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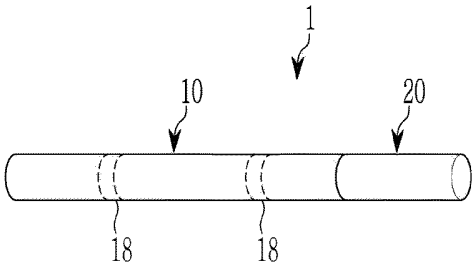
(54) **COATING COMPOSITION FOR LOW IGNITION PROPENSITY CIGARETTE PAPER, TOBACCO USING SAME, AND METHOD FOR MANUFACTURING LOW IGNITION PROPENSITY CIGARETTE PAPER**

(57) A coating composition for low ignition propensity cigarette paper, according to one embodiment of the present invention, comprises 10-30 wt% of gum arabic, 25-35 wt% of maltose, 15-30 wt% of ethanol and 10-40 wt% of water.

FIG. 1



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Description

Technical Field

[0001] A coating composition for a low ignition propensity cigarette paper, a cigarette using the same, and a method for manufacturing a low ignition propensity cigarette paper are provided.

Background Art

[0002] In general, in order to manufacture a tobacco, various kinds of leaf tobaccos are processed by blending them to the desired aroma and taste. The processed tobacco leaves are then carved out to produce cut tobacco leaves, which are surrounded by a cigarette paper to produce a filter-less cigarette. A filter is then attached to the filter-less cigarette as needed.

[0003] The cigarette paper may be made of flax, wood pulp, and the like, which is required to maintain the combustibility and the taste of the tobacco when the cigarette paper is burned. The tobacco filter may include an activated carbon, a flavoring material, and the like, and may be composed of a mono-filter or a multi-filter, and the cigarette filter is surrounded by a cigarette filter wrapping paper. The cut tobacco leaves and the cigarette filter are connected by a tipping paper, and the tipping paper may include fine holes.

[0004] The cigarette paper may be not only made to deliver a target tar and a target nicotine during smoking due to the appropriate porosity and combustibility, but may also be made to give a cigarette its unique smoking taste.

[0005] A low ignition propensity cigarette paper may include a band-shaped coating portion, and the coated band has a low porosity. Accordingly, when the combustion of the cigarette reaches the coated band, the amount of oxygen introduced into the tobacco cut leaves may decrease to extinguish the cigarette.

[0006] Korean Patent Application Publication No. 2013-0045157 discloses a coating composition for forming a coating portion of the low ignition propensity cigarette paper and a cigarette using the same. The coating composition includes alpha starch, maltodextrin, ethanol, and water. However, it may be less than 2 months to maintain the properties of the coating composition at 20 °C or more due to the inherent aging characteristics of the starch, and the service life may further be shortened because the aging occurs drastically when the coating composition is exposed to the low temperature. In addition, such coating composition may reduce the low ignition performance at the high temperature drying, and it may be difficult to dry the coating composition coated on the cigarette paper at the room temperature drying. In addition, such coating composition may have a large change in viscosity in a dynamic state such as rotation, such that a coating amount may decrease during coating, and the workability may decrease.

SUMMARY OF THE INVENTION

Technical Problem

[0007] One embodiment of the present invention is to extend the service life and the expiration date of the coating composition in the low ignition propensity cigarette paper.

[0008] One embodiment of the present invention is to extend the viscosity retention period of time of the coating composition in the low ignition propensity cigarette paper at the room temperature and the low temperature conditions.

[0009] One embodiment of the present invention is to improve the dynamic viscosity retention rate of the coating composition in the low ignition propensity cigarette paper.

[0010] One embodiment of the present invention is to increase the amount of coating the coating composition on the low ignition propensity cigarette paper during the coating operation on the cigarette paper, and to maintain the coating amount constantly.

[0011] One embodiment of the present invention is to improve the productivity and the workability of the tobacco.

[0012] One embodiment of the present invention is to allow the room temperature drying of the coating composition in the low ignition propensity cigarette paper by improving the drying ability.

[0013] One embodiment of the present invention is to reduce the manufacturing cost of the low ignition propensity cigarette paper, and to shorten the manufacturing time.

[0014] In addition to the above objects, embodiments according to the present invention may be used to achieve other objects which have not been specifically mentioned.

Technical Solution

[0015] The coating composition for the low ignition propensity cigarette paper according to an embodiment of the present invention includes 10% to 30% by weight of arabic gum, 25% to 35% by weight of maltose, 15% to 30% by

weight of ethanol, and 10% to 40% by weight of water.

[0016] The viscosity of the coating composition for the low ignition propensity cigarette paper may be more than 100 cPs and less than 1000 cPs.

[0017] The dynamic viscosity retention rate may be 84% or more when the rotational speed of the coating composition for the low ignition propensity cigarette paper increases from about 20 rpm to 100 rpm.

[0018] A cigarette according to an embodiment of the present invention includes a cigarette column portion, and a low ignition propensity cigarette paper surrounding the cigarette column portion and including a coating portion formed by drying a coating composition, wherein the coating composition includes 10% to 30% by weight of arabic gum, 25% to 35% by weight of maltose, 15% to 30% by weight of ethanol, and 10% to 40% by weight of water.

[0019] The cigarette may further include a cigarette filter portion.

[0020] The cigarette filter portion may further include at least one of filter member.

[0021] The cigarette filter portion may include at least one of an adsorbent and a flavoring agent.

[0022] A method for manufacturing a low ignition propensity cigarette paper according to an embodiment of the present invention includes steps of preparing a coating composition, coating the coating composition on one side of a cigarette paper and then letting out the cigarette paper, and heating and drying the cigarette paper coated with the coating composition to form a band-shaped coating portion, thereby producing the low ignition propensity cigarette paper.

[0023] Here, the coating composition includes 10% to 30% by weight of arabic gum, 25% to 35% by weight of maltose, 15% to 30% by weight of ethanol, and 10% to 40% by weight of water.

[0024] The step of preparing the coating composition may include a weighing step of measuring the weight of arabic gum, maltose, ethanol, and water, respectively, and a blending step of mixing arabic gum, maltose, ethanol, and water The blending step may include a step of mixing the ethanol with the water to preparing a dispersion medium, the first dispersion step of dispersing the maltose in the dispersion medium, the second dispersion step of dispersing the arabic gum in the dispersion medium, the first homogenization step of rotating a composition made by the second dispersion step at the speed of 250 rpm to 350 rpm, and the second homogenization step of rotating a composition made by the first homogenization step at the speed of 150 rpm to 250 rpm while controlling the temperature of 40 °C or less.

[0025] The unit dispersion amount of maltose may be 10 g/L/min to 20 g/L/min, and the rotational speed may be 17000 rpm to 20000 rpm in the first dispersion step, and the unit dispersion amount of arabic gum may be 10 g/L/min to 20 g/L/min, and the rotational speed may be 17000 rpm to 20000 rpm in the second dispersion step.

[0026] The coating portion may include two or more portions, and the two or more portions may be spaced apart from each other.

Advantageous Effects

[0027] A coating composition for a low ignition propensity cigarette paper according to an embodiment of the present invention, a cigarette using the same, and a method for manufacturing a low ignition propensity cigarette paper may extend the service life and the expiration date of the coating composition in the low ignition propensity cigarette paper, may extend the viscosity retention period of time of the coating composition in the low ignition propensity cigarette paper at the room temperature and the low temperature conditions, may improve the dynamic viscosity retention rate of the coating composition in the low ignition propensity cigarette paper, may increase the amount of coating the coating composition on the low ignition propensity cigarette paper during the coating operation on the cigarette paper, and to maintain the coating amount constantly, may improve the productivity and the workability of the tobacco, may allow the room temperature drying of the coating composition in the low ignition propensity cigarette paper by improving the drying ability, and may reduce the manufacturing cost of the low ignition propensity cigarette paper, and to shorten the manufacturing time.

