

DESCRIPTION

TITLE

UNDERPANTS-TYPE ABSORBENT ARTICLE

FIELD

5 [0001]

The present invention relates to an underpants-shaped absorbent article.

BACKGROUND

[0002]

10 Patent Literature 1 discloses that insect repellent microcapsules in which natural plant extract exhibiting an insect repellent effect is microencapsulated is applied to an absorbent article including a liquid-permeable top sheet, an absorbent core, and a liquid-impermeable back sheet. Specifically, there is disclosed
15 a configuration in which insect repellent microcapsules are applied to a back sheet.

[CITATION LIST]

[PATENT LITERATURE]

[0003]

20 Patent Literature 1: Japanese Patent Application Publication (Translation of PCT Application) No. 2012-522618

SUMMARY

[TECHNICAL PROBLEM]

[0004]

25 The applicant has focused on suppressing insect bites while an absorbent article is put on. In contrast, Patent Literature 1 aims to prevent insect pests from entering absorbent articles during the process of distribution and storage. Therefore, there is not disclosed the specific attachment position of the insect
30 repellent microcapsules in the back sheet, and the effect of suppressing insect bites while the absorbent article is put on is not sufficient. Further, absorbent articles such as diapers include tape-type absorbent articles and underpants-shaped absorbent articles. As for the tape-type absorbent articles,
35 the main target wearers are infants up to several months old,

elderly people, or the like, who often spend most of their time in a lying-down posture. On the other hand, as for the underpants-shaped absorbent articles, the main target wearers are infants who exceed several months and are active in crawling and walking, and elderly people who are not bedridden, or the like. The present applicant has focused on the fact that the movement of the target wearer differs between the tape-type absorbent article and the underpants-shaped absorbent article. As a result of intensive research, it has been found that the target wearer of the tape-type absorbent article is more likely to be bitten by insects on the face than on the legs whereas the target wearer of the underpants-shaped absorbent article is more likely to be bitten by insects on the legs (particularly, thighs and shins) than on the face.

[0005]

The present invention was achieved in light of problems that described above and an aspect of the present invention is to effectively prevent a wearer of an underpants-shaped absorbent article from being bitten by insects.

[SOLUTION TO PROBLEM]

[0006]

A main aspect of the present invention for achieving the above-described aspect is an underpants-shaped absorbent article having a vertical direction, a lateral direction, and a front-back direction, the underpants-shaped absorbent article including: a pair of waist portions; and a crotch portion, two lateral side portions of one of the pair of waist portions and two lateral side portions of another one of the pair of waist portions being joined in a pair of joining portions, each of the waist portions having an upper region and a lower region when the waist portion in a stretched state is divided into two parts in the vertical direction, and of the pair of waist portions, at least either one waist portion being provided with a repellent for insects, in the lower region.

Features of the present invention other than the above will

become clear by reading the present specification with reference to the accompanying drawings.

[ADVANTAGEOUS EFFECT OF THE INVENTION]

[0007]

5 According to the present invention, it is possible to effectively prevent a wearer of an underpants-shaped absorbent article from being bitten by insects.

BRIEF DESCRIPTION OF DRAWINGS

[0008]

10 FIG. 1 is a schematic perspective view of an underpants-shaped disposable diaper 1.

FIG. 2 is a schematic plan view of the diaper 1 in an unfolded and stretched state when viewed from a skin side.

15 FIG. 3 is a schematic cross-sectional view taken along a line A-A in FIG. 2.

FIG. 4 is an explanatory diagram illustrating a repellent arrangement region 41.

FIG. 5 is an explanatory diagram illustrating the repellent arrangement region 41.

20 FIGS. 6A and 6B are each an explanatory diagram illustrating the repellent arrangement region 41 of a modified example of a first embodiment.

FIGS. 7A and 7B are each an explanatory diagram illustrating the repellent arrangement region 41 of a second embodiment.

25 FIG. 8 is an explanatory diagram illustrating the repellent arrangement region 41 of the second embodiment.

DESCRIPTION OF EMBODIMENTS

[0009]

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

An underpants-shaped absorbent article having a vertical direction, a lateral direction, and a front-back direction, the underpants-shaped absorbent article including: a pair of waist portions; and a crotch portion, two lateral side portions of one
35 of the pair of waist portions and two lateral side portions of

another one of the pair of waist portions being joined in a pair of joining portions, each of the waist portions having an upper region and a lower region when the waist portion in a stretched state is divided into two parts in the vertical direction, and
5 of the pair of waist portions , at least either one waist portion being provided with a repellent for insects, in the lower region.
[0010]

According to the above-described underpants-shaped absorbent article, the repellent is provided in a portion of the
10 underpants-shaped absorbent article that is close to the wearer's legs, making it possible to release the repellent around the wearer's legs. Therefore, the wearer of the underpants-shaped absorbent article whose legs are likely to be bitten by insects can be effectively prevented from being bitten by insects.

15 [0011]

In such an underpants-shaped absorbent article, in the waist portion where the repellent is provided, a basis weight of the repellent in the lower region is greater than a basis weight of the repellent in the upper region.

20 [0012]

According to the above-described underpants-shaped absorbent article, a larger amount of the repellent is provided in a portion of the underpants-shaped absorbent article that is close to the wearer's legs. Therefore, the wearer of the underpants-shaped
25 absorbent article whose legs are likely to be bitten by insects can be effectively prevented from being bitten by insects.

[0013]

In such an underpants-shaped absorbent article, the underpants-shaped absorbent article further comprises: an absorbent main
30 body; and an exterior member that is arranged on a non-skin side with respect to the absorbent main body, the exterior member has an elastic member in the waist portion, the elastic member stretching and contracting in the lateral direction, each of the waist portions has a non-stretchable region where the elastic
35 member is not capable of stretching, in a region where the

absorbent main body is positioned, and at least a part of the repellent is provided in the non-stretchable region of the waist portion.

[0014]

5 According to the above-described underpants-shaped absorbent article, the repellent is provided in the non-stretchable region where wrinkles due to the elastic members are less likely to be generated, and the region where the repellent is provide is exposed to the outside. Therefore, the repellent is likely to
10 be released to the outside and an insect repellent effect is produced.

[0015]

In such an underpants-shaped absorbent article, the repellent is contained in a plurality of microcapsules, the waist portion
15 where the repellent is provided has a marked portion that indicates a region where the repellent is provided, and at least a part of the repellent is provided in a region where the marked portion and the non-stretchable region located on an identical side in the front-back direction to the marked portion overlap
20 each other in the front-back direction.

[0016]

According to the above-described underpants-shaped absorbent article, it enhances the visibility of the marked portion positioned in the non-stretchable region, where wrinkles due to
25 the elastic members are less likely to be generated. Further, the repellent is provided in the non-stretchable region (absorbent main body), and therefore the absorbent core, which has a high stiffness, serves as a table, making the user likely to rub the marked portion. Therefore, the microcapsules are
30 efficiently broken, making the repellent likely to be released.

[0017]

In such an underpants-shaped absorbent article, the underpants-shaped absorbent article further comprises: an absorbent core that absorbs excrement, in the waist portion, at least a part of
35 the repellent is provided in a region where the absorbent core

is positioned.

[0018]

According to the above-described underpants-shaped absorbent article, the repellent is less likely to be released to the skin side through the absorbent core and is likely to be released to the outside, producing an insect repellent effect.

[0019]

In such an underpants-shaped absorbent article, a plurality of regions where the repellent is provided are provided side-by-side in the vertical direction with a space.

[0020]

According to the above-described underpants-shaped absorbent article, the repellent can be provided in a wide range in the vertical direction of the underpants-shaped absorbent article while suppressing the increase of the amount of the repellent. Therefore, an insect repellent effect is produced in a wide range in the vertical direction of the underpants-shaped absorbent article.

