

{Description}

{Title of Invention}

DISPOSABLE WEARING ARTICLE

{Technical Field}

5 {0001}

The present invention relates to disposable wearing articles and more particularly to disposable wearing articles such as open-type disposable diapers, disposable toilet-training pants, disposable incontinent pants and
10 disposable sanitary napkins each having front and rear waist regions adapted to be joined to each other by the intermediary of fasteners when putting on the wearer's body.

{Background}

{0002}

15 Conventionally, open-type disposable wearing articles having front and rear waist regions adapted to be joined to each other by the intermediary of fasteners when putting on the wearer's body are known. For example, PTL 1 discloses a disposable diaper including a liquid-pervious topsheet, a
20 liquid-impervious leakage-barrier sheet, a liquid absorbent structure and side flaps formed on lateral edges of the absorbent structure, respectively. The respective side flaps are provided with fastening tapes by which the rear waist region and the front waist region are joined to each other and thereby the diaper

is formed into a pant shape. Leg elastics extending in the longitudinal direction are attached to the respective side flaps and elasticize the side flaps in the longitudinal direction. PTL 2 discloses a disposable diaper including an absorbent
5 chassis and a pair of flaps extending outward in a transverse direction from the chassis. The respective flaps are provided with fastening tape strips by which front and back sides of the diaper are joined to each other and thereby the diaper is formed into a pant shape. The respective flaps are provided with a
10 plurality of flap elastic members extending in the transverse direction of the diaper.

{Citation List}

{Patent Literature}

{0003}

15 {PTL 1} JP 2001-212175 A

{PTL 2} JP 2008-161527 A

{Summary}

{Technical Problem}

{0004}

20 In the disposable diapers disclosed by PTL 1 and PTL 2, respectively, the elastics extending the longitudinal direction or the transverse direction are attached to side flaps to ensure that the side flaps are kept in close contact with the wearer's body and thereby prevent the side flaps from being curled up.

However, these diapers of prior art still have a problem that the crotch region of the diaper might sag and eventually the diaper as a whole might slip down when the absorbent structure absorbs urine or other body waste and gains weight.

5 {0005}

An object of the present invention is to provide a disposable wearing article improved so that the disposable wearing article should not slip down even when urination or the like occurs.

10 {Solution to Problem}

{0006}

The present invention relates to a disposable wearing article having a longitudinal direction and a transverse direction. The disposable wearing article includes a chassis, an absorbent structure, side flaps and fastening means. The chassis has a skin-facing side and a non-skin-facing side opposite thereto, a first waist region corresponding to one of front and rear waist regions, a second waist region corresponding to another of the front and rear waist regions, a crotch region extending between these first and second waist regions and an imaginary transverse center line bisecting a dimension in the longitudinal direction. The absorbent structure is lying at least in the crotch region. The side flaps are lying outboard of the absorbent structure in the transverse direction. The

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fastening means are attached to the second waist region and used to connect the first and second waist regions with each other.

The side flaps have a pair of second flaps lying in the second waist region and a pair of crotch side flaps lying in the crotch
5 region. The fastening means include connected portions affixed to the respective second side flaps and extensions extending outward in the transverse direction from the associated connected portions and adapted to be fastened to the first waist region. Each of the connected portions is contoured by inner
10 and proximal edges extending in the longitudinal direction and front and rear ends. Imaginary lines respectively connecting intersections between the respective proximal edges and the front end to intersections between the respective side edges of the absorbent structure and the imaginary transverse center
15 line extend across the second side flaps and the crotch side flaps. The second side flaps have a bending stiffness in a range of 0.10 to 0.20 N/m in the longitudinal direction and in a range of 0.05 to 0.10 N/m in the transverse direction.

{Advantageous Effects of Invention}

20 {0007}

According to one or more embodiments of this invention, the bending stiffnesses of the second side flaps and the crotch side flaps are appropriately adjusted in a range of 0.10 to 0.20 N/m in the longitudinal direction and in a range of 0.05 to 0.10

N/m in the transverse direction to prevent the second side flaps as well as the crotch side flaps from being easily curled up. In addition, the ends of the respective imaginary lines lie on the second side flaps and therefore the front and rear waist regions may be joined to each other with use of the fastening means lying on the second side flaps to ensure that the wearing article can be reliably retained on the wearer's waist. Thus, the wearing article should not easily slip down along the wearer's body.