BRIEF DESCRIPTION OF THE DRAWINGS

[0028]

Figure 1 is a perspective view schematically showing a cigarette according to an embodiment of the present invention.

Figure 2 is a cross-sectional view schematically showing a cigarette according to an embodiment of the present invention.

Figure 3 is a cross-sectional view schematically showing a cigarette according to an embodiment of the present invention.

Figure 4 is a graph showing a result of comparing the viscosity uniformity in the first and second homogenization steps with the viscosity uniformity before the homogenization step is performed in the manufacturing process of the coating composition according to Example 1.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0029] An embodiment of the present invention will be described in detail with reference to the accompanying drawings so that those skilled in the art may easily practice the present invention. The present invention may be modified in various different ways, and is not limited to an embodiment described herein. In the drawings, parts irrelevant to the description are omitted in order to clearly describe the present invention, and the same reference numerals are used for the same or similar elements throughout the specification. In addition, the detailed description of the widely known technologies will be omitted.

[0030] In order to clearly express various layers and regions in the drawings, the thickness is shown on an enlarged scale. When a portion of a layer, a film, a region, a plate, and the like is "on" another part, this includes not only another part is "directly on" but also other parts are in the middle thereof. On the other hand, when a part is "directly on" another part, there are no other parts in the middle thereof. Conversely, when a portion of a layer, a film, a region, a plate, and the like is "below" another part, this includes not only another part is "directly below" but also other parts are in the middle thereof. On the other hand, when a part is "directly below" another part, there are no other parts in the middle thereof.

[0031] Throughout the specification, when a part "includes" a certain component, it means that it may further include other components, except to exclude other components unless specifically stated otherwise.

[0032] A cigarette paper and a cigarette according to an embodiment of the present invention will be described in detail with reference to Figures 1 to 3.

[0033] Figure 1 is a perspective view schematically showing a cigarette according to an embodiment of the present invention, Figure 2 is a cross-sectional view schematically showing a cigarette according to an embodiment of the present invention, and Figure 3 is a cross-sectional view schematically showing a cigarette according to an embodiment of the present invention.

[0034] As shown in Figures 1 and 2, a cigarette 1 includes a cigarette column portion 10 which is burned by a fire, and a cigarette filter portion 20 which filters cigarette smoke. The cigarette column portion 10 may be surrounded by a cigarette paper 19, and the cigarette filter portion 20 may be surrounded by a cigarette filter wrapping paper 28. The cigarette column portion 10 may be connected to the cigarette filter portion 20 by a tipping paper 29. The circumference of the cigarette 1 may be from about 5 mm to about 30 mm. The cigarette filter portion 20 may be omitted.

[0035] The cigarette column portion 10 includes cut tobacco leaves 11 carved from the leaf tobacco processed by various methods.

[0036] The cigarette filter portion 20 may include the first filter portion 21. The first filter portion 21 may be formed of acetate tow, paper, or the like. The cigarette filter portion 20 may be a multiple filter including two or more filter members. For example, referring to Figure 3, the cigarette filter portion 20 may include the second filter portion 22 and the third filter portion 23. In addition, the cigarette filter portion 20 may include three filter members and four filter members.

[0037] The cigarette filter portion 20 may include an adsorbent, a flavoring agent, and the like. For example, the adsorbent may be an activated carbon, or the like, and the flavoring agent may be an herbal flavor material, or the like. The one or more filter elements in the multiple filter may include at least one of an adsorbent and a flavoring agent. For example, referring to Figure 3, at least one of the second filter portion 22 and the third filter portion 23 may include at least one of an adsorbent and a flavoring agent.

[0038] The cigarette paper 19 includes one or more coating portions 18. For example, the coating portions 18 may have a band-shape, but may have various shapes. The number, thickness, and shape of the coating portions 18 may be variously modified, and the spacing of the plurality of coating portions 18 may also be variously modified. For example, the coating composition is coated on the cigarette paper 19 having a porosity of about 10 cu to about 100 cu, so that two bands per cigarette 1 which may have about 5 mm to about 10 mm of the width, respectively, may be disposed between 15 mm from the tip of the cigarette column portion 10 and 5 mm from the cigarette filter portion 20.

[0039] The coating portions 18 may lower the porosity of the cigarette paper 19. Accordingly, when the combustion of the cigarette reaches the coating portions 18, the amount of oxygen introduced into the cigarette column portion 10 decreases, thereby extinguishing the cigarette 1. The cigarette paper 19 including the coating portions 18 is also referred to as a low ignition propensity cigarette paper. The coating portions 18 are coated with a coating composition. For example, the porosity of the cigarette paper 19 may be about 10 cu to about 100 cu, and the porosity of the coating portions 18 may be about 3 cu to about 20 cu. The thickness of the base paper of the cigarette paper may be about 30 μm to about 100 pm, and the basis weight of the base paper may be about 15 g/m^2 to about 80 g/m^2. The thickness of the coating portions 18 may be about 5 μm or less, and the basis weight of the coating portions 18 may be about 15 g/m^2 or less. The weight ratio of the coating composition to the total weight of the cigarette paper 19 and the coating composition may be about 40% by weight or less. When the coating portions 18 have a band-shape, the mass of the coating composition per band may be about 2.5 mg or less.

[0040] The coating composition includes arabic gum, maltose, ethanol, and water.

[0041] Arabic gum may be prepared by drying and desalting the sap of the arabian gum tree.

[0042] Arabic gum may block the pores contained in the cigarette paper 19 to obstruct the oxygen supply, thereby

allowing the low ignition performance of the coating composition.

[0043] Arabic gum may have a relatively low viscosity even at the high concentrations, and accordingly, it may be easier to control the concentration in the low viscosity state. Therefore, a coating composition having the low viscosity and high concentration characteristics may be prepared, and the combustion strength may be easily controlled by adjusting the coating concentration of the coating composition.

[0044] Arabic gum may have a large solubility in water, so that the dispersion stability of the coating composition may improve, thereby forming the coating portions 18 having the composition and concentration dispersed uniformly. In addition, the coating composition including the arabic gum may have a higher drying speed at the higher temperature than the conventional coating composition. Therefore, the coating composition according to the embodiment may improve the workability of the coating process.

[0045] Arabic gum may reduce aging phenomena of the coating composition, which may extend the service life, the shelf life, the viscosity retention period of time, or the expiration date of the coating composition, compared to conventional coating compositions including alpha starch. In addition, the dynamic viscosity retention rate in the dynamic situation in which a coating roller operates may be improved, and the viscosity change which may occur in the low temperature environment of about 2 °C may decrease greatly.

[0046] In addition, arabic gum is excellent in heat resistance, thereby maintaining the performance even at the high temperature, and an off-flavor generation during combustion in the drying process may be reduced.

[0047] Arabic gum may be included in an amount of about 10% to about 30% by weight based on the total coating composition. Within this range, the dispersion stability of the coating composition may improve and the drying speed may increase, so that the workability of the coating process may further improve, and the low viscosity retention period of time may be greatly extended, the viscosity retention rate may significantly improve, and the aging phenomena may decrease thereby extending the expiration date.

[0048] Maltose may block the pores contained in the cigarette paper 19 to obstruct the oxygen supply, thereby allowing the low ignition performance of the coating composition, similar to arabic gum. However, since the average size of maltose is smaller than the average size of arabic gum, maltose may block the fine pores which are relatively small in diameter or size.

[0049] Maltose may also effectively lower the aging rate of arabic gum and significantly delay the aging rate of the coating composition. Therefore, the viscosity retention period of time may be extended, the viscosity retention may improve, and the viscosity change may be minimized even when exposed to the low temperature of about 2 °C, compared to the conventional coating composition containing maltodextrin.