[0021]

In such an underpants-shaped absorbent article, a plurality of regions where the repellent is provided are provided side-by-side in the lateral direction with a space.

[0022]

According to the above-described underpants-shaped absorbent article, the repellent can be provided in a wide range in the lateral direction of the underpants-shaped absorbent article while suppressing the increase of the amount of the repellent. Therefore, an insect repellent effect is produced in a wide range in the lateral direction of the underpants-shaped absorbent article.

[0023]

In such an underpants-shaped absorbent article, the underpants-shaped absorbent article further comprises: an absorbent core that absorbs excrement, in the waist portion, the repellent is provided in a region where the absorbent core is not positioned.

[0024]

According to the above-described underpants-shaped absorbent article, it is possible to suppress the reduction of the effect of the repellent due to the odor of excrement absorbed by the absorbent core.

[0025]

In such an underpants-shaped absorbent article, in the lower region of the waist portion, a region where the repellent is provided extends continuously in the lateral direction from a position that overlaps a left joining portion in the front-back direction to a position that overlaps a right joining portion in the front-back direction.

[0026]

According to the above-described underpants-shaped absorbent article, since the repellent is provided in the joining portion, the repellent is positioned at the apex portions of the leg openings of the underpants-shaped absorbent article, that is, in the portions where the legs are most exposed. Accordingly, an insect repellent effect can be enhanced around the wearer's legs.

[0027]

In such an underpants-shaped absorbent article, a left end of a region where the repellent is provided is positioned on a right side with respect to a right end of the joining portion located on a left side, and a right end of the region where the repellent is provided is positioned on the left side with respect to a left end of the joining portion located on the right side.

[0028]

According to the above-described underpants-shaped absorbent article, the repellent is not provided in the joining portion, which is likely to protrude while the absorbent article is put on. This makes it possible to prevent the repellent from being attached to the clothing of the wearer.

[0029]

In such an underpants-shaped absorbent article, the underpants-shaped absorbent article further comprises: an absorbent main

body; and an exterior member that is arranged on a non-skin side with respect to the absorbent main body, in at least either one waist portion of the pair of waist portions, the exterior member has an extension portion that extends downward from the at least
5 either one waist portion, and the repellent is also provided in the extension portion.

[0030]

According to the above-described underpants-shaped absorbent article, the repellent is further provided in a portion of the
10 underpants-shaped absorbent article that is close to the wearer's legs, making it possible to effectively prevent the wearer's legs from being bitten by insects.

[0031]

In such an underpants-shaped absorbent article, in the lower
15 region of the waist portion, a region where the repellent is provided is positioned above a lower end of the waist portion, being spaced apart from the lower end.

[0032]

According to the above-described underpants-shaped absorbent
20 article, even in the case where the lower end portion of the waist portion is curled up due to the movement of the wearer's legs, the region in which the repellent is provided is less likely to be covered with the curled portion. Therefore, the repellent is likely to be released to the outside, producing an
25 insect repellent effect.

[0033]

In such an underpants-shaped absorbent article, each of the waist portions has a stretchable region that is capable of stretching and contracting due to an elastic member, the elastic member
30 stretching and contracting in the lateral direction, and in the waist portion where the repellent is provided, a force for stretching a region having a unit length in the vertical direction by a predetermined length in the lateral direction is greater in the stretchable region in the lower region than in
35 the stretchable region in the upper region.

[0034]

According to the above-described underpants-shaped absorbent article, the repellent is provided in the region where wrinkles are likely to be generated due to the elastic members, and
5 therefore the repellent is likely to be covered with the wrinkles in an unused state (non-stretched state). This makes it possible to suppress the release of the repellent. Therefore, a larger amount of the repellent is likely to be retained in the underpants-shaped absorbent article until when the absorbent
10 article is put on.

[0035]

In such an underpants-shaped absorbent article, each of the waist portions has a stretchable region that is capable of stretching and contracting due to an elastic member, the elastic member
15 stretching and contracting in the lateral direction, a force for stretching a region having a unit length in the vertical direction by a predetermined length in the lateral direction is greater in the stretchable region of one waist portion of the pair of waist portions than in the stretchable region of the
20 other waist portion, and a basis weight of the repellent in the one waist portion is greater than a basis weight of the repellent in the other waist portion.

[0036]

According to the above-described underpants-shaped absorbent
25 article, a larger amount of the repellent is provided in the region where wrinkles are likely to be generated due to the elastic members, and therefore the repellent is likely to be covered with the wrinkles in an unused state (non-stretched state). This makes it possible to suppress the release of the
30 repellent. Therefore, a larger amount of the repellent is likely to be retained in the underpants-shaped absorbent article until when the absorbent article is put on.

[0037]

In such an underpants-shaped absorbent article, each of the waist
35 portions has a stretchable region that is capable of stretching

and contracting due to an elastic member, the elastic member stretching and contracting in the lateral direction, a force for stretching a region having a unit length in the vertical direction by a predetermined length in the lateral direction is greater in the stretchable region of one waist portion of the pair of waist portions than in the stretchable region of the other waist portion, and a basis weight of the repellent in the one waist portion is smaller than a basis weight of the repellent in the other waist portion.

10 [0038]

According to the above-described underpants-shaped absorbent article, a larger amount of the repellent is provided in the region where wrinkles are less likely to be generated due to the elastic members. This makes the region where the repellent is provided likely to be exposed to the outside while the absorbent article is put on, making the repellent likely to be released. Consequently, the insect repellent effect is enhanced.

[0039]

An underpants-shaped absorbent article having a vertical direction, a lateral direction, and a front-back direction, the underpants-shaped absorbent article including: a pair of waist portions; and a crotch portion, the underpants-shaped absorbent article having a waist opening and a pair of leg openings formed therein, and an insect repellent being provided in at least a part of a circumferential edge portion along each of the leg openings.

[0040]

According to the underpants-shaped absorbent article, the repellent is provided in a portion of the underpants-shaped absorbent article that is close to the wearer's legs, making it possible to release the repellent around the wearer's legs. Therefore, the wearer of the underpants-shaped absorbent article whose legs are likely to be bitten by insects can be effectively prevented from being bitten by insects.

35 [0041]

Embodiments

The following describes an underpants-shaped absorbent article according to the present embodiment, by way of example of an underpants-shaped disposable diaper for infants. Note that the underpants-shaped absorbent article according to the present embodiment is not limited to the above, and can be used as an underpants-shaped disposable diaper for adults, an underpants-shaped sanitary napkin, or the like.

[0042]

Basic configuration of underpants-shaped disposable diaper 1

FIG. 1 is a schematic perspective view of an underpants-shaped disposable diaper 1 (hereinafter, also referred to as a "diaper 1"). FIG. 2 is a schematic plan view of the diaper 1 in an unfolded and stretched state when viewed from a skin side. FIG. 3 is a schematic cross-sectional view taken along a line A-A in FIG. 2.

[0043]

The unfolded state of the diaper 1 is a state where a pair of joining portions 2 provided on two side portions of the underpants-shaped diaper 1 are separated from each other and the diaper 1 has been spread and unfolded flat. The "stretched state" of the diaper 1 is a state where the elastic members of the diaper 1 have been stretched such that wrinkles can no longer be seen in the diaper 1. Specifically, this is a state where the diaper 1 has been stretched such that the dimensions of the constituent members thereof match or are close to the dimensions of the members on their own (that is, the dimensions in a state where the stretchability of the elastic members is not exhibited).

[0044]

As shown in FIG. 1, the underpants-shaped diaper 1 has a vertical direction, a lateral direction, and a front-back direction, and a waist opening BH and a pair of leg openings LH are formed in the diaper 1. In the front-back direction, the side corresponding to the wearer's stomach is the front side, and the side corresponding to the wearer's back is the back side.