10 {Brief Description of Drawings}

{0008}

{Fig. 1} Fig. 1 is a perspective view of a disposable diaper as one example of disposable wearing articles formed into a pants shape.

15 {Fig. 2} Fig. 2 is a developed plan view of the diaper.

{Fig. 3} Fig. 3 is an exploded perspective view of the diaper.

{Fig. 4} Fig. 4 is a sectional view taken along line IV-IV in Fig.2.

20 {Fig. 5} Fig. 5 is a sectional view taken along line V-V in Fig. 2.

{Fig. 6} Fig. 6 is a diagram of the diaper put on the wearer's body.

{Description of Embodiments}

{0009}

Referring to Fig. 1, a diaper 1 has a longitudinal direction Y and a transverse direction X and includes a front waist region 11, a rear waist region 12, a crotch region 13 extending between these front and rear waist regions 11, 12, front and rear ends 14, 15 extending in the transverse direction X and lateral edges 16 extending in the longitudinal direction Y. In this embodiment, the front waist region 11 corresponds to a first waist region and the rear waist region 12 corresponds to a second waist region. The diaper 1 may be formed into a pant shape by engaging a hook component 81 attached to the rear waist region 12 with a loop component 82 attached to the front waist region 11.

15 {0010}

Referring to Figs. 2 through 5, the diaper 1 has an imaginary longitudinal center line P-P bisecting a dimension of the diaper 1 in the transverse direction X and an imaginary transverse center line Q-Q bisecting a dimension of the diaper 1 in the longitudinal direction Y and is approximately symmetric about the imaginary longitudinal center line P-P. In the accompanying drawings, one of each pair of symmetrically arranged components was not denoted by reference numeral as the case may be.

{0011}

Referring to Fig. 3, the diaper 1 has a liquid-pervious topsheet 20 lying on a skin-facing side facing the wearer's body, a liquid-impervious backsheet 30 lying on a non-skin-facing side opposite to the skin-facing side (i.e., garment-facing side), an absorbent structure 40 interposed between these top- and backsheets 20, 30, and a leakage-barrier sheet 50 interposed between the absorbent structure 40 and the backsheet 30. The topsheet 20 is formed on the skin-facing side with a pair of leakage-barrier cuffs 60 spaced apart from each other in the transverse direction X. The topsheet 20 cooperates with the backsheet 30 to form a chassis 10.

{0012}

As material of the topsheet 20, for example, a point-bonded fibrous nonwoven fabric having a mass per unit area of about 15 to about 35 g/m² may be used. As material of the backsheet 30, at least one of a spun bonded/melt blown/spun bonded (SMS) fibrous nonwoven fabric, a spun bonded fibrous nonwoven fabric, a plastic sheet and a laminate of one of these fibrous nonwoven fabrics and a plastic sheet may be used.

{0013}

As material of the leakage-barrier cuffs 60, for example, a spun bonded/melt blown/spun bonded (SMS) fibrous nonwoven fabric having a mass per unit area of about 10 to about 30 g/m²

may be used. Front and rear ends 61, 62 of the respective leakage-barrier cuffs 60 are bonded to front and rear ends 21, 22 of the topsheet 20 with hot melt adhesive or the like (not shown) so that the front and rear ends 61, 62 may be respectively aligned with the front and rear ends 21, 22. Proximal edges 63 of the respective leakage-barrier cuffs 60 are bonded to lateral edges 33 with hot melt adhesives (not shown). Distal edges 64 of the respective leakage-barrier cuffs 60 are not bonded to the topsheet 20 so that the distal edges 64 may be spaced away from the topsheet 20. The respective distal edges 64 are provided with cuff elastics 65 extending in the longitudinal direction Y and contractibly attached thereto under tension. The cuff elastics 65 attached to the cuffs 60 in this manner allow the respective distal edges 64 to be spaced away from the topsheet 20 as if they rise up on the topsheet 20 until these distal edges 64 come in close contact with the wearer's skin and thereby prevent body waste such as urine from leaking out of the diaper 1.

