

DESCRIPTION
OPEN-TYPE DISPOSABLE DIAPER

Technical Field

[0001] The invention relates to an open-type disposable diaper.

Background Art

[0002] Conventional open-type disposable diapers have been known. The diapers have the longitudinal direction, the transverse direction and the thickness direction, these directions being perpendicular to one another. The diaper includes a first waist part, a crotch part and a second waist part, which are arranged in this order in the longitudinal direction. On the transverse ends of the second waist part, fastening tapes are provided. By fastening the fastening tapes to a target area of the first waist part, a waist opening and a pair of leg openings are formed and the diaper is worn by a diaper user ([PTL 1]).

Citation List

[Patent Literature]

[0003] [PTL 1] Japanese Patent Application Laid-open Publication No. 2002-253608

Summary of the Invention

Technical Problem

[0004] There are low-weight infants whose weight at birth is low, 3000 grams or less. Some of such low-weight infants, after birth, stay for most of their time in a fetus-like bending posture, the posture being taken by infants in their mother's womb. This fetus-like bending posture is also referred to as a positioned posture. In this posture, while an infant's back bends in C shape as seen from side as shown in FIG. 1A, the infant's legs spread in M shape with the infant's knees being bent almost up to his/her stomach as shown in FIG. 1B. A suitable safety action such as laying an infant on a round cushion (not shown) is taken, and then the infant is placed in prone position. The infant stays in prone position for most of

his/her time.

In some cases, in terms of not providing extra stress, a concept of minimum handling, no touch on a patient's body is preferable, is applied depending on low-weight infants 101. For such low-weight infants 101, open-type disposable diapers 1' are used.

[0005] In prone position, the target area 1a' of a first waist part 1a', to which the male members 11m' of fastening tapes 11' are fasten, is generally located on the ventral side of a low-weight infant 101, that is, under the body of the low-weight infant 101. Accordingly, when changing a diaper, the posture of the low-weight infant 101 changes to supine position. The first waist part 1a' is therefore turned up and exposed, and then the male members 11m' fastened to the target area 1a' are separated and the diaper 1' is opened to remove the diaper 1' from the low-weight infant 101.

[0006] In terms of minimum handling, the foregoing posture changing to remove the diaper 1', however, is preferably avoided as much as possible. Accordingly, health care providers, etc. have demanded open-type diapers which can be removed from a diaper user such as a low-weight infant 101 while the diaper user remains in prone position.

[0007] In view of the conventional problem described above, it is an object of the present invention to provide an open-type disposable diaper which can be removed from a diaper user in prone position.

Solution to Problem

[0008] An aspect of the invention to achieve the above advantage is an open-type disposable diaper having a longitudinal direction, a transverse direction and a thickness direction perpendicular to one another, including:

- a first waist part;
- a crotch part;
- a second waist part,

the first waist part, the crotch part and the second

waist part being arranged in this order in the longitudinal direction;

fastening tapes

which are respectively fixed to the transverse ends of the second waist part, and

which are fastened to the first waist part and thereby a waist opening and a pair of leg openings are formed; and

a tear-off line

that is for cutting out a section of the second waist part to which the fastening tape is fixed and

that is formed in a state in which the diaper is spread out.

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

Effects of the Invention

[0009] According to the invention, it is possible to provide an open-type disposable diaper which can be removed from a diaper user in prone position.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] FIG. 1A is a schematic side view of a low-weight infant 101 in the positioned posture, and FIG. 1B is a view of FIG. 1A taken along line B-B as viewed from the arrow side.

FIG. 2 is a schematic plan view of a disposable diaper 1 of the present embodiment, which is spread out.

FIGS. 3A, 3B and 3C are cross-sectional views of FIG. 2 respectively taken along line A-A, line B-B and line C-C.

FIG. 4 is a schematic perspective view of the disposable diaper 1 which is worn.

FIG. 5A is a schematic side view of a low-weight infant 101 in prone position before the diaper 1 is removed, and FIG. 5B is a schematic side view showing how the diaper 1 is removed from the infant 101 in prone position.

FIG. 6 is a magnified view of the body of the present invention, for illustrating tear-off lines 1c.

FIG. 7 is a magnified view of the body of the present invention, for illustrating the tear-off lines 1c.

FIG. 8 is a magnified view of the body of the present invention, for illustrating tear-off lines 1c' of the first modified example.

FIG. 9 is a magnified view of the body of the present invention, for illustrating tear-off lines 1c'' of the second modified example.

FIG. 10 is a magnified view of the body of the present invention, for illustrating tear-off lines 1c''' of the third modified example.

FIG. 11 is an explanatory diagram showing fastening tapes which are fastened in such a manner that the fastening tapes overlap.

Mode for Carrying Out the Invention

[0011] At least the following matters will be made clear by the description in the present specification and the accompanying drawings.

An open-type disposable diaper having a longitudinal direction, a transverse direction and a thickness direction perpendicular to one another, including:

- a first waist part;
- a crotch part;
- a second waist part,

the first waist part, the crotch part and the second waist part being arranged in this order in the longitudinal direction;

fastening tapes

which are respectively fixed to the transverse ends of the second waist part, and

which are fastened to the first waist part and thereby a waist opening and a pair of leg openings are formed; and

a tear-off line

that is for cutting out a section of the second waist part to which the fastening tape is fixed and

that is formed in a state in which the diaper is spread out.

[0012] With such a disposable diaper, it is possible to remove the diaper from a diaper user while the diaper user remains in prone position. More specifically, it is as follows. The open-type diaper is usually worn by a diaper user so that the second waist part, to which the fastening tapes are fixed, is located on the dorsal side of the diaper user. Accordingly, in prone position, the second waist part is usually located above in the vertical direction. With such a diaper of the foregoing configuration, it is possible to cut out using the tear-off line the part which is included in the second waist part and to which the fastening tape is fixed. While the diaper user remains in prone position, it is therefore possible to remove the fastening tape from the transverse central part of the second waist part. In prone position, the diaper can therefore be opened. This makes it possible to remove the diaper from the diaper user in prone position.

[0013] In such an open-type disposable diaper, it is preferable that

the tear-off line corresponds to each of the fastening tapes and is formed at each of positions on both sides in the transverse direction,

the tear-off line is formed extending from a section which serves as the waist opening, to a section which serves as the leg opening, through a position in the transverse direction on an inner side of the section to which the fastening tape is fixed.

[0014] With such a disposable diaper, the section that is included in the second waist part and to which the fastening tape is fixed can start to be cut from the section which serves as the waist opening or the section which serves as the leg opening. It is therefore possible to quickly cut out the sections to which the fastening tape is fixed while the diaper user remains in prone position.

The tear-off line extends through a position in the transverse direction on the inner side of a section, of the second waist part, to which the fastening tape is fixed. When cutting out the section, it is not therefore necessary to cut the fastening tapes. This makes it possible to reduce a force necessary to cut the tear-off line. Accordingly, it is possible to reduce external stress which may be applied to a diaper user during cutting of the tear-off line.

[0015] In such an open-type disposable diaper, it is preferable that

the tear-off line includes a plurality of through holes extending through in the thickness direction, and

the plurality of through holes are placed along a direction in which the tear-off line should extend.

