

Description
DISPOSABLE WORN ARTICLE

Technical Field

[0001]

The present invention relates to a disposable worn article having a fixing member configured to connect in an attachable and detachable manner a front waistline region and a back waistline region of a worn article body.

Background Art

[0002]

Conventionally, an open-type disposable diaper has been provided as a disposable worn article (for example, see Patent Literature 1). The open-type disposable diaper has a worn article body and a fixing member, in which the worn article has a front waistline region arranged at the front waistline of a wearer and a back waistline region arranged at the back waistline of the wear, and the fixing member is joined to outer ends in a widthwise direction of the worn article body to connect the front waistline region and the back waistline region of the worn article body in an attachable and detachable manner.

[0003]

The disposable diaper according to Patent Literature 1 is provided in a state where the worn article body is spread out without connecting the front waistline region and the back waistline region by means of the fixing member. In this state, the fixing member is folded over toward the inner side in the widthwise direction along the both ends in the widthwise direction of the worn article body.

[0004]

In a case of wearing the disposable diaper thus configured, after the folded fixing member is spread out and the waistline of the wearer is covered with the back waistline region and the front waistline region of the worn article body, the back waistline region and the front waistline region are connected to each other by means of the fixing member.

Citation List

Patent Literature

[0005]

Patent Literature 1: Japanese Unexamined Patent Publication No. 2000-140018 (Fig. 1, etc.)

Summary of Invention

[0006]

However, the aforementioned disposable diaper described in Patent Literature 1 has the following problems.

[0007]

Since the fixing member is folded over toward the inner side in the widthwise direction along the both ends in the widthwise direction of the worn article body, the fixing member has holding patterns along the longitudinal direction, in positions adjacent to the both ends in the widthwise direction of the worn article body. On condition that the folding patterns are formed in the positions adjacent to the both ends in the widthwise direction of the worn article body, in a state where the disposable diaper is installed on the wearer, there is a possibility that components such as the fixing member and the both ends in the widthwise direction of the worn article body are floated from the body of the wearer. This decreases the fitting ability and possibly causes a problem such as displacement of the disposable diaper or leakage of bodily fluid from a gap between the disposable diaper and the body.

[0008]

Therefore, an object of the present invention is to provide a disposable worn article which is improved in the fitting ability with respect to a wearer by arranging along a body, both ends in a widthwise direction of an worn article body, a fixing member, and the like.

[0009]

To solve the problem described above, a disposable worn article (disposable diaper 1) comprises an worn article body including a liquid-permeable topsheet (topsheet 110) arranged at a skin contact surface side with respect to a wearer; a liquid-impermeable backsheet (exterior sheet 120) arranged at a non-skin contact surface side with respect to the wearer; and an absorber (absorber 130) provided between the topsheet and the backsheet, the worn article body (worn article body 2) having a front waistline region arranged at a front waistline of the wearer, and a back waistline region arranged at a back waistline of the wearer; and a pair of fixing members (fixing members 40) joined to both ends in a widthwise direction of the worn article body through joining units, and configured to connect the front waistline region and the back waistline region in an attachable and detachable manner, wherein: the worn article body is folded over toward an inner side in the widthwise direction based on a pair of reference folding lines (reference folding line FL1) positioned at inner sides in the widthwise direction with respect to the joining units (joining units 44) configured to join the worn article body and the fixing members; the pair of fixing members are arranged so as to be separated from each other in the widthwise direction in a state

in which the worn article body is folded over based on the reference folding lines; and the reference folding lines are formed in only the worn article body without being formed in the fixing members.

Brief Description of Drawings

[0010]

[Fig. 1] Fig. 1 is a plan view for showing a folded state of a disposable diaper according to a first embodiment.

[Fig. 2] Fig. 2 is a plan view of a spread-out state of the disposable diaper shown in Fig. 1.

[Fig. 3] Fig. 3 is an assembly drawing of the disposable diaper shown in Fig. 1.

[Fig. 4] Fig. 4 is a cross-sectional view taken along the line A-A' shown in Fig. 1.

[Fig. 5] Fig. 5 is a cross-sectional view taken along the line B-B' shown in Fig. 1.

[Fig. 6] Fig. 6 is a plan view for schematically showing a step of manufacturing the disposable diaper according to the first embodiment.

[Fig. 7] Fig. 7 is a plan view for schematically showing a folded mode of the disposable diaper according to the first embodiment.

[Fig. 8] Fig. 8 is a partially enlarged plan view of a disposable diaper according to a second embodiment. Fig. 8(a) shows a state in which the disposable diaper is folded back based on a reference folding line, and Fig. 8(b) shows a state in which the disposable diaper is folded back based on an inner folding line.

[Fig. 9] Fig. 9 is a cross-sectional view taken along the line C-C' shown in Fig. 8(b).

[Fig. 10] Fig. 10 is a plan view for schematically showing steps of manufacturing the disposable diaper according to the second embodiment.

[Fig. 11] Fig. 11 is a view showing a disposable diaper according to a third embodiment. Fig. 11(a) is a partially enlarged plan view showing a state in which the disposable diaper is folded back based on a reference folding line, and Fig. 11(b) is a cross-sectional view taken along the line D-D' shown in Fig. 11(a).

[Fig. 12] Fig. 12 is a partially enlarged plan view of a disposable diaper according to a fourth embodiment. Fig. 12(a) shows a state in which the disposable diaper is folded back based on a reference folding line, and Fig. 12(b) shows a state in which the disposable diaper is folded back based on an inner folding line.

[Fig. 13] Fig. 13 is a cross-sectional view taken along the line E-E' shown in Fig. 12(b).

Description of Embodiments

[0011]

(Disposable Diaper According to First Embodiment)

A disposable diaper as a disposable worn article according to a first embodiment is explained with reference to drawings. In the following description of the drawings, the same or similar reference numerals are used to designate the same or similar parts. It will be appreciated that the drawings are schematically shown and the ratio and the like of each dimension are different from the real ones.

[0012]

For example, the following drawings show, for the convenience of explanation, a state where a disposable diaper 1 is not stretched by stretching force of elastic members. However, the actual disposable diaper 1 is partially stretched by means of first and second elastic members to be described later.