{0014}

The absorbent structure 40 is located at least in the rear waist region 12 and the crotch region 13 and, in this embodiment, the absorbent structure 40 extends across the crotch region 13 into the front and rear waist regions 11, 12. Referring to Fig. 5, the absorbent structure 40 has an absorbent body 44 and tissue

papers 45, 46 wrapping the body 44. As the body 44, at least one of fluff pulp, superabsorbent polymer particles and a mixture thereof may be used. Referring to Fig. 2, the absorbent structure 40 has a dimension in the front and rear waist regions 11, 12 measured in the transverse direction X larger than a dimension thereof measured along the imaginary transverse center line Q-Q.

More specifically, the dimension of the absorbent structure 40 in the transverse direction X is uniform at least in the front and rear waist regions 11, 12 and smaller than thereof the front and rear waist regions 11, 12 in the crotch region 13.

{0015}

The top- and backsheets 20, 30 and the absorbent structure 40 are bonded together by bonding means such as hot melt adhesives (not shown). The absorbent structure 40 is dimensioned to have a surface area smaller than those of the top- and backsheets 20, 30 so that the top- and backsheets 20, 30 may extend outward beyond front and rear ends 41, 42 as well as lateral edges 43 of the absorbent structure 40. In consequence, front and rear flaps 74, 75 in which the absorbent structure 40 is not present are defined outboard of the absorbent structure 40 in the longitudinal direction Y and side flaps in which also the absorbent structure 40 is not present are defined outboard of the absorbent structure 40 in the transverse direction X. The side flaps include a pair of front waist side flaps 71 defined

in the front waist region 11, a pair of rear waist side flaps 72 defined in the rear waist region 12 and a pair of crotch side flaps 73 defined in the crotch region 13. The crotch side flaps 73 are provided with leg elastics 76 extending in the longitudinal direction Y. The leg elastics 76 are contractibly attached under tension in the longitudinal direction Y to at least one of the top- and backsheets 20, 30 by bonding means such as hot melt adhesives.

{0016}

10 A leakage-barrier sheet 50 is interposed between the absorbent structure 40 and the backsheet 30. As material of the leakage-barrier sheet 50, a liquid-impervious and breathable plastic film may be used. In this way, it is possible to prevent urine or other body waste once having been absorbed by the absorbent body 44 from leaking out of the diaper 1.

{0017}

20 The backsheet 30 and the leakage-barrier sheet 50 are bonded to each other by a bonding region 90 such as hot melt adhesives. Lateral edges 93 of the bonding region 90 lie inboard of lateral edges 33 of the backsheet 30 as viewed in the transverse direction X and also inboard of lateral edges 53 of the leakage-barrier sheet 50 as viewed in the transverse direction X. In vicinities of these lateral edges 33, 53, non-bonded regions 94 are defined. In the non-bonding regions

94, the backsheet 30 and the leakage-barrier sheet 50 are not bonded to each other. The leakage-barrier sheet 50 is provided with leg elastics 76. More specifically, in this embodiment, two or more thread, string or strand leg elastics 76 are attached to the leakage-barrier sheet 50 so that these leg elastics 76 do not overlap the bonding region 90. In this regard, it is not essential that the leg elastics 76 should not overlap with the bonding region 90 at all as long as the leg elastics 76 partially lie outboard of the bonding region 90 in the transverse direction X. The bonding region 90 may be continuously formed in a planar pattern with use of a coater or the like or may be intermittently formed in a spiral pattern with use of a spiral spray or the like.

{0018}

The respective hook components 81 are attached by the intermediary of associated base sheets 83 to the rear waist region 12. The base sheets 83 have connected portions 84 affixed to the second side flaps 72 and extensions 85 extending outward from the associated connected portions 84 beyond the associated side edges 16 in the transverse direction X wherein the respective hook components 81 are attached to the respective extensions 85. The connected portions 84 are interposed between the associated leakage-barrier cuffs 60 and the backsheet 30 (See Figs. 3 and 4) and are defined by inner and proximal edges

84a, 84b extending in the longitudinal direction Y and front and rear ends 84c, 84d extending in the transverse direction X, respectively.

