustrated in FIG. **4**. In addition, the cooling portion **5** may, for example, include a sheet folded in a gathered form that defines flow paths extending in the axial direction of the mouthpiece **3** so that the aerosols from the thin rods **21** are not easily mixed.

Second Embodiment

[0108] A flavor rod according to a second embodiment will now be described. FIG. **17** illustrates a cross-section of a flavor rod **2**A according to the second embodiment. As illustrated in FIG. **17**, the flavor rod **2**A includes two thin rods **21**. The basic structure of the flavor rod **2**A including two thin rods **21** (two-thin-rod type) is similar to that of the above-described flavor rod **2** including the three thin rods **21** (three-thin-rod type).

[0109] In FIG. **17**, structures similar to those in the above-described embodiment are denoted by the same reference signs, and detailed description thereof is thus omitted. In the example illustrated in FIG. **17**, the pair of thin rods **21** have substantially congruent elliptical shapes, and are arranged such that the major axes thereof are parallel to each other. The minor axis of each thin rod **21** extends in a radial direction of the flavor rod **2**A. More specifically, the minor axes of the thin rods **21** are on the same straight line that passes through the central axis CL, and the pair of thin rods **21** are arranged such that the outer surfaces **23**A of the inner wrapping paper **23** are in contact with each other in a central region of the flavor rod **2**A in cross-section. Thus, the above-described central gap **25** can be eliminated, or the cross-sectional area of the central gap **25** can be reduced. In addition, the area of the outer peripheral gaps **26** in the flavor rod **2**A can be reduced by arranging the pair of thin rods **21** such that the major axes thereof are in parallel with each other.

[0110] The flavor rod **2**A illustrated in FIG. **17** is also integrally connected to the mouthpiece **3** with the above-described tipping paper **8** to form the flavor stick **1** (see FIG. **2**). The flavor rod **2**A according to the present modification can basically be manufactured by steps similar to those for manufacturing the flavor rod **2** of the three-thin-rod type. The two-thin-rod type differs, of course, from the three-thin-rod type in that the number of thin rods **21** is two. Therefore, in the present embodiment, two long thin rods **21**P**1** and **21**P**2** are provided in the above-described long-thin-rod forming step. Assuming the diameter of the flavor rod **2**A to be manufactured is 7 mm, the diameter of the two long thin rods **21**P**1** and **21**P**2** (before compression) may be set to about 4 mm to about 4.5 mm.

[0111] FIG. **18** illustrates cross-sections of the leakage-suppressing portion **4** according to the second embodiment. In FIG. **18**, the dashed lines show the outer shapes of the thin rods **21** in cross-section, that is, the positions of the outer surfaces **23**A of the inner wrapping paper **23**. In the structures illustrated in (a) and (b), the leakage-suppressing portion **4** has a pair of aerosol flow paths **41**A and **41**B that extend therethrough along the central axis CL**2** to individually cause aerosols from the pair of thin rods **21** to flow therethrough. In the example illustrated in (a), the aerosol flow paths **41**A and **41**B have cross-sections congruent with those of the thin rods **21**, and are disposed to face the respective thin rods **21**. As illustrated in (a), the leakage-suppressing portion **4** is structured such that the outer peripheral blocking portions **42**B of the blocking surface **42** block the rear ends of the outer peripheral gaps **26** in the flavor rod **2**A.

[0112] In the structure illustrated in (b), the cross-sectional area of the aerosol flow paths **41**A and **41**B that face the respective thin rods **21** is smaller than that of the thin rods **21**. The rear end of each thin rod **21** extends along the blocking surface **42** (outer peripheral blocking portions **42**B) of the leakage-suppressing portion **4** and the corresponding one of the aerosol flow paths **41**A and **41**B. In other words, in the structure illustrated in (b), the rear end of each thin rod **21** partially faces the corresponding one of the aerosol flow paths **41**A and **41**B, and is partially supported from behind by being in contact with the blocking surface **42** (outer peripheral blocking portions **42**B). As a result, the blocking surface **42** (outer peripheral blocking portions **42**B) of the leakage-suppressing portion **4** serves as a stopper (support member) in regions in which the blocking surface **42** faces (is in contact with) the rear ends of the thin rods **21**, the stopper restraining the thin rods **21** from being displaced. Accordingly, even when insertion resistance occurs upon insertion of the flavor rod **2**A into the heating chamber **31**, the thin rods **21** can be restrained from being pushed toward the mouthpiece **3** (toward the rear end).

[0113] In the structure illustrated in (c), the leakage-suppressing portion **4** includes a single aerosol flow path **41** in a central region of the leakage-suppressing portion **4** in cross-section, and the blocking surface **42** (outer peripheral

blocking portions **42**B) partially blocks the rear ends of the outer peripheral gaps **26** in the flavor rod **2**A.

