

DESCRIPTION

Title of Invention: ABSORBENT ARTICLE

Technical Field

[0001]

5 The present invention relates to an absorbent article such as a sanitary napkin or an incontinence pad.

Background Art

[0002]

10 In conventional absorbent articles such as sanitary napkins, large amounts of excreted fluid may lead to leakage of fluid even during everyday activities. Applicant has proposed methods for preventing fluid leakage, such as providing an absorbent core of an absorbent article with a raised portion having a large basis weight in an excretion-section opposing zone that is arranged in opposition to the wearer's fluid excretion section, and further providing the raised portion with lateral
15 grooves having a low basis weight to disperse fluid without letting the fluid remain at the excretion point (for example, Patent Literature 1 and Patent Literature 2).

[0003]

20 For example, Patent Literature 1 proposes a technique of providing a surface facing the wearer's skin with a surface structure having a raised portion that bulges toward the skin side, and forming a depression surrounding the entire perimeter of the raised portion. The absorbent article disclosed in Patent Literature 1 has excellent fittability and absorptivity and can prevent fluid leakage.

[0004]

25 Patent Literature 2 proposes an absorbent article including an absorbent core in which a raised region and grooves are formed by integral molding, and that has a plurality of absorbent portions that are partitioned into blocks by the grooves. According to the absorbent article disclosed in Patent Literature 2, uncomfortableness due to creasing of the absorbent core is suppressed, rewetting

caused by once-absorbed fluid is less likely to occur, and fluid leakage can be prevented.

Citation List

Patent Literature

5 [0005]

Patent Literature 1: JP H11-33054A

Patent Literature 2: JP 2014-104093A

Summary of Invention

[0006]

10 The invention relates to an absorbent article including an absorbent core having a shape that is long in a longitudinal direction corresponding to a wearer's front-to-rear direction, the absorbent article having a front zone and a rear zone. The absorbent core has a first region located on the front side, a second region located on the rear side, and a middle region located between the first region and the
15 second region. The absorbent core includes, in the middle region, a raised portion that has a greater thickness than the thickness of the first region and that of the second region. In a planar view of the absorbent core, the raised portion has a maximum width portion at which the length in a lateral direction, which is orthogonal to the longitudinal direction of the absorbent core, becomes the greatest.
20 The length, in the lateral direction, at the maximum width portion is the same as the length, in the lateral direction, of the absorbent core.

Brief Description of Drawings

[0007]

25 [Fig. 1] Fig. 1 is a plan view illustrating a skin-facing surface side (skin-side sheet side) of a sanitary napkin which is a preferred embodiment of an absorbent article of the invention.

[Fig. 2] Fig. 2 is a plan view on the skin-facing surface side of an absorbent core of the sanitary napkin illustrated in Fig. 1.

30 [Fig. 3] Fig. 3 is a cross-sectional view schematically illustrating a cross-section taken along line III-III in Fig. 2.

[Fig. 4] Fig. 4 is a cross-sectional view schematically illustrating a cross-section taken along line IV-IV in Fig. 2.

[Fig. 5] Figs. 5(a) and 5(b) are diagrams explaining a process for manufacturing the absorbent core provided in the sanitary napkin illustrated in Fig. 1.

[Fig. 6] Figs. 6(a) to 6(f) are plan views each illustrating the skin-facing surface side of a portion of an absorbent core provided in a sanitary napkin according to other preferred embodiments of the absorbent article of the invention.

[Fig. 7] Fig. 7 is a plan view illustrating a skin-facing surface side (skin-side sheet side) of a sanitary napkin which is another preferred embodiment of the absorbent article of the invention.

[Fig. 8] Fig. 8 is a plan view illustrating a skin-facing surface side (skin-side sheet side) of a sanitary napkin which is yet another preferred embodiment of the absorbent article of the invention.

[Fig. 9] Fig. 9 is a plan view on the skin-facing surface side of an absorbent core of a napkin according to Example 1.

[Fig. 10] Fig. 10(a) is a plan view on the skin-facing surface side of an absorbent core of a napkin according to Comparative Example 1, Fig. 10(b) is a plan view on the skin-facing surface side of an absorbent core of a napkin according to Comparative Example 2, and Fig. 10(c) is a plan view on the skin-facing surface side of an absorbent core of a napkin according to Comparative Example 3.

[Fig. 11] Fig. 11 is a graph showing measurement results of rigidity values of the napkin of Example 1 and the napkins of Comparative Examples 1 to 3.

