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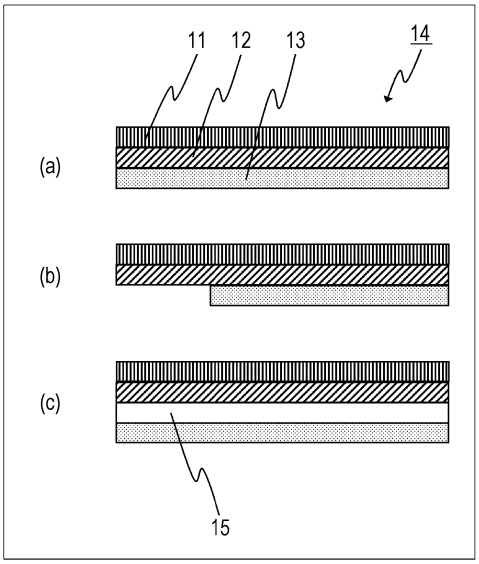
(54) TIP PAPER FOR TOBACCO PRODUCTS WITH CAPSULE FILTERS AND TOBACCO PRODUCTS

(57) Provided are: A tip paper for tobacco products with capsule filters, wherein it is possible to suppress stains, on the surface of the tip paper, derived from components in capsules included in the capsule filters, and to give a clear decoration to the surface; and tobacco products having said tip paper. A tip paper for tobacco products with capsule filters, the paper being composed of three or more layers and including at least a $CaCO_3$-containing layer, a paper layer, and an oil-resistant layer, wherein the $CaCO_3$-containing layer, the paper layer, and the oil-resistant layer are laminated on top of one another in this order, the $CaCO_3$-containing layer and the paper layer are arranged adjacent to each other, the content of the $CaCO_3$-containing layer is 2.0 gsm or more, and the $CaCO_3$-containing layer has a surface smoothness of 400 seconds or more and 3000 seconds or less.

FIG. 1



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Description

Technical Field

[0001] The present invention relates to a tip paper for tobacco products with capsule filters and a tobacco product.

Background Art

[0002] Attention has been recently focused on tobacco products composed of a tobacco rod portion including shredded tobacco, a mouthpiece portion including a filter, a tip paper wrapped around these members, and the like as cigarettes (paper-wrapped tobacco), which have been used for many years, or as alternatives to cigarettes. Such tobacco products have been used as, for example, tobacco flavor inhaler items for electric heating tobacco products, which use electric heating without combustion.

[0003] Common cigarettes (paper-wrapped tobacco) are composed of a tobacco rod, which is produced by shredding dry tobacco leaves to a width of about 1 mm, adding a flavoring agent, a humectant, and an adequate amount of moisture to the shreds, and wrapping the resulting mixture with a wrapper made primarily of paper into a cylindrical shape, and a mouthpiece rod, which is produced by wrapping fibers made of cellulose acetate or the like or pleated paper with a wrapper made of paper into a cylindrical shape, the tobacco rod and the mouthpiece rod being joined to each other with lining paper while the ends of the tobacco rod and the mouthpiece rod are abutted against each other. When a cigarette is used, smoking is commonly done by the user setting fire to the end of the tobacco rod with a lighter or the like and inhaling from the end of the mouthpiece. The front end of the tobacco rod, that is, burning end, burns at temperatures more than 800°C.

[0004] Common electric heating tobacco products are composed of a cylindrical tobacco flavor inhaler item for electric heating tobacco products, which is analogous to common cigarettes, and a heating device including a battery, a controller, a heater, and the like. Examples of the heater include an electric resistance heater and an IH heater. An example of the electric resistance heater is designed to come into contact with the non-combustion-heating-type tobacco flavor inhaler item such that the outer portion of the cylindrical non-combustion-heating-type tobacco flavor inhaler item can be heated. Another example is designed to come into contact with the non-combustion-heating-type tobacco flavor inhaler item such that an acicular or blade-like member is inserted into the tobacco-filled layer from the front end of the non-combustion-heating-type tobacco flavor inhaler item.

[0005] The tobacco rod portion included in a common cigarette or tobacco flavor inhaler item for electric heating tobacco products includes a flavor component. During use, the user can appreciate various flavors by inhaling the flavor component. There have been user needs for flavors that surpass the flavors produced by the flavor components included in such tobacco rod portion. One of the means for addressing the above needs is a capsule filter. A capsule filter is a filter that includes a capsule composed of a crushable shell and a flavor component encapsulated in the shell. During use, the user crushes the capsule to release the flavor component included in the capsule and appreciate a flavor that surpasses the flavor produced by the flavor component included in the tobacco rod portion. For example, Patent documents 1 to 3 disclose techniques related to tobacco products with capsule filters.

Citation List

Patent document

[0006]

Patent document 1: International Publication No. 2016/050688
Patent document 2: International Publication No. 2011/118001
Patent document 3: Japanese Unexamined Patent Application Publication No. 53-133697

Summary of Invention

Technical Problem

[0007] The component included in the above capsule is commonly a liquid including an oil. As a result of the shell of the capsule being crushed, the liquid seeps into the filter. The seeped liquid reaches the surface of the filter and disadvantageously spreads into a tip paper present on the surface of the filter. If the seepage occurs in the surface of the tip paper, discoloration of the tip paper degrades appearance. Furthermore, decorations printed on the surface of the tip paper, such as characters or figures, become unclear.

[0008] In order to address the above issues, an object of the present invention is to provide a tip paper for tobacco products with capsule filters which reduces the likelihood of a component included in the capsule included in the capsule filter seeping into the surface of the tip paper and which enables the surface to be clearly decorated and a tobacco product that includes the above-described tip paper.

Solution to Problem

[0009] The inventors of the present invention found that the above issues can be addressed by producing the tip paper by laminating a layer including a specific substance and having specific properties, a paper layer, and an oil-resistant layer on top of one another in this order and conceived the present invention.

[0010] Specifically, the summary of the present invention is as follows.

[1] A tip paper for tobacco products with capsule filters, the tip paper being composed of three or more layers, the tip paper including at least a $CaCO_3$-containing layer, a paper layer, and an oil-resistant layer,

wherein the $CaCO_3$-containing layer, the paper layer, and the oil-resistant layer are laminated on top of one another in this order,
wherein the $CaCO_3$-containing layer and the paper layer are arranged adjacent to each other,
wherein a content of the $CaCO_3$-containing layer is 2.0 gsm or more, and
wherein the $CaCO_3$-containing layer has a surface smoothness of 400 seconds or more and 3000 seconds or less.

[2] The tip paper for tobacco products with capsule filters described in [1], wherein the $CaCO_3$-containing layer has a linear decoration having a width of 0.5 mm or less, the linear decoration being formed on at least a part of a surface of the $CaCO_3$-containing layer, the surface being on a side opposite to a side on which the paper layer is arranged adjacent to the $CaCO_3$-containing layer.

[3] The tip paper for tobacco products with capsule filters described in [1] or [2], wherein a surface of the oil-resistant layer, the surface being on a side opposite to a side on which the paper layer is present, has a Kit value of 12.

[4] The tip paper for tobacco products with capsule filters described in any one of [1] to [3], wherein the $CaCO_3$-containing layer further includes kaolin.

[5] The tip paper for tobacco products with capsule filters described in any one of [1] to [4], wherein the $CaCO_3$-containing layer is a layer including particles containing $CaCO_3$, and wherein the particles have an average size of 0.1 μm or more and 20.0 μm or less.

[6] A rod-like tobacco product including a tobacco rod portion, a mouthpiece portion including a capsule filter, and a tip paper wrapped around the tobacco rod portion and the mouthpiece portion,
wherein the tip paper is the tip paper for tobacco products with capsule filters described in any one of [1] to [5].

[7] The tobacco product described in [6],

wherein the mouthpiece portion has a perforation formed therein, and
wherein the perforation is disposed in a region sandwiched between two planes, the two planes being a plane that passes through a point 15 mm from a center of a capsule included in the capsule filter toward a inhalation port of the tobacco product in a longitudinal direction of the tobacco product, the plane being perpendicular to the longitudinal direction, and a plane that passes through a point 15 mm from the center toward the tobacco rod portion in the longitudinal direction, the plane being perpendicular to the longitudinal direction.

[8] The tobacco product described in [6] or [7], the tobacco product being used for cigarettes.

[9] The tobacco product described in [6] or [7], the tobacco product being used for electric heating tobacco products.

[10] An electric heating tobacco product including an electric heating device, the electric heating device including a heater member, a battery unit serving as a power source for the heater member, and a control unit that controls the heater member, and the tobacco product described in [9] inserted therein so as to come into contact with the heater member.

Advantageous Effects of Invention

[0011] According to the present invention, a tip paper for tobacco products with capsule filters which reduces the likelihood of a component included in the capsule included in the capsule filter seeping into the surface of the tip paper and which enables the surface to be clearly decorated and a tobacco product that includes the above-described tip paper can be provided.

Brief Description of Drawings

[0012]

[Fig. 1] Fig. 1 is a schematic diagram illustrating a tip paper according to an embodiment of the present invention.
[Fig. 2] Fig. 2 is a schematic diagram illustrating a tobacco product according to an embodiment of the present invention.
[Fig. 3] Fig. 3 is a schematic diagram illustrating a tobacco product according to an embodiment of the present invention.
[Fig. 4] Fig. 4 is a schematic diagram illustrating a tobacco product according to an embodiment of the present invention.
[Fig. 5] Fig. 5 is a schematic diagram illustrating a tobacco product according to an embodiment of the present invention.
[Fig. 6] Fig. 6 includes diagrams for explaining the modes in which perforations are formed according to an embodiment of the present invention.
[Fig. 7] Fig. 7 is a diagram for explaining the position of the perforations formed in a tobacco product according to an embodiment of the present invention.
[Fig. 8] Fig. 8 is a diagram for explaining a glue-free zone formed in a tobacco product according to an embodiment of the present invention.
[Fig. 9] Fig. 9 is a schematic diagram illustrating an electric heating tobacco product according to an embodiment of the present invention.
[Fig. 10] Fig. 10 is a schematic diagram illustrating an electric heating tobacco product according to an embodiment of the present invention.
[Fig. 11] Fig. 11 includes diagrams (photographs substitute for drawings) illustrating the results of Test 1 conducted in Examples.
[Fig. 12] Fig. 12 includes diagrams (photographs substitute for drawings) illustrating the results of Test 2 conducted in Examples.

Description of Embodiments

[0013] Details of embodiments of the present invention are described below. Note that the following description is merely an example (typical example) of the embodiments of the present invention and the present invention is not limited by the contents thereof without departing from the summary thereof.

[0014] In the present specification, in the case where a range is expressed using "to" and values or physical properties described before and after "to", it is considered that the range includes the values described before and after "to".

[0015] In the present specification, the term "a plurality of" refers to "two or more" unless otherwise specified.

[0016] Note that, in the figures illustrated in the drawings, such as a schematic diagram, members are enlarged or reduced as needed for illustrative purposes; the sizes and proportions of the members are not actual one according to the embodiments of the present invention.

<Tip Paper for Tobacco Products With Capsule Filters>

[0017] A tip paper for tobacco products with capsule filters according to an embodiment of the present invention (also referred to simply as "tip paper for tobacco products with capsule filters" or "tip paper") is a tip paper for tobacco products with capsule filters which is composed of three or more layers and includes at least a $CaCO_3$-containing layer, a paper layer, and an oil-resistant layer.

[0018] The $CaCO_3$-containing layer, the paper layer, and the oil-resistant layer are laminated on top of one another in this order.

[0019] The $CaCO_3$-containing layer and the paper layer are arranged adjacent to each other.

[0020] The content of the $CaCO_3$-containing layer is 2.0 gsm or more.

[0021] The $CaCO_3$-containing layer has a surface smoothness of 400 seconds or more and 3000 seconds or less.

[0022] Fig. 1 illustrates examples of the tip paper according to the embodiment. The tip paper 14 illustrated in Fig. 1(a) includes a $CaCO_3$-containing layer 11, a paper layer 12, and an oil-resistant layer 13 that are laminated on top of one another in this order. The above layers have the same area. The areas of the layers constituting the tip paper 14 may be the same as one another as illustrated in Fig. 1(a) and are not necessarily the same as one another as illustrated in Fig. 1(b). In the tip paper 14 illustrated in Fig. 1(b), the $CaCO_3$-containing layer 11 and the paper layer 12 have the same area and the oil-resistant layer 13 has a smaller area than these layers. The types of the layers constituting the tip paper 14 are not limited. The tip paper 14 includes at least the $CaCO_3$-containing layer 11, the paper layer 12, and

the oil-resistant layer 13. The tip paper 14 may be composed only of the above layers as illustrated in Fig. 1(a). In another case, the tip paper 14 may include a layer other than any of the above layers (such a layer is also referred to as "other layer") as illustrated in Fig. 1(c). The tip paper 14 illustrated in Fig. 1(c) includes an adhesive layer interposed between the paper layer 12 and the oil-resistant layer 13. The tip paper 14 according to this embodiment is not limited to the tip papers illustrated in Fig. 1.

[0023] The $CaCO_3$-containing layer 11 may serve as an outermost layer. Alternatively, another layer may be laminated on the $CaCO_3$-containing layer 11. The oil-resistant layer 13 may serve as an outermost layer. Alternatively, another layer may be laminated on the oil-resistant layer 13.

[0024] A tobacco product produced by using the tip paper 14 according to this embodiment as a tip paper for a tobacco product as illustrated in Fig. 2, that is, specifically, a tobacco product such as a rod-like tobacco product including a tobacco rod portion 20, a mouthpiece portion 19 including a capsule filter 18, and a tip paper wrapped around the tobacco rod portion 20 and the mouthpiece portion 19, and performing wrapping with the $CaCO_3$-containing layer 11 facing outside is discussed below. Since the tip paper 14 included in the above tobacco product includes the oil-resistant layer 13 arranged closer to the inside than the $CaCO_3$-containing layer, even when an oil-containing liquid present inside a capsule included in the capsule filter seeps into the filter upon the shell of the capsule being crushed, the likelihood of the liquid seeping and spreading into the $CaCO_3$-containing layer 11 and the paper layer 12, which are present closer to the outside than the oil-resistant layer 13, can be reduced. Moreover, since the $CaCO_3$-containing layer 11 includes a specific material and has specific properties, clear decoration can be achieved. Furthermore, in the case where a lip release agent, varnish, or the like is applied onto the surface of the tip paper 14, since the tip paper includes the $CaCO_3$-containing layer 11, the tip paper limits the degradation of the functionality of the lip release agent, varnish, or the like compared with tip papers known in the related art.

[0025] Note that the above-described structure of the tobacco product is merely an example; any tobacco product with capsule filters can produce the above advantageous effects.

[0026] The structure, properties, etc. of the tip paper 14 that enables the above advantageous effects to be produced are described below in detail.

[$CaCO_3$-Containing Layer]

[0027] The material constituting the $CaCO_3$-containing layer 11, which is arranged adjacent to the paper layer 12, is not limited and may be any material that contains $CaCO_3$ in order to enhance the clarity of the surface decoration. Examples of pigment components other than $CaCO_3$ which can be included in the above material include pigments such as kaolin, talc, and $Al(OH)_3$ (aluminum hydroxide). In order to enhance the clarity of the surface decoration, the material preferably contains at least one component selected from kaolin, talc, and $Al(OH)_3$ and particularly preferably contains kaolin. Only one of the above materials may be used alone. Two or more of the above materials may be used in any combination at any ratio.

[0028] The $CaCO_3$ content in the $CaCO_3$-containing layer 11 is not limited. In order to enhance the clarity of the surface decoration, the $CaCO_3$ content per unit surface area of the $CaCO_3$-containing layer 11 is preferably 2.0 gsm or more, is more preferably 3.0 gsm or more, is further preferably 4.0 gsm or more, and is particularly preferably 5.0 gsm or more. The above $CaCO_3$ content is commonly 10.0 gsm or less, is preferably 8.0 gsm or less, is more preferably 7.0 gsm or less, and is further preferably 6.0 gsm or less.

[0029] The above content can be measured by a publicly known method. In another case, the above content may be determined by measuring the surface area and weight of the $CaCO_3$-containing layer 11 and calculating weight per unit surface area.

[0030] In the case where the $CaCO_3$-containing layer 11 contains $CaCO_3$ and kaolin, the weight ratio between the $CaCO_3$ and kaolin included in the $CaCO_3$-containing layer 11 ($CaCO_3$:kaolin) is not limited. In order to enhance the clarity of the surface decoration, the above weight ratio is preferably 3:7 to 7:3, is more preferably 4:6 to 7:3, and is further preferably 5:5 to 6:4.