Third Embodiment

[0114] A flavor rod according to a third embodiment will now be described. In the above-described flavor rods **2** and **2**A, the space inside the inner wrapping paper **23** of each thin rod **21** is filled with the flavor source **24**. However, the flavor source is not necessarily provided in this form, and may be provided in various forms as long as the flavor source and the aerosol-source material are disposed in the space inside the inner wrapping paper **23**.

[0115] FIG. **19** illustrates a cross-section of a flavor rod **2**B according to the third embodiment. The flavor rod **2**B differs from the flavor rod **2** of the first embodiment only in the form of the flavor source containing the aerosol-source material disposed inside the inner wrapping paper **23** of each thin rod **21**, and other structures are similar to those of the flavor rod **2**.

[0116] In FIG. **19**, reference sign **24**A denotes a flavor source disposed inside the inner wrapping paper **23**. The flavor source **24**A contains the flavor source, the aerosol-source material, and a holding substrate **240** that holds the flavor source and the aerosol-source material. In the present embodiment, the flavor source may be, for example, the above-described flavoring agent. For example, the holding substrate **240** of the flavor source **24**A is a substrate sheet impregnated with a liquid flavoring agent and an aerosol-source material, and the material of the holding substrate may be, for example, a nonwoven fabric. The flavoring agent with which the holding substrate **240** (substrate sheet) of the flavor source **24**A is impregnated may contain no tobacco component. The holding substrate **240** (substrate sheet) of the flavor source **24**A may, for example, be bonded to the inner surface of the inner wrapping paper **23** of each thin rod **21**. The thickness of the holding substrate **240** (substrate sheet) is not particularly limited, and may be, for example, about 0.1 mm to about 2 mm. To manufacture the flavor rod **2**A according to the present embodiment, in the above-described long-thin-rod forming step, plural long thin rods may be formed in parallel with each other along the transport direction of the wrapping machine by wrapping a long sheet-shaped substrate sheet impregnated with the flavor source and the aerosol-source material with long-sheet-shaped thin-rod wrapping paper into a tubular shape continuously in the longitudinal direction. The long-flavor-rod forming step and the cutting step performed subsequently are similar to those in the above-described first embodiment.

[0117] The thin rods **21** may include the flavor source **24**A containing the flavor source (flavoring agent) of the same type or different types. Although the holding substrate **240** (substrate sheet) of the flavor source **24**A of each thin rod **21** has a tubular cross-sectional shape in the example illustrated in FIG. **19**, the cross-sectional shape is not limited to this. The holding substrate **240** (substrate sheet) may have any cross-sectional shape, such as a C-shape, an S-shape, or a spiral shape. A substrate sheet impregnated with a liquid flavoring agent and an aerosol-source material may be shredded into small pieces, and the space inside the inner wrapping paper **23** may be filled with these pieces. One or more of the thin rods **21** included in the flavor rod **2**A may, of course, be replaced with the thin rods **21** including the flavor source **24** composed of the tobacco filler described with reference to FIG. **3**.

[0118] FIG. **20** illustrates variants of the flavor source **24**A of each thin rod **21** according to the third embodiment. In FIG. **20**, (a) shows a flavor source **24**A (holding substrate **240**) having a C-shape; (b) shows a flavor source **24**A (holding substrate **240**) having an S-shape; (c) shows a flavor source **24**A (holding substrate **240**) having a meandering shape; and (d) shows a flavor source **24**A (holding substrate **240**) having a spiral shape. The variants illustrated in FIG. **20** are, of course, also examples of the flavor source **24**A (holding substrate **240**).

[0119] In each of the above-described embodiments, the ratio of the total cross-sectional area of the central gap **25** and the outer peripheral gaps **26** to the cross-sectional area of the flavor rod **2** is not particularly limited, and may be, for example, 10% or less, preferably 5% or less. In this case, the downstream leakage of air through the central gap **25** and the outer peripheral gaps **26** can be reduced.

[0120] In addition, as described above, the number of thin rods **21** included in the flavor rod **2** is not particularly limited as long as two or more thin rods **21** are provided. However, to restrain the flavor source **24** from falling from the front end of each thin rod **21** and facilitate manufacturing of the flavor rod **2**, three or more thin rods **21** are preferably provided. The number of thin rods **21** may be changed along the axial direction of the flavor rod **2**. For example, three thin rods **21** may be disposed adjacent to the front end of the flavor rod **2**, and two thin rods **21** may be disposed adjacent to the rear end of the flavor rod **2**.

