

[DESCRIPTION]

[Title of Invention]

Disposable diaper

[Technical Field]

[0001]

The present invention relates to a disposable diaper.

[Background Art]

[0002]

Conventionally, there is known a disposable diaper having: a front waistline region; a back waistline region; and a crotch region which is positioned between the front waistline region and the back waistline region, a pair of leg-hole opening units being formed therein, the disposable diaper being provided with an absorber running across the crotch region and extending to the front waistline region and the back waistline region.

[0003]

Here, in Patent Literature 1 and Patent Literature 2, there are disclosed a technique of, in such a disposable diaper, providing an indicator which is composed of an alterant by which pH varies due to the alterant coming into contact with moisture to cause discoloration, at a position which is visually recognizeable from a non-skin contact surface side.

[0004]

A wearing assistant can check whether or not excretion by a wearer arises, from the non-skin contact surface side of the disposable diaper.

[Citation List]

[Patent Literature]

[0005]

[Patent Literature 1] Japanese Patent No. 4086712

[Patent Literature 2] Japanese Unexamined Patent Application Publication No. H11-4852

[Summary of Invention]

[0006]

In the conventional disposable diaper, an indicator is configured to come into contact with a mount which is adhered in duplicate in order to clarify a degree of discoloration of the indicator.

[0007]

However, in the disposable diaper as mentioned above, an absorbent core is covered with the mount as mentioned above and thus there has been a problem that a component of the indicator permeates into the mount and reacts with the moisture that is absorbed by SAP (Superabsorbent polymer), and the indicator may cause discoloration before use of the disposable diaper as mentioned above.

[0008]

Specifically, in the disposable diaper as mentioned above, there is almost no space between the absorbent core and the indicator and thus there has been a problem that permeation of the component of the indicator easily arises depending on non-uniformity of a basis weight of the mount or a fixing level of the indicator, and the indicator is discolored due to the moisture that retained by the SAP in the absorbent core before use of the disposable diaper.

[0009]

Further, if thinning of the absorbent core advances, a basis weight of bulky pulp decreases, and a SAP ratio increases, whereby there is a higher risk that the SAP is exposed to the non-skin contact surface side of the

absorbent core and thus there has been a problem that the moisture that is retained by the SAP easily accelerates discoloration of the indicator.

[0010]

Accordingly, the present invention has been made in view of such a circumstance, and it is an object of the present invention to provide a disposable diaper which is capable of making it difficult to cause a circumstance that an indicator is partially discolored before use.

[0011]

First aspect of the present invention is summerized as a disposable diaper having: a front waistline region; a back waistline region; and a crotch region which is positioned between the front waistline region and the back waistline region, the disposable diaper comprising an absorber running across the crotch region and extending to the front waistline region and the back waistline region, the disposable diaper having: a product longitudinal direction which is oriented from the front waistline region to the back waistline region; and a product widthwise direction which is orthogonal to the product longitudinal direction, the disposable diaper comprising: a liquid-impermeable backsheet which is disposed at a non-skin contact surface side of the absorber; and

an indicator which is provided between the backsheet and the absorber and which is configured to visually change if the indicator comes into contact with moisture, wherein a non-skin contact surface side and a skin contact surface side of an absorbent core which constitutes the absorber are covered with a liquid-permeable covering sheet, wherein the covering sheet is configured to overlap at the non-skin contact surface side of the absorbent core, wherein an overlap site of the covering sheet is configured to extend along the product longitudinal direction, wherein at the overlap site of the covering sheet, by way of adhesive, an end of an inside sheet and an outside sheet which is disposed a non-skin contact surface side of the inside sheet are configured to be joined with each other, and an end of the outside sheet and the inside sheet are configured to be joined with each other, wherein between regions in which the adhesive is applied, a non-joint region in which the inside sheet and the outside sheet are not joined with each other is configured to extend in the product longitudinal direction, and wherein the indicator is provided in the non-joint region.

[Brief Description of Drawings]

[0012]

[Fig. 1] Fig. 1 is an exploded plan view (skin contact surface side S2) of a disposable diaper according to a first embodiment of the present invention.

[Fig. 2] Fig. 2 is an exploded plan view (non-skin contact surface side S1) of a disposable diaper according to a first embodiment of the present invention.

[Fig. 3] Fig. 3 is a sectional view of the disposable diaper according to the embodiment, taken along the line F1-F1 shown in Fig. 1 and Fig. 2.

[Fig. 4] Fig. 4 is a sectional view of the disposable diaper according to the embodiment, taken along the line F2-F2 shown in Fig. 1 and Fig. 2.

[Fig. 5] Fig. 5 is a view showing an example of a region in which adhesive is applied to a covering sheet which is included in the disposable diaper according to the first embodiment of the present invention.

