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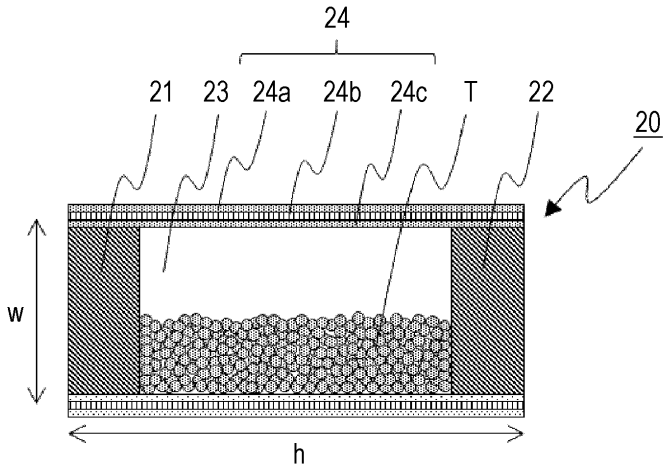
(54) **NON-COMBUSTION-HEATED TOBACCO PRODUCT AND HEATED TOBACCO PRODUCT**

(57) Provided is a cylindrical non-combustion-heated tobacco product having a first filter, a second filter, and a wound paper that is wound around these filter parts so that a space section is formed between the first filter part and the second filter part, a particulate tobacco material being positioned in the space section so as to be capable of moving, wherein the wound paper is configured from three or more layers, two outermost-surface-side layers of the wound paper are each made of paper having specific a specific ventilation rate, and an intermediate layer positioned between the two outermost-surface-side layers includes an air-impermeable layer.

FIG. 1

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## Description

### Technical Field

**[0001]** The present invention relates to a non-combustion-heating-type tobacco and a heated tobacco product.

### Background Art

**[0002]** A non-combustion-heating-type tobacco and a non-combustion-heating-type tobacco product that use electric heating or the like without burning have been developed. The non-combustion-heating-type tobacco product is generally made up of a non-combustion-heating-type tobacco, a battery, a controller, and a heating device including a heater and the like. The heater may be the one based on electrical resistance or may be the one based on induction heating (IH). The electrical resistance-based heater may be the one configured to heat from a contact part that contacts with the outer periphery of the non-combustion-heating-type tobacco, the one in which a needle-like or blade-like heater is inserted from the distal end of the non-combustion-heating-type tobacco into a tobacco filled part, or the like.

**[0003]** For example, Patent Document 1 describes a non-combustion-heating-type tobacco product that includes a heating device and a mouthpiece. A non-combustion-heating-type tobacco is disposed in a housing of the heating device, and the mouthpiece is provided so as to cover the distal end part of the non-combustion-heating-type tobacco.

**[0004]** The non-combustion-heating-type tobacco is generally formed such that a tobacco rod made by wrapping tobacco material with a wrapping paper and a filter are coupled by using a chip paper or the like, and commonly the wrapping paper is made of paper On the other hand, as for the tobacco material, in recent years, for the purpose of, for example, improving a flavor, tobacco material containing a large amount of flavor has been increasing. As a result, there occurs a problem that the flavor contained in tobacco material exudes to the wrapping paper while the non-combustion-heating-type tobacco is stored in a warehouse, and "stains" appear on the wrapping paper to impair the appearance of the non-combustion-heating-type tobacco. To reduce the occurrence of such "stains" on a wrapping paper, for example, using a laminated paper made by laminating and bonding polyethylene films or the like on a paper has been studied.

**[0005]** On the other hand, hitherto, a wrapping machine is used as a method of wrapping tobacco material with a wrapping paper. A wrapping paper has a pair of end regions extending along the long-axis direction of a non-combustion-heating-type tobacco. In wrapping with the wrapping machine, the wrapping paper is formed into a cylindrical shape while wrapping tobacco material, and the pair of end regions overlaps with a predetermined width and is joined by binders.

### Citation List

#### Patent Document

**[0006]** Patent Document 1: Japanese Unexamined Patent Application Publication No. 2018-528788

### Summary of Invention

#### Technical Problem

**[0007]** With the technology described in Patent Document 1, when a non-combustion-heating-type tobacco is replaced after use, there is a job that a mouthpiece is removed, the non-combustion-heating-type tobacco is pulled out from the housing of a heating device, a new non-combustion-heating-type tobacco is put in the housing, and the mouthpiece is attached. Therefore, the non-combustion-heating-type tobacco and the mouthpiece need to be separately removed, which takes time and effort.

**[0008]** When the above-described laminated paper is used to reduce the occurrence of stains on the wrapping paper due to tobacco material, it is found that, in wrapping with a high-speed wrapping machine, a pair of end regions of a wrapping paper is poorly joined and is likely to peel off while being stored in a warehouse.

**[0009]** The present invention is directed to providing a non-combustion-heating-type tobacco and a non-combustion-heating-type tobacco product with which, in replacing a non-combustion-heating-type tobacco after use, the non-combustion-heating-type tobacco is not left in a housing of a heating device, that is, the non-combustion-heating-type tobacco is able to be removed together with a removed mouthpiece. In addition, the present invention is directed to providing a non-combustion-heating-type tobacco with which stains on wrapping paper due to flavor contained in tobacco material are not visually recognized on the outermost surface of the non-combustion-heating-type tobacco and the appearance is able to be favorably maintained by suppressing peeling of bonded parts of the wrapping paper while being stored in a warehouse.

Solution to Problem

**[0010]** As a result of diligent study of the inventors, the inventors found that a tubular non-combustion-heating-type tobacco comprising a first filter part, a second filter part, and a wrapping paper wrapping the filter parts such that a space section is formed between the first filter part and the second filter part, particulate tobacco material being movably disposed in the space section, wherein

the wrapping paper is made up of three or more layers,
the outermost two layers of the wrapping paper are layers made of paper,
of the outermost two layers of the wrapping paper, the outer peripheral layer of the non-combustion-heating-type tobacco has an air permeability of 100 CORESTA Unit or less, and the layer on a side opposite to the outer peripheral layer has an air permeability of 1000 CORESTA Unit or greater, and
an intermediate layer located between the outermost two layers includes an air-impermeable layer,
solves the above-described inconvenience.

**[0011]** The summary of the present invention is as follows.

[1] A tubular non-combustion-heating-type tobacco comprising a first filter part, a second filter part, and a wrapping paper wrapping the filter parts such that a space section is formed between the first filter part and the second filter part, particulate tobacco material being movably disposed in the space section, wherein

the wrapping paper is made up of three or more layers,
the outermost two layers of the wrapping paper are layers made of paper,
of the outermost two layers of the wrapping paper, the outer peripheral layer of the non-combustion-heating-type tobacco has an air permeability of 100 CORESTA Unit or less, and the layer on a side opposite to the outer peripheral layer has an air permeability of 1000 CORESTA Unit or greater, and
an intermediate layer located between the outermost two layers comprises an air-impermeable layer.

[2] The non-combustion-heating-type tobacco according to [1], wherein the wrapping paper has a basis weight of 100 gsm or greater.
[3] The non-combustion-heating-type tobacco according to [1] or [2], wherein, of the outermost two layers of the wrapping paper, the outer peripheral layer of the non-combustion-heating-type tobacco has a smoothness of 50 seconds or more.
[4] The non-combustion-heating-type tobacco according to any one of [1] to [3], wherein the wrapping paper has a pair of a first end region and a second end region extending along a long-axis direction of the non-combustion-heating-type tobacco and when the wrapping paper is formed into a cylindrical shape with a perimeter of 24.5 mm and a height of 20 mm by the first end region and the second end region overlappingly joined to each other with a width of 2.5 mm,

a buckling strength that is measured while a load is applied in an axial direction of the cylinder is greater than or equal to 30.0 N, and
a stress that is measured while a load is applied in a radial direction of the cylinder within a range up to 5 mm in a direction from one end of the axial direction of the cylinder to the other end to deform the cylinder to 50% of a diameter of the cylinder is 0.15 N or greater.

[5] The non-combustion-heating-type tobacco according to any one of [1] to [4], wherein the air-impermeable layer is a film made of resin.
[6] An electrically heated tobacco product comprising an electric heating device that comprises a heater member, a battery unit serving as an electric power supply of the heater member, and a control unit for controlling the heater member, and the non-combustion-heating-type tobacco according to any one of [1] to [5], inserted so as to be in contact with the heater member.
[7] The electrically heated tobacco product according to [6], wherein the electric heating device comprises a housing and a mouthpiece, and
the housing extends in an axial direction and has an opening at a first end in the axial direction, the housing has an accommodation space inside so as to communicate with the opening, the non-combustion-heating-type tobacco is accommodated in the accommodation space of the housing, and the mouthpiece has an engaging part and a holder.

Advantageous Effects of Invention

**[0012]** According to the present invention, it is possible to provide a non-combustion-heating-type tobacco and a non-combustion-heating-type tobacco product with which, in replacing a non-combustion-heating-type tobacco after use, the non-combustion-heating-type tobacco is not left in the housing of the heating device, that is, the non-combustion-heating-type tobacco is able to be removed together with a removed mouthpiece. In addition, since stains on a wrapping paper due to flavor contained in tobacco material are not visually recognized on the outermost side of the non-combustion-heating-type tobacco, it is possible to provide the non-combustion-heating-type tobacco that is able to favorably maintain the appearance and to suppress peeling of bonded parts of the wrapping paper while being stored in a warehouse.

Brief Description of Drawings

**[0013]**

[Fig. 1] Fig. 1 is a schematic diagram of a non-combustion-heating-type tobacco according to an embodiment of the present invention.
[Fig. 2A] Fig. 2A is a schematic diagram showing one mode of a wrapping paper of the non-combustion-heating-type tobacco of Fig. 1 and shows one mode of a method of applying binders to a wrapping paper before being formed into a cylindrical shape.
[Fig. 2B] Fig. 2B is a schematic diagram showing one mode of a wrapping paper of the non-combustion-heating-type tobacco of Fig. 1 and shows a condition to join a wrapping paper at the time of being formed into a cylindrical shape.
[Fig. 3] Fig. 3 is a perspective view showing one mode of an electrically heated tobacco product that accommodates the non-combustion-heating-type tobacco of Fig. 1.
[Fig. 4] Fig. 4 is a perspective view of a state where a cap of the electrically heated tobacco product of Fig. 3 is removed.
[Fig. 5] Fig. 5 is a sectional view taken along the line III-III in Fig. 4.
[Fig. 6] Fig. 6 is a partially sectional view of a cartridge and a mouthpiece that are one mode of the non-combustion-heating-type tobacco according to the embodiment of the present invention.

Description of Embodiments

**[0014]** Hereinafter, an embodiment of the present invention will be described in detail; however, these descriptions are examples (typical examples) of the embodiment of the present invention, and the present invention is not limited to these details as long as within the scope of the present invention.

**[0015]** In the specification, when numeric values or physical property values are put on both sides of "to", it means that those numeric values or physical property values are included.

<Non-Combustion-Heating-Type Tobacco>

**[0016]** A non-combustion-heating-type tobacco according to the embodiment of the present invention (hereinafter, also simply referred to as "non-combustion-heating-type tobacco") is a tubular non-combustion-heating-type tobacco that includes a first filter part, a second filter part, and a wrapping paper wrapping the filter parts such that a space section is formed between the first filter part and the second filter part, particulate tobacco material being movably disposed in the space section, wherein the wrapping paper is made up of three or more layers, the outermost two layers of the wrapping paper are paper, of the outermost two layers of the wrapping paper, the outer peripheral layer of the non-combustion-heating-type tobacco has an air permeability of 100 CORESTA Unit or less, and the layer on a side opposite to the outer peripheral layer has an air permeability of 1000 CORESTA Unit or greater, and an intermediate layer located between the outermost two layers includes an air-impermeable layer.

**[0017]** Fig. 1 shows an example of the non-combustion-heating-type tobacco according to the embodiment of the present invention. Hereinafter, the non-combustion-heating-type tobacco will be described with reference to the drawing. The direction of h in Fig. 1 is the long-axis direction of the non-combustion-heating-type tobacco.

**[0018]** As shown in Fig. 1, the components of the non-combustion-heating-type tobacco according to the embodiment of the present invention include a first filter part 21, a second filter part 22, a wrapping paper 24 for making up a tubular body by wrapping these filter parts to form a space section 23 between these filter parts, and particulate tobacco material T movably disposed in the space section 23.

**[0019]** The wrapping paper 24 is made up of three or more layers and has two layers on its outermost sides. Of the outermost two layers, the outer peripheral layer of the non-combustion-heating-type tobacco is indicated by 24a, and the layer facing the first and second filter parts and the space section is indicated by 24c. In the specification, the layer

indicated by 24a is also simply referred to as "the front side layer of the wrapping paper", and the layer indicated by 24c is also simply referred to as "the back side layer of the wrapping paper". In other words, the front side layer 24a of the wrapping paper is disposed so as to be located on the outer peripheral side of the non-combustion-heating-type tobacco, and the back side layer of the wrapping paper is disposed so as to be located on the side adjacent to the tobacco material T and filter parts of the non-combustion-heating-type tobacco. The wrapping paper 24 includes an intermediate layer 24b located between the outermost two layers (that is, the front side layer 24a of the wrapping paper and the back side layer 24c of the wrapping paper). In Fig. 1, the intermediate layer 24b is shown as a single layer; however, the configuration is not limited thereto. The intermediate layer 24b may be made up of, for example, two or more layers.

**[0020]** The above-described configurations will be described later.

**[0021]** The first filter part and the second filter part are distinguished from each other in the specification and the drawings for the sake of convenience. Unless otherwise specified, these are not distinguished from each other, and any one of the filter parts may be a first filter part or a second filter part.

**[0022]** The non-combustion-heating-type tobacco 20 has a columnar shape that satisfies a shape of which an aspect ratio defined as follows is higher than or equal to one.

$$\text{Aspect Ratio} = h/w$$

where w is the width of the bottom of the columnar body (in the present invention, the width of the bottom of the first filter part 21 or the second filter part 22) and h is the height, it is desirable that $h \geq w$. However, in the present invention, as described above, it is defined that the long-axis direction is a direction indicated by h.

**[0023]** Therefore, even in the case where $w \geq h$, the direction indicated by h is referred to as long-axis direction for the sake of convenience. The shape of the bottom is not limited and may be a polygonal shape, a rounded-corner polygonal shape, a circular shape, an elliptical shape, or the like. The width w is a diameter when the bottom has a circular shape, a longitudinal diameter when the bottom has an elliptical shape, or the diameter of a circumcircle or the longitudinal diameter of a circumellipse when the bottom has a polygonal shape or a rounded-corner polygonal shape. For example, when the bottom has a circular shape, the diameter of the circle is able to be determined. The diameter is the width w, and the length in a direction perpendicular to the diameter is the height h. The aspect ratio (h/w) represented by the height h with respect to the width w is preferably higher than or equal to one.

**[0024]** The length h of the non-combustion-heating-type tobacco in the long-axis direction is not limited and is, for example, commonly greater than or equal to 15 mm and preferably greater than or equal to 20 mm. The length h is commonly less than or equal to 85 mm, preferably less than or equal to 60 mm, and more preferably less than or equal to 40 mm.

**[0025]** The width w of the bottom of the columnar body of the non-combustion-heating-type tobacco is obtained by adding a value that is twice as large as the thickness of the wrapping paper (described later) and a value of the diameter of the filter of the columnar body. The width w is, for example, commonly greater than or equal to 5 mm and preferably greater than or equal to 5.5 mm. The width w is commonly less than or equal to 10 mm, preferably less than or equal to 9 mm, and more preferably less than or equal to 8 mm.

**[0026]** As shown in Fig. 1, the space section 23 is a space surrounded by the first filter part 21, the second filter part 22, and the wrapping paper 24.

