

[DESCRIPTION]

[Title of Invention] ABSORBENT ARTICLE

[Technical Field]

[0001]

5 The present invention relates to an absorbent article.

[Background Art]

[0002]

Absorbent articles that are put on a body and include an absorbent
body for absorbing a liquid are well-known. A disposable diaper is
10 one example of such an absorbent article.

[0003]

Some of such absorbent articles include an insect-repellent fragrance
composition.

[Citation List]

15 [Patent Literature]

[0004]

[Patent Document 1] Japanese Patent Application Publication No. H3-
285993

[Summary of Invention]

20 [Technical Problem]

[0005]

With conventional absorbent articles, there have been cases where the
fragrance volatilizes (disperses) immediately, which is not suitable in
view of sustaining the insect repelling effect. On the other hand,
25 suppressing initial volatilization (dispersal) of the fragrance in
order to improve the sustainability of the insect repelling effect
causes a problem of not being able to demonstrate the insect repelling
fragrance to the user (i.e., giving the user an expectation of such an
effect).

30 [0006]

The present invention was achieved in light of conventional problems
such as that described above, and an aspect of the present invention
is to ensure the sustainability of the insect repelling effect while
also giving the user an expectation of the insect repelling effect.

35 [Solution to Problem]

[0007]

A main aspect of the present invention for achieving the above-described aspect is an absorbent article including: an insect-repellent fragrance composition that includes

5 at least one type of a fragrance having a boiling point higher than or equal to 200°C and lower than or equal to 220°C selected from a group A below and

at least one type of a fragrance having a boiling point higher than or equal to 150°C and lower than 200°C selected from a group B below,

10 a weight ratio of the fragrance from the group A being higher than a weight ratio of the fragrance from the group B in the insect-repellent fragrance composition,

[0008]

group A: citronellal, menthol, α -terpineol, linalyl acetate,
15 isopulegol, ethyl linalool, terpinyl acetate, geranyl formate, menthone, borneol, and camphor,

group B: menthane, camphene, tetrahydrolinalool, dihydromyrcenol, osimenol, ocimene, myrcene, α -pinene, β -pinene, α -ferrandrene, α -terpinene, γ -terpinene, terpinolene, 3-carene, 1-heptanol, 2-heptanol,
20 3-heptanol, 1-octanol, 2-octanol, 3-octanol, 2-nonanol, 3,5,5-trimethyl-1-hexanol, cis-3-hexenol, trans-2-hexenol, 2,4-hexadiene-1-ol, 1-octen-3-ol, 2,6-nonadienol, tetrahydromugol, 4-thujanol, n-heptanal, n-octanal, 3,5,5-trimethylhexanal, cis-3-hexenal, 2,4-hexadienal, 2,6-nonadienal, heptanal dimethyl acetal, octanal dimethyl
25 acetal, citral dimethyl acetal, 2-heptanone, 2-octanone, 3-octanone, 2-nonanone, 3-nonanone, methylheptenone, fencon, acetylfuran, linalool oxide, menthofuran, 1,8-cineole, 1,4-cineole, 2,2,6-trimethyl-6-vinyltetrahydropyran, cis-3-hexenyl formate, prenyl acetate, hexyl acetate, cis-3-hexenyl acetate, trans-2-hexenyl acetate, heptyl
30 acetate, hexyl propionate, cis-3-hexenyl butyrate, cis-3-hexenyl isobutyrate, ethyl 2-methylvalerate, ethyl heptanoate, and allyl hexanoate.

Features of the present invention other than the above will become clear by reading the description of the present specification with
35 reference to the accompanying drawings.

[Advantageous Effects of Invention]

[0009]

According to the present invention, it is possible to ensure the sustainability of the insect repelling effect while also giving the user an expectation of the insect repelling effect.

[Brief Description of the Drawings]

[0010]

FIG. 1 is a plan view of an unfolded state of a diaper 1 according to the present embodiment.

FIGS. 2A to 2C are exploded illustrative views of portions of the diaper 1 according to the present embodiment. FIG. 2A is an exploded illustrative view of a front portion 3. FIG. 2B is an exploded illustrative view of a crotch portion 5. FIG. 2C is an exploded illustrative view of a back portion 7.

FIG. 3 is an enlarged view of a non-skin-side surface of a band-like sheet 33.

FIG. 4 is a schematic diagram that schematically shows insect repellent microcapsules 50 provided on the non-skin side of the band-like sheet 33.

FIG. 5 is a diagram showing a particle size distribution of the insect repellent microcapsules 50 according to the present embodiment.

FIG. 6A is a table showing fragrances in a group A that can be applied in the diaper 1.

FIG. 6B is a table showing fragrances in a group B that can be applied in the diaper 1.

FIG. 6C is a table showing fragrances in the group B that can be applied in the diaper 1.

FIG. 6D is a table showing fragrances in a group C that can be applied in the diaper 1 and fragrances that cannot be applied.

FIG. 7 is a schematic diagram that schematically shows insect repellent microcapsules 50 provided on the non-skin side of a nonwoven fabric sheet 60 according to a variation.

FIG. 8 is a diagram showing a one-side fastening tape portion 140 according to another aspect, as seen from the non-skin side.

FIG. 9 is an electron micrograph of a region that includes both damaged

capsules DC and undamaged capsules NC in a coated portion.

[Description of Embodiments]

[0011]

At least the following matters will become clear with the description
5 of this specification and the attached drawings.

[0012]

An absorbent article including: an insect-repellent fragrance
composition that includes

10 at least one type of a fragrance having a boiling point higher than
or equal to 200°C and lower than or equal to 220°C selected from a
group A below and

at least one type of a fragrance having a boiling point higher than
or equal to 150°C and lower than 200°C selected from a group B below,
a weight ratio of the fragrance from the group A being higher than
15 a weight ratio of the fragrance from the group B in the insect-repellent
fragrance composition,

[0013]

group A: citronellal, menthol, α -terpineol, linalyl acetate,
isopulegol, ethyl linalool, terpinyl acetate, geranyl formate,
20 menthone, borneol, and camphor,

group B: menthane, camphene, tetrahydrolinalool, dihydromyrcenol,
osimenol, ocimene, myrcene, α -pinene, β -pinene, α -ferrandrene, α -
terpinene, γ -terpinene, terpinolene, 3-carene, 1-heptanol, 2-heptanol,
3-heptanol, 1-octanol, 2-octanol, 3-octanol, 2-nonanol, 3,5,5-
25 trimethyl-1-hexanol, cis-3-hexenol, trans-2-hexenol, 2,4-hexadiene-1-
ol, 1-octen-3-ol, 2,6-nonadienol, tetrahydromugol, 4-thujanol, n-
heptanal, n-octanal, 3,5,5-trimethylhexanal, cis-3-hexenal, 2,4-
hexadienal, 2,6-nonadienal, heptanal dimethyl acetal, octanal dimethyl
acetal, citral dimethyl acetal, 2-heptanone, 2-octanone, 3-octanone,
30 2-nonanone, 3-nonanone, methylheptenone, fencon, acetylfuran, linalool
oxide, menthofuran, 1,8-cineole, 1,4-cineole, 2,2,6-trimethyl-6-
vinyltetrahydropyran, cis-3-hexenyl formate, prenyl acetate, hexyl
acetate, cis-3-hexenyl acetate, trans-2-hexenyl acetate, heptyl
acetate, hexyl propionate, cis-3-hexenyl butyrate, cis-3-hexenyl
35 isobutyrate, ethyl 2-methylvalerate, ethyl heptanoate, and allyl

hexanoate.

According to this absorbent article, it is possible to ensure the sustainability of the insect repelling effect while also giving the user an expectation of the insect repelling effect. In addition, in terms of allergic reaction, it is possible to give the user a sense of ease.

[0014]

In such an absorbent article, it is desirable that

the insect-repellent fragrance composition includes at least one type of a fragrance having a boiling point higher than 220°C and lower than or equal to 270°C selected from a group C,

[0015]

the group C: sobornyl acetate, p-menthane-3,8-diol, 2-(tert-butyl)cyclohexyl acetate, dihydroterpinyl acetate, nerol, 4-tert-butylcyclohexyl acetate, citronellyl acetate, neryl acetate, geranyl acetate, ethyl linalyl acetate, tricyclodecenyl acetate, bornyl acetate, β -caryophyllene, cis-jasmon, L-carvone, nopyr acetate, pulegone, and allyl octanoate.

According to this absorbent article, it is possible to reinforce the sustainability of the insect repelling effect.

[0016]

In such an absorbent article, it is desirable that

the absorbent article further comprises a hot-melt adhesive.

[0017]

According to this absorbent article, it is possible to prevent peeling of the absorbent article and the like, and it is possible to appropriately maintain the performance of the absorbent article.

[0018]

In such an absorbent article, it is desirable that

the insect-repellent fragrance composition does not contain any of the following:

limonene, phenylacetaldehyde, methyl salicylate, thymol, methyl isoeugenol, coumarin, β -phenylethyl alcohol, cymene, eugenol, carvacrol, phenylethyl acetate, safrole, benzyl acetate, styrylyl acetate, anisyl acetate, cinnamyl acetate, cumin aldehyde, diphenyl

oxide, and cinnamyl formate.