[Fig. 6] Fig. 6 is a sectional view (a sectional view taken along the line F1-F1 shown in Fig. 1 and Fig. 2) of a disposable diaper according to Modification Example of the present invention.

[Fig. 7] Fig. 7 is a sectional view (a sectional view taken along the line F1-F1 shown in Fig. 1 and Fig. 2) of the disposable diaper according to Modification Example of the present invention.

[Fig. 8] Fig. 8 is a sectional view (a sectional view taken along the line F1-F1 shown in Fig. 1 and Fig. 2) of the disposable diaper according to Modification Example of the present invention.

[Description of Embodiments]

[0013]

(First Embodiment of the Present Invention)

With reference to Fig. 1 to Fig. 5, a disposable diaper 10 according to a first embodiment of the present invention will be described.

[0014]

It is noted that, in the description of the drawings below, identical or similar symbols are assigned to identical or similar portions. However, it should be noted that the drawings are schematic and ratios of respective dimensions and the like are different from actual ones.

[0015]

Therefore, a specific dimension and the like should be determined in view of the following description. Moreover, among the drawings, the respective dimensional relations or ratios may differ.

[0016]

It is to be noted that although explanation is made citing a tape-type disposable diaper 10 as an example in the present embodiment, the present invention is also applicable to a pant-type disposable diaper 10.

[0017]

Fig. 1 is an exploded plan view of a disposable diaper 10 according to the embodiment when the disposable diaper is seen from the non-skin contact surface side S1; Fig. 2 is an exploded plan view of the disposable diaper 10 according to the embodiment when the disposable diaper is seen from the skin contact surface side S2; Fig. 3 is a sectional view of the disposable diaper 10 according to the embodiment, taken along the line F1-F1 shown in Fig. 1; Fig. 4 is a sectional view of the disposable diaper 10 according to the embodiment, taken along the line F2-F2 shown in Fig. 1; and Fig. 5 is a view showing an example of a region in which adhesive is applied to a covering sheet 40b which is included in the disposable diaper 10 according to the embodiment.

[0018]

The exploded plan views of Fig. 1 and Fig. 2 each are a diagram in which an elastic member 71 (leg elastic member) of leg stretching unit 75 and leg side gathers 80 are in an elongated state such that wrinkles are not formed in a topsheet 50 and side flap 70, for example, that configure the disposable diaper 10.

[0019]

As illustrated in Fig. 1 and Fig. 2, the disposable diaper 10 according to the present embodiment includes a front waistline region 20, a crotch region 25, and a back waistline region 30.

[0020]

Here, the front waistline region 20 is the portion that is in contact with the front waistline portion (an abdominal portion) of a wearer, the back waistline region 30 is the portion that is in contact with a back waistline portion (a back portion) of the wearer, and the crotch region 25 is the portion that is positioned between the front waistline region 20 and the back waistline region 30, that is in contact with the crotch (excretion opening) of the wearer.

[0021]

In the present embodiment, the direction from the front waistline region 20 towards the back waistline region 30 is called the product longitudinal direction L, and the direction perpendicular to the product longitudinal direction L is called the product widthwise direction W.

[0022]

Herein, a crotch unit 200 is formed within the crotch region 25, and a region closer to the abdominal side of the wearer than the crotch unit 200 is defined as a front waistline region 20 while a region closer to a backside of the wearer than the crotch unit 200 is defined as a back waistline region 30.

[0023]

Further, it is configured that a length (in a natural state) in the product longitudinal direction L of the back waistline region 30 is longer than a length (in a natural state) in the product longitudinal direction L of the front waistline region 20.

[0024]

Furthermore, a pair of leg-hole opening units 35 is formed in the disposable diaper 10 according to the present embodiment. The leg-hole opening units 35 are provided to side ends in the product widthwise direction W of the disposable diaper 10, respectively, and are parts that are arranged along the leg holes of the wearer in a state where the disposable diaper 10 is worn by the wearer.

[0025]

The disposable diaper 10 according to present invention includes an absorber 40 spanning the crotch region 25 and extending toward at least one of the front waistline region 20 and the back waistline region 30 from the crotch region 25.

[0026]

As illustrated in Fig. 3 and Fig. 4, the absorber 40 is configured by an absorbent core 40a and a covering sheet (a core wrap) 40b.

[0027]

The absorbent core 40a is same as in the conventional disposable diaper, and the absorbent core 40a can be configured appropriately by using popular components and materials, such as ground pulp and SAP.

[0028]

Here, the contained amount of the SAP in the absorbent core 40a may be constituted so as to be 35% or more and 95% or less with respect to a basis weight of the absorbent core 40a. More preferably, it is preferable that the contained amount of the SAP in the absorbent core 40a be constituted so as to be 45% or more.