[0016] With such a disposable diaper, because the tear-off line includes a plurality of through holes, tear-off line can be torn with small effort. Accordingly, it is possible to reduce external stress which may be applied to a diaper user during cutting of the tear-off line.

[0017] In such an open-type disposable diaper, it is preferable that

the tear-off line includes

a first tear-off line part that is formed extending longitudinally inwardly from a section which serves as the waist opening, and

a second tear-off line part

that is located in an inner position in the longitudinal direction relative to the first tear-off line part and

that is located in the same longitudinal position as the fastening tape,

regarding a ratio of a length of the through holes to unit length in a direction in which the tear-off line extends, the ratio in the second tear-off line part is smaller than the ratio in the first tear-off line part.

[0018] With such a disposable diaper, the first tear-off line part is easier to cut than the second tear-off line part. This effectively prevents the second tear-off line part from breaking accidentally when the fastening tapes are each pulled outwardly in the transverse direction in order to make a diaper user to wear the diaper. Due to the first tear-off line part, when removing the diaper from the diaper user, it is concurrently possible to easily start cutting the diaper from the section which serves as the waist opening.

[0019] In such an open-type disposable diaper, it is preferable that

the tear-off line includes a curved part on the inner side of the second tear-off line part in the longitudinal direction,

the curved part being in curved shape and shifting outwardly in the transverse direction as it goes inwardly in the longitudinal direction,

regarding a ratio of a length of the through holes to unit length in a direction in which the tear-off line extends, the ratio in the second tear-off line part is smaller than the ratio in the curved part.

[0020] With such a disposable diaper, the curved part is easier to cut than the second tear-off line part. This effectively prevents the second tear-off line part from breaking accidentally when the fastening tapes are each pulled outwardly in the transverse direction in order to make a diaper user to wear the diaper. This concurrently makes it possible to precisely cut the curved part along its intended curved shape when removing the diaper from the diaper user.

[0021] In such an open-type disposable diaper, it is preferable that

the tear-off line includes

a straight part that extends straight along the longitudinal direction from a section which serves as the waist opening, and

a curved part

that is in curved shape and

that is located on an inner side of the straight part in the longitudinal direction and shifts outwardly in the transverse direction as it goes inwardly in the longitudinal direction.

[0022] With such a disposable diaper, the tear-off line includes the foregoing curved part, and the tear-off line can reach the transverse outer edge of the diaper through a relatively short route. That is, it is possible to set the tear-off lines without extending their routes greatly inwardly in the longitudinal direction. This can effectively prevent trouble which may occur when the routes of the tear-off lines extend greatly inwardly in the longitudinal direction, that is, trouble that a part of the tear-off line is trapped between the stomach of a diaper user in positioned posture and the user's legs spread in M shape, which makes it difficult to cut the tear-off line.

[0023] In such an open-type disposable diaper, it is preferable that

leg-circumference elastic members are provided along the longitudinal direction in positions on both sides in the transverse direction,

each of the leg-circumference elastic members being for shrinking a section which serves as the leg opening in the longitudinal direction, and

assuming that the curved part is divided into a portion near the waist opening and a portion near the leg opening,

when the leg-circumference elastic member is seen from the thickness direction, the leg-circumference elastic member intersects a portion of the curved part on a side of the waist opening.

[0024] With such a disposable diaper, the leg-circumference elastic member intersects the portion of the curved part on the side of the waist opening. And, in the vicinity of the boundary position between the straight part and the curved part, there

is the intersecting position at which the leg-circumference elastic member and the curved part intersect. On the other hand, when the curved part is cut following the cut of the straight part, it is likely to accidentally cut an extension of the straight part or the vicinity thereof because of momentum to cut the straight part. That is, there are possibilities that a position located away from the curved part is accidentally cut. Accordingly, the intersecting position of the leg-circumference elastic member and the curved part is located in the vicinity of the boundary position between the straight part and the curved part. During the process in which the curved part is cut following the cut of the straight part, when the cutting position reaches the intersecting position near the boundary position, the longitudinal momentum to cut the straight part is absorbed due to elastic deformation of the leg-circumference elastic member. Straight cutting movement along the longitudinal direction is therefore stopped. This makes it possible to quickly adjust the cutting position toward the curved part. This makes it possible to precisely cut the diaper along the curved part.

[0025] In such an open-type disposable diaper, it is preferable that

the diaper includes a plurality of sheets stacked in the thickness direction,

the number of the stacked sheets in at least a portion of the curved part is smaller than the number of the stacked sheets in the straight part.

[0026] With such a disposable diaper, the number of the stacked sheets in at least a portion of the curved part is smaller than that in the straight part. The portion is, therefore, relatively easy to cut. This can facilitate the cutting of a curved line, which is generally said to be more difficult than the cutting of a straight line. Accordingly, it is possible to precisely cut the curved part along its intended shape.

[0027] In such an open-type disposable diaper, it is preferable

that

the diaper includes resin film,

a direction in which the resin film stretches at time of manufacture is along the longitudinal direction, and

the straight part is formed in the resin film.

[0028] With such a disposable diaper, because the stretching direction of the resin film is the longitudinal direction, the resin film is easy to cut in the longitudinal direction. This enables the straight part to be easily cut along the longitudinal direction.

[0029] In such an open-type disposable diaper, it is preferable that

a sheet-like standing-gathers forming section is provided along the longitudinal direction in positions on both sides in the transverse direction,

the standing-gathers forming section includes a base portion and a standing portion that are arranged in this order in the transverse direction,

the base portion is not able to stand in the thickness direction,

the standing portion is able to stand from the base portion on a skin side in the thickness direction, the base portion serving as the point of support,

the standing portion stands on the skin side in the thickness direction due to shrinkage of the standing portion in the longitudinal direction by longitudinal shrinkage force that acts on the standing portion, and

the tear-off line is formed on outer sides of the base portion and the standing portion in the transverse direction.

[0030] With such a disposable diaper, the tear-off line is formed on the outer side of the base portion and the standing portion of the standing-gathers forming section in the transverse direction. Accordingly, even if the tear-off line is torn, the base portion and the standing portion of the standing-gathers forming section can appropriately confine

excrement held inside of the gathers in the transverse direction. This effectively prevents excrement from leaking from the diaper.

[0031] In such an open-type disposable diaper, it is preferable that

the diaper further comprises an absorbent core at the center in the transverse direction,

the absorbent core absorbs liquid and is composed of liquid absorbent material deposited in the thickness direction, and

the tear-off line is formed on an outer side of the absorbent core in the transverse direction.

[0032] With such a disposable diaper, the tear-off line is formed in the position where the absorbent core does not exist. This effectively avoids leaking of excrement held by the absorbent core from the core, the leaking being caused by cutting of the tear-off line. This effectively prevents excrement from leaking from the diaper.

[0033] In such an open-type disposable diaper, it is preferable that

of the first waist part, in a section which serves as the waist opening, a cutting line is formed along the longitudinal direction in a same transverse position as the tear-off line.