[0050] In addition, maltose may be dissolved in ethanol. When maltose is used with ethanol, maltose may lower the viscosity of the coating composition, and may increase the bonding strength between the constituents of the coating composition.

[0051] In addition, the coating composition including maltose may have a higher drying rate at the high temperature than the conventional coating composition. Therefore, the coating composition according to the embodiment may improve the workability of the coating process.

[0052] Maltose may be included from about 25% to about 35% by weight based on the total coating composition. Within this range, the low viscosity maintenance period of time may be greatly extended, the viscosity retention may significantly improve, the aging phenomena may greatly decrease thereby extending the expiration date, and the workability of the coating process may improve.

[0053] Ethanol may increase the solid amount of the coating composition, and the viscosity of the coating composition may be controlled by adjusting the amount of ethanol.

[0054] In addition, ethanol may increase the affinity of the coating roller and the coating composition in the coating operation by lowering the surface tension of the coating composition. Accordingly, the coating amount may increase, and the coating amount may be kept constant, thereby improving the coating workability. The low ignition performance may also improve.

[0055] In addition, ethanol may improve the drying property of the coating composition and increase the drying speed at the high temperature, thereby enhancing the workability of the coating process, and reducing the phenomenon in which the strength weakens due to the absorption of water into the cigarette paper.

[0056] Ethanol may be used in an amount of about 15% to about 30% by weight based on the total coating composition. Within this range, the viscosity of the coating composition may be properly maintained, and the workability of the coating process may further improve to increase the productivity of tobacco. The low ignition performance of the cigarette may also further improve.

[0057] Water may be used to adjust the concentration of other constituents in the coating composition or the concentration of the coating composition. Water may also enhance the absorbency of the coating composition into the cigarette paper 19.

[0058] Water may be used from about 10% to about 40% by weight relative to the total coating composition. Within this range, the concentration and viscosity of the coating composition may further be controlled easily.

[0059] The various effects caused by the coating composition may be more pronounced when all the constituents are mixed as compared to when each constituent of the coating composition is present alone. The various effects described above may occur by combining each constituent, and synergistic effects may also occur by combining each constituent.

[0060] The coating composition for the low ignition propensity cigarette paper according to an embodiment includes about 10 wt% to about 30 wt% arabic gum, about 25 wt% to about 35 wt% maltose, about 15 wt% to about 30 wt% ethanol, and about 10 wt% to about 40 wt% water. Within this range, the service life and the expiration date of the coating composition may be further extended, and the viscosity retention period of time of the coating composition may be significantly extended at the room temperature (about 25 °C) and the low temperature (about 2 °C) conditions. In addition, the dynamic viscosity retention, which indicates the viscosity retention of the coating composition when rotated by a rotational shaft at the predetermined rotational speed, may further improve. In addition, within the above-mentioned range, the coating amount of the coating composition for the low ignition propensity cigarette paper may increase, the coating amount may be kept constant, and the drying property may improve to enhance the coating workability when coating the cigarette paper. In addition, the productivity and workability of tobacco may also improve.

[0061] The coating composition may further include one or more of citric acid, tartaric acid, lactic acid, malic acid, and ascorbic acid. Such materials may reduce the rot and deterioration of the coating composition to prolong the service life or the shelf life of the coating composition.

[0062] The coating composition may further include one or more of sodium benzoate, sodium sorbate, a grapefruit seed extract, and a cinnamon extract. Such materials may reduce the rot and deterioration of the coating composition to prolong the service life or the shelf life of the coating composition. In addition, when such materials are used in combination with the above-mentioned materials such as citric acid, tartaric acid, lactic acid, malic acid, or ascorbic acid, the expiration date of the coating composition may further be delayed.

[0063] The coating composition may further include one or more of xanthan gum, guar gum, amylopectin, and starch ester. Xanthan gum, guar gum, amylopectin, ester starch and the like may subsidiarily lower the viscosity of the coating composition and improve the dispersion property of the constituents, thereby prolonging the service life of the coating composition.

[0064] The viscosity of the coating composition needs to be appropriately adjusted, and the viscosity of the coating composition for the low ignition propensity cigarette paper according to the embodiment may be about 100 cPs or more and may be less than about 1000 cPs.

[0065] Since the coating composition fills the pores inside the cigarette paper 19, the optical and the low ignition characteristics of the cigarette paper 19 may be degraded when the viscosity of the coating composition is too low. For example, when the viscosity of the coating composition is less than about 100 cPs, the whiteness and the opacity of the cigarette paper 19 may decrease, and the rate of penetration of the coating composition into the cigarette paper, e.g. the diffusion coefficient, may increase, thereby reducing an amount of arabic gum and maltose remaining in the surface of the cigarette paper, and reducing the pore blocking ability or the low ignition performance. In addition, when the viscosity of the coating composition is less than about 100 cPs, the dynamic viscosity retention rate of the coating composition may significantly decrease.

[0066] Here, with regard to the dynamic viscosity retention rate, the coating composition may be coated on the cigarette paper 19 by a rotating device such as a coating roller. If the viscosity changes under a dynamic condition such as the increase of the rotational speed, the coating portions 18 may be formed at an uneven concentration, thereby degrading the low ignition performance and deteriorating the process workability. Therefore, the coating may be stably performed only when the viscosity change of the coating composition in the dynamic state is minimized.

[0067] Even when the viscosity of the coating composition is too high, the dynamic viscosity retention rate may be lowered. For example, when the viscosity of the coating composition is about 1000 cPs or more, the dynamic viscosity retention rate of the coating composition may greatly decrease, which may result in the formation of the coating portions 18 having a non-uniform shape and a non-uniform concentration, and the degradation of the coating process workability.

[0068] When the viscosity of the coating composition is adjusted to about 100 cPs or more and less than about 1000 cPs, the dynamic viscosity retention rate in case that the rotational speed of the coating composition increases from about 20 rpm to 100 rpm may be at least about 84%. In addition, the diffusion coefficient in case that the rotational speed of the coating composition increases from about 20 rpm to 100 rpm may be about 0.15 or less. Within this range, the coating process of the coating composition may be carried out stably, so that the coating amount transferred to the cigarette paper 19 may increase, and the coating amount may be kept constant.

[0069] Generally, the cigarette paper has a property that the strength weakens when the cigarette paper contacts with water. Therefore, after coating the conventional coating composition on a cigarette paper, a drying facility is used to remove moisture. In this case, the drying process may be mainly performed at the high temperature condition of about 200 °C or more, and as a result, the cost and time of cigarette production may increase, and the coating composition may deteriorate, thereby reducing the low ignition performance. In addition, the conventional coating composition may not be dried at the room temperature condition of about 25 °C.

[0070] However, in the case of the coating composition according to the embodiment, the drying property is excellent,

and the drying rate at the high temperature condition may be relatively very fast compared to the drying rate of the conventional coating composition. In addition, unlike the conventional coating composition, the coating composition according to the embodiment may be dried even at the room temperature condition. Thus, a separate drying facility may not be required, which may save the cost and time of the cigarette manufacture and keep the properties of the coating composition constant.

[0071] A method for manufacturing a low ignition propensity cigarette paper according to an embodiment includes steps of preparing a coating composition, coating the coating composition on one side of a cigarette paper and then letting out the cigarette paper, and heating and drying the cigarette paper coated with the coating composition to form a band-shaped coating portion, thereby producing the low ignition propensity cigarette paper.

[0072] Here, the coating composition includes 10% to 30% by weight of arabic gum, 25% to 35% by weight of maltose, 15% to 30% by weight of ethanol, and 10% to 40% by weight of water.

[0073] First, the step of preparing the coating composition is performed.