[0029]

A liquid absorption quantity and a liquid retention quantity of the absorbent core 40a can be increased by increasing a rate of the contained amount of the SAP with respect to the basis weight of the absorbent core 40a.

[0030]

Also, the SAP may be constituted so that a larger amount thereof exists at the non-skin contact surface side S1 than at the skin contact surface side S2 in the absorbent core 40a.

[0031]

According to the structure as mentioned above, a velocity of taking bodily wastes in the absorbent core 40a can be accelerated.

[0032]

Also, according to the structure, there is attained an advantageous effect of enhancing an absorption function of the disposable diaper 10, and discoloration of the indicator can be restrained.

[0033]

For example, the contained amount of ground pulp in the absorbent core 40a is 100 gsm to 300 gsm (for example, 220 gsp), and the contained amount of the SAP in the absorbent core 40a is 100 gsm to 300 gsp (for example, 150 gsp).

[0034]

The covering sheet 40b is a sheet covering the absorbent core 40a. For example, an air-through fibrous nonwoven fabric, a spunbond nonwoven fabric, or an SMS (spunbond - meltblown - spunbond) nonwoven fabric having a mass of approximately 10 to 30 g/m², or a tissue sheet having a mass of approximately 10 to 30 g/m² can be used as the component configuring the covering sheet 40b.

[0035]

Specifically, the non-skin contact surface side S1 and the skin contact surface side S2 of the absorbent core 40a are covered with the covering sheet 40b.

[0036]

For example, the covering sheet 40b may be configured to envelope the entirety of the absorbent core 40a.

[0037]

As shown in Fig. 3, the covering sheet 40b is configured to overlap at the non-skin contact surface side S1 of the absorbent core 40a (refer to site A of Fig. 3)

[0038]

Here, the overlap site A of the covering sheet 40b is configured to extend along the product longitudinal direction L.

[0039]

Also, as shown in Fig. 3, at the overlap site A of the covering sheet 40b, an end 41E of an inside sheet 41 and an outside sheet 42 are joined with each other by adhesive 1 such as a hot melt-type adhesive agent (HMA), and an end 4E of the outside sheet 42 and the inside sheet 41 are configured to be joined with each other.

[0040]

Here, the inside sheet 41 is a covering sheet which is disposed at the absorbent core 40a side at the overlap site A of the covering sheet 40b and which is joined with the absorbent core 40a, and the outside sheet 42 is a covering sheet which is disposed at an opposite side to the absorbent core 40a at the overlap site A of the covering sheet 40b.

[0041]

Between regions in which the adhesive 1 is applied, a non-joint region B in which the inside sheet 41 and the outside sheet 42 are not joined with each other is configured to extend in the product longitudinal direction L.

[0042]

As shown in Fig. 3 and Fig. 4, a liquid-permeable topsheet 50 is provided at the skin contact surface side S2 of the absorber 40, and a liquid-impermeable backsheet 60a is provided at the non-skin contact surface side S1 of the absorber 40.

[0043]

It is to be noted that the backsheet 60a is composed of a film and a nonwoven sheet. Here, on the film as mentioned above, a design which can be visually recognized from the non-skin contact surface side S1 of the disposable diaper 10 is provided.

[0044]

Also, between the backsheet 60a and the absorber 40, there is provided an indicator 600 composed of an alterant which visually changes if the alterant comes into contact with moisture.

[0045]

The indicator 600 may be provided in a neutral region of the product widthwise direction W and in a non-joint region B.

[0046]

Further, a direction in which the indicator 600 extends may be configured to be coincident with a direction in which Klemm water absorption of the covering sheet 40b is high at level.

[0047]

As shown in Fig. 2, the direction in which the indicator 600 extends is equivalent to the product longitudinal direction L.

[0048]

It is to be noted that, in so far as Klemm water absorption of the covering sheet 40b is concerned, measurement can be carried out in conformance with JIS-P8141.

[0049]

Specifically, first, there are prepared: a sample 1 cut out in a short piece manner in predetermined dimensions (width 20 mm, length 200 mm) along the direction in which the indicator 600 extends; and a sample 2 cut out along a direction extending to a direction which is orthogonal to the direction in which the indicator 600 extends.

[0050]

Second, a vertical direction of the samples 1 and 2 as mentioned above is defined as a vertical direction, a portion of 15 mm from a lower end of a respective one of the samples 1 and 2 as mentioned above is immersed in distilled water, and after 10 minutes $\pm$ 10 seconds subsequent to the immersion, a distance (mm) at which the distilled water has been absorbed from the lower end of a respective one of the samples 1 and 2 is measured.