[0121] In addition, the inner wrapping paper **23** of each thin rod **21** is preferably made of a material with a high heat transfer performance to ensure efficient transmission of heat from the external heater **32** to the flavor source **24** disposed inside the inner wrapping paper **23**. Therefore, the inner wrapping paper **23** is preferably made of a low-basis-weight, high-density material. For example, the inner wrapping paper **23** preferably has a basis weight of 10 gsm or more and 40 gsm or less and a density of 1 g/cm^3 or more and 1.5 g/cm^3 or less. A coating agent, such as pectin or sodium alginate, may be applied to the inner wrapping paper **23** to improve the heat transfer performance. The inner wrapping paper **23** may be composed of a material having a high heat transfer performance, such as aluminum-laminated paper.

[0122] The inner wrapping paper **23** is preferably made of a low-air-permeability material to suppress leakage of the aerosol through the central gap **25** and the outer peripheral gaps **26**. For example, the inner wrapping paper **23** may have an air permeability of 0 CORESTA unit (CU) or more and **200** CORESTA unit (CU) or less. The above-described air permeability may be measured in accordance with, for example, ISO 2965:2009.

[0123] In addition, the outer wrapping paper **22** of the flavor rod **2** is preferably made of a material with a high heat transfer performance to ensure efficient transmission of heat from the external heater **32** to the thin rods **21** (flavor source **24**) disposed inside the outer wrapping paper **22**. Therefore, the outer wrapping paper **22** is preferably made of a low-basis-weight, high-density material. For example, the outer wrapping paper **22** preferably has a basis weight of 10 gsm or more and 40 gsm or less and a density of 1 g/cm^3 or more and 1.5 g/cm^3 or less. A coating agent, such as pectin or sodium alginate, may be applied to the outer wrapping paper

22 to improve the heat transfer performance. The outer wrapping paper 22 may be composed of a material having a high heat transfer performance, such as aluminum-laminated paper.

[0124] To suppress tearing of the outer wrapping paper 22 when the rod is inserted into or extracted from the heating chamber 31, the coefficient of static friction between the external heater 32 and the outer wrapping paper 22 is preferably adjusted to 0.45 or more and 0.75 or less, and the coefficient of kinetic friction between the external heater 32 and the outer wrapping paper 22 is preferably adjusted to 0.4 or more and 0.7 or less. In addition, to suppress tearing of the outer wrapping paper 22 when the rod is inserted into or extracted from the heating chamber 31, the tensile strength of the outer wrapping paper 22 is preferably 10 to 20 N/15 mm, and the wet tensile strength of the outer wrapping paper 22 is preferably 5 to 20 N/15 mm. The tensile strength of the outer wrapping paper 22 is measured in accordance with, for example, JIS P 8113. The wet tensile strength of the outer wrapping paper 22 may be measured based on, for example, a wet tensile strength test described in Japanese Unexamined Patent Application Publication No. 2019-187451.

[0125] Each thin rod 21 preferably has a hardness of 60% or more and 85% or less when the space inside the inner wrapping paper 23 is filled with the flavor source 24. Here, the term "hardness" means the resistance to deformation of the thin rod 21 along cross-section. The hardness of the thin rod 21 can be measured based on, for example, the test method described in Japanese Unexamined Patent Application Publication (Translation of PCT Application) No. 2019-506868 (paragraphs 0029-0031, FIG. 1). The test for measuring the hardness of the thin rod 21 can be performed in accordance with the standard operation procedure for Borgwaldt Hardness Tester H10 (produced by Heinr Borgwaldt GmbH).

[0126] More specifically, the hardness of the thin rod 21 can be determined by the following equation:

$$\text{Hardness (\%)} = (Dd/Ds) \times 100$$

[0127] In the equation, Ds is the height of the thin rod 21 in the radial direction before a load is applied by the Borgwaldt Hardness Tester H10, and Dd is the height of the thin rod 21 in the radial direction after a constant load (88 g) is applied to the thin rod 21 in the radial direction for a predetermined load time (5 seconds) by a load bar of Borgwaldt Hardness Tester H10. FIG. 21 is a schematic diagram illustrating the measurement of the hardness of the thin rod 21. In FIG. 21, reference sign F denotes the load applied to the thin rods 21 in the radial direction in the measurement test. Reference sign d denotes the amount by which the thin rod 21 is pressed downward in the radial direction by the load applied by the load bar (d=Ds−Dd). The harder the thin rod 21 (the smaller the amount of depression), the closer the hardness is to 100%.

[0128] Although an embodiment of the present invention has been described above, the flavor stick, the non-combustion-heating-type flavor inhalation product, and the method for manufacturing the flavor stick according to the present invention are not limited to the above-described embodiment. Various modes disclosed in the above-described embodiment and modifications may be combined with any other modes disclosed in this specification.