Description of Embodiments

[0008]

In both the absorbent article disclosed in Patent Literature 1 and the absorbent article disclosed in Patent Literature 2, unless the absorbent article is attached at a proper position with respect to the body at the time of attachment, the attachment position may become misaligned in the front-to-rear direction of the body or in the left/right width direction, in which case the effects of the absorbent article disclosed in Patent Literature 1 and the absorbent article disclosed in Patent Literature 2 may not be sufficiently achieved. The absorbent article disclosed in Patent Literature 1 and the absorbent article disclosed in Patent Literature 2 still have room for further

improvement.

[0009]

Thus, the invention relates to an absorbent article capable of overcoming the aforementioned drawbacks of conventional art.

5 [0010]

An absorbent article of the invention is described below according to a sanitary napkin 1 (referred to hereinafter also as “napkin 1”) which is a preferred embodiment, with reference to the drawings. Fig. 1 shows a plan view as viewed from the skin-side sheet side of the napkin 1 of the present embodiment. As
10 illustrated in Fig. 1, the napkin 1 of the present embodiment includes an absorbent core 41 having a shape that is long in the longitudinal direction X, and has a front zone A and a rear zone C. As illustrated in Fig. 1, the napkin 1 is divided into: an excretion-section opposing zone B arranged in opposition to the fluid excretion section of a wearer; and the front zone A and the rear zone C respectively arranged
15 in the front and the rear of the excretion-section opposing zone B in the longitudinal direction X.

[0011]

In the present Description, the longitudinal direction X corresponds to the front-to-rear direction of a wearer, and matches the length direction of the absorbent
20 article (napkin 1). The lateral direction Y matches the width direction (direction orthogonal to the length direction) of the absorbent article (napkin 1). Thus, unless specifically described otherwise, in the present Description, the length in the length direction X refers to the “length” which is the distance measured in the length direction X, and the length in the lateral direction Y refers to the “width”
25 which is the distance measured in the lateral direction Y. The napkin 1 is formed having left-right symmetry with respect to a center line CL extending along the longitudinal direction X. The longitudinal direction X is also a direction parallel to the center line CL. In the present Description, the skin-facing surface refers to the surface of the absorbent article (napkin 1), or constituent members thereof, that
30 faces toward the wearer’s skin side when the absorbent article (napkin 1) is worn,

and the non-skin-facing surface refers to the surface of the absorbent article (napkin 1), or constituent members thereof, that faces toward the opposite side (toward the garment side) from the skin side when the absorbent article (napkin 1) is worn.

[0012]

5 The napkin 1 has: an excretion-section opposing zone B arranged in opposition to the wearer's fluid excretion section (e.g. vaginal introitus) when the napkin is worn; a front zone A arranged more toward the wearer's stomach side (front side) than the excretion-section opposing zone B; and a rear zone C arranged more toward the wearer's back side (rear side) than the excretion-section opposing
10 zone B. Stated differently, the napkin 1 is divided in the longitudinal direction X into a front zone A, an excretion-section opposing zone B, and a rear zone C in this order.

[0013]

15 In the absorbent article of the invention, in cases where wings 1W are provided as in the napkin 1 of the present embodiment, the excretion-section opposing zone B refers to a region where the wings 1W are provided in the longitudinal direction X (i.e., a region sandwiched between one wing 1W's joining base extending along the longitudinal direction X and the other wings 1W's joining base extending along the longitudinal direction X). In an absorbent article without
20 wings, the excretion-section opposing zone B refers to a region surrounded by a first fold line and a second fold line as counted from the absorbent article's front end in the longitudinal direction X, the aforementioned first and second fold lines being the two fold lines (not illustrated) that traverse the absorbent article in the lateral direction Y and that are created when the absorbent article is folded up in
25 three into its individually-packaged form.

[0014]

30 As illustrated in Fig. 1, the napkin 1 of the present embodiment includes: a liquid-permeable skin-side sheet 2 forming the skin-facing surface; a non-skin-side sheet 3 forming the non-skin-facing surface; and an absorbent member 4 interposed between the two sheets 2, 3. The absorbent member 4 is constituted by the

absorbent core 41, and a core-wrap sheet (not illustrated) that wraps the absorbent core 41.