[0074] The step of preparing the coating composition may include a step of weighing constituents, a blending step, a step of checking the viscosity of the coating composition, and a step of letting out the coating composition.

[0075] The weighing step is a step of measuring the weight of each constituent that will constitute the coating composition. As the weight of arabic gum, maltose, and ethanol become greater than the weight of the water, the viscosity of the coating composition may increase. In addition, in case that a low ignition coating composition is used, the weight ratio of arabic gum, maltose, ethanol, water, and the like of the coating composition may be highly useful in order to exhibit the low ignition performance and simultaneously improve the productivity such as the drying property.

[0076] The blending step is a step of mixing constituents according to a predetermined mixing ratio.

[0077] The blending step may include a dispersion medium preparation step, the first dispersion step, the second dispersion step, the first homogenization step, and the second homogenization step.

[0078] First, the dispersion medium preparation step is to prepare a dispersion medium by mixing water with ethanol. At this time, the temperature of the dispersion medium may be maintained at about 25 °C to about 35 °C. Within this range, the influence of temperature which may occur during mixing may be minimized.

[0079] The first dispersion step is to disperse maltose while rotating the aforementioned dispersion medium. Here, the unit dispersion amount may be about 10 g/L/min to about 20 g/L/min, and the rotational speed of the dispersion medium may be about 17000 rpm to about 20000 rpm. Within this range, maltose may be effectively and uniformly dispersed in the dispersion medium.

[0080] The second dispersion step is to disperse arabic gum while rotating a composition which has undergone the first dispersion step. At this time, the unit dispersion amount may be 10 g/L/min to about 20 g/L/min, and the rotational speed of the composition may be from about 17000 rpm to about 20000 rpm. Within this range, arabic gum may be effectively and uniformly dispersed in the composition.

[0081] Subsequently, the first homogenization step is to rotate a composition at the speed of about 250 rpm to about 350 rpm by using equipment such as a double cross-type impeller, so that the viscosity may be uniform in all parts of the composition which has undergone the second dispersion step. Within this range, arabic gum and maltose may be homogeneously dispersed in the dispersion medium, and the viscosity may become uniform. At this time, the temperature of the composition may increase by the rotation.

[0082] In the second homogenization step, the temperature of the composition which has undergone the first homogenization step lowers below about 40 °C, and the composition is rotated at the speed of about 150 rpm to about 250 rpm by using equipment such as a homomixer. Within this range, arabic gum and maltose may be homogeneously dispersed in the dispersion medium, and the viscosity may become uniform.

[0083] In order to form the band-shaped coating portions uniformly, it is very important that the viscosity of the coating composition is kept uniform in all parts. A viscosity checking step and a step of letting out the coating composition is to finally check the viscosity uniformity in the coating composition through an inspection and then to let out the coating composition.

[0084] Subsequently, a coating composition is coated on the prepared cigarette paper, and the cigarette paper is let out.

[0085] For example, the cigarette paper rolled up in the form of a roll may be supplied to the coating apparatus through a roller, and the coating composition may also be coated on the cigarette paper through a roller.

[0086] Thereafter, the cigarette paper coated with the coating composition is heated and dried thereby forming the coating portions 18 in a band-shape, and then a low ignition propensity cigarette paper is finally manufactured. The heating may be processed by a separate heating device.

[0087] Here, the number, thickness, and shape of the coating portions 18 may be variously modified, and the spacing of the plurality of coating portions 18 may also be variously modified.

[0088] Hereinafter, the present invention will be described in more detail with reference to Examples, but the following Examples are merely examples of the present invention, and the present invention is not limited to the following Examples.

Experiment of setting an optimum unit dispersion amount of maltose and arabic gum

[0089] Arabic gum, maltose, ethanol, and water are weighed according to a mixing ratio, respectively, and water is mixed with ethanol to prepare a dispersion medium, and the temperature of the dispersion medium is maintained at about 30 °C through heating or cooling.

[0090] Maltose is dispersed in various unit dispersion amounts while maintaining a rotational speed of about 18000 rpm by using an impeller in this dispersion medium, and then the viscosity is measured (the first dispersion step). Arabic gum is then dispersed in various unit dispersion amounts while maintaining a rotational speed of about 18000 rpm (second dispersion step), and then the viscosity is measured. The results are shown in Table 1.

Table 1

Unit dispersion amount (g/L/min)	The first dispersion step (Maltose)	The second distribution step (Arabic gum)
5	30	50
10	30	190
15	55	200
20	50	720
250	50	1610
300	80	2750
350	170	No dispersion
400	680	No dispersion

[0091] Referring to Table 1, when the unit dispersion amount of maltose is 10 g/L/min to 20 g/L/min, and the unit dispersion amount of arabic gum is 10 g/L/min to 20 g/L/min, it may be seen that the viscosity of the composition is greater than 100 cPs and less than 1000 cPs.

Example 1

[0092] Arabic gum, maltose, ethanol, and water are weighed according to a mixing ratio, respectively, and water is mixed with ethanol to prepare a dispersion medium, and the temperature of the dispersion medium is maintained at about 30 °C through heating or cooling.

[0093] Maltose is dispersed in this dispersion medium at a unit dispersion amount of about 15 g/L/min by using an impeller at a rotational speed of about 18000 rpm. Arabic gum is then dispersed at a unit dispersion of about 15 g/L/min at a rotational speed of about 18000 rpm. At this time, the temperature of the composition may rise by the rotation, and the temperature is controlled so as not to exceed about 45 °C.

[0094] Next, the composition is rotated at a speed of about 300 rpm by using a double cross-type impeller, so that the viscosity becomes uniform. The temperature of the homogenized mixture is then lowered to about 30 °C and the composition is rotated at a speed of about 200 rpm by using a homomixer.

[0095] The constituents of the coating composition are arabic gum 15 wt%, maltose 35 wt%, ethanol 25 wt%, and water 25 wt%.

Example 2

[0096] A coating composition is prepared in the same manner as in Example 1 except that the constituents of the coating composition are arabic gum 20 wt%, maltose 30 wt%, ethanol 25 wt%, and water 25 wt%.

Example 3

[0097] A coating composition is prepared in the same manner as in Example 1 except that the constituents of the coating composition are arabic gum 25 wt%, maltose 25 wt%, ethanol 25 wt%, and water 25 wt%.

Example 4

[0098] The coating composition prepared in Example 1 is coated on a cigarette paper having a porosity of 60 cu, so

that two bands having a width of 7 mm, respectively, is formed on the cigarette paper at intervals of 20 mm. The porosity of the band is 4.5 cu. A cigarette is manufactured using the above prepared cigarette paper.

Comparative Example 1

[0099] A coating composition is prepared in the same manner as in Example 1 except that the constituents of the coating composition are arabic gum 10 wt%, maltose 40 wt%, ethanol 25 wt%, and water 25 wt%.

Comparative Example 2

[0100] Arabic gum, ethanol, and water are weighed according to a mixing ratio, respectively, and water is mixed with ethanol to prepare a dispersion medium, and the temperature of the dispersion medium is maintained at about 30 °C through heating or cooling.

[0101] Arabic gum is dispersed in this dispersion medium at a unit dispersion amount of about 32 g/L/min by using an impeller at a rotational speed of about 18000 rpm. At this time, the temperature of the composition may rise by the rotation, and the temperature is controlled so as not to exceed about 45 °C.

[0102] Next, the composition is rotated at a speed of about 300 rpm by using a double cross-type impeller, so that the viscosity becomes uniform. The temperature of the homogenized mixture is then lowered to about 30 °C and the composition is rotated at a speed of about 200 rpm by using a homomixer.

[0103] The constituents of the coating composition are arabic gum 50 wt%, ethanol 25 wt%, and water 25 wt%.