**[0027]** The volume of the space section is not limited. The volume of the space section may be set as needed in accordance with a relationship with other members that make up an electrically heated tobacco product other than the non-combustion-heating-type tobacco and a relationship with the amount of tobacco material disposed in the space section. The volume of the space section may be, for example, greater than or equal to 500 $mm^3$ and less than or equal to 3000 $mm^3$, or may be greater than or equal to 500 $mm^3$ and less than or equal to 800 $mm^3$.

**[0028]** With reference to the long-axis direction of the non-combustion-heating-type tobacco, the ratio of the length of the space section to the length h of the non-combustion-heating-type tobacco is not limited. From the viewpoint of ensuring the amount of tobacco material within the range in which the advantageous effects of the present invention are exercised and from the viewpoint of achieving easy-inhalation air-flow resistance, the ratio is preferably higher than or equal to 0.1 and lower than or equal to 0.9, and more preferably higher than or equal to 0.4 and lower than or equal to 0.7.

**[0029]** The air-flow resistance from the first filter part to the second filter part when the non-combustion-heating-type tobacco is mounted such that one of the first filter part and the second filter part serves as a bottom is not limited. From the viewpoint of easy-inhalation, the air-flow resistance is commonly higher than or equal to 10 $mmH_2O$, preferably higher than or equal to 13 $mmH_2O$, more preferably higher than or equal to 20 $mmH_2O$. The air-flow resistance is commonly lower than or equal to 70 $mmH_2O$, preferably lower than or equal to 32 $mmH_2O$, and more preferably lower than or equal to 28 $mmH_2O$.

**[0030]** The air-flow resistance of the non-combustion-heating-type tobacco according to the embodiment of the present invention is a pressure difference PD ($mmH_2O$) in the non-combustion-heating-type tobacco when inhalation is performed

at a flow rate of 17.5 $cm^3$/s from the first filter part or the second filter part in a state where one of the first filter part and the second filter part serves as a bottom as described above.

**[0031]** Examples of means to regulate the air-flow resistance include regulating the amount of tobacco material disposed in the space section, the height of the space section, and the height of the filter.

**[0032]** The air-flow resistance in the height direction of the first filter or the second filter part is not limited. From the viewpoint of easy inhalation, the air-flow resistance is commonly lower than or equal to 5 $mmH_2O$, and preferably lower than or equal to 4 $mmH_2O$. Although the favorable lower limit range is not limited and is commonly 1 $mmH_2O$.

<Wrapping Paper>

**[0033]** In the non-combustion-heating-type tobacco according to the embodiment of the present invention, a wrapping paper wraps a first filter part and a second filter part to form a space section between these filter parts and makes up a columnar body. Particulate tobacco material is disposed in the space section.

**[0034]** The wrapping paper is made up of three or more layers. The outermost two layers of the wrapping paper (that is, the front side layer of the wrapping paper and the back side layer of the wrapping paper) are paper, and the intermediate layer located between the outermost two layers includes an air-impermeable layer.

**[0035]** The upper limit of the number of layers that make up a wrapping paper is not limited. From the viewpoint of easiness of working at the time of wrapping, the number of layers is preferably less than or equal to seven.

**[0036]** To reduce the occurrence of stains on a wrapping paper due to tobacco material containing a larger amount of flavor than before, at the beginning, the inventors studied using a laminated paper made of three layers formed by laminating and bonding two films made of air-impermeable resin respectively on both sides of one-layer paper, as a wrapping paper. When a non-combustion-heating-type tobacco was manufactured by wrapping tobacco filters and tobacco material with the laminated paper by using a wrapping machine, no stains on the wrapping paper were visually recognized on the outermost peripheral surface of the non-combustion-heating-type tobacco.

**[0037]** However, it was also found that, after that, when the non-combustion-heating-type tobacco manufactured by using the above-described laminated paper was stored in a warehouse, the phenomenon that bonded parts of the wrapping paper peel off occurred. The inventors estimated the cause of the phenomenon as follows.

**[0038]** As shown in Fig. 2a, the wrapping paper 24 has a pair of end regions 28 extending along the axial direction of the non-combustion-heating-type tobacco. In wrapping with a general wrapping machine, the wrapping paper deforms into a cylindrical shape as shown in Fig. 2b while wrapping filters and tobacco material, and the pair of end regions 28 is j oined to each other so as to overlap with a predetermined width. For this bonding, commonly, a plurality of adhesives is used as a binder, for example, vinyl acetate emulsion adhesive serving as first adhesive 25 and hot-melt adhesive serving as second adhesive 26 are applied by using an adhesive nozzle 27 with an adhesive width set such that the adhesives are not mixed. The vinyl acetate emulsion adhesive is a liquid adhesive at room temperature, obtained by emulsion polymerization of vinyl acetate monomers in water. After the vinyl acetate emulsion adhesive is applied to an adhesive object, the vinyl acetate emulsion adhesive is dried by removal of water, and the adhesive object is bonded by vinyl acetate emulsion. The hot-melt adhesive is a solid adhesive at room temperature, which does not contain water or solvent and includes a thermoplastic resin, such as a copolymer of ethylene and vinyl acetate, as a main component. The hot-melt adhesive is applied to a wrapping paper in a state melted by heating and then rapidly solidifies. Therefore, generally, hot-melt adhesive has a quick-drying property, while the adhesion time of vinyl acetate adhesive, that is, the drying time of moisture is longer than the bonding time, that is, cooling time, of hot-melt adhesive. However, vinyl acetate emulsion adhesive has a stronger adhesion than hot-melt adhesive. Since these adhesives are used to join rolling paper such that these adhesives are not mixed, joining of a wrapping paper is maintained by using the advantage of each of the two-type adhesives such that the quick-drying property based on hot-melt adhesive is ensured and vinyl acetate emulsion adhesive is used to compensate for an insufficient strength of the hot-melt adhesive.

**[0039]** However, when the wrapping paper is a laminated paper in which two-layer films are laminated and bonded respectively to both sides of the above-described one-layer paper, the films made of resin and making up the outermost surface and the innermost surface of the wrapping paper are joined to each other when the wrapping paper is wrapped. Generally, binders are applied to a wrapping paper in a liquid state; however, penetration of liquid into the films made of resin is poorer than to paper, so the adhesion width of the binder widens to be greater than or equal to a set value at the time of joining, and the binders are estimated to be mixed. As a result, it was estimated that the properties expected for the above-described vinyl acetate emulsion adhesive and hot-melt adhesive were not sufficiently exercised and the phenomenon that the bonded parts of the wrapping paper peel off can occur while being stored in a warehouse.

**[0040]** The inventors found that the above-described problem was solved by using a wrapping paper made up of three or more layers, the outermost two layers of the wrapping paper were paper having a specific air permeability (described later), and an intermediate layer located between the outer peripheral two layers of the wrapping paper includes an air-impermeable layer. The inventors hold the mechanism as follows.

**[0041]** When the front side layer and the back side layer of the wrapping paper are made of paper having a specific

air permeability, the papers are joined so as to overlap each other when the wrapping paper is wrapped. Because the paper has a specific air permeability, the paper has more excellent penetration of adhesive than resin films, so expansion of adhesion width of adhesives to a set value or greater at the time of joining the wrapping paper is suppressed, with the result that mixing of the adhesives is prevented. As a result, it is possible to reduce the occurrence of the phenomenon that the bonded parts of the wrapping paper peel off while being stored in a warehouse.

**[0042]** Since the intermediate layer of the wrapping paper includes the air-impermeable layer (described later), it is possible to reduce the occurrence of stains on the wrapping paper due to flavor contained in tobacco material.

**[0043]** Of the papers of the outermost two layers of the wrapping paper, the paper of the outer peripheral layer of the non-combustion-heating-type tobacco has an air permeability of lower than or equal to 100 CORESTA Unit (hereinafter, also referred to as "C.U."). The air permeability is preferably lower than or equal to 50 C.U. and more preferably 0 C.U.

**[0044]** The outer peripheral layer of the non-combustion-heating-type tobacco (the front side layer of the wrapping paper) is a layer on which the logo, design, and the like of a tobacco brand are printed, so it is required to have excellent printing characteristics. A paper having excellent printing characteristics is a paper that does not have a porous structure as much as possible, so printing characteristics are more excellent as a paper has a lower air permeability. Therefore, when the air permeability of a paper that becomes the front side layer of the wrapping paper satisfies the above-described numeric range, the wrapping paper has excellent printing characteristics, so it is desirable.

**[0045]** In the specification, air permeability is a value measured in compliant with ISO2965:2009, and indicates the flow rate ($cm^3$) of gas that passes through an area 1 $cm^2$ per one minute when the pressure difference between both sides is 1 kPa. One CORESTA Unit (1 C.U.) is $cm^3/(min \cdot cm^2)$.

**[0046]** Of the papers of the outermost two layers of the wrapping paper, the paper of the outer peripheral layer of the non-combustion-heating-type tobacco preferably has a smoothness higher than or equal to 50 seconds. The smoothness is more preferably higher than or equal to 75 seconds and particularly preferably higher than r equal to 100 seconds.

**[0047]** Since the smoothness of the paper serving as the front side layer of the wrapping paper satisfies the above-described numeric range, the wrapping paper has excellent printing characteristics.

**[0048]** The upper limit of the smoothness of the paper serving as the front side layer of the wrapping paper is not limited, and may be commonly preferably lower than or equal to 1000 seconds, lower than or equal to 500 seconds, lower than or equal to 250 seconds, and lower than or equal to 150 seconds.

**[0049]** In the specification, smoothness is a value measured in compliant with JIS P 8119:1998. A test piece is put on a polished glass surface having an optical surface, a pressure of 0.1 MPa is applied from above, decompressed to a half atmospheric pressure with a vacuum pump, and then the smoothness indicates a time (second) that is taken for 10-cc air to flow in through the gap between the measured test piece and the glass surface.

**[0050]** Of the papers of the outermost two layers of the wrapping paper, to set the basis weight of the overall wrapping paper within a numeric range (described later), the paper of the outer peripheral layer of the non-combustion-heating-type tobacco (the front side layer of the wrapping paper) preferably has a basis weight of greater than or equal to 30 gsm and less than or equal to 100 gsm and more preferably greater than or equal to 40 gsm and less than or equal to 80 gsm.

**[0051]** Of the papers of the outermost two layers of the wrapping paper, to set the thickness of the overall wrapping paper within a numeric range (described later), the paper of the outer peripheral layer of the non-combustion-heating-type tobacco (the front side layer of the wrapping paper) preferably has a thickness of greater than or equal to 30 μm and less than or equal to 100 μm and more preferably greater than or equal to 30 μm and less than or equal to 80 μm.

**[0052]** A paper that serves as the front side layer of the wrapping paper is not limited as long as the paper satisfies the above-described numeric ranges. Examples of the paper may include OPN#85 (basis weight: 85 gsm, air permeability: 40 C.U., thickness: 97 μm) and OPN#57 (basis weight: 57 gsm, air permeability: 40 C.U., thickness: 65 μm) produced by Nippon Paper Papylia Co., Ltd.

**[0053]** On the other hand, of the papers of the outermost two layers of the wrapping paper, the paper of the layer on the side opposite to the outer peripheral side of the non-combustion-heating-type tobacco (the back side layer of the wrapping paper) has an air permeability of higher than or equal to 1000 C.U. The air permeability is preferably higher than or equal to 3000 C.U., more preferably higher than or equal to 6000 C.U., and particularly preferably higher than or equal to 9000 C.U.

**[0054]** When the air permeability of the paper that serves as the back side layer of the wrapping paper satisfies the above-described numeric range, penetration of adhesive to the paper improves, so, even when the wrapping paper is wrapped with a wrapping machine by using general adhesive based on the above-described mechanism, it is possible to reduce the phenomenon that the wrapping paper peels off while being stored in a warehouse.

**[0055]** The upper limit of the air permeability of the paper that serves as the back side layer of the wrapping paper is not limited and is commonly lower than or equal to 50000 C.U., and is preferably lower than or equal to 30000 C.U., lower than or equal to 20000 C.U., or lower than or equal to 15000 C.U.

**[0056]** Of the papers of the outermost two layers of the wrapping paper, to set the basis weight of the overall wrapping paper within a numeric range (described later), the paper of the layer on the side opposite to the outer peripheral side

of the non-combustion-heating-type tobacco (the back side layer of the wrapping paper) preferably has a basis weight of greater than or equal to 20 gsm and less than or equal to 100 gsm and more preferably greater than or equal to 30 gsm and less than or equal to 60 gsm.

**[0057]** Of the papers of the outermost two layers of the wrapping paper, to set the thickness of the overall wrapping paper within a numeric range (described later), the paper of the layer on the side opposite to the outer peripheral side of the non-combustion-heating-type tobacco (the back side layer of the wrapping paper) preferably has a thickness of greater than or equal to 30 μm and less than or equal to 100 μm and more preferably greater than or equal to 40 μm and less than or equal to 70 μm.

**[0058]** The paper that serves as the back side layer of the wrapping paper is not limited as long as the paper satisfies the above-described numeric ranges. Examples of the paper include S52-7000 (basis weight: 52 gsm, air permeability: 7000 C.U., thickness: 110 μm) produced by Nippon Paper Papylia Co., Ltd, P-10000C (basis weight: 24 gsm, air permeability: 10000 C.U., thickness: 60 μm), P-20000C (basis weight: 26.5 gsm, air permeability: 20000 C.U., thickness: 75 μm), and P-30000C (basis weight: 21 gsm, air permeability: 30000 C.U., thickness: 77 μm), produced by the same corporation.

**[0059]** The intermediate layer located between the outermost two layers of the wrapping paper includes an air-impermeable layer.

**[0060]** The air-impermeable layer is a layer having an air permeability of 0 C.U. The air-impermeable layer does not permeate air and also does not permeate liquid.

**[0061]** Since the intermediate layer of the wrapping paper includes the air-impermeable layer having the above-described properties, exudation of flavor contained in tobacco material is able to be stopped by the intermediate layer. The wrapping paper further includes the above-described front side layer, so stains are not visually recognized. As a result, it is possible to favorably maintain the appearance of the non-combustion-heating-type tobacco.

**[0062]** One mode of the air-impermeable layer may be a film made of resin typically polyolefin. A commercially available film made of the resin may be used. Examples of the film include a film made of thermoplastic resin, such as polyethylene, polypropylene, a copolymer of ethylene and propylene, nylon, and polyester. Of these, a film made of polyethylene is preferably used because lamination of the film is easy.

**[0063]** Polyethylene is preferably at least polyethylene of which the density measured in compliant with JIS K 6922-1:2018 is higher than 930 kg/m$^3$.

**[0064]** In a non-combustion-heating-type tobacco product described later, the outer periphery of the non-combustion-heating-type tobacco is heated at a temperature of about 120°C, and tobacco material contained therein is heated. Therefore, a resin film used in the wrapping paper needs heat resistance to some extent. Polyethylene having the above density satisfies the heat resistance.

**[0065]** The molecular weight of polyethylene is not limited. A mass average molecular weight (Mw) measured with GPC (Gel Permeation Chromatography) and converted by using a calibration curve for standard polyethylene may be commonly 20000 to 300000.

**[0066]** Another mode of the air-impermeable layer may be a metal foil typically aluminum. A commercially available metal foil may be used. Examples of the metal foil include aluminum foil and pasted paper of aluminum and paper

**[0067]** When a resin film is used for the air-impermeable layer of the wrapping paper, an advantageous effect other than stopping exudation of flavor contained in tobacco material is imparted to the non-combustion-heating-type tobacco.

**[0068]** In manufacturing a tobacco article including the non-combustion-heating-type tobacco, to check whether tobacco material in a set amount is mounted, product inspection using a transmission amount of electromagnetic waves, such as microwaves, is sometimes performed. This method allows real-time measurement in a line of manufacturing a tobacco article, so the method is excellent in efficiency However, when a metal material is contained in a tobacco article, product inspection using a transmission amount of electromagnetic waves, such as microwaves, is not able to be performed, and off-line product inspection is needed.