{0019}

5 Imaginary lines R each connecting an intersection A of the outer side edge 84b and the front end 84c in each of the connected portions 84 with an intersection B of the associated side edge 43 of the absorbent structure 40 and the imaginary transverse center line Q-Q respectively extend across the second
10 side flaps 72 and the crotch side flaps 73. In other words, these imaginary lines R extend outboard of the absorbent structure 40 as viewed in the transverse direction X without overlapping the absorbent structure 40.

{0020}

15 The respective leg elastics 76 have rear ends 76b thereof extending inboard of the imaginary lines R, i.e., on the side of the rear waist regions 12. In other words, the leg elastics 76 intersect with the associated imaginary lines R. Front ends 76a of the respective leg elastics 76 extend across the crotch
20 region 13 into the front waist region 11.

{0021}

 The first and second side flaps 71, 72 and crotch side flaps 73 have a bending stiffness in the longitudinal direction Y in a range of about 0.10 to about 0.20 N/m and a bending stiffness

in the transverse direction X in a range of about 0.05 to about 0.10 N/m. These values of bending stiffness were measured by the method as will be described below.

{0022}

5 <Measuring method for bending stiffness >

Bending stiffness was measured by KES Test. In KES Test, KES-FB2-AUTO-A Pure Bending Tester (manufactured by KATO TECH Co., Ltd. in Japan) was used to make measurements. Pieces of 10 mm x 10 mm including the imaginary line R were cut out from the diaper as test pieces and the measurement was conducted at a temperature of 20°C and a humidity of 60%. More specifically, from regions defined in the crotch side flaps 73 and including the backsheet 30, the leakage-barrier sheet 50 and the leakage-barrier cuffs 60 layered on each other, the pieces each dimensioned to be 10 mm in the longitudinal direction Y and 10 mm in the transverse direction X were cut out as the test pieces.

Such a test piece was placed in KES Tester and the sensor having a torque sensitivity up to full scale 10 gf/cm/10v (SEN 10) was used to obtain a measured value in the form of curvature (1/cm). For each test piece, bending stiffness values both in the longitudinal direction Y and in the transverse direction were measured.

{0023}

Referring to Fig. 6, the respective hook components 81

may be engaged with the associated loop components 82 to connect the front and rear waist regions 11, 12 with each other so that the diaper 1 may be in the form of the pants type diaper 1 on a body of the wearer H. If urination occurs with the diaper 1
5 put on the wearer's body in this manner, the absorbent structure 40 might gain weight due to absorption of urine and, in consequence, the diaper 1 as a whole might be pulled downward. At the intersections A corresponding to one end of the respective imaginary lines R, the diaper 1 is retained by the hook components
10 81 on wearer's waist and, at the intersections B corresponding to the other end of the respective imaginary lines R, the diaper 1 is pulled downward. Thus the diaper 1 is pulled along the imaginary lines R. The intersections A are reliably retained on the waist of the wearer H and the bending stiffness values
15 of the second side flaps 72 and the crotch side flaps 73 in which the imaginary lines R are present are adjusted to about 0.10 to about 0.20 N/m in the longitudinal direction Y and to about 0.05 to about 0.10 N/m in the transverse direction X. Consequently, even when urination occurs, the diaper 1 as a whole
20 should not sag downward due to weight (mass) of the absorbent structure having absorbed urine. Being ensured that the diaper 1 as a whole is prevented from sagging downward due to weight of the absorbent structure 40 having absorbed urine, it is ensured that the diaper 1 can be kept in close contact with the

wearer's waist without sagging downward of the diaper 1 relative to the wearer's waist.

{0024}

By adjusting the respective bending stiffness values of
5 the second side flaps 72 and the crotch side flaps 73 to the ranges, it is possible to prevent these side flaps from being easily folded and/or curled up toward the backsheet 30 and/or rolled up toward the topsheet 20. In consequence, these second side flaps 72 and crotch side flaps 73 may smoothly extend along
10 the wearer's buttocks and effectively cover the wearer's buttocks. These flaps effectively covering the wearer's buttocks ensures that, even if body waste leaks into these flaps, such leakage may be retained by the flaps and prevented from soiling the wearer's garment. In addition, by covering the
15 buttocks with the flaps, the diaper 1 of good appearance may be provided. If these flaps are rolled up toward the topsheet 20, there is a possibility that the portions of the flaps rolled up in this manner might be tucked inwardly of the diaper 1 and soiled with body waste. However, the diaper 1 according to this
20 invention may obviate such a possibility.