[0019]

According to this absorbent article, it is possible to prevent peeling of the absorbent article and the like, and it is possible to
5 appropriately maintain the performance of the absorbent article.

[0020]

In such an absorbent article, it is desirable that

the insect-repellent fragrance composition does not contain any of the following 26 types of fragrances:

10 α -isomethylionone, amyl cinnamic aldehyde, amylcinnamyl alcohol, anis alcohol, benzyl alcohol, benzyl benzoate, benzyl cinnamate, benzyl salicylate, butylphenyl methylpropional, cinnamaldehyde, cinnamic alcohol, citral, citronellol, coumarin, eugenol, farnesol, geraniol, hexyl cinnamal, hydroxycitronellal, hydroxyisohexyl 3-cyclohexene
15 carboxaldehyde, isoeugenol, limonene, linalool, methyl 2-octinate, Evernia prunastri extract, and Evernia furfuracea extract.

[0021]

According to this absorbent article, in terms of allergic reaction, it is possible to give the user a sense of ease.

20 [0022]

In such an absorbent article, it is desirable that

the insect-repellent fragrance composition includes only synthetic fragrances.

[0023]

25 According to this absorbent article, it is possible to appropriately avoid the inclusion of substances (e.g., allergens and substances that inhibit a hot-melt adhesive) that are not desired to be included in the insect-repellent fragrance composition.

[0024]

30 In such an absorbent article, it is desirable that

the absorbent article further comprises a containing member that contains the insect-repellent fragrance composition.

[0025]

According to this absorbent article, it is possible to reinforce the
35 sustainability of the insect repelling effect.

[0026]

In such an absorbent article, it is desirable that

the absorbent article is configured to be put on a body,

the absorbent article further comprises a hydrophobic nonwoven
5 fabric sheet and an insect repellent microcapsule,

the insect repellent microcapsule being disposed on a non-skin
side of the nonwoven fabric sheet,

the insect repellent microcapsule including the insect-repellent
fragrance composition and the containing member, and

10 the insect repellent microcapsule is embedded inside the nonwoven
fabric sheet in a state of not reaching a skin-side surface of the
nonwoven fabric sheet.

[0027]

According to this absorbent article, it is possible to reduce the
15 possibility of the insect repellent microcapsules coming into contact
with the wearer's skin.

[0028]

In such an absorbent article, it is desirable that

the insect repellent microcapsules include

20 an insect repellent microcapsule that discharges the insect
repellent fragrance from the containing member when subjected to a
pressure P , and

an insect repellent microcapsule that does not discharge the
insect repellent fragrance from the containing member even when
25 subjected to a pressure $2P$ that is twice the pressure P .

[0029]

According to this absorbent article, the amount of insect repellent
fragrance that is discharged can be adjusted by the user in accordance
with the risk of insect bites.

30 [0030]

In such an absorbent article, it is desirable that

the absorbent article further comprises a coated portion that is
coated with a plurality of insect repellent microcapsules,

the plurality of insect repellent microcapsules each including
35 the insect-repellent fragrance composition and the containing member,

when the absorbent article has been taken out of a packaging material, the insect repellent microcapsules include a damaged capsule and an undamaged capsule,

the damaged capsule being an insect repellent microcapsule that
5 is damaged,

the undamaged capsule being an insect repellent microcapsule that is not damaged.

[0031]

According to this absorbent article, the user or the wearer can
10 recognize the effect of the insect repellent fragrance discharged from the damaged capsule when taking the absorbent article out of the packaging material, and is likely to recognize the effect of the insect-repellent fragrance composition during usage due to breaking undamaged capsules before or during usage.

15 [0032]

In such an absorbent article, it is desirable that

the coated portion includes a processing mark portion in which a number of damaged capsules per unit area is greater than a number of undamaged capsules per unit area.

20 [0033]

According to this absorbent article, the processing mark portion makes it possible to more reliably provide damaged capsules and undamaged capsules in the absorbent article. Therefore the effect of the insect-repellent fragrance composition is likely to be recognized both before
25 and during usage.

[0034]

In such an absorbent article, it is desirable that

the coated portion includes a non-processing mark portion,

the non-processing mark portion being a portion in which the
30 number of undamaged capsules per unit area is greater than the number of damaged capsules per unit area when the absorbent article has been taken out of the packaging material, and

the non-processing mark portion has a larger area than the processing mark portion.

35 [0035]

According to this absorbent article, the effect of the insect-repellent fragrance composition can be further exhibited during usage by the wearer or the like damaging undamaged capsules for example in accordance with the desired extent of the insect repellent fragrance effect.

[0036]

In such an absorbent article, it is desirable that

when the absorbent article has been taken out of the packaging material, at least a portion of the absorbent article has been folded at a fold line portion,

the processing mark portion is the fold line portion, and

at least a part of the damaged capsule is provided in the fold line portion.

[0037]

According to this absorbent article, damaged capsule is likely to be formed by pressure from folding, and therefore the processing mark portion can be easily formed during manufacturing. Consequently the effect of the insect-repellent fragrance composition is likely to be more reliably exhibited while contained in the packaging material.

[0038]

In such an absorbent article, it is desirable that

when the absorbent article is in an unfolded state,

at least a part of the damaged capsules are provided in an outer end portion of the absorbent article.

[0039]

According to this absorbent article, damaged capsules are likely to be formed by impact in a cutting step for forming the outer end portion of the absorbent article provided with the coated portion. Consequently the effect of the insect-repellent fragrance composition is likely to be more reliably exhibited while contained in the packaging material.

[0040]

In such an absorbent article, it is desirable that

the absorbent article further comprises a fastening tape portion, and

the coated portion is provided in the fastening tape portion.

[0041]

According to this absorbent article, the fastening tape portion is a portion that has a highly possibility of being grabbed by a hand in particular when the absorbent article is put on, and therefore damaged capsules are likely to be more reliably formed when the absorbent article is put on. Consequently the effect of the insect-repellent fragrance composition is likely to be exhibited in the put-on state.

[0042]

In such an absorbent article, it is desirable that

at least a part of the damaged capsules are provided in a leading end portion of the fastening tape portion.

[0043]

According to this absorbent article, damaged capsules are likely to be formed by impact in a cutting step performed during formation of the fastening tape portion. Consequently the effect of the insect-repellent fragrance composition is likely to be more reliably exhibited while contained in the packaging material.

[0044]

In such an absorbent article, it is desirable that

when the absorbent article has been taken out of the packaging material, the fastening tape portion has been folded at a tape fold line with a skin-side surface of the fastening tape portion being on an inward side,

the tape fold line extending in a vertical direction

the fastening tape portion has a compressed portion for maintaining a folded state, and

at least a part of the damaged capsules are provided in the compressed portion.

[0045]

According to this absorbent article, damaged capsules are likely to be formed by pressure for forming compressed portions. Consequently the effect of the insect-repellent fragrance composition is likely to be more reliably exhibited while contained in the packaging material.

[0046]

Overview of disposable diaper of embodiment

A disposable diaper (corresponding to an absorbent article) of the present embodiment is a tape-type (open-type) disposable diaper (hereinafter, also simply called the diaper 1).

[0047]

5 FIG. 1 is a plan view of an unfolded state of the diaper 1 (i.e., the state where the diaper 1 has been stretched to eliminate wrinkles) according to the present embodiment. FIGS. 2A to 2C are exploded illustrative views of portions of the diaper 1 according to the present embodiment. FIG. 2A is an exploded illustrative view of a front
10 portion 3. FIG. 2B is an exploded illustrative view of a crotch portion 5. FIG. 2C is an exploded illustrative view of a back portion 7.

[0048]

As shown in FIG. 1, the diaper 1 of the present embodiment includes a
15 front portion 3, a crotch portion 5, and a back portion 7. The front portion 3 is a portion (waist portion) that is located at the wearer's front portion (stomach side). Also, the back portion 7 is a portion (waist portion) that is located at the wearer's back portion (back side). The crotch portion 5 is a portion that is located between the
20 front portion 3 and the back portion 7.

[0049]

As shown in FIG. 1, the directions used in the following description are defined as follows. The direction from the front portion 3 toward the back portion 7 is a "product longitudinal direction L", and the
25 direction that intersects the product longitudinal direction L is a "product widthwise direction W". A line CL shown in FIG. 1 indicates the center of the diaper 1 in the product longitudinal direction L (diaper center CL). Also, as shown in FIG. 2, the direction intersecting the product longitudinal direction L and the product
30 widthwise direction W is the "thickness direction", the side facing the wearer's skin (the side that is close to the wearer's skin when the diaper 1 is put on a human body (corresponding to a body)) is the "skin side", and the opposite side (the side that is distant from the wearer's skin when the diaper 1 is put on a human body) is the "non-
35 skin side".