[0031] As described above, the shape of the $CaCO_3$-containing layer 11 is not limited. The shape of the $CaCO_3$-containing layer 11 may be the shape of a $CaCO_3$-containing layer that has not been cut into a shape in which the $CaCO_3$-containing layer is used as a component of the tobacco product (e.g., rectangular shape) and may be the shape of a $CaCO_3$-containing layer that has been cut into the shape, that is, a quadrangular shape, such as a rectangular shape or a square shape. Cutting is commonly done not individually for each of the layers constituting the tip paper, but collectively after the preparation of the tip paper while the layers are laminated on top of one another.

[0032] In the case where the $CaCO_3$-containing layer 11 has a quadrangular shape into which the $CaCO_3$-containing layer 11 is formed by cutting, the size of the $CaCO_3$-containing layer 11 can be set appropriately depending on the tobacco product. The length of a side of the $CaCO_3$-containing layer 11 is commonly 10 mm or more, is preferably 12 mm or more, is more preferably 15 mm or more, and is further preferably 19 mm or more. The above length is commonly 100 mm or less, is preferably 80 mm or less, is more preferably 65 mm or less, and is further preferably 50 mm or less.

[0033] The conditions for the shape of the $CaCO_3$-containing layer 11 and the length of a side of the $CaCO_3$-containing layer 11 having a quadrangular shape apply also to the other layers.

[0034] The thickness of the $CaCO_3$-containing layer 11 is not limited. In order to enhance the clarity of the surface decoration, the above thickness may be 0.15 μm or more and 40 μm or less, may be 0.3 μm or more and 30 μm or less, and may be 0.5 μm or more and 20 μm or less.

[0035] The thickness of the $CaCO_3$-containing layer 11 is preferably uniform in the surface direction of the paper layer but may deviate within the range in which the advantageous effects of the present invention are produced. For example, the above deviation may be less than 20% and is preferably less than 10%. In the case where the thickness of the $CaCO_3$-containing layer 11 deviates, the above thickness is the value calculated as an overall average thickness.

[0036] The $CaCO_3$ included in the $CaCO_3$-containing layer 11 is preferably present in the form of particles containing $CaCO_3$ in order to enhance the clarity of the surface decoration. The above particles are preferably composed of, in addition to $CaCO_3$, a pigment such as kaolin, talc, or $Al(OH)_3$ (aluminum hydroxide).

[0037] The average size of the above particles is not limited. In consideration of manufacturability, such as a reduction in the rising of powder particles during production, the above average particle size is commonly 0.1 μm or more, may be 0.5 μm or more, may be 1 μm or more, and may be 3 μm or more. In order to enhance the clarity of the surface decoration, the above average particle size is commonly 20 μm or less, is preferably 10 μm or less, is more preferably 8 μm or less, and is further preferably 5 μm or less.

[0038] The surface smoothness of a surface of the $CaCO_3$-containing layer 11 which is located on a side opposite to the side on which the paper layer is present is 400 seconds or more and 3000 seconds or less in order to enhance the clarity of the surface decoration and is not limited. The above surface smoothness is commonly 500 seconds or more, is preferably 600 seconds or more, and is more preferably 700 seconds or more. The above surface smoothness is commonly 2500 seconds or less and is preferably 2000 seconds or less. The surface smoothness of the surface of the $CaCO_3$-containing layer 11 which is located on a side opposite to the side on which the paper layer is present can be enhanced by, for example, increasing the amount of the pigments, such as $CaCO_3$.

[0039] The above surface smoothness can be measured by a Bekk method. A Bekk smoothness test is a useful test for determining the smoothness of a sample. Smoothness or roughness is substantially one of the surface properties of paper, carton paper, paperboard, coated sheets, and the like. The qualities of the surface structure greatly affect printability and various types of coatings.

[0040] The glossiness of the surface of the $CaCO_3$-containing layer 11 which is located on a side opposite to the side on which the paper layer is present is not limited. In order to achieve a good appearance, the glossiness of the above surface which is determined in accordance with ISO 8254-1:2009 at an incidence angle and light-receiving angle of 60° is commonly more than 10%, is preferably more than 15%, and is more preferably more than 20%. The above glossiness is commonly less than 35% and is preferably less than 30%. The glossiness of the $CaCO_3$-containing layer 11 can be increased by, for example, increasing the content of the pigments, such as $CaCO_3$.

[0041] The $CaCO_3$-containing layer 11 may be decorated. In the case where the $CaCO_3$-containing layer 11 is decorated, it is preferable that a linear decoration having a width of 0.5 mm or less be formed on at least a part of one of the surfaces of the $CaCO_3$-containing layer 11 or, specifically, on at least a part of a surface of the $CaCO_3$-containing layer 11 which is located on a side opposite to the side on which the paper layer is arranged adjacent to the $CaCO_3$-containing layer 11. In the case where a tobacco product with capsule filters includes a publicly known tip paper, ink or the like used for decoration may fail to uniformly adhere to the tip paper or may spread on the tip paper. This makes it difficult to form decorations such as fine characters and figures, that is, in particular, characters and figures having a linear shape with a width of 0.5 mm or less. In contrast, since the tip paper according to this embodiment includes the above-described $CaCO_3$-containing layer 11, decorations such as characters and figures having a linear shape with a width of 0.5 mm or less can be readily formed. The type of the decorations is not limited and may be set appropriately in accordance with the intended application.

[0042] The materials used for the decoration are not limited; publicly known coloring materials, such as an ink, can be used. The method for performing the decoration is also not limited. A coloring material, such as an ink, can be printed on the $CaCO_3$-containing layer 11 by gravure printing, ink-jet printing, or the like.

[0043] Note that, in the present specification, the above decoration is not considered as a part of the $CaCO_3$-containing layer 11 or as a layer.

[Paper Layer]

[0044] The paper layer 12 is not limited; publicly known paper materials used as a tip paper for common tobacco products can be used. Examples thereof include paper including pulp as a principal component. The paper may be paper made of a wood pulp, such as a conifer wood pulp or a broadleaf wood pulp, or paper made of pulp mixture further including nonwood pulp commonly used for producing wrapping paper for tobacco items, such as a flax pulp, a cannabis pulp, a sisal hemp pulp, or an esparto pulp. The above pulp materials may be used alone. Alternatively, a plurality of

types of pulp materials may be used in combination at any ratio.

[0045] Examples of the pulp materials that can be used include a chemical pulp, a ground pulp, a chemiground pulp, and a thermomechanical pulp, which are produced by kraft cooking, acidic, neutral, or alkaline sulfite cooking, sodium salt cooking, or the like.

[0046] The shape of the paper layer 12 is not limited. The shape of the paper layer 12 may be the shape of the paper layer 12 that has not been cut into a shape in which the paper layer 12 is used as a component of the tobacco product (e.g., rectangular shape) and may be the shape of the paper layer 12 that has been cut into the shape, that is, a quadrangular shape, such as a rectangular shape or a square shape.

[0047] The thickness of the paper layer 12 is not limited. In consideration of the mounting form, the thickness of the paper layer 12 may be, for example, 20 μm or more and 120 μm or less, may be 30 μm or more and 110 μm or less, may be 30 μm or more and 100 μm or less, may be 30 μm or more and 80 μm or less, and may be 40 μm or more and 60 μm or less.

[0048] The basis weight of the paper layer 12 may be, but not limited to, for example, 10 gsm or more and 100 gsm or less, may be 20 gsm or more and 100 gsm or less, may be 30 gsm or more and 90 gsm or less, may be 30 gsm or more and 70 gsm or less, and may be 30 gsm or more and 50 gsm or less.

[0049] The air permeability of the paper layer 12 is commonly, but not limited to, 0 CORESTA unit or more and 400 CORESTA unit or less, is preferably 3 CORESTA unit or more and 100 CORESTA unit or less, and is more preferably 5 CORESTA unit or more and 10 CORESTA unit or less. The term "air permeability" used in the present specification refers to the flow rate of air per minute per square centimeter which permeates (passes through) paper from the surface ($2\ cm^2$) at a constant pressure of 1 kPa.

[0050] The paper layer 12 may contain a filler in addition to the above pulp. Examples thereof include metal carbonates, such as calcium carbonate ($CaCO_3$) and magnesium carbonate, metal oxides, such as titanium oxide, titanium dioxide, and aluminum oxide, metal sulfates, such as barium sulfate and calcium sulfate, metal sulfides, such as zinc sulfide, aluminum hydroxide ($Al(OH)_3$), quartz, kaolin, talc, diatomaceous earth, and gypsum. In order to enhance brightness and opacity and increase heating rate, it is particularly preferable that paper layer 12 include one or more selected from $CaCO_3$, kaolin, talc, and $Al(OH)_3$. The above fillers may be used alone or in combination of two or more.

[0051] The content of the filler in the paper layer 12 is commonly, but not limited to, 1% by weight or more and 50% by weight or less, is preferably 5% by weight or more and 40% by weight or less, and is more preferably 10% by weight or more and 30% by weight or less. If the above content is lower than the lower limit of the above range, the heat resistance of the tip paper 14 becomes degraded. If the above content is higher than the upper limit, the strength of the tip paper 14 becomes reduced significantly and, consequently, machinability may become degraded.

[0052] Various agents may be added to the paper layer 12 in addition to the above pulp and the above filler. For example, the paper layer 12 may include a water resistance improver in order to enhance. Examples of the water resistance improver include a wet strength agent (WS agent) and a sizing agent. Examples of the wet strength agent include a urea formaldehyde resin, a melamine formaldehyde resin, and polyamide epichlorohydrin (PAE). Examples of the sizing agent include a rosin soap, an alkyl ketene dimer (AKD), alkenylsuccinic anhydride (ASA), and highly saponified polyvinyl alcohol having a degree of saponification of 90% or more.

[0053] A strength agent may be added as an agent. Examples thereof include polyacrylamide, a cationic starch, an oxidized starch, CMC, a polyamide epichlorohydrin resin, and polyvinyl alcohol. In particular, it is known that the use of a trace amount of oxidized starch enhances air permeability (Japanese Unexamined Patent Application Publication No. 2017-218699).

[0054] The content of the agent in the paper layer 12 is commonly, but not limited to, 0.01% by weight or more and 5% by weight or less, is preferably 0.05% by weight or more and 1% by weight or less, and is more preferably 0.1% by weight or more and 0.5% by weight or less. If the above content is lower than the lower limit of the above range, the likelihood of the wrapping paper being burnt is increased. If the above content is higher than the upper limit, the strength of the wrapping paper becomes reduced significantly and, consequently, machinability may become degraded.

[0055] A common paper-wrapped tobacco includes, for example, an alkali metal salt of citric acid as a common combustion regulator (e.g., combustion improver), which may affect the spontaneous combustion velocity of the wrapping paper. In contrast, the wrapping paper according to an embodiment of the present invention does not need to include a combustion regulator because it is not necessary to burn the wrapping paper.

[Oil-Resistant Layer]

[0056] The oil-resistant layer 13 is not limited and may be any layer that includes an oil-resistant material. Examples of the oil-resistant material include organic materials, such as cellulose hydrate (also referred to as "cellophane"), polylactic acid, and starch, and metal materials that can be easily formed into shape, such as aluminum. The oil-resistant layer 13 may be a layer that includes any of the above materials, a film composed of any of the above organic materials, a metal foil (e.g., aluminum foil), or the like. The oil-resistant layer 13 is preferably composed only of the oil-resistant

material in order to achieve sufficiently high oil resistance. Only one of the above materials may be used alone. Alternatively, two or more of the above materials may be used in any combination at any ratio. Since cellulose hydrate is advantageous in that it is impermeable to liquids but permeable to water vapor, cellulose hydrate is suitable for microclimate present in and on the filter. For example, even under very unfavorable ambient conditions, wetness as a result of condensation of water vapor is not formed on the oil-resistant layer 13. In the case where the oil-resistant layer is composed only of the oil-resistant material, the oil-resistant layer may include impurities in an amount with which the advantageous effects of the present invention can be produced. The content of the oil-resistant material in the oil-resistant layer 13 is commonly 99% by weight or more, is preferably 99.9% by weight or more, and is more preferably 99.99% by weight or more.

[0057] The oil-resistant layer 13 may include a material other than the above oil-resistant material in an amount with which the advantageous effects of the present invention can be produced.

[0058] Note that, the term "oil" used in the present specification refers to a hydrophobic substance.

[0059] The thickness of the oil-resistant layer 13 is not limited. In order to achieve sufficiently high oil resistance and ease of production, the above thickness is commonly 0.1 μm or more and 50 μm or less, may be 0.5 μm or more and 30 μm or less, and may be 1.0 μm or more and 10 μm or less.

[0060] The thickness of the oil-resistant layer 13 is preferably uniform in the surface direction of the paper layer but may deviate within the range in which the advantageous effects of the present invention are produced. For example, the above deviation may be less than 20% and is preferably less than 10%. In the case where the thickness of the oil-resistant layer 13 deviates, the above thickness is the value calculated as an overall average thickness.

[0061] The basis weight of the oil-resistant layer 13 may be 0.1 gsm or more and 3 gsm or less, may be 0.1 gsm or more and 2.5 gsm or less, may be 0.1 gsm or more and 2 gsm or less, may be 0.1 gsm or more and 1.5 gsm or less, and may be 0.1 gsm or more and 1 gsm or less in order to enhance the clarity of the surface decoration. The oil-resistant layer may be printed on the surface of the above paper layer. The oil-resistant layer can define a uniform or uneven pattern. The basis weight of the oil-resistant layer 11 can be adjusted by, for example, changing the specific gravity of the material used.

[0062] The Kit value of a surface of the oil-resistant layer 13 which is present on a side opposite to the side on which the paper layer 12 is present is commonly, but not limited to, 10 or more, is preferably 11 or more, and is preferably 12. The Kit value is a parameter with a maximum value of 12. The Kit value of the oil-resistant layer 11 can be increased by, for example, increasing the content of the oil-resistant material.

[0063] The above Kit value can be measured in accordance with JAPAN TAPPI paper pulp testing method No. 41:2000 "Paper and Board-Oil Repellency Testing Method-Kit Method".

[Other Layer]

[0064] The tip paper 14 may include a layer other than the $CaCO_3$-containing layer 11, the paper layer 12, or the oil-resistant layer 13 which are described above (such a layer is also referred to as "other layer"). For example, as illustrated in Fig. 1(c), an adhesive layer 15 may be interposed between the paper layer 12 and the oil-resistant layer 13. The oil-resistant layer 13 may be laminated directly on another layer, such as the paper layer 12, by performing a treatment, such as fusion. In the case where such lamination cannot be performed, the above adhesive layer 15 can be formed to allow the oil-resistant layer 13 to be laminated indirectly on the other layer, such as the paper layer 12. The material constituting the adhesive layer 15 is not limited and may be designed appropriately in accordance with the intended application.

[0065] As another layer, a lip release agent can be applied to the $CaCO_3$-containing layer 11-side outermost layer in order to reduce the likelihood of the skin of the user's lips being peeled upon the tip paper adhering to the user's lips during use. The components of the lip release agent are not limited. Examples thereof include nitro cellulose and ethyl cellulose.

[0066] The overall thickness of the tip paper 14 is commonly, but not limited to, 1 μm or more, is preferably 1.5 μm or more, is more preferably 2 μm or more, is further preferably 2.5 μm or more, and is particularly preferably 3 μm or more. The above overall thickness is commonly 10 μm or less, is preferably 9 μm or less, is more preferably 8 μm or less, is further preferably 7 μm or less, and is particularly preferably 6 μm or less.

[0067] The overall basis weight of the tip paper 14 is commonly, but not limited to, 10 gsm or more, is preferably 15 gsm or more, is more preferably 20 gsm or more, is further preferably 25 gsm or more, and is particularly preferably 30 gsm or more. The above overall basis weight is commonly 100 gsm or less, is preferably 90 gsm or less, is more preferably 80 gsm or less, is further preferably 70 gsm or less, and is particularly preferably 60 gsm or less.

[0068] The total thickness of the $CaCO_3$-containing layer 11 and the paper layer 12 is commonly, but not limited to, 2 μm or more, is preferably 30 μm or more, and is more preferably 4 μm or more. The above total thickness is commonly 10 μm or less, is preferably 7.5 μm or less, and is more preferably 5 μm or less.

[0069] The total paper density of the $CaCO_3$-containing layer 11 and the paper layer 12 is commonly, but not limited

to, 1.1 h/dn^3 or more and is preferably 1.15 h/dn^3 or more. The above total paper density is commonly 1.3 h/dn^3 or less and is preferably 1.25 h/dn^3 or less.

[0070] It is preferable that any of the layers constituting the tip paper 14 do not contain titanium dioxide (TiO_2). Since titanium dioxide is considered to adversely affect health in some countries, the risk can be prevented.