{0025}

In the course of putting the diaper 1 on the wearer's body, the imaginary lines R being pulled come in close contact along the inguinal regions of the wearer H. The imaginary lines R are

kept in close contact with the inguinal regions which are basic points for movements of legs of the wearer H and therefore the imaginary lines R should not interfere with movements of the legs of the wearer H and, in consequence, should not cause leakage
5 of body waste such as urine. Furthermore, the imaginary lines R may retain the diaper 1 which might otherwise slip downward in the inguinal regions and effectively prevent the diaper 1 from slipping downward. If the bending stiffness values of the second side flaps 72 and the crotch side flaps 73 are 0.20 N/m
10 or more in the longitudinal direction Y and 0.10 N/m or more in the transverse direction X, stiffness of these side flaps as a whole will correspondingly increase and consequently a tensional force acting on the side flaps may not be focused on the imaginary lines R. As a result, it will be difficult to keep
15 the imaginary lines R in close contact with the wearer's body.
{0026}

The imaginary lines R lie outboard of the absorbent structure 40 as viewed in the transverse direction X without intersecting with the absorbent structure 40. This means that
20 the imaginary lines R are not segmented due to the presence of the absorbent structure 40. If the imaginary lines R overlap the absorbent structure 40, the tensile force which should be continuous from the intersections A to the associated intersections B will be segmented and each of the side flaps

may no longer maintain a state of tension. Consequentially, one or more of the side flaps might be curled up outwardly of the diaper 1 or rolled up inwardly of the diaper 1. According to this invention, however, the imaginary lines R may keep the side
5 flaps in the state of tension and thereby to eliminate such possibilities.

{0027}

The imaginary lines R intersect with the leg elastics 76 and, in consequence, the leg elastics 76 may be retained by the
10 imaginary lines R to prevent the leg elastics 76 from sagging downward. In this way, the leg elastics 76 and the crotch side flaps 73 to which the leg elastics 76 are attached may be kept in close contact with the inguinal regions of the wearer and thereby prevent body waste from leaking out of the diaper 1.
15 Merely by grasping the front and rear ends 14, 15 of the diaper 1 with one's fingers to pull these front and rear ends upward, the crotch region 13 of the diaper 1 is also pulled upward along the imaginary lines R. In this way, the diaper 1 may be easily adjusted on the wearer's body.

20 {0028}

The leg elastics 76 are attached to the non-bonding region 94 in which the bonding region 90 is not provided. Bending stiffness in the non-bonding region is adjusted to be lower than that in the region formed with the bonding region 90. For this

reason, the crotch side flaps 73 may adapt themselves to stretch and contraction of the leg elastics 76 so as to be flexibly kept in close contact with the wearer's thighs. The leg elastics 76 are attached to the leakage-barrier sheet 50 and may be spaced
5 from the backsheet 30 to come in contact with the wearer's body. In this way, the leg elastics 76 are adapted to be further smoothly kept in close contact with the wearer's body. For the reason that the leg elastics 76 are attached to the region having a relatively low bending stiffness, when the diaper 1 is pulled
10 up, the force required to pull the diaper 1 up is efficiently transmitted to the leg elastics 76. Thus, the crotch side flaps 73 may be easily brought in close contact with the inguinal regions of the wearer. With such an arrangement that the plurality of leg elastics 76 partially overlaps the bonding
15 region 90, the leg elastics 76 overlapping the bonding region 90 in this manner function to press the leakage-barrier sheet 50 and the backsheet 30 against the wearer's body and at the same time may adapt themselves to the leg elastics 76 not overlapping the bonding region 90. In consequence, the crotch
20 side flaps 73 may be further reliably brought in close contact with the wearer's body.

