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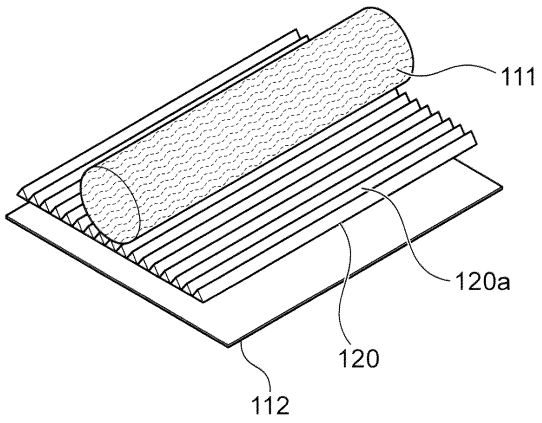
(54) **FLAVOR-GENERATING ARTICLE**

(57) In order that hardness of a part including a flavor source in a flavor-generating article is increased without increasing a filling amount, the flavor-generating article includes: a first part; and a second part that is adjacent to the first part in a longitudinal direction, the first part including a flavor source that includes tobacco strands arrayed in the longitudinal direction, an inner rolling sheet that wraps the flavor source, and an outer rolling sheet that wraps an outer periphery of the inner rolling sheet, the inner rolling sheet being thicker than the outer rolling sheet, and having a plurality of first grooves along the longitudinal direction at least in an inner surface of the inner rolling sheet, at least part of the tobacco strands entering the plurality of first grooves of the inner rolling sheet.

Fig. 5



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Description

TECHNICAL FIELD

[0001] The present invention relates to a flavor-generating article.

BACKGROUND ART

[0002] Hitherto, flavor-generating articles for allowing flavor or the like to be sucked without burning a material have been known (refer, for example to Patent Literature 1 and Patent Literature 2). Such flavor-generating articles can include a flavor source that includes tobacco containing a volatile component, and can be directly heated from an inside of the flavor source by a heater or the like that is inserted in the flavor source.

CITATION LIST

PATENT LITERATURE

[0003]

PTL 1: International Publication No. WO 2020/002165 A1
PTL 2: International Publication No. WO 2020/007879 A1

SUMMARY OF INVENTION

TECHNICAL PROBLEM

[0004] Heating devices of what is called an internal heating type in which the flavor source is heated from inside by the heater such as a heating blade, a heating pin, or a susceptor are capable of directly heating the flavor source to high temperature. However, it is conceivable that efficiency in performing the heating to high temperature up to an outer periphery of the flavor source is not significantly high because heat can be dissipated from an outer peripheral portion of the flavor source that is held in contact with the device. In order to efficiently heat the flavor source with use of the heating devices of such an internal heating type so that an aerosol source contained in the flavor source is delivered to a mouthpiece side, an orientation and a density of a tobacco raw material in the flavor source need to be properly maintained with the heater inserted. However, if a filling amount of the tobacco raw material before the insertion of the heater is reduced to properly maintain the orientation and the density, hardness of the flavor source cannot be maintained. As a result, there is a risk that imperfect rolling or end dropping occur at a time when the flavor-generating articles are manufactured. Meanwhile, if the filling amount is increased to prevent the imperfect rolling or the end dropping, the heater is difficult to insert into the flavor source in inserting the flavor-generating article into the heating device.

[0005] It is an object of the present invention to increase hardness of a part including a flavor source in a flavor-generating article without increasing a filling amount.

SOLUTION TO PROBLEM

[0006] According a first aspect, there is provided a flavor-generating article. This flavor-generating article includes:

a first part; and
a second part that is adjacent to the first part in a longitudinal direction,
the first part including

a flavor source that includes tobacco strands arrayed in the longitudinal direction,
an inner rolling sheet that wraps the flavor source, and
an outer rolling sheet that wraps an outer periphery of the inner rolling sheet,

the inner rolling sheet

being thicker than the outer rolling sheet, and
having a plurality of first grooves along the longitudinal direction at least in an inner surface of the inner rolling sheet,

at least part of the tobacco strands entering the plurality of first grooves of the inner rolling sheet.

[0007] According to the first aspect, since the flavor source is wrapped in the inner rolling sheet that is thicker than the outer rolling sheet, strength of the first part can be increased without increasing a filling amount of the flavor source. In other words, the strength of the first part, which increases generally as a volume filling rate increases, can be increased with use of the inner rolling sheet. Thus, a range of the filling amount of the flavor source is broadened, and a degree of freedom in design can be increased. Specifically, the filling amount of the flavor source can be changed in accordance with desired flavor. Further, the inner rolling sheet has the plurality of first grooves in its inner surface. If the plurality of these first grooves are, for example, half-depth cuts or debossments, when the inner rolling sheet is wrapped around the flavor source, the inner rolling sheet is easily folded along the first grooves. As a result, the inner rolling sheet may be made of a material having certain stiffness, such as thick paper. With this, the strength of the first part can be increased. In addition, even when force is applied in a direction in which the first part is crushed (radial direction), the first part is deformed in a manner that the plurality of half-depth cuts or the plurality of debossments are crushed. Then, parts of the inner surface of the inner

rolling sheet, the parts defining the half-depth cuts or the debossments, come into contact with and repel each other. Thus, a shape of the first part is easily maintained. Still further, since the tobacco is formed of strands, the tobacco easily enters the first grooves. By the entry of the tobacco into the first grooves, gaps on an inside relative to the inner rolling sheet are reduced. With this, the strength of the first part can be increased. Thus, according to the first aspect, the strength of the first part can be increased without increasing the filling amount of the flavor source. In this way, the first part can have strength to an extent that the first part and the second part can be easily wrapped, for example, in a tipping sheet while a density of the flavor source is adjusted to an extent that a heater for heating an inside can be easily inserted. Note that, as used herein, the "longitudinal direction" encompasses a direction having an inclination of 20° or less relative to a longitudinal direction of the first part.

[0008] A gist of a second aspect is that, in the first aspect,

the inner rolling sheet has a plurality of second grooves along the longitudinal direction in an outer surface of the inner rolling sheet, and
the flavor-generating article has spaces corresponding to the plurality of second grooves between the outer surface of the inner rolling sheet and an inner surface of the outer rolling sheet.

[0009] According to the second aspect, since the spaces are formed between the outer surface of the inner rolling sheet and the inner surface of the outer rolling sheet, transfer of heat of the flavor source to an outside at a time when the flavor-generating article is heated from inside can be suppressed. As a result, the flavor-generating article is efficiently heated. Thus, an amount of electricity for heating the flavor source can be suppressed, or a time period for heating the flavor source to a predetermined temperature can be shortened. In addition, transfer of the heat to a device that heats the flavor-generating article decreases, and increase in temperature of the device is suppressed. Further, if the second grooves are, for example, the half-depth cuts or the debossments, when the inner rolling sheet is wrapped around the flavor source, the inner rolling sheet is easily folded along the half-depth cuts or the debossments. As a result, the inner rolling sheet may be made of the material having certain stiffness, such as the thick paper. With this, the strength of the first part can be increased.

[0010] A gist of a third aspect is that, in the second aspect,
the inner rolling sheet has a corrugated cross-sectional shape in cross-section orthogonal to the longitudinal direction.

[0011] According to the third aspect, since the inner rolling sheet is a corrugated sheet, the strength of the first part can be increased in the longitudinal direction and a transverse direction. Note that, in this case, recessed portions to be located in the inner surface and recessed portions to be located in the outer surface when the flavor source is wrapped in the corrugated sheet correspond respectively to the first grooves and the second grooves.

[0012] A gist of a fourth aspect is that, in the second aspect or the third aspect,

the second part includes a hollow member arranged on a side that is adjacent to the first part,
the plurality of second grooves of the inner rolling sheet extend from one end to another end in the longitudinal direction of the inner rolling sheet,
the hollow member includes

a hollow channel, and
a filling layer that defines the hollow channel, and

the filling layer of the hollow member is

arranged near end portions of the plurality of second grooves, or
arranged to close the end portions of the plurality of second grooves.

[0013] According to the fourth aspect, since the second grooves extend from the one end to the other end in the longitudinal direction of the inner rolling sheet, a volume of the spaces corresponding to the second grooves can be increased, and insulating effect by the spaces corresponding to the second grooves can be increased. In addition, since the filling layer of the hollow member is arranged near or to close the end portions of the second grooves, an amount of air that flows through an inside of the second grooves can be reduced. As a result, an amount of the air that flows through the flavor source when a user sucks the flavor-generating article can be increased. With this, a delivery amount of flavor and/or aerosol to be generated from the flavor source can be increased.

[0014] A gist of a fifth aspect is that, in any of the second aspect to the fourth aspect,
an at least one of the plurality of second grooves includes a second dam portion that is provided in the at least one of the plurality of second grooves.

[0015] According to the fifth aspect, an amount of the air that flows through the at least one second groove can be reduced by the second dam portion. As a result, the amount of the air that flows through an inside of the flavor source when the user sucks the flavor-generating article can be increased. With this, the delivery amount of the flavor and/or the aerosol to be generated from the flavor source can be increased. In addition, by the arrangement of the second dam portion in the at least one second groove, the at least one second groove is hindered from being crushed. In this way, the strength of the first part can be increased.

[0016] A gist of a sixth aspect is that, in the fifth aspect,

the second dam portion includes a plurality of second dam portions, and
the plurality of second grooves each include an at least one second dam portion of the plurality of second dam portions.

[0017] According to the sixth aspect, the strength of the first part can be further increased, and the amount of the air that flows through each of the plurality of second grooves can be reduced. As a result, the amount of the air that flows through the inside of the flavor source when the user sucks the flavor-generating article can be further increased. With this, the delivery amount of the flavor and/or the aerosol to be generated from the flavor source can be increased.

[0018] A gist of a seventh aspect is that, in the sixth aspect,

the at least one second dam portion of each of the plurality of second grooves is arranged at a position different in the longitudinal direction from a position of another second dam portion of the plurality of second dam portions, the other second dam portion being provided in an adjacent one of the plurality of second grooves,
the plurality of respective second dam portions of the plurality of second grooves include

a still another second dam portion that is closest to the second part in the longitudinal direction, and
a yet another second dam portion that is farthest from the second part in the longitudinal direction, and

a length in the longitudinal direction between the still other second dam portion and the yet other second dam portion is 50% or more and 90% or less of a length in the longitudinal direction of the flavor source.

[0019] According to the seventh aspect, since the second dam portions are arranged in a distributed manner in the longitudinal direction, the strength of the first part can be increased in a broader range. When the length is less than 50% of the length in the longitudinal direction of the flavor source, the strength of the first part is non-uniform in the longitudinal direction. When the length exceeds 90% of the length in the longitudinal direction of the flavor source, there is a risk that, if a rod being a raw material of the flavor-generating article is cut at a position including the second dam portion, the second dam portion is crushed, and functions of the second dam portion (such as the reduction of the air and the increase in strength of the first part) are impaired. Note that, even when the second dam portion had already been cut at the time of cutting the rod, the functions of the second dam portion are not impaired as long as a shape of the second dam portion is maintained in the second groove.