[0051]

Third, a value of the measurement as mentioned above is defined as a "Klemm water absorption level", the Klemm water absorption levels of the samples 1 and 2 are compared with each other, and determination is made as to which of the samples 1 and 2 is a structure which is coincident with a direction in which the Klemm water absorption of the covering sheet 40b is high at level.

[0052]

According to the structure as mentioned above, the direction in which the indicator 600 extends is made coincident with the direction in which the Klemm water absorption of the covering sheet 40b is high at level, whereby, even in a case where there is employed a structure in which a plurality of covering sheets 40b are overlapped, moisture of bodily wastes can be diffused along the indicator 600 and thus it is possible to prevent shortage of discoloration of the indicator 600.

[0053]

If a length of the product widthwise direction of the indicator 600 is too large, all regions of the product widthwise direction of the indicator 600 cannot cause discoloration, non-uniformity arises, and the wearing assistant mistakenly recognizes timing of replacement of the disposable diaper 10 and thus it is preferable that the length be not too large.

[0054]

In the above mentioned point of view, it is preferable that the length of the product widthwise direction W of the indicator 600 be 1 mm or more and 10 mm or less, and it is more preferable that the length be 1 mm or more and 5 mm or less.

[0055]

It is to be noted that at least a part of the skin contact surface side S2 of the covering sheet 40b has liquid permeability.

[0056]

Here, in view of non-uniformity in basis weight, it is preferable that a basis weight of the covering sheet 40b be 7 gsm or more, and in view of liquid permeability, in order to cause discoloration of the indicator 600 even if the amount of bodily wastes is small, it is preferable that the basis weight of the covering sheet 40b be 20 gsm or less, and it is more preferable that the basis weight be 10 gsm to 15 gsm.

[0057]

Also, in the non-joint region B, the outside sheet 42 is slackened, whereby, as shown in Fig. 3, a plurality of convex shapes may be configured to be formed in order to make it easy to form a plurality of wrinkles at the skin contact surface side S2 of the outside sheet 42.

[0058]

Therefore, in a state of being stretched free of wrinkles, a length of the product widthwise direction W of the inside sheet 41 in the non-joint region B is adapted to be different from a length of the product widthwise direction W of the outside sheet 42 in the non-joint region B.

[0059]

According to the structure as mentioned above, a space is provided between the indicator 600 and the absorbent core 40a and thus the indicator 600 and the absorbent core 40a hardly come into contact with each other.

[0060]

Also, in a region in which the indicator 600 is not provided, the outside sheet 42 may be joined with the inside sheet 41. According to the structure as mentioned above, it is possible to restrain deformation of the absorbent core 40a at the time of wearing the disposable diaper 10, and it is also possible to prevent a circumstance that the SAP comes out from the covering sheet 40b by the covering sheet 40b.

[0061]

In addition, as shown in Fig. 1, Fig. 3, and Fig. 4, in so far as the disposable diaper 10 according to the embodiment is concerned, in the crotch unit 200, more specifically, in an absorber disposition region which runs across a center O of the product widthwise direction W in the crotch region 25 and in which the absorber 40 is disposed, a stretchable stretching member 200a (a crotch stretching unit) may be provided.

[0062]

Herein, the stretching member 200a may be stretchable in the product longitudinal direction L, may be stretchable in the product widthwise direction W, or alternatively, may be stretchable in both of the product longitudinal direction L and the product widthwise direction W.

[0063]

Furthermore, a center O2 of the stretching member 200a in the product longitudinal direction L is arranged closer to the side of the front waistline region 20 as compared to a center O1 of the disposable diaper 10 in the product longitudinal direction L. Furthermore, the stretching member 200a is arranged so as to span the center O1 of the disposable diaper 10 in the product longitudinal direction L.

[0064]

More specifically, the stretching member 200a is provided so as to overlap with the region in which the indicator 600 is provided. Also, the stretching member 200a is disposed between the backsheet 60a and the covering sheet 40b covering the non-skin contact surface side S1 of the absorbent core 40a.

[0065]

The stretching member 200a as mentioned above is configured to be kept in a flat shape while unevenness (a wrinkle) does not arise even in a state the stretching member shrinks in a natural state.

[0066]

Therefore, due to the shrink of the stretching member 200a as mentioned above, in the non-joint region B, as shown in Fig. 3, a plurality of convex shapes are formed between the inside sheet 41 and the outside sheet 42 that are made of non-elastic sheets, and as a result, a space is produced between the inside sheet 41 and the outside sheet 42.

[0067]

Also, in the region in which the indicator 600 is provided, by way of the indicator 600, the stretching member 200a at the S1 side with which the indicator 600 comes into contact and the outside sheet 42 at the S2 side are joined with each other and thus the rigidity is higher than that of an adjacent region in which the indicator 600 is not provided, and in the region in which the indicator 600 is not provided, the outside sheet 42 mainly shrinks.