REFERENCE SIGNS LIST

[0129] 1 flavor stick
[0130] 2 flavor rod
[0131] 3 mouthpiece
[0132] 21 thin rod
[0133] 22 outer wrapping paper
[0134] 23 inner wrapping paper
[0135] 24 flavor source

1. A flavor stick comprising:
a flavor rod configured to be inserted into a heating chamber of a flavor inhalation device and heated from an outer periphery by an external heater disposed in or on a side peripheral portion of the heating chamber; and
a mouthpiece connected to a rear end of the flavor rod,
wherein the flavor rod includes a plurality of thin rods and outer wrapping paper with which the plurality of thin rods are bundled and wrapped, and
wherein each of the plurality of thin rods includes inner wrapping paper, a flavor source, and an aerosol-source material, the flavor source and the aerosol-source material being disposed inside the inner wrapping paper.

2. The flavor stick according to claim 1, wherein the inner wrapping paper of each of the plurality of thin rods is bonded to the outer wrapping paper.

3. The flavor stick according to claim 1, wherein the mouthpiece includes a leakage-suppressing portion in a front end section thereof, the leakage-suppressing portion being connected to a rear end of the flavor rod and including an aerosol flow path and a blocking portion, the aerosol flow path extending in the axial direction and allowing an aerosol generated in the plurality of thin rods to flow therethrough, the blocking portion blocking a rear end of a gap formed between the outer wrapping paper and the plurality of thin rods.

4. The flavor stick according to claim 3, wherein the gap includes an outer peripheral gap formed adjacent to an outer periphery of the flavor rod in cross-section, and the leakage-suppressing portion includes an outer peripheral blocking portion that faces the outer peripheral gap.

5. The flavor stick according to claim 3, wherein the gap includes a central gap formed in a central region of the flavor rod in cross-section, and the leakage-suppressing portion includes a central blocking portion that faces the central gap.

6. The flavor stick according to claim 3, wherein the aerosol flow path faces rear ends of the plurality of thin rods.

7. The flavor stick according to claim 3, wherein a rear end of each of the plurality of thin rods extends along the blocking portion and the aerosol flow path, and
wherein the blocking portion serves as a stopper in regions in which the blocking portion faces the rear ends of the thin rods, the stopper restraining the thin rods from being displaced when the flavor rod is inserted into the heating chamber.

8. A non-combustion-type flavor inhalation product comprising:
the flavor stick according to claim 1; and
a flavor inhalation device used for inhalation from the flavor stick, the flavor inhalation device including a heating chamber that allows insertion of the flavor rod of the flavor stick and an external heater disposed in or on a side peripheral portion of the heating chamber.

9. A method for manufacturing a flavor stick including a flavor rod and a mouthpiece, the flavor rod being configured to be inserted into a heating chamber of a flavor inhalation

device and heated from an outer periphery by an external heater disposed in or on a side peripheral portion of the heating chamber, the mouthpiece being connected to a rear end of the flavor rod, the method comprising:

a step of forming the flavor rod by bundling a plurality of thin rods, in each of which a flavor source containing an aerosol-source material is wrapped with inner wrapping paper, and wrapping the plurality of thin rods together with outer wrapping paper; and

a connecting step in which the flavor rod and the mouthpiece are arranged in series and wrapped together with tipping paper.

10. The method for manufacturing the flavor stick according to claim **9**,

wherein the step of forming the flavor rod includes

a long-thin-rod forming step in which a plurality of long thin rods are formed in parallel with each other along a transport direction of a wrapping machine by wrapping the flavor source containing the aerosol-source material with long-sheet-shaped thin-rod wrapping paper continuously in a longitudinal direction,

a long-flavor-rod forming step in which the plurality of long thin rods are joined and wrapped together with long outer wrapping paper to form a long flavor rod, and

a cutting step in which the long flavor rod is cut to a predetermined length to form the flavor rod.

11. The method for manufacturing the flavor stick according to claim **9**,

wherein the step of forming the flavor rod includes

a long-flavor-rod forming step in which a long flavor rod is formed by supplying double-length first components, each of which is twice as long as a first component that constitutes a portion of the mouthpiece, to long-sheet-shaped long outer wrapping paper at regular intervals while the long outer wrapping paper is transported along a transport path of a wrapping machine, supplying a plurality of double-length thin rods, which are twice as long as the thin rods, to rod-receiving spaces formed between the double-length first components to form bundles of the double-length thin rods, and then wrapping together the double-length first components and the bundles of the double-length thin rods arranged in series with the long outer wrapping paper, and

a cutting step in which the long flavor rod is cut at centers of the double-length first components in a length direction and centers of the double-length thin rods in the length direction to form intermediate assemblies in each of which the flavor rod is connected to the first component, and

wherein, in the connecting step, one of the intermediate assemblies and one or more second components that constitute another portion of the mouthpiece are wrapped together with the tipping paper while the one or more second components are arranged in series with the first component of the one of the intermediate assemblies.

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