**[0069]** On the other hand, as described above, in the wrapping paper of the non-combustion-heating-type tobacco of the present invention, the front side layer and the back side layer of the wrapping paper are paper. When the intermediate layer is made up of only a film made of resin, the non-combustion-heating-type tobacco does not include a metal material in its components, so it is possible to perform product inspection using electromagnetic waves, such as microwaves, as described above.

**[0070]** On the other hand, when a metal foil is used for the air-impermeable layer of the wrapping paper, the metal foil has a higher thermal conductivity than the resin film, so it is possible to efficiently heat the tobacco material of the non-combustion-heating-type tobacco.

**[0071]** The intermediate layer of the wrapping paper is laminated such that both surfaces of the intermediate layer respectively face and in contact with the surfaces of the outermost two layers of the wrapping paper. At this time, the papers of the outermost two layers of the wrapping paper are laminated such that paper grains are aligned in the same direction. From the viewpoint of suppressing peeling of the bonded parts of the wrapping paper wrapped with the above-described wrapping machine, the paper grains of the papers of the outermost two layers of the wrapping paper are

preferably laminated so as to be parallel to the long-axis direction of the non-combustion-heating-type tobacco.

**[0072]** In the specification, the paper grain of the wrapping paper is defined as the same direction as the direction of the paper grain of the paper that makes up each of the layers of the wrapping paper.

**[0073]** The method of lamination is not limited. Examples of the method may include a method of stacking the intermediate layer and the outermost two layers of the wrapping paper and then heating the layers under pressure to perform lamination.

**[0074]** The intermediate layer that includes the air-impermeable layer of the wrapping paper may be a single layer made of the air-impermeable layer or may be two or more layers including the air-impermeable layer. When the intermediate layer is made up of two or more layers, a combination of the two layers is not limited as long as the two layers include the air-impermeable layer. Examples of the combination of the two layers may include a mode made up of paper and a resin film and not including a metal foil, a mode made up of paper and a metal foil and not including a resin film, a mode made up of a metal foil and a resin film and not including paper, and a mode made up of paper, a metal foil, and a resin film. In these modes, the order of the lamination directions of blanks may be any order. The upper limit of the number of layers that make up the intermediate layer is not limited. From the viewpoint of easiness of working at the time of wrapping, the number of layers is preferably less than or equal to five.

**[0075]** The above-described lamination method for the intermediate layer of the wrapping paper and the outermost two layers of the wrapping paper may be used as, when the intermediate layer includes two or more layers, a method of laminating two or more intermediate layers.

**[0076]** When the intermediate layer includes a paper layer, from the viewpoint of suppressing peeling of the bonded parts of the above-described wrapping paper, paper is preferably laminated such that the paper grain is aligned in the same direction as the paper grains of the papers that respectively make up the front side layer and the back side layer of the wrapping paper.

**[0077]** To set the basis weight of the overall wrapping paper within the numeric range (described later), the intermediate layer that includes the air-impermeable layer of the wrapping paper has a basis weight preferably greater than or equal to 15 gsm and less than or equal to 100 gsm and more preferably greater than or equal to 20 gsm and less than or equal to 60 gsm.

**[0078]** To set the thickness of the overall wrapping paper within the numeric range (described later), the intermediate layer that includes the air-impermeable layer of the wrapping paper has a thickness preferably greater than or equal to 10 $\mu$m and less than or equal to 100 $\mu$m and more preferably greater than or equal to 20 $\mu$m and less than or equal to 50 $\mu$m.

**[0079]** The above-described wrapping paper made up of the outermost two layers and the intermediate layer has a basis weight preferably greater than or equal to 100 gsm. The basis weight is more preferably greater than or equal to 110 gsm, particularly preferably greater than or equal to 120 gsm. On the other hand, the basis weight is preferably less than or equal to 180 gsm and more preferably less than or equal to 160 gsm.

**[0080]** By setting the basis weight of the wrapping paper within the numeric range, the capability of the mouthpiece of the non-combustion-heating-type tobacco product (described later) to hold the non-combustion-heating-type tobacco improves, so it is possible to suppress peeling of the bonded parts of the wrapping paper of the above-described non-combustion-heating-type tobacco manufactured with the wrapping machine.

**[0081]** From the viewpoint of suppressing peeling of the bonded parts of the wrapping paper of the above-described non-combustion-heating-type tobacco manufactured with the wrapping machine, the thickness of the wrapping paper is preferably less than or equal to 300 $\mu$m and more preferably less than or equal to 250 $\mu$m.

**[0082]** On the other hand, from the viewpoint of the capability of the mouthpiece of the non-combustion-heating-type tobacco product to hold the non-combustion-heating-type tobacco and the viewpoint that stains on the wrapping paper due to flavor contained in tobacco material are not visually recognized, the thickness of the wrapping paper is preferably greater than or equal to 100 $\mu$m and more preferably greater than or equal to 120 $\mu$m.

**[0083]** From the viewpoint of suppressing peeling of the bonded parts of the wrapping paper of the above-described non-combustion-heating-type tobacco manufactured with the wrapping machine, the longitudinal stiffness of the wrapping paper is preferably less than or equal to 500 $cm^3/100$ and more preferably less than or equal to 400 $cm^3/100$. On the other hand, the lower limit of the longitudinal stiffness is not limited and may be commonly higher than or equal to 100 $cm^3/100$.

**[0084]** The "longitudinal" in the longitudinal stiffness of the wrapping paper is a direction parallel to the paper grain of the wrapping paper, defined as described above. The "longitudinal direction" of the wrapping paper is the same direction as the "longitudinal direction" or "MD (machine direction)" in manufacturing the wrapping paper.

**[0085]** The longitudinal stiffness in the specification is compliant with JIS P 8143:2009 and is a value measured with a Clark stiffness tester. A test piece has a rectangular shape with a width of 27 mm and a length of 200 mm and is sampled such that the direction of the long side of the rectangle is parallel to the paper grain.

**[0086]** On the other hand, the lateral stiffness of the wrapping paper is not limited. From the viewpoint of improving the circularity of the cylindrical non-combustion-heating-type tobacco, the lateral stiffness of the wrapping paper is commonly lower than or equal to 300 $cm^3/100$ and preferably lower than or equal to 250 $cm^3/100$. On the other hand,

the lower limit of the lateral stiffness is not limited and may be commonly higher than or equal to 100 $cm^3/100$.

**[0087]** The "lateral" in the lateral stiffness of the wrapping paper is a direction orthogonal to the paper grain of the wrapping paper, defined as described above. The "longitudinal direction" of the wrapping paper is the same direction as the "lateral direction" or "CD (cross direction)" in manufacturing the wrapping paper.

**[0088]** The lateral stiffness in the specification is also compliant with JIS P 8143:2009 and is a value measured with a Clark stiffness tester. A test piece has a rectangular shape with a width of 27 mm and a length of 200 mm and is sampled such that the direction of the long side of the rectangle is perpendicular to the paper grain.

**[0089]** When the wrapping paper has a pair of a first end region and a second end region extending along the long-axis direction of the non-combustion-heating-type tobacco and is formed into a cylindrical shape with a perimeter of 24.5 mm by the first end region and the second end region overlappingly joined to each other with a width of 2.5 mm. A buckling strength that is measured while a load is applied in the axial direction of the wrapping paper formed in the cylindrical shape is preferably greater than or equal to 30.0 N. The buckling strength is more preferably greater than or equal to 35.0 N and particularly preferably greater than or equal to 40.0 N. The wrapping paper formed in the cylindrical shape, which is subjected to measurement of the buckling strength, wraps the first filter part and the second filter part so as to form the space section between these filters.

**[0090]** When the buckling strength satisfies the above-described numeric range, the capability of the mouthpiece of the non-combustion-heating-type tobacco product to hold the non-combustion-heating-type tobacco improves, so, at the time of replacing the used non-combustion-heating-type tobacco, the non-combustion-heating-type tobacco is able to be removed together with the removed mouthpiece.

**[0091]** On the other hand, when the buckling strength is less than 30.0 N, it is insufficient for the mouthpiece of the non-combustion-heating-type tobacco product to hold the non-combustion-heating-type tobacco, so, at the time of replacing the used non-combustion-heating-type tobacco, the non-combustion-heating-type tobacco is not removed together with the mouthpiece and is left in the housing of the heating device.

**[0092]** The upper limit of the buckling strength is not limited and may be less than or equal to 100.0 N from the viewpoint that deformation with the wrapping machine is possible.

**[0093]** The buckling strength is able to be regulated by changing the basis weight, thickness, and longitudinal stiffness of the wrapping paper

**[0094]** Adhesive is used to join the first end region and the second end region of the wrapping paper at the time of forming the wrapping paper into a cylindrical shape. As for the adhesive, it is desirable to reproduce wrapping of the wrapping paper with the wrapping machine, so vinyl acetate emulsion adhesive and hot-melt adhesive are used and applied in parallel so as not to be mixed.

**[0095]** The vinyl acetate emulsion adhesive is a liquid adhesive at room temperature, obtained by emulsion polymerization of vinyl acetate monomers and is an adhesive generally using polyvinyl alcohol as an emulsifier. In the present invention, for example, Cevian A20753 (produced by Dicel Fine Chem Co., Ltd.) or the like may be used.

**[0096]** The hot-melt adhesive is a solid adhesive at room temperature, which does not contain water or solvent and includes a thermoplastic resin, such as a copolymer of ethylene and vinyl acetate, as a main component. In the present invention, for example, DAIKALAC S1101B (produced by Daido Chemical Corporation) or the like may be used, and is applied to the wrapping paper after being put in a heated molten state.

**[0097]** These adhesives are applied to any one of the first end region and the second end region of the wrapping paper. The adhesion width of each of the adhesives is not limited as long as the adhesives are not mixed at the time of joining the first end region and the second end region of the wrapping paper. For example, the adhesion width of the vinyl acetate adhesive may be greater than or equal to 0.5 mm and less than or equal to 1.2 mm, and the adhesion width of the hot-melt adhesive may be greater than or equal to 0.5 mm and less than or equal to 1.2 mm.

**[0098]** The amount of application of each adhesive in the first end region or the second end region of the wrapping paper is not limited as long as it is possible to sufficiently join both end regions. For example, the vinyl acetate adhesive may be greater than or equal to 3.0 mg/80 mm and less than or equal to 6.0 mg/80 mm, and the hot-melt adhesive may be greater than or equal to 4.0 mg/80 mm and less than or equal to 7.0 mg/80 mm.

**[0099]** The above-described buckling strength is specifically measured with the following method.

(1) A wrapping paper of which the length of a side in the long-axis direction of the non-combustion-heating-type tobacco is 20 mm and the length of a side orthogonal to the long-axis direction is 27.0 mm is prepared. 1.0 mg of vinyl acetate adhesive and 1.25 mg of hot-melt adhesive are applied parallel to each other in the first end region or the second end region of the wrapping paper such that the adhesives are not mixed, both end regions are overlapped with a width of 2.5 mm and joined, thus forming a cylinder with a perimeter of 24.5 mm. At the time of forming the wrapping paper into a cylindrical shape, the wrapping paper wraps the first filter part and the second filter part to form a space section between these filters (height: 4 mm each).

(2) The cylinder is placed on a stage of a rheometer (for example, product name: CR-3000EX-S made by SUN Scientific Co., Ltd.) such that the axial direction of the cylinder is perpendicular to the stage.

(3) A rheometer contact is lowered at a displacement speed of 100.0 mm/min, and measurement of stress is started on the assumption that a deformation distance is 0 mm at the time when the rheometer contact touches the cylinder.
(4) As the rheometer contact is lowered, stress increases; however, as the cylinder significantly deforms (buckles), the stress instantaneously decreases. A maximum value of stress just before the decrease is recorded as the buckling strength (N).

**[0100]** The wrapping paper has the above-described buckling strength, and stress measured while the cylinder is deformed to 50% of the diameter of the wrapping paper formed in a cylindrical shape is preferably greater than or equal to 0.15 N. The stress is more preferably greater than or equal to 0.50 N and is particularly preferably greater than or equal to 0.80 N. In the specification, the stress is also referred to as "1/2 deformation stress". The wrapping paper formed in a cylindrical shape, to be subjected to measurement of 1/2 deformation stress, is not wrapping filters.

**[0101]** When the 1/2 deformation stress satisfies the above-described numeric range, the capability of the mouthpiece of the non-combustion-heating-type tobacco product to hold the non-combustion-heating-type tobacco improves, so, at the time of replacing the used non-combustion-heating-type tobacco, the non-combustion-heating-type tobacco is able to be removed together with the removed mouthpiece.

**[0102]** On the other hand, when the 1/2 deformation stress is less than 0.15 N, it is insufficient for the mouthpiece of the non-combustion-heating-type tobacco product to hold the non-combustion-heating-type tobacco, so, at the time of replacing the used non-combustion-heating-type tobacco, the non-combustion-heating-type tobacco is not removed together with the mouthpiece and is left in the housing of the heating device.

**[0103]** The upper limit of the 1/2 deformation stress is not limited and may be less than or equal to 20.0 N from the viewpoint that deformation with the wrapping machine is possible.

**[0104]** The 1/2 deformation stress is able to be regulated by changing the basis weight, thickness, and longitudinal stiffness of the wrapping paper

**[0105]** The above-described 1/2 deformation stress is specifically measured with the following method.

(1) Except that no filters are wrapped, a cylinder formed from a wrapping paper similar to that used to measure the above-described buckling strength is prepared.
(2) The cylinder is placed on a stage of a rheometer (for example, product name: CR-3000EX-S made by SUN Scientific) such that the axial direction of the cylinder is parallel to the stage.
(3) The location of the cylinder on the stage is adjusted such that the rheometer contact contacts within the range of 5 mm in a direction from one end to the other end of the axial direction of the cylinder.
(4) The rheometer contact is lowered at a displacement speed of 100.0 mm/min, and measurement of stress is started on the assumption that a deformation distance is 0 mm at the time when the rheometer contact touches the cylinder.
(5) The rheometer contact is lowered, and a stress measured at the time when the cylinder is deformed to 50% of the diameter is recorded as 1/2 deformation stress (N).

<Filter Part>

**[0106]** The non-combustion-heating-type tobacco of the present embodiment has the first filter part and the second filter part, however, these are not distinguished from each other, a user is able to selectively choose which filter part is set for the inhalation port side or the heater side according to the form of the electrically heated tobacco product used during use. The following description of a filter part is applied to any of the first filter part and the second filter part unless otherwise specified. The configuration of the first filter part and the configuration of the second filter part may be different within a usable range or the same.

**[0107]** The filter part is a part that includes a filter (described later) and is not limited as long as the filter part has the function of a general filter. For example, the filter part may be made up of a single segment made up of only a filter or may be made up of a plurality of segments made by a combination of a filter and another member.

**[0108]** The filter part may use a filter including an additive releasing container (described later)

**[0109]** The size of the first filter part and the second filter part is not limited and may be set as needed in accordance with the form of the non-combustion-heating-type tobacco to be used during use or the form of the electrically heated tobacco product used during use. For example, the following mode may be used. In the filter part, the length of the non-combustion-heating-type tobacco in the long-axis direction is defined as "height".

**[0110]** From the viewpoint of air-flow resistance, the height per one filter part is commonly greater than or equal to 3 mm, preferably greater than or equal to 4 mm, and is commonly less than or equal to 15 mm and preferably less than or equal to 10 mm.

**[0111]** When the non-combustion-heating-type tobacco is a columnar body, the filter part is also a columnar body; however, the diameter (width) is less than the width w of the bottom of the columnar body of the non-combustion-heating-

type tobacco, and a value obtained by adding the width of the filter part of the columnar body to a value that is twice as large as the thickness of the above-described wrapping paper is the width w of the bottom of the columnar body of the non-combustion-heating-type tobacco.

