(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 3 733 001 A1**

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

(43) Date of publication:
**04.11.2020 Bulletin 2020/45**

(21) Application number: **17936963.2**

(22) Date of filing: **27.12.2017**

(51) Int Cl.:
***A24D 3/04*** *(2006.01)*

(86) International application number:
**PCT/JP2017/047022**

(87) International publication number:
**WO 2019/130500 (04.07.2019 Gazette 2019/27)**

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

(71) Applicant: **Japan Tobacco Inc.**
**Tokyo 105-8422 (JP)**

(72) Inventors:
- **YAMAUCHI, Yuji**
  **Tokyo 130-8603 (JP)**
- **OMURA, Takashi**
  **Tokyo 130-8603 (JP)**
- **MIYAMOTO, Shingo**
  **Tokyo 130-8603 (JP)**

(74) Representative: **Hoffmann Eitle**
**Patent- und Rechtsanwälte PartmbB**
**Arabellastraße 30**
**81925 München (DE)**

(54) **SMOKING ARTICLE**

(57) A smoking article includes an aerosol generating rod, and a filter portion disposed adjacent to the aerosol generating rod. The filter portion includes a filter body, a capsule member, and an adhesive. The capsule member contains a flavorant inside and is embedded in the filter body. The adhesive bonds the filter body and the capsule member.

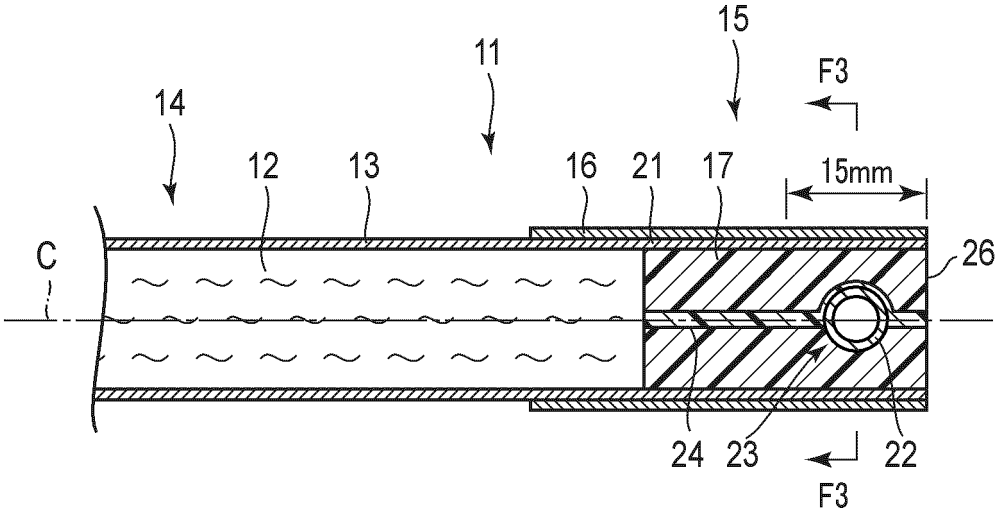


FIG. 2

EP 3 733 001 A1

## Description

### FIELD

**[0001]** The present invention relates to a smoking article including a capsule member.

### BACKGROUND

**[0002]** A smoking article with a filter, for example, a conventional filter cigarette, includes a filter portion, a tobacco portion, and a tipping paper member. The filter portion is formed in a rod shape by wrapping with filter wrapping paper a filter body containing a cellulose acetate fiber bundle or a filter body formed of a nonwoven fabric containing a pulp. The tobacco portion is formed in a rod shape by wrapping dried tobacco leaves with cigarette paper. The filter portion and the tobacco portion are joined end to end. The filter portion and the tobacco portion are wrapped with the tipping paper member over the entire circumferences to adhere to each other to form one integral body.

**[0003]** Conventionally, as disclosed in Patent Literature 1, for example, a flavor capsule is incorporated into a cigarette filter body. A smoker crushes the flavor capsule with fingers to inhale the flavor produced from the content in the flavor capsule at the time of smoking or to mask the smell of the cigarette butt left after the cigarette is extinguished. The details of the flavor capsule are described in Patent Literature 2, for example.

**[0004]** Besides the cigarette, there are many smoking articles, such as cigars and cigarillos, which generate smoke by burning the tip of an aerosol generating rod containing a tobacco material. Also, there are many smoking articles which generate a fragrance component by heating an aerosol generating rod containing an aerosol base material such as a tobacco material, a flavor component, and a glycerin without combustion. As methods of heating without combustion, there are various methods that can be used depending on the required level, such as heating by electrical resistance, IH, chemical change, or phase change.

**[0005]** The aerosol generating rod includes a tobacco rod formed by wrapping dried tobacco leaves with a cigarette paper and formed into a rod shape. In addition, the aerosol generating rod includes a rod formed by wrapping dried tobacco leaves with a cigarette sheet, and a rod formed by impregnating a base material other than the tobacco leaves with an aerosol source such as glycerin and a fragrance component and thereafter wrapping the base material with paper into a rod shape. In any shape, the aerosol generating rod is substantially cylindrical, and generally a filter portion is arranged at and connected to one end of the aerosol generating rod by wrapping with a tipping paper.

**[0006]** Examples of smoking articles in which a fragrance component is generated by heating the aerosol generating rod without combustion are disclosed in Patent Literature 3 and Patent Literature 4.

### CITATION LIST

#### PATENT LITERATURE

**[0007]**

Patent Literature 1: Japanese Patent No. 6078657
Patent Literature 2: Jpn. PCT National Publication No. 2007-520204
Patent Literature 3: Japanese Patent No. 5990500
Patent Literature 4: Japanese Patent No. 5292410

### SUMMARY

#### TECHNICAL PROBLEM

**[0008]** It is an object of the present invention to provide a smoking article in which a capsule member is prevented from being out of position inside a filter portion.

#### SOLUTION TO PROBLEM

**[0009]** According to the present invention, a smoking article includes an aerosol generating rod, and a filter portion disposed adjacent to the aerosol generating rod. The filter portion includes a filter body, a capsule member, and an adhesive. The capsule member contains a flavorant inside and is embedded in the filter body. The adhesive bonds the filter body and the capsule member.

#### ADVANTAGEOUS EFFECTS OF INVENTION

**[0010]** According to the present invention, it is possible to provide a smoking article in which a capsule member is prevented from being out of position inside a filter portion, and the ease of crushing the capsule member can be improved. Thus, the convenience of the user can be improved.

### BRIEF DESCRIPTION OF THE DRAWINGS

**[0011]**

FIG. 1 is a front view of a cigarette as an example of a smoking article according to an embodiment.
FIG. 2 is a sectional view of the cigarette taken along a central axis C shown in FIG. 1.
FIG. 3 is a sectional view of the cigarette taken along line F3-F3 shown in FIG. 2.
FIG. 4 is a sectional view of a smoking article (cigarette) taken along a central axis C according to a first modification.
FIG. 5 is a sectional view of a smoking article (cigarette) taken along a central axis C according to a second modification.
FIG. 6 is a sectional view of a smoking article taken

along a central axis C according to a third modification.