[0020] A gist of an eighth aspect is that, in any of the first aspect to the seventh aspect,
an at least one of the plurality of first grooves includes a first dam portion that is provided in the at least one of the plurality of first grooves.

[0021] According to the eighth aspect, air-flow resistance of the at least one first groove can be increased by the first dam portion. As a result, an amount of the air that flows through a vicinity of a center of the flavor source when the user sucks the flavor-generating article can be increased. With this, the delivery amount of the flavor and/or the aerosol to be generated from the flavor source can be increased. In addition, by the arrangement of the first dam portion in the at least one first groove, the at least one first groove is hindered from being crushed. In this way, the strength of the first part can be increased.

[0022] A gist of a ninth aspect is that, in the eighth aspect,

the first dam portion includes a plurality of first dam portions,
the plurality of first grooves each include an at least one first dam portion of the plurality of first dam portions,
the at least one first dam portion of each of the plurality of first grooves is arranged at a position different in the longitudinal direction from a position of another first dam portion of the plurality of first dam portions, the other first dam portion being provided in an adjacent one of the plurality of first grooves,
the plurality of respective first dam portions of the plurality of first grooves include

a still another first dam portion that is closest to the second part in the longitudinal direction, and
a yet another first dam portion that is farthest from the second part in the longitudinal direction, and

a length in the longitudinal direction between the still other first dam portion and the yet other first dam portion is 50% or more and 90% or less of a length in the longitudinal direction of the flavor source.

[0023] According to the ninth aspect, the strength of the first part can be further increased, and the air-flow resistance of each of the plurality of first grooves can be increased. As a result, the amount of the air that flows through the vicinity of the center of the flavor source when the user sucks the flavor-generating article can be further increased. With this, the delivery amount of the flavor and/or the aerosol to be generated from the flavor source can be increased. In addition, according to the eighth aspect, the first dam portions are arranged in a distributed manner in the longitudinal direction, and hence the

strength of the first part can be increased in a broader range. When the length is less than 50% of the length in the longitudinal direction of the flavor source, the strength of the first part is non-uniform in the longitudinal direction. When the length exceeds 90% of the length in the longitudinal direction of the flavor source, there is a risk that, if the rod being the raw material of the flavor-generating article is cut at a position including the first dam portion, the first dam portion is crushed, and functions of the first dam portion (such as the reduction of the air and the increase in strength of the first part) are impaired. Note that, even when the first dam portion had already been cut at the time of cutting the rod, the functions of the first dam portion are not impaired as long as a shape of the first dam portion is maintained in the first groove.

[0024] A gist of a tenth aspect is that, in any of the first aspect to the ninth aspect,
a width of each of the plurality of first grooves is 0.5 mm or more and 2.0 mm or less under a state in which the inner rolling sheet is wrapped around the flavor source.

[0025] According to the tenth aspect, the tobacco strands can easily enter the first grooves. When the width of the first groove is less than 0.5 mm, the entry of the tobacco strands is hindered. Meanwhile, when the width of the first groove exceeds 2.0 mm, the first grooves are excessively wide. As a result, there is a risk that the strength of the first part decreases to be lower than that in a case where the width of the first groove falls within the above-mentioned range.

[0026] A gist of an eleventh aspect is that, in any of the first aspect to the tenth aspect,
a depth of each of the plurality of first grooves is 0.1 mm or more and 1.5 mm or less.

[0027] According to the eleventh aspect, the tobacco strands can easily enter the first grooves. When the depth of the first groove is less than 0.1 mm, the entry of the tobacco strands is hindered. Meanwhile, when the width of the first groove exceeds 2.0 mm, the first grooves are excessively deep. As a result, there is a risk that the strength of the first part decreases to be lower than that in a case where the depth of the first groove falls within the above-mentioned range.

[0028] A gist of a twelfth aspect is that, in any of the first aspect to the eleventh aspect,
a width of each of the tobacco strands is 0.5 mm or more and 2.0 mm or less in a direction orthogonal to the longitudinal direction.

[0029] According to the twelfth aspect, the tobacco strands can easily enter the first grooves each having the appropriate width and the appropriate depth.

[0030] A gist of a thirteenth aspect is that, in any of the first aspect to the twelfth aspect,
a thickness of each of the tobacco strands is 0.1 mm or more and 0.5 mm or less in a direction orthogonal to the longitudinal direction.

[0031] According to the thirteenth aspect, the tobacco strands can easily enter the first grooves each having the appropriate width and the appropriate depth.

[0032] A gist of a fourteenth aspect is that, in any of the first aspect to the thirteenth aspect,
a basis weight of the inner rolling sheet is 40 g/m^2 or more and 150 g/m^2 or less.

[0033] A gist of a fifteenth aspect is that, in any of the first aspect to the fourteenth aspect,
of the tobacco strands included in the flavor source, tobacco strands at 50 weight% or more are arrayed in the longitudinal direction.

BRIEF DESCRIPTION OF DRAWINGS

[0034]

Fig. 1 is a schematic cross-sectional side view of a heating system according to an embodiment of the present invention, the heating system including a flavor-generating article.

Fig. 2 is an enlarged view of a chamber illustrated in Fig. 1.

Fig. 3A is a cross-sectional view illustrating an example of a cross-sectional shape of the chamber as viewed in a direction indicated by arrows 3-3 shown in Fig. 2.

Fig. 3B is a cross-sectional view illustrating another example of the cross-sectional shape of the chamber as viewed in the direction indicated by the arrows 3-3 shown in Fig. 2.

Fig. 3C is a cross-sectional view illustrating a still another example of the cross-sectional shape of the chamber as viewed in the direction indicated by the arrows 3-3 shown in Fig. 2.

Fig. 4 is a cross-sectional view of the flavor-generating article.

Fig. 5 is an exploded perspective view of a base portion.

Fig. 6 is a side view of an inner rolling sheet as viewed in a longitudinal direction.

Fig. 7 is a cross-sectional view of the base portion, the cross-sectional view being taken orthogonal to the longitudinal direction.

Fig. 8 is a side view of the inner rolling sheet according to another example as viewed in the longitudinal direction.

Fig. 9 is a cross-sectional view of the base portion according to the other example, the cross-sectional view being taken orthogonal to the longitudinal direction.

Fig. 10 is a side view of the inner rolling sheet according to the other example as viewed in the longitudinal direction.

Fig. 11A is a perspective view of the inner rolling sheet according to a still another example.

Fig. 11B is a side view of the inner rolling sheet illustrated in Fig. 11A as viewed in the longitudinal direction.

Fig. 12A is a perspective view of the inner rolling sheet according to a yet another example.

Fig. 12B is a side view of the inner rolling sheet illustrated in Fig. 12A as viewed in the longitudinal direction.

DESCRIPTION OF EMBODIMENTS

[0035] Now, an embodiment of the present invention is described with reference to the drawings. In the drawings referred to below, the same or corresponding components are denoted by the same reference symbols to omit redundant description thereof. Note that, as used herein, a "longitudinal direction" refers to a longitudinal direction of a flavor-generating article, that is, a direction in which the flavor-generating article is inserted into a heating device. In addition, as used herein, a "transverse direction" refers to a direction orthogonal to the longitudinal direction.

[0036] Fig. 1 is a schematic cross-sectional side view of a heating system according to this embodiment, the heating system including the flavor-generating article. A heating system 10 according to this embodiment includes a flavor-generating article 100 and a heating device 20. The heating device 20 is preferred to be a portable device or a handheld device. As illustrated in Fig. 1, the heating device 20 includes a battery 22, a PCB (Printed Circuit Board) 24, a housing 30, and a heating unit 40. The flavor-generating article 100 includes a smokable material 102 including a flavor source to be heated by the heating device 20. Details of a configuration of the flavor-generating article 100 are described below.

[0037] The heating device 20 is configured to vaporize the smokable material 102 included in the flavor-generating article 100. The smokable material 102 constitutes a part of the flavor-generating article 100 having, for example, a shape of a post that extends along the longitudinal direction. The flavor-generating article 100 can be, for example, a cigarette stick in which the smokable material 102 includes tobacco. The battery 22 stores electricity to be used in the heating device 20. The battery 22 is, for example, a lithium-ion battery. The battery 22 may be chargeable by an external power source.

[0038] The PCB 24 includes a CPU and a memory, and controls operation of the heating device 20. For example, the PCB 24 starts heating of the smokable material 102 in response to an operation by a user to an input apparatus such as a push button or a slide switch (not shown), and ends the heating of the smokable material 102 after a lapse of a certain time period. If the number of times of puffs by the user exceeds a certain value, the PCB 24 may end the heating of the smokable material 102 even before the lapse of the certain time period from the start of the heating of the smokable material 102. The puffs are detected, for example, by a sensor (not shown).

[0039] Alternatively, the PCB 24 may start the heating of the smokable material 102 in response to a start of the puff, and may end the heating of the smokable material 102 in response to an end of the puff. If a certain time period elapses from the start of the puff, the PCB 24 may end the heating of the smokable material 102 even before the end of the puff. In this embodiment, the PCB 24 is arranged between the battery 22 and the heating unit 40.

[0040] In the illustrated example, the heating device 20 is configured to receive the stick-like flavor-generating article 100. In addition, as in the illustration, the battery 22, the PCB 24, and the heating unit 40 can be arrayed in the direction in which the flavor-generating article 100 is inserted into the heating device 20. The housing 30 is a casing that houses the battery 22, the PCB 24, and the heating unit 40. The housing 30 has an air inlet 30a for supplying air to the heating unit 40, and includes an insertion end portion 32 where an opening 34 in which a chamber described below is housed is formed.

[0041] The heating unit 40 includes a heating portion 42 and a chamber 50. The heating portion 42 is formed to be insertable into the smokable material 102, and is configured to heat the smokable material 102 from inside. Specifically, the heating portion 42 includes a blade portion 42a that is inserted into the smokable material 102, and a holder portion 42b for fixing the heating portion 42 to the housing 30. The blade portion 42a is a part that is held in contact with the smokable material 102 with the flavor-generating article 100 located at a desired position in the chamber 50. The blade portion 42a may include a resin board and heating tracks formed in its surface. A lead wire 43 for supplying the electricity from the battery 22 to the blade portion 42a is connected to the blade portion 42a. The heating portion 42 may include a susceptor that is induction-heated by an induction coil. In that case, the susceptor is inserted into the smokable material 102, and then is induction-heated by the induction coil (not shown). In this way, the smokable material 102 is heated.