Comparative Example 3

[0104] Alpha starch, maltodextrin, ethanol, and water are weighed according to a mixing ratio, respectively, and water is mixed with ethanol to prepare a dispersion medium. Maltodextrin and alpha starch are sequentially added to this dispersion medium at a rotational speed of about 30000 rpm. The dispersion temperature is about 30 °C

[0105] The constituents of the coating composition are alpha starch 15 wt%, maltodextrin 35 wt%, ethanol 25 wt%, and water 25 wt%.

Comparative Example 4

[0106] A coating composition is prepared in the same manner as in Example 1 except that the coating composition includes maltodextrin instead of maltose.

[0107] The constituents of the coating composition are arabic gum 15 wt%, maltodextrin 35 wt%, ethanol 25 wt%, and water 25 wt%.

Comparative Example 5

[0108] A coating composition is prepared in the same manner as in Example 1, except that the coating composition includes sorbitol instead of maltose.

[0109] The constituents of the coating composition are arabic gum 15 wt%, sorbitol 35 wt%, ethanol 25 wt%, and water 25 wt%.

Comparative Example 6

[0110] A coating composition is prepared in the same manner as in Example 1, except that the coating composition includes sucrose instead of maltose. The constituents of the coating composition are arabic gum 15 wt%, sucrose 35 wt%, ethanol 25 wt%, and water 25 wt% .

Comparative Example 7

[0111] The coating composition prepared in Comparative Example 2 is coated on a cigarette paper having a porosity of 60 cu, so that two bands having a width of 7 mm, respectively, is formed on the cigarette paper at intervals of 20 mm. The porosity of the band is 3.1 cu. A cigarette is manufactured using the above prepared cigarette paper.

Comparative Example 8

[0112] A cigarette is manufactured in the same manner as in Comparative Example 7 except that the coating compo-

sition prepared in Comparative Example 4 is used.

Comparative Example 9

[0113] A cigarette is manufactured in the same manner as in Comparative Example 7 except that the coating composition prepared in Comparative Example 5 is used.

Comparative Example 10

[0114] A cigarette is manufactured in the same manner as in Comparative Example 7 except that the coating composition prepared in Comparative Example 6 is used.

Comparison of viscosity uniformity of coating compositions by the first and second homogenization steps

[0115] In Example 1, immediately after dispersing maltose and arabic gum in the dispersion medium, A sample of each position of the composition are taken, and then the viscosity is measured. A Sample of each position of the composition which has undergone the first homogenization step of rotating the composition at a speed of about 300 rpm is taken, and then the viscosity is measured. A Sample of each position of the composition which has undergone the second homogenization, which is to lower the temperature of the composition which has undergone the first homogenization step to about 30 °C and rotate at a speed of about 200 rpm, is taken, and then the viscosity is measured. A graph comparing each viscosity measurement result is shown in Figure 4.

[0116] Referring to Figure 4, the viscosity is measured by a total of 40 sampling. As a result, it may be seen that the viscosity of each position of the composition immediately after dispersion of maltose and arabic gum is more uniform than the first homogenization step and the second homogenization step.

Measurement of changes in viscosity of coating compositions over time

[0117] Table 2 shows the results of measuring the viscosity change of the coating compositions of Example 1 and Comparative Example 3 over time at 25 °C and 20 rpm. At this time, the viscosity is measured by BrookField, Spindle No. 3 equipment.

Table 2

Type	directly after preparing	1 month	2 months	3 months	4 months	5 months	6 months	8 months	10 months
Comparative Example 3	1950	1960	1990	1970	-	-	-	-	-
Example 1	330	320	330	330	330	330	320	330	330

[0118] Referring to Table 2, the coating composition according to Comparative Example 3 is unable to measure and use after 3 months, because the viscosity after 3 months exceeds about 10000 cPs of the measurable range.

[0119] However, in the case of the coating composition according to Example 1 may be seen to maintain a constant viscosity of about 330 cPs for 10 months. Thus, it may be seen that the viscosity retention period of time, the service life and the expiration date of the coating composition according to Example 1 are significantly extended.

Measurement of changes in viscosity of coating compositions over time at the low temperature

[0120] Table 3 shows the results of measuring the viscosity change of the coating compositions of Example 1 and Comparative Example 3 over time at 2 °C and 20 rpm.

Table 3

Type	directly after preparing	1 hour	2 hours	3 hours	4 hours	1 day	1 month	3 months	6 months
Comparative Example 3	1960	3120	4870	6125	-	-	-	-	-
Example 1	270	270	260	270	270	270	280	270	270

[0121] Referring to Table 3, the coating composition according to Comparative Example 3 is unable to measure and use over 4 hours, because the composition is deteriorated due to excessively high viscosity over 4 hours.

[0122] However, in the case of the coating composition according to Example 1, the relatively low viscosity is maintained for 6 months.

[0123] From this, the coating composition according to the comparative example is deteriorated in a very fast time when exposed to the low temperature. However, in the case of the coating composition according to Example 1, it may be seen that there is little change in viscosity over time, and there is also little change in viscosity even at a low temperature such as about 2 °C, so that the viscosity is hardly affected by the storage temperature. Accordingly, it may be seen that the coating composition according to the embodiment has a greatly extended the expiration date, and the markedly improved viscosity retention rate and stability at a low temperature, compared with the conventional coating composition.

Experiment of setting an optimum viscosity of coating compositions

[0124] In the starting condition of 25 °C and 20 rpm, the results of measuring the dynamic viscosity retention rate and the diffusion coefficient of the coating compositions according to Example 1, Example 2, Example 3, Comparative Example 1, and Comparative Example 2 are shown in Table 4.

[0125] Here, the diffusion coefficient is measured by placing an analytical sample between two chambers and supplying a different type of gas to each chamber, and then checking the gas concentration on each opposite chamber after passing through the sample. As the diffusion coefficient becomes smaller, the amount of gas passing through the sample becomes smaller, which means that the coating amount may be high and be kept constant when the sample is coated on cigarette paper.

Table 4

Type	Viscosity by Spindle Speed (cPs)		Dynamic Viscosity Retention Rate (%)	Diffusion coefficient	
	20 rpm	100 rpm		Average	Standard Deviation
Less than100 cPs (Comparative Example 1)	87	45	52	0.37	0.21
100~300 cPs (Example 1)	210	200	95	0.11	0.03
300~500 cPs (Example 2)	390	370	95	0.12	0.02
500~1000 cPs (Example 3)	750	630	84	0.15	0.12
1000 cPs or more (Comparative Example 2)	1050	780	74	0.27	0.22

[0126] Referring to Table 4, at the 20 rpm rotation condition, the viscosity of the coating composition according to Comparative Example 1 measures 87 cPs, the viscosity of the coating composition according to Example 1 measures 210 cPs, the viscosity of the coating composition according to Example 2 measures 390 cPs, the viscosity of the coating composition according to Example 3 measures 750 cPs, and the viscosity of the coating composition according to Comparative Example 2 measures 1050 cPs.

[0127] Here, as a result of measuring the viscosity retention rate (dynamic viscosity retention rate) when the rotational speed increases to 100 rpm, it may be seen that the coating compositions according to Comparative Examples 1 and 2 show a relatively low viscosity retention rate, whereas the coating compositions according to Examples 1 to 3 exhibit a high dynamic viscosity retention of about 84% or more.

[0128] Accordingly, in the case of the coating composition according to the embodiment, the viscosity decrease does not occur even if the coating roller rotates at a high speed. Since the amount of the coating composition transferring to the cigarette paper is kept constant, it may be expected that the coating workability improves.

[0129] In addition, the coating compositions according to Comparative Examples 1 and 2 have a relatively high diffusion coefficient, whereas the coating compositions according to Examples 1 to 3 may have a diffusion coefficient of about 0.15 or less.