[0034] With such a disposable diaper, the section, of the first waist part, which serves as the waist opening can be fold by cutting the tear-off line formed in the first waist part. This makes it possible to expose a part of a diaper user's body. Any action such as light treatment can be performed to this exposed part. When the cutting line is cut, the waist opening can change flexibly in the transverse direction. A diaper user whose stomach is large can consequently wear the diaper comfortably.

[0035] === Present Embodiment ===

FIG. 2 is a schematic plan view of the disposable diaper 1 of the present embodiment, which is spread out.. FIGS. 3A, 3B and

3C are cross-sectional views of FIG. 2 respectively taken along line A-A, line B-B and line C-C. FIG. 4 is a schematic perspective view of the disposable diaper 1 which is worn.

[0036] The diaper 1 is an open-type diaper 1 which is worn by a diaper user 101 using fastening tapes 11, and in particular, is suitably applied to a low-weight infant 101 of 3000 grams or less. It is to be noted that the following description is made by considering that a low-weight infant 101 is the diaper user. However, the invention is not limited thereto. Infants or young children may be a diaper user, and an adult may also be a diaper user.

[0037] In the state in which the diaper 1 is spread out as shown FIG. 2, the diaper 1 has three directions perpendicular to one another: the longitudinal direction, the transverse direction and the thickness direction. The diaper 1 includes a first waist part 1a, a crotch part 1m and a second waist part 1b, which are arranged in this order in the longitudinal direction. Generally when the diaper 1 is worn as shown in FIG. 4, the first waist part 1a covers the ventral side of the low-weight infant 101, the crotch part 1m covers the crotch of the infant 101, and the second waist part 1b covers the dorsal side of the infant 101. In some cases, the diaper 1 is, however, worn by the low-weight infant 101 while the longitudinal direction is opposite to the foregoing case. That is, the diaper 1 is worn so that the first waist part 1a covers the dorsal side of the low-weight infant 101 and the second waist part 1b covers the ventral side.

[0038] In the spread-out state of FIG. 2, the first waist part 1a and the second waist part 1b extend beyond both sides of the crotch part 1m in the transverse direction, and the contour of the diaper 1 in the thickness direction is therefore substantially in hourglass shape when viewed from above. In other words, the diaper 1 includes: an absorbent body 3 which absorbs excreted fluid; and a flexible, thin sheet-like part which extends more outwardly than the absorbent body 3 in the

transverse direction and in the longitudinal direction, the contour of the sheet-like part being substantially in hourglass shape when viewed from above.

[0039] Of this sheet-like part, parts 1sf extending towards both sides beyond the absorbent body 3 in the transverse direction are hereinafter referred to as "side flaps 1sf". The side flap 1sf exists across three parts, namely the first waist part 1a, the crotch part 1m and the second waist part 1b. The side flaps 1asf located in the first waist part 1a are hereinafter referred to as "first side flaps 1asf". The side flaps 1msf located in the crotch part 1m are hereinafter referred to as "crotch part side flaps 1msf". The side flaps 1bsf located in the second waist part 1b are hereinafter referred to as "second side flaps 1bsf". The second side flaps 1bsf and 1bsf correspond to the "transverse ends" according to the claims. One side in the thickness direction is hereinafter referred to as the "skin side", and the other side thereof is referred to as the "non-skin side". The schematic plan view of FIG. 2 shows the diaper 1 which is spread out, as seen from the skin side.

[0040] As shown in FIG. 2, On each of transverse outer ends 1bsef2 of the second side flaps 1bsf, the fastening tape 11 is formed extending in the transverse direction. By fastening the fastening tapes 11 onto a target area 1at provided on the non-skin-side surface of the first waist part 1a (FIG. 2), a waist opening 1HB and a pair of leg openings 1HL and 1HL are formed as shown in FIG. 4, and the diaper 1 is worn by the low-weight infant 101.

[0041] The diaper 1 includes: the absorbent body 3 which has a substantially longitudinally-elongated shape and absorbs excreted fluid such as urine; a liquid-permeable top sheet 2 which covers the absorbent body 3 from the skin side; a liquid-impermeable leak-proof sheet 4 which covers the absorbent body 3 from the non-skin side; an exterior sheet 5 having a substantially hourglass shape which covers the leak-proof sheet

4 from the non-skin side and defines the contour of the diaper 1; and a pair of standing-gather sheets 6 and 6 which are arranged in the transverse direction on the top sheet 2 and form standing gathers 6g and 6g respectively on the transverse ends of the absorbent body 3, the standing gathers serving as leakage barriers.

[0042] As shown in FIGS. 3A to 3C, the absorbent body 3 includes: an absorbent core 3c; and a core-wrapping sheet 3rs which wraps almost the entire outer surface of the absorbent core 3c. The absorbent core 3c is a member formed by shaping a certain liquid absorbent material into a substantially hourglass shape when viewed from above (FIG. 2), the substantially hourglass shape being an example of a predetermined shape. Such a liquid absorbent material is exemplified by liquid-absorbent fiber (e.g., pulp fiber) and liquid-absorbent particulate matter such as super absorbent polymer (hereinafter referred to as SAP). As for the core-wrapping sheet 3rs, a liquid-permeable sheet such as a sheet of tissue paper or nonwoven fabric is employed. It should be noted that the shape of the absorbent core 3c is not limited to the substantially hourglass shape when viewed from above. The shape may be, for example, a substantially rectangular shape when viewed from above.

[0043] The top sheet 2 is made of nonwoven fabric such as air-through nonwoven fabric, and has planar dimensions in which the top sheet 2 extends beyond the longitudinal sides and the transverse sides of the absorbent body 3 as shown in FIGS. 2 and 3A to 3C. The leak-proof sheet 4 is made of resin film such as polyethylene film, and similarly has planar dimensions in which the leak-proof sheet 4 extends beyond the longitudinal sides and the transverse sides of the absorbent body 3. These sheets 2 and 4 are joined together, by means such as adhesion or welding, on parts which extend beyond the absorbent body 3 in the longitudinal direction and in the transverse direction. The absorbent body 3 is thereby held between these sheets 2 and

4.

[0044] As shown in FIG. 2, the exterior sheet 5 is made of suitable nonwoven fabric and the like, and defines the contour of the diaper 1. On the skin-side surface of the exterior sheet 5, the foregoing sheets 2 and 4 and the absorbent body 3 held therebetween are integrated by means such as adhesion or welding, the sheets 2 and 4 and the absorbent body 3 being stacked while coinciding their transverse centers with one another (FIGS. 3A to 3C). In the foregoing integrated state, the absorbent body 3 extend from the first waist part 1a through the crotch part 1m to the second waist part 1b (FIG. 2).

