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(54) **SMOKING PRODUCT AND FILTER**

(57) A smoking article includes: a filter main body that is cylindrical; a sheet that forms a cylindrical body having one end portion and another end portion opposite to and overlapping the one end portion to wrap the filter main body; a first hot melt type adhesive and a first aque-

ous adhesive provided at a position between the filter main body and the sheet; and a second hot melt type adhesive and a second aqueous adhesive provided at a position between the one end portion and the other end portion.

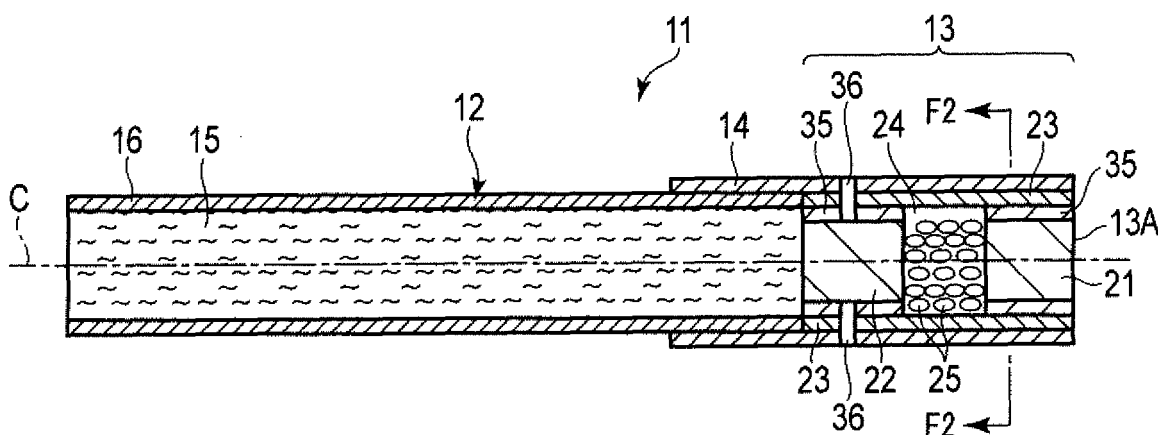


FIG. 1

Description**FIELD**

[0001] The present invention relates to a smoking article constructed by wrapping a filter main body with a sheet and a filter used for the smoking article.

BACKGROUND

[0002] Filters for cigarettes are usually produced by wrapping a filtering material such as cellulose acetate tow with wrapping paper. In order to remove gas and vapor components of mainstream smoke, filters containing adsorbent particles, such as activated carbon, or containing flavor enhancer particles for supplementing tobacco flavor are generally known. Known methods of adding the particles are roughly classified into two types of a Dalmatian type in which particles are dispersed in a filter material such as cellulose acetate tow, and a cavity type in which a cavity part is formed between filters and particles are added to the cavity part.

[0003] There are many examples of adding additives to a cavity filter. In Jpn. PCT National Publication No. 2005-525795, spherical activated carbon as an adsorbent is added to a cavity part as a measure for an improvement in the packing ratio of activated carbon and as a countermeasure against contamination of machines. Examples of adding a flavor enhancer include the following: In Jpn. PCT National Publication No. 2010-521962, cellulose particles containing flavor are added to a cavity portion, and in Jpn. PCT National Publication No. 2007-520204, a breakable capsule is added to a cavity portion.

[0004] U.S. Patent No. 6,537,186 discloses a method for manufacturing a cavity filter. Jpn. Pat. Appln. KOKAI Publication No. 2008-48734 discloses a gluing method at the time of production of a continuous body of articles in the tobacco processing industry. Japanese Patent No. 4955866 discloses a method of applying an adhesive to a covering paper tape.

CITATION LIST**PATENT LITERATURE****[0005]**

[Patent Literature 1] Jpn. PCT Publication No. 2005-525795

[Patent Literature 2] Jpn. PCT Publication No. 2010-521962

[Patent Literature 3] Jpn. PCT Publication No. 2007-520204

[Patent Literature 4] U.S. Patent No. 6,537,186

[Patent Literature 5] Jpn. Pat. Appln. KOKAI Publication No. 2008-48734

[Patent Literature 6] Japanese Patent No. 4955866

SUMMARY OF INVENTION**TECHNICAL PROBLEM**

[0006] A smoking article is desired that not only is adhered correctly at the time of manufacture but also maintains sufficient adhesive strength even after a predetermined time has elapsed.

10 SOLUTION TO PROBLEM

[0007] According to one aspect of the present invention, there is provided a smoking article comprising: a filter main body that is cylindrical; a sheet that forms a cylindrical body having one end portion and another end portion opposite to and overlapping the one end portion to wrap the filter main body; a first hot melt type adhesive and a first aqueous adhesive provided at a position between the filter main body and the sheet; and a second hot melt type adhesive and a second aqueous adhesive provided at a position between the one end portion and the other end portion.

ADVANTAGEOUS EFFECTS OF INVENTION

[0008] According to the present invention, it is possible to provide a smoking article in which a sufficient adhesive strength is maintained at the time of manufacture and after a lapse of a predetermined time after manufacture.

BRIEF DESCRIPTION OF THE DRAWING(S)**[0009]**

FIG. 1 is a cross-sectional view of a cigarette according to a first embodiment along a longitudinal direction.

FIG. 2 is a cross-sectional view of the cigarette shown in FIG. 1 taken along line F2-F2.

FIG. 3 is a table showing each condition of cigarettes of an example and a comparative example.

FIG. 4 is a cross-sectional view of a cigarette of the comparative example shown in FIG. 3 in a direction crossing the longitudinal direction.

FIG. 5 is a cross-sectional view of a cigarette of a second embodiment in a direction crossing the longitudinal direction.

FIG. 6 is a cross-sectional view of a cigarette of a third embodiment in a direction crossing the longitudinal direction.