Further, the diaper 1 has a thickness direction as shown in FIG. 3, and with respect to the thickness direction, the side that comes into contact with the wearer is the skin side, and the side opposite to the skin side is the non-skin side.

5 [0045]

The diaper 1 has an absorbent main body 10, and exterior members 20 and 30 arranged on the non-skin side with respect to the absorbent main body 10. The diaper 1 of the present embodiment is a so-called three-piece type of diaper, and the exterior
10 member has a front exterior member 20 and a back exterior member 30. In the portion of the absorbent main body 10 below the front exterior member 20 and the back exterior member 30, the non-skin-side surface of the absorbent main body 10 is exposed to the outside.

15 [0046]

As shown in FIG. 2, the non-skin-side surface of the front end portion of the absorbent main body 10 in the longitudinal direction is joined to the skin-side surface of the front exterior member 20 with an adhesive or the like, and the non-
20 skin-side surface of the back end portion of the absorbent main body 10 in the longitudinal direction is joined to the skin-side surface of the back exterior member 30 with an adhesive or the like. In the diaper 1 in the unfolded state in FIG. 2, the absorbent main body 10 is folded one time so that the front
25 exterior member 20 and the back exterior member 30 face each other, and two lateral side portions of the front exterior member 20 and two lateral side portions of the back exterior member 30 are joined by welding (e.g., heat welding or ultrasonic welding) or the like, forming the pair of joining portions 2, thus
30 obtaining the diaper 1 in an underpants-shaped state.

[0047]

In the present embodiment, in the diaper 1, regions in the vertical range where the joining portion 2 is located (that is, regions each extending from the position of an upper end 2a of
35 the joining portion 2 to the position of a lower end 2b thereof)

are referred to as "a pair of waist portions 1F and 1B". A region below the pair of waist portions 1F and 1B is referred to as a "crotch portion 1C". The waist portion on the front side in the front-back direction (a region surrounded by points a, b, c and d in FIG. 2) is called a "front waist portion 1F", and the waist portion on the back side (a region surrounded by points e, f, g and h in FIG. 2) is called a "back waist portion 1B"

[0048]

Further, the front waist portion 1F has an upper region 1FU (a region surrounded by points a, i, c and j) and a lower region 1FL (a region surrounded by points i, b, j and d) when the front waist portion 1F in the stretched state is divided into two parts in the vertical direction. Similarly, the back waist portion 1B has an upper region 1BU (a region surrounded by points k, f, l and h) and a lower region 1BL (a region surrounded by points e, k, g and l) when the back waist portion 1B in the stretched state is divided into two parts in the vertical direction.

[0049]

The absorbent main body 10 includes a liquid-permeable top sheet 11, an absorbent core 12 that absorbs excrement, a liquid-impermeable back sheet 13, and an exterior sheet 14, which are adhered with an adhesive or the like. For example, the absorbent core 12 is constituted by liquid-absorbent fibers such as pulp fibers containing a superabsorbent polymer, which are molded into a predetermined shape. The absorbent core 12 may be covered with a core-wrapping sheet formed of liquid-permeable tissue paper, nonwoven fabric or the like. In addition, examples of the absorbent core 12 include an SAP sheet obtained by affixing an SAP layer to a hydrophilic sheet, an air-laid sheet in which liquid-absorbent fibers are formed into a sheet by an air-laid method, and the like.

[0050]

Further, in two lateral side portions, the absorbent main body 10 has leg elastic members 15 (e.g., elastic strings) that stretch and contract in the longitudinal direction (vertical

direction). Accordingly, the diaper 1 fits around the wearer's legs.

[0051]

In addition, in two lateral side portions, the absorbent main
5 body 10 has leak-proof wall portions 16 that are capable of
rising up toward the skin side. For example, the leak-proof wall
portions 16 are formed as follow: two lateral side portions of
the exterior sheet 14 are folded back inward in the lateral
10 direction so that the two lateral side portions of the exterior
sheet 14 are positioned on the skin-side surface of the top sheet
11, and the leak-proof-wall elastic members 161 (e.g., elastic
strings) that stretch and contract in the longitudinal direction
are provided in the folded-back portions.

[0052]

15 As shown in FIG. 3, the front exterior member 20 and the back
exterior member 30 respectively include: skin-side sheets 21 and
31 and non-skin-side sheets 22 and 32 each of which are formed
of a soft nonwoven fabric sheet or the like, and a plurality of
waist elastic members 23 and 33 that stretch and contract in the
20 lateral direction (e.g., elastic strings). The plurality of
waist elastic members 23 and 33 are arranged side by side with a
space in the vertical direction respectively in the waist
portions 1F and 1B, and are fixed to a sheet in a state of being
stretched in the lateral direction. Therefore, the front
25 exterior member 20 and the back exterior member 30 are capable
of stretching and contracting in the lateral direction, and fit
around the wearer's waist.

[0053]

Further, the front exterior member 20 has a print sheet 24
30 subjected to printing (e.g., a resin film such as polyethylene
or polypropylene) between the skin-side sheet 21 and the non-
skin-side sheet 22. Although not shown, the back exterior member
30 may also include a print sheet between the skin-side sheet 31
and the non-skin-side sheet 32.

35 [0054]

Further, as shown in FIG. 2, the front exterior member 20 has a rectangular shape. On the other hand, the back exterior member 30 has an extension portion 34 that extends downward from the back waist portion 1B having a rectangular shape. The extension portion 34 has a substantially trapezoidal shape in which the lateral length thereof decreases as it goes downward.

[0055]

While the basic configuration of the diaper 1 has been described above, the configuration of the diaper 1 is not limited to the above. For example, the diaper 1 may be a two-piece-type diaper. That is, the front exterior member 20 and the back exterior member 30 may be constituted by one continuous member (see FIG. 8 to be described later), or a crotch exterior member that connects the front exterior member 20 and the back exterior member 30 may be provided. Further, the waist elastic members 23 and 33 and the leg elastic member 15 may be a sheet-like elastic member (a stretchable film or stretchable nonwoven fabric), instead of an elastic string.

[0056]

First Embodiment: Repellent Arrangement Region 41

FIGS. 4 and 5 are each an explanatory diagram illustrating a repellent arrangement region 41 and show the front waist portion 1F in a stretched state.

[0057]

An "insect repellent 40" is provided in the diaper 1. The insect repellent 40 refers to a repellent against insect pests such as mosquitoes, gnats, non-biting midges, flies, and the like (insect repelling agent), and includes a synthetic compound or a natural plant extract containing a component having an insect repellent effect. For example, citronellal, 1,8-cineole, linalyl acetate, N,N-diethyl-3-methylbenzamide (DEET), sesquiterpene, ethylbutylacetylaminopropionate, picaridin, pyrethroid, cinnamon, rosemary, lavender, peppermint, eucalyptus, citronella, lemon eucalyptus, holy basil, and the like can be used. The repellent 40 can be selected according to the target insect pest and the

target wearer. In the present embodiment, an isolated fragrance extracted from lemon grass is employed. Accordingly, a component having an insect repellent effect (citronellal) is given to the diaper 1.

5 [0058]

Note that the repellent 40 is preferably an allergen-free substance. For example, it is preferable that 26 types of substances that are obligated to be displayed as allergens on their labels under EU (European Union) Cosmetics Directive
10 (76/768/EEC) are substantially not contained (the ratio of the substances in the repellent 40 is 1% or less). Further, it is preferable that the repellent 40 does not inhibit the adhesive performance of the hot-melt adhesive used in the diaper 1.