[0050]

The diaper 1 includes an absorbent body 21, a top sheet 22, a leak-proof sheet 23, a back sheet 24, a skin-side sheet 26, a waist gather film 28, fastening tape portions 30, and target tape 29. These members
5 are joined to their adjacent members using a hot-melt adhesive.

[0051]

The absorbent body 21 is for absorbing a liquid. Specifically, the absorbent body 21 is a member (absorbent core) constituted by a stack of liquid absorbent materials that can absorb an excrement such as
10 urine, and is arranged extending over the front portion 3, the crotch portion 5, and the back portion 7. The region shown by shading in FIG. 1 is the region occupied by the absorbent body 21.

[0052]

The absorbent body 21 of the present embodiment has an hourglass shape,
15 with a width that is shorter in the central portion in the product longitudinal direction L. Note that the shape of the absorbent body 21 is not limited to the shape shown in FIG. 1, and may be a simple rectangular shape. Also, it is sufficient that the absorbent body 21 is provided in at least the crotch portion 5.

20 [0053]

The absorbent body 21 is wrapped in a core wrap 25 that is made of a liquid-permeable sheet (nonwoven fabric sheet), and is sandwiched between the top sheet 22 and the leak-proof sheet 23 in the thickness direction. The liquid absorbent material that forms the absorbent
25 body 21 can be made of liquid absorbent fibers such as pulp fibers, and a liquid absorbent particulate matter such as a superabsorbent polymer. It may also contain a liquid absorbent material other than liquid absorbent fibers and liquid absorbent particulate matter.

[0054]

30 The top sheet 22 is a liquid-permeable member arranged on the skin side of the absorbent body 21.

[0055]

The leak-proof sheet 23 is a liquid-impermeable member arranged on the non-skin side of the absorbent body 21.

35 [0056]

The back sheet 24 is a member (exterior sheet) that constitutes the non-skin-side exterior of the diaper 1, and is made of nonwoven fabric, for example. The back sheet 24 is arranged on the non-skin side of the leak-proof sheet 23 (see FIGS. 2A to 2C).

5 [0057]

Also, a flap portion 14 is provided in each of two side portions of the back portion 7 in the product widthwise direction W of the diaper 1. The flap portions 14 are mainly constituted by the skin-side sheet 26 and the back sheet 24 (see FIG. 2C). The skin-side sheet 26 is a skin-side member that extends over the front portion 3, the crotch portion 5, and the back portion 7, and is constituted by nonwoven fabric, for example. The skin-side sheet 26 is a member that constitutes later-described leg side gathers 16 (corresponding to barrier cuffs), and the outward portions of the skin-side sheet 26 constitute the flap portions 14.

15 [0058]

Also, end edge portions that form the leg openings of the diaper 1 are provided with a pair of leg gathers 15 that can stretch and contract in the product longitudinal direction L (leg stretchable portions) and extend along the product longitudinal direction L. In the present embodiment, the leg gathers 15 are constituted by elastic strings provided between the skin-side sheet 26 and the back sheet 24, and the elastic strings give stretchability to the skin-side sheet 26 and the back sheet 24. Also, these elastic strings extend from the front portion 3 to the back portion 7 in the product longitudinal direction L. Note that the leg gathers 15 are not limited to being constituted by elastic strings, and may be constituted by a stretchable sheet (film), for example.

20 [0059]

Also, a pair of leg side gathers 16 that stretch and contract in the product longitudinal direction L are provided extending along the product longitudinal direction L at positions inward of the leg gathers 15 in the product widthwise direction W. The leg side gathers 16 are for preventing the leakage of a liquid from gaps around the wearer's legs, and are mainly constituted by inward portions of the skin-side

35

sheet 26.

[0060]

The leg side gathers 16 (portions of the skin-side sheet 26) are joined in end joining portions 17 located at the two end portions in the product longitudinal direction L (rectangular portions in FIG. 1). Also, in the portion between the pair of end joining portions 17 (hereinafter, called a main body portion 18 for convenience), only the outward portions in the product widthwise direction W are joined (hereinafter called main-body joining portions 18a). For this reason, the main body portion 18 is shaped as a pocket surrounded by the pair of end joining portions 17 and the main-body joining portions 18a, and rises from the main-body joining portions 18a. Note that stretchable members (elastic strings 19 in the present embodiment) are provided in an inward portion of the main body portion 18 in the product widthwise direction W, and therefore the inward portion has stretchability. In this way, the leg side gathers 16 are constituted by the end joining portions 17 and the main body portion 18, and, similarly to the leg gathers 15, are provided extending from the front portion 3 to the back portion 7 in the product longitudinal direction L.

[0061]

Also, in the back portion 7, a waist gather film 28 is arranged between the absorbent body 21 and the back sheet 24 (see FIG. 2C). The waist gather film 28 is a band-shaped member that stretches and contracts along the product widthwise direction W. The waist gather film 28 gives stretchability to the back sheet 24 and the like, thus forming a waist gather. The waist gather film 28 has a longer length in the product widthwise direction W than the absorbent body 21. For this reason, the waist gather protrudes outward from the absorbent body 21 in the product widthwise direction W.

[0062]

The pair of fastening tape portions 30 each include a rectangular band-like sheet 33 that is made of hydrophobic spunbond nonwoven fabric, and a hook-and-loop fastener 35.

[0063]

Inward portions (substantially inner halves in the present embodiment)

in the longitudinal direction (product widthwise direction W) of the fastening tape portions 30 (band-like sheets 33) serve as fixing portions 32. The fastening tape portions 30 are fixed to the flap portions 14 of the back portion 7 by the fixing portion 32. In the present embodiment, the fastening tape portions 30 are attached due to portions of the fastening tape portions 30 being sandwiched between the skin-side sheet 26 and the back sheet 24 that form the flap portions 14 (see FIG. 2C).

[0064]

Also, outward portions (substantially outer halves in the present embodiment) in the longitudinal direction (product widthwise direction W) of the fastening tape portions 30 (band-like sheets 33) serve as engaging portions 31. The diaper 1 can be put on the wearer by engaging the engaging portions 31 with later-described target tape 29.

[0065]

More specifically, the engaging portions 31 of the fastening tape portions 30 (band-like sheets 33) are provided with the hook-and-loop fasteners 35, and the engaging portions 31 are engaged with the target tape 29 due to the hook-and-loop fasteners 35 becoming caught on the target tape 29.

[0066]

Note that the hook-and-loop fasteners 35 are fixed to the skin-side surfaces of the band-like sheets 33. Also, rather than the hook-and-loop fasteners 35 being fixed to the entirety of the outward portions (engaging portions 31) of the band-like sheets 33, the outward portions (engaging portions 31) have portions where the hook-and-loop fasteners 35 are not provided. In the present embodiment, in the outward portions (engaging portions 31), inner portions, which are located inward of the hook-and-loop fasteners 35 in the longitudinal direction of the band-like sheets 33, and outer portions, which are located outward of the same, are no-hook-and-loop-fastener portions 31a where the hook-and-loop fasteners 35 are not provided.

[0067]

Also, outermost ends of the fastening tape portions 30 (band-like sheets 33, engaging portions 31) are wavy portions 31b that have a

wave-like shape. The wavy portions 31b are cut edges formed when the band-like sheets 33 are cut to form the fastening tape portions 30. Note that the wavy portions 31b are also portions of the no-hook-and-loop-fastener portions 31a.

5 [0068]

The target tape 29 is arranged on the non-skin side of the back sheet 24 in the front portion 3 (see FIG. 2A). The target tape 29 is a member that can engage with the fastening tape portions 30, and is formed by nonwoven fabric, for example. Also, as shown in FIG. 1, the target tape 29 of the present embodiment is a rectangular member that is elongated in the product widthwise direction W.

[0069]

Insect repellent microcapsules 50

The diaper 1 of the present embodiment is provided with insect repellent microcapsules 50. The insect repellent microcapsules 50 are constituted by a membrane (corresponding to a containing member) that contains an insect repellent fragrance (in the present embodiment, an insect-repellent fragrance composition made up of multiple types of fragrances) that has an insect repelling effect (insect controlling effect, repellent effect). In other words, the insect repellent microcapsules 50 include an insect repellent fragrance (insect-repellent fragrance composition) and a membrane that contains (holds) the insect repellent fragrance (insect-repellent fragrance composition).

25 [0070]

The insect repellent microcapsules 50 are configured such that when the user touches the diaper 1 and grabs the diaper 1 in order to put the diaper 1 on a human body, for example, the membranes rupture (become damaged) due to the pressure (impact, friction), and the insect-repellent fragrance composition therein is discharged. The insect repelling effect is exhibited when the insect-repellent fragrance composition is discharged. In other words, the insect repellent microcapsules 50 are impact-rupturing microcapsules that contain an insect-repellent fragrance composition.

35 [0071]

The membrane of the present embodiment is made of urethane resin, but there is no limitation to this, and the membrane need only have a predetermined strength so as to rupture when subjected to the above-described pressure (impact, friction). Other examples of materials
5 include gelatin, gelatin/gum arabic, melamine resin, and urea/formalin resin. These resins may be used on their own, or two or more types of resin may be used together.