**[0112]** The material of the filter may be obtained by working cellulose acetate tow into a cylindrical shape. Generally, in comparison with a combustible tobacco, the non-combustion-heating-type tobacco according to the embodiment of the present invention preferably has a smaller removal amount of tobacco vapor at the filter part. From such a viewpoint, in the case of the non-combustion-heating-type tobacco with a perimeter of 24.5 mm, the single yarn fineness of cellulose acetate tow is greater than or equal to 5 g/9000 m and less than or equal to 20 g/9000 m, preferably greater than or equal to 5 g/9000 m and less than or equal to 12 g/9000 m, and the overall fineness is greater than or equal to 12000 g/9000 m and less than or equal to 35000 g/9000 m and preferably greater than or equal to 12000 g/9000 m and less than or equal to 28000 g/9000 m. The packing density of fiber is preferably greater than or equal to 0.09 g/cc and less than or equal to 0.12 g/cc. The sectional shape of fiber of cellulose acetate tow may be a Y cross section or may be an R cross section. In the case of a filter filled with cellulose acetate tow, 5 wt% or higher and 10 wt% or lower of triacetin may be added to the weight of cellulose acetate tow to improve filter hardness.

**[0113]** A method of wrapping cellulose acetate tow with a filter wrapping paper may be used as a method of working cellulose acetate tow into a cylindrical shape. The physical property of the filter wrapping paper is not limited. Examples of the filter wrapping paper may include a high air permeability paper with an air permeability of 1000 C.U. or higher and a low air permeability paper with an air permeability of 100 C.U. A wrapping paper used for a common cigarette filter may be used as the filter wrapping paper. For example, a wrapping paper with a basis weight of 30 to 100 gsm and a thickness of 30 to 100 μm may be used. Such an air permeability paper is not limited. Examples of the air permeability paper may include LPWS-OLL (air permeability 1300 C.U., basis weight 26.5 gsm, thickness 48 μm), P-10000C (air permeability 10000 C.U., basis weight 24.0 gsm, thickness 60 μm), or plain paper (air permeability 0 C.U., basis weight 24 gsm, thickness 32 μm), produced by Nippon Paper Papylia Co., Ltd.

**[0114]** Other than the filter made of a tow, such as the above-described acetate tow, a filter filled with paper or nonwoven fabric sheet containing pulp as a main component may be used.

**[0115]** In manufacturing a filter, regulating air-flow resistance and adding additives (known adsorbent, flavor, flavor holder, and the like) are able to be designed as needed.

**[0116]** As described above, each of the first filter part and the second filter part may be made up of a single segment or may be made up of a plurality of segments. Even when the first filter part and/or the second filter part is made up of a plurality of segments, the wrapping paper wraps them to make up a non-combustion-heating-type tobacco.

**[0117]** When the first filter part and/or the second filter part is made up of a single segment, examples of the mode include a mode in which the filter part is made up of only a filter filled with cellulose acetate tow and a mode in which the filter part is made up of only a filter filled with paper or nonwoven fabric sheet containing pulp as a main component. Examples of the mode further include a mode in which an additive releasing container (described later) is included in each of these filters.

**[0118]** Examples of a mode in the case where the first filter part and/or the second filter part is made up of a plurality of segments include a mode in which the plurality of segments is made up of a plurality of the same or different filters. In this case, the filter may be the above-described one filled with acetate tow, may be the one filled with paper or nonwoven fabric sheet containing pulp as a main component, or may be the one including an additive releasing container (described later).

**[0119]** Examples of another mode in which the first and second filters each are made up of a plurality of segments include a mode in which each of the first and second filters is made up of a filter and another member. The "another member" is not limited. Examples of the "another member" include a paper core formed by working thick paper into a cylindrical shape. For example, if the length of a tobacco filling section (space section) is elongated when the length of the non-combustion-heating-type tobacco in the long-axis direction is intended to be elongated, tobacco material needs to be disposed more than necessary; whereas, if the length of the filter is elongated, the air-flow resistance of the filter part increases, which influences easiness of inhalation. In this case, when a paper core is used, the length of the non-combustion-heating-type tobacco in the long-axis direction is able to be adjusted without receiving the above influence.

**[0120]** Any one of the first filter part and the second filter part may include a filter that includes a breakable additive releasing container (for example, a capsule) including a breakable outer shell, such as gelatin. In this case, the filter that includes the additive releasing container is an inhalation port end. When the capsule is broken by the user of the non-combustion-heating-type tobacco before use, during use, or after use, the capsule releases liquid or substance (commonly, flavor material) contained in the capsule. Subsequently, the liquid or the substance is transferred by the smoke of tobacco while the non-combustion-heating-type tobacco is being used, and is transferred to an ambient environment after use.

**[0121]** The form of the additive releasing container is not limited. Examples of the form of the additive releasing container may include a capsule, such as an easily breakable capsule, and the shape of the capsule is preferably spherical. An additive contained in the additive releasing container may include the above-described selected additive

and particularly preferably includes flavor material and activated carbon. One or more kinds of materials that help filtering smoke may be added as an additive. The form of the additive is not limited and is commonly liquid or solid. Using a capsule containing an additive is known in the technical field. An easily breakable capsule and its manufacturing method are known in the technical field.

**[0122]** Examples of the flavor material include menthol, spearmint, peppermint, fenugreek, and clove. These flavor materials may be used solely or may be used in combination.

<Tobacco Material>

**[0123]** The form of tobacco material is not limited as long as the tobacco material is particulate. Examples of the form of tobacco material include (1) tobacco granules (also referred to as "tobacco material (A)"), and (2) the one made up of a composition including shredded tobacco or ground tobacco (also referred to as "tobacco material (B)"). The tobacco material (A) (tobacco granules) is preferable.

**[0124]** To implement an intended tobacco flavor, multiple kinds of tobacco leaves need to be blended and disposed in the space section of the non-combustion-heating-type tobacco. The tobacco material (B) tends to cause variations in blend ratio at the time of inserting tobacco material in the space section at high speed. In contrast, in the case of the tobacco material (A), since tobacco leaves are blended at a predetermined blend ratio and then granules are manufactured, there is a low possibility of variations in blend ratio at the time of inserting tobacco material into the space section of the non-combustion-heating-type tobacco at high speed. Breakage at the time of transport of tobacco material is also less likely in the case of the tobacco material (A), so variations in air-flow resistance are smaller when the tobacco material (A) is used. For these reasons, the tobacco material (A) is more preferable than the tobacco material (B).

**[0125]** The tobacco material may be made up of only the tobacco material (A) or the tobacco material (B), may be made up of a mixture of them, or may be a mixture containing another particulate tobacco material. However, from the viewpoint similar to the above, the tobacco material is preferably made up of only the tobacco material (A). When the tobacco material is made up of a mixture, the mixture ratio may be designed at any ratio.

**[0126]** Granules (also referred to as "tobacco granules") in the specification mean granulated tobacco.

**[0127]** The ratio of the volume of tobacco material to the overall volume of the space section is not limited and can be set as needed according to the form of the non-combustion-heating-type tobacco or the tobacco material. From the viewpoint of ensuring a suitable air-flow resistance, the ratio of the volume of tobacco material to the volume of the space section on volumetric basis is commonly higher than or equal to 25 vol%, preferably higher than or equal to 30 vol%, more preferably higher than or equal to 40 vol%, and further preferably higher than or equal to 50 vol%. When the ratio is higher than or equal to 30 vol%, a flavor component contained in the tobacco material is sufficiently released to a user. The ratio is commonly lower than or equal to 75 vol%, preferably lower than or equal to 70 vol%, more preferably lower than or equal to 65 vol%, and further preferably lower than or equal to 60 vol%. When the ratio is lower than or equal to 70 vol%, the air-flow resistance does not become excessive, so good inhalation response is ensured, and flowability of tobacco material in the space is ensured.

**[0128]** As described above, in the non-combustion-heating-type tobacco according to the embodiment of the present invention, tobacco material is movably disposed in the space section. Generally, in comparison with a non-combustion-heating-type tobacco in a mode in which the space section is filled with tobacco material, that is, in a mode in which the ratio of the volume of tobacco material to the overall volume of the space section is close to 100 vol%, the non-combustion-heating-type tobacco in which tobacco material is movably disposed in the space section does not provide stress based on tobacco material and is estimated to easily deform against pressure from an external source. However, since the non-combustion-heating-type tobacco according to the embodiment of the present invention adopts the wrapping paper made up of three or more layers as described above, the non-combustion-heating-type tobacco is difficult to deform against pressure from an external source even in a mode in which tobacco material is movably disposed in the space section.

**[0129]** The ratio of the weight of tobacco material to the overall volume 100 vol% of the space section is not limited and can be set as needed according to the form of the non-combustion-heating-type tobacco or the tobacco material. From the viewpoint of ensuring a suitable air-flow resistance, the ratio of the weight of tobacco material is commonly higher than or equal to 0.1 g/cm$^3$ and preferably higher than or equal to 0.3 g/cm$^3$, and the ratio of the weight of tobacco material is commonly lower than or equal to 1.5 g/cm$^3$, preferably lower than or equal to 1.0g/cm$^3$, and more preferably lower than or equal to 0.6 g/cm$^3$.

**[0130]** The particulate tobacco material according to the embodiment of the present invention is preferably classified by a screen having the following screen opening. For example, from the viewpoint that easiness of movement and high specific surface area in the space section are easily achieved, and, by extension, easy control of the air-flow resistance and the advantage of excellent flavor and taste are easily obtained, the particulate tobacco material is preferably the one that commonly does not pass through a screen having a screen opening of 149 μm (> 149 μm (greater than 149 μm)) and that passes through a screen having a screen opening of 1680 μm (< 1680 μm (less than 1680 μm)). More

preferably, the particulate tobacco material does not pass through a screen having a screen opening of 250 μm (> 250 μm (greater than 250 μm)) and passes through a screen having a screen opening of 840 μm (less than 840 μm).

**[0131]** An average particle size in the specification is able to be obtained by preparing several numbers of screen openings, that is, a screen opening near the lower limit of present particle sizes, a screen opening near the upper limit of present particle sizes, and a screen opening between the lower limit screen opening and the upper limit screen opening, classifying the tobacco material, measuring the weight of tobacco material remaining on each screen opening, and performing apportionment by weight.

**[0132]** The average particle size of the particulate tobacco material according to the embodiment of the present invention is preferably greater than or equal to 400 μm and less than or equal to 700 μm. With such an average particle size, the air-flow resistance does not become excessive, so good inhalation response is ensured, and appropriate flowability of tobacco material is ensured.

**[0133]** The average particle size of the particulate tobacco is able to be obtained by measuring the weights of tobacco material, obtained by classifying tobacco material by using screen openings of 850 μm, 710 μm, 600 μm, 500 μm, 425 μm, 300 μm, 212 μm, and 106 μm and then performing apportionment by weight. The measurement is able to be performed by using a sieve shaker (for example, AS 200 CONTROL made by Retsch).

**[0134]** The average particle size of the particulate tobacco material is able to be adjusted by classifying tobacco material used.

**[0135]** An object to be measured for the average particle size may be granules added with flavor material or aerosol-source material or may be granules not added with flavor material or aerosol-source material as long as the object is granulated granules. From the viewpoint that a more accurate average particle size is able to be measured, granules not added with flavor material or aerosol-source material are preferably measured. This is because the size of granules is estimated almost not to change depending on addition of flavor material or aerosol-source material.

[Flavor Developing Agent]

**[0136]** A flavor developing agent may be added to tobacco material. The flavor developing agent includes at least one of carbonates, hydrogencarbonates, oxides, and hydroxides of alkali metal and/or alkaline earth metal. Preferably, the flavor developing agent is potassium carbonate or sodium carbonate. By adding the flavor developing agent, volatilization of tobacco contents that are mostly amines is ensured, so it is possible to develop sufficient tobacco flavor even with the non-combustion-heating-type tobacco of a type that is heated at a relatively low temperature.

**[0137]** By adding the flavor developing agent, the pH of tobacco material may be 6.5 to 11.0.

**[0138]** In the specification, pH is able to be measured by a pH meter (for example, IQ240 made by IQ Scientific Instruments, Inc.). For example, distilled water ten times as heavy as 2 to 10 g of tobacco material in weight ratio is added to the tobacco material, a mixture of water and the tobacco material is shaken at 200 rpm for ten minutes at room temperature (for example, 22°C) and left standing for five minutes, and then the pH of the obtained extract is measured with the pH meter.

**[0139]** The pH of the tobacco material is not limited. From the viewpoint of ensuring volatilization of tobacco contents that are mostly amines, including nicotine, the pH is commonly higher than or equal to 6.5, preferably higher than or equal to 7.0, and more preferably higher than or equal to 7.5, and the pH is commonly lower than or equal to 11.0 and preferably lower than or equal to 10.0. The pH tends to be determined mainly based on the type and amount of the above-described flavor developing agent and can also change based on another material.

**[0140]** The pH of the tobacco material used in a common cigarette or non-combustion-heating-type tobacco depends on the type of tobacco used or the type of flavor component added but the pH is about four to six due to contribution of various organic acids contained. In the case of such a small pH, that is, in an acid environment, tobacco contents that are mostly amines are difficult to be volatilized. In terms of this point, in a common cigarette or non-combustion-heating-type tobacco, the heating temperature during use is high, so a desired amount of volatilization of tobacco contents that are mostly amines is ensured. However, when the heating temperature during use is high, not only volatilization of aerosol-source material but also decomposition of another component occurs, with the result that white tobacco vapor is easily produced.

**[0141]** On the other hand, by setting the pH of the tobacco material within the above-described range, a desired amount of volatilization of nicotine is ensured while the heating temperature during use is maintained at a low temperature, that is, reduction of white tobacco vapor is achieved.

**[0142]** Hereinafter, each of the tobacco material (A) and the tobacco material (B) will be specifically described; however, unless otherwise specified, various conditions and suitable ranges described in each of tobacco materials can also be applied to another tobacco material.

<Tobacco Material (A)>

**[0143]** The tobacco material (A) is made up of tobacco granules.

**[0144]** The raw material of the tobacco material (A) is not limited and may include (a) ground tobacco material, (b) moisture, (c) at least one-type flavor developing agent selected from a group consisting of potassium carbonate and sodium hydrogencarbonate, and (d) at least one-type binder selected from a group consisting of pullulan and hydroxypropyl cellulose.

**[0145]** The ground tobacco material (component (a)) included in the raw material of the tobacco material (A) includes the one obtained by grinding tobacco leaves, ground tobacco sheet, the tobacco material (B) (described later), or the like. The types of tobacco include a burley type, a flue cured type, and an oriental type. The ground tobacco material is preferably ground into an average particle diameter of greater than or equal to 30 μm and less than or equal to 300 μm. The average particle diameter is able to be measured by using a particle counter (for example, Mastersizer made by Spectris).

**[0146]** The moisture (component (b)) contained in the tobacco material (A) is used to maintain the unity of tobacco granules.

**[0147]** The raw material mixture of the tobacco material (A) commonly contains moisture higher than or equal to 3 wt% and lower than or equal to 13 wt%. The tobacco material (A) commonly can contain moisture such that the value of drying loss is higher than or equal to 5 wt% and lower than or equal to 17 wt%. A drying loss means a change in weight before and after drying when part of a sample is collected for measurement and the sample is completely dried by evaporating all the moisture in the collected sample (for example, when dried at a certain temperature (105°C) for 15 minutes) and specifically means the percentage (wt%) of a total value of the amount of moisture contained in the sample and the amount of volatile component that volatilizes under the drying condition to a sample weight. In other words, the drying loss (wt%) is expressed by the following expression (1).

$$\text{Drying Loss (wt\%)} = \{(\text{Weight of Sample before Completely Dried}) - (\text{Weight of Sample after Completely Dried})\} \times 100/(\text{Weight of Sample before Completely Dried}) \quad (1)$$

**[0148]** The flavor developing agent (component (c)) contained in the tobacco material (A) is made of potassium carbonate, sodium hydrogencarbonate, or a mixture of them. These flavor developing agents adjust the pH of the tobacco material (A) to the alkali side to thereby facilitate releasing flavor component contained in the tobacco material (A) from tobacco granules and provide flavor that can be satisfied by a user.