[0059]

15 The repellent 40 of the present embodiment is contained in microcapsules (membrane). A microcapsule is a capsule that has a diameter of 1 to 1000 μm and has a space containing a core material (repellent 40). As the materials for the microcapsule, there are provided urethane resins, gelatin, gelatin/gum acacia,
20 melamine resins, urea, formalin resins, sugars, and the like. In the present embodiment, microcapsules formed of a urethane resin, which rupture when subjected to a physical impact. However, the microcapsules are not particularly limited as long as the membrane ruptures when subjected to a physical stimulus
25 (e.g., pressure, impact, heat, vibration, light, or the like) or a chemical stimulus (e.g., contact with a liquid) and the contained repellent 40 is released.

[0060]

When the repellent 40 is contained in the microcapsules, most of
30 the repellent 40 is retained in the diaper 1 until putting on the diaper 1. While the diaper 1 is put on, the diaper 1 is rubbed by the movement of the wearer or the user rubs or holds the region in which the repellent 40 is provided to cause a physical stimulus. Thus, the microcapsule is broken and the
35 repellent 40 is released to the outside of the diaper 1. However,

the repellent 40 need not be contained in the microcapsule.

[0061]

As a method for providing the repellent 40 in the diaper 1, there is provided a method of applying a liquid in which microcapsules
5 containing the repellent 40 are dispersed to the diaper 1. It is preferable that the liquid (dispersion medium) in which the microcapsules are dispersed does not dissolve and swell the microcapsules and which retains the function of the repellent 40. Examples of a coating method includes various known methods such
10 as a spraying method, a roller coating method, and a brush coating method. Further, as another method for providing the repellent 40 in the diaper 1, for example, the following methods are provided: to immerse a material constituting the diaper 1 in a dispersion liquid (solution) of the repellent 40; to knead the
15 repellent 40 into the fibers of the material constituting the diaper 1; or to mix the particulate repellent 40 into the fibers of the material constituting the diaper 1.

[0062]

As described above, the diaper 1 is an underpants-shaped diaper
20 in which two lateral side portions of each of the pair of waist portions 1F and 1B are joined by the pair of joining portions 2. As a result of intensive research, the applicant has found that, the underpants-shaped diaper is mainly worn by infants who exceed several months and are active in crawling and walking, and they
25 are more likely to be bitten by insects on their legs (particularly, thighs and shins) rather than their faces.

[0063]

Therefore, in the diaper 1, the insect repellent 40 is provided in the lower region 1FL or 1BL of at least either one waist
30 portion of the pair of waist portions 1F and 1B. In the diaper 1 of the first embodiment, as shown in FIGS. 4 and 5, the repellent 40 is provided in the lower region 1FL of the front waist portion 1F. That is, the repellent 40 is provided in a portion of the front exterior member 20 or in a portion of the
35 absorbent main body 10, which are positioned in the lower region

1FL of the front waist portion 1F.

[0064]

In such a case, the repellent 40 is provided in portions of the diaper 1 that are close to the wearer's legs, compared with the case where the repellent 40 is provided only in the upper regions 1FU and 1BU of the waist portions 1F and 1B, for example. Therefore, the repellent 40 is released around the wearer's legs, making it possible to prevent the wearer's legs from being bitten by insects. That is, the wearer of the underpants-shaped diaper 1 whose legs are likely to be bitten by insects can be effectively prevented from being bitten by insects. In addition, in hot weather, in which the infants are likely to be bitten by insects, infants often wear short pants. Therefore, by providing the repellent 40 in the lower regions 1FL and 1BL of the waist portions 1F and 1B, the repellent 40 becomes likely to be released to the outside from the leg opening portions of the clothing, making it possible to enhance the insect repellent effect. In addition, an infant may wear clothing in which the top and the bottom are connected, such as a baby romper. Even in this case, since the repellent 40 is provided in the lower regions 1FL and 1BL of the waist portions 1F and 1B, the repellent 40 is less likely to remain in the inside of the clothing, and is likely to be released to the outside from the leg opening portions of the clothing.

[0065]

Specifically, as shown in FIG. 3, the repellent 40 is provided on (applied to) the non-skin-side surface of the non-skin-side sheet 22, which is a portion of the front exterior member 20 that is positioned in the lower region 1FL of the front waist portion 1F. As described above, the repellent 40 is provided in a portion of the diaper 1 located further on the non-skin side, and therefore the repellent 40 is likely to be released to the outside of the diaper 1, and thus the insect repellent effect can be enhanced.

[0066]

However, the configuration is not limited to the above, and the repellent 40 may be provided in another portion positioned in the lower region 1FL of the front waist portion 1F. For example, the repellent 40 may be provided on the skin-side surface of the non-skin-side sheet 22 included in the front exterior member 20, or in the skin-side sheet 21, or in the print sheet 24. Further, the repellent 40 may be provided in the absorbent core 12, the back sheet 13, or the exterior sheet 14, which are included in the absorbent main body 10. Further, the number of materials in which the repellent 40 is provided is not limited to one, and a plurality of materials may be used.

[0067]

Further, it is sufficient that at least a part of the repellent 40 is provided in the lower regions 1F and 1B of the waist portions 1F and 1B, and also it is acceptable that the repellent 40 is provided in the upper regions 1FU and 1BU. However, it is preferable that in the waist portion where the repellent 40 is provided (in this example, the front waist portion 1F), the basis weight (g/m^2) of the repellent 40 in the lower region (1FL) is greater than the basis weight (g/m^2) of the repellent 40 in the upper region (1FU). That is, it is preferable that the value obtained by dividing the total weight (g) of the repellent 40 provided in the upper region (1FU) by the area (m^2) of the upper region (1FU) in a stretched state is larger than the value obtained by dividing the total weight (g) of the repellent 40 provided in the lower region (1FL) by the area (m^2) of the lower region (1FL) in a stretched state.

[0068]

In such a case, a larger amount of the repellent 40 is provided in portions of the diaper 1 that are close to the wearer's legs, making the repellent 40 likely to be released around the wearer's legs. Therefore, the wearer of the underpants-shaped diaper 1 whose legs are likely to be bitten by insects can be more effectively prevented from being bitten by insects.

[0069]

Note that confirmation of whether or not the repellent 40 is provided in the lower regions 1FL and 1BL of the waist portions 1F and 1B can be performed by a well-known method. First, cutting out the waist portions 1F and 1B to be measured (absorbent main body 10 + exterior members 20 and 30) from the diaper 1, the cut-out waist portions 1F and 1B are further divided into two upper and lower parts, forming samples of the lower regions 1FL and 1BL. The components of the samples are analyzed using, for example, a gas chromatography device (7890B manufactured by Agilent Technologies, Inc., or an equivalent device), and this makes it possible to confirm whether or not the samples of the lower regions 1FL and 1BL contain a component having an insect repellent effect (repellent 40). Alternatively, in the case where the repellent 40 is contained in the microcapsules, the presence or absence of the microcapsule (repellent 40) can be confirmed by observing the samples in the lower regions 1FL and 1BL with an electron microscope.

[0070]

Further, by using the gas chromatography device, it is possible to carry out the comparison of the basis weight (g/m^2) of the repellent 40 between in the upper regions 1FU and 1BU and in the lower regions 1FL and 1BL.

(1) First, cutting out the waist portions 1F and 1B to be measured (absorbent main body 10 + exterior members 20 and 30) from the diaper 1, the cut-out waist portions 1F and 1B are separated into the lower regions 1FL and 1BL and the upper regions 1FU and 1BU. The lower regions 1FL and 1BL and the upper regions 1FU and 1BU, which have been separated, are further cut into fine samples having a predetermined size (e.g., 20 mm in the vertical direction $\times$ 40 mm in the lateral direction).

(2) Next, the microcapsules are dissolved by means such as immersing the finely cut samples in water, and a mixture of the repellent 40 (a component having an insect repellent effect) and other components (a solvent or the like) are extracted from the samples.

(3) For each sample, the components of the mixtures extracted from the sample is analyzed using the gas chromatography apparatus.