[0045] The pair of standing-gather sheets 6 and 6 (corresponding to the standing-gathers forming section) correspond to the transverse ends 2e and 2e of the top sheet 2 and are provided so as to respectively cover the ends 2e and 2e from the skin side, as shown in FIG. 2. The sheets 6 and 6 form the standing gathers 6g and 6g along the longitudinal direction, the gathers 6g and 6g standing from the skin-side surface of the top sheet 2. That is, each standing-gather sheet 6 includes a base portion 6k in the form of a strip and a standing portion 6s, which are arranged in the transverse direction: the base portion 6k is fixed along the longitudinal direction to the top sheet 2 with hot-melt adhesive, etc. and cannot stand; and the standing portion 6s can stand from the point of support, which is the base portion 6k, on the skin side in the thickness direction. On the transverse edge of the standing portion 6s, rubber threads 6r stretch in the longitudinal direction and are fixed with hot-melt adhesive, etc. The rubber threads 6r serves as a standing-gathers elastic member 6r arranged along the longitudinal direction. Longitudinal shrinkage force is therefore applied to the standing portion 6s. Due to shrinkage of the standing portion 6s in the longitudinal direction by the shrinkage force, the standing portion 6s forms a plurality of pleats and stands on the skin side in the thickness direction. The standing gathers 6g function in this way (FIGS. 2 and 3B).

[0046] As shown in FIGS. 2, 3A and 3C, in the longitudinal ends 6sea and 6seb of each standing portion 6s, fixing sections 6j and 6j in the form of a strip are formed along the longitudinal direction; the ends 6sea and 6seb are fixed with the fixing sections 6j and 6j in such a manner that the ends 6sea and 6seb are lying on the top sheet 2. That is, between the top sheet 2 and portions of the ends 6sea and 6seb corresponding to the fixing sections 6j and 6j, dabs of hot-melt adhesive serving as the fixing sections 6j and 6j are placed along the longitudinal direction in the form of a strip. The ends 6seLa and 6seLb are fixed with the adhesive in such a manner that the ends 6sea and 6seb are lying on the top sheet 2.

A material suitable for the standing-gather sheet 6 is exemplified by suitable nonwoven fabric, and SMS nonwoven fabric (spunbonded nonwoven fabric/ melt-blown nonwoven fabric/ spunbonded nonwoven fabric) is employed in this example. However, this invention is not limited thereto as long as a material is flexible.

[0047] As shown in FIGS. 2 and 3A to 3C, the standing-gather sheets 6 extend outward in the transverse direction to substantially the same position as the outer edges of the exterior sheet 5; on or in the vicinity of the foregoing edges, the standing-gather sheets 6 and the exterior sheet 5 are integrated by adhesion or welding. By the standing-gather sheet 6 together with the exterior sheet 5, the foregoing first side flaps 1asf and the second side flaps 1bsf are respectively formed on the first waist part 1a and the second waist part 1b. Similarly, in the crotch part 1m, on or in the vicinity of the foregoing edges, the standing-gather sheets 6 and the exterior sheet 5 are integrated by adhesion or welding. The crotch part side flaps 1msf and 1msf are thereby formed throughout certain inner areas from the edges in the transverse direction.

[0048] Each of the crotch part side flaps 1msf and 1msf, together with a part of the first side flap 1asf and a part of the second side flap 1bsf, form the leg opening 1HL when a

diaper is worn. That is, the crotch part side flaps constitute parts surrounding the legs of the low-weight infant 101. In order to shrink the crotch part side flaps 1msf in the longitudinal direction to form leg gathers, a rubber thread 21 stretches in the longitudinal direction and is fixed to each crotch part side flap 1msf by means such as adhesion, the rubber thread 21 serving as a leg-circumference elastic member 21 extending straight along the longitudinal direction. When the stretched leg-circumference elastic member 21 is loosed, the crotch part side flap 1msf shrinks in the longitudinal direction to form a plurality of pleats, which become leg gathers.

In this example, as shown in FIG. 3B, the leg-circumference elastic member 21 is interposed between the exterior sheet 5 and the standing-gather sheet 6, but this invention is not limited thereto. For example, the leg-circumference elastic member 21 may adhere to the non-skin-side surface of the exterior sheet 5 or to the skin-side surface of the standing-gather sheet 6.

In this example, the rubber thread 21 is used as the leg-circumference elastic member 21, but this invention is not limited thereto. Elastic tape may be used, or stretchable nonwoven fabric or stretchable film which has stretchability based on its own elasticity may be used.

[0049] As shown in FIG. 2, the fastening tapes 11 and 11 is provided respectively on the transverse outer ends 1bsfe2 and 1bsfe2 of a pair of the second side flaps 1bsf and 1bsf. The tape base member 11a of each fastening tape 11 is a strip-like sheet made of nonwoven fabric elongated in the transverse direction; one transverse end of the tape base member 11a is fixed to a section 1bk of the outer end 1bsfe2 of the second side flap 1bsf, and the other transverse end projects outwardly in the transverse direction beyond the outer end 1bsfe2 of the second side flap 1bsf.

Onto the skin-side surface of this projecting section, a male

member 11m of a hook-and-loop fastener is fixed, and a plurality of fastening hooks (not shown) are provided on the skin-side surface of the male member 11m. The fastening hooks of the male member 11m are therefore caught with the target area 1at provided in the non-skin-side surface of the first waist part 1a, and the fastening tape 11 is thereby fastened to the first waist part 1a. A well-known hook-and-loop fastener is applicable for the male member 11m; for example, fishhook-shaped or T-shaped fastening hooks may be employed as appropriate.

[0050] As shown in FIGS. 2 and 3A, the target area 1at is placed on the non-skin-side surface of the exterior sheet 5, that is, the non-skin-side surface of the first waist part 1a. In other words, in this example, because the exterior sheet 5 is nonwoven fabric and is able to guarantee a capability sufficient for fastening to the male member 11m, the non-skin-side surface of the exterior sheet 5 is itself used as an object to which the male member 11m is fastened. The invention is however not limited thereto. A dedicated target tape may be employed for forming the target area 1at.

[0051] When making the low-weight infant 101 wear the diaper 1, while the second waist part 1b of the diaper 1 is pulled towards both transverse sides by a pair of the fastening tapes 11 and 11 in the second waist part 1b, each of the pair of fastening tapes 11 and 11 is fastened to the target area 1at of the first waist part 1a (FIG. 4). In the example of FIG. 2, the tape base members 11a extend beyond the male members 11m outwardly in the transverse direction, these extending parts 11ap serve as handles 11ap each of which is held when being pulled towards both sides of the fastening tapes 11.

[0052] The basic configuration of the diaper 1 is described above. In the present embodiment, in order to make it possible to remove the diaper 1 from the low-weight infant 101 in prone position of FIG. 5A, in the second side flaps 1bsf and 1bsf of the second waist part 1b, tear-off lines 1c and 1c are

respectively provided in a state in which the diaper 1 is spread out as shown in FIG. 2.

[0053] FIG. 6 is a magnified view of the body of the present invention, for illustrating the tear-off lines 1c. As shown in FIG. 6, the tear-off lines 1c are provided in the form of perforations so that it is possible to cut out the sections 1bk, of the second waist part 1b, to which the tape base members 11a of the fastening tapes 11 are fixed (the sections 1bk indicated by hatching in FIG. 6; hereinafter referred to as the fastening-tape fixing section 1bk). More specifically, the tear-off lines 1c are formed respectively in the second side flaps 1bsf corresponding to each of the fastening tapes 11. Each tear-off line 1c is formed extending, in the second waist part 1b, from a section 1bHB serving as the waist opening 1HB, towards a section 1bHL serving as the leg opening 1HL, through a position in the transverse direction on the inner side of the fastening-tape fixing section 1bk.