DETAILED DESCRIPTION**[First Embodiment]**

[0010] Hereinafter, a first embodiment of a cigarette as an example of a smoking article will be described with reference to FIG. 1 and FIG. 2. The smoking articles in-

clude a cigarette, a smoking tool to inhale flavor of tobacco by electronic device heating, a carbon heat source, or the like, and a non-heating type smoking tool to inhale flavor of tobacco.

[0011] As shown in FIG. 1, a cigarette 11 has a cylindrical tobacco portion 12, a cylindrical filter portion 13 provided adjacent to the tobacco portion 12, and a tipping paper 14 covering the tobacco portion 12 and the filter portion 13. An end portion of the filter portion 13 constitutes a suction opening 13A, and the suction opening 13A is positioned in the oral cavity of a smoker when it is put in lips of the smoker.

[0012] The tobacco portion 12 is formed by wrapping the periphery of the shredded leaves 15 (tobacco) with a wrapping paper 16.

[0013] The filter portion 13 (filter) includes a first filter main body 21 (filter main body) located on the side of the suction opening 13A, a second filter main body 22 provided separately from the first filter main body 21 in the central axis C direction and located on the tobacco portion 12 side, a cylindrical outer wrapper 23 (sheet) covering the first filter main body 21 and the second filter main body 22, a cavity 24 (cavity) provided between the first filter main body 21 and the second filter main body 22, granules 25 contained in the cavity 24, the tipping paper 14, and a plurality of openings (ventilation holes) 36 for taking in outside air.

[0014] The outer wrapper 23 (sheet) has a rectangular shape in a state not bonded with an adhesive. As shown in FIG. 2, the outer wrapper 23 has one end portion 26 and the other end portion 27 opposite thereto. The outer wrapper 23 is adhered so that the one end portion 26 overlaps the other end portion 27 so as to form a cylindrical shape and to wrap the first filter main body 21 and the second filter main body 22 inside thereof. When the outer wrapper 23 becomes cylindrical, the one end portion 26 is arranged inside the other end portion 27. Hereinafter, a position at which the other end portion 27 overlaps the one end portion 26 is referred to as an overlap portion 29.

[0015] The outer wrapper 23 is formed as a transparent paper sheet and a transparent film. More specifically, the outer wrapper 23 is made of a paper having high transparency such as glassine paper or paraffin paper, a cellophane film made from wood pulp as a raw material, or a plastic-based transparent film such as polypropylene (PP), polyethylene (PE) polymethyl methacrylate (PMMA), polystyrene (PS), or polyethylene terephthalate (PET). Furthermore, the outer wrapper 23 may be formed of opaque general paper. The outer wrapper 23 may have air permeability or may not have air permeability.

[0016] FIG. 2 shows a sectional view taken along the line F2-F2 of FIG. 1 (in FIG. 2, the tipping paper is omitted). The filter portion 13 further includes a first hot melt type adhesive 31 provided at a position between the first filter main body 21 and the outer wrapper 23 (and between the second filter main body 22 and the outer wrapper 23), a second hot melt type adhesive 32 provided at

a position (overlap portion 29) between the one end portion 26 and the other end portion 27 of the outer wrapper 23, a first aqueous adhesive 33 provided at a position between the first filter main body 21 and the outer wrapper 23 (and between the second filter main body 22 and the outer wrapper 23), and a second aqueous adhesive 34 provided at a position (overlap portion 29) between the one end portion 26 and the other end portion 27.

[0017] In the present embodiment, as shown in FIG. 2, the first aqueous adhesive 33 and the second aqueous adhesive 34 are continuous and integrally formed. In other words, the aqueous adhesive is provided across the position between the first filter main body 21 (the second filter main body 22) and the outer wrapper 23, and the position between the one end portion 26 and the other end portion 27 (overlap portion 29).

[0018] As the granules 25 contained in the cavity 24, adsorbent particles (activated carbon or the like) which partially adsorb and remove the tobacco smoke component and flavor enhancer particles can be used. Both adsorbent particles and flavor enhancer particles can be mixed and filled in the cavity 24.

[0019] The first filter main body 21 and the second filter main body 22 each have a columnar shape formed by wrapping fibrous filler material 37 with a wrapper 35. The first filter main body 21 and the second filter main body 22 can be formed by various kinds of filler material 37. In the present embodiment, these are constituted of the filler material 37 of a cellulose-based semisynthetic fiber such as cellulose acetate, for example, but the filler material 37 is not limited thereto. Examples of the filler material 37 include plant fibers such as cotton, hemp, Manila hemp, palm, rush and the like, animal fibers such as wool and cashmere, cellulose-based regenerated fibers such as rayon, synthetic fibers such as nylon, polyester, acrylic, polyethylene, polypropylene, or a combination thereof. The constituent elements of the first filter main body 21 and the second filter main body 22 may include granular substances of adsorbent particles and flavor enhancer particles in addition to the filler material made of the above cellulose acetate fibers. The first filter main body 21 and the second filter main body 22 may have a multi-segment structure in which two or more different types of segments are connected in the axial direction. In that case, each segment is wrapped with the wrapper 35 so that its position in the first filter main body 21 and the second filter main body 22 is fixed. As each segment, the filler material 37 may be wrapped with a segment wrapper, or a non-wrap filter as shown in FIG. 15 of Japanese Patent No. 4262247 may be used.

[0020] In addition, at least one of a plasticizer and a binder may be added to the first filter main body 21 and the second filter main body 22 in order to obtain a desired hardness of the filter. Any type of plasticizer may be used. Examples of the plasticizer include triethyl citrate, acetyl triethyl citrate, acetyl tributyl citrate, dibutyl tartrate, ethyl phthalyl ethyl glycolate, methyl phthalyl ethyl glycolate, triacetin, triethyl phosphate, triphenyl phosphate, tripro-

pionine, or a combination thereof. Any type of binder may be used. For example, as the binder, HMC, HPMC, PVA, PVAc, PEG, or a combination thereof may be used. Optionally, plasticizers and binders may not be used.