Then, for each sample, the peak value of the repellent 40 (a component having an insect repellent effect) and the peak value of the other component (the solvent or the like) are acquired, and the ratio of the peak value of the repellent to the peak value of the other component (the peak value of the repellent/the peak value of the other component) is calculated. The ratio is considered to correspond to the amount of the repellent 40 located in the sample.

(4) Finally, calculating the average value of the ratios of the repellent (the peak value of the repellent/the peak value of other components $\cong$ the amount of the repellent 40) of the plurality of samples constituting the upper regions 1FU and 1BU, this average value is considered corresponding to the basis weight of the repellent 40 in the upper regions 1FU and 1BU. Further, calculating the average value of the ratios of the repellents (the peak value of the repellent/the peak value of other components $\cong$ the amount of the repellent 40) of the plurality of samples constituting the lower regions 1FL and 1BL, and this average value is considered corresponding to the basis weight of the repellent 40 in the lower regions 1FL and 1BL. These average values are compared.

Further, the basis weight of the repellent 40 in the front waist portion 1F and the basis weight of the repellent 40 in the back waist portion 1B, which will be described later, can be compared in the same manner.

[0071]

Here, in the diaper 1, the region where the repellent 40 is provided is also referred to as a "repellent arrangement region 41". The repellent arrangement region 41 in the diaper 1 can be identified using the same method as described above. That is, it is preferable that the repellent arrangement region 41 is identified as follow: by cutting the diaper 1 into fine samples,

analyzing the components of each sample using a gas chromatography device, and confirming whether or not the repellent 40 is included. Further, the repellent arrangement region 41 may be identified by observing the finely cut samples
5 with an electron microscope and confirming the presence or absence of the microcapsules (repellent 40).

[0072]

In the diaper 1 of the first embodiment, as shown in FIG. 5, three repellent arrangement regions 41 are provided side by side
10 with spaces in the vertical direction, the repellent arrangement regions 41 being elongated in the lateral direction rather than in the vertical direction of the diaper 1 and extending continuously in the lateral direction from the left end to the right end of the front waist portion 1F.

15 [0073]

Therefore, in the diaper 1, in the waist portions 1F and 1B where the repellent 40 is provided (in this example, the front waist portion 1F), at least a part of the repellent 40 is provided in a region where the absorbent core 12 is positioned. That is, in
20 the unfolded state of the diaper 1, the absorbent core 12 and the repellent arrangement region 41 at least partially overlap each other in the thickness direction of the diaper 1.

[0074]

In this case, the repellent 40 provided at a position that overlaps the absorbent core 12 (particularly, a portion of the
25 repellent 40 that is provided on the non-skin side with respect to the absorbent core 12) is less likely to pass through the absorbent core 12, which has a high density and a large thickness. Therefore, the repellent 40 is more likely to be released to the
30 outside of the diaper 1, rather than to be released toward the skin side. This enhances the insect repellent effect of the diaper 1.

[0075]

Further, the front exterior member 20 and the back exterior
35 member 30 respectively have the waist elastic members 23 and 33

in the waist portions 1F and 1B. In addition, each of the waist portions 1F and 1B has a non-stretchable region NS where the waist elastic members 23 (33) are not capable of stretching, in the region where the absorbent main body 10 is positioned. This can prevent the generation of a space between the diaper 1 and the wearer due to contraction of the absorbent main body 10 (absorbent core 12) caused by the waist elastic members 23 and 33. Note that, in the drawing, there are shown only portions of the waist elastic members 23 and 33 where stretchability is exhibited. But, in the non-stretchable region NS, there may be portions of the waist elastic members 23 and 33 where stretchability is not exhibited.

[0076]

It is preferable that at least a part of the repellent 40 is provided in the non-stretchable regions NS of the waist portions 1F and 1B where the repellent 40 is provided (in this example, the front waist portion 1F). This makes it possible to prevent the repellent 40 from being covered with wrinkles generated in the waist portions 20 and 30 due to the waist elastic members 23 and 33, making the repellent 40 likely to be released to the outside of the diaper 1. This enhances the insect repellent effect of the diaper 1. However, the configuration is not limited thereto. The repellent 40 need not be provided in the non-stretchable region NS.

[0077]

Further, in the case where the repellent 40 is contained in a plurality of microcapsules, as shown in FIGS. 1 and 4, it is preferable that the waist portions 1F and 1B where the repellent 40 is provided (in this example, the front waist portion 1F) have a marked portion 50 indicating the region where the repellent 40 is provided. This makes the user likely to easily and correctly recognize the region where the repellent 40 is provided.

[0078]

The marked portion 50 of the present embodiment is formed by printing in a color (e.g., green or yellow) different from the

surrounding color (e.g., white). Specifically, the marked portion 50 printed on the print sheet 24 can be visually recognized from the outside of the diaper 1 through the non-skin-side sheet 22. In addition, the marked portion 50 shown in FIG. 4 includes text "AntiMos" indicating that the diaper 1 has an insect (mosquito) repellent effect, and text "Rub here" indicating an operation for breaking the microcapsules. Therefore, the user who has visually recognized the marked portion 50 can break the microcapsules when putting on the diaper 1 or at a desired timing during usage, making it possible to release a larger amount of the repellent 40.

[0079]

However, the marked portion 50 is not limited to the example shown in FIG. 4, and may be a pattern or a plain colored region, for example. Further, the material on which the marked portion 50 is printed is not limited to the print sheet 24, and the marked portion 50 may be printed on other materials constituting the diaper 1 (a nonwoven fabric sheet or the like). Further, the marked portion 50 may be formed by a compressed portion (unevenness) in which the diaper 1 is compressed in the thickness direction. In addition, the marked portion 50 may be formed by coloring the waist elastic members 23 and 33 or by coloring the microcapsules (repellent 40 itself), so as to have a different color from the color of the surroundings.

[0080]

It is preferable that, in the front-back direction, the marked portion 50 overlap the non-stretchable region NS of the waist portions 1F and 1B that is located on an identical side to the marked portion 50 in the front-back direction, and at least a part of the repellent 40 is provided in the overlapped region. That is, in the unfolded state of the diaper 1, the non-stretchable region NS, the marked portion 50, and the repellent arrangement region 41 may at least partially overlap each other in the thickness direction of the diaper 1.

[0081]

In such a case, the marked portion 50 is positioned in the non-stretchable region NS where wrinkles due to the waist elastic members 23 and 33 are less likely to be generated, and therefore the visibility of the marked portion 50 is enhanced. Further, since the absorbent main body 10 (non-stretchable region NS) and the repellent arrangement region 41 overlap each other, the absorbent core 12, which has a high stiffness, serves as a table, making the user likely to rub the repellent arrangement region 41. Accordingly, the microcapsules are efficiently broken, making the repellent 40 likely to be released to the outside of the diaper 1. However, the configuration is not limited thereto. The marked portion 50 and the repellent 40 need not be provided in the non-stretchable region NS.

[0082]

Further, as shown in FIG. 5, a plurality of repellent arrangement regions 41 are provided side-by-side in the vertical direction of the diaper 1 with a space, in the front waist portion 1F. In this case, the repellent 40 is not concentrated on a part of the diaper 1, and therefore the repellent 40 can be provided in a wide range in the vertical direction of the diaper 1 while suppressing the increase of the amount of the repellent 40 provided in the diaper 1. Therefore, an insect repellent effect is produced in a wide range in the vertical direction of the diaper 1. However, the configuration is not limited thereto. The repellent arrangement regions 41 may be provided without any space in the vertical direction.

[0083]

In the present embodiment, the width (the vertical length) of one repellent arrangement region 41 is set to about 5 mm, and the vertical space between the repellent arrangement regions 41 is set to 2.5 mm. Therefore, the repellent 40 is provided in a region having a vertical length of approximately 20 mm. That is, since the repellent 40 is provided in the region of the length of the user's fingertip, the user easily rubs the repellent arrangement region 41 with the pad of the finger.