[0013]

A specific dimension should be determined in view of the following description. Further, among the drawings, the respective dimensional relations or ratios may naturally differ. Yet further, the same reference numerals have been used for configurations having the same operation and effect while omitting the detailed explanation.

[0014]

Figs. 1 and 2 are plan views of the disposable diaper 1 according to the first embodiment. Fig. 1 shows a state in which the disposable diaper 1 is folded back based on a reference folding line FL1 to be described later. Fig. 2 shows a spread-out state. Fig. 3 shows an assembly drawing of the disposable diaper 1 shown in Fig. 1. Fig. 4 is a cross-sectional view of the disposable diaper 1 taken along the line A-A'. Fig. 5 is a cross-sectional view of the disposable diaper 1 taken along the line B-B'.

[0015]

The disposable diaper 1 includes a worn article body 2 and fixing members 40. The worn article body 2 includes an absorbent body 10, a dorsal side flap 20, and a ventral side flap 30. The worn article body 2 has a front waistline region arranged at the front waistline of a wearer, a back waistline region arranged at the back waistline of the wearer, and a crotch region arranged at the crotch portion of the wearer.

[0016]

The absorbent body 10 of the worn article body 2 configures the crotch region S3 arranged at the crotch portion of the wearer. The dorsal side flap 20 configures the back waistline region arranged at the back waistline of the wearer. The ventral side flap 30 configures the front waistline region arranged at the front waistline of the wearer.

[0017]

Note that in the present invention, the worn article body 2 is configured by the absorbent body 10, the dorsal side flap 20, and the ventral side flap 30 but there is no limitation to this configuration. The worn article body may be configured by only the absorbent body 10 without formation of the dorsal side flap 20 and the ventral side flap 30 by configuring the absorbent body 10 to have the front waistline region, the back waistline region, and the crotch region.

[0018]

The absorbent body 10 has a rectangular shape. The absorbent body 10 includes: a topsheet 110 which is arranged at a wearer side and has a liquid permeability; an exterior sheet 120 as a backsheet which is arranged at a clothing side and has a liquid impermeability; an absorber 130 which is arranged between the topsheet 110 and the exterior sheet 120; and sidesheets 141, 142 which is provided at outer sides in a widthwise direction of the absorber 130.

[0019]

The topsheet 110 is not particularly limited as long as the topsheet 110 is a sheet-like material having a structure that allows liquids to pass through, such as a nonwoven fabric, a woven fabric, a perforated plastic sheet, and a mesh sheet. As a material for a woven fabric and a nonwoven fabric, both of a natural fiber and a chemical fiber can be used.

[0020]

Examples of the natural fiber include cellulose such as ground pulp and cotton. Examples of the chemical fiber include regenerated cellulose such as rayon and fibril rayon, semisynthetic cellulose such as acetate and triacetate, thermoplastic hydrophobic chemical fibers, and thermoplastic hydrophobic chemical fibers subjected to hydrophilization treatment. Examples of the thermoplastic hydrophobic chemical fiber include a single fiber such as polyethylene (PE), polypropylene (PP), and polyethylene terephthalate (PET), a fiber obtained by graft polymerization of polyethylene and polypropylene, and a composite fiber with a sheath-core structure and the like. For example, the topsheet 110 is point bond nonwoven fabric having a basis weight of 23 g/m².

[0021]

As a method of forming nonwoven fabric, any one of dry methods (the carding method, the spun bonding method, the melt-blowing method, the air-laid method, etc.) and wet methods may be used. Alternatively, out of the dry methods and wet methods, the plural methods may be used in combination. Moreover, thermal bonding, needle punching, and chemical bonding may be included. However, the method of forming nonwoven fabric is not particularly limited to the above methods.

[0022]

The exterior sheet 120 has a back nonwoven fabric 121 which comes in contact with the clothing, and a liquid-impermeable film (hereinafter, referred to as a back film) 122 which is positioned closer to a skin side than the back nonwoven fabric 121. The back film 122 is made from a moisture-permeable or moisture-impermeable film. The back nonwoven fabric 121 is a hydrophobic nonwoven cloth configured from an SMS nonwoven cloth (a composite nonwoven cloth of a spun bond nonwoven cloth and a melt-blown nonwoven cloth), a spun bond nonwoven cloth, or a point bond nonwoven cloth. The back nonwoven fabric 121 and the back film 122 are joined together by means of a hot-melt adhesive (hereinafter, referred to as HMA) or the like. For example, the back film 122 is a non-breathable film having a basis weight of 16 g/m^2 , and the back nonwoven fabric 121 is an SMS nonwoven cloth having a basis weight of 13 g/m^2 .

[0023]

The absorber 130 has an absorbent core 131 configured to absorb liquids, and an absorbent sheet 132. The absorbent core 131 includes hydrophilic fibers and highly absorbent polymer. Examples of the hydrophilic fiber include cellulose such as ground pulp and cotton, regenerated cellulose such as rayon and fibril rayon, semisynthetic cellulose such as acetate and triacetate, granular polymers, fibrous polymers, thermoplastic hydrophobic chemical fibers, and thermoplastic hydrophobic chemical fibers subjected to hydrophilization treatment. These can be used alone or in combination. Out of these, in consideration of lower costs and workability of forming the absorber, it is desirable that ground pulp be used. A mixture obtained by mixing the highly absorbent polymer with the hydrophilic fibers may be used.

[0024]

The absorbent core 131 is wrapped with the absorbent sheet 132. In the present embodiment, the absorbent sheet 132 is a tissue. The absorber 130 is joined to a surface at the skin side of the back film 122 by means of an HMA or the like in a state that the absorber 130 is wrapped with the topsheet 110.

[0025]

The sidesheets 141, 142 are disposed at the both sides in the widthwise direction of the topsheet 110. The sidesheets 141, 142 are joined to the back nonwoven fabric 121 at the outer sides in the widthwise direction with respect to the back film 122. The first elastic members, which are to be described later, are arranged between the sidesheets 141, 142 and the back nonwoven fabric 121.

[0026]

The sidesheets 141, 142 may be selected from similar materials to

that of the exterior sheet 120. However, in order to prevent bodily waste such as urine and stool from flowing into the outer sides in the widthwise direction of the disposable absorber 1 by crossing over the sidesheets 141, 142, it is desirable that the material have a hydrophobic property or water repellency.