[0021] In addition, the first filter main body 21 and the second filter main body 22 may contain flavor such as menthol. There is no particular limitation on the method of adding the flavor. For example, a string-like substance having a flavor adsorbed thereon may be provided in the first filter main body 21 and the second filter main body 22, or a flavor may be contained in the filler of the first filter main body 21 and the second filter main body 22. Alternatively, a material, such as a capsule in which a flavor is immobilized, may be provided in the first filter main body 21 and the second filter main body 22.

[0022] The type and material of the wrapper 35 used for the first filter main body 21 and the second filter main body 22 are not limited. As the wrapper 35, a wrapper used for a general cigarette filter can be used, and the wrapper 35 may have air permeability, or may be one which does not have air permeability. The wrapper 35 used for a general product has a basis weight of 20 to 100 g/m², a thickness of 30 to 110 μ m, and an air permeability of 0 to 32,000 Coresta units. Paper made from plant fibers is generally used as the material of the wrapper 35; however, nonwoven fabrics using chemical fibers of polymer series (polypropylene, polyethylene, nylon, etc.), or film of polymer series (cellulose, cellulose acetate, polypropylene, polyethylene, nylon, polylactic acid, etc.), or a metal foil such as an aluminum foil may be used.

[0023] The material of the tipping paper 14 is not limited. Generally, paper made from plant fibers is used for the tipping paper 14; however, nonwoven fabric using chemical fiber of a polymer series (polypropylene, polyethylene, nylon, etc.), or film of a polymer series (cellulose, cellulose acetate, polypropylene, polyethylene, nylon, polylactic acid, etc.), or metal foil such as aluminum foil may be used. The tipping paper 14 may be transparent or opaque. The tipping paper 14 used for a general product is paper having a basis weight of 35 to 56 g/m² and a thickness of 35 to 45 μ m, and has smoothness on the surface for facilitating printing of a brand logo or the like. The tipping paper 14 may contain the filler material 37 such as titanium dioxide, calcium carbonate or the like to increase the opacity, so that the filter portion 13 cannot be seen through. In order to ensure ventilation from the filter in the cigarette, the tipping paper may be perforated beforehand, or may be perforated by the cigarette maker when making the cigarette.

[0024] The plurality of openings 36 are provided radially around the central axis C of the cigarette 11. The openings 36 are formed, for example, in a line in the circumferential direction of the cigarette 11. For example, the number of openings 36 is 10 to 40 in total.

[0025] Subsequently, a manufacturing process of the cigarette 11 of the present embodiment will be described. First, a base filter portion to be the first filter main body 21 and the second filter main body 22 is manufactured

by a general filter manufacturing apparatus. The manufactured base filter portion is cut into a length corresponding to two cigarettes after being put into the combiner, and the base filter main body 21 and the filter main body 22, which were cut, are alternately aligned. The aligned filter is provided with a cavity 24 of a desired length by a drum or the like. The outer wrapper 23 is intermittently fed to a continuous body of the filter main body 21 and the filter main body 22 provided with the cavity 24. At this time, the first hot melt type adhesive 31 is applied to the inner surface of the outer wrapper 23 in advance from a first nozzle, and bonding is started simultaneously with joining with the continuous body. The fed outer wrapper 23 is shaped into a "U" shape with an open top, to form a shape that wraps around the continuous body of the filter main body 21, the filter main body 22, and the cavity 24. After that, the granules 25 are charged from above the outer wrapper 23 which opens like the U-shape.

[0026] On the line to which the outer wrapper 23 is fed, a second nozzle that supplies the second hot melt type adhesive 32 and a wide third nozzle that supplies an aqueous adhesive (the first aqueous adhesive 33 and the second aqueous adhesive 34 which are integrated) are disposed. The adhesives are applied to the inner surface of the outer wrapper 23. After that, the U-shaped outer wrapper 23 is rolled into a cylindrical shape, and the second hot melt type adhesive 32 and the aqueous adhesive (the first aqueous adhesive 33 and the second aqueous adhesive 34 which are integrated) begin adhesion. As a result, the first hot melt type adhesive 31 and the first aqueous adhesive 33 are provided at a position between the first filter main body 21 and the outer wrapper 23. Similarly, the first hot melt type adhesive 31 and the first aqueous adhesive 33 are provided at a position between the second filter main body 22 and the outer wrapper 23. In addition, the second hot melt type adhesive 32 and the second aqueous adhesive 34 are provided at a position (overlap portion 29) between the one end portion 26 and the other end portion 27 of the outer wrapper 23. The continuous body of the filter thus produced is finally cut to a predetermined length, and a filter portion corresponding to four cigarettes is completed.

[0027] Using a general cigarette maker prepared separately, the tobacco portion 12 (roll) is manufactured. Then, filters for two cigarettes obtained by cutting the filter portion formed as described above in half are inserted between the two cigarette portions 12. In the cigarette maker, the cigarette portions 12 and the filter portions 13 corresponding to two cigarettes 11 are collectively wrapped by using the tipping paper 14, so that the cigarette portions 12 and the filter portions 13 corresponding to two cigarettes are connected to form a rod-shaped object.

[0028] Then, while running the rod-shaped object at a predetermined speed, openings 36 for ventilation are formed by a CO₂ laser or the like. Then, the filter portions 13 and the tipping papers 14 are cut by a cutter at the center position of a length of two pieces of filter portion

13, and the manufacture of one cigarette 11 is completed. The openings 36 for ventilation may be formed by a laser or the like after being cut into a single cigarette. Also, the openings 36 for ventilation may be secured by the air permeability of the tipping paper 14, the outer wrapper 23, and the wrapper 35. In that case, no laser or the like is used. In this way, the method of perforation is determined by the specification of the cigarette maker and the cigarette.