[0068]

As a result, the absorbent core 40a and the indicator 600 further hardly come into contact with each other.

[0069]

Similarly, the stretching member 200a is kept in a flat shape even in its shrunk state in a natural state and thus the non-elastic backsheet 60a forms a convex shape at the non-skin contact surface side S1, impact can be mitigated even if a pressure is applied from the non-skin contact surface side S1, and a space between the indicator 600 and the absorbent core 40a can be retained.

[0070]

Incidentally, in view of the pressure in the package, in addition to joining the indicator 600 and the outside sheet 42 with each other, it is preferable to join the stretching member 200a and the indicator 600 so as to overlap with each other and then generate wrinkles at the inside sheet 41 and the outside sheet 42 due to the shrink of the stretching member 200a in a natural state (in a package-sealed state) as well, so as to be able to retain the space between the inside sheet 41 and the outside sheet 42.

[0071]

In such a state, in order to retain the space between the indicator 600 and the absorbent core 40a, it is preferable that the backsheet 60a, the exterior sheet 60, and the stretching member 200a be high in rigidity.

[0072]

Here, in view of softness or a touch sense at the time of wearing, it is preferable that a basis weight of film constituting the backsheet 60a be 10 gsm to 30 gsm, a basis weight of nonwoven sheet constituting the backsheet 60a be 10 gsm to 40 gsm, and a basis weight of the stretching member 200a be 20 gsm to 50 gsm.

[0073]

Also, the frequency of generation of unevenness or the height of the unevenness increases, and the space between the indicator 600 and the absorbent core 40a is easily retained and thus it is preferable that the elasticity of the stretching member 200a be high.

[0074]

However, in view of the touch sense, it is preferable that the elasticity of the stretching member 200a be 1.1 times to 1.8 times.

[0075]

The stretch rate implies the extent of stretching of the stretching member 200a in the stretching direction (product longitudinal direction L in the present embodiment), and is stipulated as below:

[0076]

Stretch rate = (Length in the stretching direction of the stretching member 200a in the maximum stretched state) / (Length in the stretching direction of the stretching member 200a in the natural state)

It is to be noted that the stretch rate as used herein is to be measured as described below, for example.

[0077]

Firstly, in a case where the disposable diaper 10 is sealed in package or the like, the disposable diaper 10 is taken out from the package, and in that state, the diaper is left for 60 minutes in an atmospheric environment of 20 degrees Centigrade $\pm$ 2 degree Centigrade and a relative humidity of 60 % $\pm$ 5% RH, and then, a length of the stretching member 200a is measured in a stretching direction. This length is defined as "a length of the

stretching member 200a in a natural state”.

[0078]

It is to be noted that such measurement was carried out using a spring tape measure produced by Shinwa Rules Co., Ltd. (a tape unit: glass fiber-containing vinyl chloride coating) in such a manner as to be taken along a measurement object area (10 samples).

[0079]

Secondly, the length in the stretching direction of the desired region of the open-type disposable diaper in this state (that is, in the natural state), and the length in the stretching direction of the desired region, when the open-type disposable diaper is stretched from its natural state until wrinkles caused by the elastic members cannot be visually checked, are measured. This length is defined as “a length of the stretching member 200a in the stretched state”.

[0080]

By employing these results of measurement and then carrying out computation by the formula as mentioned above, the stretch rate is measured.

[0081]

Further, in a region in which the indicator 600 is provided, it is preferable that the stretching member 200a be joined with the outside sheet 42 and the backsheet 60a.

[0082]

According to the structure as mentioned above, in the region in which the indicator 600 is provided, sheets of the non-skin contact side S1 (such as the stretching member 200a, the backsheet 60a, and exterior sheets 60) come into intimate contact more significantly than the indicator 600 and thus discoloration of the indicator 600 is easily visually recognized from the non-skin contact surface side S1.

[0083]

As shown in Fig. 3 and Fig. 4, the exterior sheet 60 composed of a nonwoven sheet may be provided at the non-skin contact surface side S1 of the backsheet 60a. The exterior sheet 60 as mentioned above forms an emboss array in a direction crossing to the stretching direction.

[0084]

It is to be noted that the backsheet 60a and the exterior sheet 60 may be joined with each other in a dot pattern or a line pattern.

[0085]

A side flap 70 is provided at both side edges in the product widthwise direction W of the absorber 40. The side flaps 70 are made of one or two or more pieces of nonwoven fabrics overlapping one another.

[0086]

Further, as shown in Fig. 1 and Fig. 2, a fastening tape 90 is provided in each of the pair of side flaps 70.