[0130] Accordingly, it may be seen that the amount of coating on the cigarette paper will be relatively high from the low diffusion coefficient value of the coating composition according to the embodiment. It may be expected that the manufacturing time shortens, the manufacturing cost drops, and the productivity of tobacco improves.

Experiment of measuring a dynamic viscosity retention rate by the constituents of coating compositions

[0131] In the starting condition of 25 °C and 20 rpm, the results of measuring the dynamic viscosity retention rate of the coating compositions according to Example 1, Comparative Example 3, Comparative Example 4, Comparative Example 5, and Comparative Example 6 are shown in Table 5.

Table 5

Type	Viscosity by Spindle Speed (cPs)		Dynamic Viscosity Retention Rate (%)
	20 rpm	100 rpm	
Comparative Example 3	1950	1700	87
Comparative Example 4	200	110	55
Comparative Example 5	250	80	32
Comparative Example 6	230	65	28
Example 1	210	205	98

[0132] Referring to Table 5, at the 20 rpm rotation condition, the viscosity of the coating composition according to Comparative Example 3 measures 1950 cPs, the viscosity of the coating composition according to Comparative Example 4 measures 200 cPs, the viscosity of the coating composition according to Comparative Example 5 measures 250 cPs, the viscosity of the coating composition according to Example 3 measures measured at 750 cPs, and the viscosity of the coating composition according to Comparative Example 2 measures 1050 cPs.

[0133] Here, as a result of measuring the viscosity retention rate (dynamic viscosity retention rate) when the rotational speed increases to 100 rpm, it may be seen that the coating composition according to Example 1 is 98% greatly better than the coating composition according to Comparative Examples 3 to 6. Accordingly, in the case of the coating composition according to the embodiment, the viscosity decrease does not occur even if the coating roller rotates at a high speed. Since the amount of the coating composition transferring to the cigarette paper is kept constant, it may be expected that the coating workability improves.

Comparative experiment of drying rate of coating compositions

[0134] The results of measuring the solvent drying rate of the coating compositions according to Comparative Example 3 and Example 1 over time under the high temperature condition of 105 °C are shown in Table 6.

Table 6

Type	Solvent drying rate (%) of the coating composition over time at 105 °C						
	1 minute	2 minutes	3 minutes	4 minutes	5 minutes	10 minutes	30 minutes
Comparative Example 3	19	30	49	62	72	87	100
Example 1	96	100	100	100	100	100	100

[0135] Referring to Table 6, it may be seen that all the solvent is dried only after 30 minutes in the coating composition according to Comparative Example 3, whereas the drying is completed in 2 minutes in the coating composition according to Example 1. Accordingly, it may be seen that the coating composition according to the embodiment has a very excellent drying property. From this, it may be expected that the coating workability improves, the tobacco production cost drops, and the manufacturing time shortens.

Comparison of low Ignition performance and diffusion coefficient according to production rate changes by coating compositions and drying conditions

[0136] As a result of measuring the low ignition performance and the diffusion coefficient of the cigarette according to Comparative Example 7 and Example 4 dependent on the cigarette production rates at a room temperature (25 °C) and a high temperature (220 °C) are shown in Tables 7 and 8.

[0137] Here, the low ignition performance represents the extinguishing rate of cigarettes placed on 10 sheets of filter paper by an ISO-12863 Ignition Propensity measuring method.

Table 7

Cigarette	Drying Temp.	Low ignition performance (%) by cigarette production rates (cpm)						
		2000	3000	4000	5000	6000	8000	10000
Comparative Example 7	25 °C	100	45	-	-	-	-	-
	220 °C	100	100	100	90	90	85	80
Example 4	25 °C	100	100	100	100	100	100	100
	220 °C	100	100	100	100	100	100	100

[0138] Referring to Table 7, in the case of the cigarette according to Comparative Example 7, the low ignition performance decreases under the high temperature drying condition while the production rate increases from 2000 cpm (cigarette per minute) to 10000 cpm. However, the low ignition performance is still maintained in the case of the cigarette according to Example 4.

[0139] In addition, in the case of cigarettes according to Comparative Example 7, the low ignition performance may not measure at a production rate of 4000 cpm or more under the room temperature drying condition, because the coating portions on the cigarette paper have not dried so that the cigarette production is impossible. However, the low ignition performance is still maintained in the case of the cigarette according to Example 4.

[0140] Accordingly, the high temperature drying process of 220 °C or higher is necessary in the case of the cigarette according to the comparative example. However, it may be seen that the drying property of the coating composition is relatively excellent in the case of tobacco according to the embodiment, so that the room temperature drying process is feasible irrespective of the cigarette production rates. As a result, it may be expected that the high temperature drying equipment is omitted in the production process, thereby improving the coating workability, reducing cigarette manufacturing costs, and saving manufacturing time.

Table 8

Cigarette	Drying Temp.	Diffusion coefficient by cigarette production rates (cpm)						
		2000	3000	4000	5000	6000	8000	10000
Comparative Example 7	25 °C	0.15	0.67	-	-	-	-	-
	220 °C	0.12	0.13	0.14	0.13	0.21	0.22	0.23

(continued)

Cigarette	Drying Temp.	Diffusion coefficient by cigarette production rates (cpm)						
		2000	3000	4000	5000	6000	8000	10000
Example 4	25 °C	0.15	0.16	0.15	0.16	0.16	0.16	0.17
	220 °C	0.15	0.15	0.15	0.16	0.16	0.16	0.16

[0141] Referring to Table 8, in the case of the cigarette according to Comparative Example 7, the diffusion coefficient increases under the high temperature drying condition while the production rate increases from 2000 cpm (cigarette per minute) to 10000 cpm. However, the diffusion coefficient is maintained almost the same in the case of the cigarette according to Example 4.

[0142] In addition, in the case of cigarettes according to Comparative Example 7, the low ignition performance may not measure at a production rate of 4000 cpm or more under the room temperature drying condition, because the coating portions on the cigarette paper have not dried so that the cigarette production is impossible. However, the diffusion coefficient increases slightly in the case of the cigarette according to Example 4.

[0143] Accordingly, in the case of the cigarette according to the embodiment, it may be seen that the coating amount of the coating composition is kept constant under both the high temperature and room temperature conditions irrespective of the cigarette production rate. As a result, it may be expected that a cigarette including the same level of the coating portions is produced, so that the quality of the cigarette is kept constant and the coating workability improves.

Comparison of intermediate extinguishing rate of cigarettes dependent on cigarette production rates by coating compositions

[0144] For the cigarettes according to Comparative Examples 7 to 10, and Example 4, the results of measuring the intermediate extinguishing rate dependent on the changes in cigarette production rate are shown in Table 9.

[0145] Here, the intermediate extinguishing rate represents the extinguishing rate of cigarettes placed on 10 sheets of filter paper by the ISO-12863 Ignition Propensity measuring method, and may be used in the same meaning as the above-described low ignition performance.

Table 9

Cigarette	Intermediate extinguishing rate (%) by cigarette production rates (cpm)					
	5000	6000	7000	8000	9000	10000
Comparative Example 7	100	100	100	100	100	100
Comparative Example 8	100	100	90	52.5	0	5
Comparative Example 9	100	85	10	0	0	0
Comparative Example 10	60	0	0	0	0	0
Example 4	100	100	100	100	100	100

[0146] Referring to Table 9, in the case of cigarettes according to Comparative Examples 8 to 10, as the cigarette production rate increases, the quality of the coating lowers thereby reducing the intermediate extinguishing rate rapidly. In particular, it may be seen that the intermediate extinguishing rate is none at a speed of 9000 cpm or more. However, it may be seen that an intermediate extinguishing rate of 100% is maintained regardless of the cigarette production rate in the case of tobacco according to Example 4.

[0147] Accordingly, it may be expected that the coating workability is excellent and the productivity of the cigarette is high in the case of the cigarette according to the embodiment.