**[0149]** The raw material mixture of the tobacco material (A) can commonly contain the flavor developing agent higher than or equal to 5 wt% and lower than or equal to 20 wt%.

**[0150]** The binder (component (d)) contained in the tobacco material (A) is used to hold the unity of tobacco granules by binding the tobacco granule component. The binder is made of pullulan, gellan gum, carageenan, agar, guar gum, roast bean gum, hydroxypropyl cellulose (HPC), hydroxypropyl methylcellulose (HPMC), carboxymethyl cellulose (CMC), starch, modified starch, or a mixture of them.

**[0151]** The raw material mixture of the tobacco material (A) can commonly contain the binder higher than or equal to 0.5 wt% and lower than or equal to 15 wt%.

**[0152]** The tobacco material (A) can be made up of the components (a), (b), (c), and (d) and may further contain an additional component.

**[0153]** The additional component is (e) a volatile flavor (also referred to as "flavor component" or "flavor material", solid or liquid).

The volatile flavor may be a selected flavor as a flavor capable of developing a flavor feeling at a low temperature about 100°C. A flavor feeling means that, when the non-combustion-heating-type tobacco is used, it is possible to feel flavor originated from the flavor. The flavor component may be one type selected from among 1-menthol, natural plant flavor (for example, cognac oil, orange oil, jasmine oil, spearmint oil, peppermint oil, aniseed oil, coriander oil, lemon oil, chamomile oil, labdanum, cuscus oil, rose oil, and lovage oil), esters (for example, menthyl acetate, isoamyl acetate, linalyl acetate, isoamyl propionate, benzyl butyrate, methyl salicylate, and the like), ketones (for example, menthone, ionone, ethyl maltol, and the like), alcohols (for example, phenylethyl alcohol, anethole, cis-6-nonen-1-ol, eucalyptol, and the like), aldehydes (for example, benzaldehyde, and the like), and lactones (for example, ω-pentadecalactone, and the like). Particularly preferable volatile flavors to be contained in the tobacco material include 1-menthol, anethole, menthyl acetate, eucalyptol, ω-pentadecalactone, and cis-6-nonen-1-ol. Alternatively, the volatile flavors to be contained in the tobacco material may be a mixture of two or more types selected from the above group.

**[0154]** The volatile flavors to be contained in the tobacco material (A) may be used in a solid state or may be dissolved or dispersed in an appropriate solvent, for example, propylene glycol, ethyl alcohol, benzyl alcohol, water, or glycerine, and used. Preferably, the volatile flavor may be a flavor of which a dispersed state tends to be formed in a solvent as a result of addition of emulsifier, for example, hydrophobic flavor, oil-soluble flavor, or the like. These flavor components may be used solely or may be used in a mixed state.

**[0155]** The raw material mixture of the tobacco material (A) can commonly contain the flavor material higher than or equal to 0.5 wt% and lower than or equal to 30 wt%. The flavor material may be added to the components (a), (b), (c), (d), and (e) by being directly kneaded with the components or may be added to the components by being supported on a known host inclusion compound, such as cyclodextrin, to prepare an inclusion compound and kneading the inclusion compound with the above components. Alternatively, after the tobacco material (A) is produced without a flavor material added, the flavor material dissolved in a solvent may be added by spraying. Alternatively, after the tobacco material (A) is produced without a flavor material added, the flavor material dissolved in a solvent may be added by spraying.

**[0156]** The content of the flavor in the tobacco material (A), obtained from the above-described raw material mixture, is not limited. From the viewpoint of imparting a good flavor, the content of the flavor is commonly higher than or equal to 100 ppm, preferably higher than or equal to 1000 ppm, more preferably higher than or equal to 5000 pp, and the content of the flavor is commonly lower than or equal to 10000 ppm, preferably lower than or equal to 25000 ppm, and more preferably lower than or equal to 40000 ppm.

**[0157]** When the tobacco material (A) is made up of the above components (a), (b), (c), (d), and (e), the raw material mixture of the tobacco material (A) can commonly contain the component (a) higher than or equal to about 20 wt% (lower than or equal to about 80 wt%).

**[0158]** The tobacco material (A) is obtained by, for example, mixing the components (a), (b), (c), and (d), and, when desired, the component (e), granulating the obtained kneaded product (into a long columnar shape) with a wet extrusion granulator, and then sizing the granules into a short columnar shape or a spherical shape.

**[0159]** An extrusion pressure in extrusion granulation is able to be set to a selected value according to the viscosity or the like of the kneaded product. For example, a mode in which the kneaded product is extruded under a pressure of 2 kN or higher at an ambient temperature may be used.

**[0160]** By extruding the kneaded product under such a relatively high pressure, the temperature of the kneaded product at the outlet of the extrusion granulator instantaneously rapidly increases from the ambient temperature to, for example, higher than or equal to 90°C and lower than or equal to 100°C, and the moisture and the volatile component, higher than or equal to 2 wt% and lower than or equal to 4 wt%. Therefore, when extrusion granulation is performed in such a mode, water to be blended to produce a kneaded product needs to be increased by the amount of vaporization as compared to a desired moisture in tobacco granules to be obtained.

**[0161]** Tobacco granules obtained by extrusion granulation may be further dried as needed to adjust moisture. For example, when the drying loss of the tobacco granules obtained by extrusion granulation is measured and the measured drying loss is higher than a desired drying loss (for example, higher than or equal to 5 wt% and lower than or equal to 17 wt%), the tobacco granules may be further dried to obtain the desired drying loss. A drying condition (temperature and time) for obtaining the desired drying loss is able to be set based on a drying condition (temperature and time) needed to reduce the drying loss by a predetermined value.

**[0162]** The tobacco material (A) may be made up of only the above-described tobacco granules and may further include an additional tobacco material. The additional tobacco material is commonly shreds or fine powder of tobacco leaves. The additional tobacco material may be mixed with tobacco granules and used.

<Tobacco Material (B)>

**[0163]** The material of shredded tobacco contained in the tobacco material (B) is not limited and may be a known one, such as lamina and a midrib, may be used. For example, the dried tobacco leaves may be the one shredded into a width greater than or equal to 0.5 mm and less than or equal to 2.0 mm. The length of the shredded tobacco leaves ranges from about 0.5 mm to about 10 mm. Alternatively, the dried tobacco leaves may be ground into ground tobacco with an average particle diameter greater than or equal to 20 μm and less than or equal to 200 μm, the one obtained by forming a sheet from the uniformed ground tobacco (hereinafter, also simply referred to as uniform sheet) may be shredded into a width greater than or equal to 0.5 mm and less than or equal to 2.0 mm. The average particle diameter of the ground tobacco is able to be measured by using a particle counter (for example, Mastersizer made by Spectris). The length of the shredded uniform sheet ranges from about 0.5 mm to about 10 mm. As for tobacco leaves used to manufacture the shredded tobacco or the uniform sheet, various types of tobacco may be used. Examples of the types of tobacco include a flue cured type, a burley type, an orient type, a local type, other nicotiana-tabacum-series species, nicotiana-rustica-series species, and mixtures of them. The mixtures may be used by appropriately blending the above-described species to attain an intended taste. The details of the species of the tobaccos are disclosed in "Tobacco Dictionary, Tobacco Research Center, 2009.3.31 ". The method of manufacturing a uniform sheet, that is, a method of grinding tobacco

leaves and working the ground tobacco leaves into a uniform sheet, includes a plurality of existing methods. The first one is a method of manufacturing a paper-made sheet by using a paper-making process. The second one is a method of casting a uniformed product onto a metal plate or a metal plate belt with a thin thickness after an appropriate solvent, such as water, is mixed with the ground tobacco leaves to be uniformed and drying the uniformed product to form a cast sheet. The third one is a method of manufacturing a calendared sheet by extruding a product obtained by mixing an appropriate solvent, such as water, with the ground tobacco leaves and kneaded, into a sheet. The type of the uniform sheet is disclosed in detail in "Tobacco Dictionary, Tobacco Research Center, 2009.3.31 ".

**[0164]** The moisture content of the tobacco material (B) may be higher than or equal to 10 wt% and lower than or equal to 15 wt% with respect to the total amount of tobacco material and preferably higher than or equal to 11 wt% and lower than or equal to 13 wt%. With such a moisture content, a change in moisture is small during manufacturing and after manufacturing, so process management during manufacturing and quality degradation after manufacturing are small.

**[0165]** The tobacco material (B) may contain the materials (a) to (e) in the above-described tobacco material (A). The types and contents of these materials and other usage modes may be designed similarly to those of the above-described tobacco material (A).

**[0166]** The above-described tobacco material (A) or tobacco material (B) may contain aerosol-source material or does not need to contain aerosol-source material. The type of the aerosol-source material is not limited. Extracted substances from various natural products and/or components of them may be selected according to an application. Examples of the aerosol-source material include glycerine, propylene glycol, triacetin, 1,3-butanediol, and mixtures of them.

**[0167]** The content in the case where aerosol-source material is contained may be, for example, lower than or equal to 10 wt% with respect to 100 wt% of tobacco material, may be lower than or equal to 8 wt% in another mode, may be lower than or equal to 5 wt% in further another mode, may be lower than or equal to 3 wt% in further another mode, may be lower than or equal to 1 wt% in further another mode, or may be no content (0 wt%).

<Mouthpiece>

**[0168]** A mouthpiece may be engaged with the non-combustion-heating-type tobacco. Even when no mouthpiece is used, it is possible to use the non-combustion-heating-type tobacco. In this case, the non-combustion-heating-type tobacco and the mouth of a user directly contact with each other, so the tobacco, particularly, the inhalation port end filter, tends to get wet. Thus, there are a problem that the air-flow resistance increases and a problem that a feeling deteriorates. To improve these problems, it is desirable to use a mouthpiece.

**[0169]** In terms of easiness of handling during use, such as easiness of holding in a mouth, the distance between an electrically heated tobacco product in which the non-combustion-heating-type tobacco is inserted and the mouth of the user preferably ensures a length to some extent, so it is preferable to use a mouthpiece in terms of this point.

**[0170]** The material of the mouthpiece is not limited, and may be any one of a polymer material, such as resin and rubber, a metal material, and an inorganic material. From the viewpoint of easiness of manufacturing and lightweight, the material of the mouthpiece is preferably resin.

**[0171]** The shape of the mouthpiece is not limited as long as a flow path s2 through which tobacco vapor to be inhaled by a user flows is ensured. The shape of the mouthpiece may be a cylindrical shape or a polygonal tubular shape. From the viewpoint of improving inhalation easiness, the inhalation port side is preferably narrow. As shown in Fig. 4, the mouthpiece is not uniformly narrowed, and is preferably narrowed such that the shape of a cross section orthogonal to the long-axis direction of the inhalation port end becomes a flat shape so as to be adapted to the shape of the lip of the user. With this configuration, when the user holds the mouthpiece in the mouth, the opening of the lip in the up and down direction reduces, so it is possible to reduce flow of air into the oral cavity through the gap between each end of the lip in the right and left direction and the mouthpiece.

**[0172]** The shape of the cross section of a hole that directly goes to the long-axis direction of an engaging part with the non-combustion-heating-type tobacco is not limited. If the shape of the cross section of the hole is a circle, the non-combustion-heating-type tobacco to be engaged tends to rotate and is easily removed, so the shape of the cross section of the hole is preferably such a shape that has a protruding part to apply pressure (catch) such that a part to be engaged with the non-combustion-heating-type tobacco deflects. To uniform the force that the mouthpiece applies to the non-combustion-heating-type tobacco, the shape of the hole of the engaging part and the arrangement of the protruding part are preferably symmetric.

**[0173]** Providing a protruded part (finger hook 311) present at a part where the mouthpiece of Fig. 6 is narrowed is preferable because removal of the mouthpiece is easy.

**[0174]** The length of the mouthpiece in the long-axis direction is not limited. From the viewpoint of ensuring easiness of inhalation, the length of the mouthpiece in the long-axis direction may be greater than or equal to 20 mm and less than or equal to 50 mm or may be greater than or equal to 25 mm and less than or equal to 30 mm.

**[0175]** In the non-combustion-heating-type tobacco, the length in the long-axis direction, of the part to be engaged

with the mouthpiece, is not limited, and is commonly higher than or equal to 10% and lower than or equal to 30% with respect to the length h of the non-combustion-heating-type tobacco and is preferably about 20%.

**[0176]** Since the non-combustion-heating-type tobacco is not able to be repeatedly used, the mouthpiece is preferably able to be engaged at the time of the start of use of the non-combustion-heating-type tobacco and removed at the time of the end of use, that is, the mouthpiece is detachable from the non-combustion-heating-type tobacco.

<Electrically Heated Tobacco Products

**[0177]** The non-combustion-heating-type tobacco according to the embodiment of the present invention is able to be used as a cartridge to be accommodated in the electrically heated tobacco product as will be described below. The electrically heated tobacco product according to the embodiment of the present invention will be described.

**[0178]** Hereinafter, the non-combustion-heating-type tobacco according to the embodiment of the present invention is referred to as "cartridge". Generally, it may be called "consumables".

**[0179]** An embodiment of the electrically heated tobacco product according to the present invention includes a housing and a mouthpiece. The housing extends in an axial direction and has an opening at a first end in the axial direction. The housing has an accommodation space inside, and the accommodation space communicates with the opening. The non-combustion-heating-type tobacco (cartridge) in which a flavor component is contained is accommodated in the accommodation space of the housing. The mouthpiece includes an engaging part and a holder. The engaging part is engaged with the opening.

**[0180]** The holder is configured to hold the non-combustion-heating-type tobacco.

**[0181]** According to the present embodiment, in replacing the non-combustion-heating-type tobacco, when the mouthpiece is removed from the housing, engagement of the engaging part of the mouthpiece with the opening of the housing is released, and the non-combustion-heating-type tobacco held by the holder of the mouthpiece is removed from the housing together with the mouthpiece. Thus, it is not necessary to remove the cartridge separately from the mouthpiece, so replacement of the cartridge is easily performed.

**[0182]** In the electrically heated tobacco product according to the present embodiment, the mouthpiece is configured to extend toward both sides of the opening in the axial direction in a state of being engaged with the opening. According to this mode, when the mouthpiece is removed from the housing, the part protruding outward from the opening of the housing in the mouthpiece can be held, so work for removing the mouthpiece is easy.

**[0183]** Fig. 3 is a perspective view of the electrically heated tobacco product (flavor inhaler; hereinafter, also simply referred to as inhaler) according to the embodiment of the present invention.

**[0184]** As shown in Fig. 3, the inhaler 1 that is an example of the electrically heated tobacco product according to a first embodiment is used to taste the flavor of tobacco leaves by inhaling vapor generated by heating tobacco leaves.

**[0185]** Fig. 4 is a perspective view of a state where a cap 40 is removed from the inhaler 1.

**[0186]** As shown in Fig. 4, the inhaler 1 includes a main unit 10, a cartridge 20, a mouthpiece 30, and the cap 40 (see Fig. 3). The cartridge 20 according to each of the embodiments and modifications, as described above, is typically made up of three or more layers and has an outer periphery formed by paper, and has a specific buckling strength and 1/2 deformation stress.

**[0187]** The outer shape of the inhaler 1 is formed in a substantially square prism shape with a central axis set to an axis O. The main unit 10, the cartridge 20, the mouthpiece 30, and the cap 40 are disposed so as to be aligned in the axis O. In the following description, in an axis O direction (a direction along the axis O, axial direction), a direction heading from the main unit 10 toward the mouthpiece 30 is referred to as inhalation port side, and a direction heading from the mouthpiece 30 toward the main unit 10 is referred to as anti-inhalation port side. A direction that intersects with the axis O in plan view in the axis O direction is referred to as radial direction. In the radial direction, a direction to approach the axis O is referred to as inner side, and a direction to move away from the axis O is referred to as outer side. A direction to orbit around the axis O is referred to as circumferential direction. In the specification, the "direction" means two orientations, and, when one orientation of the "direction" is indicated, the one orientation is referred to as "side".