[Working Example]

[0029] FIG. 3 shows representative conditions of the cigarette of a working example. The cigarette 11 of the working example has the same structure as the above embodiment shown in FIGS. 1 and 2. The filter portion 13 used for the cigarette 11 was manufactured as follows. A filter containing menthol was used as a filter portion to be the first filter main body 21 and the second filter main body 22. As the wrapper 35, an ordinary wrapper (manufactured by NIPPON PAPER PAPYLIA CO., LTD.) having an air permeability of 30000 Coresta unit and a basis weight of 21 g/m² was used. The length of the first filter main body 21 and the second filter main body 22 in the direction of the center axis C of the cigarette 11 is 10 mm. The length of the cavity 24 between the first filter main body 21 and the second filter main body 22 in the direction of the central axis C of the cigarette 11 is 7 mm. The circumference of the filter portion 13 is 24.2 mm. The length of the filter portion is 108 mm, which corresponds to four pieces of the filter portion 13 having a length of 27 mm at the time of manufacturing the cigarette 11. The first filter main body 21 and the second filter main body 22 are wrapped with a transparent outer wrapper 23 (PBD, manufactured by FUTAMURA CHEMICAL CO., LTD.) composed of a cellophane film.

[0030] The cavity 24 is filled with 20 mg of spearmint leaf granules 25 (manufactured by Takasago International Corporation). The granules 25 of spearmint leaves were dried and pulverized, and then sieved to select particles having diameters in the range of 0.5 to 1.4 mm for use.

[0031] DAIKALAC S-1101S (trade name) manufactured by Daido Chemical Corporation was used as the first hot melt type adhesive 31 and the second hot melt type adhesive 32. In addition, Sevia A 20753 (trade name) manufactured by Daicel FineChem Ltd. was used as the first aqueous adhesive 33 and the second aqueous adhesive 34. The aqueous adhesive is an adhesive that solidifies by evaporation of moisture in the adhesive. The second hot melt type adhesive 32 is located between the one end portion 26 and the other end portion 27 of the outer wrapper 23. The first hot melt type adhesive 31 is positioned between the wrapper 35 and the outer wrapper 23. The first aqueous adhesive 33 and the second aqueous adhesive 34 are provided at positions between the first hot melt type adhesive 31 and the second hot melt type adhesive 32. The first aqueous adhesive 33

and the second aqueous adhesive 34 protrude from the overlap portion 29, and are provided across the position between one end portion 26 and the other end portion 27 of the outer wrapper 23 and the position between the wrapper 35 and the outer wrapper 23.

[0032] For a piece of a filter of 108 mm, 10 mg of the first hot melt type adhesive 31, 3 mg of the second hot melt type adhesive 32, and 3 mg of the first aqueous adhesive 33 and the second aqueous adhesive 34 in total are used. The first aqueous adhesive 33 is continuous with the second aqueous adhesive 34.

[Comparative Example]

[0033] FIG. 3 shows representative conditions of the filter portion 41 of a comparative example. FIG. 4 shows a structure of the filter portion 41 of the comparative example. The filter portion 41 of the comparative example is the same as the working example described above in terms of the structure, the type of the adhesives used, etc., although the locations of the adhesives are different. Therefore, the following description will mainly focus on the part of the filter portion 41 of the comparative example that is different from the filter portion 13 of the cigarette 11 of the above working example.

[0034] The filter portion 41 of the comparative example is positioned so that the aqueous adhesive (second aqueous adhesive 34) does not protrude from the overlap portion 29, and is provided at a position between the one end portion 26 and the other end portion 27 of the outer wrapper 23. [Evaluation of Adhesive Strength]

[0035] Subsequently, the adhesive strengths (tensile strengths) of the outer wrapper 23 and the wrapper 35 in the filter portion 13 of the cigarette 11 of the above working example and in the filter portion 41 of the comparative example were evaluated. This evaluation was carried out to evaluate the adhesive strength of the outer wrapper 23 on the wrapper 35 of the first filter main body 21 by measuring the tensile strength after storing it for 1 day or 14 days.

[0036] Samples for evaluation were prepared as follows. First, a part of the filter portion 13 is cut in parallel with the direction of the center axis C so as to cut out the bonded portion of the wrapper 35 and the outer wrapper 23. Then, the filler material 37 is removed from the first filter main body 21, and only the wrapper 35 is set. As a result, a structure in which the outer wrapper 23 and the wrapper 35 are adhered by the first hot melt type adhesive 31 and the first aqueous adhesive 33 is taken out. The tensile strength of the sample thus formed was measured using a small table-top testing machine (Shimadzu Corporation, EZ Graph 5N). At that time, the wrapper 35 was grasped with one arm of the small table-top testing machine, the outer wrapper 23 was grasped with the other arm of the small table-top testing machine, the sample was pulled with a force of 5 N to peel off the wrapper 35 and the outer wrapper 23, and the adhesive strength (tensile strength) was measured. The measure-

ment was carried out 5 times, and the average value was taken as the measurement value.

[0037] As a result of the test, the adhesive strength of the working example one day after storage was 0.523 N, whereas the adhesive strength of the comparative example one day after storage was 0.166 N. The adhesive strength of the working example after 14 days in storage was 0.304 N, whereas the adhesive strength of the comparative example after 14 days storage was 0.075 N. As a result of this evaluation, it was confirmed that the working example exhibited superior adhesive strengths in comparison with the comparative example in either case of 1 day or 14 days after storage.

[0038] According to the first embodiment and the working example, the smoking article comprises the filter main body that is cylindrical; the sheet that forms a cylindrical body having the one end portion 26 and the other end portion 27 opposite to and overlapping the one end portion 26 to wrap the filter main body; the first hot melt type adhesive 31 and the first aqueous adhesive 32 provided at a position between the filter main body and the sheet; and the second hot melt type adhesive 32 and the second aqueous adhesive 34 provided at a position between the one end portion 26 and the other end portion 27.