Quality comparison experiment of cigarettes

[0148] The quality comparison results of the cigarettes according to Comparative Example 7 and Example 4 are shown in Table 10.

[0149] Intermediate extinguishing rate measures by the ISO-12863 Ignition Propensity measuring method. Free-Air Self Extinguish (FASE) measures the propensity to burn during smoking, similar to the ISO12863 method for intermediate

extinguishing rate, but measures for an ignited cigarette in the air without other media in a smoldering state.

Table 10

Cigarette	Intermediate extinguishing rate (%)	FASE (%)	Smoke ingredients		
			Tar (mg/cig.)	Nicotine (mg/cig.)	Puff No.
Comparative Example 7	97.5	65	1.1	0.10	7.5
Example 4	100	50	1.1	0.10	7.6

[0150] Referring to Table 10, the cigarette according to Comparative Example 7 and the cigarette according to Example 4 show comparable levels of the intermediate extinguishing rate and the smoke constituents.

[0151] However, in relation to FASE representing an extinguishing rate in a smoldering state, the FASE value of the cigarette according to Example 4 is lower than the FASE value of the cigarette according to Comparative Example 7. Accordingly, it may be seen that the cigarette according to the embodiment is less likely to be extinguished during smoking of the smoke than the cigarette according to the comparative example.

Sensory evaluation of cigarettes

[0152] The quality of the cigarettes according to Comparative Example 7 and Example 4 is evaluated by a panel of 30 people and is shown in Table 11.

Table 11

Cigarettes	Tobacco taste strength	Smoke amount	Consistency of taste	Off-flavor	Aftertaste
Comparative Example 7	4.888	5.740	5.850	3.410	5.250
Example 4	4.930	5.740	6.350	3.380	5.700

[0153] Referring to Table 11, the cigarettes according to Comparative Example 7 and the cigarettes according to Example 4 is found to be similar.

Evaluation of coating quality dependent on a ratio of arabic gum and maltose

[0154] The results of evaluating the viscosity, the diffusion coefficient and the intermediate extinguishing rate of the coating composition according to each constituent amounts including arabic gum, maltose, ethanol, and water, and the cigarettes thereof are shown in Table 12.

Table 12

Constituent amounts (wt%)				Viscosity (cPs)	Diffusion Coefficient	Intermediate extinguishing rate (%)
Arabic gum	Maltose	Ethanol	Water			
5	10	29	56	26	0.786	10
7.5	15	26.5	51	58	0.665	35
10	20	24	46	100	0.312	75
12.5	25	21.5	41	130	0.256	100
15	30	19	36	200	0.211	100
17.5	35	16.5	31	250	0.182	100
20	40	14	26	350	0.175	100
22.5	45	11	21.5	550	0.305	77
25	50	8.5	16.5	830	0.425	67

(continued)

Constituent amounts (wt%)				Viscosity (cPs)	Diffusion Coefficient	Intermediate extinguishing rate (%)
Arabic gum	Maltose	Ethanol	Water			
27.5	50	7.6	14.9	1300	0.750	15
30	50	6.8	13.2	1600	0.833	0
30	20	20	30	370	0.235	100
30	30	16	24	420	0.275	100
30	40	12	18	680	0.365	75

[0155] Referring to Table 12, it may be seen that the diffusion coefficient is less than 0.4 and the intermediate extinguishing rate is 75% or more in the cases of arabic gum 10 wt% to 20 wt% and maltose 20 wt% to 40 wt%, and in the cases of arabic gum 30 wt% and maltose 20 wt% to 40 wt% .

[0156] In the case of the coating composition beyond the above-mentioned range of arabic gum and maltose, it may be seen that the diffusion coefficient is relatively high due to the viscosity of the coating composition being too low or too high, and the intermediate extinguishing rate after coating is relatively low.

[0157] Accordingly, in the cases of arabic gum 10 wt% to 20 wt% and maltose 20 wt% to 40 wt%, and in the cases of arabic gum 30 wt% and maltose 20 wt% to 40 wt%, the diffusion coefficient is relatively low, thereby increasing the coating amount of the coating composition on the cigarette paper. As a result, the coating workability may improve, and the low ignition performance may also improve.

Evaluation of coating quality dependent on ethanol amounts

[0158] With respect to the coating compositions containing arabic gum, maltose, ethanol, and water, and a cigarette thereof, the results of measuring the surface tension and the intermediate extinguishing rate dependent on the ethanol amounts are shown in Table 13.

[0159] Here, the surface tension measures by the Sessile Drop method in which each coating composition makes droplets, and the droplets are placed on a solid surface, and then measures using the shape of the droplets.

Table 13

Constituent amounts (wt%)				surface tension	intermediate extinguishing rate (%)
Ethanol	Arabic gum	Maltose	Water		
0	17.5	35	47.5	76.1	0
10	17.5	35	37.5	55.7	45
12.5	17.5	35	35	48.6	60
15	17.5	35	32.5	42.7	93
17.5	17.5	35	30	40.2	100
20	17.5	35	27.5	37.6	100
22.5	17.5	35	25	36.3	100
25	17.5	35	22.5	35.1	100
27.5	17.5	35	20	34.5	100
30	17.5	35	17.5	33.6	78
32.5	17.5	35	15	32.8	0
35	17.5	35	12.5	No dispersion	-

[0160] Referring to Table 13, it may be seen that the intermediate extinguishing rate is relatively high and the low ignition performance is excellent in the case of ethanol 15 wt% to 30 wt% in the coating composition.

[0161] Accordingly, when ethanol is 15 wt% to 30 wt%, it may be seen that the low ignition performance of the coating

composition further improves, and the ethanol lowers the surface tension of the coating composition to an appropriate level, so that the affinity between the coating roller and the coating composition may increase. As a result, the coating amount may increase and be kept constant, thereby improving the coating workability.

[0162] Although the preferred embodiments of the present invention have been described in detail above, the scope of the present invention is not limited thereto, and various modifications and improvements of those skilled in the art using the basic concepts of the present invention defined in the following claims also belongs to the scope of the present invention.

Claims

1. A coating composition for a low ignition propensity cigarette paper comprising:

10% to 30% by weight of arabic gum,
25% to 35% by weight of maltose,
15% to 30% by weight of ethanol, and
10% to 40% by weight of water.

2. The coating composition for the low ignition propensity cigarette paper according to claim 1, wherein viscosity of the coating composition for the low ignition propensity cigarette paper is more than 100 cPs, less than 1000 cPs.

3. The coating composition for the low ignition propensity cigarette paper according to claim 2, wherein a dynamic viscosity retention rate is 84% or more when a rotational speed of the coating composition for the low ignition propensity cigarette paper increases from about 20 rpm to 100 rpm.

4. A cigarette, comprising:

a cigarette column portion, and
a low ignition propensity cigarette paper surrounding the cigarette column portion and including a coating portion formed by drying a coating composition,
wherein the coating composition comprises 10% to 30% by weight of arabic gum, 25% to 35% by weight of maltose, 15% to 30% by weight of ethanol, and 10% to 40% by weight of water.

5. The cigarette according to claim 4, wherein the cigarette further comprises a cigarette filter portion.

6. The cigarette according to claim 5, wherein the cigarette filter portion comprises at least one of filter member.

7. The cigarette according to claim 4, wherein the cigarette filter portion comprises at least one of an adsorbent and a flavoring agent.

8. A method for manufacturing a low ignition propensity cigarette paper, comprising steps of:

preparing a coating composition,
coating the coating composition on one side of a cigarette paper to discharge the cigarette paper, and
heating and drying the cigarette paper coated with the coating composition to form a coating portion having a band-shape, thereby producing the low ignition propensity cigarette paper,
wherein the coating composition comprises 10% to 30% by weight of arabic gum, 25% to 35% by weight of maltose, 15% to 30% by weight of ethanol, and 10% to 40% by weight of water.