[0054] As shown in FIG. 5B, it is consequently possible to quickly remove the diaper 1 from the low-weight infant 101 in prone position shown in FIG. 5A. That is, as shown in FIG. 5A, the diaper 1 is usually worn by the low-weight infant 101 so that the second waist part 1b, to which the fastening tapes 11 are fixed, is located on the dorsal side of the low-weight infant 101. Accordingly, in prone position, the second waist part 1b is located above in the vertical direction. With the diaper 1, it is possible to cut out the fastening-tape fixing section 1bk of the second waist part 1b using the tear-off line 1c as mentioned above (FIG. 5B). This enables the fastening tapes 11 to be separated from the transverse central part 1bc of the second waist part 1b (FIG. 6). This makes it possible to separate the first waist part 1a and the second waist part 1b and to open the diaper 1, while the male members 11m of the fastening tapes 11 remain fastened to the first waist part 1a. This makes it possible to remove the diaper 1 from the low-weight infant 101 in prone position.

[0055] With reference to FIG. 6, as mentioned above, the tear-off lines 1c extends through a position within the second waist part 1b in the transverse direction on the inner side of the fastening-tape fixing section 1bk. When cutting out the fixing section 1bk, it is not therefore necessary to cut the fastening tape 11 at all. This makes it possible to reduce a force necessary to cut the tear-off line 1c. Accordingly, it is possible to reduce external stress which may be applied to the low-weight infant 101 during cutting, which is adequate for the idea of minimum handling.

[0056] Perforations of the tear-off lines 1c are a set of a plurality of straight slits (corresponding to through holes and are represented schematically in FIG. 6 and all figures in which the perforations are illustrated). That is, a plurality of straight slits (not shown) which extend through the second side flap 1bsf in the thickness direction are placed along a direction in which the tear-off lines 1c should extend. The length and the pitch of the slits are designed to take into account appropriate cutting performance and the like. Specifically speaking, the length of the slits is exemplified by 1-3mm, and the length of the space between adjacent slits (in other words, the length of portions between slits where no slit exists) is exemplified by 0.5-2mm. It can be said that the foregoing pitch of the slits is the sum of the length of the slits and the space.

[0057] The tear-off lines 1c will be described further in detail below.

As shown in FIG. 6, the tear-off line 1c formed in one of the second side flaps 1bsf and the tear-off line 1c formed in the other second side flap 1bsf are line symmetric about the transverse center line C1 of the diaper 1. Each of the tear-off lines 1c is substantially J-shaped and is composed of a straight part 1cL, which is along the longitudinal direction, and a curved part 1cB, which is in curved shape.

[0058] The straight part 1cL starts at the section 1bHB of the

second waist part 1b which serves as the waist opening 1HB; in other words, the straight part 1cL starts at the longitudinal outer edge 1be1 the second waist part 1b. Then, the straight part 1cL extends longitudinally inwardly along a line parallel to the longitudinal direction, and reaches the same longitudinal position as the fastening tape 11 or a position slightly inside the same longitudinal position. The straight part 1cL connects to the curved part 1cB at the position at which the straight part 1cL reaches. The curved part 1cB further extends inwardly in the longitudinal direction. More specifically, the curved part 1cB is curved outwardly in the transverse direction with a certain curvature as the curved part 1cB extend inwardly in the longitudinal direction; the curved part 1cB eventually reaches the section 1bHL of the second waist part 1b, which serves as the leg opening 1HL, that is, the transverse outer edge 1be2 of the second waist part 1b.

[0059] With such a route of the tear-off line 1c, the tear-off line 1c encloses the fastening-tape fixing section 1bk completely from inside in the transverse direction. When the tear-off line 1c is cut, the fastening-tape fixing section 1bk together with the fastening tape 11 can therefore be separated from the transverse central part 1bc of the second waist part 1b.

[0060] Further, if the foregoing curved part 1cB is included, the tear-off lines 1c can follow a relatively short route to the transverse outer edge 1be2 of the second waist part 1b. That is, it is possible to set the tear-off lines 1c without extending their routes greatly inwardly in the longitudinal direction. This can effectively prevent trouble which may occur when the routes of the tear-off lines 1c extend greatly inwardly in the longitudinal direction, for example, trouble that, when the routes each reach the first side flaps 1asf (FIG. 2), a part of the tear-off line 1c is trapped between the stomach of the low-weight infant 101 in positioned posture and the user's legs spread in M shape, which makes it difficult to

cut the tear-off line 1c.

[0061] In the example of FIG. 6, the tear-off line 1c is placed within the second side flap 1bsf. However, this invention is not limited thereto. That is, in some cases, a part of the tear-off line 1c may extend further into the crotch part side flap 1msf. Excessive extension, however, causes trouble that it is difficult to cut the tear-off line 1c, because the tear-off line 1c is likely to be trapped between the stomach and the legs spread in M shape of the low-weight infant 101, or because cutting length is longer.

[0062] In this example, a plurality of sheets 4, 5 and 6 are placed in the position at which the straight part 1cL is formed. Specifically, there are the following three sheets from the skin side in the thickness direction: the standing-gather sheet 6; the leak-proof sheet 4; and the exterior sheet 5. The number of the stacked sheets is three. In the straight part 1cL, perforations are therefore formed extending through the three stacked sheets 4, 5 and 6.

On the other hand, as mentioned above, a position at which the curved part 1cB is formed shifts outwardly in the transverse direction as it goes inwardly in the longitudinal direction. The number of the stacked sheets therefore varies over the route from the one end of the curved part 1cB to the other end. In other words, as illustrated in the left half of FIG. 6, in a certain range within a portion 1cB1 of the curved part 1cB which connects to the straight part 1cL, the number of the stacked sheets is three in the same way as in the straight part 1cL. There is a portion 1cB2 of the curved part 1cB which is adjacent to the certain range of the portion 1cB1 and which is located on the inner side of the certain range in the longitudinal direction, and the portion 1cB2 does not include the leak-proof sheet 4, and includes two sheets: the standing-gather sheet 6 and the exterior sheet 5. Accordingly, whereas the perforations are formed extending through three sheets 4, 5 and 6 in the former portion 1cB1, the perforations are formed

extending through two sheets 5 and 6 in the latter portion 1cB2.

When there is such a portion 1cB2 of the curved part 1cB at which the number of the stacked sheets is smaller, such a portion 1cB2 is relatively easy to cut. This can facilitate the cutting of a curved line, which is generally said to be more difficult than the cutting of a straight line. Accordingly, it is possible to precisely cut the curved part 1cB along its intended curved shape.

[0063] In this example, with reference to FIG. 6, as mentioned above, the tear-off lines 1c are formed in the second side flap 1bsf, and each of the tear-off lines 1c is formed in an outer position in the transverse direction relative to the absorbent body 3. As can be seen from FIG. 6, the tear-off lines 1c are formed in outer positions in the transverse direction relative to the base portions 6k and the standing portions 6s of the standing-gather sheets 6.