[0039] In addition, the filter comprises the filter main body that is cylindrical; the sheet that forms a cylindrical body having the one end portion 26 and the other end portion 27 opposite to and overlapping the one end portion 26 to wrap the filter main body; the first hot melt type adhesive 31 and the first aqueous adhesive 33 provided at a position between the filter main body and the sheet; and the second hot melt type adhesive 32 and the second aqueous adhesive 34 provided at a position between the one end portion 26 and the other end portion 27.

[0040] In general, the hot melt type adhesive is quick-drying, and the drying time of the aqueous adhesive is longer than the drying time of the hot melt type adhesive. According to the above-described configuration, in addition to the hot melt type adhesive, the aqueous adhesive is provided at a position between the filter main body and the sheet, a position between the one end portion 26 and the other end portion 27. Therefore, it is possible to make full use of each of the advantages of the two types of adhesives, that is, quick drying is ensured with the hot melt type adhesive while insufficient strength of the hot melt type adhesive is compensated for by using the aqueous adhesive. Therefore, the sheet is not peeled off from the filter main body, and high quality cigarette 11 can be provided.

[0041] The first aqueous adhesive 33 is continuous with the second aqueous adhesive 34. According to this configuration, one continuous aqueous adhesive can be provided across the position between the filter main body and the sheet, and the position between the one end portion 26 and the other end portion 27. Therefore, the number of nozzles for applying the aqueous adhesive in the production line of the cigarette 11 can be reduced, thereby reducing the manufacturing cost. Furthermore,

both of a surface constituting the one end portion 26 (front surface 26A) and an end surface 26B of the one end portion 26, that is, a corner portion of the one end portion 26 can be wrapped with the aqueous adhesive. Therefore, the adhesive strength between the filter main body and the sheet can be improved as compared with a case where the opposing surfaces are simply bonded to each other.

[0042] In this case, the cavity 24 is provided adjacent to the filter main body inside the sheet. Generally, when the cavity 24 is provided inside the sheet, the position of the filter main body is easily shifted with respect to the sheet. According to the above configuration, even if the structure of the filter main body is easily shifted with respect to the sheet, the adhesive strength between the sheet and the filter main body can be increased by using two types of adhesives such as a hot melt type adhesive and an aqueous adhesive, to prevent the positional deviation of the filter main body.

[0043] The smoking article comprises the second filter main body 22 that is cylindrical and is wrapped inside the sheet so that the cavity 24 is positioned between the filter main body and the second filter main body 22. The first hot melt type adhesive 31 and the first aqueous adhesive 33 are provided between the second filter main body 22 and the sheet, and the second hot melt type adhesive 32 and the second aqueous adhesive 34 are provided between one end portion 26 and the other end portion 27.

[0044] According to this configuration, the second filter main body 22 can also be bonded to the sheet, as well as the filter main body, with two kinds of adhesives. This makes it possible to take advantage of each of the advantages of the two kinds of adhesives and to improve the adhesive strength of the second filter main body 22 to provide a high-quality smoking article.

[0045] The cavity 24 is filled with at least one of the adsorbent particles 25 for partially adsorbing and removing the tobacco smoke component and the flavor enhancer particles 25 carrying a flavor component. According to this configuration, since a part of the tobacco smoke can be adsorbed to the filter side by the adsorbent particles 25, it is possible to provide a smoking article free from any unpleasant taste and having a more refined flavor. In addition, since the flavor enhancer particles 25 can impart the flavor component to the tobacco smoke, it is possible to impart a refreshing feeling to the flavor and taste, or to make the flavor and taste deeper. As a result, it is possible to provide smoking articles of higher quality with improved flavor and taste.

[0046] The sheet is a film. According to this configuration, even when a film to which the adhesive cannot be easily applied is adopted for the sheet, sufficient adhesive strength can be secured by using two kinds of adhesives as in this embodiment.

[0047] The filter main body contains menthol. The inventors of the present application found that when menthol is contained in the filter main body, menthol vaporized from the filter main body gradually lowers the adhe-

sive force of the hot melt type adhesive over time. According to the above configuration, even when the adhesive force of the hot melt type adhesive decreases due to the influence of menthol, adhesion between the filter main body and the sheet can be secured by the adhesive force of the aqueous adhesive. In other words, the hot-melt adhesive ensures instantaneous adhesion or short-term adhesion, and the aqueous adhesive can secure adhesion for a longer period of time. As a result, both adhesives act complementarily, so that the sheet does not fall off from the filter main body for a long period of time immediately after bonding. Accordingly, a high-quality cigarette 11 can be provided.

[Second Embodiment]

[0048] A cigarette as an example of the smoking article of the second embodiment will be described with reference to FIG. 5. The cigarette 11 of the second embodiment is different from that of the first embodiment in that the first aqueous adhesive 33 and the second aqueous adhesive 34 are not continuous, but the other parts are the same as those of the first embodiment. For this reason, mainly the parts different from the first embodiment will be described, and illustration or description of parts common to the first embodiment will be omitted.

[0049] A filter portion 13 includes a first hot melt type adhesive 31 provided at a position between a wrapper 35 and an outer wrapper 23, a second hot melt type adhesive 32 provided at a position (overlap portion 29) between one end portion 26 and another end portion 27 of the outer wrapper 23, a first aqueous adhesive 33 provided at a position between the wrapper 35 and the outer wrapper 23, and a second aqueous adhesive provided 34 provided at a position (overlap portion 29) between the one end portion 26 and the other end portion 27. In the present embodiment, as shown in FIG. 5, the first aqueous adhesive 33 and the second aqueous adhesive 34 are separately located.

[0050] According to the cigarette 11 of the present embodiment, the following advantages are obtained. For example, as in the first embodiment, if the first aqueous adhesive 33 and the second aqueous adhesive 34 are continuous, there is a possibility of an imbalance between the amount of the aqueous adhesive at the position between the wrapper 35 and the outer wrapper 23 and the amount of that at the position (the overlap portion 29) between the one end portion 26 and the other end portion 27 of the outer wrapper 23. According to the above configuration, since the first aqueous adhesive 33 and the second aqueous adhesive 34 are separately located, the amounts of the aqueous adhesives can be easily controlled. Therefore, it is possible to prevent peeling of the sheet from the filter main body by appropriately controlling the amounts of the aqueous adhesives, and to provide a high-quality cigarette.