[0027]

A dorsal side flap 20 and a ventral side flap 30 are joined to the both ends in the longitudinal direction of the absorbent body 10, respectively. The dorsal side flap 20 is mounted on at least one end region 10A in the longitudinal direction of the absorbent body 10. The ventral side flap 20 is longer than a width of the absorbent body 10 and covers the end region 10A.

[0028]

The ventral side flap 30 is mounted on the other end region 10B in the longitudinal direction of the absorbent body 10. The ventral side flap 30 is longer than a width of the absorbent body 10 and covers the end region 10B.

[0029]

The dorsal side flap 20 and the ventral side flap 30 are made from a hydrophobic nonwoven cloth, a moisture-permeable or moisture-impermeable film, or a composite sheet formed by pasting together a hydrophobic nonwoven cloth and a moisture-permeable or moisture-impermeable film. A film with the main constituent as polyethylene or polypropylene, a breathable resin film, or a sheet in which a breathable resin film is joined to a nonwoven cloth such as spun bond or spun lace can be used.

[0030]

The dorsal side flap 20 and the ventral side flap 30 according to the present embodiment are made from an SMS nonwoven cloth with a basis weigh of 15 g/m². At least at free ends 20A, 20B in the widthwise direction of the dorsal side flap 20, the outer ends in the widthwise direction are folded over toward the inner side in the widthwise direction based on the outer ends in the widthwise direction, thereby being folded to form two layers.

[0031]

The fixing members 40 are joined to the dorsal side flap 20 through joining units 44, respectively. The fixing members 40 are mounted on the free ends 20A, 20B positioned at the both ends in the widthwise direction of the dorsal side flap 20, respectively. The joining units 44 are coated with an adhesive such as a hot melt adhesive, and join the dorsal side flap 20 and the fixing members 40.

[0032]

As the clothing contact surface side of the end region 10B of the absorbent body 10, a locking unit 43, into which the fixing members 40 are locked, is provided. Each of the fixing members 40 is a male member of a so-called hook-and-loop faster, whereas the locking unit 43 is a female member.

[0033]

Each of the fixing members 40 is joined to the dorsal side flap 20 through the joining unit 44 and has a sheet-like base end 40a and a hook-like looking unit 40b, in which the joining unit 44 extends toward the outer end in the widthwise direction, and the hooking unit 40b is provided on the base end 40a and is locked into the locking unit 43 in an attachable and detachable manner. At the outer end in the widthwise direction of the base end 40a, there is a protruded unit 40c which is protruded toward the outer side in the widthwise direction with respect to the hooking unit 40b.

[0034]

Examples of a material for the fixing member 40 include PPSB (polypropylene spunbonded nonwoven fabric). For example, it is desirable to use a PPSB having a basis weight of 80 g/m^2 . It is also desirable that a basis weight of the hooking unit be equal to 100 g/m^2 .

[0035]

The locking unit 43 into which the fixing member 40 is locked is nonwoven cloth or knitted material into which the hook can be engaged. As a fiber material configuring the nonwoven cloth, a composite fiber having a core-clad structure is used. This fiber material adopts as a combination of a core component and a clad component, PP (polypropylene)/PE (polyethylene), PP/low-melting-point PP, PET (polyethylene terephthalate)/low-melting-point PET, and PET/PE. A fiber may be mixed with the fiber material, in which examples of the fiber include polyamide such as rayon, PET, PP, and nylon, acrylic, urethane, and cotton. For example, a basis weight of the female member is equal to 38 g/m^2 .

[0036]

In the absorbent body 10, the plurality of elastic members are arranged in a stretched-out state along a longitudinal direction L of the absorber 130. The elastic members include first elastic members 123a, 123b, 124a, 124b configuring leg gathers formed around the leg openings of the wearer, and second elastic members 123c, 124c configuring leakage-preventing walls arranged at the crotch portion of the wearer.

[0037]

The first elastic members 123a, 123b, 124a, 124b are joined in a stretched-out state along the longitudinal direction L of the absorbent body 10 by means of an HMA or the like, between a surface at a skin contact

surface side of the back nonwoven fabric 121 at the outer side in the widthwise direction with respect to the back film 122, and non-skin contact surface sides of the sidesheets 141, 142.

[0038]

The second elastic members 123c, 124c are arranged at the inner sides in the longitudinal direction with respect to the dorsal side flap 20 and the ventral side flap 30, and configure the leakage-preventing walls. The second elastic members 123c, 124c are installed on the sidesheets 141, 142, in a stretched-out state in the longitudinal direction L. The sidesheets 141, 142 are folded over toward the inner side so as to involve the second elastic members 123c, 124c at the inner ends in the widthwise direction. By formation of the leakage-preventing walls, bodily waste discharged from the wearer can be prevented from leaking from the sidesheets 141, 142 to the outer sides in the widthwise direction.

[0039]

Each of the first elastic members 123a, 123b, 124a, 124b according to the present embodiment is rubber having a diameter of 620 dtex. This rubber is arranged while it is stretched out 2.2 times. Further, each of the second elastic members 123c, 124c according to the present embodiment is rubber having a diameter of 620 dtex. This rubber is arranged while it is stretched out 2.5 times.

[0040]

In a case of using the disposable diaper 1 thus configured, in a state in which the absorber 130 of the diaper body 10 is brought in contact with the crotch of the wearer while the ventral side flap 30 is brought in contact with the belly of the wear, the fixing members 40 installed on the both sides in the widthwise direction of the dorsal side flap 20 are fixed to the locking unit 43 of the ventral side flap 30.

[0041]

Further, in a state prior to use, the disposable diaper 1 is folded over toward the inner side in the widthwise direction based on a pair of reference folding lines FL1 along the longitudinal direction. Fig. 1 shows a state in which the disposable diaper 1 is folded over based on the reference folding lines FL1. Fig. 2 shows a state in which the disposable diaper 1 is not folded over based on the reference folding lines FL1, that is, shows a spread-out state. The disposable diaper 1 is folded back based on the reference folding lines FL1 so as to involve the skin contact surface side of the dorsal side flap 20 in the inner side.