[0072]

Also, the insect repellent microcapsules 50 of the present embodiment
10 are prepared (microcapsulized) by so-called interfacial polymerization, but there is no limitation to this, and various methods can be used. Examples include a phase separation method (a coacervation method), a liquid hardening coating method (an orifice method), a pan coating method, a spray drying method, a liquid drying method (interfacial
15 precipitation method), an interfacial inorganic reaction method (an inorganic wall microcapsule), an in-situ polymerization method, and an ultrasonic method.

[0073]

Note that the insect-repellent fragrance composition will be described
20 in detail later.

[0074]

In the present embodiment, the insect repellent microcapsules 50 are provided on the non-skin side of the band-like sheets 33 (corresponding to hydrophobic nonwoven fabric sheets) of the fastening tape portions
25 30.

[0075]

FIG. 3 is an enlarged view of the non-skin-side surface of one band-like sheet 33. FIG. 4 is a schematic diagram that schematically shows the insect repellent microcapsules 50 provided on the non-skin side of
30 the band-like sheet 33.

[0076]

Note that FIG. 3 shows nonwoven fabric fibers 34 of the band-like sheet 33 (a nonwoven fabric fiber 34 in the outermost layer (the layer located the farthest on the non-skin side) and a nonwoven fabric fiber
35 34 in the second layer) and many insect repellent microcapsules 50.

Also, FIG. 4 schematically shows the nonwoven fabric fibers 34 in the
aforementioned layers and the insect repellent microcapsules 50. The
nonwoven fabric fibers 34 are not actually aligned as regularly as
shown in FIG. 4, and are shown schematically in order to make the
figure easier to understand.

[0077]

As shown in FIG. 4, the insect repellent microcapsules 50 of the
present embodiment are embedded inside the band-like sheet 33 so as to
not reach a skin-side surface 33a of the band-like sheet 33. In other
words, the insect repellent microcapsules 50 are contained inside the
band-like sheet 33, while also not reaching the skin-side surface 33a
of the band-like sheet 33.

[0078]

For this reason, it is possible to reduce the possibility of the insect
repellent microcapsules 50 coming into contact with the wearer's skin.

[0079]

Also, as shown in FIG. 4, the insect repellent microcapsules 50
embedded inside the band-like sheet 33 are located in a range from a
non-skin-side surface 33b of the band-like sheet 33 to a middle
position C in the thickness direction of the band-like sheet 33 (diaper
1), the middle position C being a position which is between the skin-
side surface 33a and the non-skin-side surface 33b. In other words,
the insect repellent microcapsules 50 are contained inside the band-
like sheet 33, while also remaining in a range less than or equal to
a depth $T/2$, which is half of a thickness T of the band-like sheet 33
(i.e., while also not being located deeper than the depth $T/2$, which
is half the thickness T).

[0080]

For this reason, it is possible to further reduce the possibility of
the insect repellent microcapsules 50 coming into contact with the
wearer's skin. Also, if the insect repellent microcapsules 50 are
embedded too deeply, such insect repellent microcapsules 50 are not
subjected to an appropriate amount of pressure (impact, friction), and
therefore the insect-repellent fragrance composition is not discharged,
and the insect repelling effect is not exhibited. In the present

embodiment, the insect repellent microcapsules 50 remain at or above the middle position C (less than or equal to the depth $T/2$, which is half the thickness T of the band-like sheet 33), and therefore the insect-repellent fragrance composition can be appropriately discharged, and the insect repelling effect can be exhibited effectively.

[0081]

Also, in the present embodiment, the volume of the insect repellent microcapsules 50 embedded inside the band-like sheet 33 (i.e., the total volume of the insect repellent microcapsules 50 remaining at or above the middle position C) is greater than the volume (total volume) of the insect repellent microcapsules 50 located above the non-skin-side surface 33b of the band-like sheet 33 (i.e., located above the nonwoven fabric fibers 34 in the outermost layer). Here, letting the upper surface be the surface formed by the tips of the most protruding fibers in the nonwoven fabric fiber layer, "inside" of the band-like sheet 33 refers to the portion inward of the upper surface.

[0082]

If the volume (amount) of insect repellent microcapsules 50 located above the non-skin-side surface 33b is too large, the insect repellent microcapsules 50 rupture easily (rather easily) and the insect-repellent fragrance composition is discharged immediately, which is not suitable in terms of the sustainability of the insect repelling effect (the property of sustaining the insect repelling effect of the insect repellent microcapsules 50). In the present embodiment, the volume (total volume) of the insect repellent microcapsules 50 embedded inside the band-like sheet 33 is set larger than the volume (total volume) of the insect repellent microcapsules 50 located above the non-skin-side surface 33b of the band-like sheet 33, and therefore it is possible to prevent the case where the insect repellent microcapsules 50 rupture easily (rather easily) and the insect-repellent fragrance composition is discharged immediately, and the insect repelling effect can be appropriately sustained.

Note that in the present embodiment, as shown in FIGS. 3 and 4, the insect repellent microcapsules 50 are not located above the non-skin-side surface 33b of the band-like sheet 33 (above the nonwoven fabric

fibers 34 in the outermost layer). For this reason, the insect repelling effect can be sustained even more appropriately.

[0083]

As described above, in the present embodiment, the insect repellent microcapsules 50 are arranged at appropriate locations in the thickness direction of the band-like sheet 33, thus making it possible to effectively exhibit the insect repelling effect while also reducing the possibility of the insect repellent microcapsules 50 coming into contact with the wearer's skin.

[0084]

The following describes how the insect repellent microcapsules 50 are arranged at suitable positions as described above in the present embodiment.

[0085]

FIG. 5 is a diagram showing a particle size distribution of the insect repellent microcapsules 50 according to the present embodiment. As shown in FIG. 5 (see FIG. 3 as well), first, the average particle size of the insect repellent microcapsules 50 (in the present embodiment, 5 to 15 μm) is smaller than the average fiber diameter of the band-like sheet 33 (in the present embodiment, 20 μm as shown by A in FIG. 5). If the average particle size of the insect repellent microcapsules 50 is larger than the average fiber diameter of the band-like sheet 33, it is difficult for the insect repellent microcapsules 50 to become physically embedded inside the band-like sheet 33, and the insect repellent microcapsules 50 remain on the non-skin-side surface 33b of the band-like sheet 33 (on the nonwoven fabric fibers 34 in the outermost layer). This situation is not suitable in terms of the sustainability of the insect repelling effect as previously described, but in the present embodiment, the average particle size of the insect repellent microcapsules 50 is set smaller than the average fiber diameter of the band-like sheet 33, and therefore the insect repellent microcapsules 50 easily become embedded inside the band-like sheet 33, and the insect repelling effect can be appropriately sustained.

[0086]

Also, in a similar manner, the volume (total volume) of the insect

repellent microcapsules 50 whose particle size is smaller than the average fiber diameter (20 μm) of the band-like sheet 33 is greater than the volume (total volume) of the insect repellent microcapsules 50 whose particle size is larger than the average fiber diameter (see
5 FIGS. 3 and 5). Accordingly, similarly, the insect repellent microcapsules 50 easily become embedded inside the band-like sheet 33, and the insect repelling effect can be appropriately sustained.

[0087]

Note that it is also difficult for the insect repellent microcapsules
10 50 to become embedded inside the band-like sheet 33 if their particle size is too small. Specifically, static electricity is generated easily if the particle size is too small, and, due to the generated static electricity, the insect repellent microcapsules 50 fail to move from the top of the non-skin-side surface 33b of the band-like sheet
15 33 (the top of the nonwoven fabric fibers 34 in the outermost layer), and continue to remain above the non-skin-side surface 33b (above the nonwoven fabric fibers 34 in the outermost layer). For this reason, in the present embodiment, in order to avoid such a phenomenon, the particle size of the insect repellent microcapsules 50 is greater than
20 or equal to 0.1 μm (preferably, greater than or equal to 0.5 μm) (see FIG. 5, and note that the upper limit value is less than or equal to 50 μm (preferably, less than or equal to 30 μm)).

[0088]

Also, in the present embodiment, an aqueous dispersion, which contains
25 PVA (polyvinyl alcohol) having an adhesive function and also contains the insect repellent microcapsules 50 dispersed in water, is prepared, and the insect repellent microcapsules 50 are provided in (applied on) the band-like sheet 33 by applying the aqueous dispersion to the non-skin side of the band-like sheet 33, which is made of hydrophobic
30 nonwoven fabric. Also, the band-like sheet 33 is a nonwoven fabric sheet that has a relatively high grammage. For this reason, the aqueous dispersion (insect repellent microcapsules 50) does not move very far into the band-like sheet 33, and the insect repellent microcapsules 50 can remain within the depth $T/2$, which is half the
35 thickness T of the band-like sheet 33.

[0089]

Note that in the step of applying the aqueous dispersion to the band-like sheet 33, a hydrophilic agent (0.3%, polyoxyethylene sorbitan monooleate) is added to the aqueous dispersion in order to achieve uniform application. Also, in this case, a defoaming agent (0.2% polyoxyethylene polyoxypropylene glycol (block copolymer)) is also added in accordance with the addition of the hydrophilic agent.