[0071] The opacity of the tip paper 14 which is measured on the $CaCO_3$-containing layer-side is not limited. In order to achieve a good appearance, the above opacity is commonly 65% or more, is preferably 70% or more, is more preferably 75% or more, and is further preferably 80% or more. The above opacity is commonly 100% or less, is preferably 97% or less, is more preferably 94% or less, and is further preferably 90% or less. The above opacity can be increased by, for example, increasing the content of pigments, such as $CaCO_3$, in the $CaCO_3$-containing layer 11.

[0072] The brightness of the tip paper 14 which is measured on the $CaCO_3$-containing layer-side is not limited. In order to achieve a good appearance, the above brightness is commonly 65% or more, is preferably 70% or more, is more preferably 75% or more, and is further preferably 80% or more. The above brightness is commonly 100% or less, is preferably 97% or less, is more preferably 94% or less, and is further preferably 90% or less. The above opacity can be increased by, for example, increasing the content of pigments, such as $CaCO_3$, in the $CaCO_3$-containing layer 11.

[0073] The above opacity and brightness are values measured in accordance with ISO 2470 and ISO 2471, respectively, with a brightness-opacity measuring machine (e.g., produced by Murakami Color Research Laboratory Co., Ltd., Model No.: WMS-1). Note that the above opacity is a value calculated using the following computational expression: Single-sheet luminous reflectance factor (R0)/Intrinsic luminous reflectance factor ($R\infty$) $\times$ 100(%). In the above computational expression, the intrinsic luminous reflectance factor ($R\infty$) is the intrinsic reflectance factor of brightness which is measured with a predetermined reflectometer and a light source under spectral conditions in which the effective wavelength is 457 nm and the half-width is 44 nm.

[0074] The tensile strength of the tip paper is not limited. In order to achieve sufficient mechanical properties, the tensile strength of the tip paper which is measured when the width of the tip paper is 15 mm is commonly 15 N/15 mm or more, is preferably 20 N/15 mm or more, is more preferably 25 N/15 mm or more, and is further preferably 30 N/15 mm or more. The above tensile strength is commonly 100 N/15 mm or less, is preferably 80 N/15 mm or less, is more preferably 70 N/15 mm or less, and is further preferably 60 N/15 mm or less.

[0075] The elongation of the tip paper is not limited. In order to achieve sufficient mechanical properties, the elongation of the tip paper which is measured when the width of the tip paper is 15 mm is commonly 0.5% or more, is preferably 1% or more, is more preferably 1.5% or more, and is further preferably 2% or more. The above elongation is commonly 10% or less, is preferably 8.5% or less, is more preferably 6.5% or less, and is further preferably 5% or less.

[0076] The above tensile strength and elongation can be measured in accordance with JIS P 8113.

[Method for Producing Tip Paper]

[0077] The method for producing the tip paper 14 is not limited and may be any public known method that enables the $CaCO_3$-containing layer 11, the paper layer 12, the oil-resistant layer 13, and the other optional layers such as the adhesive layer 15, which are described above, to be laminated on top of one another such that the $CaCO_3$-containing layer 11, the paper layer 12, and the oil-resistant layer 13 are arranged in this order and the $CaCO_3$-containing layer 11 and the paper layer 12 are arranged adjacent to each other. As an example of the method for producing the tip paper 14, a method for producing the tip paper 14 illustrated in Fig. 1(c), which is constituted by a $CaCO_3$-containing layer 11, a paper layer 12, an adhesive layer 15, and an oil-resistant layer 13, is described below.

(Lamination of Paper Layer and $CaCO_3$-Containing Layer)

[0078] First, a paper layer 12 is prepared (paper layer preparation step). Then, a solution that contains at least $CaCO_3$ and a solution that contains other optional components that can be included in the $CaCO_3$-containing layer and a solvent are prepared (CaCOs-containing solution preparation step). These solutions are applied to the paper layer 12 prepared in the paper layer preparation step. The resulting coating is dried to cause a $CaCO_3$-containing layer 11 to be laminated on the paper layer 12. Hereby, a laminated body is formed (CaCOs-containing layer formation step). The above solvent is not limited and may be any solvent capable of dissolving various raw materials that may be used to prepare the solution.

[0079] The temperature at which the $CaCO_3$-containing solution is dried is commonly more than 100°C, is preferably more than 140°C, is more preferably more than 150°C, and is further preferably more than 170°C. The above temperature is commonly less than 300°C, is preferably less than 250°C, and is more preferably less than 200°C.

[0080] The drying of the $CaCO_3$-containing solution may be performed while pressure is applied using, for example, a pressing machine including a cylinder. This removes the moisture included in the paper layer.

[0081] A calendering treatment may be performed using a calender roller or the like as the above drying or in addition to the above drying as a treatment of the laminated body including the paper layer and the $CaCO_3$-containing layer which is finally obtained.

(Lamination of Paper Layer, Adhesive Layer, and Oil-Resistant Layer)

[0082] A solution containing the components that may be included in the adhesive layer and a solvent is prepared (adhesive layer material-containing solution preparation step). Subsequent to or at the same time as the above step, a solution containing the components constituting the oil-resistant layer and a solvent is prepared (oil-resistant layer material-containing solution preparation step), and a film is prepared using the solution by an appropriate method (oil-resistant film preparation step). Then, the laminated body prepared in the $CaCO_3$-containing layer formation step above is prepared. The adhesive layer material-containing solution is applied to a surface of the paper layer 12 which is on a side opposite to the side on which the $CaCO_3$-containing layer 11 is present. The resulting coating is dried as needed to cause an adhesive layer 15 to be laminated on the paper layer 12. Hereby, a laminated body is formed (adhesive layer formation step). Before the adhesive layer 15 has been completely dried, before the drying of the adhesive layer 15 is started, or after the adhesive layer 15 has been completely dried and then again melted by heating or the like, the adhesive layer 15 is brought into contact with the above oil-resistant film such that an oil-resistant layer 13 is laminated on the adhesive layer 15. Hereby, a final laminated body (tip paper 14) is formed (oil-resistant layer lamination step). Alternatively, the oil-resistant layer 13 may be laminated by applying the raw materials of the oil-resistant layer 13 onto the surface of the layer on which the oil-resistant layer 13 is to be laminated, that is, specifically, by applying the raw materials onto the above surface by a printing method, such as gravure printing, and drying the resulting coating.

[0083] The adhesive layer is not necessarily interposed between the oil-resistant layer and the paper layer in the case where the oil-resistant layer can be bonded directly to the paper layer when the oil-resistant layer material-containing solution is dried. In such a case, the laminated body illustrated in Fig. 1(a) is formed.

<Tobacco Product>

[0084] A tobacco product according to another embodiment of the present invention (also referred to simply as "tobacco product") is a rod-like tobacco product including a tobacco rod portion, a mouthpiece portion including a capsule filter, and a tip paper wrapped around the tobacco rod portion and the mouthpiece portion.

[0085] The tip paper is the above-described tip paper for tobacco products with capsule filters.

[0086] In this embodiment, tip paper is wrapped around the tobacco rod portion, etc. such that the $CaCO_3$-containing layer faces outward and the oil-resistant layer faces inward.

[0087] Fig. 2 illustrates an example of the tobacco product according to the embodiment. The tobacco product 10 illustrated in Fig. 2 is a rod-like tobacco product that includes a tobacco rod portion 20, a capsule filter 18 (mouthpiece portion 19) including a filter 17 and a capsule 16, and a tip paper 14 wrapped around the tobacco rod portion 20 and the mouthpiece portion 19. The tip paper 14 is the above-described tip paper for tobacco products with capsule filters. Note that, in the present specification, the mouthpiece portion 19 is a portion that includes at least the capsule filter 18, the capsule filter 18 is a portion that includes the capsule 16 and the filter 17, and the filter 17 is a member that includes at least a filter element. Thus, since the mouthpiece portion 19 illustrated in Fig. 2 is composed only of the capsule filter 18, the object serving as the capsule filter 18 and the object serving as the mouthpiece portion 19 are the same.

[0088] Fig. 2 above illustrates a structure that includes a tip paper 14 in which the areas of the layers constituting the tip paper 14 are all the same as illustrated in Fig. 1(a). In the case where the oil-resistant layer 13 is made smaller than the $CaCO_3$-containing layer 11 or paper layer 12 as illustrated in Fig. 1(b), the tobacco product 10 illustrated in Fig. 3 is formed. In the tobacco product 10 illustrated in Fig. 3, the mouthpiece portion 19 illustrated in Fig. 2 is wrapped with the oil-resistant layer 13.

[0089] Fig. 4 illustrates another example of the tobacco product according to the embodiment. In the tobacco product 10 illustrated in Fig. 4, the mouthpiece portion 19 includes two filters 17 and a capsule 16 interposed therebetween. In this case, as in the structure illustrated in Fig. 2, the mouthpiece portion 19 is composed only of the capsule filter 18 and, therefore, the object serving as the capsule filter 18 and the object serving as the mouthpiece portion 19 are the same.

[0090] Fig. 5 illustrates another example of the tobacco product according to the embodiment. In the tobacco product 10 illustrated in Fig. 5, the mouthpiece portion 19 includes a filter 17 encapsulating a capsule 16 and a cooler 21. As described below, the cooler is also a component of the mouthpiece portion.

[0091] The tobacco product 10 according to this embodiment is not limited to the tobacco products illustrated in Figs. 2 and 3.

[0092] The method for preparing the tobacco product 10 is described below. The process for preparing the tobacco product 10 is not limited. For example, the tobacco product 10 illustrated in Fig. 1 may be produced by preparing a tip paper 14 that includes a $CaCO_3$-containing layer 11, a paper layer 12, and an oil-resistant layer 13 that are laminated on top of one another and wrapping a tobacco rod portion 20 and a mouthpiece portion 19 with the tip paper 14. The tobacco product 10 may also be produced by wrapping a tobacco rod portion 20 and a mouthpiece portion 19 with an oil-resistant layer and then laminating a paper layer 12 and a $CaCO_3$-containing layer 11 on the oil-resistant layer.

[0093] Details of the structure, properties, etc. of the tobacco product 10 are described below.

[0094] The surface of the tip paper 14 wrapped about the tobacco rod portion 20 and the mouthpiece portion 19 may be, but is not necessarily, coated. The type of the coating material used is not limited. Examples thereof include a material capable of imparting an additional function, such as the lip release agent described above.

[0095] The rod-like tobacco product 10 preferably has a pillar-like shape that is a shape having an aspect ratio of 1 or more, the aspect ratio being defined as described below.

Aspect ratio = h/w

[0096] where, as illustrated in Figs. 2 and 3, w represents the width of the bottom of the pillar-shaped body (in the present specification, the width of the tobacco rod portion-side bottom), and h represents the height. It is preferable that $h \geq w$. In the present specification, the longitudinal direction is defined as the direction represented by h. The shape of the bottom may be, but not limited to, a polygonal shape, a polygonal shape having rounded corners, a circular shape, an oval shape, or the like. When the bottom has a circular shape, the width w is the diameter of the circle. When the bottom has an oval shape, the width w is the major-axis length of the oval. When the bottom has a polygonal shape or a polygonal shape having rounded corners, the width w is the diameter of the circle circumscribing the polygon or the major-axis length of the oval circumscribing the polygon.

[0097] The length h of the tobacco product 10 in the longitudinal direction is not limited. The length h is, for example, commonly 40 mm or more, is preferably 45 mm or more, and is more preferably 50 mm or more. The length h is commonly 100 mm or less, is preferably 90 mm or less, and is more preferably 85 mm or less.

[0098] The width w of the bottom of the pillar-shaped body of the tobacco product 10 is not limited. The width w is, for example, commonly 5 mm or more and is preferably 5.5 mm or more. The width w is commonly 10 mm or less, is preferably 9 mm or less, and is more preferably 8 mm or less.

[0099] The airflow resistance of the tobacco product 10 in the longitudinal direction is not limited. In consideration of ease of smoking, the above airflow resistance is commonly $60H_2O$ or more, is preferably 70 mmH_2O or more, and is more preferably 80 mmH_2O or more. The above airflow resistance is commonly 130 mmH_2O or less, is preferably 120 mmH_2O or less, and is more preferably 110 mmH_2O or less.

[0100] In the present specification, the term "airflow resistance" refers to the pressure difference PD (mmH_2O) that occurs across the tobacco product when suction is performed at a flow rate of 17.5 cm^3/sec.

[Tobacco Rod portion]

[0101] The structure of the tobacco rod portion 20 is not limited and may be any publicly known structure. The tobacco rod portion 20 commonly includes a tobacco filler and a wrapping paper with which the tobacco filler is wrapped.

[0102] The tobacco rod portion 20, which includes a tobacco filler and a wrapping paper with which the tobacco filler is wrapped, preferably has a pillar-like shape. In this case, the aspect ratio that is the ratio of the height of the tobacco rod portion 20 in the longitudinal direction to the width of the bottom of the tobacco rod portion 20 is preferably 1 or more.

[0103] The shape of the bottom may be, but not limited to, a polygonal shape, a polygonal shape having rounded corners, a circular shape, or an oval shape. When the bottom has a circular shape, the above width is the diameter of the circle. When the bottom has an oval shape, the width is the major-axis length of the oval. When the bottom has a polygonal shape or a polygonal shape having rounded corners, the width is the diameter of the circle circumscribing the polygon or the major-axis length of the oval circumscribing the polygon. The height of the tobacco filler constituting the tobacco rod portion 20 is preferably about 10 to 70 mm. The width of the tobacco filler is preferably about 4 to 9 mm.

[0104] In the case where the tobacco rod portion 20 is used for electronic heating tobacco products, the tobacco rod portion 20 may have a fitting portion to which, for example, a heater member used for heating the tobacco product 10 can be fit.

(Tobacco Filler)

(1) First Tobacco Filler

[0105] First, a first tobacco filler (also referred to simply as "first filled portion") is described. The material constituting the shredded tobacco included in the first filler is not limited; publicly known materials, such as lamina and midrib, can be used. The first filler may be produced by pulverizing dry tobacco leaves into particles having an average size of 20 μm or more and 200 μm or less, homogenizing the pulverized tobacco particles, forming the homogenized tobacco particles into a sheet-like shape (hereinafter, such a sheet is also referred to simply as "homogenized sheet"), and shredding the sheet. In another case, a homogenized sheet having a length substantially equal to the length of the tobacco rod in the longitudinal direction is shredded in a direction substantially parallel to the longitudinal direction of the tobacco rod and the shredded sheet is charged into the tobacco rod. That is, a "strand-type" tobacco filler may be

used. The width of the shredded tobacco is preferably 0.5 mm or more and 2.0 mm or less in consideration of ease of filling of the tobacco rod. The content of the tobacco filler in the tobacco rod is, in the case where the tobacco rod has a perimeter of 22 mm and a length of 20 mm, for example, 200 mg/rod or more and 800 mg/rod or less and is preferably 250 mg/rod or more and 600 mg/rod or less. Various types of tobacco can be used as tobacco leaves for preparing the shredded tobacco or the homogenized sheet. Examples of the types of tobacco include Nicotiana tabacum species, such as a yellow species, a Burley species, an orient species, and a native species, Nicotiana rustica species, and mixtures thereof. As for the mixtures, the above species can be blended with one another as needed such that an intended taste can be produced. Details of the above tobacco species are disclosed in "Encyclopedia of Tobacco, Tobacco Academic Studies Center, 2009.3.31". As a method for producing the homogenized sheet, that is, specifically, a method for pulverizing tobacco leaves and forming the pulverized tobacco leaves into a homogenized sheet, there are a plurality of methods known in the related art. A first example is a method in which a sheet is prepared using a papermaking process. A second example is a method in which an appropriate solvent, such as water, is mixed with pulverized tobacco leaves, the resulting mixture is homogenized, the homogenized material is cast on a metal plate or a metal plate belt to form a thin layer, and the thin layer is dried to form a cast sheet. A third example is a method in which an appropriate solvent, such as water, is mixed with pulverized tobacco leaves, the resulting mixture is homogenized, and the homogenized material is extrusion-molded into a sheet-like shape to form a rolled sheet. Details of types of the homogenized sheets are disclosed in "Encyclopedia of Tobacco, Tobacco Academic Studies Center, 2009.3.31".

[0106] The moisture content in the tobacco filler is, for example, 10% by weight or more and 15% by weight or less and is preferably 11% by weight or more and 13% by weight or less of the total amount of the tobacco filler. When the above moisture content falls within the above range, the staining of the wrapping paper is reduced and the machinability during the production of the tobacco rod is enhanced.

[0107] The size of the shredded tobacco included in the first tobacco filler and a method for preparing the shredded tobacco are not limited. For example, a material prepared by shredding dry tobacco leaves to a width of 0.5 mm or more and 2.0 mm or less may be used.