[0042]

The reference folding lines FL1 are positioned at the inner sides

in the widthwise direction with respect to the fixing members 40. The reference folding lines FL1 are not overlapped with the fixing members 40 in the thickness direction T of the disposable diaper 1 but are overlapped with the dorsal side flap 20 and the ventral side flap 30 configuring the worn article body 2. Therefore, the folding patterns by the reference folding lines FL1 are not formed in the fixing members 40 but are formed in only the dorsal side flap 20 and the ventral side flap 30.

[0043]

The fixing members 40 generally have more stiffness as compared with the dorsal side flap 20 which comes in direct contact with the skin, so that folding patterns are easily left on the fixing members 40. In a case where the folding patterns are left on the fixing members 40, at the time of wearing the disposable diaper, the disposable diaper is possibly floated off the body of the wearer. However, since the folding patterns are not formed in the fixing members 40, the fixing members 40 are prevented from being floated off the body due to the folding patterns, and the disposable diaper 1 can be arranged along the body and at the same time, a gap between the body and the disposable diaper can be decreased. Therefore, such a problem can be avoided, that the fixing members are floated off to come in contact with the skin or the fixing members are not brought in close contact with the fixing unit to thereby cause displacement of the diaper.

[0044]

Further, in a case where the folding patterns are formed in the fixing members 40, a shape of the diaper is undesirably restored due to the folding patterns while it is spread out at the time of wearing or the like, thereby making it difficult to maintain the spread-out state, causing difficulty in wearing. However, by making it difficult to leave the folding patterns in the fixing members, restoration due to the folding patterns can be prevented to improve the wearing ability.

[0045]

Further, since the disposable diaper 1 is folded back based on the reference folding lines FL1 so as to involve the skin contact surface side of the dorsal side flap 20 in the inner side, the hooking units 40b of the fixing members 40 are folded back so as to face to the dorsal side flap 20. This prevents the hooking units 40 from being exposed to the outside.

[0046]

Further, the disposable diaper 1 is folded over with the skin contact surface side being set to the inner side, so that the worn article body 2 is deformed by the folding patterns made by the reference folding lines

FL1, in a direction toward the wearer side. Therefore, the worn article body 2 is easily deformed along the curve of the wearer' body, thereby making it easy to fit the worn article body into the wearer's body.
[0047]

Note that it is desirable that the reference folding lines FL1 be arranged in the vicinity of the fixing members 40 at the inner side in the widthwise direction with respect to the fixing members 40. By folding over the dorsal side flap 20 at the close edges to the fixing members, the folding patterns by the reference folding lines FL1 can be formed in the dorsal side flap 20 around the inguinal portion in which legs are most movable. The above folding patterns make it easier for the dorsal side flap 20 to follow the skin, so that the dorsal side flap 20 can be arranged along the curve of the body.
[0048]

For example, in a case where the fixing members 40 and the reference folding lines FL1 are too much separated from each other, the folding pattern is not formed in the inguinal portion in which legs are most movable, so that the disposable diaper 1 lacks the ability of following the body, thereby leading to a possibility of decreasing the fitting ability. From the above point of view, it is desirable that a distance in the widthwise direction between the fixing members and the reference folding lines RL1 fall within a range from 0 mm to 20 mm.
[0049]

The fixing members 40 are joined to the non-skin contact surface side of the worn article body. For example, in a case where the fixing members are joined to the skin contact surface of the worn article body, there is a possibility that the fixing members come in contact with the skin to stimulate it. However, since the fixing members are joined to the non-skin contact side of the worn article body, the fixing members 40 having more stiffness than the dorsal side flap 20 are kept away from the skin, thereby making it difficult to bring the fixing members 40 in contact with the skin of the wearer.
[0050]

Note that the dorsal side flap 20 has portions which are protruded from the absorber 130 toward the both ends in the widthwise direction and are configured so that the both end portions in the widthwise direction are folded back to form two layers. Thus, the skin can be protected by the dorsal side flap 20 to thereby prevent the fixing members 40 from coming in direct contact with the skin, thereby being able to reduce a stimulation to the skin effectively.
[0051]

The pair of fixing members 40 are arranged as separated from each

other in the widthwise direction in a state where the disposable diaper 1 is folded back based on the reference folding lines FL1. As compared with a configuration in which the fixing members 40 are arranged continuously, the fixing members 40 stand out easily. Further, in use of the disposable diaper 1, the wearer can grip the fixing members more easily when gripping the fixing member.

[0052]

Note that it is desirable that stiffness of the dorsal side flap 20 be lower than that of the fixing members 40. By making stiffness of the dorsal side flap 20 lower than that of the fixing members 40, even in a case where the folding pattern is formed in the dorsal side flap 20 due to the reference folding line, the strong folding pattern is not left on the dorsal side flap 20, so that a stimulation to the skin due to a hard wrinkle can be reduced while decreasing a gap between the skin and the dorsal side flap due to a three-dimensional wrinkle.

[0053]

Further, it is desirable that the dorsalside flap 20 be provided with comparatively weak and appropriate folding wrinkles. In a case where the dorsal side flap 20 or the ventral side flap 30 has formation of an appropriate folding wrinkles, close contact between the dorsal side flap 20 or the like and the body is increased at the inguinal portion in which legs are most movable, so that the dorsal side flap or the like can be fit along the curve of the body.

[0054]

In a state in which the disposable diaper 1 is folded over based on the reference folding lines, it is desirable that a distance X1 (see Fig. 1) between the fixing members and the absorber be 5 mm or greater. In a case where the distance X1 between the fixing members and the absorber is less than 5 mm, there is a possibility that the folding lines are formed in the fixing members due to displacement caused during a manufacturing step.

[0055]

Note that, in the disposable diaper according to the present embodiment, the dorsal side flap 20 and the ventral side flap 30 are formed from another material which is different from a material of the absorbent body. The dorsal side flap 20 and the ventral side flap 30 are made of a sheet which extends across the entire disposable diaper 1 in the widthwise direction. The dorsal side flap 20 or the like at portions protruded toward the outer sides in the widthwise direction of the absorbent body 10 is folded back to form two layers.