[0090]

Insect-repellent fragrance composition

10 An insect-repellent fragrance composition includes at least one type of a fragrance having a boiling point higher than or equal to 200°C and lower than or equal to 220°C selected from a group A below and at least one type of a fragrance having a boiling point higher than or equal to 150°C and lower than 200°C selected from a group B below. The weight ratio of the fragrance from the group A is higher than the weight ratio of the fragrance from the group B in the insect-repellent fragrance composition. The fragrances of group A include: citronellal, menthol, α -terpineol, linalyl acetate, isopulegol, ethyl linalool, terpinyl acetate, geranyl formate, menthone, borneol, and camphor. The

20 fragrances of group B include: menthane, camphene, tetrahydrolinalool, dihydromyrcenol, osimenol, ocimene, myrcene, α -pinene, β -pinene, α -ferrandrene, α -terpinene, γ -terpinene, terpinolene, 3-carene, 1-heptanol, 2-heptanol, 3-heptanol, 1-octanol, 2-octanol, 3-octanol, 2-nonanol, 3,5,5-trimethyl-1-hexanol, cis-3-hexenol, trans-2-hexenol,

25 2,4-hexadiene-1-ol, 1-octen-3-ol, 2,6-nonadienol, tetrahydromugol, 4-thujanol, n-heptanal, n-octanal, 3,5,5-trimethylhexanal, cis-3-hexenal, 2,4-hexadienal, 2,6-nonadienal, heptanal dimethyl acetal, octanal dimethyl acetal, citral dimethyl acetal, 2-heptanone, 2-octanone, 3-octanone, 2-nonanone, 3-nonanone, methylheptenone, fencon, acetylfuran,

30 linalool oxide, menthofuran, 1,8-cineole, 1,4-cineole, 2,2,6-trimethyl-6-vinyltetrahydropyran, cis-3-hexenyl formate, prenyl acetate, hexyl acetate, cis-3-hexenyl acetate, trans-2-hexenyl acetate, heptyl acetate, hexyl propionate, cis-3-hexenyl butyrate, cis-3-hexenyl isobutyrate, ethyl 2-methylvalerate, ethyl heptanoate, and

35 allyl hexanoate. Note that, in addition to the abovementioned

fragrances, the insect-repellent fragrance composition includes solvent (e.g., isopropyl myristate).

[0091]

The following are reasons for this. If the insect-repellent fragrance composition includes only a low boiling point fragrance (only a fragrance in group B), the fragrance volatilizes (disperses) immediately, which is not suitable in view of giving the user an expectation of the insect repelling effect. On the other hand, if the insect-repellent fragrance composition includes only a high boiling point fragrance (only a fragrance in the group A), the sustainability of the insect repelling effect improves due to time being required for volatilization (dispersal). But the initial fragrance volatilization (dispersal) is very low, and therefore it is not possible to demonstrate the insect repelling effect to the user.

[0092]

In contrast, according to the present embodiment, the fragrance having a higher weight ratio (the main component of the insect-repellent fragrance composition) is a high boiling point fragrance (fragrance in the group A), thus suitably ensuring the sustainability of the insect repelling effect. Moreover, the low boiling point fragrance (fragrance in the group B) is added as a supplementary fragrance in order to promote the initial fragrance volatilization (dispersal), thus making it possible for the insect repelling effect to be recognized by (demonstrated to) the user through the fragrance, and making it possible to give the user an expectation of the insect repelling effect. In this way, according to the diaper 1 of the present embodiment, it is possible to ensure the sustainability of the insect repelling effect while also giving the user an expectation of the insect repelling effect.

[0093]

Furthermore, citronellal, menthol, α -terpineol, linalyl acetate, isopulegol, ethyl linalool, terpinyl acetate, geranyl formate, menthone, borneol, camphor, menthane, camphene, tetrahydrolinalool, dihydromyrcenol, osimenol, ocimene, myrcene, α -pinene, β -pinene, α -ferrandrene, α -terpinene, γ -terpinene, terpinolene, 3-carene, 1-

heptanol, 2-heptanol, 3-heptanol, 1-octanol, 2-octanol, 3-octanol, 2-nonanol, 3,5,5-trimethyl-1-hexanol, cis-3-hexenol, trans-2-hexenol, 2,4-hexadiene-1-ol, 1-octen-3-ol, 2,6-nonadienol, tetrahydromugol, 4-thujanol, n-heptanal, n-octanal, 3,5,5-trimethylhexanal, cis-3-hexenal, 2,4-hexadienal, 2,6-nonadienal, heptanal dimethyl acetal, octanal dimethyl acetal, citral dimethyl acetal, 2-heptanone, 2-octanone, 3-octanone, 2-nonanone, 3-nonanone, methylheptenone, fencon, acetylfuran, linalool oxide, menthofuran, 1,8-cineole, 1,4-cineole, 2,2,6-trimethyl-6-vinyltetrahydropyran, cis-3-hexenyl formate, prenyl acetate, hexyl acetate, cis-3-hexenyl acetate, trans-2-hexenyl acetate, heptyl acetate, hexyl propionate, cis-3-hexenyl butyrate, cis-3-hexenyl isobutyrate, ethyl 2-methylvalerate, ethyl heptanoate, and allyl hexanoate are allergen-free substances. For this reason, in terms of allergic reaction, it is possible to give the user a sense of ease.

[0094]

Note that the insect-repellent fragrance composition of the present embodiment does not contain any of the following 26 types of fragrances. These 26 types of fragrances are α -isomethylionone, amyl cinnamic aldehyde, amylcinnamyl alcohol, anis alcohol, benzyl alcohol, benzyl benzoate, benzyl cinnamate, benzyl salicylate, butylphenyl methylpropional, cinnamaldehyde, cinnamic alcohol, citral, citronellol, coumarin, eugenol, farnesol, geraniol, hexyl cinnamal, hydroxycitronellal, hydroxyisohexyl 3-cyclohexene carboxaldehyde, isoeugenol, limonene, linalool, methyl 2-octinate, Evernia prunastri extract, and Evernia furfuracea extract. Here, "not containing" these fragrances means that the fragrance is substantially not contained, and does not mean that the fragrance is not contained at all (not at all present). If the ratio of a fragrance in the insect-repellent fragrance composition (solvent + fragrance) is 1% or less, it can be said that that fragrance is substantially not contained.

[0095]

Under the EU (European Union) Cosmetic Directive (76/768/EEC), there is an obligation to display these fragrances as allergens on the label. Accordingly, due to the insect-repellent fragrance composition not

containing these fragrances, it is possible to give the user a sense of ease, in terms of allergic reaction.

[0096]

Also, in the present embodiment, the following effects are achieved
5 due to the insect-repellent fragrance composition being applied to an absorbent article (diaper 1) that includes a hot-melt adhesive. Specifically, some fragrances inhibit the adhesive function of the hot-melt adhesive, and if such fragrances are used in the absorbent article (diaper 1), it is possible for the fragrance, which has
10 volatilized in the package (packaging material) before the diaper 1 is used, to have an effect on the hot-melt adhesive and cause peeling of the diaper 1 or the like.

[0097]

The following do not inhibit the adhesive function of a hotmelt
15 adhesive: citronellal, menthol, α -terpineol, linalyl acetate, isopulegol, ethyl linalool, terpinyl acetate, geranyl formate, menthone, borneol, camphor, menthane, camphene, tetrahydrolinalool, dihydromyrcenol, osimenol, ocimene, myrcene, α -pinene, β -pinene, α -ferrandrene, α -terpinene, γ -terpinene, terpinolene, 3-carene, 1-
20 heptanol, 2-heptanol, 3-heptanol, 1-octanol, 2-octanol, 3-octanol, 2-nonanol, 3,5,5-trimethyl-1-hexanol, cis-3-hexenol, trans-2-hexenol, 2,4-hexadiene-1-ol, 1-octen-3-ol, 2,6-nonadienol, tetrahydromugol, 4-thujanol, n-heptanal, n-octanal, 3,5,5-trimethylhexanal, cis-3-hexenal, 2,4-hexadienal, 2,6-nonadienal, heptanal dimethyl acetal, octanal
25 dimethyl acetal, citral dimethyl acetal, 2-heptanone, 2-octanone, 3-octanone, 2-nonanone, 3-nonanone, methylheptenone, fencon, acetylfuran, linalool oxide, menthofuran, 1,8-cineole, 1,4-cineole, 2,2,6-trimethyl-6-vinyltetrahydropyran, cis-3-hexenyl formate, prenyl acetate, hexyl acetate, cis-3-hexenyl acetate, trans-2-hexenyl acetate,
30 heptyl acetate, hexyl propionate, cis-3-hexenyl butyrate, cis-3-hexenyl isobutyrate, ethyl 2-methylvalerate, ethyl heptanoate, and allyl hexanoate. For this reason, it is possible to prevent the occurrence of peeling of the diaper 1 and the like, and it is possible to appropriately maintain the functionality of the diaper 1.