[0084]

Further, by arranging the plurality of repellent arrangement regions 41 with a space, it makes it easier likely to adjust the number of breaks of the microcapsules, ie, the amount of the repellent 40 released, depending on the width of the region rubbed by the user. In the marked portion 50 (FIG. 1) of the present embodiment, a region between the repellent arrangement regions 41 is also colored similarly to the repellent arrangement regions 41. However, the marked portion 50 may also have colored regions which are spaced apart in the vertical direction in accordance with the repellent arrangement regions 41. In such a case, if the user desires to enhance the insect repellent effect, the user can rub three colored regions (repellent arrangement regions 41). If the user desires to obtain a moderate insect repellent effect, the user can rub one colored region (repellent arrangement region 41). In this manner, the user easily adjust the amount of the repellent 40 released.

[0085]

In addition, the repellent arrangement region 41 of the first embodiment is provided extending continuously in the lateral direction in the lower region 1FL of the front waist portion 1F, from a position that overlaps the left joining portion 2 in the front-back direction (thickness direction) to a position that overlaps the right joining portion 2 in the front-back direction. Therefore, the repellent 40 is provided in the portions of the diaper 1 that are respectively close to the pair of leg openings LH, making the repellent 40 likely to be released in the vicinity of two legs of the wearer. Further, the repellent arrangement region 41 can overlap the absorbent main body 10 and/or the absorbent core 12. Further, since the repellent 40 is provided in the pair of joining portions 2, the repellent 40 is provided in the vicinity of the apex portions of the leg openings LH of the diaper 1, that is, the portions where the legs are most exposed. Accordingly, it is possible to more effectively prevent the wearer's legs from being bitten by insects.

[0086]

Further, in a manufacturing step of the diaper 1, the pair of joining portions 2 can be formed after the repellent 40 is applied to the front waist portion 1F. In this case, when forming the joining portions 2 by welding or the like, it is possible to rupture the microcapsules that are located at the positions in which the joining portions 2 are formed. Therefore, the diaper 1 can be enclosed in a package (bag for packaging) with some of the microcapsules provided in the diaper 1 ruptured. This make the package filled with the repellent 40, making the effect of the repellent 40 likely to exhibit in the entire diaper 1. Further, the user who has opened the package can feel the repellent 40, and can recognize that the diaper 1 has an insect repellent effect. Note that, it is recommended to confirm that the microcapsules positioned in the joining portion 2 have been ruptured in the manufacturing step, by observing with an electron microscope the diaper 1 immediately after being taken out of the package. That is, the foregoing confirmation can be performed based on the fact that the number of ruptured microcapsules positioned in the joining portion 2 are larger than the number of ruptured microcapsules positioned in portions other than the joining portion 2.

[0087]

In addition, in the diaper 1 of the first embodiment, the repellent 40 is provided in the front waist portion 1F and the repellent 40 is not provided in the back waist portion 1B. Further, the diaper 1 for infants is often enclosed in a package without being folded. Therefore, it is recommended that a plurality of diapers 1 are placed and enclosed in the package with being arranged side-by-side in the thickness direction so that the front waist portion 1F of one diaper 1 and the back waist portion 1B of another diaper 1 come into contact with each other. This makes the effect of the repellent 40 provided in the front waist portion 1F of one diaper 1 likely to be applied to the back waist portion 1B of another diaper 1. Therefore, an

insect repellent effect is likely to be produced also in the back waist portion 1B of the diaper 1.

[0088]

Further, it is preferable that, in the lower regions 1FL and 1BL of the waist portions 1F and 1B, the regions where the repellent 40 is provided are positioned above the lower end (1Fa) of the waist portions 1F and 1B (in this example, the front waist portion 1F), being spaced apart therefrom. Accordingly, even in the case where the lower end portions of the waist portions 1F and 1B are curled up due to the movement of the wearer's legs while the diaper 1 is put on, the repellent arrangement region 41 is less likely to be covered with the curled portion. Therefore, the repellent 40 is likely to be released to the outside more reliably, producing an insect repellent effect. However, the configuration is not limited thereto. The repellent 40 may be provided extending up to the lower ends of the waist portions 1F and 1B.

[0089]

Further, the waist portions 1F and 1B each have a stretchable region (a region excluding the non-stretchable region NS) that is capable of stretching and contracting due to the waist elastic members 23 and 33. In the waist portions 1F and 1B (in this example, the front waist portion 1F) where the repellent 40 is provided, it is preferable that a force for stretching a region having a unit length in the vertical direction by a predetermined length in the lateral direction is greater in the stretchable region in the lower regions 1FL and 1BL than in the stretchable region in the upper regions 1FU and 1BU.

[0090]

That is, it is preferable that the stretching stress of the lower regions 1FL and 1BL, where the repellent 40 is provided, is high, and it is preferable that wrinkles is likely to be generated in the lower regions 1FL and 1BL due to the waist elastic members 23 and 33. In such a case, in a natural state where the waist elastic members 23 and 33 are not stretched, that is, in an unused state of the diaper 1, the repellent arrangement region

41 is likely to be covered with wrinkles generated in the waist portions 1F and 1B. Therefore, the repellent 40 is less likely to be released before the diaper 1 is used, making likely to retain the repellent 40 in the diaper 1 until when the diaper 1 is put on.

[0091]

However, contrary to the above, a force (stretching stress) for stretching a region having a unit length in the vertical direction by a predetermined length in the lateral direction may be lower in the stretchable region in the lower regions 1FL and 1BL than in the stretchable region in the upper region 1FU and 1BU. That is, a configuration is acceptable in which wrinkles are less likely to be generated in the lower regions 1FL and 1BL in which the repellent 40 is provided. This makes the repellent arrangement region 41 less likely to be covered with wrinkles while the diaper 1 is put on, and consequently the repellent arrangement region 41 is exposed to the outside. Therefore, the repellent 40 is likely to be released to the outside.

[0092]

Further, a force (stretching stress) for stretching a region having a unit length in the vertical direction by a predetermined length in the lateral direction is set to be greater in the stretchable region of one waist portion of the pair of waist portions 1F and 1B than in the stretchable region of the other waist portion. In this case, it is recommended that the basis weight of the repellent 40 in the one waist portion (in this example, the front waist portion 1F) is greater than the basis weight of the repellent 40 in the other waist portion (in this example, the back waist portion 1B).

[0093]

That is, a larger amount of the repellent 40 is preferably arranged in the waist portion having a high stretching stress. In such a case, in a state before use of the diaper 1, a region where a larger amount of the repellent 40 is provided is likely to be covered with wrinkles, and the repellent 40 is less likely

to be released. Therefore, a larger amount of the repellent 40 is likely to be retained in the diaper 1 until when the diaper 1 is put on.

[0094]

5 However, conversely to the above, the basis weight of the repellent 40 in one waist portion of the pair of waist portions 1F and 1B having a high stretching stress (in this example, the back waist portion 1B) may be smaller than the basis weight of the repellent 40 in the other waist portion (in this example,
10 the front waist portion 1F). This makes the region where a larger amount of the repellent 40 is provided less likely to be covered with wrinkles while the diaper 1 is put on, and consequently the region is exposed to the outside. Therefore, a larger amount of the repellent 40 is likely to be released.

15 [0095]

Note that, in order to adjust the stretching stresses of the waist portions 1F and 1B, it is recommended to adjust the number of the waist elastic members 23 and 33, the thickness of the string-like waist elastic members 23 and 33, and the stretch
20 factor at the time of fixing the waist elastic members 23 and 33 to the sheet.

[0096]

Further, comparison of the stretching stress between the upper regions 1FU and 1BU and the lower regions 1FL and 1BL can be
25 performed by the following method using a tensile tester.