[0042] Fig. 2 is an enlarged view of the chamber 50 illustrated in Fig. 1. As illustrated in Fig. 2, the chamber 50 has an opening 51 that receives the flavor-generating article 100. The chamber 50 has a side wall 52 that surrounds the smokable material 102, and a bottom wall 54 against which an end portion of the smokable material 102 abuts. The bottom wall 54 has an opening 54a for supplying the air to the end portion of the smokable material 102. The air that flows in through the air inlet 30a of the housing 30 by suction of the flavor-generating article 100 by the user reaches the smokable material 102 through the opening 54a of the chamber 50. Then, the air is supplied into the mouth of the user together with aerosol or flavor to be generated from the smokable material 102.

[0043] In addition, in the heating device 20, a first space S1 may be formed between the housing 30 and an outer peripheral surface of the side wall 52 of the chamber 50. With this, transfer of heat of the blade portion 42a and of the smokable material 102 heated thereby to the housing 30 can be suppressed or reduced by the first space S1. Thus, increase in temperature of a surface of the housing 30 can be reduced, and dissipation of the heat from the smokable material 102 due to the chamber 50 can be

reduced. In particular, dissipation of the heat from an outer peripheral side of the smokable material 102 can be reduced. Thus, even in a latter half of smoking, the aerosol can be further sufficiently generated from the smokable material 102. In addition, transfer of the heat to the chamber 50 also can be suppressed or reduced, and hence even transfer of the heat into the heating device 20 via the chamber 50 can be reduced.

[0044] The chamber 50 in the illustration may be configured to be movable relative to the housing 30 along the direction in which the flavor-generating article 100 is inserted. Specifically, the side wall 52 of the chamber 50 may be configured to be slidable relative to the opening 34 of the housing 30 without being fixed to the housing 30. Although not shown, if the heating device 20 includes operating means such as a lever that causes the chamber 50 to move along the direction in which the flavor-generating article 100 is inserted, the chamber 50 to which the operating means is coupled can be moved in the direction in which the flavor-generating article 100 is inserted. With this, after use of the flavor-generating article 100, by moving the chamber 50 toward the insertion end portion 32 with the smokable material 102 arranged in the chamber 50, the smokable material 102 can be removed from the blade portion 42a while spill of the smokable material 102 such as tobacco from the flavor-generating article 100 is suppressed or reduced.

[0045] Then, a cross-sectional shape of the chamber 50 is described. Fig. 3A to Fig. 3C are cross-sectional views illustrating examples of the cross-sectional shape of the chamber 50 as viewed in a direction indicated by arrows 3-3 shown in Fig. 2. As illustrated in Fig. 3A, the side wall 52 of the chamber 50 includes holding portions 56a that hold the smokable material 102 by being held in contact with an outer peripheral surface of the smokable material 102, and spaced portions 56b that are spaced apart from the smokable material 102. The holding portions 56a and the spaced portions 56b are arranged alternately to each other along a circumferential direction of the chamber 50. The holding portions 56a and the spaced portions 56b are connected to each other with flat wall surfaces, and the chamber 50 is formed into a star shape in cross-section.

[0046] In the example illustrated in Fig. 3B, the chamber 50 has a substantially circular shape in cross-section, and a plurality of substantially plate-like holding members 58 are formed on an inner surface of the side wall 52 of the chamber 50. The plurality of holding members 58 may be formed at equal intervals along the circumferential direction of the inner surface of the side wall 52 of the chamber 50. The holding members 58 each have one end that is connected to the side wall 52, and another end that holds the smokable material 102 by being held in contact with the smokable material 102.

[0047] According to the examples of the chamber 50, the examples being illustrated in Fig. 3A and Fig. 3B, second spaces S2 are formed between an inner peripheral surface of the side wall 52 of the chamber 50 and the smokable material 102 of the flavor-generating article 100 housed in the chamber 50. By forming the second spaces S2, an insulating air layer is formed around the smokable material 102. With this, transfer of the heat generated from the blade portion 42a of the heating portion 42 to the chamber 50 and the housing 30 can be suppressed or reduced by the second spaces S2. Thus, the increase in temperature of the surface of the housing 30 can be reduced, and the dissipation of the heat from the smokable material 102 due to the chamber 50 can be reduced. In particular, the dissipation of the heat from the outer peripheral side of the smokable material 102 can be reduced. Thus, even in the latter half of the smoking, the aerosol or the flavor can be further sufficiently generated from the smokable material 102.

[0048] In the example illustrated in Fig. 3C, the side wall 52 of the chamber 50 has an inner side wall 52a and an outer side wall 52b each having a substantially circular shape in cross-section. A space that is defined by the inner side wall 52a and the outer side wall 52b is sealed, and, for example, a sodium-based insulator 57 can be sealed in this space. An inner diameter of the inner side wall 52a is substantially the same as an inner diameter of the smokable material 102. A substantial entirety of an inner surface of the inner side wall 52a functions as a holding surface that holds the smokable material 102.

[0049] The side wall 52 of the chamber 50 need not necessarily be formed into the cross-sectional shapes illustrated in Fig. 3A to Fig. 3C, and may be arbitrarily formed in cross-section.

[0050] Next, the configuration of the flavor-generating article 100 according to this embodiment is described. Fig. 4 is a cross-sectional view of the flavor-generating article 100. In the embodiment illustrated in Fig. 4, the flavor-generating article 100 includes a base portion 100A (corresponding to an example of a first part) including a flavor source 111, an inner rolling sheet 120 that wraps the flavor source 111, and a first rolling sheet 112 (corresponding to an example of an outer rolling sheet) that wraps an outer periphery of the inner rolling sheet 120, and includes a mouthpiece portion 100B (corresponding to an example of a second part) that forms an end portion on a side opposite to a side where the base portion 100A is present. The mouthpiece portion 100B is arranged adjacent to the base portion 100A in the longitudinal direction. The inner rolling sheet 120 is preferred to be made of a material that is non-flammable at 200°C. In addition, a thermal conductivity of the inner rolling sheet 120 is preferred to be 0.3 w/(m·K) or less. In this case, heat of the flavor source 111 is hindered from being transferred to an outside of the flavor-generating article 100, and the flavor source 111 can be efficiently heated by the heating portion 42. Note that, the thermal conductivity of the inner rolling sheet 120 can be measured, for example, with Quick Thermal Conductivity Meter QTM-500 manufactured by KYOTO ELECTRONICS MANUFACTURING CO., LTD.

[0051] The smokable material 102 illustrated in Fig. 1

and Fig. 2, which includes the flavor source 111, may further contain an aerosol source for enhancing the flavor. The base portion 100A and the mouthpiece portion 100B are coupled to each other not with the first rolling sheet 112 but with a second rolling sheet 113. Note that, the second rolling sheet 113 may be omitted, and the base portion 100A and the mouthpiece portion 100B may be coupled to each other with use of the first rolling sheet 112.

[0052] The mouthpiece portion 100B in Fig. 4 includes a hollow segment 116 (corresponding to an example of a hollow member), a filter portion 115, and a paper tube portion 114 arranged between the hollow segment 116 and the filter portion 115. In other words, the hollow segment 116 is arranged at an end portion of the mouthpiece portion 100B, the end portion being adjacent to the base portion 100A. The hollow segment 116 includes one or a plurality of hollow channels 116a, and a filling layer 116b that defines the hollow channels 116a. A filling density of fiber of the filling layer 116b is high. Thus, during the suction, the air, the flavor, or the aerosol flows mostly through the hollow channels 116a, and flows scarcely through the filling layer 116b. In the flavor-generating article 100, replacing a part formed by shortening the filter portion 115 with the hollow segment 116 so as to suppress a component of the aerosol from decreasing as a result of filtration through the filter portion 115 is effective at increasing a delivery amount of the flavor or the aerosol. In addition, in the flavor-generating article 100, a paper filter may be arranged, and some of the hollow segment 116, an acetate filter, and the paper filter may be combined with each other.

[0053] Although the mouthpiece portion 100B in Fig. 4 is constituted by the three segments, in this embodiment, the mouthpiece portion 100B may be constituted by one or two segments, or may be constituted by four or more segments. For example, the mouthpiece portion 100B may be formed by omitting the hollow segment 116, that is, by arranging the paper tube portion 114 and the filter portion 115 adjacent to each other. In addition, the paper tube portion 114 may be filled with a cooling member made, for example, of a phase-change material such as polylactic acid.

[0054] In the embodiment illustrated in Fig. 4, a length in the longitudinal direction of the flavor-generating article 100 is preferred to be 40 mm to 90 mm, more preferred to be 50 mm to 75 mm, and further more preferred to be 50 mm to 60 mm. A circumference of the flavor-generating article 100 is preferred to be 15 mm to 25 mm, more preferred to be 17 mm to 24 mm, and further more preferred to be 20 mm to 23 mm. Further, in the flavor-generating article 100, a length of the base portion 100A is preferred to be 10 mm to 20 mm, a length of the first rolling sheet 112 is preferred to be 10 mm to 20 mm, a length of the hollow segment 116 is preferred to be 5 mm to 10 mm, a length of the paper tube portion 114 is preferred to be 10 mm to 40 mm, and a length of the filter portion 115 is preferred to be 5 mm to 20 mm. These lengths of the segments may be individually changed as appropriate in accordance, for example, with suitability for manufacture or required quality. Still further, as in the illustration, the members on a downstream side relative to the flavor source 111 may be connected integral to the flavor source 111 with use of the second rolling sheet 113, or these downstream members may be provided independent of each other and connected integral to the flavor source 111 with use of the first rolling sheet.

[0055] In this embodiment, the flavor source 111 of the flavor-generating article 100 can contain the aerosol source that generates the aerosol by being heated at a predetermined temperature. A type of the aerosol source is not limited in particular, and extracts of various natural products and/or components thereof may be selected in accordance with use. The aerosol source is preferred to be a polyhydric alcohol, and may be, for example, glycerin, propylene glycol, triacetin, 1,3-butanediol, and mixtures thereof. A content of the aerosol source in the flavor source 111 is not limited in particular. From viewpoints of generating the aerosol sufficiently and imparting good flavor, the content is normally 5 weight% or more and preferred to be 10 weight% or more, and normally 50 weight% or less and preferred to be 20 weight% or less.