[0108] In the case where a material prepared by pulverizing a homogenized sheet is used, a material prepared by pulverizing dry tobacco leaves into particles having an average size of about 20 to 200 μm, homogenizing the particles, forming the homogenized material into a sheet-like shape, and shredding the resulting sheet to a width of 0.5 mm or more and 2.0 mm or less may be used.

[0109] The first tobacco filler may include an aerosol-source material that generates smoke aerosol. The type of the aerosol-source material is not limited; substances extracted from various natural products and/or components thereof can be selected in accordance with the intended application. Examples of the aerosol-source material include glycerine, propylene glycol, triacetin, 1,3-butanediol, and mixtures thereof.

[0110] The content of the aerosol-source material in the first tobacco filler is not limited. In order to generate aerosol in a sufficient manner and impart a good flavor, the above content is commonly 5% by weight or more and is preferably 10% by weight or more; and is commonly 50% by weight or less and is preferably 15% by weight or more and 25% by weight or less of the total amount of the tobacco filler.

[0111] The first tobacco filler may include a flavoring agent. The type of the flavoring agent is not limited. In order to impart a good flavor, the following flavoring agents may be used: acetanisole, acetophenone, acetylpyrazine, 2-acetylthiazole, an alfalfa extract, amyl alcohol, amyl butyrate, trans-anethole, a star anise oil, an apple juice, a Peru balsam oil, a beeswax absolute, benzaldehyde, benzoin resinoid, benzyl alcohol, benzyl benzoate, benzyl phenylacetate, benzyl propionate, 2,3-butanedione, 2-butanol, butyl butyrate, butyric acid, caramel, a cardamom oil, a carob absolute, β-carotene, a carrot juice, L-carvone, β-caryophyllene, a cassia bark oil, a cedarwood oil, a celery seed oil, a chamomile oil, cinnamaldehyde, cinnamic acid, cinnamyl alcohol, cinnamyl cinnamate, a citronella oil, DL-citronellol, a clary sage extract, cocoa, coffee, a cognac oil, a coriander oil, cuminaldehyde, a davana oil, δ-decalactone, γ-decalactone, decanoic acid, a dill herb oil, 3,4-dimethyl-1,2-cyclopentanedione, 4,5-dimethyl-3-hydroxy-2,5-dihydrofuran-2-one, 3,7-dimethyl-6-octenoic acid, 2,3-dimethylpyrazine, 2,5-dimethylpyrazine, 2,6-dimethylpyrazine, ethyl 2-methylbutyrate, ethyl acetate, ethyl butyrate, ethyl hexanoate, ethyl isovalerate, ethyl lactate, ethyl laurate, ethyl levulinate, ethyl maltol, ethyl octanoate, ethyl oleate, ethyl palmitate, ethyl phenylacetate, ethyl propionate, ethyl stearate, ethyl valerate, ethyl vanillin, ethyl vanillin glucoside, 2-ethyl-3,(5 or 6)-dimethylpyrazine, 5-ethyl-3-hydroxy-4-methyl-2(5H)-furanone, 2-ethyl-3-methylpyrazine, eucalyptol, a fenugreek absolute, a genet absolute, gentian root infusion, geraniol, geranyl acetate, a grape juice, guaiacol, a guava extract, γ-heptalactone, γ-hexalactone, hexanoic acid, cis-3-hexen-1-ol, hexyl acetate, hexyl alcohol, hexyl phenylacetate, honey, 4-hydroxy-3-pentenoic acid lactone, 4-hydroxy-4-(3-hydroxy-1-butenyl)-3,5,5-trimethyl-2-cyclohexen-1-one, 4-(para-hydroxyphenyl)-2-butanone, sodium 4-hydroxyundecanoate, an immortelle absolute, β-ionone, isoamyl acetate, isoamyl butyrate, isoamyl phenylacetate, isobutyl acetate, isobutyl phenylacetate, a jasmine absolute, kola nut tincture, a labdanum oil, lemon oil terpeneless, a glycyrrhiza extract, linalool, linalyl acetate, a lovage root oil, maltol, maple synzp, menthol, menthone, L-menthyl acetate, para-methoxy benzaldehyde, methyl-2-pyrrolyl ketone, methyl anthranilate, methyl phenylacetate, methyl salicylate, 4'-methylacetophenone, methylcyclopentenolone, 3-methylvaleric acid, a mimosa absolute, molasses, myristic acid, nerol, nerolidol, γ-nonalactone, a nutmeg

oil, δ-octalactone, octanal, octanoic acid, an orange flower oil, an orange oil, an orris root oil, palmitic acid, ω-pentadecalactone, a peppermint oil, a petitgrain oil Paraguay, phenethyl alcohol, phenethyl phenylacetate, phenylacetic acid, piperonal, a plum extract, propenyl guaethol, propyl acetate, 3-propylidene phthalide, a prune juice, pyruvic acid, a raisin extract, a rose oil, rum, a sage oil, a sandalwood oil, a spearmint oil, a styrax absolute, a marigold oil, tea distillate, α-terpineol, terpinyl acetate, 5,6,7,8-tetrahydroquinoxaline, 1,5,5,9-tetramethyl-13-oxacyclo(8.3.0.0(4.9))tridecane, 2,3,5,6-tetramethylpyrazine, a thyme oil, a tomato extract, 2-tridecanone, triethyl citrate, 4-(2,6,6-trimethyl-1-cyclohexenyl)2-buten-4-one, 2,6,6-trimethyl-2-cyclohexene-1,4-dione, 4-(2,6,6-trimethyl-1,3-cyclohexadienyl)2-buten-4-one, 2,3,5-trimethylpyrazine, γ-undecalactone, γ-valerolactone, a vanilla extract, vanillin, veratric aldehyde, a violet leaf absolute, N-ethyl-p-menthane-3-carboxamide (WS-3), and ethyl-2-(p-menthane-3-carboxamide) acetate (WS-5). Menthol is particularly preferable. The above flavoring agents may be used alone or in combination of two or more.

[0112] The content of the flavoring agent in the first tobacco filler is not limited. In order to impart a good flavor, the above content is commonly 10000 ppm or more, is preferably 20000 ppm or more, and is more preferably 25000 ppm or more. The above content is commonly 70000 ppm or less, is preferably 50000 ppm or less, is more preferably 40000 ppm or less, and is further preferably 33000 ppm or less.

[0113] The pack density of the first tobacco filler is not limited. In order to maintain the performance of the first non-combustion-heating-type tobacco at a certain level and impart a good flavor, the above pack density is commonly 250 mg/cm^3 or more and is preferably 300 mg/cm^3 or more. The above pack density is commonly 400 mg/cm^3 or less and is preferably 350 mg/cm^3 or less.

[0114] The tobacco rod portion is prepared by wrapping the above-described first tobacco filler with a wrapping paper with the filler facing inward.

(2) Second Tobacco Filler

[0115] A second tobacco filler is composed of a plurality of tobacco sheets arranged concentrically. Note that the expression "arranged concentrically" used in the present specification means that the tobacco sheets are arranged such that all of the centers of the tobacco sheets are substantially at the same position. The term "sheet" used in the present invention refers to a shape having a pair of principal surfaces substantially parallel to each other and side surfaces. The second filler is composed of a plurality of tobacco sheets that are wound concentrically in a direction orthogonal to the longitudinal direction of the tobacco product 10.

[0116] Examples of a substrate for the sheets include a tobacco material, such as a tobacco powder. A tobacco material is particularly preferable. Tobacco sheets that include substrate sheets composed of a tobacco material and a component capable of generating a flavor which is deposited on the substrate sheets as needed are preferable.

[0117] The tobacco sheets may include an aerosol-source material that generates smoke aerosol upon being heated. An aerosol source, such as a polyol, such as glycerine, propylene glycol, or 1,3-butanediol, is added as an aerosol-source material. The amount of the aerosol-source material added is preferably 5% by weight or more and 50% by weight or less and is more preferably 15% by weight or more and 25% by weight or less of the dry weight of the tobacco sheet.

[0118] Tobacco sheets that have not been arranged concentrically, that is, tobacco sheet materials, are described.

[0119] The tobacco sheets can be produced using a publicly known method, such as a papermaking method, a slurry method, or a rolling method, as needed. The homogenized sheet described in "First Tobacco Filler" above can also be used.

[0120] In the case where a papermaking method is used, the tobacco sheets can be produced by a method including the following steps: 1) crushing dry tobacco leaves and subsequently performing extraction using water to separate a water extract and a residue from each other, and 2) drying the water extract under reduced pressures to perform concentration, 3) adding pulp to the residue, then performing fibrillation with a refiner, and subsequently perform papermaking, and 4) adding the condensate of the water extract to the resulting paper sheet, which is then dried to form a tobacco sheet. In this case, a step of removing some of the components, such as nitrosamine, may be further conducted (see Japanese Unexamined Patent Application Publication (Translation of PCT Application) No. 2004-510422).

[0121] In the case where a slurry method is used, the tobacco sheets can be produced by a method including the following steps: 1) mixing water, pulp, a binder, and crushed tobacco leaves with one another, 2) stretching (casting) the resulting mixture into a thin film and drying the film. In this case, a step of irradiating the slurry including water, pulp, a binder, and crushed tobacco leaves with ultraviolet radiation or an X-ray to remove some of the components, such as nitrosamine, may be further conducted.

[0122] Furthermore, as described in International Publication No. 2014/104078, a nonwoven fabric-like tobacco sheet produced by a method including the following steps can also be used: 1) mixing powder-like tobacco leaves with a binding agent, 2) sandwiching the resulting mixture between nonwoven fabric sheets, and 3) forming the resulting multilayer body into a predetermined shape by thermal welding to produce a nonwoven fabric-like tobacco sheet.

[0123] The types of the tobacco leaves used as a raw material in the above methods may be the same as those

described in the description of the first filler above.

[0124] The composition of the tobacco sheets is not limited. For example, the content of the tobacco raw material (tobacco leaves) is preferably 50% by weight or more and 95% by weight or less of the total weight of the tobacco sheet. The tobacco sheets may include a binder. Examples of the binder include a guar gum, a xanthan gum, CMC (carboxymethyl cellulose), and CMC-Na (sodium salt of carboxymethyl cellulose). The amount of the binder is preferably 1% by weight or more and 10% by weight or less of the total weight of the tobacco sheet. The tobacco sheets may further include another additive. Examples of the additive include a filler, such as pulp. In the present invention, a plurality of tobacco sheets are used. All the tobacco sheets may have the same composition or the same physical properties. Some or all of the tobacco sheets may have different compositions or different physical properties.

[0125] The second tobacco filler can be produced by preparing a plurality of tobacco sheets having different widths, stacking the tobacco sheets on top of one another such that the widths of the tobacco sheets decreases in the direction from bottom to top to prepare a multilayer body, and passing the multilayer body through a winding tube to perform winding forming. This production method enables the tobacco sheets to extend in the longitudinal direction and be arranged concentrically with the longitudinal direction axis being the center. Optionally, a fitting portion extending in the longitudinal direction may be formed between the longitudinal direction axis and the innermost tobacco sheet.

[0126] In this production method, it is preferable that the multilayer body be prepared such that a noncontact portion is formed between each pair of the adjacent tobacco sheets subsequent to the winding forming.

[0127] When a noncontact portion (gap) at which the tobacco sheets do no come into contact with one another is present between the tobacco sheets, the channel through which a flavor passes can be maintained and the efficiency with which a flavor component is delivered can be increased. In addition, in the case where the tobacco product is used as an electric heating tobacco product, a high heat transfer efficiency can be achieved because the heat produced by a heater can be transferred to outer tobacco sheets through contact portions between the tobacco sheets.

[0128] For forming the noncontact portions, at which the tobacco sheets do not come into contact with one another, between the tobacco sheets, the multilayer body may be prepared by, for example, the following methods: a method in which embossed tobacco sheets are used, a method in which the tobacco sheets are stacked on top of one another without bonding the entire surfaces of each pair of the adjacent tobacco sheets to each other; a method in which the tobacco sheets are stacked on top of one another with parts of each pair of the adjacent tobacco sheets being bonded to each other; and a method in which the tobacco sheets are stacked on top of one another while the entirety or parts of the surfaces of each pair of the adjacent tobacco sheets being bonded to each other slightly such that they become detached subsequent to the winding forming.

[0129] In the case where a tobacco rod portion that includes the wrapping paper is prepared, the wrapping paper may be arranged at the bottommost portion of the multilayer body.

[0130] The fitting portion can also be formed by placing a tubular dummy, such as a mandrel, at the topmost portion of the multilayer body and removing the dummy after the second tobacco filler has been formed.

[0131] The thickness of each of the tobacco sheets are not limited. In consideration of the balance between heat transfer efficiency and strength, the above thickness is preferably 150 μm or more and 1000 μm or less and is more preferably 200 μm or more and 600 μm or less. The thicknesses of the tobacco sheets may be the same as or different from one another.

[0132] The number of the tobacco sheets constituting the second tobacco filler is, for example, but not limited to, 2, 3, 4, 5, 6, or 7.

(3) Third Tobacco Filler

[0133] A third tobacco filler is constituted by a single, folded tobacco sheet. The sheet may be a sheet having a length that is substantially the same as the length of the tobacco rod portion in the longitudinal direction and filled in the tobacco rod while being folded a plurality of times in a direction parallel to the longitudinal direction of the tobacco rod, that is, a "gathered sheet". The thickness of the sheet is preferably 150 μm or more and 1000 μm or less and is more preferably 200 μm or more and 600 μm or less in consideration of the balance between heat transfer efficiency and strength.

[0134] The substrate for the sheet included in the third tobacco filler may be the same as that used for the second tobacco filler.

(4) Fourth Tobacco Filler

[0135] A fourth tobacco filler is composed of tobacco granules.

[0136] Examples of raw materials constituting the fourth tobacco filler include, but are not limited to, (a) a pulverized tobacco material, (b) moisture, (c) at least one pH-controlling agent selected from the group consisting of potassium carbonate and sodium hydrogen carbonate, and (d) at least one binder selected from the group consisting of pullulan and hydroxypropyl cellulose.

[0137] Examples of the pulverized tobacco material (component (a)) included in the fourth tobacco filler include pulverized tobacco leaves and a pulverized tobacco sheet. The type of tobacco may be a Burley species, a yellow species, or an orient species. The tobacco material is preferably pulverized to a size of 200 μm or more and 300 μm or less.

[0138] The content of the pulverized tobacco material in a mixture of the raw materials of the fourth tobacco filler is commonly 20% by weight or more and 80% by weight or less.

[0139] The moisture (component (b)) included in the fourth tobacco filler maintains the unity of the tobacco granules.

[0140] The content of the moisture in a mixture of the raw materials of the fourth tobacco filler is commonly 3% by weight or more and 13% by weight or less. Commonly, the fourth tobacco filler may include moisture such that the weight loss on drying is 5% by weight or more and 17% by weight or less. Note that the term "weight loss on drying" refers to the change in the weight of a part of the sample taken for the measurement which occurs while the sample is completely dried by causing all the moisture included in the sample to evaporate (e.g., drying for 15 minutes at a constant temperature (105°C)). Specifically, the term "weight loss on drying" refers to the ratio (% by weight) of the total amount of the moisture included in the sample and the volatile component included in the sample, which volatilizes under the above drying conditions, to the weight of the sample. That is, the weight loss on drying (% by weight) can be represented by the following formula.

Weight loss on drying (% by weight)=

{(Weight of sample before complete drying) - (Weight of sample after complete drying)} × 100/Weight of sample before complete drying

[0141] The pH-controlling agent (component (c)) included in the fourth tobacco filler is composed of potassium carbonate, sodium hydrogen carbonate, or a mixture thereof. The pH-controlling agent adjusts the pH of the fourth tobacco filler to shift to alkaline, thereby accelerates the release of the flavor component included in the fourth tobacco filler from the tobacco granules, and produces a flavor that may satisfy the user.

[0142] The content of the pH-controlling agent in the mixture of the raw materials of the fourth tobacco filler may be commonly 5% by weight or more and 20% by weight or less.

[0143] The binder (component (d)) included in the fourth tobacco filler causes the tobacco granule components to bind to one another and thereby maintains the unity of the tobacco granules. The binder is composed of pullulan, hydroxypropyl cellulose (HPC), or a mixture thereof.

[0144] The content of the binder in the mixture of the raw materials of the fourth tobacco filler may be, commonly, 0.5% by weight or more and 15% by weight or less.

[0145] The fourth tobacco filler, which may be composed of the components (a), (b), (c), and (d) above, may further include an additional component.

[0146] Examples of the additional component include an aerosol-source material (component (e)). The aerosol-source material is a material that generates smoke aerosol. The aerosol-source material is composed of a polyhydric alcohol. Examples of the polyhydric alcohol include glycerine, propylene glycol, sorbitol, xylitol, and erythritol. The above polyhydric alcohols can be used alone or in combination of two or more.