DETAILED DESCRIPTION

[Embodiments]

**[0012]** An embodiment of a cigarette, which is an example of a smoking article, will now be described. The smoking article includes a cigarette, a cigar, a hand-rolled cigarette, a cigarillo, and a smoking tool (electronic cigarette) that allows a user to inhale a fragrance of tobacco by heating the tobacco by a heater or the like or steaming the tobacco by steam, a smoking tool that allows a user to inhale a fragrance of tobacco by heating with a carbon heat source, or the like, and a non-heating type smoking tool that allows a user to inhale a fragrance of tobacco.

**[0013]** As shown in FIGS. 1 and 2, a cigarette 11 includes an aerosol generating rod 14 including cut tobacco 12 (shredded leaves, tobacco) and cigarette paper 13 wrapped around the cut tobacco 12, a filter portion 15 disposed adjacent to the aerosol generating rod 14, and a tipping paper member 16 wrapped around the aerosol generating rod 14 and the filter portion 15 so as to connect the aerosol generating rod 14 to the filter portion 15. A central axis C passing through the center of the aerosol generating rod 14 and the center of the filter portion 15 can be defined in the cigarette 11.

**[0014]** The filter portion 15 includes a filter body 17 having a cylindrical shape, a filter wrapping paper 21 wrapped around the filter body 17, a capsule member 23 that is embedded within the filter portion 15 (within the filter body 17) and that holds a content liquid containing flavorant inside a capsule shell 22, and an adhesive 24 that bonds the filter body 17 and the capsule member 23.

**[0015]** The tipping paper member 16 which wraps the filter portion 15 may or may not be provided with a plurality of vents on a part of the outer periphery. In the case where the vents are provided, the number of the vents may be, for example, 10 to 40. In this case, the plurality of vents are arranged in a row in an annular shape, for example, in an outer peripheral part of the tipping paper member 16 wrapped around the filter portion 15. The plurality of vents are formed at substantially regular intervals. With the plurality of vents, air is drawn into the filter portion 15 through the vents when the user smokes. Diluting mainstream smoke with ambient air flowing through the vents allows a product design with a desired tar value.

**[0016]** As shown in FIG. 2, the cigarette 11 includes the aerosol generating rod 14 including the cut tobacco 12, and the cigarette paper 13 wrapped around the cut tobacco 12, the filter portion 15, and the tipping paper member 16 disposed on the aerosol generating rod 14 and the filter portion 15 so as to connect the aerosol generating rod 14 to the filter portion 15.

**[0017]** The capsule member 23 is embedded in the filter body 17. The number of the capsule members 23 in the filter portion 15 may be one or more (for example, 2 to 10). The capsule member 23 is provided on or near the central axis C of the filter portion 15. The capsule member 23 is positioned at a distance of 15 mm or shorter from a mouthpiece end 26 of the filter portion 15 in the direction of the central axis C toward the aerosol generating rod 14. Preferably, the capsule member 23 is positioned at a distance shorter than 10 mm from the mouthpiece end 26 of the filter portion 15 in the direction of the central axis C toward the aerosol generating rod 14. More preferably, the capsule member 23 is positioned at a distance of 7 mm or shorter from the mouthpiece end 26 of the filter portion 15 in the direction of the central axis C toward the aerosol generating rod 14. By adopting this arrangement, the user can easily crush the capsule member 23 not only with fingers, but by biting the capsule member 23 with teeth during smoking. Furthermore, since the fragrance generating source is close to the mouthpiece end, the smoker can enjoy a stronger flavor sensation.

**[0018]** The capsule member 23 includes the capsule shell 22, and a content liquid encapsulated in the capsule shell 22 and containing a flavorant. The capsule shell 22 may contain, for example, starch, dextrin, polysaccharides, agar, gellan gum, gelatin, various natural gelling agents, glycerin, sorbitol, calcium chloride, and the like, and may further contain a flavorant and a coloring agent. The capsule member 23 is preferably colored so as to be recognizable by the smoker when the capsule member 23 is crushed, even though it is surrounded by opaque filter wrapping paper 21 and tipping paper member 16. The capsule shell 22 preferably contains a coloring agent, such as Blue No. 1. If the capsule shell 22 of the capsule member 23 contains a hydrophilic material, it may be considered that the capsule shell 22 is composed of a material weakened by water absorption.

**[0019]** As the flavorant of the content liquid, any flavorant for a smoking article such as menthol, plant essential oil, etc. may be used. Main examples of the flavorant include menthol, leaf tobacco extract; natural plant flavors (e.g., cinnamon, sage, herb, chamomile, pueraria lobata, sweet hydrangea leaf, clove, lavender, cardamom, caryophyllus, nutmeg, bergamot, geranium, honey essence, rose oil, lemon, orange, cassia bark, caraway, jasmine, ginger, coriander, vanilla extract, spearmint, peppermint, cassia, coffee, celery, cascarilla, sandalwood, cocoa, ylang ylang, fennel, anise, licorice, St John's bread, prune extract, and peach extract), saccharides (e.g., glucose, fructose, isomerized saccharide, and caramel), cocoa (e.g., powder and extract), esters (e.g., isoamyl acetate, linalyl acetate, isoamyl propionate, and linalyl butyrate), ketones (e.g., menthone, ionone, damascenone, and ethyl maltol), alcohols (e.g., geraniol, linalool, anethole, and eugenol), aldehydes (e.g., vanillin, benzaldehyde, and anisaldehyde), lactones (e.g., γ-undecalactone and γ-nonalactone), animal flavorants (e.g., musk, ambergris, civet, and castoreum), and hydrocarbons (e.g., limonene and pinene). These

flavorants may be used alone or in combination.

**[0020]** As a solvent of the content liquid, a solvent suitable to the flavorant can be used. For example, medium chain fatty acid triglyceride (MCT) (specifically, capryl/capric acid glycerin), propylene glycol, water, or ethanol may be used. The content liquid may contain other solvents, and other additives such as a pigment, an emulsifier, and a thickener.

**[0021]** Although the manufacturing method of the capsule member 23 is not limited to any particular one, the falling-dropping method may be used for manufacturing a capsule member 23 having a seamless capsule shell 22. This method employs a double nozzle. The content liquid is ejected from the inner side nozzle, and simultaneously a liquid material formed of the capsule shell 22 is ejected from the outer side nozzle. As a result, the liquid material formed of the capsule shell 22 can encapsulate the content liquid without forming any seam.