[0056] The flavor source 111 of the flavor-generating article 100 according to this embodiment is constituted by an array of tobacco strands in the longitudinal direction of the flavor-generating article 100. Of the tobacco strands included in the flavor source 111, tobacco strands at 50 weight% or more are preferred to be arrayed in the longitudinal direction. The tobacco strands can be formed, for example, by pulverizing dried tobacco leaves uniformly into particles having an average diameter of approximately 20 μm to 200 μm, processing these particles into a sheet, and then cutting this sheet into strands. Note that, as used herein, the "strands" refer to a shape of strings or strips each having a width equal to or larger than a thickness of the sheet of the tobacco leaves. A material of the tobacco is not limited in particular, and known materials such as lamina and stems may be used. When a circumference of the flavor source 111 in the flavor-generating article 100 is 22 mm and a length of the same is 20 mm, a range of the content of the flavor source 111 is, for example, 200 mg to 400 mg, and preferred to be 250 mg to 320 mg. A moisture content of the flavor source 111 is, for example, 8 weight% to 18 weight%, and preferred to be 10 weight% to 16 weight%. At such a moisture content, occurrence of rolling-sheet discoloration is suppressed, and satisfactory suitability for rolling in manufacture of the base portion 100A is achieved. For example, the dried tobacco leaves to be used may be sliced into a width of 0.8 mm to 1.2 mm. In addition, the flavor source 111 may contain one or two or more types of flavor. Although the types of the flavor are not limited in particular, menthol is preferred from a viewpoint of imparting good flavor.

[0057] In this embodiment, the first rolling sheet 112 and the second rolling sheet 113 of the flavor-generating

article 100 can be made of base paper having a basis weight of, for example, 20 gsm to 65 gsm, the basis weight being preferred to be 25 gsm to 45 gsm. Although a thickness of each of the first rolling sheet 112 and the second rolling sheet 113 is not limited in particular, from viewpoints of stiffness, air permeability, and ease of adjustment in papermaking, the thickness is 10 μm to 100 μm, preferred to be 20 μm to 75 μm, and more preferred to be 30 μm to 50 μm.

[0058] In this embodiment, the first rolling sheet 112 and the second rolling sheet 113 of the flavor-generating article 100 can contain a filler. A content of the filler is, for example, 10 weight% to 60 weight% of a total weight of the first rolling sheet 112 and the second rolling sheet 113, and preferred to be 15 weight% to 45 weight%. In this embodiment, the content of the filler is preferred to be 15 weight% to 45 weight% relative to the preferred range of the basis weight (25 gsm to 45 gsm). Calcium carbonate, titanium dioxide, kaolin, or the like may be used as the filler. Paper containing such a filler is capable of exhibiting bright white color that is preferred from a viewpoint of an external appearance in use as rolling sheets of the flavor-generating article 100, and is capable of permanently maintaining its whiteness. When such a filler is contained by a large amount, the rolling sheet can have, for example, an ISO brightness of 83% or more. In addition, from a practical viewpoint of the use as the rolling sheets of the flavor-generating article 100, the first rolling sheet 112 and the second rolling sheet 113 are each preferred to have a tensile strength of 8 N715mm or more. This tensile strength can be increased by reducing the content of the filler. Specifically, this tensile strength can be increased by reducing the content of the filler to be smaller than an upper limit of the content of the filler in each of the exemplified ranges of the basis weight.

[0059] The flavor-generating article 100 according to this embodiment includes the inner rolling sheet 120 so that hardness of the base portion 100A is increased without increasing a filling amount. Fig. 5 is an exploded perspective view of the base portion 100A. Fig. 6 is a side view of the inner rolling sheet 120 as viewed in the longitudinal direction. Fig. 7 is a cross-sectional view of the base portion 100A, the cross-sectional view being taken orthogonal to the longitudinal direction. As illustrated in Fig. 5 to Fig. 7, the inner rolling sheet 120 that wraps the flavor source 111 has a plurality of first grooves 120a in its inner surface along the longitudinal direction. Although the plurality of first grooves 120a may be formed in a part in the longitudinal direction of the inner rolling sheet 120, the plurality of first grooves 120a are preferred to extend from one end to another end in the longitudinal direction of the inner rolling sheet 120. In addition, the inner rolling sheet 120 is thicker than the first rolling sheet 112. Note that, as used herein, the "inner surface of the inner rolling sheet 120" and an "outer surface of the inner rolling sheet 120" respectively refer to a surface corresponding to an inner surface and a surface corresponding to an outer surface under a state in which the inner rolling sheet 120 is wrapped around the flavor source 111.

[0060] The plurality of first grooves 120a in the illustrated example can be half-depth cuts or debossments. The half-depth cuts or the debossments can be formed, for example, by slitting the surface of the inner rolling sheet 120, trimming a part of the surface, or by compressing the surface. Alternatively, the half-depth cuts or the debossments may be formed by laser machining. In other words, the half-depth cuts or the debossments can be regarded also as trimming lines or indentation lines formed in the surface of the inner rolling sheet 120. As illustrated in Fig. 7, in the flavor-generating article 100 according to this embodiment, at least part of the tobacco strands constituting the flavor source 111 enters the first grooves 120a of the inner rolling sheet 120.

[0061] According to the flavor-generating article 100 illustrated in Fig. 5 to Fig. 7, since the flavor source 111 is wrapped in the inner rolling sheet 120 that is thicker than the first rolling sheet 112, strength of the base portion 100A can be increased without increasing the filling amount of the flavor source 111. In other words, the strength of the base portion 100A, which increases generally as a volume filling rate increases, can be increased with use of the inner rolling sheet 120. Thus, a range of the filling amount of the flavor source 111 is broadened, and a degree of freedom in design can be increased. Specifically, the filling amount of the flavor source 111 can be changed in accordance with desired flavor. Further, since the inner rolling sheet 120 has the plurality of first grooves 120a being the half-depth cuts or the debossments in its inner surface, when the inner rolling sheet 120 is wrapped around the flavor source 111, the inner rolling sheet 120 is easily folded along the first grooves 120a. As a result, the inner rolling sheet 120 may be made of a material having certain stiffness, such as thick paper. With this, the strength of the base portion 100A can be increased. Note that, a basis weight of the inner rolling sheet 120 is preferred to be 40 g/m^2 or more and 150 g/m^2 or less. In addition, even when force is applied in a direction in which the base portion 100A is crushed (radial direction), the base portion 100A is deformed in a manner that the plurality of half-depth cuts or the plurality of debossments are crushed. Then, parts of the inner surface of the inner rolling sheet 120, the parts defining the half-depth cuts or the debossments, come into contact with and repel each other. Thus, the shape of the base portion 100A is easily maintained. Still further, since the tobacco constituting the flavor source 111 is formed of strands, the tobacco easily enters the first grooves 120a. By the entry of the tobacco into the first grooves 120a, gaps on an inside relative to the inner rolling sheet 120 are reduced. With this, the strength of the base portion 100A can be increased. Thus, the flavor-generating article 100 according to this embodiment is capable of increasing the strength of the base portion 100A without increasing the filling amount of the flavor source 111. In this way, the base portion 100A can have

strength to an extent that the base portion 100A and the mouthpiece portion 100B can be easily wrapped in the second rolling sheet 113 (tipping sheet) while a density of the flavor source 111 is adjusted to an extent that the blade portion 42a for heating the inside can be easily inserted.

[0062] Fig. 8 is a side view of the inner rolling sheet 120 according to another example as viewed in the longitudinal direction. Fig. 9 is a cross-sectional view of the base portion 100A according to the other example, the cross-sectional view being taken orthogonal to the longitudinal direction. As illustrated in Fig. 8 and Fig. 9, the inner rolling sheet 120 that wraps the flavor source 111 has, in addition to the plurality of first grooves 120a, a plurality of second grooves 120b in its outer surface along the longitudinal direction. Note that, the "outer surface of the inner rolling sheet 120" refers to an outer surface under the state in which the inner rolling sheet 120 is wrapped around the flavor source 111.

[0063] The inner rolling sheet 120 in the illustration is obtained by processing a sheet material to be formed as the inner rolling sheet 120 into a corrugated shape, specifically, into a triangular wave shape. Thus, the first grooves 120a and the second grooves of the inner rolling sheet in the illustration correspond respectively to recessed portions in the inner surface and recessed portions in the outer surface of the inner rolling sheet 120 formed into the corrugated shape. The inner rolling sheet 120 illustrated in Fig. 8 may be manufactured, for example, by forming a pattern of the triangular wave shape by passing an acetate sheet or the like between embossing rollers (corrugated rollers).

[0064] As illustrated in Fig. 9, in the flavor-generating article 100 according to this embodiment, at least part of the tobacco strands constituting the flavor source 111 enters the first grooves 120a of the inner rolling sheet 120. In addition, as illustrated in Fig. 9, in the flavor-generating article 100, since the inner rolling sheet 120 has the plurality of second grooves 120b, spaces S3 corresponding to the plurality of second grooves 120b are formed between the outer surface of the inner rolling sheet 120 and an inner surface of the first rolling sheet 112.

[0065] According to the example illustrated in Fig. 8 and Fig. 9, since the spaces S3 are formed between the outer surface of the inner rolling sheet 120 and the inner surface of the first rolling sheet 112, the transfer of the heat of the flavor source 111 to the outside at a time when the flavor-generating article 100 is heated from inside can be suppressed. As a result, the flavor-generating article 100 is efficiently heated. Thus, an amount of the electricity for heating the flavor source 111 can be suppressed, or a time period for heating the flavor source 111 to the predetermined temperature can be shortened. In addition, the transfer of the heat to the heating device 20 that heats the flavor-generating article 100 decreases, and increase in temperature of the heating device 20 is suppressed. In addition, by the formation of the spaces S3, the inner rolling sheet 120 can be deformed when the blade portion 42a is inserted into the flavor source 111. In this way, the blade portion 42a can be easily inserted into the flavor source 111. Although the plurality of second grooves 120b may be formed in a part in the longitudinal direction of the inner rolling sheet 120, the plurality of second grooves 120b are preferred to extend from the one end to the other end in the longitudinal direction of the inner rolling sheet 120. With this, a volume of the spaces S3 corresponding to the second grooves 120b can be increased, and insulating effect by the spaces S3 corresponding to the second grooves 120b can be increased.

[0066] In addition, since the inner rolling sheet 120 is the sheet having the corrugated shape (corrugated sheet), the strength of the base portion 100A can be increased in the longitudinal direction and the transverse direction.

[0067] Note that, the plurality of second grooves 120b may be formed in the outer surface of the inner rolling sheet 120 illustrated in Fig. 5 to Fig. 7 by forming the half-depth cuts or the debossments. Also in this case, the spaces S3 are formed between the outer surface of the inner rolling sheet 120 and the inner surface of the first rolling sheet 112. Thus, the transfer of the heat of the flavor source 111 to the outside at the time when the flavor-generating article 100 is heated from inside can be suppressed. In addition, when the inner rolling sheet 120 is wrapped around the flavor source 111, the inner rolling sheet 120 is easily folded along the half-depth cuts or the debossments. As a result, the inner rolling sheet 120 may be made of the material having certain stiffness, such as the thick paper. With this, the strength of the base portion 100A can be increased.