9. A method for manufacturing a low ignition propensity cigarette paper according to claim 8, wherein the step of preparing the coating composition comprising:

a weighing step of measuring a weight of the arabic gum, the maltose, the ethanol, and the water, respectively, and
a blending step of mixing the arabic gum, the maltose, the ethanol, and the water.

10. A method for manufacturing a low ignition propensity cigarette paper according to claim 9, wherein the blending step comprising:

a step of mixing the ethanol with the water to preparing a dispersion medium,
a first dispersion step of dispersing the maltose in the dispersion medium,
a second dispersion step of dispersing the arabic gum in the dispersion medium,
a first homogenization step of rotating a composition made by the second dispersion step at a speed of 250 rpm to 350 rpm, and
a second homogenization step of rotating a composition made by the first homogenization step at a speed of 150 rpm to 250 rpm while controlling a temperature of 40 °C or less.

11. A method for manufacturing a low ignition propensity cigarette paper according to claim 10, wherein:

an unit dispersion amount of the maltose is 10 g/L/min to 20 g/L/min, and a rotational speed is 17000 rpm to 20000 rpm in the first dispersion step, and
an unit dispersion amount of the arabic gum is 10 g/L/min to 20 g/L/min, and a rotational speed is 17000 rpm to 20000 rpm in the second dispersion step.

12. A method for manufacturing a low ignition propensity cigarette paper according to claim 8, wherein the coating portion comprises two or more portions, and the two or more portions are spaced apart from each other.

FIG. 1

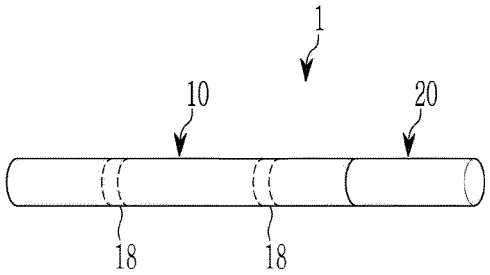


FIG. 2

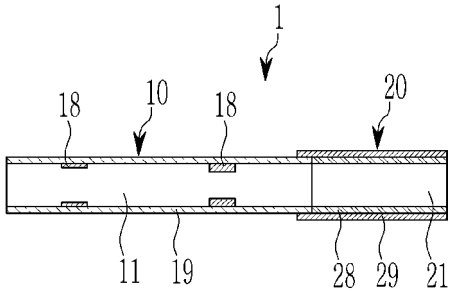


FIG. 3

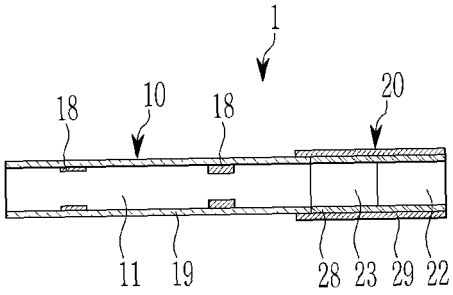
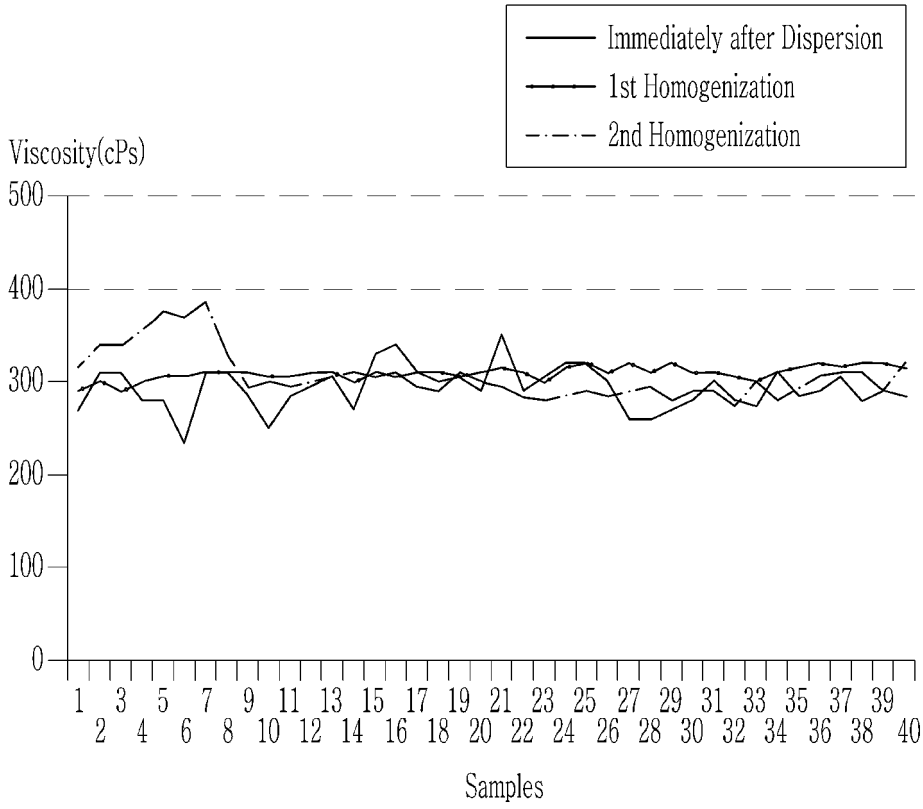


FIG. 4


Immediately after Dispersion
1st Homogenization
2nd Homogenization
Viscosity(cPs)
500
400
300
200
100
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40
Samples

INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2018/008977

A. CLASSIFICATION OF SUBJECT MATTER

D21H 19/14(2006.01)i, A24D 1/00(2006.01)i, A24D 1/02(2006.01)i, A24D 1/04(2006.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

D21H 19/14; A24B 15/28; A24D 1/02; B41F 5/24; D21H 19/34; D21H 19/44; D21H 21/14; D21H 23/22; D21H 27/22; A24D 1/00; A24D 1/04

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Korean Utility models and applications for Utility models: IPC as above
Japanese Utility models and applications for Utility models: IPC as above

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

eKOMPASS (KIPO internal) & Keywords: low ignition propensity cigarette paper, coating, cigarette, arabic gum, maltose, solvent

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	KR 10-1582900 B1 (MUDANJIANG HENGFENG PAPER CO., LTD.) 07 January 2016 See claims 1, 5, 7, 9; paragraphs [0013], [0016], [0024], [0028], [0040]; figures 1, 2.	1-12
Y	US 4453553 A (COHN, C. C.) 12 June 1984 See claims 4, 6, 8; examples 80, 93.	1-12
Y	CN 104805730 A (MUDANJIANG HENGFENG PAPER CO., LTD.) 29 July 2015 See abstract; claims 1-2, 6-10; figure 1.	1-12
Y	US 4044778 A (COHN, C. C.) 30 August 1977 See claims 1-10; figures 1-3.	1-12
A	KR 10-2014-0084035 A (MIQUEL Y COSTAS & MIQUEL, S.A.) 04 July 2014 See abstract; claims 1-2.	1-12
A	KR 10-1534822 B1 (KT & G CORPORATION) 07 July 2015 See abstract; claims 1-7, 10-11; figures 2-3.	1-12

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

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Date of the actual completion of the international search	Date of mailing of the international search report
01 NOVEMBER 2018 (01.11.2018)	**01 NOVEMBER 2018 (01.11.2018)**
Name and mailing address of the ISA/KR Korean Intellectual Property Office Government Complex Daejeon Building 4, 189, Cheongsa-ro, Seo-gu, Daejeon, 35208, Republic of Korea Facsimile No. +82-42-481-8578	Authorized officer Telephone No.

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