[0087]

The fastening tape 90 extends in the product widthwise direction W in the back waistline region 30, and is configured to retain the disposable diaper 10 at the wearer's body by being mounted to the target unit 95 that is disposed on the non-skin contact surface of the front waistline region 20.

[0088]

Also, as shown in Fig. 1 to Fig. 3, a pair of stretchable leg stretching units (leg gathers) 75 that are formed along the leg-hole opening units 35 at between the side flaps 70 and the exterior sheet 60, and that are provided in at least the product longitudinal direction L.

[0089]

Further, as shown in Fig. 1, a pair of leg side gathers 80 extending along the product longitudinal direction L

may be provided at the inner side of the pair of leg stretching units 75 (towards the center O in the product widthwise direction W).

[0090]

The leg side gathers 80 are provided at inside ends in the product widthwise direction W of the side flap 70, and are rising-type stretching gathers disposed to be inner in the product widthwise direction W than the leg stretching unit 75.

[0091]

The side flap 70 is folded back to the side of topsheet 50 at an inside end in the product widthwise direction W, and is laminated in two layers.

[0092]

As shown in Fig. 3, an elastic member 71 in a state of being stretched out in the product longitudinal direction L is provided between laminated pieces of the side flap 70. The leg side gathers 80 are made up of the side flaps 70 and the elastic members 71.

[0093]

The leg side gathers 80 include a joining portion 81 joined to the topsheet 50 or the backsheet 60a, and a free end portion 82 provided with an elastic member 71.

[0094]

Of a free end portion 82, a central portion in the product longitudinal direction L including a crotch region 25 is shrunk in the product longitudinal direction L by the elastic member 71.

[0095]

The leg side gathers 80 rise, with a joining portion 81 being a proximal end, at the time of wearing of the disposable diaper 10, and come into contact with the wearer's skin with the shrinking unit 84 of the free end portion 82 being an apex part. That is, the joining portion as mentioned above is obtained as a proximal portion of the rise of the leg side stretching unit.

[0096]

Also, Fig. 1 shows leg side gathers 80 by applying the shaded line to a joining portion 81 at which a side flap 70 and a topsheet 50 (or backsheet 60a and the like) are joined with each other.

[0097]

In the disposable diaper 10 according to the embodiment, a waist stretching unit 100 composed of an elastic sheet may be provided.

[0098]

Further, as shown in Fig. 1, the absorber 40 may have a low rigidity region 210 in the back waistline region 30, the low rigidity region 210 having a smaller basis weight than the other area of the absorber 40 or having no existence of the absorbent core 40a.

[0099]

The low rigidity region 210 and the waist stretching unit 100 to shrink in the product widthwise direction W overlap with each other, whereby the absorbent cores 40a outside of the product widthwise direction of the low rigidity region 210 are forced to close to the center of the product widthwise direction W, are shaped like a cup, and are formed in a shape which is easily taken along the wearer's buttocks part.

[0100]

Furthermore, the absorber 40 has a stretch suppression region 220 as a region in which stretch in the product widthwise direction W is suppressed as compared to the other region.

[0101]

Herein, the stretch suppression region 220, as shown in Fig. 1, is formed at each of the outer sides in the

product widthwise direction W of the low rigidity region 210.

[0102]

Furthermore, a boundary between the stretch suppression region 220 and the low rigidity region 210 is formed in an arc shape projecting toward the center in the product widthwise direction W. With such a configuration, a wearing helper can be given an image of a shape of the buttocks of the wearer.

[0103]

As shown in Fig. 1, at the crotch region 25 of the absorber 40, a notch 110 and a notch 120 are formed. The notch 110 and the notch 120 are regions in which the absorbent core 40a making up the absorber 40 does not exist.

[0104]

It is to be noted that in place of forming the notch 110 and the notch 120, it may be configured to set a basis weight of the absorbent core 40a smaller than the other area of the absorbent core 40a.

[0105]

As shown in Fig. 1, the notch 110 and the notch 120 are formed along the edge in the product longitudinal direction L of the stretching member 200a.

[0106]

The notch 110 and the notch 120 are configured so that the length (in the natural state) in the product longitudinal direction L increases as these notches go to the outside in the product widthwise direction W.

[0107]

The edge at the side of the front waistline region 20 in the product longitudinal direction L of the notch 110 makes up a first inflection unit 115 while the edge at the side of the back waistline region 30 in the product longitudinal direction L of the notch 120 makes up a second inflection unit 125.

[0108]

It is to be noted that the first inflection unit 115 and the second inflection unit 125 are configured to extend in the product widthwise direction W to function as a bending base point of the disposable diaper 10.