[Third Embodiment]

[0051] A cigarette 11 as an example of the smoking article of the third embodiment will be described with reference to FIG. 6. The cigarette 11 of the third embodiment is different from that of the first embodiment in that a first hot melt type adhesive 31 and a second hot melt type adhesive 32 are continuous and a first aqueous adhesive 33 and a second aqueous adhesive 34 are not continuous, but the other parts are the same as those of the first embodiment. For this reason, mainly the parts different from the first embodiment will be described, and illustration or description of parts common to the first embodiment will be omitted.

[0052] The filter portion 13 includes the first hot melt type adhesive 31 provided at a position between a wrapper 35 and an outer wrapper 23, the second hot melt type adhesive 32 provided at a position (overlap portion 29) between one end portion 26 and the other end portion 27 of the outer wrapper 23, the first aqueous adhesive 33 provided at a position between the wrapper 35 and the outer wrapper 23, and the second aqueous adhesive provided 34 provided at a position (overlap portion 29) between the one end portion 26 and the other end portion 27.

[0053] In the present embodiment, as shown in FIG. 6, the first hot melt type adhesive 31 and the second hot melt type adhesive 32 are continuous and integrally formed. In other words, the hot melt type adhesives are provided across the position between the wrapper 35 and the outer wrapper 23 and the position (overlap portion 29) between the one end portion 26 and the other end portion 27. On the other hand, the first aqueous adhesive 33 and the second aqueous adhesive 34 are separated.

[0054] According to the cigarette 11 of the present embodiment, the first hot melt type adhesive 31 is continuous with the second hot melt type adhesive 32. For this reason, it is possible to arrange one continuous hot melt adhesive across a position between the filter main body and the sheet and a position between one end portion 26 and the other end portion 27. Therefore, it is possible to reduce the number of nozzles for applying the hot-melt adhesive in the production line of the cigarette 11, thereby reducing the manufacturing cost. Furthermore, both of a surface constituting the one end portion 26 (front surface 26A) and an end surface 26B of one end portion 26, that is, a corner portion of the one end portion 26 can be wrapped with the hot melt type adhesive. Therefore, the adhesive strength between the filter main body and the sheet can be improved as compared with a case where the opposing surfaces are simply bonded to each other.

[0055] The smoking article (cigarette 11) is not limited to the embodiments described above, and at the implementation stage, the constituent elements can be modified and embodied within the scope not deviating from its gist. Specifically, although the cavity 24 is provided between the first filter main body 21 and the second filter main body 22 in the above-described embodiments, a

cavity (recess) may be provided in the suction opening 13A of the filter portion 13. Furthermore, one cigarette 11 can be realized by appropriately combining the constituent elements in the above-described different embodiments.

REFERENCE SIGNS LIST

[0056] 11 ... cigarette, 12 ... tobacco portion, 13 ... filter portion, 14 ... tipping paper, 15 ... shredded leaves, 16 ... wrapping paper, 21 ... first filter main body, 22 ... second filter main body, 23 ... outer wrapper, 24 ... cavity, 25 ... granule, 26 ... one end portion, 27 ... other end portion, 31 ... first hot melt type adhesive, 32 ... second hot melt type adhesive, 33 ... first aqueous adhesive, 34 ... second aqueous adhesive, 35 ... wrapper, 36 ... opening, 37 ... filler material, 41 ... filter portion.

Claims

1. A smoking article comprising:

a filter main body that is cylindrical;
a sheet that forms a cylindrical body having one end portion and another end portion opposite to and overlapping the one end portion to wrap the filter main body;
a first hot melt type adhesive and a first aqueous adhesive provided at a position between the filter main body and the sheet; and
a second hot melt type adhesive and a second aqueous adhesive provided at a position between the one end portion and the other end portion.

2. The smoking article according to claim 1, wherein the first aqueous adhesive is continuous with the second aqueous adhesive.

3. The smoking article according to claim 1, wherein the first hot melt type adhesive is continuous with the second hot melt type adhesive.

4. The smoking article according to claim 1, wherein a cavity is provided adjacent to the filter main body inside the sheet.

5. The smoking article according to claim 4, further comprising a second filter main body that is cylindrical and wrapped inside the sheet to locate the cavity between the filter main body and the second filter main body, wherein:

the first hot melt type adhesive and the first aqueous adhesive are provided between the second filter main body and the sheet; and
the second hot melt type adhesive and the sec-

ond aqueous adhesive are provided between the one end portion and the other end portion.

6. The smoking article according to claim 5, wherein the cavity is filled with at least one of adsorbent particles that partially adsorb and remove a tobacco smoke component and flavor enhancer particles carrying a flavor component.

7. The smoking article according to claim 1, wherein the sheet is a film.

8. The smoking article according to claim 1, wherein the filter main body contains menthol.

9. A filter comprising:

a filter main body that is cylindrical;
a sheet that forms a cylindrical body having one end portion and another end portion opposite to and overlapping the one end to wrap the filter main body;
a first hot melt type adhesive and a first aqueous adhesive provided at a position between the filter main body and the sheet; and
a second hot melt type adhesive and a second aqueous adhesive provided at a position between the one end portion and the other end portion.