[0015]

As illustrated in Fig. 1, in the napkin 1, the skin-side sheet 2 covers the entire region of the skin-facing surface of the absorbent member 4, and extends outward in the lateral direction Y from both the absorbent member 4's lateral side edges which extend along the longitudinal direction X. On the other hand, the non-skin-side sheet 3 covers the entire region of the non-skin-facing surface of the absorbent member 4, and extends outward in the lateral direction Y from both the skin-side sheet 2's lateral side edges which extend along the longitudinal direction X, to form side flaps 1S together with later-described side sheets 5. The non-skin-side sheet 3 and each side sheet 5 are joined together by a known joining means, such as an adhesive, heat sealing, or ultrasonic sealing, in an extension portion extending out from the absorbent member 4's lateral side edge which extends along the longitudinal direction X. Note that the absorbent member 4 may be joined with the skin-side sheet 2 and with the non-skin-side sheet 3 with an adhesive.

[0016]

As illustrated in Fig. 1, in the napkin 1, the side sheets 5 are arranged at the skin-side sheet 2's respective lateral sides which extend along the longitudinal direction X on the skin-facing surface. Preferably, the side sheets 5 are arranged so as to span the skin-side sheet 2's entire length in the longitudinal direction X such that the side sheets overlap the skin-side sheet 2's respective lateral sides, which extend along the longitudinal direction X, in a planar view.

[0017]

In the napkin 1, the pair of side sheets 5, 5 is joined with the skin-side sheet 2 at respective joined regions 6, as illustrated in Fig. 1. The joined regions 6 each have a wavy form in which curvilinear projections and depressions in the lateral direction Y are alternately and continuously arranged in the longitudinal direction X, and in a planar view, the pair of joined regions are arranged symmetrically in the lateral direction Y with respect to the center line CL. When the side sheets 5 are

fixed by being joined to the skin-side sheet 2 by wavy joined regions 6 as described above, a space defined by each side sheet 5 and the skin-side sheet 2 is formed on the inner side, in the lateral direction Y, of the group of joined portions of the joined region 6 arranged in a wavy form. This space is opened facing the center line CL, and thus, body fluid such as menstrual blood that flows outward from the center in the lateral direction Y will be accommodated in the space. As a result, body fluid can be effectively prevented from leaking.

[0018]

As illustrated in Fig. 1, in the napkin 1, the side flaps 1S greatly project outward in the lateral direction Y in the excretion-section opposing zone B, thus forming a pair of wings 1W, 1W extending out on the napkin 1's respective lateral sides which extend along the longitudinal direction X. The wings 1W are used by being folded back toward the non-skin-facing surface side in the crotch portion of a garment such as underpants. Further, as illustrated in Fig. 1, the skin-side sheet 2 and the non-skin-side sheet 3 extend out in the longitudinal direction X from the absorbent member 4's respective front and rear ends in the longitudinal direction X. The skin-side sheet and the non-skin-side sheet are joined together in these extension portions with a known joining means such as an adhesive, heat sealing, or ultrasonic sealing, to form end seal portions.

[0019]

As illustrated in Fig. 1, in the napkin 1, a linear compressed groove 7 formed by integrally depressing the skin-side sheet 2 and the absorbent member 4 toward the non-skin-side sheet 3 side is formed on the skin-facing surface of the skin-side sheet 2. Herein, the term "linear" in the "linear compressed groove 7" means that the shape of the groove (depression) in a planar view is not limited to a straight line (rectilinear), but also includes curved lines (curvilinear). The line may be a continuous line or a broken line; the linear compressed groove 7 of the napkin 1 consists of a row of a multitude of intermittent embossed points. The density of fibers, which are constituent materials of the skin-side sheet 2 and the absorbent member 4, is higher in the linear compressed groove 7 than the density in peripheral portions of the linear compressed groove 7. The linear compressed groove 7

includes: first lateral compressed grooves 71 extending along the lateral direction Y respectively in the front zone A and the rear zone C of the absorbent member 4; and longitudinal compressed grooves 73 that extend along the longitudinal direction X in the absorbent member 4's respective lateral sides which extend along the longitudinal direction X in the excretion-section opposing zone B. In the napkin 1, each first lateral compressed groove 71 is curvilinear projecting outward in the longitudinal direction X, and each longitudinal compressed groove 73 is curvilinear projecting outward in the lateral direction Y in the excretion-section opposing zone B. The first lateral compressed grooves 71 extend in the lateral direction Y on the inner side of the pair of longitudinal compressed grooves 73 so as to span the pair of longitudinal compressed grooves 73. In the napkin 1, the first lateral compressed groove 71 in the front zone A, one of the longitudinal compressed grooves 73, the first lateral compressed groove 71 in the rear zone C, and the other longitudinal compressed groove 73 are connected to form a ring-shaped fully-circumferential groove. The linear compressed groove 7 formed as above can suppress spreading/diffusion of body fluid in the planar direction of the absorbent member 4 and thus effectively prevent fluid leakage from the periphery of the napkin 1.