35 [0098]

Note that insect repellent fragrances that inhibit the adhesive performance of a hot-melt adhesive include: limonene, phenylacetaldehyde, methyl salicylate, thymol, methyl isoeugenol, coumarin, β -phenylethyl alcohol, cymene, eugenol, carvacrol, phenylethyl acetate, safrole, benzyl acetate, styrylyl acetate, anisyl acetate, cinnamyl acetate, cumin aldehyde, diphenyl oxide, and cinnamyl formate, but the insect-repellent fragrance composition of the present embodiment does not contain any of these (as defined above for these fragrances being "not contained"). For this reason, it is possible to prevent the occurrence of peeling of the diaper 1 and the like, and it is possible to appropriately maintain the functionality of the diaper 1.

[0099]

Furthermore, in the present embodiment, in addition to the high boiling point fragrance (fragrance in the group A) and the low boiling point fragrance (fragrance in the group B), the insect-repellent fragrance composition contains at least one type of fragrance having a boiling point higher than 220°C and lower than or equal to 270°C (hereinafter, called a super high boiling point fragrance) selected from a group C. The fragrances in the group C are sobornyl acetate, p-menthane-3,8-diol, 2-(tert-butyl)cyclohexyl acetate, dihydroterpinyl acetate, nerol, 4-tert-butylcyclohexyl acetate, citronellyl acetate, neryl acetate, geranyl acetate, ethyl linalyl acetate, tricyclodecenyl acetate, bornyl acetate, β -caryophyllene, cis-jasmon, L-carvone, nopyr acetate, pulegone, and allyl octanoate. In this case, the super high boiling point fragrance is added to the low boiling point fragrance and the high boiling point fragrance, thus making it possible to reinforce the sustainability of the insect repelling effect.

[0100]

FIGS. 6A to 6D show tables of fragrances that can be applied to the diaper 1 described above and also fragrances that are not applicable. Note that the insect-repellent fragrance composition of the present embodiment has the following characteristic. Citronellal 30 to 40%, terpinyl acetate 1 to 5%, isobornyl acetate 1 to 5%, and other fragrances less than 1% have been added as fragrances to isopropyl

myristate 50% (weight ratio; this similarly applies hereinafter) that is the solvent. At least one type of fragrance selected from the group B is included in the less than 1% "other fragrances." Mentane is included, for example.

5 [0101]

Also, in the present embodiment, the insect-repellent fragrance composition includes only synthetic fragrances. Here, fragrances can be roughly divided into natural fragrances and synthetic fragrances. Natural fragrances are essential oils, for example, and are fragrances
10 directly extracted from natural plants or the like. Accordingly, the composition varies depending on the production location and harvest timing, and natural fragrances contain various fragrance components in addition to the target fragrance component.

[0102]

15 However, synthetic fragrances are chemically synthesized fragrances, and therefore do not contain such various fragrance components. Synthetic fragrances include isolated fragrances, fully synthetic fragrances, semi-synthetic fragrances, and biosynthetic fragrances. In the present embodiment, only synthetic fragrances are included,
20 thus making it possible to appropriately avoid the inclusion of substances that are not to be included in the insect-repellent fragrance composition (e.g., the above-described allergens or substances that inhibit the hot-melt adhesive).

[0103]

25 Note that isolated fragrances (e.g., citronellal), which are produced by isolating one component from a natural fragrance (e.g., citronella oil), fall under the category of synthetic fragrances, not natural fragrances, and therefore even in the case of such isolated fragrances as well, it is possible to avoid the inclusion of the aforementioned
30 substances.

[0104]

Dischargability of insect-repellent fragrance composition from insect repellent microcapsule 50

In the present embodiment, as shown in FIG. 5, there is a mixture of
35 insect repellent microcapsules 50 that have different particle sizes.

The larger (smaller) the particle size of an insect repellent microcapsule 50 is, the easier (harder) it is for the insect repellent microcapsule 50 to rupture, and therefore in the present embodiment, insect repellent microcapsules 50 that have different rupturing pressures (i.e., insect-repellent fragrance composition discharging pressures) are provided.

[0105]

Specifically, the insect repellent microcapsules 50 include low-pressure rupturing capsules, which are insect repellent microcapsules 50 that discharge the insect-repellent fragrance composition from the membrane when subjected to a pressure P (in the present embodiment, 23.6 MPa), and high-pressure rupturing capsules, which are insect repellent microcapsules 50 that do not discharge the insect-repellent fragrance composition from the membrane even when subjected to a pressure $2P$ (in the present embodiment, 47.2 MPa), which is twice the pressure P .

[0106]

In other words, in the case of the low-pressure rupturing capsules, the lowest value of the pressure required for rupturing (discharging fragrance composition), which is the pressure value at which the insect repellent microcapsule 50 first rupture when the pressure is gradually raised, is less than or equal to the pressure P (23.6 MPa), whereas in the case of the high-pressure rupturing capsules, the aforementioned lowest value is greater than the pressure $2P$ (47.2 MPa), and both of such capsules are included.

[0107]

Effects such as the following can be obtained according to such matter.

[0108]

The user can adjust the amount of insect-repellent fragrance composition that is discharged. For example, in a situation where the risk of insect bites is not very high (e.g., indoors or daytime), the user can use less pressure when touching (grabbing) the diaper 1 so as to only break (rub against and break) the low-pressure rupturing capsules, thus reducing the amount of insect-repellent fragrance composition that is discharged. On the other hand, in a situation

where the risk of insect bites is high (e.g., outdoors or after dark), the user can use more pressure when touching (grabbing) the diaper 1 so as to break (rub against and break) both the low-pressure rupturing capsules and the high-pressure rupturing capsules, thus increasing the amount of insect-repellent fragrance composition that is discharged. If only the low-pressure rupturing capsules or the high-pressure rupturing capsules are provided, the discharge amount cannot be adjusted. In this way, according to the present embodiment, the user can adjust the amount of insect-repellent fragrance composition that is discharged, in accordance with the risk of insect bites.

[0109]

Other embodiments

Although the embodiment of the present disclosure has been described hereinabove, the above embodiment of the present disclosure is simply to facilitate understanding of the present disclosure and are not in any way to be construed as limiting the present disclosure. The present disclosure may variously be changed or altered without departing from its gist and encompass equivalents thereof.

[0110]

In the above embodiment, a tape-type (open-type) diaper 1 is described as an example of the absorbent article to be worn on a body, but there is no limitation to this, and the diaper may be a pull-on diaper. Also, there is no limitation to being a diaper, and the absorbent article may be a napkin, a urine absorbing pad, or a pantyliner, for example. Also, the absorbent article to be worn on a body is not limited to being an absorbent article that is worn on a human body, and may be a pet diaper, for example.

[0111]

Also, in the above embodiment, the membrane that contains the insect-repellent fragrance composition is provided. In other words, the microcapsules are formed by containing the insect-repellent fragrance composition in a membrane, but there is no limitation to this. For example, the insect-repellent fragrance composition is not required to be contained in a membrane (not required to be microcapsulized).

[0112]

However, containing the insect-repellent fragrance composition in a membrane (microcapsulizing the insect-repellent fragrance composition) reinforces the sustainability of the insect repelling effect, and therefore the above embodiment is desirable.

5 [0113]

Also, in the above embodiment, an integrated band-like sheet 33 is described as an example of the "nonwoven fabric sheet" on which the insect repellent microcapsules are provided, but there is no limitation to this. And the nonwoven fabric sheet on which the insect repellent
10 microcapsules are provided may be constituted by multiple nonwoven fabric sheets.

[0114]

As shown in FIG. 7, in this variation, the nonwoven fabric sheet on which the insect repellent microcapsules are provided is constituted
15 by two nonwoven fabric sheets (the overall nonwoven fabric sheet constituted by two nonwoven fabric sheets will be called a nonwoven fabric sheet 60). The one of the two nonwoven fabric sheets is the same as the previously described band-like sheet 33 (corresponding to a second nonwoven fabric sheet, which will be called a band-like sheet
20 62). The other one of the two nonwoven fabric sheets is a cover member 64 (corresponding to a first nonwoven fabric sheet) that is thinner than the band-like sheet 62, and the cover member 64 covers the non-skin side of the band-like sheet 62. In other words, the band-like sheet 62 is located on the skin side of the cover member 64, and the
25 band-like sheet 62 is covered by the cover member 64 on the non-skin side.

[0115]

For this reason, a non-skin-side surface 60a of the nonwoven fabric sheet 60 is constituted by the cover member 64, not the band-like sheet
30 62, and the insect repellent microcapsules 50 are provided on the band-like sheet 62 and not provided on the cover member 64, thus making it possible to reliably realize a state where the insect repellent microcapsules 50 are not located above the non-skin-side surface 60a of the band-like sheet 62. Accordingly, it is possible to reliably
35 realize the above-described effect of sustaining the insect repelling

effect even more appropriately. Moreover, the cover member 64 also plays a role of suppressing the case where ruptured insect repellent microcapsules 50 fall out.