**[0188]** Fig. 5 is a sectional view taken along the line III-III in Fig. 4.

**[0189]** As shown in Fig. 5, the main unit 10 includes a housing 11, a power supply unit 15, and a heater 16. The housing 11 has a housing body 110, a mouthpiece support member 120, and a cartridge accommodation member 130.

**[0190]** The housing body 110 has an outer housing 111 and a bottom cap 116.

**[0191]** The outer housing 111 is formed in a substantially square tube shape with the central axis set to the axis O. The outer housing 111 makes up the outer surface of the inhaler 1. The shape of the outer housing 111 may be set as needed as long as the outer housing 111 extends in the axis O direction.

**[0192]** An inhalation port-side opening 111a extending through in the axis O direction is formed at the inhalation port-side end of the outer housing 111. An anti-inhalation port-side opening 111b extending through in the axis O direction is formed at the anti-inhalation port-side end of the outer housing 111. A switch opening 111c extending through in the radial direction is formed at part of the outer housing 111 in the circumferential direction. A switch 112 is provided at the

switch opening 111c.

**[0193]** Here, in the present embodiment, of the radial direction, a direction connecting the axis O with the switch opening 111c is referred to as front and back direction. In this case, the switch opening 111c side with respect to the axis O is defined as front side, and a side opposite to the switch opening 111c with respect to the axis O is referred to as back side.

**[0194]** The bottom cap 116 is provided at the anti-inhalation port-side opening 111b of the outer housing 111. The bottom cap 116 is formed in a substantially rectangular shape in plan view when viewed in the axis O direction. The bottom cap 116 closes the anti-inhalation port-side opening 111b of the outer housing 111. The shape of the bottom cap 116 is able to be set as needed as long as the bottom cap 116 closes the anti-inhalation port-side opening 111b of the outer housing 111.

**[0195]** An inner tubular member 117 is provided inside the housing body 110. The inner tubular member 117 extends in the axis O direction and is formed in a substantially square tube shape. The inner tubular member 117 is made up of a pair of half members divided along the axis O direction. The overall length (the length along the axis O direction) of the inner tubular member 117 is shorter than the overall length of the outer housing 111. The shape of the inner tubular member 117 is able to be set as needed.

**[0196]** A partition wall 118 is provided inside the inner tubular member 117 so as to separate a space in which the battery 151 is accommodated from a space in which the heater 16 is accommodated.

**[0197]** The partition wall 118 has an inhalation port-side partition wall part 118a and a side partition wall part 118b. With this configuration, flow of air heated by the heater 16 into the space that accommodates the battery 151 is reduced. Thus, an increase in the temperature of the battery 151 is suppressed.

**[0198]** The inhalation port-side partition wall part 118a is disposed on the inhalation port side with respect to the battery 151. The side partition wall part 118b is disposed so as to cover the outer side of the battery 151 in the circumferential direction.

**[0199]** The mouthpiece support member 120 is provided at the inhalation port-side opening 111a of the outer housing 111.

**[0200]** Fig. 5 is a sectional view of the part including the mouthpiece 30 and the cartridge 20, taken along the width direction.

**[0201]** As shown in Fig. 5, in the engaging circumferential wall 33, an anti-inhalation port-side part 331 is thinner than an inhalation port-side part 332. With this configuration, a step 333 is formed at the boundary between the anti-inhalation port-side part 331 and the inhalation port-side part 332. The step 333 is formed in a substantially annular shape in plan view when viewed in the O direction. As shown in Fig. 4, the inhalation port-side end 20a of the cartridge 20 is in contact with the step 333 of the engaging circumferential wall 33 of the mouthpiece 30. At the connecting part of the inhalation port 31 with the proximal part 32, the opening width widens from the inhalation port side toward the anti-inhalation port side. A space section s3 is formed between the inhalation port-side end 20a of the cartridge 20 and the anti-inhalation port-side face of the inhalation port 31 of the mouthpiece 30. With this configuration, the closed area of the inhalation port-side end 20a of the cartridge 20 reduces, and the air-flow resistance is reduced.

**[0202]** The cartridge 20 includes the first filter part 21, the second filter part 22, the space section 23, and the wrapping paper 24.

**[0203]** The finger hook 311 is provided on the outer periphery of the inhalation port 31. The finger hook 311 protrudes outward in the radial direction from the outer periphery of the inhalation port 31. The finger hook 311 is provided all around the outer periphery of the inhalation port 31 in the circumferential direction.

**[0204]** The flow path s2 extending through in the axis O direction is formed in the mouthpiece 30. Vapor generated from the cartridge 20 is able to flow through the flow path s2.

**[0205]** The heater member 16 of an electric heating device 10 may be, for example, a sheet heater, a flat heater, or a tubular heater. A sheet heater is a flexible sheet-shaped heater. Examples of the sheet heater include a heater that includes a film (of which the thickness is greater than or equal to about 20 μm and less than or equal to about 225 μm) made of heat-resistant polymer, such as polyimide. A flat heater is a rigid flat heater (of which the thickness is greater than or equal to about 200 μm and less than or equal to about 500 μm). Examples of the flat heater include a heater in which a resistance circuit is provided on a flat substrate and this part is regarded as a heat generating part. A tubular heater is a hollow or solid tubular heater. Examples of the tubular heater include a heater (of which the thickness is greater than or equal to about 200 μm and less than or equal to about 500 μm) that has a resistance circuit on the outer periphery of a tube made of, for example, metal and this part is regarded as a heat generating part. Examples of the heater include a prism heater and a cone heater made of, for example, metal, which has a resistance circuit inside and this part is regarded as a heat generating part. The sectional shape of the tubular heater may be a circular shape, an elliptical shape, a polygonal shape, a rounded-corner polygonal shape, or the like.

**[0206]** Where the length of the long-axis direction of the non-combustion-heating-type tobacco is L mm, the length of the heater member in the long-axis direction is able to fall within the range of L ± 5.0 mm.

**[0207]** A heating strength, that is, the heating time and heating temperature, on the non-combustion-heating-type

tobacco 20 with the heater member 16 is able to be set in advance for each electrically heated tobacco product 1. For example, the heating strength may be set such that, after the non-combustion-heating-type tobacco 20 is inserted in the electric heating device 10, pre-heating is performed for a set time, the non-combustion-heating-type tobacco 20 is heated until the temperature of at least part of the tobacco material in the non-combustion-heating-type tobacco 20 becomes X(°C), and then the temperature is maintained at a set temperature lower than or equal to X(°C).

**[0208]** The X(°C) is preferably higher than or equal to 80°C and lower than or equal to 200°C from the viewpoint of aerosol delivery. Specifically, the X(°C) may be set to 80°C, 90°C, 100°C, 110°C, 120°C, 130°C, 140°C, 150°C, 160°C, 170°C, 180°C, 190°C, or 200°C.

**[0209]** In the electrically heated tobacco product 1, as a result of heating of the heater member 16, vapor containing a flavor component and the like generated from tobacco material disposed in the space section passes through the inhalation port end-side filter part and reaches the inside of the oral cavity of a user

**[0210]** The relationship between the mouthpiece and the electric heating device during use is not limited. The mouthpiece may be in contact with the outer side of the electric heating device, or may be fitted to a mouthpiece fitting part provided in the electric heating device. From the viewpoint of preventing drop of the mouthpiece during use, the fitting mode is preferable.

**[0211]** As described above, a mode in which engagement of the non-combustion-heating-type tobacco with the mouthpiece is enhanced by providing the mouthpiece with a protruding part is preferable because the non-combustion-heating-type tobacco and the mouthpiece are removed from the electric heating device at a time in removing the non-combustion-heating-type tobacco from the electric heating device. Specifically, static friction force applied between the mouthpiece and the non-combustion-heating-type tobacco is preferably greater than static friction force applied between the inner wall of the electric heating device and the non-combustion-heating-type tobacco.

**[0212]** The electrically heated tobacco product may include another component other than the above-described components. Examples of the other component include a temperature sensor and a gas concentration sensor (chemical sensor).

## EXAMPLES

**[0213]** The present invention will be further specifically described by way of Examples. The present invention is not limited to the description of the following Examples as long as within the scope of the present invention.

### <EXAMPLE 1>

**[0214]** Of the outermost two layers of a wrapping paper, paper OPN#85 (produced by Nippon Paper Papylia Co., Ltd, air permeability: 40 C.U., basis weight: 85 gsm, thickness: 97 μm) was prepared as the layer (the front side layer of the wrapping paper) that was the outer peripheral side of the non-combustion-heating-type tobacco, and paper S52-7000 (produced by Nippon Paper Papylia Co., Ltd, air permeability: 7000 C.U., basis weight: 52 gsm, thickness: 110 μm) was prepared as the layer (the back side layer of the wrapping paper) on the side opposite to the front side layer. A laminate layer (produced by Nippon Paper Papylia Co., Ltd, thickness: 20 μm) that is a film made of polyethylene resin was prepared as the intermediate layer (air-impermeable layer) of the wrapping paper. These were cut into a rectangular shape of which the length of one side that would be the long-axis direction of the non-combustion-heating-type tobacco was 20 mm and the length of another side orthogonal to the one side was 27.0 mm.

**[0215]** A wrapping paper 1 (basis weight: 150.6 gsm, thickness: 204 μm) was obtained by stacking the cut three layers and pressurizing the stacked layers while applying heat (laminating) to the stacked layers. As a result that the paper layer is compressed during lamination and part of the paper layer is embedded in the thermoplastic resin layer (here, laminate layer), the obtained wrapping paper is thinner than the total thickness of the thicknesses of the layers before lamination. The physical properties of the wrapping paper 1 are shown in Table 1.

### <EXAMPLES 2 and 3>

**[0216]** Except that the paper that serves as the back side layer of the wrapping paper 1 was replaced with P-10000C (produced by Nippon Paper Papylia Co., Ltd, air permeability: 10000C.U., basis weight: 24.0 gsm, thickness: 60 μm), a wrapping paper 2 having the same configuration as the wrapping paper 1 was prepared.

**[0217]** Except that the paper that serves as the front side layer of the wrapping paper 2 was replaced with OPN#57 (produced by Nippon Paper Papylia Co., Ltd, basis weight: 57 gsm, air permeability: 40 C.U., thickness: 65 μm), a wrapping paper 3 having the same configuration as the wrapping paper 2 was prepared.

**[0218]** The physical properties of the wrapping paper 2 and wrapping paper 3 are shown in Table 1.

<COMPARATIVE EXAMPLE 1>

**[0219]** Except that the paper that serves as the back side layer of the wrapping paper 1 was replaced with OPN#57 (produced by Nippon Paper Papylia Co., Ltd, basis weight: 57 gsm, air permeability: 40 C.U., thickness: 65 μm), a comparative wrapping paper 1 having the same configuration as the wrapping paper 1 was prepared. The physical properties of the comparative wrapping paper 1 are shown in Table 1.

<Preparation of COMPARATIVE EXAMPLE 2>

**[0220]** A single-layer paper S-2000 (produced by Nippon Paper Papylia Co., Ltd, air permeability: 2000 C.U., basis weight: 117 gsm, thickness: 220 μm) was prepared and cut into a rectangular shape of which the length of one side that would be the long-axis direction of the non-combustion-heating-type tobacco was 20 mm and the length of another side orthogonal to the one side was 27.0 mm to obtain a comparative wrapping paper 2. The physical properties of the comparative wrapping paper 2 are shown in Table 1. The comparative wrapping paper 2 is made up of a single layer, so, in Table 1, this single layer is shown as the front side layer.

<Preparation of COMPARATIVE EXAMPLE 3>

**[0221]** A two-layer laminated indicator base paper (produced by Nippon Paper Papylia Co., Ltd, air permeability: 0 C.U., basis weight: 150 gsm, thickness: 350 μm) obtained by laminating a polyethylene resin film (the back side layer of a wrapping paper) and an indicator base paper (the front side layer of the wrapping paper) was prepared and cut into a rectangular shape of which the length of one side that would be the long-axis direction of the non-combustion-heating-type tobacco was 20 mm and the length of another side orthogonal to the one side was 27.0 mm to obtain a comparative wrapping paper 3. The physical properties of the comparative wrapping paper 3 are shown in Table 1. Since the comparative wrapping paper 3 is made up of two layers, the outermost layer of the non-combustion-heating-type tobacco is shown as the front side layer of the wrapping paper and the layer on the side opposite to the front side layer is shown as the back side layer of the wrapping paper in the above and Table 1.

<Preparation of COMPARATIVE EXAMPLE 4>

**[0222]** OPER MMW170 (produced by Nippon Paper Papylia Co., Ltd, air permeability: 0 C.U., basis weight: 140 gsm, thickness: 170 μm) of which the back side layer and the front side layer of the wrapping paper were films made of polyethylene resin and the intermediate layer was paper (OPN#104) was prepared and cut into a rectangular shape of which the length of one side that would be the long-axis direction of the non-combustion-heating-type tobacco was 20 mm and the length of another side orthogonal to the one side was 27.0 mm to obtain a comparative wrapping paper 4. The physical properties of the comparative wrapping paper 4 are shown in Table 1.

<Preparation of COMPARATIVE EXAMPLE 5>

**[0223]** A single-layer paper LPWS-OLL (produced by Nippon Paper Papylia Co., Ltd, air permeability: 1300 C.U., basis weight: 26.5 gsm, thickness: 48 μm) was prepared and cut into a rectangular shape of which the length of one side that would be the long-axis direction of the non-combustion-heating-type tobacco was 20 mm and the length of another side orthogonal to the one side was 27.0 mm to obtain a comparative wrapping paper 5. The physical properties of the comparative wrapping paper 5 are shown in Table 1. The comparative wrapping paper 5 is made up of a single layer, so, in Table 1, this single layer is shown as the front side layer.

<Measurement of Buckling Strength of Each of Wrapping Papers 1 to 3>

**[0224]** The buckling strength of each of the wrapping papers 1 to 3 was measured by the following method.

(1) After 1.0 mg of vinyl acetate adhesive and 1.25 mg of hot-melt adhesive were applied parallel to each other in the first end region or the second end region of the wrapping paper, extending along the long-axis direction of the non-combustion-heating-type tobacco, such that the adhesives were not mixed, both end regions were overlapped with a width of 2.5 mm and bonded, thus forming a cylinder with a perimeter of 24.5 mm. When the wrapping paper was formed into a cylindrical shape, (two) filters (described later) were wrapped with the wrapping paper so as to be disposed at both ends of the non-combustion-heating-type tobacco in the long-axis direction.
(2) The cylinder was placed upright on a stage of a rheometer (product name: CR-3000EX-S made by SUN Scientific Co., Ltd.) such that the axial direction of the prepared cylinder was perpendicular to the surface of the stage.

(3) The rheometer contact was lowered at a displacement speed of 100.0 mm/min, and measurement of stress was started on the assumption that a deformation distance was 0 mm at the time when the rheometer contact touched the cylinder.
(4) The maximum value of stress at the time when the cylinder significantly deformed (buckled) as a result of lowering the rheometer contact, that is, when the stress to be measured instantaneously decreased, was recorded as buckling strength (N).