[0056]

As described above, by configuring the absorbent body 10 and the side flaps, i.e., the dorsal side flap 20 and the ventral side flap 30, from different materials, the dorsal side flap can be improved in its texture while maintaining its stiffness. Specifically, the central portion of the dorsal side flap 20 or the like, with which the buttocks or the abdominal portion comes in contact, is configured softly by a single layer, whereas the both ends in the widthwise direction of the dorsal side flap 20 or the like to which the fixing members are joined are configured by two layers so as to have high stiffness.

[0057]

(Manufacturing Method of Disposable Diaper)

Next, based on Fig. 6, one example of a manufacturing method of the disposable diaper 1 is explained. As far as the other method that is not explained, the existing method can be used. Further, a manufacturing method explained hereinafter is one example and the disposable diaper 1 can also be manufactured by other methods. The manufacturing method of the disposable diaper 1 includes a first folding step S10, a second folding step S20, a fixing-member attaching step S30, a first cutting step S40, an absorbent-body forming step S50, a flap attaching step S60, and a second cutting step S70.

[0058]

In the first folding step 10, the both ends of a continuous side flap sheet W10, which configures the dorsal side flap 20 and the ventral side flap 30, are folded back toward the central side in the widthwise direction and joined together. In this manner, the both ends of the side flap sheet 10 are provided with overlapped portions, respectively, in which the side flap sheet W10 is folded to form multiple layers. The overlapped portions configure the free ends 20A, 20B of the dorsal side flap 20, for example.

[0059]

In the second folding step S20, the both ends in the widthwise direction of the side flap sheet W10, which were folded back in the first folding step S10, are folded over toward the inner side in the widthwise direction based on the reference folding lines FL1. Note that, for example, in a state in which the both ends are folded over toward the inner side in the widthwise direction based on the reference folding lines FL1, this folded portions may be pressed along the reference folding lines FL1. By pressing the folded portions along the reference folding lines FL1, the folding patterns can be formed on the reference folding lines FL1 to thereby prevent the folded portions from being spread out during conveyance.

[0060]

In the fixing-member attaching step S30, the fixing members 40 are attached to the dorsal side flap 20 which was folded over based on the reference folding lines FL1. Note that hooks configuring the hooking units 40 are attached to the fixing members 40 in advance.

[0061]

In the first cutting step S40, the side flap sheet W10 to which the fixing members 40 were joined is cut at predetermined intervals, along a crossing direction CD orthogonal to a conveyance direction MD. A cut piece P is one united body of the dorsal side flap 20 and the ventral side flap 30.

[0062]

In the absorbent-body forming step S50, a continuous body of the absorbent bodies is formed. First, as shown in Fig. 6(b), after the back film 122 is arranged on a continuous back nonwoven fabric sheet W121 which configures the back nonwoven fabric 121, leg open elastic members which configure leg gathers are provided at the outer sides in the widthwise direction of the back film. Subsequently, the absorber 130 to which the topsheet 110 has been attached is arranged on the back film 122 and the sidesheets 141, 142 are joined so as to cover the both sides in the widthwise direction of the absorber. Through the above steps, a continuous body made up of the continuous absorbent bodies 10 is manufactured.

[0063]

In the flap attaching step S60, with respect to the continuous body made up of the continuous absorbent bodies 10, the cut piece P which is one united body of the dorsal side flap 20 and the ventral side flap is attached.

[0064]

In the second cutting step S70, the continuous body of the absorbent bodies to which the cut piece P has been attached is cut in the crossing direction. The cut piece P is divided into the ventral side flap 30 for one product and the dorsal side flap 20 for another product subsequent to the aforementioned one product. Through the above steps, the disposable diaper 1 is completed.

[0065]

The disposable diaper thus manufactured may be configured so as to be laminated with another disposable diaper and contained in a package body such as a container bag in a state where the disposable diaper is further folded back. Specifically, as shown in Fig. 7, the disposable diaper can be folded based on a folding line along the longitudinal direction and a folding line along the widthwise direction. Fig. 7 is a view for schematically showing a folded mode of the disposable diaper.

[0066]

Fig. 7(a) shows the disposable diaper 1 manufactured by the manufacturing method described above. The both ends in the widthwise direction of the dorsal side flap 20 and the ventral side flap 30 are folded over toward the inner side in the widthwise direction based on the reference folding lines FL1. Subsequently, the disposable diaper 1 is folded back in the longitudinal direction L based on a widthwise folding line FLW 1 along the widthwise direction W, thereby becoming a state shown in Fig. 7(b). In a state in which the disposable diaper 1 is folded back based on the widthwise folding line FW1, the folding line is not overlapped with the fixing member 40, so that no folding pattern is formed therein. [0067]

However, the widthwise-direction folding line FW1 is arranged by being overlapped with the absorber 130 in the thickness direction, so that the folding pattern is formed in the absorber 130 by folding back the disposable diaper 1 based on the widthwise folding line FW1. The comparatively strong folding pattern formed in the absorber 130 makes it easy to maintain a state in which the disposable diaper is folded back. [0068]

By folding back the worn article body based on a reference folding line at the inner side in the widthwise direction with respect to the joining unit between the fixing member and the worn article body, the disposable worn article can be folded back without forming a folding line on the fixing member. Therefore, a problem caused by formation of a folding pattern on the fixing member can be suppressed, and the fixing member, the outer ends in the widthwise direction of the worn article body, and the like can be brought in close contact with each other. [0069]

(Second Embodiment)

Next, a disposable diaper 1A according to the second embodiment is explained with reference to Figs. 8 to 10. In the following explanation of the embodiment, only the configuration that is different from the first embodiment is explained, and the same signs are used for the configuration that is the same as the first embodiment while omitting the explanation. [0070]

After being folded over toward the inner side in the widthwise direction based on the reference folding lines FL1, the worn article body 2 of the disposable diaper 1A is further folded over toward the inner side in the widthwise direction based on inner folding lines FL2, which are positioned at the inner sides in the widthwise direction with respect to the reference folding lines FL1. Fig. 8(a) shows a state before the worn article body 2 is folded over based on the inner folding lines FL2. (b) shows a state after the worn article body 2 is folded over based on

the inner folding lines FL2. Fig. 9 is a cross-sectional view taken along the line C-C in Fig. 8(b).