[0116]

5 Note that FIG. 7 is a schematic diagram that schematically shows insect repellent microcapsules 50 provided on the non-skin side of the nonwoven fabric sheet 60 according to this variation.

[0117]

The following are examples of other aspects of the absorbent article.

10 [0118]

A configuration is possible in which the absorbent article includes a coated portion that is coated with insect repellent microcapsules, and when the absorbent article is taken out of the packaging material, the insect repellent microcapsules include damaged capsules, which are insect repellent microcapsules that are damaged, and undamaged capsules, which are insect repellent microcapsules that are not damaged.

[0119]

The coated portion is provided at any location on a diaper 101. In this aspect, a coated portion R (hatched portion in FIG. 8) is provided on the non-skin-side surface of a fastening tape portion 140 on one side in the product widthwise direction W. The coated portion R is applied flatly over the entirety of a band-like sheet 141. Note that FIG. 8 is a diagram showing the one-side fastening tape portion 140 according to this aspect, as seen from the non-skin side.

25 [0120]

The coated portion R of the diaper 101, which has been taken out of the packaging material, includes damaged capsules DC, which are insect repellent microcapsules MC that are damaged, and undamaged capsules NC, which are insect repellent microcapsules MC that are not damaged. In other words, in the state of being contained in the packaging material, the diaper 101 includes the damaged capsules DC and the undamaged capsules NC.

[0121]

The damaged capsules DC are insect repellent microcapsules MC whose membrane is at least partially damaged. The term "damaged" refers to

the state where the membrane has at least a scratch, an indentation, a deformation, or a crack. The damaged capsules DC are in a state where the contained insect-repellent fragrance composition has leaked from the ruptured portion to the outside of the insect repellent microcapsule MC, or the insect-repellent fragrance composition is exposed.

[0122]

FIG. 9 is an electron micrograph of a region that includes both damaged capsules DC and undamaged capsules NC in the coated portion. In the photograph shown in FIG. 9, microcapsules MC are provided around the nonwoven fabric fibers 145. The undamaged capsules NC are spherical, and include the insect-repellent fragrance composition. On the other hand, the damaged capsules DC have various shapes, have collapsed, or are in a state where the inside is visible.

[0123]

The insect-repellent fragrance composition of this aspect is a highly volatile fragrance, and therefore due to the diaper 101 including the damaged capsules DC, the insect-repellent fragrance composition easily fills the air-tight packaging material. When the packaging material is opened, firstly, the wearer or user can recognize the fragrance of the insect-repellent fragrance composition that was contained in the damaged capsules DC. Accordingly, the wearer or user can recognize that the diaper 101 includes the insect-repellent fragrance composition before putting on the diaper 101.

[0124]

Also, due to the diaper 101 including the damaged capsules DC when taken out of the packaging material, the wearer or user can recognize the fragrance of the insect-repellent fragrance composition discharged from the damaged capsule DC when taking the diaper 101 out of the packaging material or performing an operation such as unfolding the diaper 101, for example. Accordingly, the wearer or user can recognize that the diaper 101 includes the insect-repellent fragrance composition before putting on the diaper 101.

[0125]

Furthermore, due to the diaper 101 including not only the damaged

capsules DC but also the undamaged capsules NC, the undamaged capsules NC can also become damaged when subjected to some sort of impact or contact in the put-on state. When the undamaged capsules NC are subjected to a physical stimulus, they become damaged capsules DC, and
5 new insect-repellent fragrance composition can leak to the outside or become exposed. Accordingly, the existence of the insect-repellent fragrance composition can be recognized not only before the diaper is put on, but also while the diaper is in the put-on state. Also, the insect repelling effect is likely to be exhibited by the insect-
10 repellent fragrance composition not only before the diaper 101 is put on, but also while the diaper 101 is put on.

[0126]

Also, normally, the fastening tape portions 140 are portions that are grabbed by a hand of the wearer or the user when the diaper is put on.
15 For this reason, due to providing the coated portion R on the fastening tape portions 140, the fastening tape portions 140 are physically stimulated (e.g., rubbed) when pinched by the wearer or the user, and therefore the undamaged capsules NC among the insect repellent microcapsules MC of the coated portion R can more reliably become
20 damaged capsules DC, thus making it more likely for the effect of the insect-repellent fragrance composition to be exhibited when the diaper is put on.

[0127]

The coated portion R has a processing mark portion, where the number
25 of damaged capsules DC per unit area is greater than the number of undamaged capsules NC per unit area. The processing mark portion is a marked portion that has been subjected to pressure or impact in compression processing, folding processing, cutting processing, laser processing, or the like after the formation of the coated portion R.
30 The processing mark portion is a portion where undamaged capsules NC have become damaged capsules DC due to pressure or impact during processing. It is preferable that this processing that forms the processing mark portion is performed in the manufacturing process. Due to this processing being performed in the manufacturing process, the
35 damaged capsules DC are included in the processing mark portion of the

diaper 101 in the packaged state. Accordingly, the wearer or user can recognize that the diaper 101 includes the insect-repellent fragrance composition before putting on the diaper 101. Note that in FIG. 8, processing mark portions (M1 to M3) are shown by dotted hatching.

[0128]

The number of damaged capsules DC per unit area and the number of undamaged capsules NC per unit area in the diaper 101 can be compared by forming sample pieces by cutting out regions that have the predetermined unit of area, and using an electron microscope to visually compare the number of damaged capsules DC and undamaged capsules NC in the sample pieces.

[0129]

When the diaper 101 has been taken out of the packaging material, the fastening tape portion 140 has been folded at a tape fold line (fold line portion) TL, and the portion overlapped with the tape fold line TL is the processing mark portion M1. In the step for folding the fastening tape portion 140, a folding guide is pressed against the tape fold line TL from the skin-side surface, for example. For this reason, damaged capsules DC are provided in at least the processing mark portion M1 due to pressure in the folding processing. In this way, due to a fold line such as the tape fold line TL serving as the processing mark portion M1, there is no need to provide a separate step for forming the damaged capsules DC, thus making it possible to more easily obtain the diaper 101 that reliably includes the damaged capsules DC in the packaged state. As a result, the wearer or user can recognize that the diaper 101 includes the insect-repellent fragrance composition before putting on the diaper 101.

[0130]

Also, in the diaper 101, damaged capsules DC are provided in a leading end portion M2 of the fastening tape portion 140. The leading end portion M2 of the fastening tape portion 140 is a portion that is adjacent to the cut made when forming the shape of the band-like sheet 141. For this reason, the leading end portion M2 is also the processing mark portion M2. In the processing mark portion M2, damaged capsules DC are easily formed due to impact in the cutting step. Accordingly,

the packaged diaper 101 includes the damaged capsules DC, and the wearer or user can recognize that the diaper 101 includes the insect-repellent fragrance composition before the diaper 101 is put on.

[0131]

5 Furthermore, in the packaged state, the diaper 101 includes compressed portions F for maintaining the folded state of the fastening tape portion 140, and the compressed portions F are the processing mark portions M3. The compressed portions F are formed after coating of the coated portion R, and therefore the processing mark portions M3
10 are portions where damaged capsules DC are likely to be formed due to pressure during coating. Accordingly, the packaged diaper 101 includes the damaged capsules DC, and the wearer or user can recognize that the diaper 101 includes the insect-repellent fragrance composition before the diaper 101 is put on.

15 [0132]

Note that the coated portion R has a non-processing mark portion N in which the number of undamaged capsules NC per unit area is greater than the number of damaged capsules DC per unit area when the diaper 101 is taken out of the packaging material. At this time, it is
20 preferable that the area of the non-processing mark portion N is greater than the area of the processing mark portions in the coated portion R. Specifically, the processing mark portions of the coated portion R of the diaper 101 include the processing mark portions M1 and M2 and the compressed portions M3 (F), and the non-processing mark
25 portion N is the region of the fastening tape portion 140 excluding the processing mark portions M1 and M2 and the compressed portion M3 (F). As shown in FIG. 8, the area of the non-processing mark portion N is greater than the area of the processing mark portions of the processed portions of the diaper 101. In this way, due to setting a
30 larger region for the undamaged capsules NC, the wearer or user can adjust the number of damaged capsules according to the desired effect of the insect-repellent fragrance composition, thus making it possible to obtain an effect of the insect-repellent fragrance composition that corresponds to the put-on state.

35 [0133]

Note that although the processing mark portions M1 and M2 and the compressed portions M3 (F) of the fastening tape portion 140 are described above, the processing mark portions are not limited to these portions. In the case where the coated portion is provided on a portion overlapped with a processing mark portion P1 shown in FIG. 8, the damaged capsules DC are formed in the processing mark portion P1. The processing mark portion P1 is the outer end portion of the diaper 101, and is a portion that is adjacent to the cut portion when the back sheet and the side sheet are cut into the shape shown in FIG. 8, for example. In the processing mark portion P1, damaged capsules DC are easily formed due to impact in the cutting step.