**[0225]** The measured results are shown in Table 1.

<Measurement of 1/2 Deformation Stress of Each of Wrapping Papers 1 to 3>

**[0226]** The 1/2 deformation stress of each of the wrapping papers 1 to 3 was measured by the following method.

(1) Except that no filters were wrapped, a wrapping paper formed in a cylinder same as that used to measure the above-described buckling strength was prepared.
(2) The cylinder was placed on a stage of a rheometer (product name: CR-3000EX-S made by SUN Scientific Co., Ltd.) such that the axial direction of the cylinder was parallel to the surface of the stage.
(3) The location of the cylinder on the stage was adjusted such that the rheometer contact contacted within the range of 5 mm in a direction from one end to the other end of the axial direction of the cylinder.
(4) The rheometer contact was lowered at a displacement speed of 100.0 mm/min, and measurement of stress was started on the assumption that a deformation distance was 0 mm at the time when the rheometer contact touched the cylinder.
(5) The rheometer contact was lowered, and a stress measured at the time when the cylinder was deformed to 50% of the diameter was recorded as 1/2 deformation stress (N).

**[0227]** The test results are shown in Table 1.

[Table 1]

**[0228]**

Table 1

| | Wrapping Paper Name | Basis Weight (gsm) | Thickness (μm) | Surface Layer Air Permeability (C.U.) | Front Side Layer Smoothness (s) | Back Side Layer Air Permeability (C.U.) | Buckling Strength (N) | 1/2 Deformation Stress (N) |
|---|---|---|---|---|---|---|---|---|
| Example 1 | Wrapping Paper 1 | 150.6 | 204 | 0 | 100-120 | 7000 | 58.22 | 1.31 |
| Example 2 | Wrapping Paper 2 | 124.7 | 157 | 0 | 100-120 | 10000 | 42.87 | 0.81 |
| Example 3 | Wrapping Paper 3 | 100.6 | 126 | 0 | 50-100 | 10000 | 32.65 | 0.16 |
| Comparative Example 1 | Comparative Wrapping Paper 1 | 183 | 220 | 0 | 100-120 | 0 | - | - |
| Comparative Example 2 | Comparative Wrapping Paper 2 | 117 | 220 | 2000 | 15 | - | - | - |
| Comparative Example 3 | Comparative Wrapping Paper 3 | 150 | 350 | 0 | 500 or Higher | 0 | - | - |
| Comparative Example 4 | Comparative Wrapping Paper 4 | 140 | 170 | 0 | 500 or Higher | 0 | - | - |
| Comparative Example 5 | Comparative Wrapping Paper 5 | 26.5 | 48 | 1300 | 3 | - | 2.20 | 0.02 |

<Preparation of Non-Combustion-Heating-Type Tobacco 1>

**[0229]** A non-combustion-heating-type tobacco 1 using the above-described wrapping paper 1 was prepared. The materials other than the wrapping paper are as follows.

[Used Raw Materials of Tobacco Material]

**[0230]**

· Ground tobacco material 1; flue cured type, average particle diameter 70 μm (measured by the particle counter (Mastersizer made by Spectris))
· Ground tobacco material 2; burley type, average particle diameter 70 μm (measured by the particle counter (Mastersizer made by Spectris))
· Water
· Flavor developing agent; potassium carbonate
Binder; hydroxypropyl cellulose (HPC)
· Flavor material; 1-menthol
· Aerosol-source material; glycerine

[Used Filter]

**[0231]** · A cylindrical filter blank was prepared from cellulose acetate tow with a single yarn fineness of 12 g/9000 m and a total yarn fineness of 28000 g/9000 m as a raw material by using a filter production machine (FRA3SE) made by Sanjo Machine Works, Ltd. Subsequently, a filter blank with a filter wrapping paper with a perimeter of 24.5 mm and a height of 80 mm was prepared by wrapping the filter blank with the filter wrapping paper (name: LPWS-OLL, air permeability: 1300 C.U., basis weight: 26.5 gsm, thickness: 48 μm, produced by Nippon Paper Papylia Co., Ltd.). Subsequently, the filter blank with the filter wrapping paper was cut into a height of 4 mm to prepare a cylindrical filter with an air-flow resistance in the height direction of 3.7 mm$H_2O$.

**[0232]** The ground tobacco material 1 and tobacco material 2, the flavor developing agent, and the binder were prepared as raw materials and mixed, kneaded with addition of water, and the obtained kneaded product was granulated by a wet extrusion granulator (made by Dalton Corporation; mesh size ϕ0.9mm, temperature of a kneaded product at the extrusion outlet 50 to 60°C).

**[0233]** The contents of the components in the raw materials were 50.00 wt% of tobacco material 1, 12.50 wt% of tobacco material 2, 25.00 wt% of water, 7.50 wt% of flavor developing agent, and 5.00 wt% of binder. The kneaded product was dried with a drier until 12.50 wt% of water, and then classified by a grinding classifier (made by Freund-Turbo Corporation; mesh size upstream ϕ710 mm, downstream ϕ250 mm). In accordance with the conditions described in the above-described method of measuring the particle size of the particulate tobacco material, the average particle size of the obtained granules was 530 μm.

**[0234]** After that, the flavor material was added with a pipet such that the content of the flavor material in the tobacco granules was 9.09 wt%, and rotationally agitated for 24 hours or longer in a vial container under an environment of 22°C to be uniformly dispersed. The pH of the obtained tobacco granules was 9.5 (measurement temperature 22°C).

**[0235]** The contents of the components in the obtained tobacco granules were 53.03 wt% of tobacco material 1, 13.26 wt% of tobacco material 2, 11.36 wt% of water, 7.95 wt% of flavor developing agent, 5.30 wt% of binder, and 9.09 wt% of flavor material.

**[0236]** The tobacco granules were disposed between two filter parts, and these were wrapped with the wrapping paper 1 to obtain the cylindrical non-combustion-heating-type tobacco 1. Vinyl acetate adhesive and hot-melt adhesive were used as binders at the time of bonding the paper layer of the front side layer of the wrapping paper with the paper layer of the back side layer into a cylindrical shape.

**[0237]** In the non-combustion-heating-type tobacco 1, the diameter of the bottom was 7.8 mm, the height in the long-axis direction was 20 mm, and the volume ratio (packing fraction) of tobacco material to the overall volume of the space section was 45 vol%. The air-flow resistance of the non-combustion-heating-type tobacco in the long-axis direction was 18 mm$H_2O$ (flow rate; 35 cc/2 sec).

<Preparation of Non-Combustion-Heating-Type Tobaccos 2 and 3>

**[0238]** Except that the wrapping paper 1 was replaced with the wrapping paper 2 in the above-described non-combustion-heating-type tobacco 1, a non-combustion-heating-type tobacco 2 was obtained by preparation with the same procedure.

**[0239]** Similarly, except that the wrapping paper 1 was replaced with the wrapping paper 3 in the above-described non-combustion-heating-type tobacco 1, a non-combustion-heating-type tobacco 3 was obtained by preparation with the same procedure.

<Preparation of Comparative Non-Combustion-Heating-Type Tobaccos 1 to 5>

**[0240]** Except that the wrapping paper 1 was replaced with the comparative wrapping paper 1 in the above-described non-combustion-heating-type tobacco 1, a comparative non-combustion-heating-type tobacco 1 was obtained by preparation with the same procedure.

**[0241]** Similarly, except that the wrapping paper 1 was replaced with the comparative wrapping paper 2 in the above-described non-combustion-heating-type tobacco 1, a comparative non-combustion-heating-type tobacco 2 was obtained by preparation with the same procedure.

**[0242]** Similarly, except that the wrapping paper 1 was replaced with the comparative wrapping paper 3 in the above-described non-combustion-heating-type tobacco 1, a comparative non-combustion-heating-type tobacco 3 was obtained by preparation with the same procedure.

**[0243]** Similarly, except that the wrapping paper 1 was replaced with the comparative wrapping paper 4 in the above-described non-combustion-heating-type tobacco 1, a comparative non-combustion-heating-type tobacco 4 was obtained by preparation with the same procedure.

**[0244]** Similarly, except that the wrapping paper 1 was replaced with the comparative wrapping paper 5 in the above-described non-combustion-heating-type tobacco 1, a comparative non-combustion-heating-type tobacco 5 was obtained by preparation with the same procedure.

**[0245]** Performance evaluation was performed in accordance with the following method.

<Adhesion Retention Performance of Wrapping Paper>

**[0246]** The non-combustion-heating-type tobaccos 1 to 3 and the comparative non-combustion-heating-type tobaccos 1 to 5 were stored in a warehouse, observed for the peeling condition of the bonded parts of the wrapping paper, and evaluated in accordance with the following criteria. A storage condition was four weeks in a high-temperature, high-humidity environment (temperature 60°C, humidity 60%RH).

Evaluation Criteria

**[0247]**

A: Adhesion of wrapping paper was maintained (no peeling occurred) after a lapse of the storage period.
B: Peeling occurred at the bonded parts of wrapping paper in the storage period.
C: After wrapping, peeling occurred at the bonded parts of wrapping paper before storage.

**[0248]** The evaluation results are shown in Table 2.

<Appearance Retention Performance>

**[0249]** After the storage period in the above-described <Adhesion Retention Performance of Wrapping Paper>, the appearance of each of the non-combustion-heating-type tobaccos 1 to 3 and the comparative non-combustion-heating-type tobaccos 1 to 5 was observed and evaluated in accordance with the following criteria.

Evaluation Criteria

**[0250]**

A: No stains occurred or visually recognized on the surface of a non-combustion-heating-type tobacco.
B: No stains occurred on the surface of a non-combustion-heating-type tobacco, but stains were visually recognized.
C: Stains occurred on the surface of a non-combustion-heating-type tobacco.

**[0251]** The evaluation results are shown in Table 2.

<Mouthpiece Holding Performance>

**[0252]** Each of the non-combustion-heating-type tobaccos 1 to 3 prepared by the above-described method was accommodated in the accommodation space of the housing of the electric heating device of a non-combustion-heating-type tobacco product and engaged with a mouthpiece. After that, when the mouthpiece was pulled out, it was tested whether each of the non-combustion-heating-type tobaccos 1 to 3 was pulled out together with the mouthpiece. This test was repeated ten times, and evaluation was performed in accordance with the following criteria.

Evaluation Criteria

**[0253]**

A: The non-combustion-heating-type tobacco was pulled out with the mouthpiece nine times or more.

B: The non-combustion-heating-type tobacco was pulled out with the mouthpiece six times or more and eight times or less.

C: The non-combustion-heating-type tobacco was pulled out with the mouthpiece five times or less.

**[0254]** The evaluation results are shown in Table 2.

[Table 2]

**[0255]**

Table 2

| | Non-Combustion-Heating-Type Tobacco Name | Wrapping Paper Adhesion Retention Performance | Appearance Retention Performance | Mouthpiece Holding Performance (with Filter) | Mouthpiece Holding Performance (without Filter) |
|---|---|---|---|---|---|
| Example 1 | Non-Combustion-Heating-Type Tobacco 1 | A | A | A | B |
| Example 2 | Non-Combustion-Heating-Type Tobacco 2 | A | A | A | B |
| Example 3 | Non-Combustion-Heating-Type Tobacco 3 | A | A | B | B |
| Comparative Example 1 | Comparative Non-Combustion-Heating-Type Tobacco 1 | B | A | - | - |
| Comparative Example 2 | Comparative Non-Combustion-Heating-Type Tobacco 2 | A | C | - | - |
| Comparative Example 3 | Comparative Non-Combustion-Heating-Type Tobacco 3 | C | B | - | - |

(continued)

| | Non-Combustion-Heating-Type Tobacco Name | Wrapping Paper Adhesion Retention Performance | Appearance Retention Performance | Mouthpiece Holding Performance (with Filter) | Mouthpiece Holding Performance (without Filter) |
|---|---|---|---|---|---|
| Comparative Example 4 | Comparative Non-Combustion-Heating-Type Tobacco 4 | C | A | - | - |
| Comparative Example 5 | Comparative Non-Combustion-Heating-Type Tobacco 5 | A | C | C | C |

Reference Signs List

**[0256]**

| | |
|---|---|
| 1 | non-combustion-heating-type tobacco (inhaler) |
| 10 | electric heating device (main unit) |
| 11 | housing |
| 15 | power supply unit |
| 16 | heater member |
| 20 | cartridge |
| 21 | first filter part |
| 22 | second filter part |
| 23 | space section |
| T | tobacco material |
| 24 | wrapping paper |
| 24a | outer peripheral layer of the non-combustion-heating-type tobacco (front side layer of the wrapping paper) |
| 24b | intermediate layer |
| 24c | layer on a side opposite to the outer peripheral side of the non-combustion-heating-type tobacco (back side layer of the wrapping paper) |
| 25 | first adhesive |
| 26 | second adhesive |
| 27 | adhesive nozzle |
| 28 | a pair of end regions of the wrapping paper |
| 30 | mouthpiece (pull-out jig) |
| 31 | inhalation port |
| 32 | proximal part |
| 33 | engaging circumferential wall |
| 40 | cap |
| 110 | housing body |
| 111 | outer housing |
| 111a | inhalation port-side opening |
| 117 | inner tubular member |
| 120 | mouthpiece support member |
| 125 | mouthpiece opening (opening) |
| 130 | cartridge accommodation member |
| 140 | cartridge support member |
| 151 | battery |
| 152 | control unit |
| 311 | finger hook |
| s2 | flow path |

## Claims

1. A tubular non-combustion-heating-type tobacco comprising a first filter part, a second filter part, and a wrapping paper wrapping the filter parts such that a space section is formed between the first filter part and the second filter part, particulate tobacco material being movably disposed in the space section, wherein

   the wrapping paper is made up of three or more layers,
   the outermost two layers of the wrapping paper are layers made of paper,
   of the outermost two layers of the wrapping paper, the outer peripheral layer of the non-combustion-heating-type tobacco has an air permeability of 100 CORESTA Unit or less, and the layer on a side opposite to the outer peripheral layer has an air permeability of 1000 CORESTA Unit or greater, and
   an intermediate layer located between the outermost two layers comprises an air-impermeable layer.

2. The non-combustion-heating-type tobacco according to claim 1, wherein the wrapping paper has a basis weight of 100 gsm or greater.

3. The non-combustion-heating-type tobacco according to claim 1 or 2, wherein, of the outermost two layers of the wrapping paper, the outer peripheral layer of the non-combustion-heating-type tobacco has a smoothness of 50 seconds or more.

4. The non-combustion-heating-type tobacco according to any one of claims 1 to 3, wherein the wrapping paper has a pair of a first end region and a second end region extending along a long-axis direction of the non-combustion-heating-type tobacco and when the wrapping paper is formed into a cylindrical shape with a perimeter of 24.5 mm and a height of 20 mm by the first end region and the second end region overlappingly joined to each other with a width of 2.5 mm,

   a buckling strength that is measured while a load is applied in an axial direction of the cylinder is greater than or equal to 30.0 N, and
   a stress that is measured while a load is applied in a radial direction of the cylinder within a range up to 5 mm in a direction from one end of the axial direction of the cylinder to the other end to deform the cylinder to 50% of a diameter of the cylinder is 0.15 N or greater.

5. The non-combustion-heating-type tobacco according to any one of claims 1 to 4, wherein the air-impermeable layer is a film made of resin.

6. An electrically heated tobacco product comprising:

   an electric heating device that comprises a heater member, a battery unit serving as an electric power supply of the heater member, and a control unit for controlling the heater member; and
   the non-combustion-heating-type tobacco according to any one of claims 1 to 5, inserted so as to be in contact with the heater member.

7. The electrically heated tobacco product according to claim 6, wherein

   the electric heating device comprises a housing and a mouthpiece, and
   the housing extends in an axial direction and has an opening at a first end in the axial direction, the housing has an accommodation space inside so as to communicate with the opening, the non-combustion-heating-type tobacco is accommodated in the accommodation space of the housing, and the mouthpiece comprises an engaging part and a holder.