[0109]

Next, an example of a manufacturing method of the disposable diaper 10 according to the embodiment will be described. It is to be noted that an existing method can be employed as to the manufacturing method that is not described in the embodiment. Also, the manufacturing method that is described hereinafter is merely provided as an example, and the disposable diaper 10 according to the embodiment can also be measured by another manufacturing method. The manufacturing method of the disposable diaper 10 as mentioned above includes at least the steps of: forming components; placing components; forming leg-holes; and cutting.

[0110]

In the step of forming components, components (for example, the absorber 40) constituting the disposable diaper 10 are formed.

[0111]

In the step of placing components, an elastic sheet constituting the leg stretching unit 75, other webs constituting the topsheet 50, and components constituting the disposable diaper 10 such as the absorber 40 are placed on the webs constituting the backsheet 60a.

[0112]

Here, at a stage at which the absorbent core 40a is covered with the covering sheet 40b, by varying a material conveyance velocity (a feed quantity) of a site which is equivalent to the outside sheet 42 and a material conveyance velocity (a feed quantity) of a site which is equivalent to the inside sheet 41, or alternatively, by varying resistances of conveyance lines at both of the sites, slackness can be provided by covering the

absorbent core 40a while one of the inside sheets 41 and the outside sheets 42 is slackened.

[0113]

In the step of forming leg-holes, a part of elastic sheets constituting the topsheet 50, the exterior sheet 60, the backsheet 60a, and the leg stretching unit 75 is cut along an outside end in an MD direction of the leg stretching unit 75. In this manner, the leg-hole opening unit 35 that is disposed along the wearer's leg hole is formed.

[0114]

In the step of cutting, a continuous body at which the topsheet 50, the backsheet 60a, and the absorber 40 or the like have been disposed is cut in size of one product along the MD direction. In this manner, the disposable diaper 10 is manufactured.

[0115]

In so far as the disposable diaper 10 according to the embodiment according to the embodiment is concerned, a space is generated between the inside sheet 41 and the outside sheet 42; the absorbent core 40a and the indicator 600 hardly come into contact with each other; and it is possible to avoid a circumstance that the indicator 600 is discolored before excretion of the wearer.

[0116]

Also, in so far as the disposable diaper 10 according to the embodiment according to the embodiment is concerned, at the time of excretion of the wearer, the inside sheet 41 and the outside sheet 42 are wetted by bodily fluid; the inside sheet 41 and the outside sheet 42 come into intimate contact with each other due to surface tension of the liquid that is interposed between the inside sheet 41 and the outside sheet 42; and the adhesive 1 does not exist between both of these sheets and thus the indicator 600 can be speedily discolored.

[0117]

In addition, in so far as the disposable diaper 10 according to the embodiment according to the embodiment is concerned, the adhesive 1 does not exist at the overlap site A of the inside sheet 41 and the outside sheet 42 that can be the heaviest in basis weight and thus the absorber 40 can be finished to be soft.

[0118]

(Modification Example)

A disposable diaper 10 according to Modification Example of the present invention will be described focusing on matters which are different from those of the disposable diaper 10 according to the first embodiment as mentioned above.

[0119]

In the disposable diaper 10 according to Modification Example, as shown in Fig. 6, the stretching member 200a as mentioned above may not be provided.

[0120]

Also, in the disposable diaper 10 according to Modification Example, as shown in Fig. 7, the end 42E of the outside sheet 42 may be configured to be folded back to the inside sheet 41 side.

[0121]

Alternatively, in the disposable diaper 10 according to Modification Example, the end 41E of the inside sheet 41 may be configured so as to be folded back to the outside sheet 42 side.

[0122]

Alternatively, in the disposable diaper 10 according to Modification Example, the end 42E of the outside sheet 42 is configured to be folded back to the inside sheet 41 side, and the end 41E of the inside sheet 41 may be configured to be folded back to the outside sheet 42 side.

[0123]

According to the structure as mentioned above, a wider space can be formed between the absorbent core 40a and the indicator 600 by way of a fold back site of the end 41E of the inside sheet 41 and the end 42E of the outside sheet 42.

[0124]

Incidentally, it is preferable that a thickness of the fold back site of the end 41E of the inside sheet 41 or the end 42E of the outside sheet 42 be 0.05 mm to 0.3 mm from the viewpoints of ensuring the space as mentioned above and speedy discoloration at the time of excretion.

[0125]

Further, in the disposable diaper 10 according to Modification Example, as shown in Fig. 8, between the inside sheet 41 and the outside sheet 42, a sheet 2 such as a nonwoven sheet may be provided in a region in which the indicator 600 is not provided.

[0126]

According to the structure as mentioned above, by way of the sheet 2 as mentioned above, a wider space can be formed between the absorbent core 40a and the indicator 600.