[0147] In the case where the mixture of the raw materials of the fourth tobacco filler includes the aerosol-source material, the content of the aerosol-source material may be 5% to 15% by weight.

[0148] Examples of the additional component further include (f) a flavor material (solid or liquid) other than the flavor component. Examples of such a flavor material include sugar (e.g., sucrose or fructose), a cocoa powder, a carob powder, a coriander powder, a licorice powder, an orange peel powder, a rose hip powder, a chamomile flower (flower) powder, a lemon verbena powder, a peppermint powder, a leaf powder, a spearmint powder, a black tea powder, and menthol.

[0149] The content of the flavor material in the mixture of the raw materials of the fourth tobacco filler may be, commonly, 0.5% by weight or more and 30% by weight or less. The flavor material may be added to the components (a), (b), (c), (d), and (e) by being directly kneaded with these components. The flavor material may also be added to the above components by supporting the flavor material on a publicly known inclusion host compound, such as cyclodextrin, to form an inclusion compound and kneading the inclusion compound with the above components.

[0150] In the case where the fourth tobacco filler is composed of the components (a), (b), (c), (d), and (e), the content of the component (a) in the mixture of the raw materials of the fourth tobacco filler may be, commonly, about 33% by weight or more (and about 90% by weight or less).

[0151] The fourth tobacco filler can be produced by mixing the components (a), (c), and (d) and, as needed, the components (e) and (f) with one another, adding the component (b) to the resulting mixture, then kneading the mixture, granulating the kneaded material into particles (long pillar-shaped) with a wet extrusion granulation machine, and subsequently forming the particles into a short pillar-like or spherical shape. The average size (D50) of the resulting tobacco granules is commonly 0.2 mm or more and 1.2 mm or less, is preferably 0.2 mm or more and 1.0 mm or less, and is

more preferably 0.2 mm or more and 0.8 mm or less.

[0152] In the extrusion granulation, it is preferable that the kneaded material be extruded at a pressure of 2 kN or more and ambient temperature. As a result of the extrusion performed at high pressures, the temperature of the kneaded material instantaneously and rapidly increases from ambient temperature to, for example, 90°C to 100°C at the outlet of the extrusion granulation machine and the amount of moisture and volatile component reduces by 2% by weight or more and 4% by weight or less as a result of evaporation. Therefore, the water used for preparing the kneaded material is set to be larger than the amount of moisture that is intended to be included in the tobacco granules, which is the final product, by an amount equal to the amount of the evaporation.

[0153] The tobacco granules prepared by the extrusion granulation may be further dried as needed for moisture control. For example, in the case where the weight loss on drying of tobacco granules prepared by the extrusion granulation is higher than the intended weight loss on drying (e.g., 5% by weight or more and 17% by weight or less), the tobacco granules may be further dried in order to achieve the intended weight loss on drying. The drying conditions (temperature and time) necessary for achieving the intended weight loss on drying can be set on the basis of predetermined drying conditions (temperature and time) necessary for reducing the weight loss on drying by a predetermined value.

[0154] The fourth tobacco filler may be composed only of the tobacco granules described above. The fourth tobacco filler may further include an additional tobacco material other than the tobacco granules. The additional tobacco material is commonly shredded tobacco leaves or a fine powder of tobacco leaves. The additional tobacco material can be used in combination with the tobacco granules according to the present invention in the form of a mixture.

(Wrapping Paper)

[0155] The wrapping paper 20 is not limited, and a common wrapping paper may be employed. Examples of the wrapping paper include a wrapping paper that includes pulp as a principal component. The wrapping paper may be a wrapping paper made of a wood pulp, such as a conifer wood pulp or a broadleaf wood pulp, or a wrapping paper made of pulp mixture further including a nonwood pulp commonly used for producing wrapping paper for tobacco products, such as a flax pulp, a cannabis pulp, a sisal hemp pulp, or an esparto pulp.

[0156] Examples of the pulp that can be used include a chemical pulp, a ground pulp, a chemiground pulp, or a thermomechanical pulp, which are produced by kraft cooking, acidic, neutral, or alkaline sulfite cooking, sodium salt cooking, or the like.

[0157] A wrapping paper is produced with a fourdrinier paper machine, a cylinder paper machine, a cylinder-tanmo hybrid paper machine, or the like using the pulp. In the papermaking step, the formation is arranged and homogenization is performed. As needed, a wet strength agent may be added to impart water resistance to the wrapping paper. In another case, a sizing agent may be added to adjust the manner in which printing is performed on the wrapping paper. Furthermore, aluminum sulfate, various anionic, cationic, nonionic, and zwitterionic internal agents for papermaking, such as a yield improver, a freeness improver, and a strength agent, and papermaking additives, such as a dye, a pH-controlling agent, an antifoaming agent, a pitch-controlling agent, and a slime-controlling agent, can also be added.

[0158] The basis weight of the base paper for the wrapping paper is, for example, commonly 20 gsm or more and is preferably 25 gsm or more. The above basis weight is commonly 65 gsm or less, is preferably 50 gsm or less, and is further preferably 45 gsm or less.

[0159] The thickness of the wrapping paper having the above properties is not limited. In consideration of stiffness, air permeability, and ease of control during papermaking, the above thickness is commonly 10 μm or more, is preferably 20 μm or more, and is more preferably 30 μm or more. The above thickness is commonly 100 μm or less, is preferably 75 μm or less, and is more preferably 50 μm or less.

[0160] Examples of the shape of the wrapping paper included in the non-combustion-heating-type tobacco include square and rectangular.

[0161] In the case where the wrapping paper is used for wrapping the tobacco filler (for preparing the tobacco rod portion), the length of a side of the wrapping paper is, for example, about 12 to 70 mm. The length of the other side is, for example, 15 to 28 mm, is preferably 22 to 24 mm, and is further preferably about 23 mm. When the tobacco filler is wrapped with the wrapping paper to form a pillar-shaped body, for example, an edge portion of the wrapping paper which extends about 2 mm from one of the edges of the wrapping paper in the w-direction illustrated in Fig. 2 is bonded to the other edge portion with a glue such that they overlap each other. As a result, the wrapping paper is formed into a pillar-like paper tube, in which the tobacco filler is filled. The size of the rectangular wrapping paper can be determined in accordance with the size of the final tobacco rod portion.

[0162] The wrapping paper according to this embodiment may include a filler in addition to the above pulp. The content of the filler is, for example, 10% by weight or more and less than 60% by weight and is preferably 15% by weight or more and 45% by weight or less of the total weight of the wrapping paper according to the embodiment of the present invention.

[0163] The content of the filler in the wrapping paper according to the embodiment of the present invention is preferably

15% by weight or more and 45% by weight or less when the basis weight falls within the preferable range (25 gsm or more and 45 gsm or less).

[0164] When the basis weight is 25 gsm or more and 35 gsm or less, the above filler content is preferably 15% by weight or more and 45% by weight or less. When the basis weight is more than 35 gsm and 45 gsm or less, the above filler content is preferably 25% by weight or more and 45% by weight or less.

[0165] Examples of the filler include calcium carbonate, titanium dioxide, and kaolin. For example, in order to enhance a flavor and brightness, calcium carbonate is preferably used.

[0166] Various agents may be added to the wrapping paper in addition to the base paper and the filler. For example, a water resistance improver may be added in order to enhance water resistance. Examples of the water resistance improver include a wet strength agent (WS agent) and a sizing agent. Examples of the wet strength agent include a urea formaldehyde resin, a melamine formaldehyde resin, and polyamide epichlorohydrin (PAE). Examples of the sizing agent include a rosin soap, alkyl ketene dimer (AKD), alkenylsuccinic anhydride (ASA), and highly saponified polyvinyl alcohol having a degree of saponification of 90% or more.

[0167] A strength agent may be added as an agent. Examples of the strength agent include polyacrylamide, a cationic starch, an oxidized starch, CMC, a polyamide epichlorohydrin resin, and polyvinyl alcohol. In particular, it is known that the use of a trace amount of oxidized starch enhances air permeability (Japanese Unexamined Patent Application Publication No. 2017-218699).

[0168] The wrapping paper may be coated as needed.

[0169] A coating agent may be applied onto at least one of the two surfaces, that is, the front and rear surfaces, of the wrapping paper. The coating agent is not limited. It is preferable to use a coating agent capable of forming a film on the surface of the paper and thereby reducing the permeability of the paper to liquids. Examples thereof include alginic acid and salts thereof (e.g., sodium salt), polysaccharides, such as pectin, cellulose derivatives, such as ethyl cellulose, methyl cellulose, carboxymethyl cellulose, and nitro cellulose, and starch and derivatives thereof (e.g., ether derivatives, such as a carboxymethyl starch, a hydroxyalkyl starch, and a cationic starch, and ester derivatives, such as starch acetate, starch phosphate, and starch octenylsuccinate).

[Mouthpiece]

[0170] The mouthpiece portion 19 is not limited and may be any publicly known mouthpiece portion that includes the capsule filter 18 and has the same function as common filters. For example, the mouthpiece portion 19 illustrated in Fig. 2 includes a filter 17 and a capsule 16 that are wrapped with a filter wrapper. In the present specification, the mouthpiece portion is a portion that includes at least a capsule filter ("also referred to as "capsule filter portion").

[0171] The filter 17 is not limited; publicly known filters may be employed. Examples thereof include a filter produced by forming cellulose acetate tow into a cylindrical shape. The filament denier and total denier of the cellulose acetate tow are not limited. For example, the above filament denier may be 1 g/9000 m or more and 12 g/9000 m or less and may be 1.9 g/9000 m or more and 12 g/9000 m or less. The above total denier may be 10000 g/9000 m or more and 44000 g/9000 m or less and may be 12000 g/9000 m or more and 35000 g/9000 m or less. The above ranges are particularly preferable when the perimeter of the mouthpiece member is 22 mm. The number of fibers included in the cellulose acetate tow and the airflow resistance of the cellulose acetate tow are not limited. For example, the number of the fibers may be 830 or more and 23500 or less. The airflow resistance may be 100 mmH_2O/120 mm or more and 600 mmH_2O/120 mm or less. The cross-sectional shape of fibers of the cellulose acetate tow may be either Y-shape or R-shape. In the case where the filter is filled with cellulose acetate tow, a plasticizer, such as triacetin, may be added to the filter in order to reduce the hardness of the filter. The amount of the plasticizer added may be 6% by weight or more and 10% by weight or less of the weight of the cellulose acetate tow. In the case where active carbon is added to the cellulose acetate tow, the amount of the plasticizer added may be 2% by weight or more and 20% by weight or less of the weight of the cellulose acetate tow.

[0172] Instead of the above acetate filter, a paper filter filled with sheet-like pulp paper may also be used.

[0173] In the production of the filter 17, the adjustment of airflow resistance and the addition of the additives (e.g., publicly known adsorbents, flavoring agents, and flavor keepers) can be designed as needed.

[0174] The shape of the filter 17 is not limited; publicly known shapes may be employed. Commonly, the filter 17 is cylindrical. The filter 17 may have the following structure.

[0175] The filter 17 may have a section, such as a cavity or recess, formed therein such that a cross section of the filter 17 taken in the circumferential direction is hollow (i.e., has a hollow space).

[0176] The ventilation of the filter 17 may be performed by a publicly known method. For example, a perforated packaging material or an air-permeable packaging material may be used. In another case, the packaging material and a tip overwrap (when it is present) may be perforated with a laser. Similarly, the full-tip overwrap for ventilation may be originally permeable to air, or air holes may be formed therein. In an air-permeable product that includes both packaging material and tip overwrap, it is preferable that the position of the ventilation portion of the overwrap be aligned with that

of the ventilation portion of the packaging material (e.g., plug wrap). Air holes that penetrate the filter packaging material, air holes that penetrate the tip overwrap, or air holes that penetrate both of these materials together may be formed by laser perforation in the production of the filter.

[0177] The cross-sectional shape of the filter 17 in the axial direction is substantially circular. The diameter of the circle, which may be changed appropriately in accordance with the size of the product, is commonly 2 mm or more and 10 mm or less, is preferably 3 mm or more and 9 mm or less, and is more preferably 4 mm or more and 8 mm or less. In the case where the above cross section is not circular, the above diameter is the diameter of a virtual circle having the same area as the cross section.

[0178] The perimeter of the cross section of the filter 17 in the axial direction, which may be changed appropriately in accordance with the size of the product, is commonly 7 mm or more and 35 mm or less, is preferably 9 mm or more and 32 mm or less, and is more preferably 12 mm or more and 26 mm or less.

[0179] The length of the filter 17 in the axial direction, which may be changed appropriately in accordance with the size of the product, is commonly 6 mm or more and 35 mm or less, is preferably 10 mm or more and 30 mm or less, and is more preferably 13 mm or more and 26 mm or less.

[0180] The capsule 16 (also referred to as "additive release container" in the technical field) is not limited; publicly known capsules may be employed. For example, the capsule 16 may be a crushable additive release container that includes a crushable shell composed of gelatin or the like. In such a case, when the capsule 16 is broken before, while, or after the user uses the tobacco product, the capsule 16 releases a liquid or substance (commonly, a flavor agent) included in the capsule. The liquid or substance is transferred to tobacco smoke during the use of the tobacco product and then transferred to the ambient environment after the use.

[0181] The capsule 16 is preferably completely encapsulated in the filter 17 as illustrated in Fig. 3 because at least one of the ends of the filter preferably has a uniform appearance and in order to prevent the detachment of the container. Note that the expression "completely encapsulated" means that the capsule 16 cannot be visually identified from the mouth or oral cavity side end of the filter during use. The uniform appearance of the end of the filter (e.g., the appearance that allows only the filter material to be visually identified from the end of the core) is comfortable for the user and also advantageous.

[0182] The capsule 16 may be interposed between two filters 17 as illustrated in Fig. 4. In this case, time and effort required for encapsulating the capsule in the filter 17, which is necessary for the filter illustrated in Fig. 3, can be saved advantageously.

[0183] The capsule 16 and the method for producing the capsule 16 are known in the technical field.

[0184] The form of the capsule 16 is not limited. The capsule 16 may be, for example, an easy-to-crush capsule. The shape of the capsule 16 is preferably spherical. As an additive, the capsule 16 may include the optional additives described above and particularly preferably include a flavor agent and active carbon. One or more materials that assist the filtration of smoke may be used as an additive. The form of the additive is commonly, but not limited to, liquid or solid. Note that the use of a capsule including an additive is known in the technical field. An easy-to-crush capsule and the method for producing such a capsule are known in the technical field.

[0185] Examples of the flavor agent include menthol, spearmint, peppermint, fenugreek, clove, and medium-chain triglyceride (MCT). The above components may be used alone or in any combination of two or more at any ratio.

[0186] In the case where the capsule 16 is spherical, the diameter of a circular cross section of the sphere which is taken along a plane that passes through the center of the sphere is commonly, but not limited to, 1.0 mm or more and 8.0 mm or less, is preferably 3.0 mm or more and 6.0 mm or less, and is more preferably 3.5 mm or more and 4.5 mm or less. In the case where the capsule 16 is not spherical, the above diameter is the diameter of a circular cross section of a virtual sphere having the same volume as the container which is taken along a plane that passes through the center of the virtual sphere.

[0187] The ratio of the diameter of the above capsule 16 to the diameter of the above filter 17 is commonly, but not limited to, 0.1 or more and 1.0 or less, is preferably 0.3 or more and 0.8 or less, and is more preferably 0.4 or more and 0.6 or less.

[0188] The weight of the capsule 16 and the content of the additive in the capsule 16 are not limited and may be changed as needed.

[0189] The volume of the capsule 16 is not limited and set such that it can be included in the filter 16. The volume of the capsule 16 is commonly 0.003 cm^3 or more and 1.1 cm^3 or less, is preferably 0.08 cm^3 or more and 0.7 cm^3 or less, and is more preferably 0.13 cm^3 or more and 0.30 cm^3 or less.

[0190] In order to increase strength and structural stiffness, the filter 17 may include a filter wrapper with which the materials constituting the filter are wrapped. The filter wrapper is not limited and may include one or more seams including an adhesive. The adhesive may include a hot-melt adhesive. The hot-melt adhesive may include polyvinyl alcohol. In the case where the filter 17 is constituted by two or more segments, it is preferable that the two or more segments be collectively wrapped with the filter wrapper.

[0191] The material constituting the filter wrapper is not limited; publicly known materials may be used. The filter

wrapper may include a filler, such as calcium carbonate.

[0192] The thickness of the filter wrapper may be, for example, but not limited to, 25 μm or more and 200 μm or less, may be 25 μm or more and 150 μm or less, may be 30 μm or more and 100 μm or less, may be 30 μm or more and 80 μm or less, and may be 40 μm or more and 50 μm or less.