FIG. 1

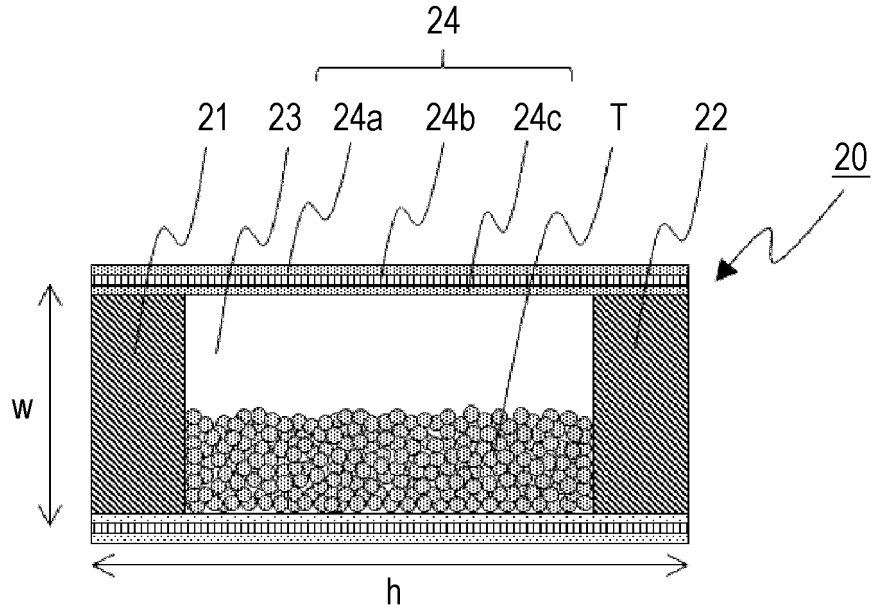



FIG. 2A

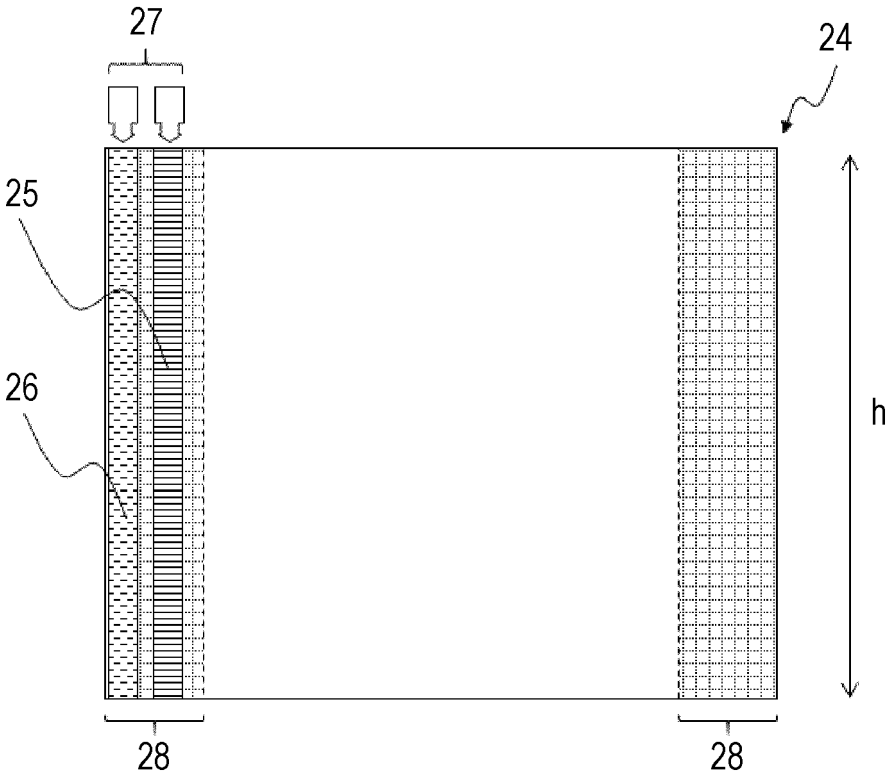


FIG. 2B

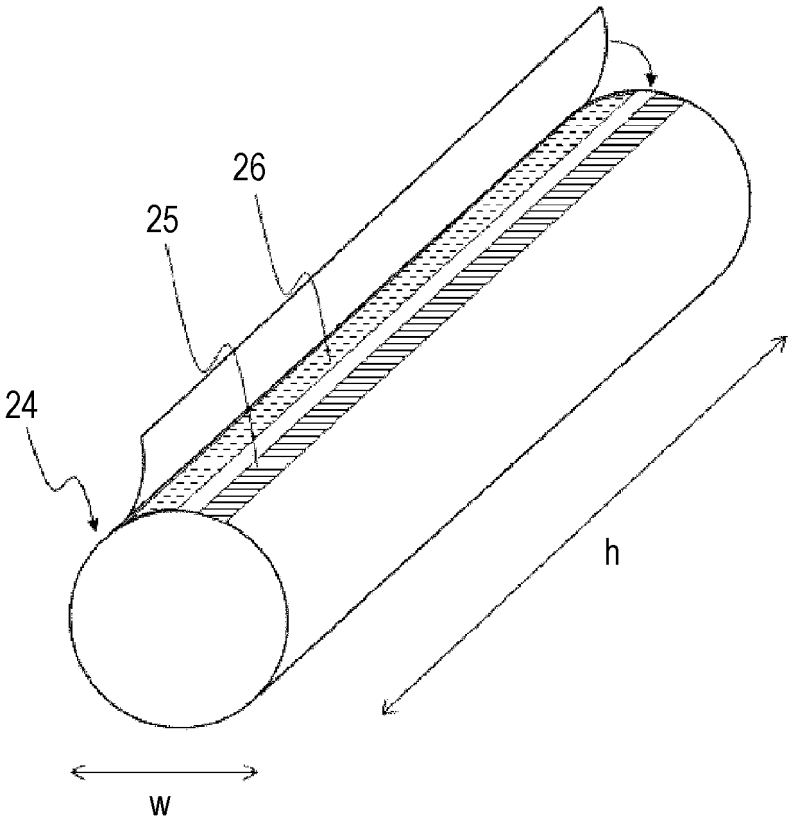



FIG. 3

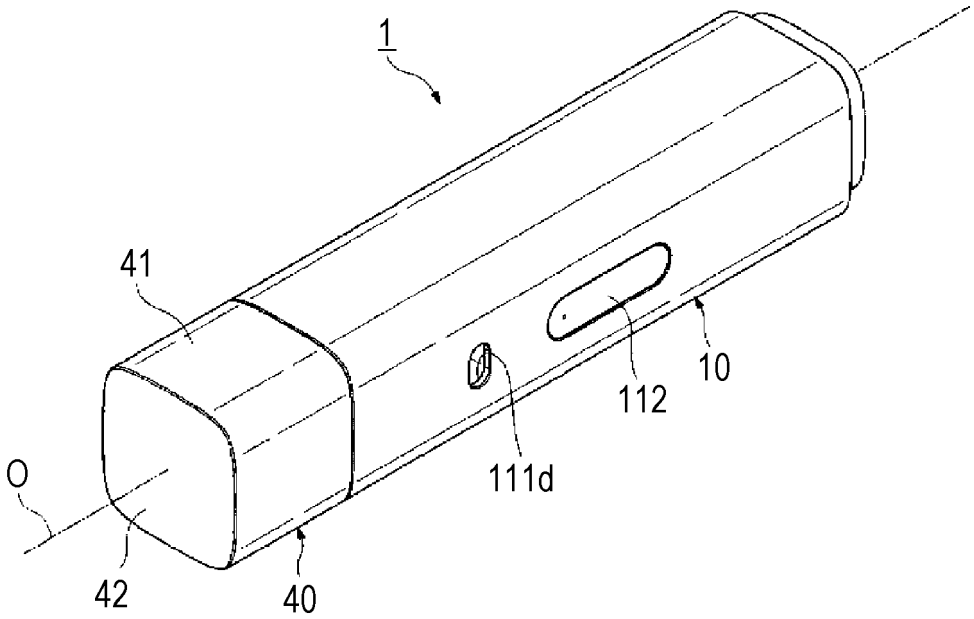


FIG. 4

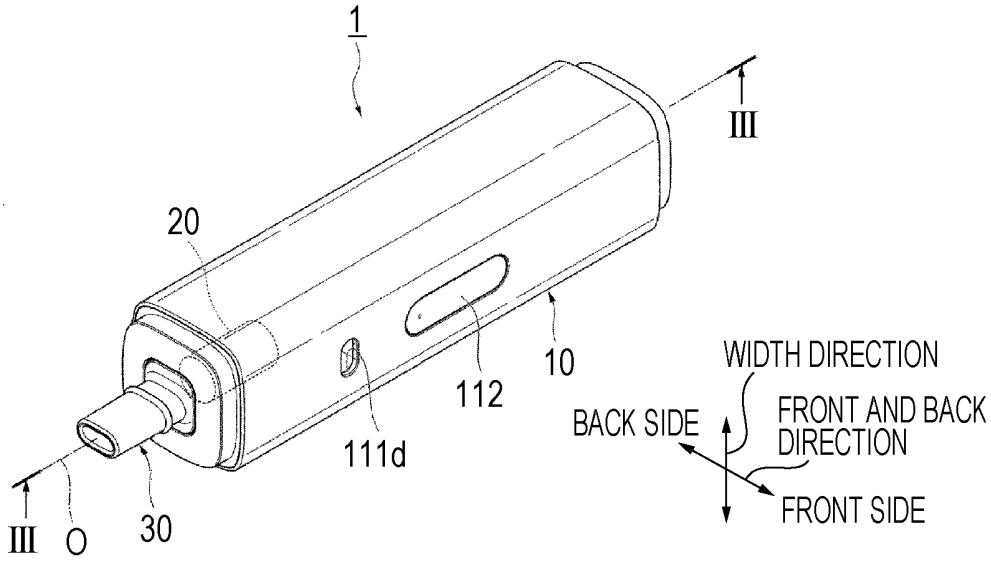



FIG. 5

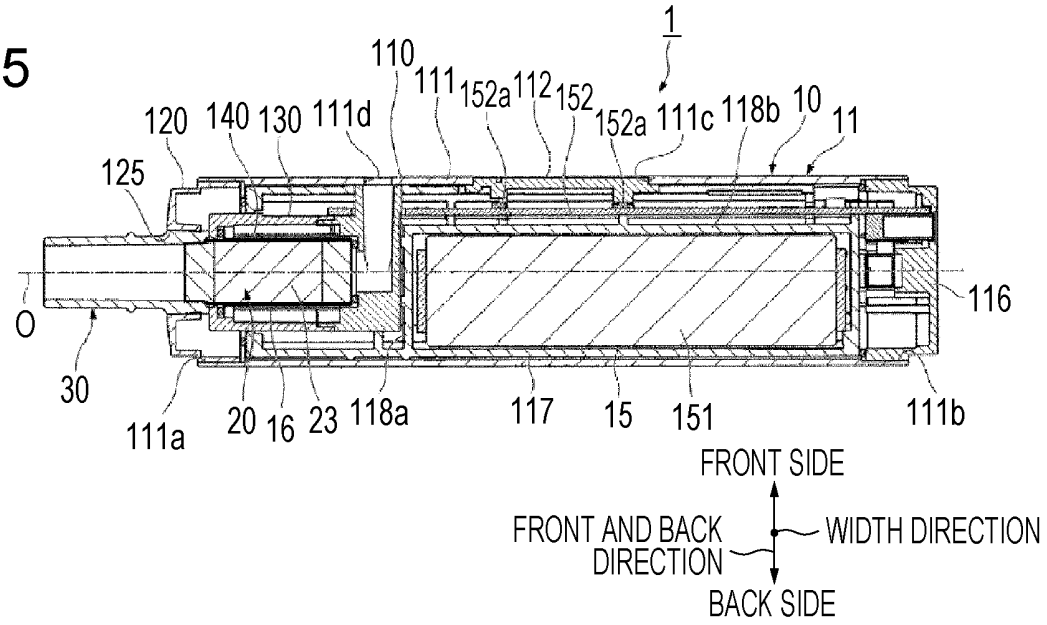
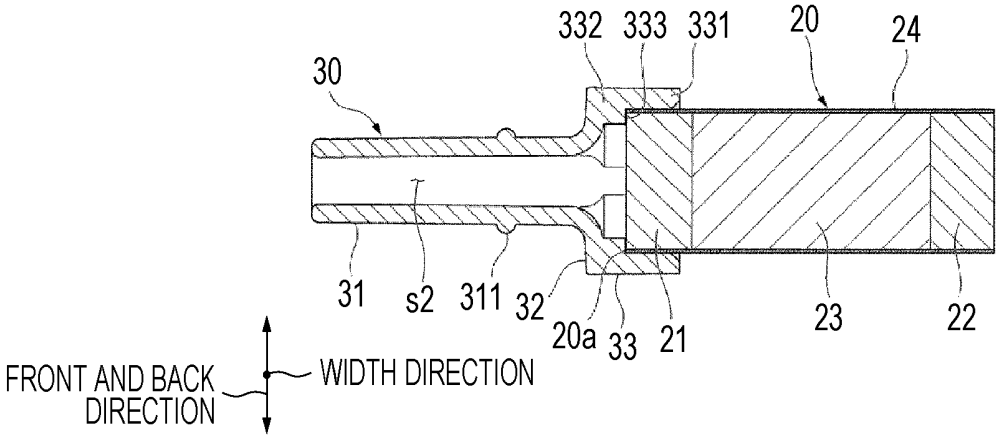



FIG. 6



# INTERNATIONAL SEARCH REPORT

International application No.
**PCT/JP2021/016269**

## A. CLASSIFICATION OF SUBJECT MATTER

***A24D 1/20***(2020.01)i; ***A24D 3/04***(2006.01)i; ***A24F 47/00***(2020.01)i; ***A24F 40/20***(2020.01)i
FI: A24D1/20; A24D3/04; A24F40/20; A24F47/00

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)

A24D1/20; A24D3/04; A24F47/00; A24F40/20

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

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

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

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| A | JP 2019-126290 A (NIPPON PAPER PAPYLIA CO., LTD.) 01 August 2019 (2019-08-01) paragraphs [0009]-[0037], fig. 1 | 1-7 |
| A | WO 2017/187628 A1 (JAPAN TOBACCO INC.) 02 November 2017 (2017-11-02) paragraphs [0047]-[0049], fig. 7 | 1-7 |
| A | CN 2545843 Y (HENGFENG PAPER INDUSTRY CO., LTD., MUDANJIANG) 23 April 2003 (2003-04-23) page 2, line 1 to page 3, line 11, fig. 1, 2 | 1-7 |
| A | JP 2019-524060 A (PHILIP MORRIS PRODUCTS S.A.) 05 September 2019 (2019-09-05) paragraph [0068], fig. 1 | 6-7 |
| A | US 5240012 A (PHILIP MORRIS INC.) 31 August 1993 (1993-08-31) column 9, line 46 to column 10, line 58, fig. 1-5 | 6-7 |

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

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"&" document member of the same patent family

| Date of the actual completion of the international search | Date of mailing of the international search report |
|---|---|
| **17 June 2021** | **06 July 2021** |
| Name and mailing address of the ISA/JP<br>**Japan Patent Office (ISA/JP)**<br>**3-4-3 Kasumigaseki, Chiyoda-ku, Tokyo 100-8915**<br>**Japan** | Authorized officer<br><br>Telephone No. |

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**INTERNATIONAL SEARCH REPORT**
**Information on patent family members**

International application No.
**PCT/JP2021/016269**

| Patent document cited in search report | Publication date (day/month/year) | Patent family member(s) | Publication date (day/month/year) |
|---|---|---|---|
| JP 2019-126290 A | 01 August 2019 | (Family: none) | |
| WO 2017/187628 A1 | 02 November 2017 | EP 3449739 A1<br>paragraphs [0047]-[0049], fig. 7<br>KR 10-2018-0135022 A<br>CN 109310143 A | |
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| US 5240012 A | 31 August 1993 | (Family: none) | |

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

## REFERENCES CITED IN THE DESCRIPTION

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### Patent documents cited in the description


- JP 2018528788 A **[0006]**


### Non-patent literature cited in the description


- Tobacco Dictionary. Tobacco Research Center, 31 March 2009 **[0163]**