**[0022]** The capsule member 23 may be in the form of a sphere or a cylinder. The sphere includes a round object having a substantially circular section and an ellipsoidal object having an ellipsoidal section. Preferably, the capsule member 23 is an object having a substantially circular section. If the capsule member 23 is a sphere having a substantially circular section, it may have a diameter, for example, of 1.0 to 8.0 mm. In the case of an ellipsoid, the capsule member 23 may have, for example, a maximum diameter of 2.0 to 8.0 mm and a minimum diameter of 1.0 to 7.0 mm. In the case of a cylinder, the capsule member 23 may have a diameter of 1.0 to 8.0 mm and a height of 1.0 to 8.0 mm. When a spherical capsule member is applied to a generally distributed cigarette, a capsule having a diameter smaller than 7.5 to 8.0 mm, which is the diameter of the commonly distributed cigarette and filter portion, should be used. When a spherical capsule member is applied to a generally distributed cigarette, it is preferable to use a capsule member having a diameter of 3.0 mm to 4.5 mm. If the diameter of the capsule is too small, problems may arise; for example, the amount of the flavorant applied to the cigarette may be reduced, thereby reducing the feeling of satisfaction that can be imparted by the flavorant; and it may be difficult to find the presence of the capsule, when the smoker breaks the capsule. If the diameter of the capsule is too large, the ratio of the cross-sectional area of the capsule to the cross-sectional area of the filter body is increased, so that the ventilation resistance of the filter portion when the capsule is not crushed becomes too large, causing the smoker to feel difficulty in inhaling.

**[0023]** The filter body 17 can be formed of a filter material of a cellulose acetate fiber bundle (acetate tow), as in the case of a conventional filter cigarette. The filter body 17 may comprise only a filter material of acetate tow, or may comprise a filter material of acetate tow and the filter wrapping paper 21 wrapped around the filter material. If the filter portion 15 includes a plurality of filter bodies 17, the filter body 17 on the cut tobacco 12 side and the filter body 17 on the mouthpiece side may have the same material and structure, or may have different materials and structures.

**[0024]** The acetate tow may have a filament denier of 1.9 to 12.0 (g/9000m), a total denier of 10,000 to 44,000 (g/9000m), a fiber number of 830 to 23,500 (fibers), and a pressure drop of 100 to 600 ($mmH_20$/120mm). The filament denier, the total denier, and the number of fibers should be designed to achieve the target value of ventilation resistance, depending on the setting circumference (14.0 to 26.0 (mm)) of the filter body. A plasticizer such as triacetin may be added to the acetate tow. The plasticizer may be added in an amount of 5 to 12% by weight relative to the weight of the acetate tow. If activated charcoal is added in a dispersed manner between the fibers of the acetate tow, the plasticizer may be added in an amount of 2 to 12% by weight relative to the weight of the acetate tow.

**[0025]** For example, the filter portion 15 may have a circumference of about 14 to 26 mm, and a length, for example, of 17 to 40 mm, like a conventional filter.

**[0026]** The aerosol generating rod 14, like the conventional cigarette 11, comprises the cut tobacco 12 and the cigarette paper 13 wrapped around the cut tobacco, and may have, for example, a circumference of about 14 to 26 mm and a length of about 20 to 70 mm.

**[0027]** The adhesive 24 is provided over the entire length of the filter portion 15 in the longitudinal direction (direction of the central axis C). The adhesive 24 is linearly provided on or near the central axis C of the filter portion 15 along the central axis C of the filter portion 15. Since the capsule member 23 is located on or near the central axis C, a part of the adhesive 24 is positioned within the projection section in the direction of the central axis C of the capsule member 23. The adhesive 24 bonds the capsule member 23 and the filter body 17 which are also located on the central axis C.

**[0028]** The adhesive 24 is partially arranged in an arc shape along the outer shape of the capsule member 23. The adhesive 24 is formed of a thermoplastic resin (hot-melt adhesive). When the adhesive 24 is applied to the filter portion 15, it becomes liquefied by heating to a high temperature of 100 to 200°C. However, at the time of product shipment, the adhesive 24 is completely solid. In the production line of the filter portion 15, the adhesive 24 is applied continuously and linearly to filter tow at a rate of 10 to 50 mg per 120 mm length in the longitudinal direction of the filter body 17. As shown in FIG. 3, the adhesive 24 may cover 1/20 to 1/3 of the total surface area of the capsule member 23, for example. The area covering the surface of the capsule member 23 is preferably 1/2 or less, for example. If 1/2 or more of the capsule member 23 is covered with the adhesive 24, the capsule member 23 becomes too hard to be crushed by fingers, since the adhesive 24 functions as a kind of a coating.

**[0029]** Flavorants may be uniformly added to the adhesive 24. In the case of uniformly adding the flavor components to the adhesive 24, it is considered that the pref-

erable amount of the flavor components is the amount that does not cause deterioration of the function of the adhesive 24. The amount of the flavorants uniformly contained within the adhesive 24 can be adjusted appropriately, for example, by increasing or decreasing the amount of the flavorants to be added for flavoring the mainstream smoke of the cigarette 11 (smoking article).

**[0030]** These flavor components may be dispersed directly in the adhesive 24, or the flavor components may be included in an inclusion compound such as dextrin, α-cyclodextrin, and β-cyclodextrin, and the inclusion compound may be dispersed in the adhesive 24. By adopting such a technique, it is also possible to reduce the influence on the adhesive force of the adhesive 24 by dispersing the flavor components in the adhesive 24.

**[0031]** Examples of the flavorants added to the adhesive 24 include the following. Examples include acetoanisole, acetophenone, acetylpyrazine, 2-acetylthiazole, alfalfa extract, amyl alcohol, amyl butyrate, transanethole, 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 acids, cinnamyl alcohol, cinnamyl cinnamate, citronella oil, DL-citronellol, clary sage extract, cocoa, coffees, cognac oil, coriander oil, cuminaldehyde, davana oil, δ-decalactone, γ-decalactone, decanoic acid, dill herb oil, 3,4-dimethyl-1,2-cyclopentanedione, 4,5-dimethyl-3-hydroxy-2,6-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-methyl-3-hydroxy-4-methyl-2(5H)-furanone, 2-ethyl-3-methylpyrazine, eucalyptol, fenugreek absolute, genet absolute, gentian root infusion, geraniol, geranylacetate, grape juice, guaiacol, guava extract, γ-heptalactone, γ-hexalactone, hexanoic acid, cis-3-hexan-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-cyclohexane-1-on, 4-(para-hydroxyphenyl)-2-butanone, sodium 4-hydroxyundecanoate, immortel absolute, β-ionone, isoamyl acetate, isoamyl butyrate, isoamyl phenylacetate, isobutyl acetate, isobutyl phenylacetate, jasmine absolute, coconut tincture, labdanum oil, lemon-terpeneless oil, licorice extract, linalool, linalyl acetate, lovage root oil, maltol, maple syrup, menthol (L-menthol), menthone, L-menthyl acetate, para-methoxybenzaldehyde, methyl-2-pyrrolylketone, 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, oris oil, palmitic acid, peppermint oil, petitgrain paraguai oil, phenethyl alcohol, phenethyl phenylacetate, phenylacetic acid, piperonal, plum extract, propenyl guaethol, propyl acetate, 3-propylidenphthalide, prune juice, pyruvate, 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, trimethylcitrate, 4-(2,6,6-trimethyl-1,3-cyclohexenyl)2-butene-4-one, 2,6,6-trimethyl-2-cyclohexene-1,4-dione, 4-(2,6,6-trimethyl-1,3-cyclohexadienyl)2-butene-4-one, 2,3,5-trimethylpyrazine, γ-undecalactone, γ-valerolactone, vanilla extract, vanillin, veratraldehyde, and violet leaf absolute.