[0193] The basis weight of the filter wrapper may be, for example, but not limited to, 10 gsm or more and 150 gsm or less, may be 14 gsm or more and 115 gsm or less, may be 20 gsm or more and 100 gsm or less, may be 30 gsm or more and 60 gsm or less, may be 40 gsm or more and 60 gsm or less, may be 50 gsm or more and 90 gsm or less, and may be 65 gsm or more and 85 gsm or less.

[0194] In the case where the filter wrapper is used, the above-described materials, such as cellulose acetate tow, are wrapped with the filter wrapper and subsequently the members, such as the filter including the filter wrapper and the tobacco rod portion, are wrapped with the tip paper described above such that the tip paper is disposed on the filter wrapper. In the case where the filter wrapper is not used, the above-described materials, such as cellulose acetate tow, which are not wrapped with the filter wrapper, the tobacco rod portion, and the other members are wrapped with the tip paper. In this case, the tip paper serves also as a filter wrapper while serving as a common tip paper.

[0195] The mouthpiece portion 19 may include a cooler (cooling segment) in addition to the capsule filter. Examples of the cooling segment include a cooling segment composed of a tubular member, such as the cooling segment 21 illustrated in Fig. 5. The tubular member may be a paper tube produced by, for example, forming paperboard into a cylindrical shape.

[0196] The total surface area of the cooling segment 21 may be 300 mm^2/mm or more and 1000 mm^2/mm or less. The above surface area is a surface area per unit length (mm) of the cooling segment 21 in the direction of ventilation. The total surface area of the cooling segment 21 is preferably 400 mm^2/mm or more and is more preferably 450 mm^2/mm or more. The above total surface area is preferably 600 mm^2/mm or less and is more preferably 550 mm^2/mm or less.

[0197] The internal structure of the cooling segment 21 desirably has a large total surface area. Therefore, in a preferable embodiment, the cooling segment 21 may be formed of a thin sheet material that has been wrinkled in order to form channels and then pleated, gathered, and/or folded. The larger the number of folds or pleats per unit volume of the component, the larger the total surface area of the cooling segment 21.

[0198] According to an embodiment, the thickness of the material constituting the cooling segment 21 is 5 μm or more and 500 μm or less and may be, for example, 10 μm or more and 250 μm or less.

[0199] The mouthpiece portion 19 may include perforations 22 through which the outside air is taken in (such perforations are also referred to as "ventilation filter (Vf)" in the technical field) as illustrated in Fig. 6 (the reference signs that denote the components illustrated in Figs. 1 to 5 are omitted). Specifically, Fig. 6(a) illustrates a structure in which the perforations 22 are formed only in the tip paper 14; Fig. 6(b) illustrates a structure in which the perforations 22 are formed so as to extend compared with the structure illustrated in Fig. 6(a) and penetrate the filter 19; and Fig. 6(c) illustrates a structure in which the perforations 22 are formed so as to penetrate through the tip paper and the cooler. Although eight perforations 22 are arranged concentrically in Fig. 6, the number of the perforations 22 is not limited to this. In the case where the perforations 22 are arranged concentrically as described above and they are considered as one perforation group, the number of the perforation groups may be either only one or two or more.

[0200] The presence of the perforations 22 allows the outside air to flow into the inside of the cooler during use and consequently reduces the temperatures of the components and air that are taken in from the tobacco rod portion. In the case where the tobacco rod portion includes an aerosol-source material, a vapor produced as a result of the tobacco rod being heated which includes the aerosol-source material and a tobacco flavor component is brought into contact with the air taken in from the outside and becomes liquified due to a temperature reduction. This facilitates the formation of aerosol. The number of the perforations 22 arranged concentrically is not limited. The number of the perforations 22 may be either only one or two or more.

[0201] The diameter of the perforations is preferably 100 μm or more and 1000 μm or less and is more preferably 300 μm or more and 800 μm or less. The perforations are preferably substantially circular or substantially oval. In the case where the perforations are substantially oval, the term "diameter" refers to a major-axis length. If the diameter of the perforations is excessively large, the liquid included in the capsule 16 may disadvantageously seep into the tip paper 14 to reach the $CaCO_3$-containing layer 11. When the above diameter falls within the above range, the possibility of the seeping can be reduced.

[0202] The position at which the perforations are arranged is not limited. The perforations 22 are preferably arranged within the region sandwiched between two planes below: a plane that passes through the point 15 mm from the center of the capsule included in the capsule filter toward the inhalation port in the longitudinal direction of the tobacco product and that is perpendicular to the longitudinal direction; and a plane that passes through the point 15 mm from the above center toward the tobacco rod portion in the longitudinal direction and that is perpendicular to the longitudinal direction. Fig. 7 illustrates the region described above. The region having a width of L in Fig. 7 is the region described above.

[0203] In the case where the perforations 22 are present in the above region, the possibility of the capsule being broken when the perforations are formed can be reduced.

[0204] The distance from the center of the capsule, which determines the above region, is not necessarily 15 mm. The above distance may be 12.5 mm, more preferably may be 10 mm, further preferably may be 7.5 mm, and particularly preferably may be 5 mm. However, if the distance between the perforations 22 and the capsule 16 is excessively small, the capsule may become broken when the perforations are formed. Therefore, commonly, it is preferable that the perforations 22 be present at a position closer to the inhalation port than the position 0.5 mm from the center of the capsule 16 included in the capsule filter 18 toward the inhalation port in the longitudinal direction of the tobacco product and/or at a position closer to the tobacco rod portion than the position 0.5 mm from the above center toward the tobacco rod portion in the longitudinal direction of the tobacco product.

[0205] In the case where the tip paper 14 includes an adhesive layer 15 interposed between the paper layer 12 and the oil-resistant layer 13 and perforations are formed in at least the tip paper 14, a region in which the adhesive layer is absent (such a region is also referred to as "glue-free zone") may be formed in the vicinity of each of the perforations as illustrated in Fig. 8. Specifically, as illustrated in Fig. 8, when the diameter of perforations formed in the layers other than the adhesive layer is defined as M and the diameter of perforations formed in the adhesive layer is defined as N, $N \geq M$ may be satisfied. The shapes of the perforations formed in the layers other than the adhesive layer and the perforations formed in the adhesive layer are not limited. The shapes of the above perforations are preferably circular. In the case where the above perforations are not circular, M and N represent the diameter of a virtual circle having the same area as the shape.

[0206] When $N \geq M$ is satisfied as described above, the possibility of power dust being generated in the formation of the perforations can be reduced.

[0207] The above-described conditions for the diameter of the perforations can apply also to the diameter M of the perforations formed in the layers other than the adhesive layer.

[0208] As described above, if the diameter of the perforations is excessively large, the liquid included in the capsule 16 may disadvantageously seep into the tip paper 14 to reach the $CaCO_3$-containing layer 11. However, the possibility of the seeping can be commonly reduced when the diameter M falls within the range in which the conditions for the diameter of the perforations are satisfied, regardless of the magnitude of the diameter N.

[Method for Producing Tobacco Product]

[0209] The method for producing the above-described tobacco product 10 is not limited; publicly known methods can be used. Note that the tip paper 14 is wrapped around the tobacco rod portion 20 and the mouthpiece portion 19 such that the $CaCO_3$-containing layer 11 faces outward and the oil-resistant layer 13 faces inward.

[Application of Tobacco Product]

[0210] The above-described tobacco product 10 can be used as a tobacco product for cigarettes (paper-wrapped tobacco) and as a tobacco product for electric heating tobacco products.

[0211] In the case where the tobacco product 10 is used for cigarettes, the method of use is not limited. For example, after crushing the capsule included in the capsule filter, the user burns the tobacco rod portion and sucks the inhalation port-end portion to obtain nicotine, the flavor component, and the like.

[0212] In the case where the tobacco product 10 is used as a tobacco product for electric heating tobacco products, it is commonly used in combination with an external device having a heating function. The electric heating tobacco product may be composed of, for example, an electric heating device including a heater member, a battery unit that serves as a power source for the heater member, and a control unit that controls the heater member and the above-described tobacco product inserted in the electric heating device so as to come into contact with the heater member. An example of the electric heating tobacco product is described in detail below.

<Electric Heating Tobacco Product>

[0213] Examples of the electric heating tobacco product include an electric heating tobacco product that heats the inside of the tobacco rod portion 20 of the tobacco product 10 as illustrated in Fig. 9 (hereinafter, also referred to as "inside heating-type electric heating tobacco product") and an electric heating tobacco product that heats the outer periphery of the tobacco product 10 as illustrated in Fig. 10 (hereinafter, also referred to as "outside heating-type electric heating tobacco product").

[0214] An electric heating tobacco product according to a first embodiment is described below with reference to Fig. 9.

[0215] When an electric heating tobacco product 40 is used, a tobacco product 10 is inserted into an electric heating device 30 so as to come into contact with a heater member 34 disposed in the electric heating device 30.

[0216] The electric heating device 30 includes a body 31 formed of a resin or the like and a battery unit 32 and a control unit 33 that are disposed inside the body 31.

[0217] When the tobacco product 10 is inserted into the electric heating device 30, first, the tobacco filler included in the tobacco rod portion 20 is brought into contact with the heater member 34 and the entirety of the heater member 34 is then inserted into the tobacco filler.

[0218] The heater member 34 of the electric heating device 30 produces heat due to the control performed by the control unit 33. As a result of the heat transmitting to the tobacco filler of the tobacco product 10, the aerosol-source material, flavor component, and the like included in the tobacco filler become volatilized.

[0219] The heater member 34 of the electric heating device 30 may be, for example, a sheet-like heater, a tabular heater, or a tubular heater. The sheet-like heater is a flexible, sheet-shaped heater. Examples thereof include a heater including a film (thickness: about 20 to 225 μm) formed of a heat-resistant polymer, such as polyimide. The tabular heater is a stiff, flat sheet-shaped heater (thickness: about 200 to 500 μm). Examples thereof include a heater that includes, for example, a flat-sheet substrate and a resistance circuit disposed on the substrate, the resistance circuit serving as a heat-producing portion. The tubular heater is a hollow or solid tube-shaped heater. Examples thereof include a heater (thickness: about 200 to 500 μm) that includes, for example, a cylinder made of a metal or the like and a resistance circuit formed on the outer periphery of the cylinder, the resistance circuit serving as a heat-producing portion. Examples of the tubular heater further include pillar-shaped and cone-shaped heaters made of a metal or the like which include an internal resistance circuit that serves as a heat-producing portion. The cross-sectional shape of the tubular heater may be, for example, a circular shape, an oval shape, a polygonal shape, or the shape of a polygon with rounded corners.

[0220] In the case where the electric heating tobacco product is an inside heating-type electric heating tobacco product as illustrated in Fig. 9, the tabular heater, the pillar-shaped heater, and the cone-shaped heater can be used. In the case where the electric heating tobacco product is an outside heating-type electric heating tobacco product as illustrated in Fig. 10, the sheet-like heater, the tabular heater, and the tubular heater can be used.

[0221] The length of the heater member 34 in the longitudinal direction may fall within the range of T ± 5.0 mm, where T [mm] represents the length of the tobacco rod portion, which is constituted by the tobacco filler and the wrapping paper, in the longitudinal direction.

[0222] The heating conditions, such as the amount of heating time during which the heater member 34 heats the tobacco product 10 and the heating temperature at which the heater member 34 heats the tobacco product 10, can be predetermined for each electric heating tobacco product 40. For example, the heating conditions can be predetermined such that, after the tobacco product 10 has been inserted into the electric heating device 30, preheating is performed for a predetermined period of time to increase the temperature of at least a part of the tobacco filler included in the tobacco product 10 to X(°C) and the temperature is subsequently maintained to be a certain temperature equal to or less than X(°C).

[0223] The temperature X(°C) is preferably 150°C or more and 450°C or less in consideration of aerosol delivery. Specifically, the temperature X(°C) can be 150°C, 160°C, 170°C, 180°C, 190°C, 200°C, 210°C, 220°C, 230°C, 240°C, 250°C, 260°C, 270°C, 280°C, 290°C, 300°C, 310°C, 320°C, 330°C, 340°C, 350°C, 360°C, 370°C, 380°C, 390°C, 400°C, 410°C, 420°C, 430°C, 440°C, or 450°C.

[0224] In the electric heating tobacco product 40, a vapor including the aerosol-source material, the flavor component, etc. which is generated from the tobacco filler of the tobacco product 10 as a result of heating performed by the heater member 34 is delivered into the oral cavity of the user through the mouthpiece member.

EXAMPLES

[0225] The present invention is described further specifically with reference to Examples below. The present invention is not limited by the following description of Examples without departing from the summary thereof.

<Preparation of Tip Paper>

[Sample Preparation]

(1) Paper Layer

[0226] A base paper having the properties described in Table 1 (flame resistant, waterproof paper produced by Feurstein) was used (hereinafter, also referred to simply as "base paper").

(2) Laminated Body Including $CaCO_3$-Containing Layer and Paper Layer

[0227] A solution including calcium carbonate and a binder was prepared. The solution was applied to the above paper layer such that the weight of the solution deposited per unit surface area was 13 gsm. The resulting coating was dried

to prepare a laminated body including a $CaCO_3$-containing layer and a laminated body including the paper layer (hereinafter, also referred to as "laminated body 1"). Table 1 lists the properties of the laminated body 1.

(3) Laminated Body Including $CaCO_3$-Containing Layer, Paper Layer, Adhesive Layer, and Oil-Resistant Layer

[0228] An oil-resistant material-containing solution was applied to the paper layer-side surface of the laminated body 1 such that an oil-resistant layer having a Kit value of 12 could be formed. The resulting coating was dried to prepare a laminated body including the $CaCO_3$-containing layer, the paper layer, an adhesive layer, and an oil-resistant layer (hereinafter, also referred to as "laminated body 2"). Table 1 lists the properties of the laminated body 2.

[Evaluation Properties]

(Brightness and Opacity)

[0229] One of the surfaces of the base paper and the $CaCO_3$-containing layer-side surfaces of the laminated bodies 1 and 2 were evaluated in terms of brightness and opacity. Specifically, brightness and opacity were measured in accordance with ISO 2470 and ISO 2471, respectively, with a brightness-opacity measuring machine (produced by Murakami Color Research Laboratory Co., Ltd., Model No.: WMS-1).

(Glossiness)

[0230] One of the surfaces of the base paper and the $CaCO_3$-containing layer-side surfaces of the laminated bodies 1 and 2 were evaluated in terms of glossiness. Specifically, a glossiness value at an incidence angle and light-receiving angle of 20° and a glossiness value at an incidence angle and light-receiving angle of 60° which were based on ISO 8254-1:2009 were determined with Gloss Checker IG-331 (produced by HORIBA, Ltd.).

(Tensile Strength and Elongation)

[0231] The tensile strength and elongation of each of the base paper and the laminated bodies 1 and 2 having a width of 15 mm were measured with a tensile testing machine E-L (produced by Toyo Seiki Seisaku-sho, Ltd.) on the basis of JIS P 8113.

(Surface Smoothness)

[0232] One of the surfaces of the base paper and the $CaCO_3$-containing layer-side surfaces of the laminated bodies 1 and 2 were evaluated in terms of glossiness with a Bekk smoothness testing machine.

(Kit Value)

[0233] One of the surfaces of the base paper and surfaces of the laminated bodies 1 and 2 which were present on a side opposite to the side on which the $CaCO_3$-containing layer was present were evaluated in terms of Kit value. Specifically, Kit value was measured in accordance with JAPAN TAPPI paper pulp testing method No. 41:2000 "Paper and Board-Oil Repellency Testing Method-Kit Method".

[Table 1]

Item	Unit	Base paper	Laminated body 1	Laminated body 2
Basis weight	g/m^2	37	50	51
Thickness	mm/100	4.2	4.4	4.5
Brightness	%	88 or more	82	82
Opacity	%	81 or more	83	83
Glossiness (20°)	%	9	34	34
Glossiness (60°)	%	26	48	48
Tensile strength (longitudinal)	N/15mm	24.0 or more	35	36

(continued)

Item	Unit	Base paper	Laminated body 1	Laminated body 2
Elongation (longitudinal)	%	1.0 or more	1.7	1.8
Smoothness (surface)	see	88 or more	2000	120
Kit value	-	<1	<1	12

[Test 1: Evaluation of Clarity of Decoration]

[0234] The base paper and the laminated body 1 were evaluated in terms of clarity of decoration. Specifically, printing (gravure printing) was performed using an ink (silver ink produced by Tokyo Printing Ink Mfg. Co., Ltd. on one of the surfaces of the base paper and the $CaCO_3$-containing layer-side surface of the laminated body 1. The printed surfaces were inspected with an optical microscope for the clarity of decoration formed by the ink. Fig. 11 illustrates the evaluation results.