(1) First, the absorbent main body 10 and the exterior members 20 and 30 are separated from each other by cold spray or the like, and the waist portions 1F and 1B to be measured are taken out from the exterior members 20 and 30. The taken-out waist
30 portions 1F and 1B (exterior members 20 and 30) are divided into two upper and lower parts, preparing samples for the upper regions 1FU and 1BU, and samples for the lower regions 1FL and 1BL. Note that, in the case where the waist portions 1F and 1B have the non-stretchable region NS, the samples are separated
35 into a plurality of rectangular portions so that the samples do

not contain the non-stretchable region NS. For example, in the case shown in FIG. 5, a sample of the upper region 1FU is separated into three samples: a region located above the non-stretchable region NS; a region located on the left side of the non-stretchable region NS; and a region located on the right side of the non-stretchable region NS. Further, a sample of the lower region 1BU is separated into two samples: a region located on the left side of the non-stretchable region NS; and a region located on the right side of the non-stretchable region NS.

(2) Next, for each sample, its two end portions corresponding to the lateral direction of the diaper 1 are held by chucks of the tensile tester. The chuck-to-chuck distance is adjusted so that the sample is in a state where the sample is not loosened and stretched. Then, the chuck-to-chuck distance is expanded by the tensile tester at a predetermined speed, and the load at a time when the sample has stretched by a predetermined length in the lateral direction is acquired.

(3) Next, the vertical length of each sample is measured. The load (N) acquired in the foregoing step (2) is converted into a value (N/mm) per unit width (mm) in the vertical direction. The obtained values are defined as the stretching stress of the upper regions 1FU and 1BU and the stretching stress of the lower regions 1FL and 1BL.

Note that, in the case where samples of the upper regions 1FU and 1BU or samples of the lower regions 1FL and 1BL are separated in order to remove the non-stretchable region NS, the stretching stress (N/mm) for each separated sample is individually calculated. The average values thereof are defined as the stretching stress of the upper regions 1FU and 1BU and the stretching stress of the lower regions 1FL and 1BL.

[0097]

Further, comparison of the stretching stress between the front waist portion 1F and the back waist portion 1B can be performed by the above-described method using the tensile tester. It is recommended to prepare samples without dividing the waist

portions 1F and 1B taken out from the diaper 1 (exterior members 20 and 30) into two upper and lower parts.

[0098]

Modified Examples of First Embodiment

5 FIGS. 6A and 6B are each an explanatory diagram illustrating the repellent arrangement region 41 of a modified example of the first embodiment. For example, as shown in FIG. 6A, the following configurations are also acceptable: the repellent 40 is provided in both the lower region 1FL of the front waist portion 1F and the lower region 1BL of the back waist portion 1B; or the region where the repellent 40 is provided (application pattern) is different between the front side and the back side. Further, as shown in FIG. 6B, the following configuration is also acceptable: the repellent 40 is provided in the lower region 1BL of the back waist portion 1B and is neither provided in the lower region 1FL of the front waist portion 1F nor in the entire front waist portion 1F. Further, although not shown, in the case where the repellent 40 is provided in the lower region 1FL or 1BL of at least either one of the pair of waist portions 1B and 1F, the repellent 40 may be provided in the upper region 1FU or 1BU in the other waist portion. Further, although not shown, the repellent arrangement regions 41 in the lower regions 1FL and 1BL of the waist portions 1F and 1B may extend continuously in the vertical direction up to the upper regions 1FU and 1BU or up to the extension portion 34 on the lower side.

[0099]

In addition, in the diaper 1 shown in FIGS. 4 and 5, the repellent arrangement regions 41 are provided extending continuously in the lateral direction, but the pattern (application pattern) of the repellent arrangement regions 41 is not limited thereto. For example, as shown in FIG. 6A, a plurality of regions where the repellent 40 is provided may be provided side-by-side in the lateral direction with a space. In this case, the repellent 40 can be provided in a wide range in the lateral direction of the diaper 1, while suppressing the increase of the amount of the

repellent 40 provided in the diaper 1. Therefore, an insect repellent effect is produced in a wide range in the lateral direction of the diaper 1.

[0100]

5 Further, in the case where the repellent arrangement regions 41 are spaced apart in the lateral direction as shown in the front side in FIG. 6A, it is easier to adjust the release location of the repellent 40. For example, in the case where the user desires to enhance the insect repellent effect of one of the left and
10 right legs of the wearer, the user can rub the repellent arrangement region 41 that is close to the one of the legs. Further, in the case where a plurality of repellent arrangement regions 41 are arranged side-by-side in the lateral direction with a narrow space as shown in the back side in FIG. 6A, it is
15 easier to adjust the area of the region rubbed by the user (the number of repellent arrangement regions 41), making it easier to adjust the amount of the repellent 40 released.

[0101]

Further, as shown in FIG. 6A, in the waist portions 1F and 1B
20 where the repellent 40 is provided, the repellent 40 may be provided in a region where the absorbent core 12 is not positioned. That is, a configuration is acceptable in which, in an unfolded state of the diaper 1, the absorbent core 12 and the repellent arrangement region do not overlap in the thickness direction of
25 the diaper 1. This makes it possible to prevent the odor of the excrement absorbed by the absorbent core 12 from being mixed with the repellent 40, reducing the effect of the repellent 40, and to prevent the generation of an unpleasant odor.

[0102]

30 Further, as shown in FIG. 6A, a configuration is acceptable in which, the left end 40a of the region where the repellent 40 is provided is positioned on the right (inner) side with respect to the right end 2a of the left joining portion 2, and the right
end 40b of the region where the repellent 40 is provided is
35 positioned on the left (inner) side with respect to the left end

2b of the right joining portion 2. That is, it is possible for the repellent 40 not to be provided in the joining portion 2. In such a case, the joining portion 2 are highly stiff and likely to protrude while the diaper 1 is put on, and therefore the repellent 40 provided in the joining portion 2 can be prevented from coming into strong contact with the clothing of the wearer and being attached to the clothing.

[0103]

Further, as shown in FIG. 6B, in the case where the back exterior member 30 has an extension portion 34 that extends downward from the back waist portion 1B, the repellent 40 may be provided in the extension portion 34. In such a case, the repellent 40 is further provided in a portion of the diaper 1 that is close to the wearer's legs, making it possible to effectively prevent the wearer's legs from being bitten by insects. Note that, although not shown, the following configuration is acceptable: the front exterior member 20 has an extension portion that extends downward from the front waist portion 1F and the repellent 40 is provided in the extension portion.

[0104]

Second Embodiment

FIGS. 7A, 7B, and 8 are each an explanatory diagram illustrating the repellent arrangement region 41 of an second embodiment. In the diaper 1 of the second embodiment, the repellent 40 is provided in at least a part of the circumferential edge portion along each of the leg openings 1L. In such a case, the repellent 40 is provided in a portion of the diaper 1 that is close to the wearer's legs. Therefore, the repellent 40 is released around the wearer's legs, and the wearer of the underpants-shaped diaper 1 whose legs are likely to be bitten by insects can be effectively prevented from being bitten by insects.

[0105]

Also, in the diaper 1 shown in FIGS. 4 and 5 (a three-piece-type diaper in which the repellent 40 is provided in the lower region 1FU of the front waist portion 1F, which does not have an

extension portion), the repellent 40 is provided in a part of the circumferential edge portion along the leg opening 1L. That is, some diapers 1 of the first embodiment are included in the diapers 1 of the second embodiment.

5 [0106]

Further, as shown in FIG. 7A, the diaper 1 may be configured such that the repellent 40 is provided in the lower region 1FL or 1BL of at least either one of the pair of waist portions 1F and 1B (in this example, the lower region 1FL of the front waist portion 10 1F) and in the side portions of the absorbent main body 10. That is, in the diaper 1 of the first embodiment, the repellent 40 may be provided in the side portions of the absorbent main body 10. In this case, since the repellent 40 is provided in a wider range of the circumferential edge portion along the leg opening 15 1L, it is possible to more effectively prevent the wearer's legs from being bitten by insects.