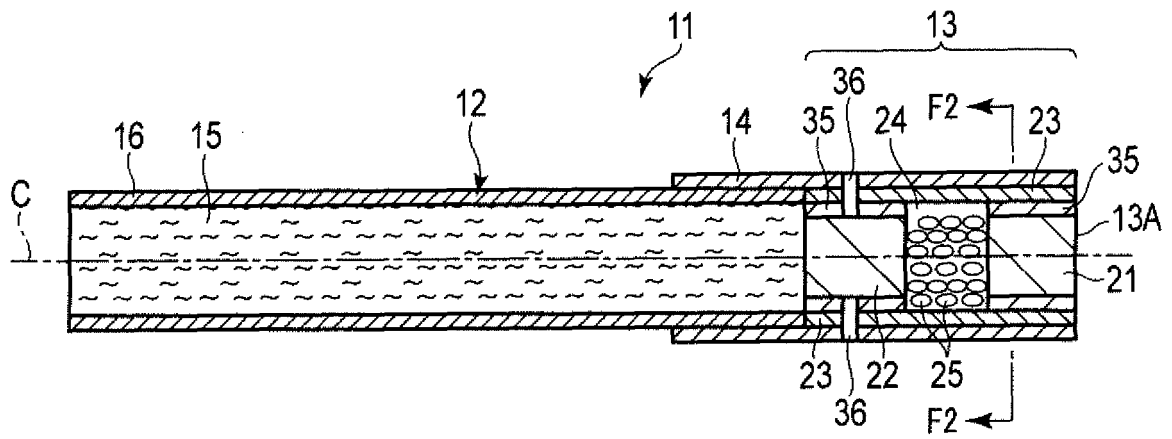


FIG. 1

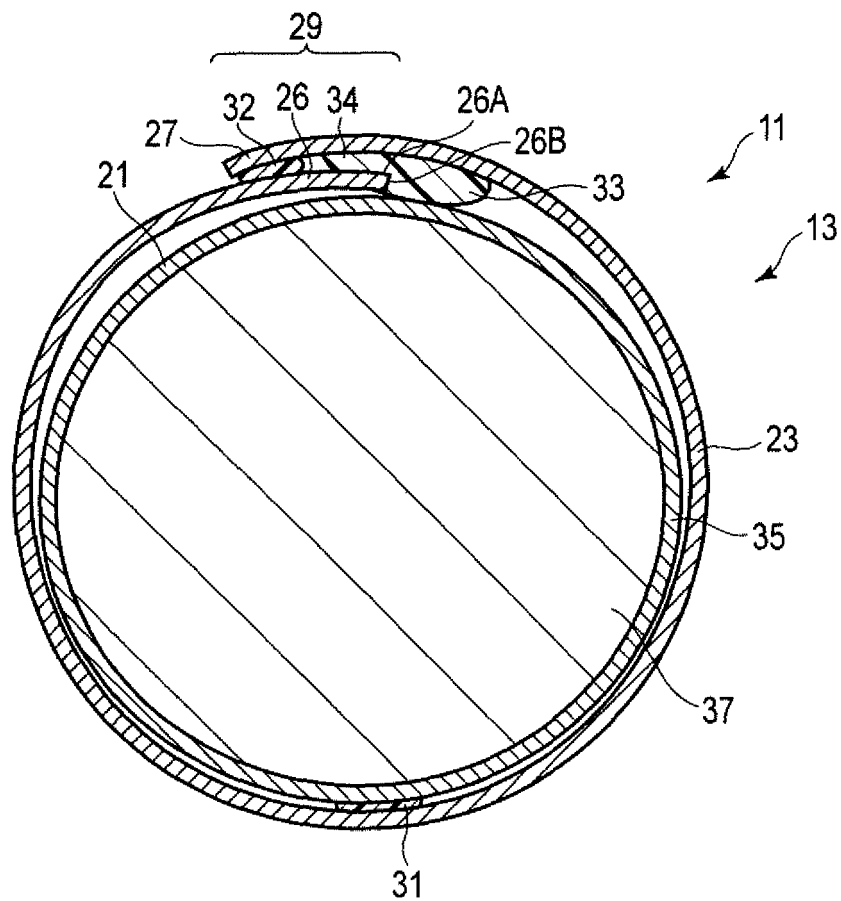


FIG. 2

Test lot	Second hot melt type adhesive(mg)	First aqueous adhesive, second aqueous adhesive(mg)	First hot melt type adhesive(mg)	Adhesive strength(N)	
				After 1 day	After 14 days
Working example	3	3 (Protrusion from overlap portion)	10	0.523	0.304
Comparative example	3	3 (No protrusion from overlap portion)	10	0.166	0.075