[0235] The results shown in Fig. 11 confirm that both characters and lines formed on the laminated body 1, which included a $CaCO_3$-containing layer, had higher clarity than those formed on the base paper. This is presumably because it was smooth and the likelihood of particles of the silver ink penetrating the paper was reduced.

[Test 2: Evaluation of Oil Stain]

[0236] The above base paper and the laminated bodies 1 and 2 were evaluated in terms of oil stain. Specifically, 0.15 mL of medium-chain triglyceride (MCT) was added dropwise onto one of the surfaces of the atom, the paper layer-side surface of the laminated body 1, and the oil-resistant layer-side surface of the laminated body 2. The degree of diffusion of MCT was determined at 1 minute, 5 minutes (corresponding to common smoking time), and 10 minutes after the addition. MCT is a component included in capsules of common capsule filters, and 0.15 mL of MCT corresponds to the amount of MCT included in 2 capsules. The degree of diffusion of MCT was calculated by determining the minimum and maximum diameters on the basis of the shape of the spread MCT droplet which was observed in the evaluation and averaging the minimum and maximum diameters. Fig. 12 includes photographs illustrating the degree of diffusion of MCT at 10 minutes later. Note that the photograph of the laminated body 2 in Fig. 12 is a photograph taken after the MCT present on the laminated body had been wiped off subsequent to the evaluation, because the MCT did not seep into the laminated body at all and flowed off on the laminated body.

[0237] Furthermore, opacity was determined before the addition of MCT and at 5 minutes after the addition of MCT (0.01 ml/cm^2). A change in the opacity (after addition of MCT - before addition of MCT) was also determined. Opacity was determined by the same method as described above.

[0238] Table 2 lists the results of evaluation of MCT. Table 3 lists the results of opacity evaluation. Note that the following evaluation results are the averages with n = 3.

[Table 2]

	Degree of diffusion of MCT (cm)		
	After 1 minute	After 5 minutes	After 10 minutes
Base paper	3.4	4.5	50
Laminated body 1	3.4	4.0	4.0
Laminated body 2	0.9	1.0	1.0

[Table 3]

	Opacity (%)		
	Before addition of MCT	After addition of MCT	Opacity change (after addition of MCT - before addition of MCT)
Base paper	86	72	-14
Laminated body 1	78	40	-39

(continued)

	Opacity (%)		
	Before addition of MCT	After addition of MCT	Opacity change (after addition of MCT - before addition of MCT)
Laminated body 2	77	77	0

[0239] The results illustrated in Fig. 12 and described in Table 2 confirm that there was no significant change in the degree of diffusion of MCT between the base paper and the laminated body 1 and that the laminated body 2, which included the oil-resistant layer, had a lower degree of diffusion of MCT than these samples. This is presumably because the oil-resistant layer reduced the diffusion of the sample.

[0240] The results described in Table 3 confirm that, as for opacity, the transparency of the laminated body 1, which did not include an oil-resistant layer but included a $CaCO_3$-containing layer, was degraded compared with the base paper and that the transparency of the laminated body 2, which included an oil-resistant layer, could be maintained. This is presumably because the oil-resistant layer reduced the seeping of the sample.

[0241] Thus, it was confirmed that the laminated body 2, which is the tip paper according to this embodiment, reduces the diffusion of MCT and degradation of transparency.

[0242] The above-described test results confirm that the present invention provides a tip paper for tobacco products with capsule filters which reduces the likelihood of a component included in the capsule included in the capsule filter seeping into the surface of the tip paper and which enables the surface to be clearly decorated and a tobacco product that includes the above-described tip paper.

Reference Signs List

[0243]

10 tobacco product
11 $CaCO_3$-containing layer
12 paper layer
13 oil-resistant layer
14 tip paper
15 adhesive layer
16 capsule
17 filter
18 capsule filter
19 mouthpiece portion
20 tobacco rod portion
21 cooler
22 perforation
30 electric heating device
31 body
32 battery unit
33 control unit
34 heater member
40 electric heating tobacco product

Claims

1. A tip paper for tobacco products with capsule filters, the tip paper being composed of three or more layers, the tip paper comprising at least a $CaCO_3$-containing layer, a paper layer, and an oil-resistant layer,

wherein the $CaCO_3$-containing layer, the paper layer, and the oil-resistant layer are laminated on top of one another in this order,
wherein the $CaCO_3$-containing layer and the paper layer are arranged adjacent to each other,
wherein a content of the $CaCO_3$-containing layer is 2.0 gsm or more, and

wherein the $CaCO_3$-containing layer has a surface smoothness of 400 seconds or more and 3000 seconds or less.

2. The tip paper for tobacco products with capsule filters according to claim 1, wherein the $CaCO_3$-containing layer has a linear decoration having a width of 0.5 mm or less, the linear decoration being formed on at least a part of a surface of the $CaCO_3$-containing layer, the surface being on a side opposite to a side on which the paper layer is arranged adjacent to the $CaCO_3$-containing layer.

3. The tip paper for tobacco products with capsule filters according to claim 1 or 2, wherein a surface of the oil-resistant layer, the surface being on a side opposite to a side on which the paper layer is present, has a Kit value of 12.

4. The tip paper for tobacco products with capsule filters according to any one of claims 1 to 3, wherein the $CaCO_3$-containing layer further includes kaolin.

5. The tip paper for tobacco products with capsule filters according to any one of claims 1 to 4, wherein the $CaCO_3$-containing layer is a layer including particles containing $CaCO_3$, and wherein the particles have an average size of 0.1 μm or more and 20.0 μm or less.

6. A rod-like tobacco product comprising a tobacco rod portion, a mouthpiece portion including a capsule filter, and a tip paper wrapped around the tobacco rod portion and the mouthpiece portion,
wherein the tip paper is the tip paper for tobacco products with capsule filters according to any one of claims 1 to 5.

7. The tobacco product according to claim 6,

wherein the mouthpiece portion has a perforation formed therein, and
wherein the perforation is disposed in a region sandwiched between two planes, the two planes being a plane that passes through a point 15 mm from a center of a capsule included in the capsule filter toward a inhalation port of the tobacco product in a longitudinal direction of the tobacco product, the plane being perpendicular to the longitudinal direction, and a plane that passes through a point 15 mm from the center toward the tobacco rod portion in the longitudinal direction, the plane being perpendicular to the longitudinal direction.

8. The tobacco product according to 6 or 7, the tobacco product being used for cigarettes.

9. The tobacco product according to 6 or 7, the tobacco product being used for electric heating tobacco products.

10. An electric heating tobacco product comprising an electric heating device, the electric heating device including a heater member, a battery unit serving as a power source for the heater member, and a control unit that controls the heater member, and the tobacco product according to claim 9 inserted therein so as to come into contact with the heater member.