[0107]

Further, a configuration is acceptable in which, as shown in FIG. 7B, the repellent 40 is not provided in the lower regions 1FL and 1BL of the waist portions 1F and 1B and is provided in the 20 side portions of the absorbent main body 10. Even in this case, the repellent 40 is provided in a part of the circumferential edge portion along the leg opening 1L.

[0108]

25 Further, as shown in FIG. 8, in the two-piece-type diaper 1 formed of a single exterior member that continues from the front waist portion 1F to the back waist portion 1B, the repellent 40 may be provided in the side end portions of the exterior member 60. Even in this case, the repellent 40 is provided in a part 30 of the circumferential edge portion along the leg opening 1L.

[0109]

The above embodiments are 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 35 variously be changed or altered without departing from its gist

and encompass equivalents thereof.

REFERENCE SIGNS LIST

[0110]

- 1: diaper (underpants-shaped absorbent article), 2: joining
- 5 portion,
- 1F: front waist portion, 1B: back waist portion, 1C: crotch
- portion,
- 1FL, 1BL: lower region, 1FU, 1BU: upper region,
- 10: absorbent main body, 11: top sheet, 12: absorbent core,
- 10 13: back sheet, 14: exterior sheet, 15: leg elastic member,
- 16: leak-proof wall portion, 161: leak-proof-wall elastic member,
- 20: front exterior member, 21: skin-side sheet, 22: non-skin-
- side sheet,
- 23: waist elastic member (elastic member), 24: print sheet,
- 15 30: back exterior member, 31: skin-side sheet, 32: non-skin-side
- sheet,
- 33: waist elastic member (elastic member),
- 40: (insect) repellent, 41: repellent arrangement region,
- 50: marked portion,
- 20 LH: leg opening, BH: waist opening

CLAIMS

[Claim 1]

An underpants-shaped absorbent article having a vertical direction, a lateral direction, and a front-back direction,

5 the underpants-shaped absorbent article comprising:

a pair of waist portions; and

a crotch portion,

two lateral side portions of one of the pair of waist portions and two lateral side portions of another one of the pair of waist portions being joined in a pair of joining portions,

10 each of the waist portions having an upper region and a lower region when the waist portion in a stretched state is divided into two parts in the vertical direction, and

of the pair of waist portions , at least either one waist portion being provided with a repellent for insects, in the lower region.

[Claim 2]

The underpants-shaped absorbent article according to claim 1, wherein

20 in the waist portion where the repellent is provided,

a basis weight of the repellent in the lower region is greater than a basis weight of the repellent in the upper region.

[Claim 3]

The underpants-shaped absorbent article according to claim 1 or 2, wherein

25 the underpants-shaped absorbent article further comprises:

an absorbent main body; and

an exterior member that is arranged on a non-skin side with respect to the absorbent main body,

30 the exterior member has an elastic member in the waist portion, the elastic member stretching and contracting in the lateral direction,

each of the waist portions has a non-stretchable region where the elastic member is not capable of stretching, in a region 35 where the absorbent main body is positioned, and

at least a part of the repellent is provided in the non-stretchable region of the waist portion.

[Claim 4]

The underpants-shaped absorbent article according to claim 3,
5 wherein

the repellent is contained in a plurality of microcapsules,
the waist portion where the repellent is provided has a marked
portion that indicates a region where the repellent is provided,
and

10 at least a part of the repellent is provided in a region where
the marked portion and the non-stretchable region located on an
identical side in the front-back direction to the marked portion
overlap each other in the front-back direction.

[Claim 5]

15 The underpants-shaped absorbent article according to any one of
claims 1 to 4, wherein

the underpants-shaped absorbent article further comprises:

an absorbent core that absorbs excrement,

in the waist portion, at least a part of the repellent is
20 provided in a region where the absorbent core is positioned.

[Claim 6]

The underpants-shaped absorbent article according to any one of
claims 1 to 5, wherein

a plurality of regions where the repellent is provided are
25 provided side-by-side in the vertical direction with a space.

[Claim 7]

The underpants-shaped absorbent article according to any one of
claims 1 to 6, wherein

a plurality of regions where the repellent is provided are
30 provided side-by-side in the lateral direction with a space.

[Claim 8]

The underpants-shaped absorbent article according to any one of
claims 1 to 4, wherein

the underpants-shaped absorbent article further comprises:

35 an absorbent core that absorbs excrement,

in the waist portion, the repellent is provided in a region where the absorbent core is not positioned.

[Claim 9]

The underpants-shaped absorbent article according to any one of
5 claims 1 to 6, wherein

in the lower region of the waist portion,

a region where the repellent is provided extends continuously in the lateral direction from a position that overlaps a left joining portion in the front-back direction to a
10 position that overlaps a right joining portion in the front-back direction.

[Claim 10]

The underpants-shaped absorbent article according to any one of claims 1 to 8, wherein

15 a left end of a region where the repellent is provided is positioned on a right side with respect to a right end of the joining portion located on a left side, and

a right end of the region where the repellent is provided is positioned on the left side with respect to a left end of the
20 joining portion located on the right side.

[Claim 11]

The underpants-shaped absorbent article according to any one of claims 1 to 10, wherein

the underpants-shaped absorbent article further comprises:

25 an absorbent main body; and

an exterior member that is arranged on a non-skin side with respect to the absorbent main body,

in at least either one waist portion of the pair of waist portions,

30 the exterior member has an extension portion that extends downward from the at least either one waist portion, and

the repellent is also provided in the extension portion.

[Claim 12]

The underpants-shaped absorbent article according to any one of
35 claims 1 to 11, wherein

in the lower region of the waist portion,

a region where the repellent is provided is positioned above a lower end of the waist portion, being spaced apart from the lower end.

5 [Claim 13]

The underpants-shaped absorbent article according to any one of claims 1 to 12, wherein

each of the waist portions has a stretchable region that is capable of stretching and contracting due to an elastic member,

10 the elastic member stretching and contracting in the lateral direction, and

in the waist portion where the repellent is provided,

a force for stretching a region having a unit length in the vertical direction by a predetermined length in the lateral
15 direction is greater in the stretchable region in the lower region than in the stretchable region in the upper region.

[Claim 14]

The underpants-shaped absorbent article according to any one of claims 1 to 13, wherein

20 each of the waist portions has a stretchable region that is capable of stretching and contracting due to an elastic member,

the elastic member stretching and contracting in the lateral direction,

a force for stretching a region having a unit length in the
25 vertical direction by a predetermined length in the lateral direction is greater in the stretchable region of one waist portion of the pair of waist portions than in the stretchable region of the other waist portion, and

a basis weight of the repellent in the one waist portion is
30 greater than a basis weight of the repellent in the other waist portion.

[Claim 15]

The underpants-shaped absorbent article according to any one of claims 1 to 13, wherein

35 each of the waist portions has a stretchable region that is

capable of stretching and contracting due to an elastic member,
the elastic member stretching and contracting in the
lateral direction,

5 a force for stretching a region having a unit length in the
vertical direction by a predetermined length in the lateral
direction is greater in the stretchable region of one waist
portion of the pair of waist portions than in the stretchable
region of the other waist portion, and

10 a basis weight of the repellent in the one waist portion is
smaller than a basis weight of the repellent in the other waist
portion.

[Claim 16]

An underpants-shaped absorbent article having a vertical
direction, a lateral direction, and a front-back direction,

15 the underpants-shaped absorbent article comprising:

a pair of waist portions; and

a crotch portion,

the underpants-shaped absorbent article having a waist
opening and a pair of leg openings formed therein, and

20 an insect repellent being provided in at least a part of a
circumferential edge portion along each of the leg openings.