Accordingly, even if the tear-off line 1c is torn, the absorbent body 3 and the base portions 6k and the standing portions 6s of the standing-gather sheets 6 are healthily maintained without being affected at all. This effectively prevents excrement held by the absorbent body 3 or the standing portion 6s from leaking from the diaper 1, the leaking being caused by cutting of the tear-off lines 1c.

[0064] As for the positional relationship between the tear-off lines 1c and the top sheet 2, the tear-off lines 1c are formed on the outer side of the top sheet 2 in the transverse direction, and in other words, the top sheet 2 does not exist in the position of the tear-off line 1c. The number of the stacked sheets is therefore smaller in the position of the tear-off lines 1c than in other areas. This configuration contributes to improvement of the ease with which the tear-off lines 1c are cut.

[0065] In terms of further facilitating cutting of the tear-off lines 1c, the leak-proof sheet 4 is preferably arranged so that a direction in which the resin film stretches at time of

manufacture is along the longitudinal direction, the resin film serving as the leak-proof sheet 4 in FIG. 6. That is, resin film is generally likely to be cut along the stretching direction because of resin orientation aligned with the stretching direction. If the stretching direction is along the longitudinal direction, the leak-proof sheet 4 is therefore easier to cut along the longitudinal direction. Accordingly, it is possible to cut precisely the straight part 1cL, in which the leak-proof sheet 4 exists, along the longitudinal direction. [0066] As shown in FIG. 6, when the curved part 1cB is cut following the cut of the straight part 1cL of the tear-off line 1c, it is likely to accidentally cut an extension of the straight part 1cL or the vicinity thereof because of momentum to cut the straight part 1cL. That is, there are possibilities that a position located away from the curved part 1cB is accidentally cut. In order to prevent the above, the following expedient is employed in this example.

The leg-circumference elastic member 21 is located in the vicinity of the tear-off line 1c. As seen from the thickness direction, the leg-circumference elastic member 21 intersects the curved part 1cB of the tear-off line 1c at a certain intersecting position Plc. More specifically, as illustrated in the right half of FIG. 6, assuming that the curved part 1cB is divided into two portions, namely a portion 1cBa near the waist opening 1HB and a portion 1cBb near the leg opening 1HL, the intersecting position Plc is placed in the former portion 1cBa near the waist opening 1HB. The intersecting position Plc is therefore located relatively near the boundary position PLB between the straight part 1cL and the curved part 1cB.

[0067] During the process in which the curved part 1cB of the tear-off line 1c is cut following the cut of the straight part 1cL, when the cutting position reaches the intersecting position Plc near the boundary position PLB, the longitudinal momentum to cut the straight part 1cL is absorbed due to elastic deformation of the leg-circumference elastic member 21.

Straight cutting movement along the longitudinal direction is therefore stopped. This makes it possible to quickly adjust the cutting position toward the curved part 1cB. This makes it possible to precisely cut the diaper along the curved part 1cB.

[0068] In the example of FIG. 7, due to the expedient regarding the perforations, the ease with which the tear-off lines 1c are cut differs depending on a longitudinal position. For example, assuming that the tear-off line 1c is divided into three longitudinal parts 1c1, 1c2 and 1c3, the ease with which the tear-off lines 1c are cut is set corresponding to the parts 1c1, 1c2 and 1c3. More specifically, the first part 1c1 (corresponding to the first tear-off line part), which is one of three parts 1c1, 1c2 and 1c3, is located in an area including the section 1bHB of the second waist part 1b serving as the waist opening 1HB. This first part 1c1 is composed of easy-to-cut perforations. The second part 1c2 (corresponding to the second tear-off line part), which is another one of three parts 1c1, 1c2 and 1c3, is located in a longitudinal area including the position corresponding to the fastening-tape fixing section 1bk. This second part 1c2 is composed of easy-to-cut perforations which are more difficult to cut than those of the first part 1c1. The third part 1c3, which is the remaining one 1c3, is the curved part 1cB mentioned above. This third part 1c3 is composed of easy-to-cut perforations which is the same type as those of the first part 1c1.

[0069] This effectively prevents, due to easy-to-cut perforations of the second part 1c2, the second part 1c2 from breaking accidentally when the fastening tapes 1l and 1l are each pulled outwardly in the transverse direction in order to make a low-weight infant 101 to wear the diaper 1. Also, when removing the diaper 1 from the low-weight infant 101, easy-to-cut perforations of the first part 1c1 make it possible to easily start cutting the diaper 1 from the section 1bHB which serves as the waist opening 1HB. It is concurrently possible to precisely cut the curved part 1cB along its intended curved

shape due to easy-to-cut perforations, the curved part 1cB serving as the third part 1c3.

[0070] The above-mentioned setting of the ease of cutting the perforations is achieved by changing the lengths of the slits included in the perforations, and this is employed in this example. That is, in this example, the pitches of the slits are maintained uniform and the lengths of the slits are different. Because of this, the ratio of the length of the slits to unit length in a direction in which the tear-off line 1c extend in the part 1c2 is different from those in the parts 1c1 and 1c3. Generally speaking, perforations having a large ratio are easy to cut, and perforations having a small ratio are difficult to cut. Accordingly, in this example, the ratio in the second part 1c2 is smaller than the ratio in the first part 1c1 and the ratio in the third part 1c3.

[0071] In the example of FIG. 2, in each of the first side flaps 1asf and 1bsf of the first waist part 1a, a cutting line 1ca is composed of perforations. In other words, in each first side flap 1asf, the cutting line 1ca is formed extending longitudinally inwardly from the longitudinal outer edge 1asfe. The transverse positions at which the cutting lines 1ca are formed are the same as the positions at which the tear-off lines 1c are formed on the longitudinal outer edges 1bsfe of the second side flaps 1bsf.

[0072] This allows relatively wide space to be placed between the cutting lines 1ca and 1ca in the first waist part 1a. Accordingly, after cutting the perforations of the cutting lines 1ca and 1ca, the stomach of a low-weight infant 101 can be exposed by folding a section 1am of the first waist part 1a between cutting lines 1ca and 1ca. This is effective in a case in which suitable action such as light treatment is needed for the infant's stomach. Because the cutting lines 1ca and 1ca are easily open in the transverse direction after cutting these cutting lines, the first waist part 1a can change flexibly in the transverse direction. A low-weight infant 101 whose stomach

is large can consequently wear the diaper 1 comfortably.

[0073] FIG. 8 is an explanatory diagram of tear-off lines 1c' of the first modified example. Whereas, in the foregoing embodiment, the number of the stacked sheets varies from three to two depending on positions in the tear-off lines 1c as shown in FIG. 6, in the first modified example, the number of the stacked sheets is constant through the entire length of each tear-off line 1c'. That is, as shown in FIG. 8, the position of the tear-off line 1c' in the first modified example is located out in the transverse direction relative to the tear-off line 1c in FIG. 6 of the foregoing embodiment. Through the entire length of the tear-off line 1c', the tear-off line 1c' is therefore located out in the transverse direction relative to the leak-proof sheet 4. At the position, there are two sheets alone: the standing-gather sheet 6 and the exterior sheet 5. And, the perforations of the tear-off line 1c' are formed through these two sheets 5 and 6 in the thickness direction. A smaller number of the sheets are stacked, and the tear-off line 1c' can be cut with good cutting performance. The rest of the configuration is substantially the same as that of the foregoing embodiments. The same components as those of the foregoing embodiments will be denoted by the same reference numerals, and the description thereof has been omitted.