[0127]

Incidentally, it is preferable that a thickness of the sheet 2 as mentioned above be 0.05 mm to 0.3 mm from the viewpoints of ensuring the space as mentioned above and speedy discoloration at the time of excretion of the wearer.

[0128]

As described above, the present invention has been described in detail by using the above-described embodiment. However, it is apparent to those skilled in the art that the present invention is not limited to the embodiment described in this description. The present invention can be modified and changed without departing from the gist and the scope of the present invention defined by the appended claims. Therefore, the description is aimed at illustration and explanation of the present invention, and does not have any meaning which limits the present invention.

[0129]

It is to be noted that all the contents of Japanese Patent Application No. 2012-247935 (which was filed on November 9, 2012) are incorporated in the present specification by reference.

[Industrial Applicability]

[0130]

It is possible to provide a disposable diaper which is capable of making it difficult to cause a circumstance that an indicator is partially discolored before use.

[Explanation of Numerals]

[0131]

10... Disposable diaper

20... Front waistline region

25... Crotch region

30... Back waistline region

35... Leg-hole opening unit

40... Absorber

40a... Absorbent core

40b... Covering sheet (core wrap)

50... Topsheet

60a... Backsheet

60... Exterior sheet
70... Side flap
71... Elastic member
75... Leg stretching unit
80... Leg side gather
81... Joint portion
82... Free end portion
90... Fastening tape
95... Target unit
100... Waist stretching unit
110, 120... Notch
115... First inflection unit
125... Second inflection unit
200... Crotch unit
200a...Stretching member
600... Indicator

[CLAIMS]

[Claim 1]

A disposable diaper having: a front waistline region; a back waistline region; and a crotch region which is positioned between the front waistline region and the back waistline region, the disposable diaper comprising an absorber running across the crotch region and extending to the front waistline region and the back waistline region, the disposable diaper having: a product longitudinal direction which is oriented from the front waistline region to the back waistline region; and a product widthwise direction which is orthogonal to the product longitudinal direction, the disposable diaper comprising:

- a liquid-impermeable backsheet which is disposed at a non-skin contact surface side of the absorber; and
- an indicator which is provided between the backsheet and the absorber and which is configured to visually change if the indicator comes into contact with moisture, wherein

- a non-skin contact surface side and a skin contact surface side of an absorbent core which configures the absorber are covered with a liquid-permeable covering sheet;

- the covering sheet is configured to overlap at the non-skin contact surface side of the absorbent core;

- an overlap site of the covering sheet is configured to extend along the product longitudinal direction;

- at the overlap site of the covering sheet, by way of adhesive, an end of an inside sheet and an outside sheet which is disposed a non-skin contact surface side of the inside sheet are configured to be joined with each other, and an end of the outside sheet and the inside sheet are configured to be joined with each other;

- between regions in which the adhesive is applied, a non-joint region in which the inside sheet and the outside sheet are not joined with each other is configured to extend in the product longitudinal direction; and

- the indicator is provided in the non-joint region.

[Claim 2]

The disposable diaper according to claim 1, wherein, in a state of being stretched without a wrinkle, a length of the product widthwise direction of the inside sheet in the non-joint region is configured to be different from a length of the product widthwise direction of the outside sheet in the non-joint region.

[Claim 3]

The disposable diaper according to claim 1 or claim 2, wherein

- a stretching member is provided so as to overlap in a region in which the indicator is provided; and

- the indicator is provided in a central region of the product widthwise direction.

[Claim 4]

The disposable diaper according to any one of claims 1 to 3, wherein an end of at least one of the inside sheet and the outside sheet is configured to be folded back to another side.

[Claim 5]

The disposable diaper according to any one of claims 1 to 4, wherein

- the absorbent core has a high absorption polymer;

- a contained amount of the high absorption polymer in the absorbent core is configured to be 35% or more and 95% or less with respect to a basis weight of the absorbent core; and

- the high absorption polymer is configured so that a large amount thereof exists at a non-skin contact surface side than at a skin contact surface side in the absorbent core.

[Claim 6]

The disposable diaper according to any one of claims 1 to 5, wherein a direction in which the indicator extends is configured to be coincident with a direction in which Klemm water absorption of the covering sheet is high at level.

[Claim 7]

The disposable diaper according to claim 3, wherein the stretching member is disposed between the backsheet and the covering sheet that covers the non-skin contact surface side of the absorbent core.

[Claim 8]

The disposable diaper according to any one of claims 1 to 7, wherein
an exterior sheet configured by a nonwoven fabric sheet having an emboss array in a direction crossing a stretching direction is provided at a non-skin contact surface side of the backsheet; and
the backsheet and the exterior sheet are joined with each other in a dot pattern or in a line pattern.