[0068] In the example illustrated in Fig. 8 and Fig. 9, since the spaces S3 are present between the inner rolling sheet 120 and the first rolling sheet 112, when the second grooves 120b extend from the one end to the other end in the longitudinal direction of the inner rolling sheet 120, air-flow resistance of the spaces S3 can be lower than air-flow resistance against the air that flows through the inside relative to the inner rolling sheet 120, that is, through the flavor source 111. In this case, when the user sucks the flavor-generating article 100, there is a risk that a large amount of air flows through the spaces S3, and that the flavor or the aerosol to be generated from the flavor source 111 cannot be efficiently delivered into the mouth of the user. As a countermeasure, in the example illustrated in Fig. 8 and Fig. 9, the filling layer 116b of the hollow segment 116 illustrated in Fig. 4 is preferred to be arranged near end portions of the second grooves 120b or arranged to close the end portions of the second grooves 120b. With this, air-flow resistance of the second grooves 120b can be increased. As a result, an amount of the air that flows through an inside of the flavor source 111 when the user sucks the flavor-generating article 100 can be increased. With this, the delivery amount of the flavor and/or the aerosol to be generated from the flavor

source 111 can be increased.

[0069] Fig. 10 is a side view of the inner rolling sheet 120 according to the other example as viewed in the longitudinal direction. The inner rolling sheet 120 illustrated in Fig. 10 is obtained by processing the sheet material to be formed as the inner rolling sheet 120 into a corrugated shape, specifically, into a substantially sinusoidal shape. Thus, the first grooves 120a and the second grooves 120b of the inner rolling sheet in the illustration correspond respectively to the recessed portions in the inner surface and the recessed portions in the outer surface of the inner rolling sheet 120 formed into the corrugated shape. As illustrated in Fig. 10, as the inner rolling sheet 120 according to this embodiment, not only the corrugated sheet having the triangular wave shape illustrated in Fig. 8 and Fig. 9, but also the corrugated sheet having the substantially sinusoidal shape can be employed. Note that, not only these wave shapes, but also other arbitrary wave patterns can be employed. The inner rolling sheet 120 illustrated in Fig. 10 may be manufactured, for example, by forming a pattern of the substantially sinusoidal shape by passing the acetate sheet or the like between embossing rollers (corrugated rollers).

[0070] Fig. 11A is a perspective view of the inner rolling sheet 120 according to a still another example. Fig. 11B is a side view of the inner rolling sheet 120 illustrated in Fig. 11A as viewed in the longitudinal direction. The inner rolling sheet 120 illustrated in Fig. 11A and Fig. 11B is different from the inner rolling sheet 120 illustrated in Fig. 5 to Fig. 7 in that an at least one of the plurality of first grooves 120a includes a first dam portion 130 that is provided in this first groove 120a. The first dam portions 130 can be made, for example, of an arbitrary material that hinders the air from permeating therethrough or that does not allow the air to permeate therethrough, specifically, can be formed, for example, by curing an adhesive. In addition, the plurality of first grooves 120a of the inner rolling sheet 120 can be thermoformed, and the first dam portions 130 can be formed by thermoforming the inner rolling sheet 120 with use of dies conforming to the first grooves 120a and the first dam portions 130 at the time of thermoforming the first grooves 120a. The first dam portions 130 are configured to suppress communication of the air through the first grooves 120a by being located in the first grooves 120a.

[0071] As illustrated in Fig. 11A, the first dam portion 130 has an upper surface 130a and a side surface 130b. The first dam portion 130 need not necessarily be formed so that an angle to be formed between the upper surface 130a and the side surface 130b is substantially a right angle as in the illustrated example, and a corner portion to be formed by the upper surface 130a and the side surface 130b may be chamfered into a round surface. Although the first dam portion 130 may have a height that is smaller than a depth of the first groove 120a, the first dam portion 130 is preferred, as illustrated in Fig. 11B, to be configured to completely close a part in the longitudinal direction of the first groove 120a by having a height that is at least the same as the depth of the first groove 120a. More specifically, the first dam portion 130 is preferred, as illustrated in Fig. 11B, to be formed to connect peaks of adjacent triangles that define the first groove 120a. With this, the air that flows through the first groove 120a can be blocked.

[0072] According to Fig. 11A and Fig. 11B, an amount of the air that flows through the first grooves 120a can be reduced by the first dam portions 130. As a result, the air is hindered from flowing through the first grooves 120a. Thus, an amount of the air that flows through a vicinity of a center of the flavor source 111 when the user sucks the flavor-generating article 100 can be increased. With this, the delivery amount of the flavor and/or the aerosol to be generated from the flavor source 111 can be increased. In addition, by the arrangement of the first dam portions 130 in the first grooves 120a, the first grooves 120a are hindered from being crushed. In this way, the strength of the base portion 100A can be increased.

[0073] In the example illustrated in Fig. 11A and Fig. 11B, the plurality of first grooves 120a are each preferred to include the at least one first dam portion 130. With this, the strength of the base portion 100A can be further increased, and the amount of the air that flows through each of the plurality of first grooves 120a can be reduced. As a result, the amount of the air that flows through the vicinity of the center of the flavor source 111 when the user sucks the flavor-generating article 100 can be further increased. With this, the delivery amount of the flavor and/or the aerosol to be generated from the flavor source 111 can be increased. In this case, the first dam portion 130 of each of the plurality of first grooves 120a is preferred to be arranged at a position different in the longitudinal direction from that of another first dam portion 130 of the first dam portions 130, the other first dam portion 130 being provided in an adjacent one of the first grooves 120a. In this way, the first dam portions 130 are arranged in a distributed manner in the longitudinal direction, and hence the strength of the base portion 100A can be increased in a broader range.

[0074] In addition, the respective first dam portions 130 of the plurality of first grooves 120a include a still another first dam portion 130 that is closest to the mouthpiece portion 100B in the longitudinal direction and a yet another first dam portion 130 that is farthest from the mouthpiece portion 100B in the longitudinal direction, and a length L1 (refer to Fig. 11A) in the longitudinal direction between the still other first dam portion 130 and the yet other first dam portion 130 is preferred to be 50% or more and 90% or less of the length in the longitudinal direction of the flavor source 111. When the length L1 is less than 50% of the length in the longitudinal direction of the flavor source 111, the strength of the base portion 100A can be non-uniform in the longitudinal direction. When the length L1 exceeds 90% of the length in the longitudinal direction of the flavor source, there is a risk that, if a rod being a raw material of the flavor-generating article 100

is cut at a position including the first dam portion 130, the first dam portion 130 is crushed, and functions of the first dam portion 130 (such as the reduction of the air and the increase in strength of the base portion 100A) are impaired. Note that, even when the first dam portion 130 had already been cut at the time of cutting the rod, the functions of the first dam portion 130 are not impaired as long as the shape of the first dam portion 130 is maintained in the first groove 120a.

[0075] Fig. 12A is a perspective view of the inner rolling sheet 120 according to a yet another example. Fig. 12B is a side view of the inner rolling sheet 120 illustrated in Fig. 12A as viewed in the longitudinal direction. The inner rolling sheet 120 illustrated in Fig. 12A and Fig. 12B is different from the inner rolling sheet 120 illustrated in Fig. 10 in that the at least one of the plurality of first grooves 120a includes the first dam portion 130, and that an at least one of the plurality of second grooves 120b includes a second dam portion 140 that is provided in this second groove 120b. Note that, the first dam portions 130 and the second dam portions 140 need not necessarily be provided to the inner rolling sheet 120 as in the illustrated example, and only the second grooves 120b may include the second dam portions 140. The first dam portions 130 illustrated in Fig. 12A and Fig. 12B can be formed by recessing ridge portions of a wave shape from the outer surface toward the inner surface of the inner rolling sheet 120. Similarly, the second dam portions 140 can be formed by recessing the ridge portions of the wave shape from the inner surface toward the outer surface of the inner rolling sheet 120. In addition, the second dam portions 140 can be made, for example, of the arbitrary material that hinders the air from permeating therethrough or that does not allow the air to permeate therethrough, specifically, may be formed, for example, by curing an adhesive. In addition, the plurality of first grooves 120a and the plurality of second grooves 120b of the inner rolling sheet 120 can be thermoformed, and the first dam portions 130 and the second dam portions 140 can be formed by thermoforming the inner rolling sheet 120 with use of dies conforming to the first grooves 120a, the second grooves 120b, the first dam portions 130, and the second dam portions 140 at the time of thermoforming the first grooves 120a and the second grooves 120b. The first dam portions 130 and the second dam portions 140 are configured to suppress communication of the air through the second grooves 120b.

[0076] As illustrated in Fig. 12B, the second dam portion 140 has an upper surface 140a and a side surface 140b. The second dam portion 140 need not necessarily be formed so that an angle to be formed between the upper surface 140a and the side surface 140b is substantially the right angle as in the illustrated example, and a corner portion to be formed by the upper surface 140a and the side surface 140b may be chamfered into a round surface. Although the second dam portion 140 may have a height that is smaller than a depth of the second groove 120b, the second dam portion 140 is preferred, as illustrated in Fig. 12B, to be configured to completely close a part of the second groove 120b by having a height that is at least the same as the depth of the second groove 120b. More specifically, the second dam portion 140 is preferred, as illustrated in Fig. 12B, to be formed to connect tops of adjacent ridges that define the second groove 120b. With this, the air that flows through the second groove 120b can be blocked.

[0077] According to Fig. 12A and Fig. 12B, an amount of the air that flows through the second grooves 120b can be reduced by the second dam portions 140. As a result, the air is hindered from flowing through the second grooves 120b. Thus, the amount of the air that flows through the inside of the flavor source 111 when the user sucks the flavor-generating article 100 can be increased. With this, the delivery amount of the flavor and/or the aerosol to be generated from the flavor source 111 can be increased. In addition, by the arrangement of the second dam portions 140 in the second grooves 120b, the second groove 120b are hindered from being crushed. In this way, the strength of the base portion 100A can be increased.

[0078] In the example illustrated in Fig. 12A and Fig. 12B, the plurality of second grooves 120b are each preferred to include the at least one second dam portion 140. With this, the amount of the air that flows through each of the plurality of second grooves 120b can be reduced. As a result, the amount of the air that flows through the inside of the flavor source 111 when the user sucks the flavor-generating article 100 can be further increased. With this, the delivery amount of the flavor and/or the aerosol to be generated from the flavor source 111 can be increased. In this case, the second dam portion 140 of each of the plurality of second grooves 120b is preferred to be arranged at a position different in the longitudinal direction from that of another second dam portion 140 of the second dam portions 140, the other second dam portion 140 being provided in an adjacent one of the second grooves 120b. In this way, the second dam portions 140 are arranged in a distributed manner in the longitudinal direction, and hence the strength of the base portion 100A can be increased in a broader range.