{0029}

While the elastic threads/yarns are used in this embodiment as material for the leg elastics 76, the leg elastics

76 are not limited to the elastic threads/yarns but it is also possible to use a sheet having elasticity or the like. While the respective rear ends 76b of the leg elastics 76 in the illustrated embodiment are located on the side of the rear waist region 12 with respect to the imaginary lines R, it should be appreciated that the terms "rear ends 76b" used herein means the rear ends of the portions in which elasticity of the leg elastics 76 is substantially exerted.

{0030}

10 A spacing dimension between the respective imaginary lines R and the lateral edges 16 of the chassis 10 is in a range of about 5 to about 20 mm. In this regard, it is not essential for the respective imaginary lines R and the lateral edges 16 to extend in parallel to each other. Specifically, the spacing dimension may be larger than about 5 mm even in a region in which the imaginary lines R and the side edges 16 come closest to each other and may be smaller than about 20 mm even in a region in which the imaginary lines R and the side edges 16 are furthest spaced from each other. With such an arrangement, the second side flaps 72 and the crotch side flaps 73 may stably cover the wearer's buttocks. When the spacing dimension is smaller than 5 mm, the flaps might be prone to be rolled up inboard of the diaper 1 and, when the spacing dimension is larger than 20 mm, the diaper 1 might be pulled by movements of the wearer's legs

and the diaper 1 might be prone to displacement.

{0031}

Referring to Fig. 2, a dimension W1 of the chassis 10 along the imaginary transverse center line Q-Q is in a range of about 180 to about 300 mm and specified to be about 205 mm in the illustrated embodiment. A dimension W2 of the absorbent structure 40 along the imaginary transverse center line Q-Q is in a range of about 70 to about 100 mm and specified to be about 80 mm in the illustrated embodiment. The dimension W2 of the absorbent structure 40 is in a range of about 0.2 to about 0.4 times the dimension W1 of the chassis 10. In other expression, $W2/W1 = 0.2$ to 0.4 . With such dimensioning, the crotch side flaps 73 are prevented from being rolled up inwardly of the diaper 1 and may effectively cover the wearer's buttocks.

15 {0032}

The respective imaginary lines R intersect with the imaginary transverse center line Q-Q at an angle in a range of about 45° to about 60° . With such an arrangement, the buttocks as a whole may be covered with the second side flaps 72 and the crotch side flaps 73. If the angle is smaller than 45° , the imaginary lines R might lie not in the inguinal regions but about the thighs and, in consequence, movements of the wearer might cause the diaper 1 to be pulled downward and the diaper 1 might be displaced downward. If the angle is larger than 60° , the

imaginary lines R might be located on the wearer's buttocks and it might be impossible to cover the buttocks sufficiently.

{0033}

A dimension L1 of the rear waist region 12 in the longitudinal direction Y and a dimension L2 measured from the rear end 15 of the diaper 1 to the imaginary transverse center line Q-Q are correlated with each other so that the dimension L1 may correspond to about 0.4 to about 0.7 times the dimension L2, in other expression, a relationship of $L1/L2 = 0.4$ to 0.7 may be established. If the $L1/L2$ is smaller than 0.4, the area of the second side flaps 72 might be unacceptably reduced and unable to cover the wearer's buttocks and these second side flaps 72 might be apt to be rolled up inwardly of the diaper 1. If $L1/L2$ is larger than 0.7, the area of the second side flaps 72 might be unacceptably enlarged and the second side flaps 72 might be apt to be pulled by movements of the wearer's legs, and eventually the diaper 1 might be readily displaced.

{0034}

In the rear waist region 12 to which the base sheets 83 are attached, a region S1 defined by an imaginary parallel line S-S extending along the lower ends of the respective base sheets 83 in parallel to the imaginary transverse center line Q-Q, the imaginary lines R and the lateral edges 43 of the absorbent structure 40 and a region S2 defined by the imaginary lines R,

the lateral edges 16 and the imaginary transverse center line Q-Q are related to each other so that an area of the region S2 is about 0.41 to about 0.8 times an area of the region S1, in other expression, $S2/S1 = 0.41$ to 0.8 . The region S1 is easily
 5 put in close contact with the wearer's buttocks and the region S2 covers the wearer's buttocks leaving a clearance between the region S2 and the wearer's buttocks. If $S2/S1$ is smaller than 0.41 , the region used to cover the wearer's buttocks might be unacceptably reduced and unable to cover the wearer's buttocks
 10 sufficiently. In addition, this region might be readily rolled up inwardly of the diaper 1. If $S2/S1$ is larger than 0.8 , the region S2 used to cover the wearer's buttocks might be unacceptably enlarged and apt to be pulled by movements of the wearer's legs, and eventually the diaper 1 might be readily
 15 displaced. In addition, the wearer's leg or legs might be apt to be caught by this region in the course of putting the diaper 1 on the wearer's body and it might be difficult to smoothly put on the diaper 1.