[Reference Signs List]

[0134]

1 diaper,
 15 3 front portion, 5 crotch portion, 7 back portion,
 14 flap portion,
 15 leg gather, 16 leg side gather,
 17 end joining portion, 18 main body portion, 18a main-body joining portion, 19 elastic string,
 20 21 absorbent body, 22 top sheet, 23 leak-proof sheet,
 24 back sheet, 25 core wrap, 26 skin-side sheet,
 28 waist gather film,
 29 target tape, 30 fastening tape portion,
 31 engaging portion, 31a no-hook-and-loop-fastener portion, 31b wavy portion, 32 fixing portion,
 25 33 band-like sheet, 33a skin-side surface, 33b non-skin-side surface,
 34 nonwoven fabric fiber,
 35 hook-and-loop fastener,
 50 insect repellent microcapsule,
 30 60 nonwoven fabric sheet, 60a non-skin-side surface, 62 band-like sheet,
 64 cover member,
 101 diaper,
 140 fastening tape portion, 141 band-like sheet, 145 nonwoven fabric fiber,
 35 F compressed portion,

MC insect repellent microcapsule,

M1 processing mark portion, M2 processing mark portion (leading end portion), M3 processing mark portion, N non-processing mark portion,

DC damaged capsule, NC undamaged capsule,

5 P1 processing mark portion, R coated portion

CLAIMS

[Claim 1]

An absorbent article comprising: an insect-repellent fragrance
5 composition that includes

at least one type of a fragrance having a boiling point higher than
or equal to 200°C and lower than or equal to 220°C selected from a
group A below and

10 at least one type of a fragrance having a boiling point higher than
or equal to 150°C and lower than 200°C selected from a group B below,

a weight ratio of the fragrance from the group A being higher than
a weight ratio of the fragrance from the group B in the insect-repellent
fragrance composition,

15 group A: citronellal, menthol, α -terpineol, linalyl acetate,
isopulegol, ethyl linalool, terpinyl acetate, geranyl formate,
menthone, borneol, and camphor,

group B: menthane, camphene, tetrahydrolinalool, dihydromyrcenol,
osimenol, ocimene, myrcene, α -pinene, β -pinene, α -ferrandrene, α -
terpinene, γ -terpinene, terpinolene, 3-carene, 1-heptanol, 2-heptanol,
20 3-heptanol, 1-octanol, 2-octanol, 3-octanol, 2-nonanol, 3,5,5-
trimethyl-1-hexanol, cis-3-hexenol, trans-2-hexenol, 2,4-hexadiene-1-
ol, 1-octen-3-ol, 2,6-nonadienol, tetrahydromugol, 4-thujanol, n-
heptanal, n-octanal, 3,5,5-trimethylhexanal, cis-3-hexenal, 2,4-
hexadienal, 2,6-nonadienal, heptanal dimethyl acetal, octanal dimethyl
25 acetal, citral dimethyl acetal, 2-heptanone, 2-octanone, 3-octanone,
2-nonanone, 3-nonanone, methylheptenone, fencon, acetylfuran, linalool
oxide, menthofuran, 1,8-cineole, 1,4-cineole, 2,2,6-trimethyl-6-
vinyltetrahydropyran, cis-3-hexenyl formate, prenyl acetate, hexyl
acetate, cis-3-hexenyl acetate, trans-2-hexenyl acetate, heptyl
30 acetate, hexyl propionate, cis-3-hexenyl butyrate, cis-3-hexenyl
isobutyrate, ethyl 2-methylvalerate, ethyl heptanoate, and allyl
hexanoate.

[Claim 2]

35 The absorbent article according to claim 1, wherein

the insect-repellent fragrance composition includes at least one type of a fragrance having a boiling point higher than 220°C and lower than or equal to 270°C selected from a group C,

the group C: sobornyl acetate, p-menthane-3,8-diol, 2-(tert-butyl)cyclohexyl acetate, dihydroterpinyl acetate, nerol, 4-tert-butylcyclohexyl acetate, citronellyl acetate, neryl acetate, geranyl acetate, ethyl linalyl acetate, tricyclodecenyl acetate, bornyl acetate, β -caryophyllene, cis-jasmon, L-carvone, nopyr acetate, pulegone, and allyl octanoate.

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[Claim 3]

The absorbent article according to claim 1 or 2, wherein

the absorbent article further comprises a hot-melt adhesive.

15 [Claim 4]

The absorbent article according to claim 3, wherein

the insect-repellent fragrance composition does not contain any of the following:

limonene, phenylacetaldehyde, methyl salicylate, thymol, methyl isoeugenol, coumarin, β -phenylethyl alcohol, cymene, eugenol, carvacrol, phenylethyl acetate, safrole, benzyl acetate, styrylyl acetate, anisyl acetate, cinnamyl acetate, cumin aldehyde, diphenyl oxide, and cinnamyl formate.

25 [Claim 5]

The absorbent article according to claim 1 or 2, wherein

the insect-repellent fragrance composition does not contain any of the following 26 types of fragrances:

α -isomethylionone, amyl cinnamic aldehyde, amylcinnamyl alcohol, anis alcohol, benzyl alcohol, benzyl benzoate, benzyl cinnamate, benzyl salicylate, butylphenyl methylpropional, cinnamaldehyde, cinnamic alcohol, citral, citronellol, coumarin, eugenol, farnesol, geraniol, hexyl cinnamal, hydroxycitronellal, hydroxyisohexyl 3-cyclohexene carboxaldehyde, isoeugenol, limonene, linalool, methyl 2-octinate, Evernia prunastri extract, and Evernia furfuracea extract.

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[Claim 6]

The absorbent article according to any of claims 1 to 5, wherein
the insect-repellent fragrance composition includes only synthetic
fragrances.

5

[Claim 7]

The absorbent article according to any of claims 1 to 6, wherein
the absorbent article further comprises a containing member that
contains the insect-repellent fragrance composition.

10

[Claim 8]

The absorbent article according to claim 7, wherein
the absorbent article is configured to be put on a body,
the absorbent article further comprises a hydrophobic nonwoven
fabric sheet and an insect repellent microcapsule,
the insect repellent microcapsule being disposed on a non-skin
side of the nonwoven fabric sheet,
the insect repellent microcapsule including the insect-repellent
fragrance composition and the containing member, and
the insect repellent microcapsule is embedded inside the nonwoven
fabric sheet in a state of not reaching a skin-side surface of the
nonwoven fabric sheet.

15
20

[Claim 9]

The absorbent article according to claim 8, wherein
the insect repellent microcapsules include
an insect repellent microcapsule that discharges the insect
repellent fragrance from the containing member when subjected to a
pressure P, and
an insect repellent microcapsule that does not discharge the
insect repellent fragrance from the containing member even when
subjected to a pressure 2P that is twice the pressure P.

30

[Claim 10]

The absorbent article according to any of claims 7 to 9, wherein

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the absorbent article further comprises a coated portion that is coated with a plurality of insect repellent microcapsules,

the plurality of insect repellent microcapsules each including the insect-repellent fragrance composition and the containing member,

5 when the absorbent article has been taken out of a packaging material, the insect repellent microcapsules include a damaged capsule and an undamaged capsule,

the damaged capsule being an insect repellent microcapsule that is damaged,

10 the undamaged capsule being an insect repellent microcapsule that is not damaged.

[Claim 11]

The absorbent article according to claim 10, wherein

15 the coated portion includes a processing mark portion in which a number of damaged capsules per unit area is greater than a number of undamaged capsules per unit area.

[Claim 12]

20 The absorbent article according to claim 11, wherein

the coated portion includes a non-processing mark portion,

the non-processing mark portion being a portion in which the number of undamaged capsules per unit area is greater than the number of damaged capsules per unit area when the absorbent article has been
25 taken out of the packaging material, and

the non-processing mark portion has a larger area than the processing mark portion.

[Claim 13]

30 The absorbent article according to claim 11 or 12, wherein

when the absorbent article has been taken out of the packaging material, at least a portion of the absorbent article has been folded at a fold line portion,

the processing mark portion is the fold line portion, and

35 at least a part of the damaged capsule is provided in the fold line

portion.

[Claim 14]

The absorbent article according to any of claims 10 to 13, wherein

5 when the absorbent article is in an unfolded state,

at least a part of the damaged capsules are provided in an outer end portion of the absorbent article.

[Claim 15]

10 The absorbent article according to any of claims 10 to 14, wherein

the absorbent article further comprises a fastening tape portion, and

the coated portion is provided in the fastening tape portion.

15 [Claim 16]

The absorbent article according to claim 15, wherein

at least a part of the damaged capsules are provided in a leading end portion of the fastening tape portion.

20 [Claim 17]

The absorbent article according to claim 15 or 16, wherein

when the absorbent article has been taken out of the packaging material, the fastening tape portion has been folded at a tape fold line with a skin-side surface of the fastening tape portion being on
25 an inward side,

the tape fold line extending in a vertical direction

the fastening tape portion has a compressed portion for maintaining a folded state, and

at least a part of the damaged capsules are provided in the
30 compressed portion.