[0079] In addition, the respective second dam portions 140 of the plurality of second grooves 120b include a still another second dam portion 140 that is closest to the mouthpiece portion 100B in the longitudinal direction and a yet another second dam portion 140 that is farthest from the mouthpiece portion 100B in the longitudinal direction, and a length in the longitudinal direction between the still other second dam portion 140 and the yet other second dam portion 140 is preferred to be 50% or more and 90% or less of the length in the longitudinal direction of the flavor source 111. When the length is less than 50% of the length in the longitudinal direction of the flavor source 111, the strength of the base portion 100A can be non-uniform in the longitudinal direction. When the length exceeds 90% of the length in the longitudinal direction of the flavor source, there is a risk that, if the rod

being the raw material of the flavor-generating article 100 is cut at a position including the second dam portion 140, the second dam portion 140 is crushed, and functions of the second dam portion 140 (such as the reduction of the air and the increase in strength of the base portion 100A) are impaired. Note that, even when the second dam portion 140 had already been cut at the time of cutting the rod, the functions of the second dam portion 140 are not impaired as long as the shape of the second dam portion 140 is maintained in the second groove 120b.

[0080] In the inner rolling sheet 120 described hereinabove, a width of the first groove 120a is preferred to be 0.5 mm or more and 2.0 mm or less. With this, the tobacco strands can easily enter the first grooves 120a. When the width of the first groove 120a is less than 0.5 mm, the entry of the tobacco strands is hindered. As a result, there are such risks that the filling amount of the flavor source 111 cannot be sufficiently reduced, and that the strength of the base portion 100A is difficult to secure. Meanwhile, when the width of the first groove 120a exceeds 2.0 mm, the first grooves 120a are excessively wide. As a result, there is a risk that the strength of the base portion 100A decreases to be lower than that in a case where the width of the first groove 120a falls within the above-mentioned range. Note that, a width of the second groove 120b also may be similar to the width of the first groove 120a.

[0081] In addition, in the inner rolling sheet 120 described hereinabove, the depth of the first groove 120a is preferred to be 0.1 mm or more and 1.5 mm or less. With this, the tobacco strands can easily enter the first grooves 120a. When the depth of the first groove 120a is less than 0.1 mm, the entry of the tobacco strands is hindered. As a result, there are such risks that the filling amount of the flavor source 111 cannot be sufficiently reduced, and that the strength of the base portion 100A is difficult to secure. Meanwhile, when the width of the first groove 120a exceeds 2.0 mm, the first grooves 120a are excessively deep. As a result, there is a risk that the strength of the base portion 100A decreases to be lower than that in a case where the depth of the first groove 120a falls within the above-mentioned range. Note that, the depth of the second groove 120b also may be similar to the depth of the first groove 120a.

[0082] In the flavor source 111 described hereinabove, a width of the tobacco strand is preferred to be 0.5 mm or more and 2.0 mm or less in the direction orthogonal to the longitudinal direction. With this, the tobacco strands can easily enter the first grooves 120a each having the appropriate width and the appropriate depth.

[0083] In addition, in the flavor source 111 described hereinabove, a thickness of the tobacco strand is preferred to be 0.1 mm or more and 1.5 mm or less in the direction orthogonal to the longitudinal direction. With this, the tobacco strands can easily enter the first grooves 120a each having the appropriate width and the appropriate depth.

[0084] Note that, in the flavor-generating article 100 described hereinabove, when the flavor source 111 is wrapped in the inner rolling sheet 120, one end and another end of the inner rolling sheet 120 are preferred not to overlap with each other. In other words, the inner rolling sheet 120 is preferred to wrap the flavor source 111 so that the one end and the other end of the inner rolling sheet 120 are substantially held in contact with each other or that a slight gap is formed between the one end and the other end. By such overlapping of the one end and the other end of the inner rolling sheet 120, the base portion 100A can be suppressed from being deformed in its cross-section. Note that, in wrapping the first rolling sheet 112 around the outer periphery of the inner rolling sheet 120, one end and another end of the first rolling sheet 112 are overlapped with each other, and the one end and the other end can be bonded to each other, for example, with an adhesive.

[0085] The present invention is not limited to the above-described embodiment of the present invention, and may be variously modified within the scope of the technical idea described in CLAIMS, DESCRIPTION, and the drawings. Note that, as long as the functions and the advantages of the invention of the present application are obtained, any form and material that are not described directly in DESCRIPTION or the drawings are also encompassed within the scope of the technical idea of the invention of the present application.

REFERENCE SIGNS LIST

[0086]

100: flavor-generating article
100A: base portion
100B: mouthpiece portion
111: flavor source
112: first rolling sheet
116: hollow segment
116a: hollow channel
116b: filling layer
120: inner rolling sheet
120a: first groove
120b: second groove
130: first dam portion
140: second dam portion
L1: length
S3: space

Claims

1. A flavor-generating article, comprising:

a first part; and
a second part that is adjacent to the first part in a longitudinal direction,
the first part including

a flavor source that includes tobacco strands arrayed in the longitudinal direction,
an inner rolling sheet that wraps the flavor source, and
an outer rolling sheet that wraps an outer periphery of the inner rolling sheet,

the inner rolling sheet

being thicker than the outer rolling sheet, and
having a plurality of first grooves along the longitudinal direction at least in an inner surface of the inner rolling sheet,

at least part of the tobacco strands entering the plurality of first grooves of the inner rolling sheet.

2. The flavor-generating article according to Claim 1,

wherein the inner rolling sheet has a plurality of second grooves along the longitudinal direction in an outer surface of the inner rolling sheet, and
wherein the flavor-generating article has spaces corresponding to the plurality of second grooves between the outer surface of the inner rolling sheet and an inner surface of the outer rolling sheet.

3. The flavor-generating article according to Claim 2, wherein the inner rolling sheet has a corrugated cross-sectional shape in cross-section orthogonal to the longitudinal direction.

4. The flavor-generating article according to Claim 2 or 3,

wherein the second part includes a hollow member arranged on a side that is adjacent to the first part,
wherein the plurality of second grooves of the inner rolling sheet extend from one end to another end in the longitudinal direction of the inner rolling sheet,
wherein the hollow member includes

a hollow channel, and
a filling layer that defines the hollow channel, and

wherein the filling layer of the hollow member is

arranged near end portions of the plurality of second grooves, or
arranged to close the end portions of the plurality of second grooves.

5. The flavor-generating article according to any one of Claims 2 to 4,
wherein an at least one of the plurality of second grooves includes a second dam portion that suppresses communication of air through the at least one of the plurality of second grooves.

6. The flavor-generating article according to Claim 5,

wherein the second dam portion includes a plurality of second dam portions, and
wherein the plurality of second grooves each include an at least one second dam portion of the plurality of second dam portions.

7. The flavor-generating article according to Claim 6,

wherein the at least one second dam portion of each of the plurality of second grooves is arranged at a position different in the longitudinal direction from a position of another second dam portion of the plurality of second dam portions, the other second dam portion being provided in an adjacent one of the plurality of second grooves,
wherein the plurality of respective second dam portions of the plurality of second grooves include

a still another second dam portion that is closest to the second part in the longitudinal direction, and
a yet another second dam portion that is farthest from the second part in the longitudinal direction, and

wherein a length in the longitudinal direction between the still other second dam portion and the yet other second dam portion is 50% or more and 90% or less of a length in the longitudinal direction of the flavor source.

8. The flavor-generating article according to any one of Claims 1 to 7,
wherein an at least one of the plurality of first grooves includes a first dam portion that suppresses communication of air through the at least one of the plurality of first grooves.

9. The flavor-generating article according to Claim 6,

wherein the first dam portion includes a plurality of first dam portions,
wherein the plurality of first grooves each include an at least one first dam portion of the plurality of first dam portions,
wherein the at least one first dam portion of each of the plurality of first grooves is arranged at a position different in the longitudinal direction

from a position of another first dam portion of the plurality of first dam portions, the other first dam portion being provided in an adjacent one of the plurality of first grooves,
wherein the plurality of respective first dam portions of the plurality of first grooves include

a still another first dam portion that is closest to the second part in the longitudinal direction, and
a yet another first dam portion that is farthest from the second part in the longitudinal direction, and

wherein a length in the longitudinal direction between the still other first dam portion and the yet other first dam portion is 50% or more and 90% or less of a length in the longitudinal direction of the flavor source.

10. The flavor-generating article according to any one of Claims 1 to 9,
wherein a width of each of the plurality of first grooves is 0.5 mm or more and 2.0 mm or less under a state in which the inner rolling sheet is wrapped around the flavor source.

11. The flavor-generating article according to any one of Claims 1 to 10,
wherein a depth of each of the plurality of first grooves is 0.1 mm or more and 1.5 mm or less.

12. The flavor-generating article according to any one of Claims 1 to 11,
wherein a width of each of the tobacco strands is 0.5 mm or more and 2.0 mm or less in a direction orthogonal to the longitudinal direction.

13. The flavor-generating article according to any one of Claims 1 to 12,
wherein a thickness of each of the tobacco strands is 0.1 mm or more and 0.5 mm or less in a direction orthogonal to the longitudinal direction.

14. The flavor-generating article according to any one of Claims 1 to 13,
wherein a basis weight of the inner rolling sheet is 40 g/m^2 or more and 150 g/m^2 or less.

15. The flavor-generating article according to any one of Claims 1 to 14,
wherein, of the tobacco strands included in the flavor source, tobacco strands at 50 weight% or more are arrayed in the longitudinal direction.