{0035}

20 The disclosure of the present invention described hereinabove may be arranged in at least the following features:

The disposable wearing article 1 has a longitudinal direction Y and a transverse direction X and includes:

a chassis 10 including: a skin-facing side and a

non-skin-facing side, a first waist region corresponding to one of front and rear waist regions 11, 12, a second waist region corresponding to another of the front and rear waist regions 11, 12, a crotch region 13 extending between these first and second waist regions and an imaginary transverse center line Q-Q bisecting a dimension in the longitudinal direction Y;

an absorbent structure 40 lying at least in the crotch region 13;

side flaps 71, 72, 73 lying outboard of the absorbent structure 40 in the transverse direction X; and

fastening means 81, 82 attached to the second waist region and used to connect the first and second waist regions with each other.

{0036}

In the disposable wearing article 1, the side flaps have a pair of second flaps 72 lying in the second waist region 12 and a pair of crotch side flaps 73 lying in the crotch region. The fastening means include connected portions 84 affixed to the respective second side flaps 72 and extensions 85 extending outward in the transverse direction X from the associated connected portions 84 and adapted to be fastened to the first waist region wherein each of the connected portions 84 is contoured by inner and proximal edges 84a, 84b extending in the longitudinal direction Y and front and rear ends 84c, 84d.

Imaginary lines R respectively connecting intersections A between the respective proximal edges 84b and the front end 84c to intersections B between the respective side edges 43 of the absorbent structure 40 and the imaginary transverse center line Q-Q extend across the second side flaps 72 and the crotch side flaps wherein the second side flaps 72 have a bending stiffness in a range of about 0.10 to about 0.20 N/m in the longitudinal direction Y and in a range of about 0.05 to about 0.10 N/m in the transverse direction X.

10 {0037}

The aspect described above may include at least the following embodiments:

(1) The respective imaginary lines R lie outboard of the lateral edges 43 of the absorbent structure 40 as viewed in the transverse direction X.

(2) The chassis 10 has a topsheet 20 lying on the skin-facing side and a backsheet 30 lying on the non-skin-facing side. A leakage-barrier sheet 50 is interposed between these top- and backsheets 20, 30 and the backsheet 30 is bonded to the leakage-barrier sheet 50 by bonding region 90 so as to leave regions outboard of the bonding region 90 in the transverse direction to be non-bonding regions 94 in which the backsheet 30 and the leakage-barrier sheet 50 are not bonded to each other. The leakage-barrier sheet 50 is provided in a region overlapping

the non-bonding region 94 on the side facing away from the backsheet 30 with leg elastics 76 extending at least across the crotch side flaps 73 and contractibly attached thereto under tension in the longitudinal direction Y.

5 (3) The leg elastics 76 intersect with the imaginary lines R.

(4) The imaginary lines R are spaced apart from the associated side edges 16 of the chassis 10 by 5 to 20 mm in the transverse direction X.

(5) The imaginary lines R intersect with the imaginary transverse
10 center line Q-Q at an angle in a range of 45° to 60°.

(6) A dimension in the transverse direction X of the absorbent structure 40 is larger in the second waist region 12 than along the imaginary transverse center line Q-Q.

(7) Along the imaginary transverse center line Q-Q, the dimension
15 of the absorbent structure is 0.2 to 0.4 times the dimension of the chassis 10.

{0038}

The components of the disposable diaper 1 as one example of disposable wearing articles are not limited to those described
20 in the description but other types of material widely used in the relevant technical field may be used without limitation unless otherwise stated. The terms "first" and "second" used in the description and claims of this invention are used merely to distinguish the similar elements, similar positions or other

similar means.