[0074] FIG. 9 is an explanatory diagram of tear-off lines 1c'' of the second modified example. In the foregoing embodiment and the first modified example, the tear-off lines 1c and 1c' each include the straight part 1cL and the curved part 1cB as shown in FIGS. 6 and 8. In the second modified example, each of the tear-off lines 1c'', on the other hand, does not include the curved part 1cB and include the straight part 1cL alone. That is, in the second modified example, each tear-off line 1c'' is located relatively out in the transverse direction compared to the first modified example. This makes it possible to cut out the fastening-tape fixing section 1bk using a single straight part 1cL alone, which extends along the longitudinal direction.

With such a tear-off line 1c'', cutting the single straight part 1cL alone makes its cutting easier. Accordingly, it is possible to precisely cut the tear-off lines 1c'' without cutting the diaper 1 largely out of the positions of the tear-off lines 1c''. At the position of each tear-off line 1c'', there are two sheets alone: the standing-gather sheet 6 and the exterior sheet 5. And, the perforations of the tear-off line 1c'' are formed through these two sheets 5 and 6 in the thickness direction.

[0075] FIG. 10 is an explanatory diagram of tear-off line 1c''' of the third modified example. Of the foregoing embodiment (FIG. 6), first modified example (FIG. 8), and second modified example (FIG. 9), all the tear-off lines 1c, 1c' and 1c'' are formed extending substantially J-shaped or straight from serving as the waist opening 1HB section 1bHB of the second waist part 1b to the section 1bHL serving as the leg opening 1HL. The tear-off lines 1c''' of third modified example are, however, different mainly because these lines do not take such routes. That is, as shown in FIG. 10, the tear-off lines 1c''' are each substantially U-shaped so as to surround the fastening-tape fixing section 1bk on three sides. As for each of the tear-off lines 1c''', its starting point Ps is located on the transverse outermost edge 1bsfee of the second side flap 1bsf of the second waist part 1b, the tear-off line 1c''' extends from the starting point so that the fastening-tape fixing section 1bk is located inside of a substantially U-shaped route, and eventually reach the transverse outermost edge 1bsfee of the second side flap 1bsf like the starting point Ps; the position Pe where the tear-off line 1c''' reaches the outermost edge 1bsfee is the end point Pe of the tear-off line 1c'''. The rest of the configuration is substantially the same as that of the foregoing embodiments. The same components as those of the foregoing embodiments will be denoted by the same reference numerals, and the description thereof has been omitted.

[0076] Incidentally, at the beginning of the Description, there is described that the diaper 1 of the present embodiment is

suitable for a low-weight infant 101 of 3000 grams or less. In addition, consider that the diaper 1 can effectively solve the foregoing problem associated with positioned posture and minimum handling. It can be considered that the diaper 1 is more effective in a case in which a patient is likely to be in positioned posture and minimum handling is more necessary. This is a case in which a patient's weight is smaller.

Accordingly, the diaper 1 of the present embodiment is preferably applied to low-birth-weight infants of 500 grams or more and less than 2500 grams, is more preferably applied to very-low-birth-weight infants of 1000 grams or more and less than 1500 grams, is further more preferably applied to extremely-low-birth-weight infants less than 1000 grams.

[0077] The diaper 1 of the present embodiment specializes in low-weight infants 101 and is smaller than existing diapers 1 for newborn infants. For example, whereas the product length of diapers for newborn infants is 365mm and the circumference L1HB of its waist opening 1HB when being worn is 304mm, the product length L1 (FIG. 2) of the diaper 1 of the present embodiment is 210-330mm and the circumference L1HB of its waist opening 1HB when being worn is 160-295mm.

[0078] The product length L1 of the diaper 1 is measured in a state in which the diaper 1 is spread out, for example. That is, as shown in FIG. 2, in the spread-out state, the fastening tapes 11 and 11 are first unfastened from the target area 1at. Then, the diaper 1 is spread out so that the first waist part 1a, the crotch part 1m and the second waist part 1b are placed in line in the longitudinal direction, and the diaper 1 is stretched in the longitudinal direction to the extent that there is no shrinkage of the standing-gather sheet 6 caused by the standing-gathers elastic member 6r and to the extent that there is no shrinkage of the crotch part side flaps 1msf and 1msf caused by the leg-circumference elastic member s 21 and 21. Then, the longitudinal maximum length L1 of the stretched diaper 1 is measured; the measurement is the product length L1.

[0079] The circumference L1HB of the waist opening 1HB is, on the other hand, measured when a pair of the fastening tapes 11 and 11 are fastened in such a manner that the fastening tapes overlap. FIG. 11 is an explanatory diagram thereof. For the purpose of explanation, the fastening tape 11 the left second side flap 1bsf in FIG. 11 is hereinafter referred to as a "left tape 11-1" and also the fastening tape 11 of the right second side flap 1bsf is hereinafter referred to as a "right tape 11-2".

Preparatory to measurement, two fastening tapes 11-1 and 11-2 are first fastened in such a manner that the fastening tapes 11-1 and 11-2 overlap. That is, as shown in FIG. 11, the male member 11m of the left tape 11-1 is fastened to the target area 1at of the first waist part 1a, and then the male member 11m of the right tape 11-2 is fastened to the non-skin-side surface 11-1s of the left tape 11-1. At this stage, while coinciding the longitudinal centers C11-1 and C11-2 of these tapes 11-1 and 11-2, these tapes are positioned so that the edge 11-2e of the right tape 11-2 is coincided with the root-side end 11me of the male member 11m of the left tape 11-1. In this way, the fastening tapes are fastened in such a manner that the fastening tapes overlap.

[0080] The waist opening 1HB, which is formed by fastening the fastening tapes, stretches until shrinkage caused by a waist-circumference elastic member 21 just eliminate. With the waist opening 1HB stretching in such a manner, the circumference L1HB of the waist opening 1HB is measured; the circumference L1HB is thereby obtained.

[0081] As for products for low-birth-weight infants, the product length L1 and the circumference L1HB of the waist opening 1HB are respectively exemplified by 310mm and 273.5mm; as for products for very-low-birth-weight infants, the product length L1 and the circumference L1HB of the waist opening 1HB are respectively exemplified by 270mm and 220mm; and as for products for extremely-low-birth-weight infants, the product

length L1 and the circumference L1HB of the waist opening 1HB are respectively exemplified by 230mm and 219mm.

[0082] === Other Embodiments ===

Although embodiments of the present invention have been described above, the above-described embodiments are intended to facilitate the understanding of the present invention, and the present invention is not to be construed as being limited to the embodiments. Needless to say, various modifications and improvements can be made to the present invention without departing from the gist thereof, and equivalents thereof fall within the present invention. The invention can be altered as described below, for example.