Fig. 1

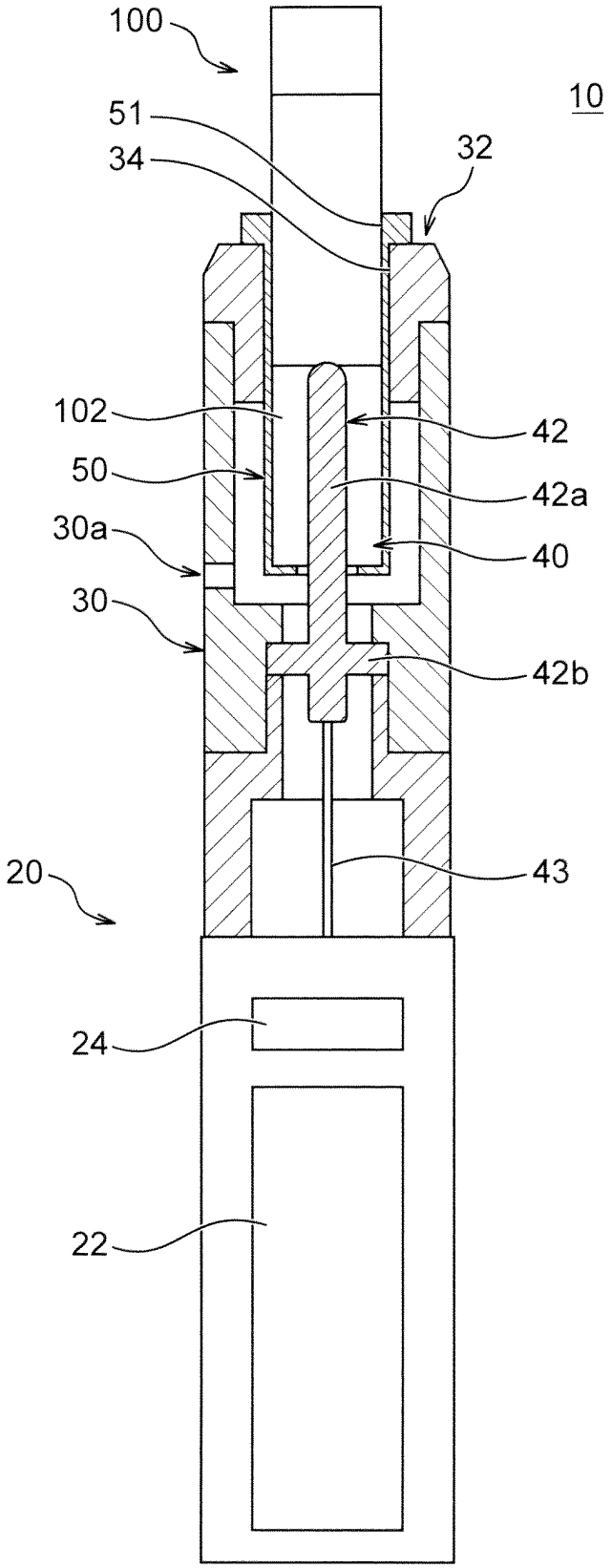


Fig. 2

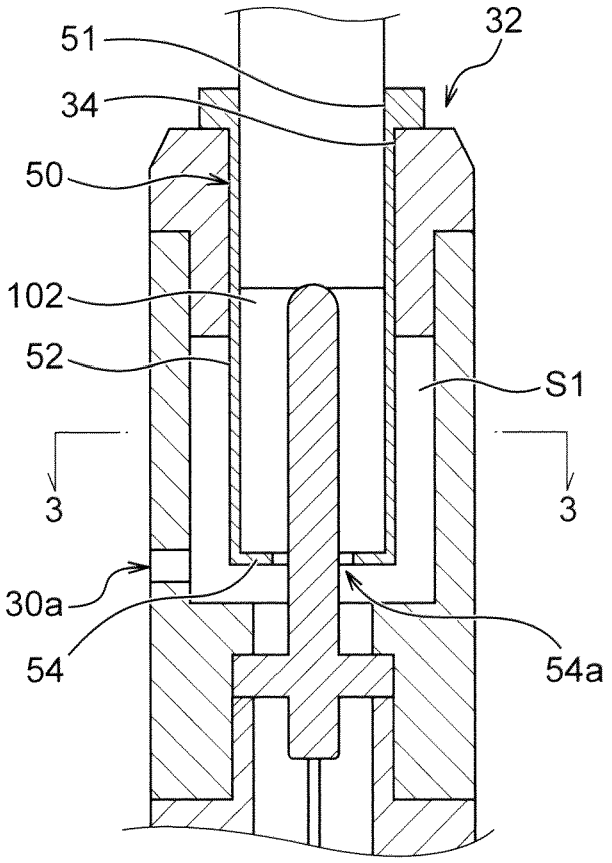


Fig. 3A

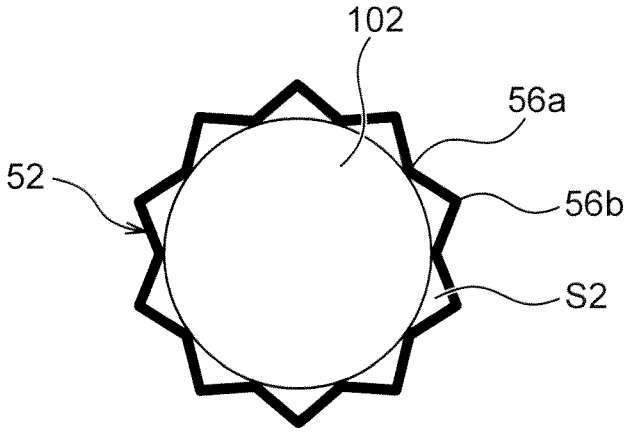


Fig. 3B

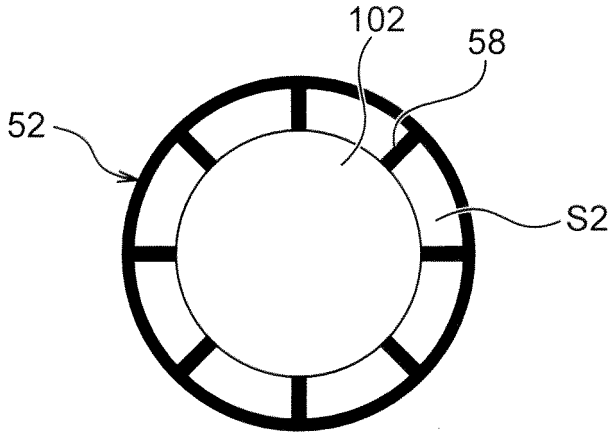


Fig. 3C

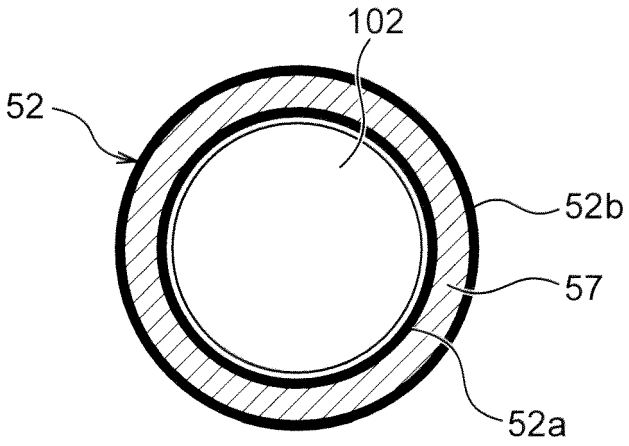


Fig. 4

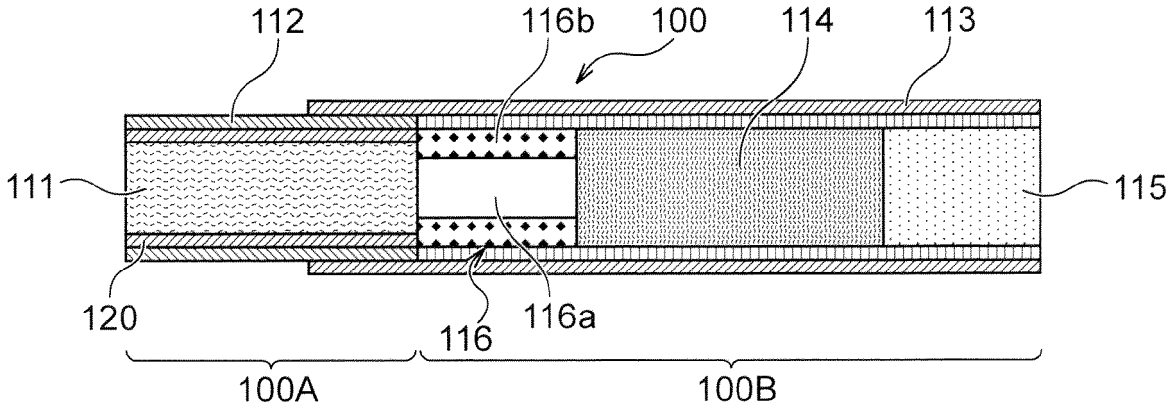


Fig. 5

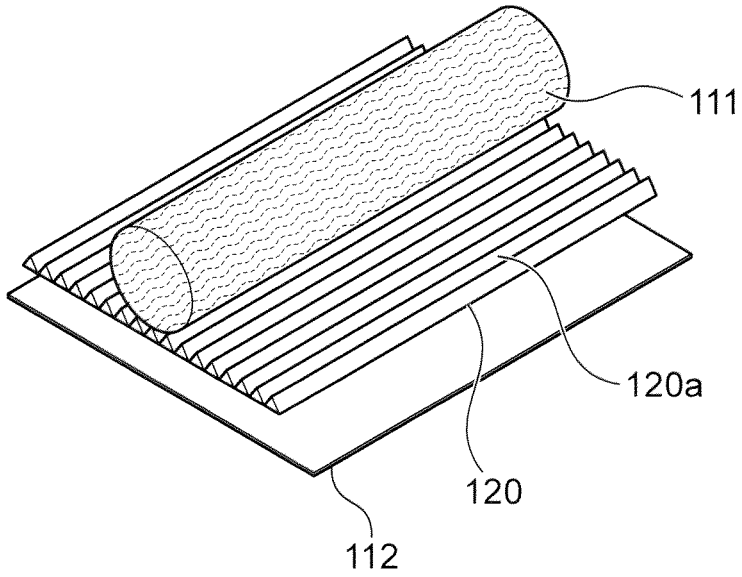


Fig. 6

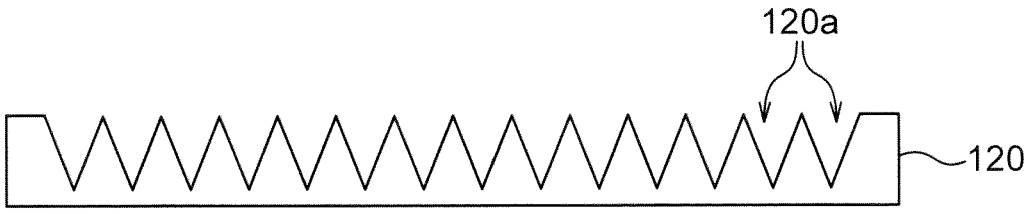


Fig. 7

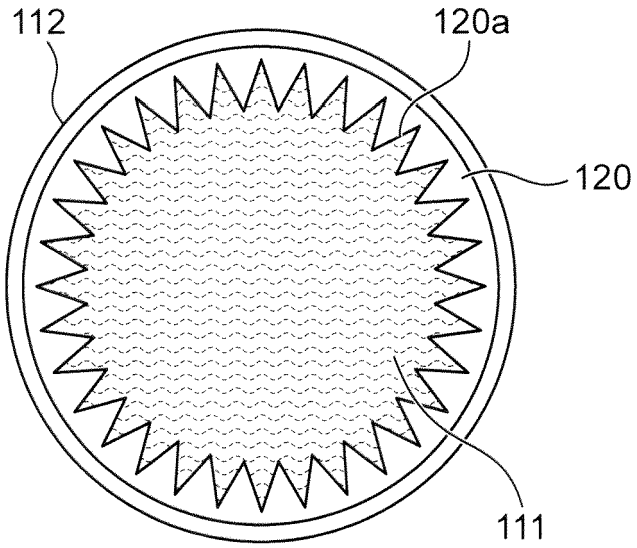


Fig. 8

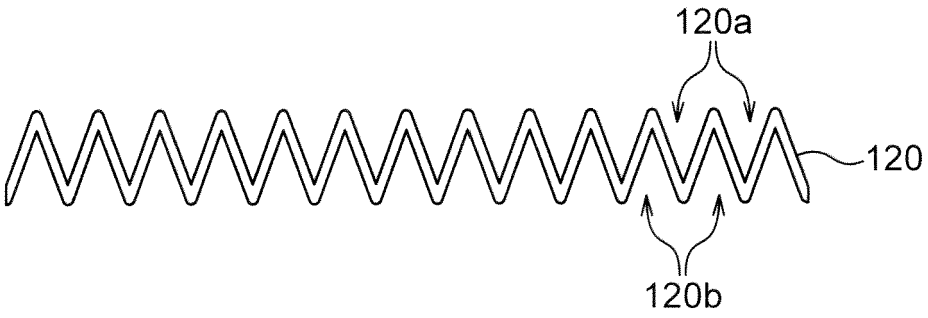


Fig. 9

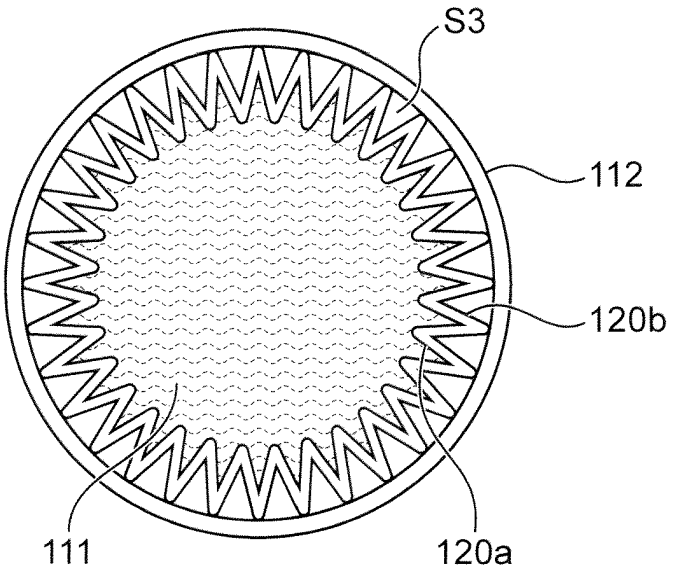


Fig. 10

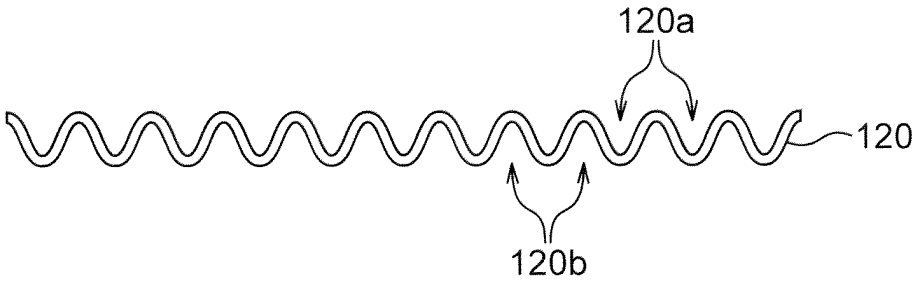


Fig. 11A

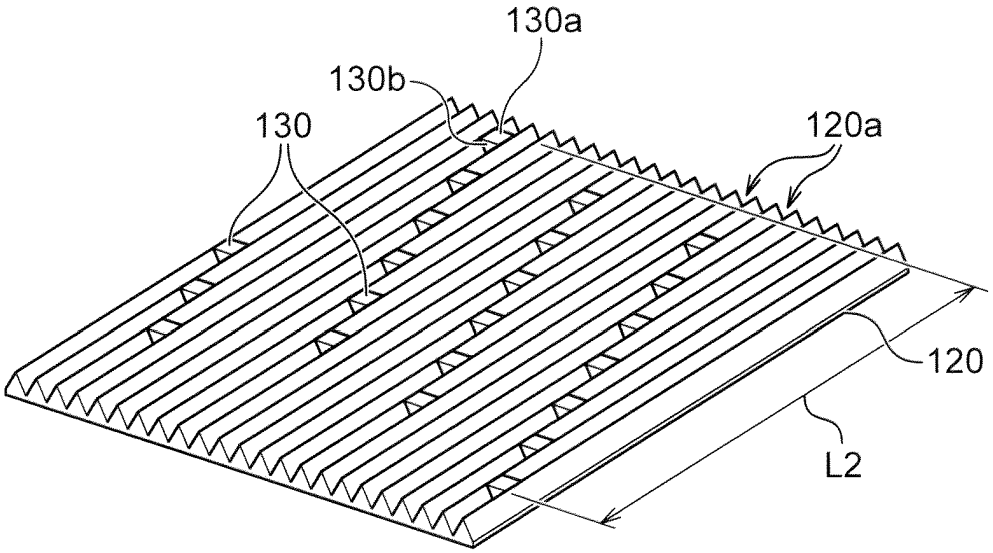


Fig. 11B

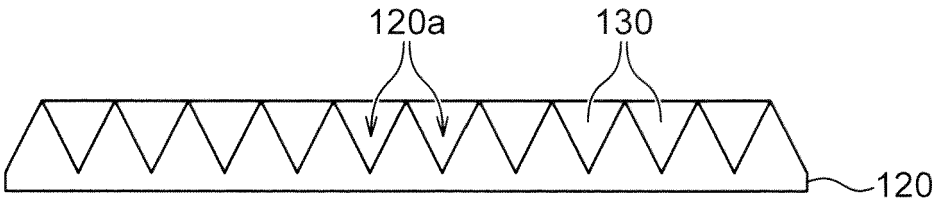


Fig. 12A

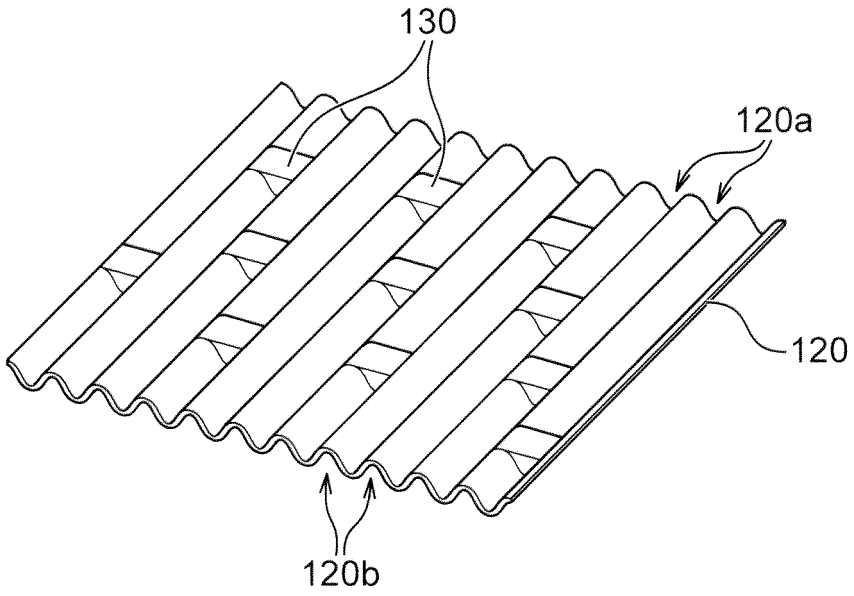
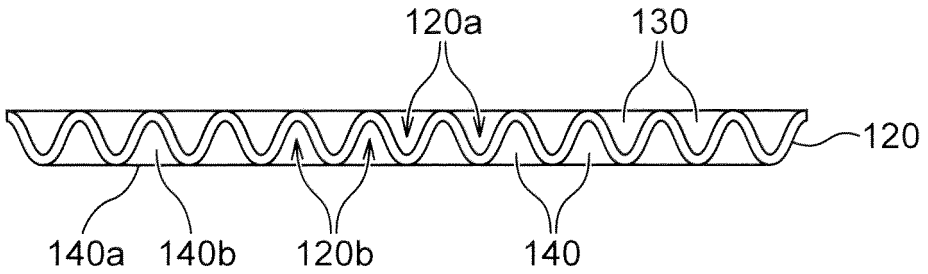


Fig. 12B



INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2020/042236

A. CLASSIFICATION OF SUBJECT MATTER
A24D 1/02(2006.01)i; A24D 1/20(2020.01)i; A24F 47/00(2020.01)i; A24F 40/20(2020.01)i
FI: A24D1/20; A24D1/02; A24F40/20; A24F47/00
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A24D1/02; A24D1/20; A24F40/00-17/00

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

Published examined utility model applications of Japan	1922-1996
Published unexamined utility model applications of Japan	1971-2020
Registered utility model specifications of Japan	1996-2020
Published registered utility model applications of Japan	1994-2020