[0071]

The inner folding lines FL2 are positioned at the inner sides in the widthwise direction with respect to the fixing members 40 and at the same time, are positioned at the outer sides in the widthwise direction with respect to the absorber 130, in a state in which the worn article body is folded over along the reference folding lines FL1. The inner folding lines are positioned at the inner sides in the widthwise direction with respect to the fixing members 40 in a state in which the worn article body is folded over along the reference folding lines FL1, so that the folding patterns due to the inner folding lines FL2 are not formed in the fixing members 40. That is, in the fixing members 40, the folding patterns due to the reference folding lines FL1 and the folding patterns due to the inner folding lines FL2 are not formed.

[0072]

Therefore, even in a case where the worn article body is folded back multiple times along the reference folding lines FL1 and the inner folding lines FL2, similarly to the disposable diaper according to the first embodiment, floating of the fixing members 40 can be controlled while improving the fitting ability with respect to the wearer.

[0073]

Further, after being folded over with the skin contact surface side being set to the inner side, the disposable diaper 1 is folded over with the fixing members being set to the inner side, so that the worn article body 2 is deformed by the reference folding lines FL1 and the inner folding lines FL2, in a direction toward the wearer side. Therefore, the worn article body 2 can be arranged along the curve of the wearer's body, thereby being able to fit the worn article body 2 into the wearer's body.

[0074]

According to a manufacturing method of the absorbent article according to the second embodiment, the absorbent article can be manufactured through steps shown in Fig. 10, for example. Note that the steps S10 to S60 are identical to those in the above-described first embodiment, thereby omitting the explanation. In a manufacturing method of the disposable diaper according to the second embodiment, a third folding step S65 is performed between the flap attaching step S60 and the second cutting step S70.

[0075]

In the third cutting step S65, the continuous body of the absorbent bodies to which the cut piece P is attached is folded over based on the inner folding lines FL2. Subsequently, the continuous body of the

absorbent bodies is cut in the crossing direction at the second cutting step S70, so that the disposable diaper 1 which is folded back based on the reference folding lines and the inner folding lines is completed.
[0076]

According to the disposable diaper 1 thus formed, it can be folded back compactly without forming the folding lines in the fixing members 40. Further, by folding over multiple times the both ends in the widthwise direction of the disposable diaper, stiffness of the outer ends in the widthwise direction of the disposable diaper in a folded-back state can be increased, so that a folded-back shape can be maintained with stable condition. The disposable diaper 1 is easily inserted into a package, and morphological stability of the inserted package can be maintained.
[0077]

(Third Embodiment)

Next, a disposable diaper 1B according to the third embodiment is explained with reference to Fig. 11. In the disposable diaper 1B according to the third embodiment, the inner folding lines FL2 are formed in the protruded units 40c of the fixing members 40. Fig. 11 shows the disposable diaper 1B according to the third embodiment in a state in which after folding over the disposable diaper 1B based on the inner folding lines FL2, the portions folded over based on the inner folding lines FL2 are spread out. (a) is a plan view, and (b) is a cross-sectional view taken along the line D-D in (a).
[0078]

By forming the inner folding lines FL2 in the protruded units 40c of the fixing members 40, the ends of the protruded units 40c are lifted up because of the folding patterns formed by the inner folding lines. Therefore, the protruded units 40c of the fixing members 40 can stand out easily, so that the wearer or the like can easily find the fixing members. Further, since the protruded units of the fixing members are floated off, it becomes easy to grip the fixing members.
[0079]

(Fourth Embodiment)

Next, a disposable diaper 1C according to the fourth embodiment is explained with reference to Figs. 12 and 13. In the disposable diaper 1C according to the fourth embodiment, the reference folding lines FL1 are formed by being overlapped with the fixing members 40 at the outer sides in the widthwise direction with respect to the joining units 44 between the fixing members 40 and the dorsal side flap 20.
[0080]

Fig. 12 is a partially enlarged plan view of the disposable diaper 1C according to the fourth embodiment. (a) shows a state before the

disposable diaper 1C is folded over based on the reference folding lines FL1. (b) shows a state in which the disposable diaper 1C is folded over based on the reference folding lines FL1. Fig. 13 is a cross-sectional view taken along the line E-E in Fig. 12(b).

[0081]

In a case where the disposable diaper is folded over based on the reference folding lines FL1, out of components in the disposable diaper, the worn article body 2, such as the dorsal side flap 20, is folded over based on the reference folding lines FL2. At this time, the fixing members 40 are joined to the dorsal side flap 20 through the joining units 44, and in association with the joining units 44, the fixing members 40 are folded over together with the dorsal side flap 20 based on the reference folding lines FL1.

[0082]

Even on condition that the fixing members 40 and the reference folding lines FL1 are overlapped with each other in the thickness direction T of the disposable diaper, in a case where the reference folding lines are not overlapped with the joining units 40, the folding lines are not formed in the fixing members. Therefore, the disposable diaper 1 can be folded back without formation of the folding patterns in the fixing members 40.

[0083]

(Other Embodiment)

So far, the present invention is disclosed through the above embodiments. However, it should not be interpreted that the statements and drawings configuring a part of the present disclosure limit the present invention. From this disclosure, a variety of alternate embodiments, examples, and applicable techniques will become apparent to one skilled in the art.

[0084]

In the present embodiments, described was the disposable diaper 1 in which the dorsal side flap 20 and the ventral side flap 30 are mounted on the absorbent body 10. However, an embodiment of the disposable diaper is not limited to the present embodiments.

[0085]

For example, the disposable diaper 1 may be an open-type which is formed by uniting a waistline region corresponding to the waistline of the wearer and a crotch region corresponding to the crotch portion of the wearer, and by hollowing out openings for the legs of the wearer. Alternatively, the disposable diaper 1 may not include the ventral side flap. The disposable diaper 1 may be for any of infants, toddlers, and adults.

[0086]

The dorsal side flap and the ventral side flap according to the present embodiments are arranged by being overlapped across the entire absorbent body in the widthwise direction. However, there is no limitation to this configuration. For example, the disposable diaper may be configured so that the side flaps are prepared as right and left individuals, and end regions 10A, 10B of the absorbent body are not completely covered with the dorsal side flap and the ventral side flap.

[0087]

As described above, needless to say, the present invention includes various embodiments and the like not described here. Therefore, the technical range of the present invention is to be defined only by the inventive specific matter according to the adequate claims from the above description.