FIG. 1

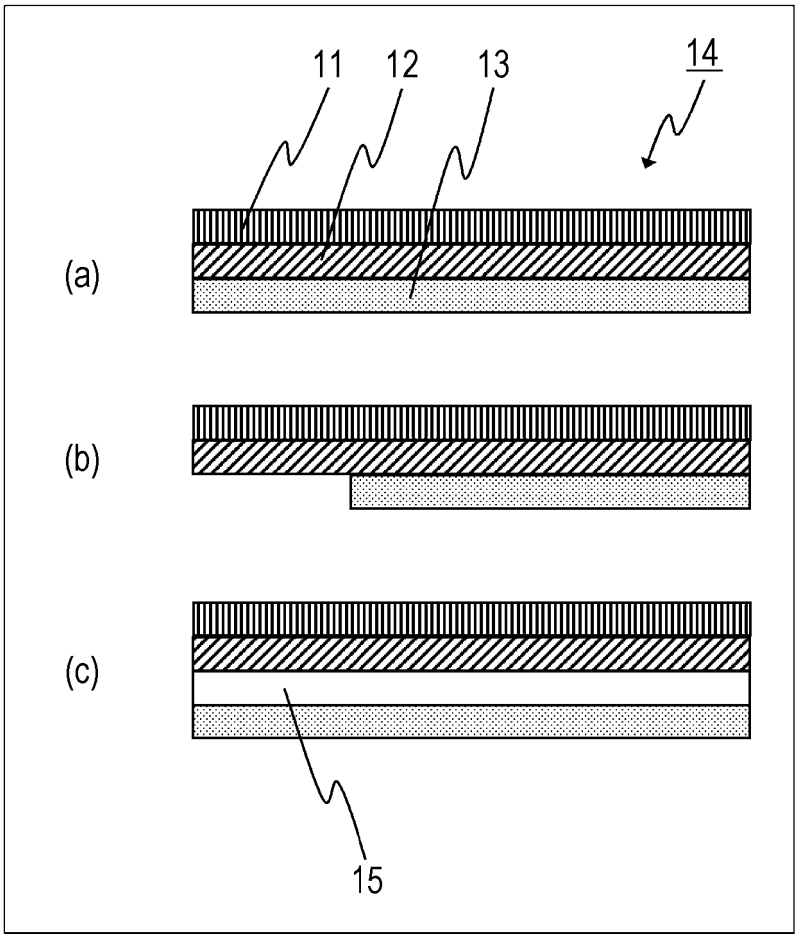


FIG. 2

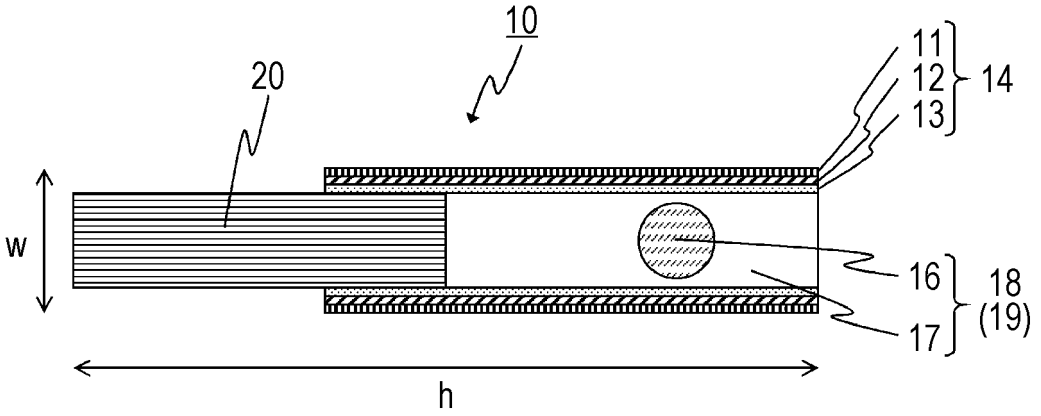


FIG. 3

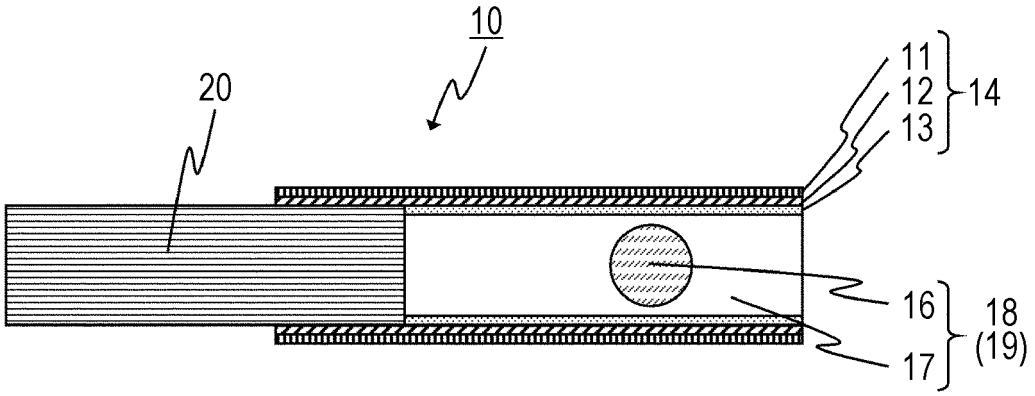


FIG. 4

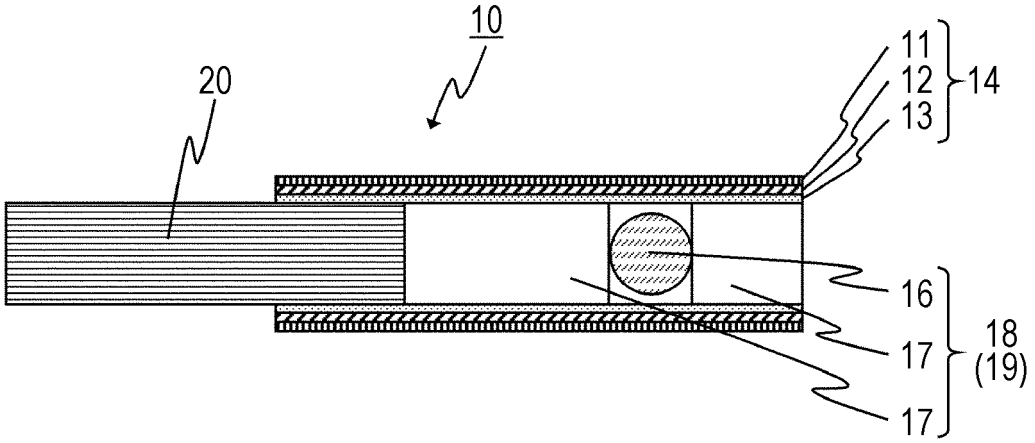


FIG. 5

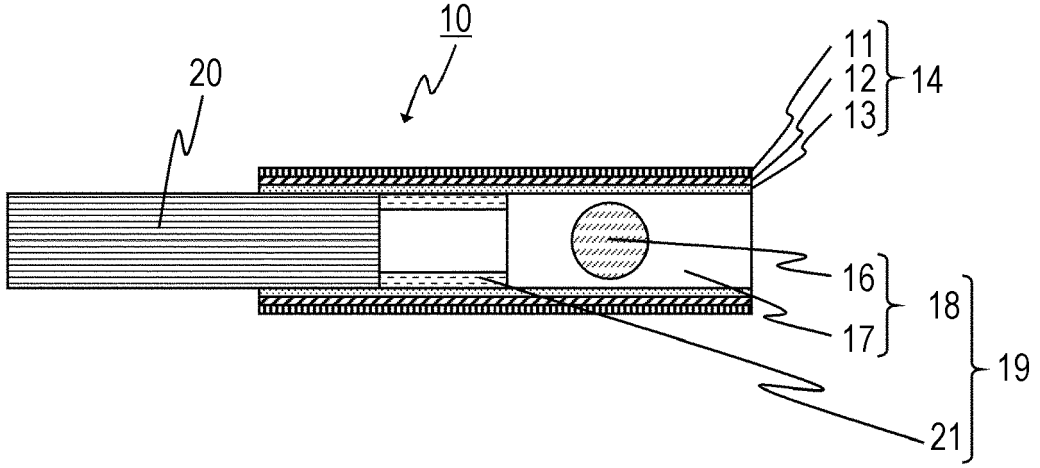


FIG. 6

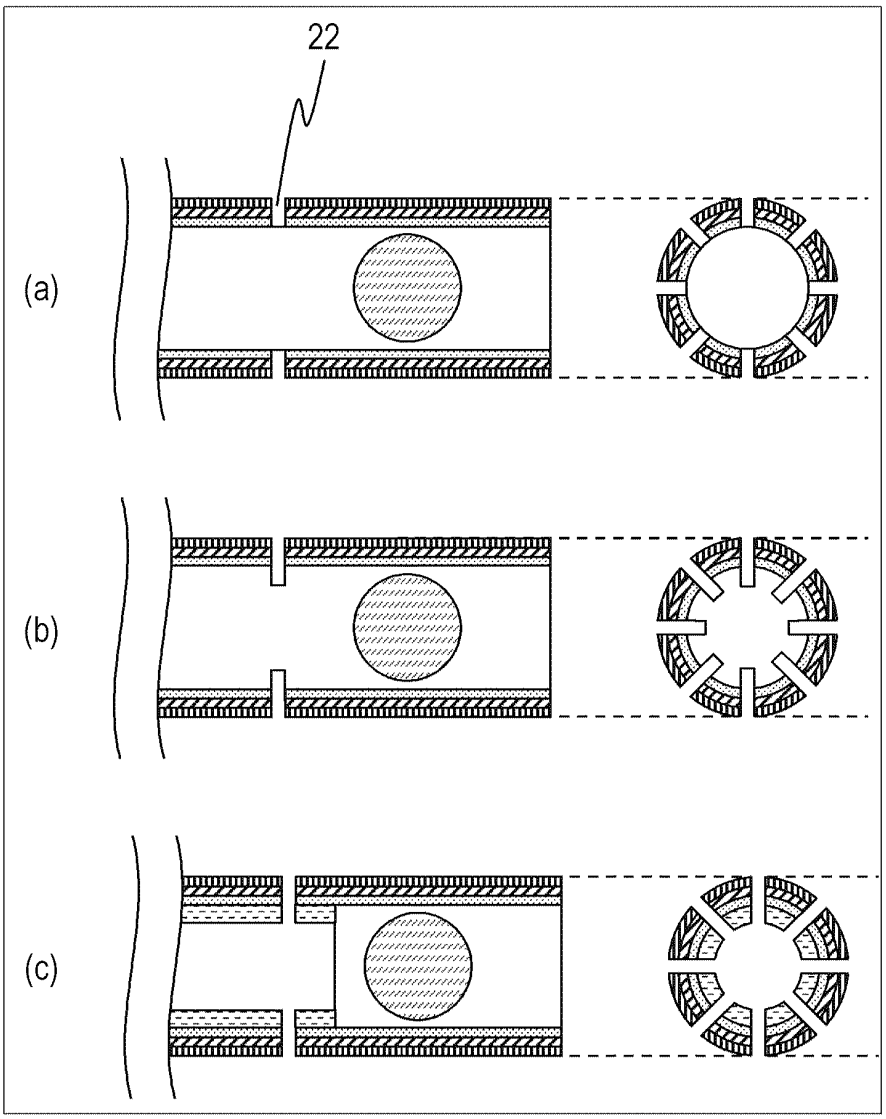


FIG. 7

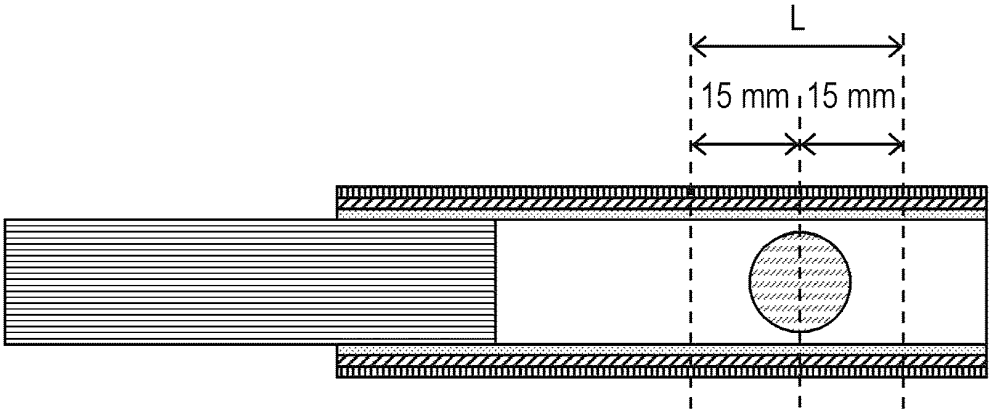


FIG. 8

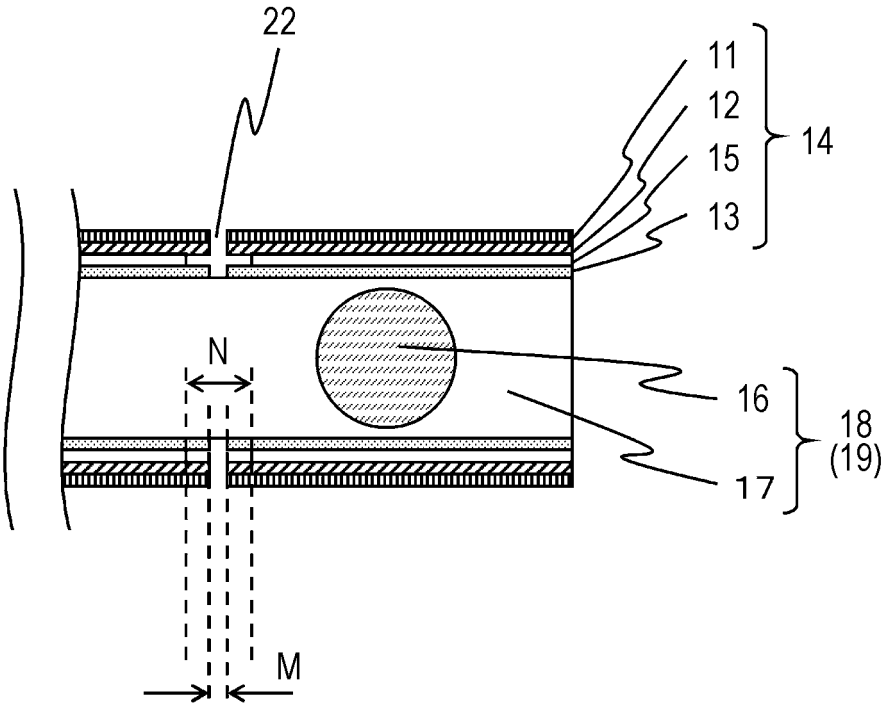


FIG. 9

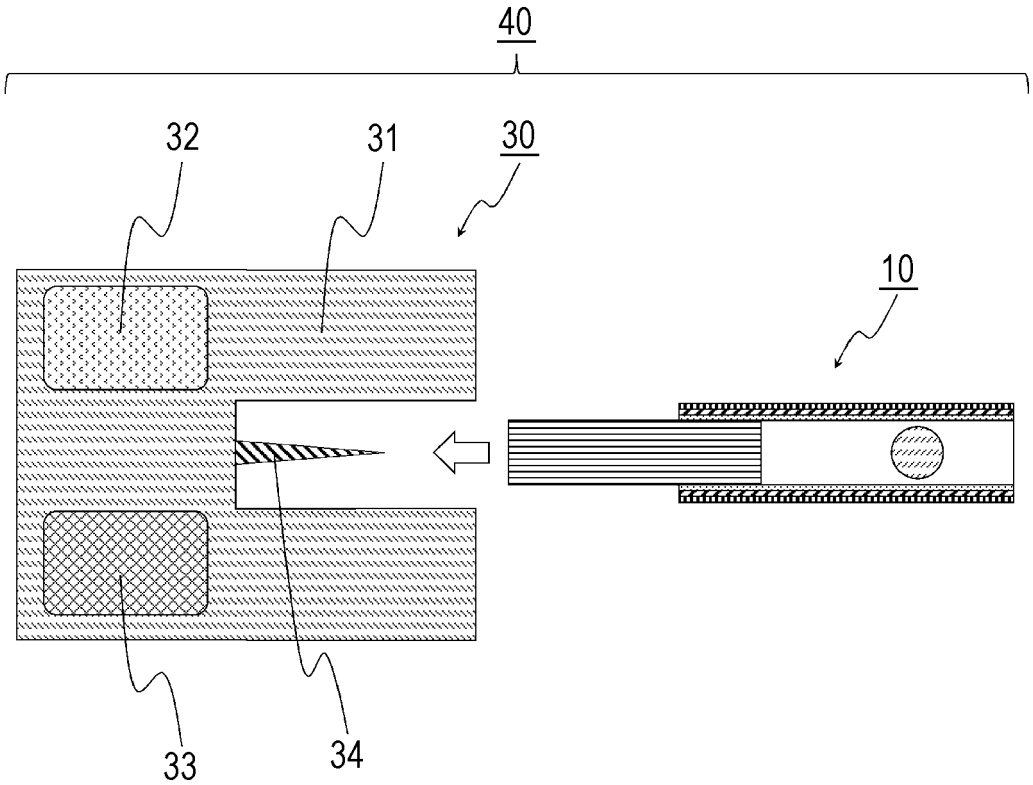


FIG. 10

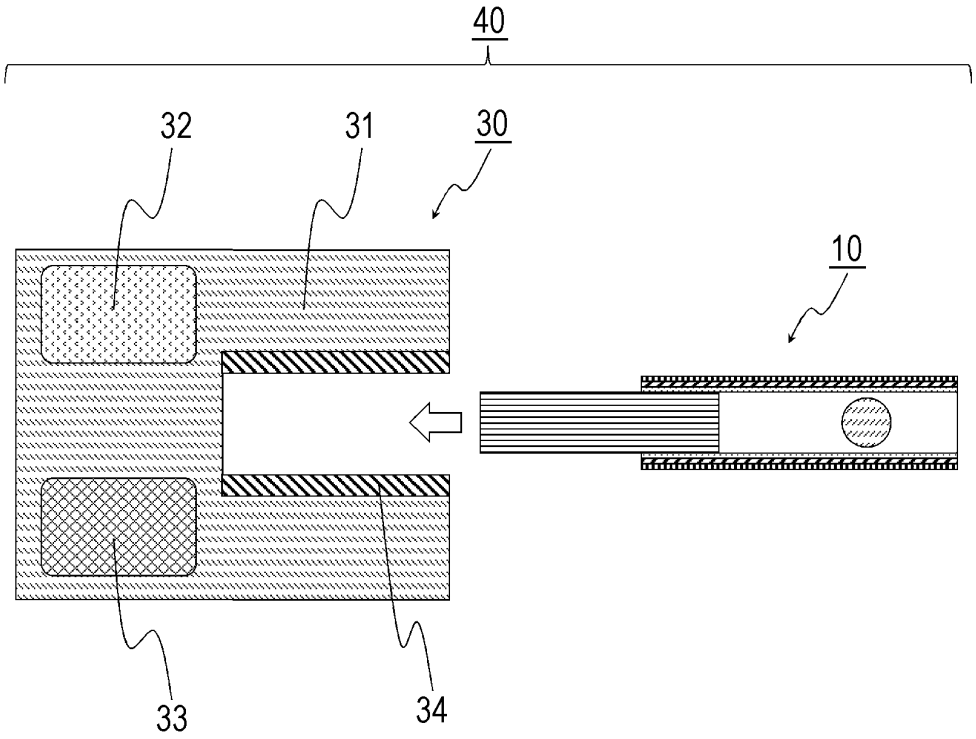


FIG. 11

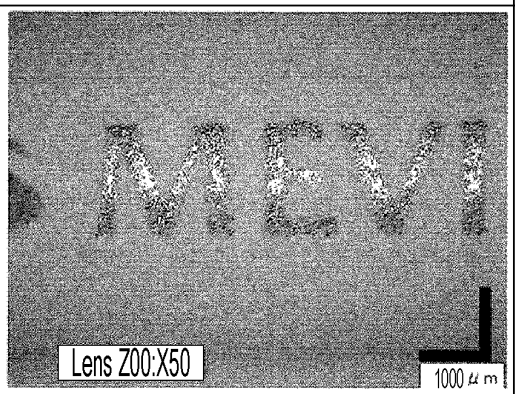
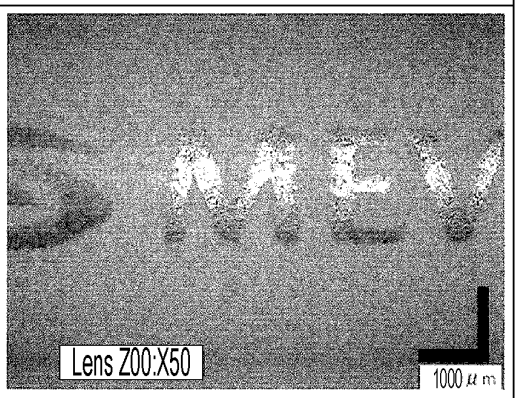
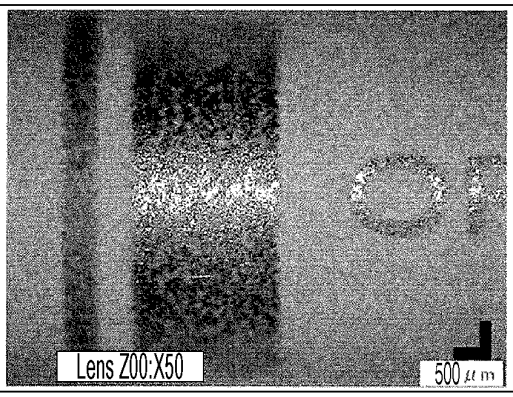
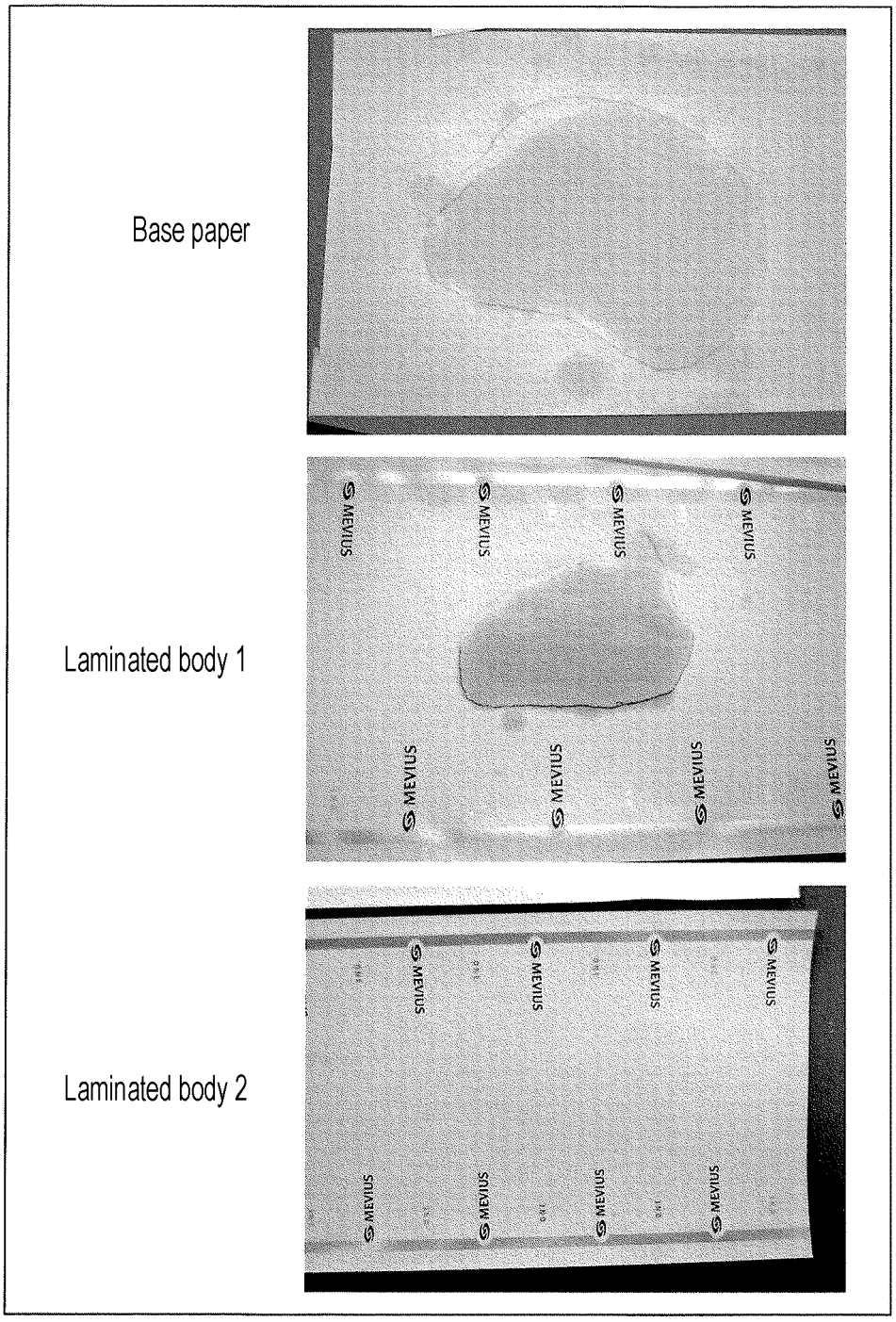
	Base paper	Laminated body 1
Character		
Line		

FIG. 12



INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2021/036410

A. CLASSIFICATION OF SUBJECT MATTER

B32B 9/00(2006.01)i; ***D21H 19/38***(2006.01)i; ***D21H 27/00***(2006.01)i; ***D21H 27/30***(2006.01)i; ***A24D 1/02***(2006.01)i; ***A24D 3/04***(2006.01)i; ***A24F 40/20***(2020.01)i
FI: A24D1/02; A24D3/04; A24F40/20; D21H19/38; D21H27/00 D; D21H27/30 A; B32B9/00 A

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)

B32B9/00; D21H19/38; D21H27/00; D21H27/30; A24D1/02; A24D3/04; 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 5-171599 A (KIMBERLY CLARK CO.) 09 July 1993 (1993-07-09) paragraphs [0009], [0010]	1-10
A	WO 2011/152316 A1 (JAPAN TOBACCO INC.) 08 December 2011 (2011-12-08) paragraph [0022]	1-10

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

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
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11 November 2021	**22 November 2021**
Name and mailing address of the ISA/JP **Japan Patent Office (ISA/JP)** **3-4-3 Kasumigaseki, Chiyoda-ku, Tokyo 100-8915** **Japan**	Authorized officer Telephone No.

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/JP2021/036410

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