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 2019-088195 A (TOA INDUSTRY CO., LTD.) 13 June 2019 (2019-06-13) paragraphs [0021]-[0024], [0043]-[0050], fig. 2-3, 7	1-7, 10-15 8-9
Y A	WO 2018/083180 A1 (HAUNI MASCHINENBAU GMBH) 11 May 2018 (2018-05-11) page 1, line 1 to page 2, line 5, page 9, line 15 to page 12, line 2, page 5, lines 4-14, fig. 1, 5	1-7, 10-15 8-9
A	JP 2010-538668 A (BRITISH AMERICAN TOBACCO (INVESTMENTS) LIMITED) 16 December 2010 (2010-12-16) paragraphs [0022]-[0028], [0044]-[0045], [0054], fig. 1-2, 9, 11	1-15
A	JP 11-169153 A (JAPAN TOBACCO INC.) 29 June 1999 (1999-06-29) paragraphs [0010]-[0015], fig. 1-3	1-15

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

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
18 December 2020 (18.12.2020)	28 December 2020 (28.12.2020)

Name and mailing address of the ISA/	Authorized officer
Japan Patent Office 3-4-3, Kasumigaseki, Chiyoda-ku, Tokyo 100-8915, Japan	Telephone No.

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

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/JP2020/042236

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
JP 2019-088195 A	13 Jun. 2019	(Family: none)	
WO 2018/083180 A1	11 May 2018	DE 102016121175 A1 US 2010/0275935 A1 paragraphs [0029]-[0035], [0051]-[0052], [0061], fig. 1-2, 9, 11 WO 2009/037304 A1 EP 2190311 A1 KR 10-2010-0061560 A CN 101917876 A	
JP 11-169153 A	29 Jun. 1999	(Family: none)	

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

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- WO 2020002165 A1 **[0003]**
- WO 2020007879 A1 **[0003]**