[Embodiment]

[0088]

By citing embodiments and comparative examples, bending stiffness and bending recovery, which are indicative of a bending property, of the fixing member and the side flap were measured to evaluate each material in terms of adequacy for the fixing member and the side flap. Note that this does not limit the present invention.

[0089]

Using materials according to the first and second embodiments, and materials according to the first and the second comparative examples, bending stiffness and bending recovery indicative of a bending property were measured. At the same time, each material was evaluated in terms of adequacy for the fixing member. The adequacy for the fixing member was evaluated based on stiffness and resistance to displacement.

[0090]

Stiffness causing no feeling of discomfort at the time of contact with the skin of the wearer was evaluated as "good", whereas stiffness possibly causing feeling of discomfort was evaluated as "bad". The material which was used as the fixing member and caused no displacement from the dorsal side flap or the ventral side flap was evaluated as "good", whereas the material which caused displacement was evaluated as "bad".

[0091]

Further, using the materials according to the third and fourth embodiments and the materials according to the third and fourth comparative examples, bending stiffness and bending recovery indicative of a bending property were measured. At the same time, each material was evaluated in terms of adequacy for the side flap. The adequacy for the side flap was evaluated based on stiffness and resistance to tear.

[0092]

Stiffness causing no feeling of discomfort at the time of contact with the skin of the wearer was evaluated as "good", whereas stiffness possibly causing feeling of discomfort was evaluated as "bad". The material which was used as the dorsal side flap and was not torn was evaluated as "good", whereas the material which was torn was evaluated as "bad".

[0093]

(Measuring Method of Bending Stiffness and Bending Recovery)

The bending stiffness and the bending recovery were measured by a KES method. Used as a measuring instrument was KES FB-2. First, for each material, a sample with 100 mm in height and 30 mm in width is obtained. The sample is obtained so that the height is oriented along a conveyance direction in a manufacturing step of a material and the width is oriented along a crossing direction orthogonal to the conveyance direction. After the measuring instrument is set to zero, the sample is set in a manner to be bent at right angles to a longitudinal direction, and the measurement is started. Values of B-2HB displayed on a screen of the measuring instrument are recorded. Subsequently, the sample is set in a manner to be bent at right angles to a lateral direction, and the measurement is started. Values of B-2HB displayed on the screen of the measuring instrument are recorded.

[0094]

Bending stiffness is calculated by an equation indicated in Equation 1.

[0095]

[Equation 1]

$$\text{Bending Stiffness} = \frac{\text{Direction MD Value B} + \text{Direction CD Value B}}{2} (\times 10^{-4} \text{ Nm/m})$$

[0096]

Bending recovery is calculated by an equation indicated in Equation 2.

[0097]

[Equation 2]

$$\text{Bending Recovery} = \frac{\text{Direction MD Value 2HB} + \text{Direction CD Value 2HB}}{2} (\times 10^{-2} \text{ Nm/m})$$

[0098]

(Measurement Result)

Measurement results are shown in Table 1. Note that a measured value is rounded to two decimal places and is shown with two decimal places.

[0099]

[Table 1]

Fixing Member	1 st Embodiment	2 nd Embodiment	1 st Comparative Example	2 nd Comparative Example
Stiffness	Good	Good	Bad	Good
Resistance to Displacement	Good	Good	Good	Bad
Bending Stiffness	0.68	0.56	0.90	0.07
Direction MD Value B	0.82	0.62	1.07	0.09
Direction CD Value B	0.53	0.50	0.73	0.05
Bending Recovery	0.74	0.52	0.95	0.08
Direction MD Value 2HB	1.03	0.66	1.33	0.10
Direction CD Value 2HB	0.44	0.38	0.57	0.05
Side Flap	3 rd Embodiment	4 th Embodiment	3 rd Comparative Example	4 th Comparative Example
Stiffness	Good	Good	Bad	Good
Resistance to Tear	Good	Good	Good	Bad
Bending Stiffness	0.07	0.07	0.56	0.01
Direction MD Value B	0.09	0.10	0.62	0.02
Direction CD Value B	0.05	0.05	0.50	0.00
Bending Recovery	0.08	0.07	0.52	0.02
Direction MD Value 2HB	0.10	0.09	0.66	0.03
Direction CD Value 2HB	0.05	0.05	0.38	0.01

[0100]

The material according to the first comparative example is obtained by performing laminating process onto the both surfaces of polypropylene spunbonded nonwoven fabric having a basis weight of 80 g/m². This material has the highest bending stiffness and bending recovery among the four materials. Since the material is stiff, it was evaluated as inadequate for the fixing member.

[0101]

The material according to the second comparative example is polypropylene spunbonded nonwoven fabric having a basis weight of 30 g/m². This material has the lowest bending stiffness and bending recovery among the four materials. Since the material is soft enough to cause displacement, it was evaluated as inadequate for the fixing member.

[0102]

The material according to the first embodiment is a polypropylene spunbonded nonwoven fabric having a basis weight of 80 g/m². In terms

of stiffness and resistance to displacement, this material was evaluated as adequate for the fixing member.

[0103]

The material according to the second embodiment is a polypropylene spunbonded nonwoven fabric having a basis weight of 60 g/m². In terms of stiffness and resistance to displacement, this material was evaluated as adequate for the fixing member.

[0104]

According to the above results, the bending stiffness of the fixing member is desired to fall within a range from 0.56×10^{-4} Nm/m to 0.68×10^{-4} Nm/m, whereas the bending recovery of the fixing member is desired to fall within a range from 0.52×10^{-2} Nm/m to 0.74×10^{-2} Nm/m.

[0105]

The material according to the third comparative example is a polypropylene spunbonded nonwoven fabric having a basis weight of 60 g/m². This material has the highest bending stiffness and the bending recovery among the four materials. Since the material is stiff, it was evaluated as inadequate for the dorsal side flap.

[0106]

The material according to the fourth comparative example is an SMS nonwoven cloth having a basis weight of 15 g/m². This material has the lowest bending stiffness and bending recovery among the four materials. Since the material is soft enough to be torn, it was evaluated as inadequate for the dorsal side flap.

[0107]

The material according to the third embodiment is a polypropylene spunbonded nonwoven fabric having a basis weight of 30 g/m². In terms of stiffness and resistance to tear, this material was evaluated as adequate for the dorsal side flap.