**[0032]** These flavorants may be used alone, or in combination to achieve a desired scent.

**[0033]** The flavorant dispersed within the adhesive 24 are fixed to the adhesive 24 before smoking, and volatilization to the outside of the adhesive 24 occurs almost not at all. On the other hand, when smoking, mainstream smoke passes through the vicinity of the adhesive 24. The flavorant fixed to the adhesive 24 is volatilized into the mainstream smoke by the heat of the mainstream smoke or the moisture (vapor) contained in the mainstream smoke. This provides a gap between the scent of the smoking article (smoking article) 11 before smoking and the scent of the mainstream smoke during smoking, which can be surprising to the smoker. Further, it is also possible to take a predetermined time from the start of smoking until the fragrant fixed in the adhesive 24 volatilizes into the mainstream smoke, that is, to give a time lag from the start of smoking before the fragrant fixed in the adhesive 24 volatilizes into the mainstream smoke.

**[0034]** The adhesive 24 can be uniformly mixed with a pigment such as a dye or a colorant. As such a pigment, an edible pigment may be used, for example. Examples of edible pigments include, for example, natural pigments, such as a gardenia yellow pigment, an annatto pigment, a capsicum pigment, a red cabbage pigment, a monascus pigment, and a gardenia blue pigment, and synthetic pigments, such as food red No. 2, food red No. 3, food red No. 102, food red No. 104, food red No. 105, food yellow No. 4, food yellow No. 5, food blue No. 1, and food blue No. 2.

**[0035]** Functions of the cigarette 11 according to the present embodiment will now be described. With the cigarette 11 of the present embodiment, the user ignites the tip of the aerosol generating rod 14, holds the mouthpiece end 26 of the filter portion 15 in the mouth and inhales, whereby the user can enjoy the flavor and taste of the tobacco. At this time, the mainstream smoke is mixed with the fragrant contained in the content liquid of the capsule member 23 or the fragrant volatilized from the

adhesive 24, and the expected flavor and taste is exhibited in the oral cavity of the user. When the capsule member 23 is crushed, the movement of the capsule member 23 is inhibited, so that the user can easily crush the capsule member 23 at a desired timing and enjoy the changed flavor and taste.

**[0036]** Next, a process of producing the cigarette 11 as an example of the smoking article of the present embodiment will be described. The aerosol generating rod 14 is formed by wrapping the wrapping paper 13 around the cut tobacco 12 in the conventional manner. On the other hand, in the production line of the filter portion 15, the manufacturing apparatus of the filter portion 15 continuously in a straight line (linearly) supplies the adhesive 24 to a position near the central axis C of the filter portion 15 before the filter body 17 is completely converged into a cylindrical shape. At this time, the adhesive is in a molten state, heated at 100 to 200°C. In addition, the manufacturing apparatus of the filter portion 15, which is provided with the adhesive 24 as mentioned above, supplies the capsule member 23 to the vicinity of the central axis C of the filter body 17. Further, the filter portion 15 is completely formed into a cylinder shape, and thereafter the filter portion 15 is left at room temperature, with the result that the adhesive 24 is solidified. Thus, the position of the capsule member 23 with respect to the filter body 17 is completely fixed.

**[0037]** Next, the movement preventing action of the capsule member 23 in the cigarette 11 as an example of the smoking article of the present embodiment will be described. Using the cigarette 11 of the present embodiment, the inventors conducted a test on seven subjects. In the test, "the capsule member 23 was intentionally pushed into the oral cavity by biting the capsule member with the teeth." The test was conducted using the cigarette 11 of the present embodiment, and a conventional cigarette as a comparative example in which the capsule member 23 and the filter body 17 were not bonded. As a result, in the case of the conventional cigarette of the comparative example, one of the seven subjects was able to push the capsule member 23 into the oral cavity. On the other hand, in the case of the cigarette 11 according to the present embodiment, none of the seven subjects was able to push the capsule member 23 into the oral cavity.

**[0038]** Since "the capsule member 23 was intentionally pushed into the oral cavity" in the test, one of the seven subjects was able to push the capsule member 23 into the oral cavity in the comparative example. However, in the normal state of use, the possibility that the capsule member 23 is pushed out into the oral cavity even in the comparative example is considered to be very close to 0. According to the present embodiment, even when the user tried to intentionally push out the capsule member 23, the capsule member 23 could not be moved to be pushed out from the filter portion 15. Thus, it is possible to realize the cigarette 11 in which the capsule member 23 is unlikely to move.

**[0039]** According to the present embodiment, the smoking article includes the aerosol generating rod 14, and the filter portion 15 adjacent to the aerosol generating rod 14, the filter portion 15 including the filter body 17, the capsule member 23 embedded in the filter body 17 and containing a flavorant, and the adhesive 24 that bonds the filter body 17 and the capsule member 23.

**[0040]** Generally, the fibers constituting the filter portion 15 extend in the axial direction (the direction of the central axis C) of the filter portion 15. Therefore, when an external force is applied to a capsule member, in some rare cases, the capsule member may move to be displaced along the direction in which the fibers extend. However, since such an event occurs very rarely, it was almost impossible for the manufacturer to recognize the event as a problem. According to the above configuration, by fixing the capsule member 23 to the filter body 17 with the adhesive 24, the capsule member 23 can be prevented from being out of position within the filter portion 15. As a result, it is possible to prevent a situation in which the capsule member 23 moves to be displaced and cannot be easily crushed, thereby improving the convenience of the user.

**[0041]** The adhesive 24 is a thermoplastic resin. According to this configuration, since the resin is completely solidified when the product is shipped, it is possible to prevent the capsule member 23 from moving in the filter portion 15, thereby realizing a smoking article in which the capsule member 23 can be easily crushed. Further, since moisture does not come out from the adhesive 24 at the time of solidification, the capsule member 23 can be prevented from being weakened by water.

**[0042]** The capsule shell of the capsule member 23 is formed of a hydrophilic material which is weakened by water absorption. In particular, the capsule shell of the capsule member 23 is formed of a material selected from starch, dextrin, polysaccharides, agar, gellan gum, gelatin, natural gelling agents, glycerin, sorbitol, calcium chloride, and mixtures thereof. According to the above configurations, by using an adhesive that does not contain moisture, such as a thermoplastic adhesive, rather than using an adhesive that contains moisture, such as vinyl acetate paste, the capsule member 23 is not weakened and is prevented from becoming difficult to crush.

**[0043]** The capsule member 23 is positioned on or near the central axis C of the filter portion 15, and the adhesive 24 linearly extends along the central axis C on or near the central axis C of the filter portion 15. According to this configuration, even when the position of the capsule member 23 is out of position with respect to the direction of the central axis C due to manufacturing variations, since the adhesive 24 extends linearly along the central axis C, a slight displacement of the capsule member 23 can be allowed, and the capsule member 23 can be reliably fixed to the filter portion 15.

**[0044]** The capsule member 23 is positioned on or near the central axis C of the filter portion 15, and a part of the adhesive 24 is positioned in a projected section in the

direction of the central axis C of the capsule member 23. According to this configuration, the adhesive 24 can be disposed at a position overlapping the capsule member 23. As a result, the adhesive 24 is not applied to a position away from the capsule member 23. Thus, it is possible to prevent such a problem wherein the adhesion between the capsule member 23 and the filter portion 15 is not successful.