[0083] In the foregoing embodiment, the tear-off lines 1c, 1c', 1c'' and 1c''' are exemplified by perforations, this invention is not limited thereto. That is, if the tear-off lines 1c, 1c', 1c'' and 1c''' are easier to cut than their surrounding areas, the tear-off lines may be composed of anything other than perforations. For example, arch-shaped or wave-shaped slits may be employed instead of straight slits along a direction in which the tear-off lines 1c, 1c', 1c'' and 1c''' should extend, or the planar shape of the through holes may be a circle, an oval or the like. Further, it is acceptable that a plurality of through holes are not arranged in line. For example, the tear-off lines 1c, 1c', 1c'' and 1c''' may be composed of a plurality of recessions formed by squeezing or squeezing-and-welding in the thickness direction.

Reference Signs List

[0084] 1 diaper (disposable diaper),
 1HB waist opening, 1HL leg opening,
 1a first waist part, 1am section,
 1asf first side flap, 1asfe outer edge, 1at target area,
 1b second waist part, 1bc central part, 1be1 outer edge, 1be2
 outer edge,
 1bsf second side flap (end), 1bsef2 outer end, 1bsfe outer
 edge,

lbsfee outermost edge,
 lbHB section which serves as waist opening, lbHL section which serves as the leg opening,
 lbk fastening-tape fixing section (a section to which the fastening tape is fixed),
 1c tear-off line, 1c' tear-off line, 1c'' tear-off line, 1c''' tear-off line,
 1c1 first part (first tear-off line part),
 1c2 second part (second tear-off line part),
 1c3 third part (curved part),
 1cL straight part,
 1cB curved part, 1cB1 portion, 1cB2 portion,
 1cBa portion, 1cBb portion,
 1ca cutting line,
 1m crotch part, 1msf crotch part side flap,
 1sf side flap,
 2 top sheet, 2e end,
 3 absorbent body, 3c absorbent core, 3rs core-wrapping sheet,
 4 leak-proof sheet, 5 exterior sheet,
 6 standing-gather sheet (standing-gathers forming section),
 6g standing gathers, 6j fixing section, 6k base portion,
 6r standing-gathers elastic member, 6s standing portion,
 6seLa end, 6seLb end,
 6sea end, 6seb end,
 11 fastening tape,
 11a tape base member, 11ap extending part (handle),
 11m male member, 11me end,
 11-1 left tape, 11-1s non-skin-side surface,
 11-2 right tape, 11-2e edge,
 21 leg-circumference elastic member,
 101 low-weight infant (diaper user),
 C1 center line,
 C11-1 center, C11-2 center,
 Plc intersecting position, PLB boundary position,
 Ps starting point, Pe end point

CLAIMS

1. An open-type disposable diaper having a longitudinal direction, a transverse direction and a thickness direction perpendicular to one another, comprising:

- a first waist part;
- a crotch part;
- a second waist part,

the first waist part, the crotch part and the second waist part being arranged in this order in the longitudinal direction;

fastening tapes

which are respectively fixed to the transverse ends of the second waist part, and

which are fastened to the first waist part and thereby a waist opening and a pair of leg openings are formed; and

a tear-off line

that is for cutting out a section of the second waist part to which the fastening tape is fixed and

that is formed in a state in which the diaper is spread out.

2. An open-type disposable diaper according to claim 1, wherein the tear-off line corresponds to each of the fastening tapes and is formed at each of positions on both sides in the transverse direction,

the tear-off line is formed extending from a section which serves as the waist opening, to a section which serves as the leg opening, through a position in the transverse direction on an inner side of the section to which the fastening tape is fixed.

3. An open-type disposable diaper according to claim 1 or 2, wherein

the tear-off line includes a plurality of through holes extending through in the thickness direction, and

the plurality of through holes are placed along a direction in which the tear-off line should extend.

4. An open-type disposable diaper according to claim 3, wherein the tear-off line includes

a first tear-off line part that is formed extending longitudinally inwardly from a section which serves as the waist opening, and

a second tear-off line part

that is located in a position on an inner side of the first tear-off line part in the longitudinal direction and

that is located in the same longitudinal position as the fastening tape,

regarding a ratio of a length of the through holes to unit length in a direction in which the tear-off line extends, the ratio in the second tear-off line part is smaller than the ratio in the first tear-off line part.

5. An open-type disposable diaper according to claim 4, wherein the tear-off line includes a curved part on the inner side of the second tear-off line part in the longitudinal direction,

the curved part being in curved shape and shifting outwardly in the transverse direction as it goes inwardly in the longitudinal direction,

regarding a ratio of a length of the through holes to unit length in a direction in which the tear-off line extends, the ratio in the second tear-off line part is smaller than the ratio in the curved part.

6. An open-type disposable diaper according to any one of claims 1 to 3, wherein

the tear-off line includes

a straight part that extends straight along the longitudinal direction from a section which serves as the waist opening, and

a curved part

that is in curved shape and

that is located on an inner side of the straight part in the longitudinal direction and shifts outwardly in the transverse direction as it goes inwardly in the longitudinal direction.

7. An open-type disposable diaper according to claim 6, wherein leg-circumference elastic members are provided along the longitudinal direction in positions on both sides in the transverse direction,

each of the leg-circumference elastic members being for shrinking a section which serves as the leg opening in the longitudinal direction, and

assuming that the curved part is divided into a portion near the waist opening and a portion near the leg opening,

when the leg-circumference elastic member is seen from the thickness direction, the leg-circumference elastic member intersects a portion of the curved part on a side of the waist opening.

8. An open-type disposable diaper according to claim 6 or 7, wherein

the diaper includes a plurality of sheets stacked in the thickness direction,

the number of the stacked sheets in at least a portion of the curved part is smaller than the number of the stacked sheets in the straight part.

9. An open-type disposable diaper according to any one of claims 6 to 8, wherein

the diaper includes resin film,

a direction in which the resin film stretches at time of manufacture is along the longitudinal direction, and

the straight part is formed in the resin film.

10. An open-type disposable diaper according to any one of claims 1 to 9, wherein

a sheet-like standing-gathers forming section is provided along the longitudinal direction in positions on both sides in the transverse direction,

the standing-gathers forming section includes a base portion and a standing portion that are arranged in this order in the transverse direction,

the base portion is not able to stand in the thickness direction,

the standing portion is able to stand from the base portion on a skin side in the thickness direction, the base portion serving as the point of support,

the standing portion stands on the skin side in the thickness direction due to shrinkage of the standing portion in the longitudinal direction by longitudinal shrinkage force that acts on the standing portion, and

the tear-off line is formed on outer sides of the base portion and the standing portion in the transverse direction.

11. An open-type disposable diaper according to any one of claims 1 to 10, wherein

the diaper further comprises an absorbent core at the center in the transverse direction,

the absorbent core absorbs liquid and is composed of liquid absorbent material deposited in the thickness direction, and

the tear-off line is formed on an outer side of the absorbent core in the transverse direction.

12. An open-type disposable diaper according to any one of claims 1 to 11, wherein

in a section of the first waist part which serves as the waist opening, a cutting line is formed along the longitudinal

direction on a same transverse position as the tear-off line.