[0108]

The material according to the fourth embodiment is an SMS nonwoven cloth having a basis weight of 15 g/m². In terms of stiffness and resistance to displacement, this material was evaluated as adequate for the dorsal side flap.

[0109]

According to the above results, the bending stiffness of the dorsal side flap is desired to be equal to 0.07×10^{-4} Nm/m, whereas the bending recovery of the dorsal side flap is desired to fall within a range from 0.07×10^{-2} Nm/m to 0.08×10^{-2} Nm/m.

[0110]

In a case where the bending stiffness and the bending recovery of the dorsal side flap fall within the aforementioned range, an appropriate

folding wrinkle is formed in the dorsal side flap, so that close contact with the dorsal side flap can be increased around the inguinal portion in which legs are most movable while fitting the dorsal side flap or the like along the curve of the body. By bringing the dorsal side flap in close contact, the holding ability around the waistline can be increased.
[0111]

In a case where the bending stiffness of the side flap is less than 0.07×10^{-4} Nm/m or the bending recovery is less than 0.07×10^{-2} Nm/m, the strength of the side flap is not enough, and there is a possibility that the diaper is broken at the time of installing the diaper or that the side flap is turned up in a state where the diaper is installed.
[0112]

On the other hand, in a case where the bending stiffness of the side flap is larger than 0.07×10^{-4} Nm/m or the bending recovery is larger than 0.08×10^{-2} Nm/m, there is a possibility that wrinkles due to the folding patterns are formed at the time of folding the disposable diaper based on the reference folding lines FL1 or the like to thereby increase a stimulation to the skin. Further, there is another possibility that due to the folding patterns, a gap is formed between the wearer and the disposable diaper to thereby decrease the fitting ability.
[0113]

Note that the entire contents of Japanese Patent Application No. 2011-190026 (filed on August 31, 2011) are incorporated in the specification of the present application by reference.
Industrial Applicability
[0114]

A disposable worn article which is improved in the fitting ability with respect to a wearer by arranging along a body, both ends in a widthwise direction of an worn article body, a fixing member, and the like can be provided.

Reference Signs List

[0115]

- 1 disposable diaper
- 2 worn article body
- 10 absorbent body
- 10A, 10B end region
- 13, 14 leg gather
- 15, 16 leakage-preventing walls
- 20 dorsal side flap
- 20A, 20B free end
- 30 ventral side flap
- 40 fixing members

40a base end
40b hook unit
40c protruded unit
43 locking unit
44 joining unit
110 topsheet
120 exterior sheet
121 back nonwoven fabric
122 back film
123a, 123b, 124a, 124b first elastic members
123c, 124c second elastic members
130 absorber
131 absorbent core
132 absorbent sheet
141, 142 sidesheets
FL1 reference folding lines
FL2 inner folding lines
P cut piece

[CLAIMS]

[Claim 1] A disposable worn article comprising:
an worn article body including:

a liquid-permeable topsheet arranged at a skin contact surface side with respect to a wearer;

a liquid-impermeable backsheet arranged at a non-skin contact surface side with respect to the wearer; and

an absorber provided between the topsheet and the backsheet, the worn article body having a front waistline region arranged at a front waistline of the wearer, and a back waistline region arranged at a back waistline of the wearer; and

a pair of fixing members joined to both ends in a widthwise direction of the worn article body through joining units, and configured to connect the front waistline region and the back waistline region in an attachable and detachable manner, wherein:

the worn article body is folded over toward an inner side in the widthwise direction based on a pair of reference folding lines positioned at inner sides in the widthwise direction with respect to the joining units configured to join the worn article body and the fixing members;

the pair of fixing members are arranged so as to be separated from each other in the widthwise direction in a state in which the worn article body is folded over based on the reference folding lines; the reference folding lines are formed in only the worn article body without being formed in the fixing members;

a respective one of the fixing members includes a hooking unit configured to be locked into the worn article body in an attachable and detachable manner, and a protruded unit protruded from the hooking unit toward an outer side in the widthwise direction;

the worn article body is further folded over toward the inner side in the widthwise direction based on inner folding lines positioned at inner sides in the widthwise direction with respect to the reference folding lines in a state in which the worn article body is folded over toward the inner side in the widthwise direction based on the reference folding lines; and

a respective one of the inner folding lines is formed in the protruded unit.

[Claim 2] The disposable worn article according to claim 1, wherein the worn article body is folded over based on the reference folding lines so as to set the skin contact surface side of the worn article body to an inner side and at the same time, is folded over based on the inner folding lines so as to involve the fixing members in the inner side.

[Claim 3] The disposable worn article according to claim 1 or 2, wherein the fixing members are joined to the non-skin contact surface side of the worn article body.

[Claim 4] A disposable worn article comprising:
an worn article body including:

- a liquid-permeable topsheet arranged at a skin contact surface side with respect to a wearer;

- a liquid-impermeable backsheet arranged at a non-skin contact surface side with respect to the wearer; and

- an absorber provided between the topsheet and the backsheet, the worn article body having a front waistline region arranged at a front waistline of the wearer, and a back waistline region arranged at a back waistline of the wearer; and

- a pair of fixing members joined to both ends in a widthwise direction of the worn article body through joining units, and configured to connect the front waistline region and the back waistline region in an attachable and detachable manner, wherein:

- the worn article body is folded over toward an inner side in the widthwise direction based on a pair of reference folding lines positioned at inner sides in the widthwise direction with respect to the joining units configured to join the worn article body and the fixing members and at the same time, is folded over in a longitudinal direction based on widthwise folding lines extending in the widthwise direction; the fixing members are arranged between the pair of reference folding lines in a state in which the worn article body is folded back based on the widthwise folding lines;

- a respective one of the fixing members includes a hooking unit configured to be locked into the worn article body in an attachable and detachable manner, and a protruded unit protruded from the hooking unit toward an outer side in the widthwise direction;

- the worn article body is further folded over toward the inner side in the widthwise direction based on inner folding lines positioned at inner sides in the widthwise direction with respect to the reference folding lines in a state in which the worn article body is folded over toward the inner side in the widthwise direction based on the reference folding lines; and

- a respective one of the inner folding lines is formed in the protruded unit.