**[0045]** The adhesive 24 includes a flavorant. According to this configuration, since the flavorant can be contained in the adhesive 24, it is not necessary to separately provide cotton yarn or the like containing the flavorant in the filter portion 15. As a result, various flavors can be added to the mainstream smoke, and the degree of freedom can be improved at the time of product design. Furthermore, the manufacturing process can be simplified and the manufacturing cost can be reduced as compared with the case of separately providing cotton yarn or the like containing the flavorant.

**[0046]** The adhesive 24 includes a pigment. According to this configuration, the adhesive 24 can be colored, and the portion where the adhesive 24 is solidified can be decorated. Generally, the color of the portion coated with the adhesive 24 in the filter portion 15 is not substantially different from the color of the portion not coated with the adhesive 24 in the filter portion 15. The portion of the filter portion 15 to which the adhesive 24 is applied is merely harder than the other portions. According to the above configuration, it is possible to positively contribute to the improvement of the appearance at the place where the adhesive 24 is applied, so that the freedom of the smoking article design can be improved.

**[0047]** The capsule member 23 is positioned at a distance shorter than 15 mm or 10 mm from the mouthpiece end 26 of the filter portion 15 in the direction of the center axis C toward the aerosol generating rod 14. According to this configuration, it is possible to place the capsule member 23 near the mouthpiece end 26, and the flavorant can be put on the mainstream smoke at a position close to the mouth of the user. Thus, the capsule member 23 can be arranged at a position where the flavorant can be delivered to the user's oral cavity most efficiently. Further, in the present embodiment, the capsule member 23 and the filter portion 15 are bonded by the adhesive 24. Therefore, even in the arrangement mentioned above, it is possible to prevent the capsule member 23 from falling off the filter portion 15.

(First Modification)

**[0048]** Next, a smoking article (cigarette) according to a first modification of the embodiment will be described. The first modification is different from the above embodiment in that the material of the capsule shell 22 of the capsule member 23 and the type of the adhesive 24 are different, but other parts are the same. In the following, the parts different from those of the above-described embodiment will be mainly described, and descriptions of the parts that are the same as those of the above-described embodiment will be omitted.

**[0049]** The capsule member 23 (capsule shell 22) is formed of a resin material (synthetic resin material). More specifically, the capsule member 23 is formed of, for example, a polyethylene resin material, but may be formed of other kinds of resin materials (synthetic resin materials), such as polypropylene, polyurethane, polyvinyl chloride, and the like. The melting point of the capsule member 23 formed of polypropylene, for example, is 104 to 120°C, which is lower than the melting point of the thermoplastic resin (hot-melt adhesive) of 150 to 180°C. Therefore, when the thermoplastic resin (hot-melt adhesive) is used as the adhesive 24, there is a possibility that a hole may be formed in the capsule member 23 when the thermoplastic resin is melted.

**[0050]** Unlike the embodiment, the adhesive 24 of this modification is composed of an aqueous dispersion adhesive. The aqueous dispersion adhesive exhibits an adhesive performance by evaporation of the water at normal temperature (room temperature). In the embodiment, for example, a vinyl acetate resin emulsion adhesive among the aqueous dispersion adhesives can be suitably used as the adhesive 24.

**[0051]** The arrangement of the adhesive 24 is the same as that of the embodiment described above. Also, as well as the embodiment described above, a flavorant may be mixed with the adhesive 24, and the pigment may be mixed with the adhesive 24. According to this modification, since the capsule member 23 is formed of a resin material, the strength of the capsule member 23 is improved, and a problem wherein the capsule member 23 is unexpectedly crushed or the like during transportation is prevented.

**[0052]** According to this modification, the adhesive 24 is an aqueous dispersion adhesive. With this configuration, an inexpensive and safe adhesive can be used as the adhesive 24. Thus, since the adhesive 24 is a liquid from the beginning, it is not necessary to apply heat to melt the adhesive 24. Therefore, it is possible to prevent holes from being formed in the capsule member 23, which may be formed if the capsule member 23 is formed of a resin material or the like by heating the adhesive 24 formed of a thermoplastic resin (hot-melt adhesive) to melt the adhesive and applying the adhesive to the filter portion 15 and the capsule member 23.

**[0053]** The capsule shell 22 of the capsule member 23 is formed of a resin material. According to this configuration, when the aqueous dispersion adhesive is used as the adhesive 24, the capsule member 23 does not absorb the moisture that is diffused (volatilized) from the aqueous dispersion adhesive, and it is possible to prevent the situation wherein the capsule member 23 is difficult to crush due to the moisture.

(Second Modification)

**[0054]** Next, referring to FIG. 4, a smoking article (cig-

arette) according to a second modification of the embodiment will be described. The cigarette 11 according to the second modification is different from the above-described embodiment in that a second filter portion 31 is provided in addition to the filter portion 15, but the other parts are the same as those of the above-described embodiments. In the following, the parts different from those of the above-described embodiment will be mainly described, and descriptions of the parts that are the same as those of the above-described embodiment will be omitted.

**[0055]** As shown in FIG. 4, the cigarette 11 includes the aerosol generating rod 14 including cut tobacco 12 (shredded leaves, tobacco) and the cigarette paper 13 wrapped around the cut tobacco 12, the filter portion 15 disposed coaxially with the aerosol generating rod 14, the second filter portion 31 disposed coaxially with the aerosol generating rod 14 at a position between the aerosol generating rod 14 and the filter portion 15, and the tipping paper member 16 wrapped around the aerosol generating rod 14 and the filter portion 15 so as to connect the aerosol generating rod 14, the second filter portion 31, and the filter portion 15.

**[0056]** The configuration of the filter portion 15 is the same as that in the above-described embodiment, except that the length in the central axis C is about half of the length of the first embodiment. The filter portion 15 is provided with the capsule member 23 in the same manner as in the above-described embodiment.

**[0057]** The second filter portion 31 is formed in the same manner as the filter portion 15 of this modification. The second filter portion 31 differs from the filter portion 15 in that it does not have the capsule member 23, but the other parts are the same as those of the filter portion 15. In the present modification, the second filter section 31 is composed of one piece, but it may be composed of two or more pieces.

**[0058]** According to this modification, at least one second filter section 31 is provided between the aerosol generating rod 14 and the filter portion 15. With this configuration, even in the cigarette 11 using a multi-segment filter, the movement of the capsule member 23 with respect to the filter portion 15 can be prevented, and the cigarette 11 in which the capsule member 23 can be easily crushed can be realized.

(Third Modification)

**[0059]** Next, referring to FIG. 5, a smoking article (cigarette) according to a third modification of the embodiment will be described. The third modification is different from the above embodiment in that the capsule member 23 is provided at a different position, but the other parts are the same as those of the above embodiment. In the following, the parts different from those of the above-described embodiment will be mainly described, and descriptions of the parts that are the same as those of the above-described embodiment will be omitted.