[0020]

As illustrated in Fig. 2, in the napkin 1, the absorbent core 41 constituting the absorbent member 4 has a first region 41F located on the front zone A side in the longitudinal direction X, a second region 41R located on the rear zone C side, and a middle region 41M located between the regions 41F and 41R. The middle region 41M includes a raised portion 42. In the napkin 1, the middle region 41M is arranged in the excretion-section opposing zone B. More specifically, in the napkin 1, the absorbent core 41's middle region 41M and the excretion-section opposing zone B match one another in the longitudinal direction. Thus, in the napkin 1, the raised portion 42 is included in the middle region 41M of the absorbent core 41. Note that, in the napkin 1, in a planar view as illustrated in Fig. 2, the size of the front zone A of the napkin 1 substantially matches the size of the first region 41F of the absorbent core 41, and the size of the rear zone C of the napkin 1 substantially matches the size of the second region 41R of the absorbent core 41.

[0021]

In cases where the napkin 1 includes a pair of wings 1W on respective outer sides in the lateral direction Y, the middle region 41M is present between the joining bases of each of the wings 1W, the joining bases being arranged with a spacing therebetween in the longitudinal direction X in each wing 1W. More specifically, the middle region 41M of the napkin 1 is present so as to span the joining bases of the wing 1W which are arranged with a spacing therebetween in the longitudinal direction X in each wing 1W. Note that, in cases where the size of the front zone A of the napkin 1 substantially matches the size of the first region 41F of the absorbent core 41 and the size of the rear zone C of the napkin 1 substantially matches the size of the second region 41R of the absorbent core 41, the length, in the longitudinal direction X, of the middle region 41M of the napkin 1 is the same as the length between the wing 1W's joining bases which are arranged with a spacing therebetween in the longitudinal direction X in each wing 1W.

15 [0022]

The thickness of the middle region 41M is greater than the thickness of the absorbent core 41 in each of the first region 41F located on the front side of the middle region 41M and the second region 41R located on the rear side of the middle region 41M. In the napkin 1, the absorbent core 41 has a shape that is long in the same direction as the longitudinal direction X of the napkin 1. Thus, the longitudinal direction of the absorbent core 41 is the same direction as the longitudinal direction X of the napkin 1, and the lateral direction of the absorbent core 41 is the same direction as the lateral direction Y of the napkin 1.

[0023]

25 As illustrated in Fig. 4, the raised portion 42 is formed so as to have a greater thickness than the thickness of the first region 41F and the thickness of the second region 41R in the absorbent core 41. Preferably, in the napkin 1, the raised portion 42 is formed so as to have a greater thickness than the thickness of the first region 41F in the absorbent core 41 and so as to have a higher basis weight than the basis weight of the first region 41F in the absorbent core 41. Further, preferably, in the napkin 1, the raised portion 42 is formed so as to have a greater thickness than the

thickness of the second region 41R in the absorbent core 41 and so as to have a higher basis weight than the basis weight of the second region 41R in the absorbent core 41. In cases where later-described grooves 45 are formed in the first region 41F and the second region 41R, the thickness and basis weight of each of the first region 41F and the second region 41R to be compared with the thickness and basis weight of the raised portion 42 refer to the thickness and basis weight in a portion where no groove 45 exists in the first region 41F and the second region 41R. A difference in thickness is provided to the absorbent core 41 of the napkin 1 by creating a difference in the basis weight of core material. Thus, the absorbent core 41 is flexible as a whole, in contrast to cases where a portion of an absorbent core having a uniform basis weight is compressed to create a difference in thickness.

[0024]

It is preferable that the thickness of the raised portion 42 with respect to the thickness of the first region 41F and the second region 41R in the absorbent core 41 is preferably 120% (i.e., 1.2 folds) or greater, more preferably 140% or greater, and preferably 700% or less, more preferably 500% or less, from the viewpoint of making the raised portion 42 protrude toward the skin and improving the absorbent core 41's fluid absorptivity, and preferably from 120 to 700%, more preferably from 140 to 500%, from the viewpoint of conformability to the body while worn and suppressing uncomfortableness. The difference in thickness between the thickness of the raised portion 42 and the thickness of the first region 41F or the second region 41R (the former minus the latter) is preferably 1.0 mm or greater, more preferably 2.0 mm or greater, and preferably 8.0 mm or less, more preferably 6.0 mm or less, and preferably from 1.0 to 8.0 mm, more preferably from 2.0 to 6.0 mm. The aforementioned configuration is particularly effective in cases where the raised portion 42 is provided in the excretion-section opposing zone B, as in the napkin 1 of the present embodiment.