FIG. 3

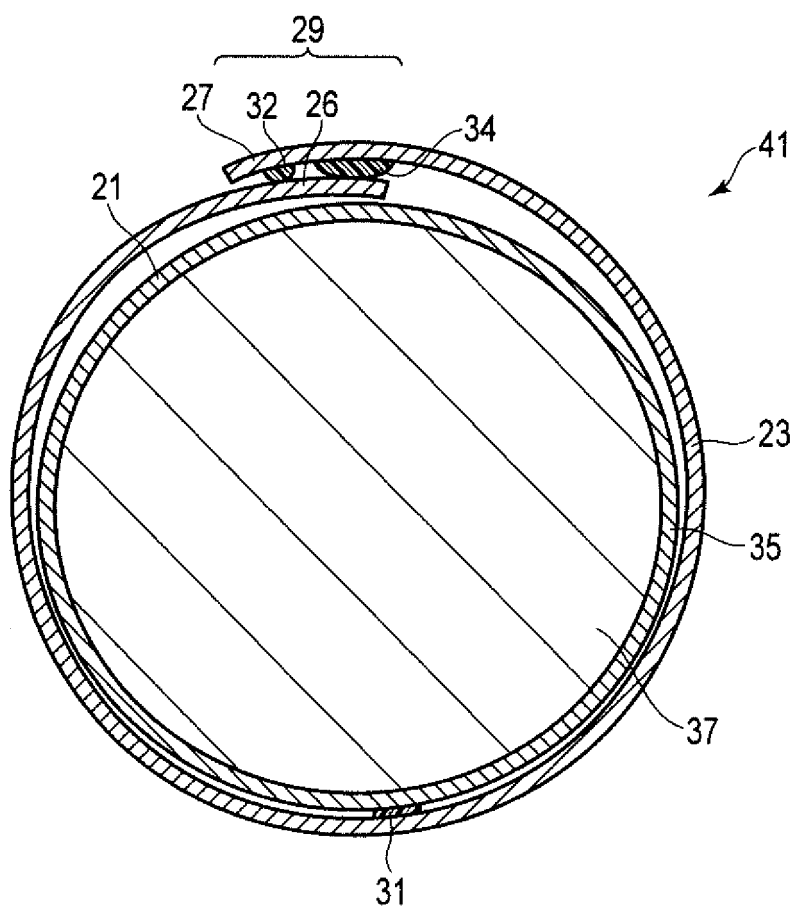


FIG. 4

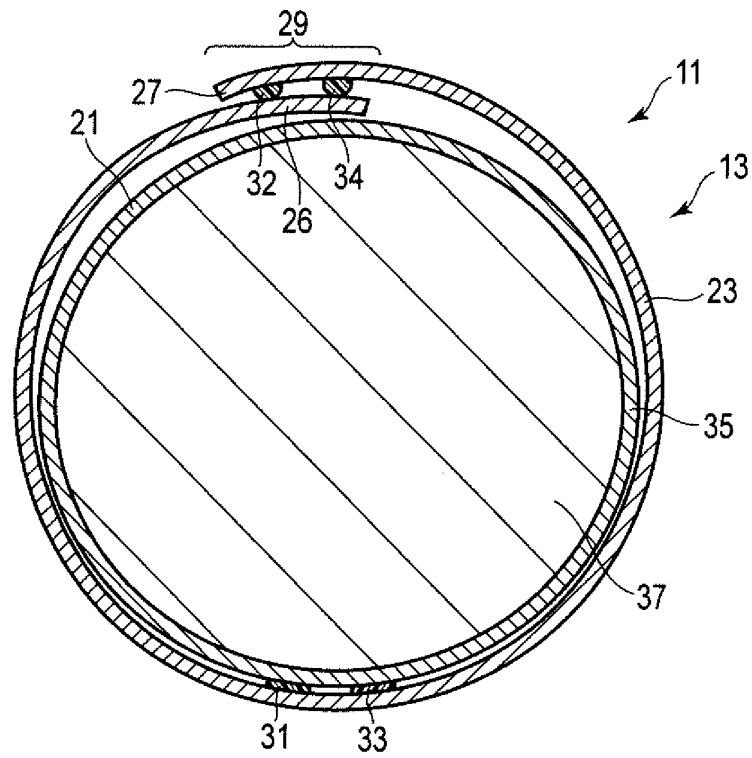


FIG. 5

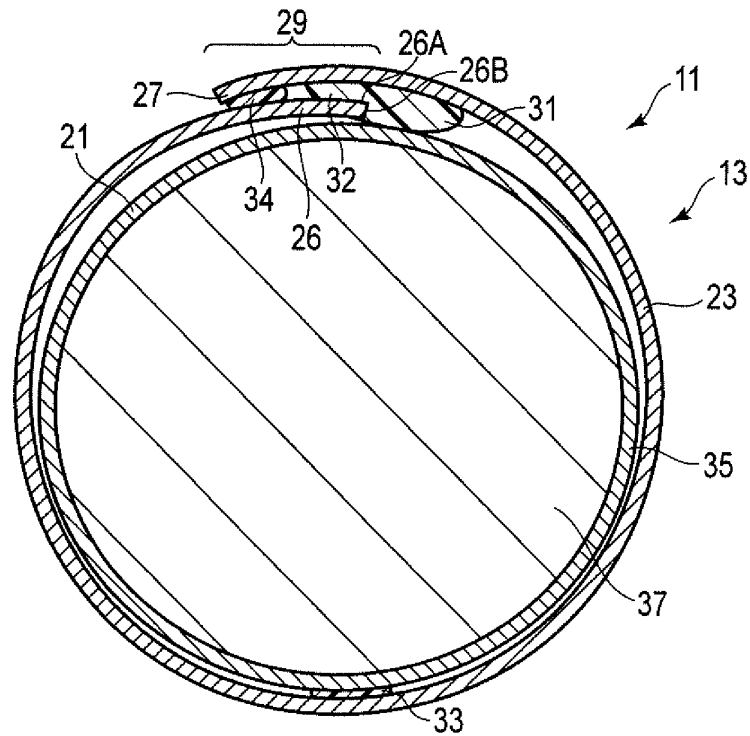


FIG. 6

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2015/085538

A. CLASSIFICATION OF SUBJECT MATTER

A24C5/24(2006.01)i, A24D3/02(2006.01)i, A24D3/04(2006.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A24C5/24, A24D3/02, A24D3/04, A24D3/10

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

Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2016
 Kokai Jitsuyo Shinan Koho 1971-2016 Toroku Jitsuyo Shinan Koho 1994-2016

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y A	JP 2015-523091 A (Philip Morris Products S.A.), 13 August 2015 (13.08.2015), paragraphs [0031] to [0034], [0057], [0071] to [0074]; fig. 4 to 5	1, 4-9 2-3
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Y	JP 2010-521962 A (Philip Morris Products S.A.), 01 July 2010 (01.07.2010), paragraphs [0031] to [0034]	6, 8
Y	JP 2009-507518 A (R. J. Reynolds Tobacco Co.), 26 February 2009 (26.02.2009), paragraph [0042]	7

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

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"T"

later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

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document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&"

document member of the same patent family

Date of the actual completion of the international search
25 January 2016 (25.01.16)Date of mailing of the international search report
02 February 2016 (02.02.16)Name and mailing address of the ISA/
Japan Patent Office
3-4-3, Kasumigaseki, Chiyoda-ku,
Tokyo 100-8915, Japan

Authorized officer

Telephone No.

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

INTERNATIONAL SEARCH REPORT
Information on patent family members

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PCT/JP2015/085538

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REFERENCES CITED IN THE DESCRIPTION

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