**[0060]** The configuration of the filter portion 15 is the same as that of the embodiment except that the capsule member 23 is provided at a different position. In this modification, the capsule member 23 is disposed at a distance of 20 mm or shorter from the mouthpiece end 26 in the direction of the central axis C. In other words, the capsule member 23 is provided at a middle portion in the central axis C direction (longitudinal direction) of the filter portion 15.

**[0061]** Even in the case where the capsule member 23 is provided in the middle portion in the longitudinal direction of the filter portion 15 as in the present modification, the movement of the capsule member 23 with respect to the filter portion 15 can be prevented by the adhesive 24, and the user's convenience can be improved.

(Fourth Modification)

**[0062]** Next, referring to FIG. 6, a smoking article according to a fourth modification of the embodiment will be described. In the fourth modification, a smoking article 41 is not a cigarette, but belongs to the field of so-called electronic cigarettes in which an aerosol generating rod 14 is heated by a so-called electric heater or the like. In the following, the parts different from those of the above-described embodiment will be mainly described, and descriptions of the parts that are the same as those of the above-described embodiment will be omitted. FIG. 6 is a sectional view cut along a plane including the central axis C, showing a lower half of a rod member 46 of the smoking article 41 and a main body 45.

**[0063]** The smoking article 41 includes the main body 45 including a battery 42, an electric heating portion 43, and a recess 44, and the rod member 46 detachably inserted into the recess 44 of the main body 45. The recess 44 is formed in a part of a case 45A of the main body 45. The battery 42 can be charged and discharged. The electric heating portion 43 is a so-called heater, and has a heat generating element disposed to surround the recess 44. The heat generating element of the electric heating portion 43 heats the aerosol generating rod 14 and causes a filler 61 of the aerosol generating rod 14 to release a fragrance into the surrounding air. The heating temperature of the aerosol generating rod 14 by the electric heating portion 43 is, for example, 400°C or lower, which is considerably lower than the combustion temperature of the cigarette of the conventional ignition type at 700 to 800°C. By heating at such a low temperature, the amount of mainstream smoke generated from the aerosol generating rod 14 is reduced as compared with the cigarette 11 of the embodiment. Therefore, the filtering function of the filter portion 15 of the present modification is preferably lower than that of the filter portion 15 of the cigarette 11 of the embodiment, so that a preferred amount of mainstream smoke is shared in the mouth of the smoker. In this modification, in order to reduce the mainstream smoke filtration of the filter portion 15, the length of the filter portion 15 in the direction of the central axis C is

shorter than that in the above-described embodiment. It is also possible to shorten the length in which the filter body is disposed out of the total length of the filter portion, and to dispose a tube portion or other segment having a low filtration rate of the mainstream smoke in the remaining portion.

**[0064]** The rod member 46 has a cigarette shape. The rod member 46 includes a tubular cylindrical portion 51, the aerosol generating rod 14 provided at one end portion 51A of the cylindrical portion 51, the filter portion 15 provided at the other end portion 51B opposite to the one end portion 51A of the cylindrical portion 51, a second filter portion 31 disposed coaxially with the aerosol generating rod 14 at a position between the aerosol generating rod 14 and the filter portion 15, and a tipping paper member 16 connecting the cylindrical portion 51, the aerosol generating rod 14, and the filter portion 15.

**[0065]** The cylindrical portion 51 is formed of, for example, a thick paper having a thickness of 100 to 300 μm in a cylindrical shape so as to have a predetermined rigidity. The tipping paper member 16 is supported by the rigid cylindrical portion 51, and even when the rod member 46 is pressed in the direction of the central axis C, the tipping paper member 16 is not crushed in the direction of the central axis C. The tipping paper member 16 and the cylindrical portion 51 have a plurality of vents 53 on a part of the outer circumference. The plurality of vents 53 extend through the tipping paper member 16 and the cylindrical portion 51. The number of vents 53 is, for example, 10 to 40. The vents 53 are arranged, for example, in a row in an annular shape on the outer circumference of the cylindrical portion. The vents 53 are formed at regular intervals.

**[0066]** The aerosol generating rod 14 includes the filler 61 including cut tobacco 12 (shredded leaves, tobacco), tobacco sheet shreds, folded or circumferentially rolled tobacco sheets, pleated tobacco sheets, or non-tobacco filler and the like, and a cigarette paper 54 wrapped around the filler 61. The cigarette paper 54 may be paper alone, or may be formed of paper bonded with a metal foil having a good thermal conductivity, such as an aluminum foil or a stainless steel foil.

**[0067]** The configuration of the filter portion 15 is substantially the same as that of the other embodiments except that the length of the filter body 17 in the direction of the central axis C is shorter. The filter portion 15 includes the filter body 17 having a cylindrical shape, a filter wrapping paper 21 wrapped around the filter body 17, a capsule member 23 that is embedded within the filter portion 15 (within the filter body 17) and that encapsulates a content liquid containing a flavorant inside a capsule shell 22, and an adhesive 24 that bonds the filter body 17 and the capsule member 23. The capsule member 23 is positioned at a distance shorter than 10 mm from a mouthpiece end 26 of the filter portion 15 in the direction of the central axis C toward the aerosol generating rod 14. More preferably, the capsule member 23 is positioned at a distance shorter than 6 mm from the mouthpiece end 26 of the filter portion 15 in the direction of the central axis C toward the aerosol generating rod 14.

**[0068]** The second filter portion 31 differs from the filter portion 15 in that it does not have the capsule member 23, but the other parts are the same as those of the filter portion 15. In the present modification, the second filter section 31 is composed of one piece, but it may be composed of two or more pieces. The filter portion 15 and the second filter portion 31 are connected by a second filter wrapping paper 62.

**[0069]** According to the present modification, the same effects as those in the above-described embodiment are obtained. That is, the user can enjoy the flavor and taste of the smoking article in the oral cavity by inhaling through the filter portion 15 and the cylindrical portion 51, while the rod member 46 is attached to the main body 45.

**[0070]** According to this modification, the smoking article 41 includes the electric heating portion 43 for heating the aerosol generating rod 14. With this configuration, in the smoking article 41 that belongs to the field of so-called electronic cigarettes, the ease of crushing the capsule member 23 can be similarly improved, and the convenience of the user can be improved. In particular, in the case of using the electric heating portion 43, the length of the filter body 17 of the filter portion 15 tends to be short because the amount of the mainstream smoke is small. According to this modification, the movement of the capsule member 23 can be prevented even in the short filter body 17. As described above, the movement of the capsule member can be effectively prevented in the smoking article 41 having the short filter body 17, in which the possibility of the capsule member 23 falling off from the filter body 17 is high. This is extremely useful in the design of the product.

**[0071]** The smoking article is not limited to the above embodiment and modifications and can be embodied by modifying structural elements in the implementation stage without departing from the gist thereof. Therefore, the smoking article described above is obviously applicable to smoking articles by which the user enjoys the fragrance of tobacco without heating. Further, some of the components may be deleted from all the components shown in the embodiments, or different modifications may be appropriately combined to constitute one invention.