{Reference Signs List}

{0039}

- | | | |
|----|----|--|
| | 1 | disposable wearing article (disposable diaper) |
| 5 | 10 | chassis |
| | 11 | front waist region (first waist region) |
| | 12 | rear waist region (second waist region) |
| | 13 | crotch region |
| | 16 | lateral edges |
| 10 | 20 | topsheet |
| | 30 | backsheet |
| | 40 | absorbent structure |
| | 43 | lateral edges |
| | 50 | leakage-barrier sheet |
| 15 | 71 | first side flap |
| | 72 | second side flap |
| | 73 | crotch side flaps |
| | 76 | leg elastics |
| | 81 | fastening means (hook component) |
| 20 | 82 | fastening means (loop component) |
| | 83 | fastening means (base sheet) |
| | 84 | connected portion |
| | 85 | extension |
| | 90 | bonding region |

94	non-bonding regions
R	imaginary line
X	transverse direction
Y	longitudinal direction
5	P-P imaginary longitudinal center line
	Q-Q imaginary transverse center line

{Claims}

{Claim 1}

A disposable wearing article having a longitudinal direction and a transverse direction, comprising:

5 a chassis comprising a skin-facing side and a non-skin-facing side, a first waist region corresponding to one of front and rear waist regions, a second waist region corresponding to another of the front and rear waist regions, a crotch region extending between these first and second waist regions and an
10 imaginary transverse center line bisecting a dimension in the longitudinal direction;

an absorbent member lying at least in the crotch region;

side flaps lying outboard of the absorbent member in the transverse direction; and

15 fastening means attached to the second waist region and used to connect the first and second waist regions with each other, wherein:

the side flaps have a pair of second flaps lying in the second waist region and a pair of crotch side flaps lying in
20 the crotch region;

the fastening means comprise fixed portions fixed to the respective second side flaps and extensions extending outward in the transverse direction from the associated fixed portions and adapted to be fastened to the first waist region wherein

each of the fixed portions is contoured by inner and outer side edges extending in the longitudinal direction and front and rear ends; and

imaginary lines respectively connecting intersections
5 between the respective outer side edges and the front end to intersections between the respective side edges of the absorbent member and the imaginary transverse center line extend across the second side flaps and the crotch side flaps wherein the second side flaps has a bending stiffness in a range of 0.10 to 0.20
10 N/m in the longitudinal direction and in a range of 0.05 to 0.10 N/m in the transverse direction;

the chassis has a topsheet lying on the skin-facing side and a backsheet lying on the non-skin-facing side;

a leakage-barrier sheet is interposed between these top- and
15 backsheets and the backsheet is bonded to the leakage-barrier sheet by bonding region so as to leave regions outboard of the bonding region in the transverse direction to be non-bonding regions in which the backsheet and the leakage-barrier sheet are not bonded to each other; and

20 the leakage-barrier sheet is provided in a region overlapping the non-bonding region on the side facing away from the backsheet with leg elastics extending at least across the crotch side flaps contractibly attached thereto under tension and in the longitudinal direction.

{Claim 2}

The disposable wearing article defined by claim 1, wherein the respective imaginary lines lie outboard of the lateral edges of the absorbent structure as viewed in the transverse direction.

5 {Claim 3}

The disposable wearing article defined by claim 1 or 2, wherein the side flap elastics intersect with the imaginary lines.

{Claim 4}

10 The disposable wearing article defined by any one of claims 1 through 3, wherein the imaginary lines are spaced from the associated side edges of the chassis by 5 to 20 mm in the transverse direction.

{Claim 5}

15 The disposable wearing article defined by any one of claims 1 through 4, wherein the imaginary lines intersect with the imaginary transverse center line at an angle in a range of 45° to 60°.

{Claim 6}

20 The disposable wearing article defined by any one of claims 1 through 5, wherein a dimension in the transverse direction of the absorbent structure is larger in the second waist region than along the imaginary transverse center line.

{Claim 7}

The disposable wearing article defined by any one of claims
1 through 6, wherein along the imaginary transverse center line,
the dimension of the absorbent structure is 0.2 to 0.4 times
5 the dimension of the chassis.