REFERENCE SIGNS LIST

**[0072]** 11 ... cigarette, 14 ... aerosol generating rod, 15 ... filter portion, 23 ... capsule member, 24 ... adhesives, 26 ... mouthpiece end, 31 ... second filter portion, 41 ... smoking article.

## Claims

**1.** A smoking article comprising:

an aerosol generating rod; and
a filter portion disposed adjacent to the aerosol generating rod, the filter portion comprising:

a filter body;
a capsule member that contains a flavorant inside and that is embedded in the filter body; and
an adhesive that bonds the filter body and the capsule member.

**2.** The smoking article according to claim 1, wherein the adhesive is a thermoplastic resin.

**3.** The smoking article according to claim 1 or 2, wherein the capsule member has a capsule shell which is formed of a hydrophilic material which is weakened by water absorption.

**4.** The smoking article according to claim 3, wherein the capsule shell of the capsule member is formed of a material selected from starch, dextrin, polysaccharides, agar, gellan gum, gelatin, natural gelling agents, glycerin, sorbitol, calcium chloride, and mixtures thereof.

**5.** The smoking article according to claim 1, wherein the adhesive is an aqueous dispersion adhesive.

**6.** The smoking article according to claim 1 or 5, wherein the capsule member has a capsule shell formed of a resin material.

**7.** The smoking article according to claim 1, wherein:

the capsule member is positioned on or near a central axis of the filter portion, and
the adhesive extends linearly on or near the central axis of the filter portion along the central axis.

**8.** The smoking article according to claim 1, wherein:

the capsule member is positioned on or near the central axis of the filter portion, and
a part of the adhesive is located in a projected cross-section with respect to the direction of the central axis in the capsule member.

**9.** The smoking article according to any one of claims 1 to 8, wherein the adhesive comprises a flavorant.

**10.** The smoking article according to any one of claims 1 to 9, wherein the adhesive comprises a pigment.

**11.** The smoking article according to any one of claims 1 to 10, wherein the adhesive extends over an entire length of the filter portion.

**12.** The smoking article according to any one of claims 1 to 11, wherein the capsule member is positioned at a distance shorter than 15 mm from a mouthpiece end of the filter portion in a direction of the central axis of the filter portion toward the aerosol generating rod.

**13.** The smoking article according to any one of claims 1 to 12, further comprising at least one second filter portion at a position between the aerosol generating rod and the filter portion.

**14.** The smoking article according to claim 1, further comprising electric heating means for heating the aerosol generating rod.

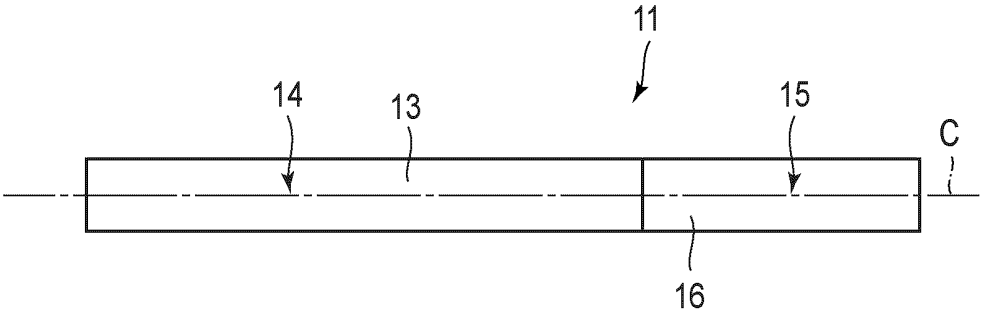


FIG. 1

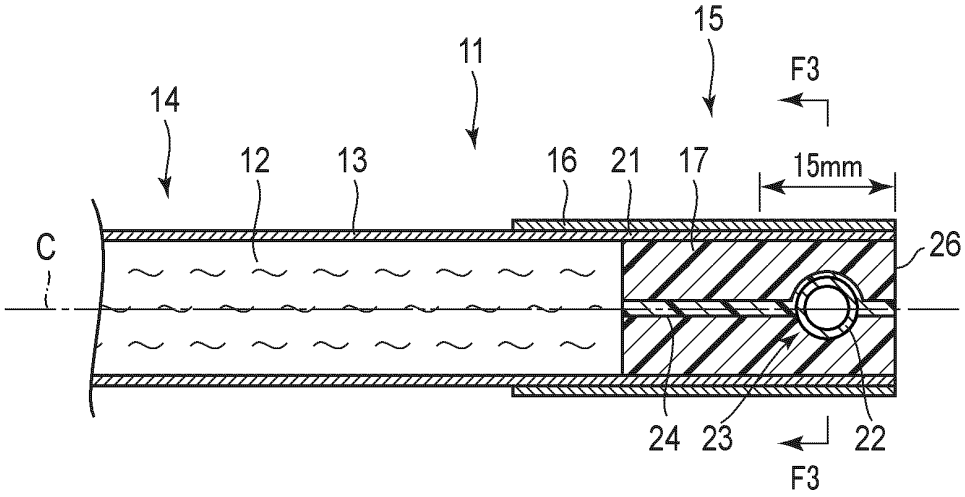


FIG. 2

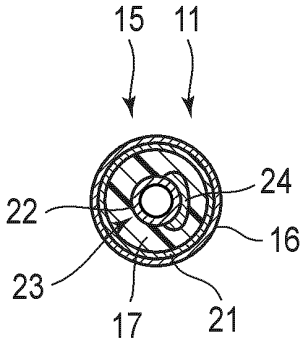


FIG. 3

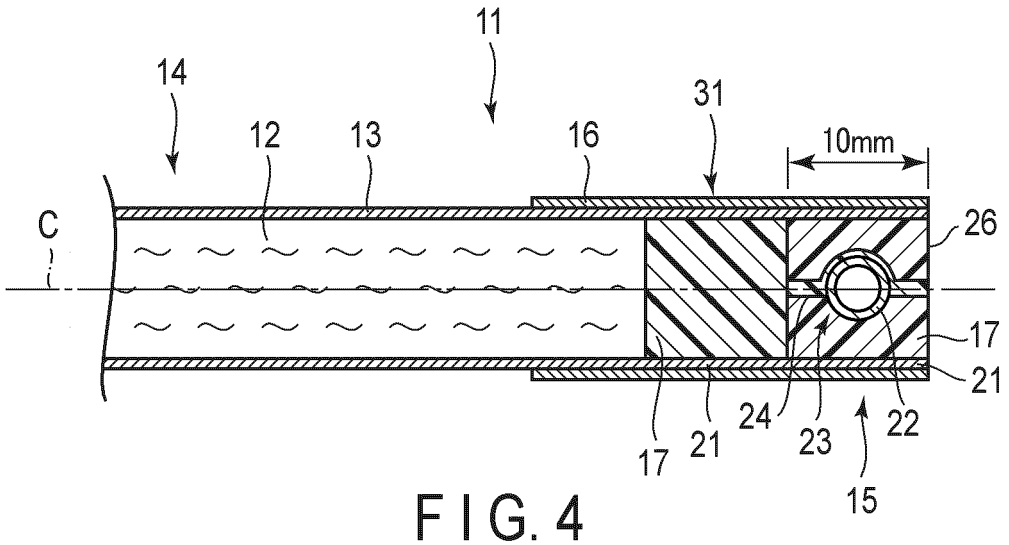
11
14
12
13
16
31
10mm
C
26
17
21
24
23
22
17
21
15

FIG. 4

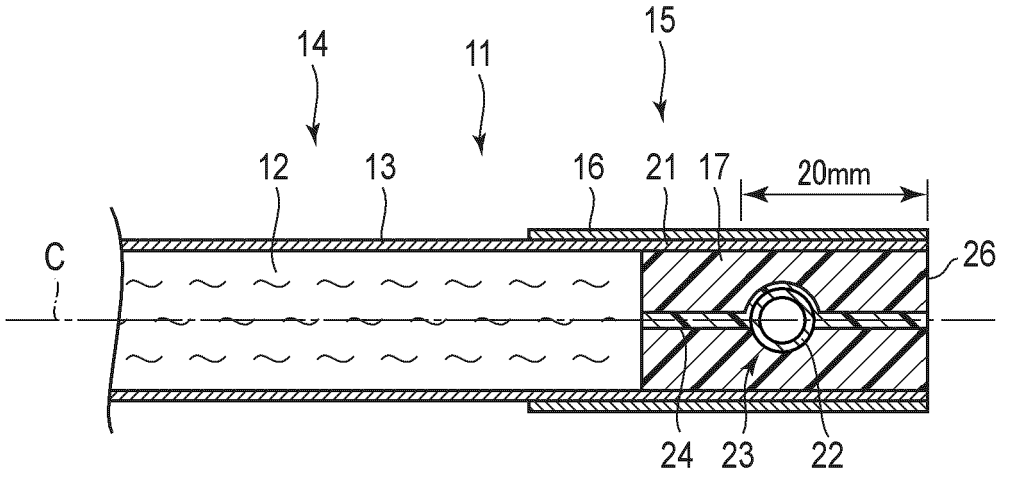
15
14
11
12
13
16
21
17
20mm
C
26
24
23
22

FIG. 5

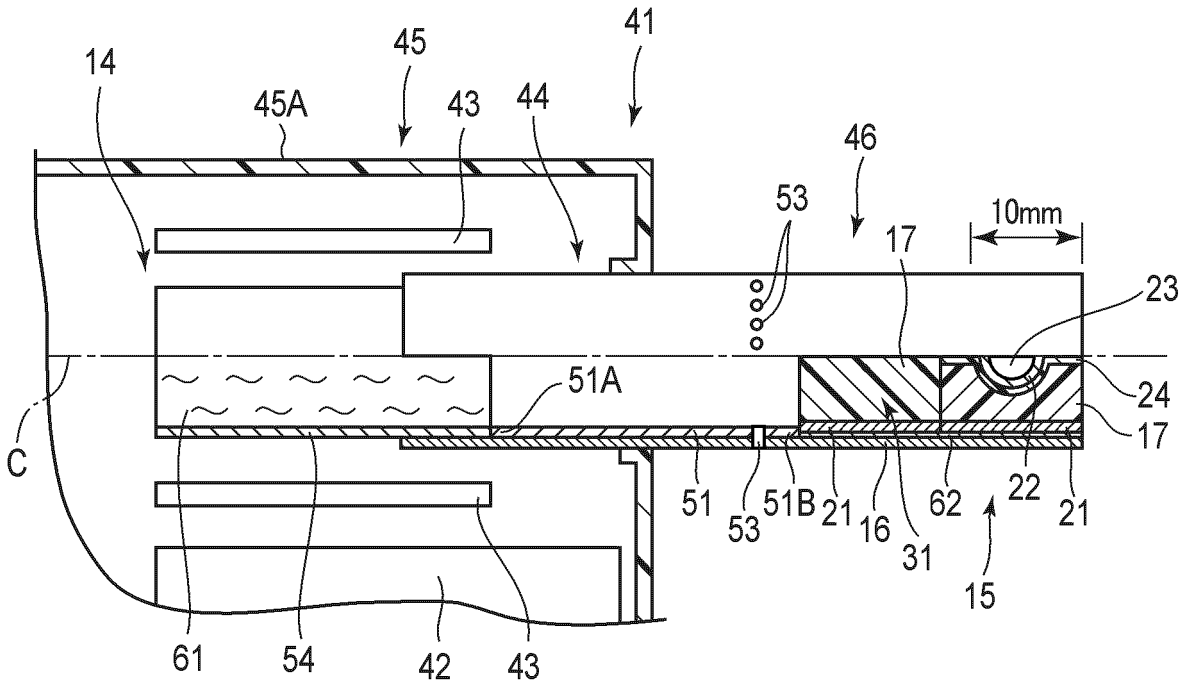
14
45A
45
43
44
41
46
53
10mm
17
23
24
17
51A
C
51
53
51B
21
16
31
62
22
21
15
61
54
42
43

FIG. 6

## INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2017/047022

A. CLASSIFICATION OF SUBJECT MATTER
Int.Cl. A24D3/04(2006.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
Int.Cl. A24D3/04

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

| | |
|---|---|
| Published examined utility model applications of Japan | 1922-1996 |
| Published unexamined utility model applications of Japan | 1971-2018 |
| Registered utility model specifications of Japan | 1996-2018 |
| Published registered utility model applications of Japan | 1994-2018 |

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| Y | WO 2015/075804 A1 (JAPAN TOBACCO INC.) 28 May 2015, paragraphs [0025], [0058]-[0060], fig. 12 & EP 3072404 A, paragraphs [0025], [0059]-[0061], fig. 12 & KR 10-2016-0081970 A | 1-14 |
| Y | WO 2014/128973 A1 (JAPAN TOBACCO INC.) 28 August 2014, paragraph [0030] (Family: none) | 1-14 |

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

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

| | |
|---|---|
| Date of the actual completion of the international search<br>26.03.2018 | Date of mailing of the international search report<br>03.04.2018 |
| Name and mailing address of the ISA/<br>Japan Patent Office<br>3-4-3, Kasumigaseki, Chiyoda-ku,<br>Tokyo 100-8915, Japan | Authorized officer<br><br>Telephone No. |

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

**INTERNATIONAL SEARCH REPORT**

International application No.
PCT/JP2017/047022

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| Y | WO 2014/061415 A1 (JAPAN TOBACCO INC.) 24 April 2014, paragraph [0026] & EP 2888959 A1, paragraph [0034] & KR 10-2015-0043493 A & CN 104780793 A | 6, 9-13 |
| Y | WO 2013/121608 A1 (KAMATA CO., LTD.) 22 August 2013, paragraphs [0032]-[0037], fig. 3 & US 2015/0027477 A1, paragraphs [0038]-[0043], fig. 3 & WO 2013/121608 A & CN 104219972 A & KR 10-2015-0001731 A | 14 |

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

## REFERENCES CITED IN THE DESCRIPTION

*This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.*

### Patent documents cited in the description


- JP 6078657 B **[0007]**
- JP 2007520204 PCT **[0007]**
- JP 5990500 B **[0007]**
- JP 5292410 B **[0007]**