The thickness of the raised portion 42 is preferably 2.0 mm or greater, more preferably 3.0 mm or greater, and preferably 10.0 mm or less, more preferably 7.0 mm or less, and preferably from 2.0 to 10.0 mm, more preferably from 3.0 to 7.0 mm. Although it is preferable if the aforementioned thickness relationship is satisfied in the entire area of the raised portion 42, in cases where there is an increase/decrease in the thickness direction of the raised portion 42, the

aforementioned relationship only needs to be satisfied at the thickest portion.

Note that, although it is preferable if the aforementioned thickness relationship is satisfied in the entire area of the raised portion 42, in cases where there is a gradual increase/decrease in thickness along the lateral direction Y or the longitudinal direction X, or both directions, in the thickness direction of the raised portion 42, the aforementioned relationship only needs to be satisfied at the thickest portion.

The thickness of the first region 41F or the second region 41R is preferably 0.5 mm or greater, more preferably 1.0 mm or greater, and preferably 7.0 mm or less, more preferably 3.5 mm or less, and preferably from 0.5 to 7.0 mm, more preferably from 1.0 to 3.5 mm.

In the napkin 1, it is preferable that the thickness of the first region 41F or the second region 41R is formed substantially uniformly in portions where the later-described grooves 45 are not present. However, in cases where there is a gradual increase/decrease in thickness of the first region 41F or the second region 41R along the lateral direction Y or the longitudinal direction X, the aforementioned relationship only needs to be satisfied at the thickest portion.

The thickness in each of the portions in the absorbent core 41, such as the raised portion 42, the first region 41F or the second region 41R, and the later-described raised-portion adjacent portion 44, is measured according to the following method.

[0025]

{Method for Measuring Thickness in Various Portions of Absorbent Core 41}

An absorbent core is placed on a horizontal place such that there are no creases or folds/bends, and the raised portion 42, the first region 41F or second region 41R, etc., which are objects to be measured, are cut out from the absorbent core 41. The thickness of the cut-out object is measured under a load of 5 cN/cm². More specifically, for example, a thickness gauge (Peacock Dial Upright Gauge R5-C from Ozaki Mfg. Co., Ltd.) is used for the thickness measurement. At the time of measuring the thickness, a plate (an approx. 5-mm-thick acrylic plate) having a circular or square shape in a planar view and adjusted in size so that the load becomes 5 cN/cm² is arranged between the tip of the thickness gauge and the cut-out object to be measured. When measuring the thickness of the first region

41F or second region 41R in the absorbent core 41, measurement is performed so as not to include the later-described grooves 45.

[0026]

In the napkin 1, from the viewpoint of making the raised portion 42 protrude toward the skin and improving the absorbent core's fluid absorptivity in the excretion-section opposing zone B, the basis weight of the raised portion 42 in the absorbent core 41 is preferably 100 g/m² or greater, more preferably 200 g/m² or greater, and preferably 1500 g/m² or less, more preferably 1200 g/m² or less, and more specifically, preferably from 100 to 1500 g/m², more preferably from 200 to 1200 g/m². The basis weight of the first region 41F or the basis weight of the second region 41R in the absorbent core 41 is preferably 50 g/m² or greater, more preferably 100 g/m² or greater, and preferably 1000 g/m² or less, more preferably 900 g/m² or less, and more specifically, preferably from 50 to 1000 g/m², more preferably from 100 to 900 g/m². The basis weight of the first region 41F or the basis weight of the second region 41R is calculated by dividing the mass of a sample of the first region 41F or the second region 41R--which is cut out as explained in the aforementioned Method for Measuring Thickness in Various Portions of Absorbent Core 41--by the area of the sample's surface on the skin-facing surface side. In measuring the basis weight of the first region 41F or the basis weight of the second region 41R in the absorbent core 41, measurement is performed so as not to include the later-described grooves 45.

[0027]

In the napkin 1, in a planar view of the absorbent core 41, the raised portion 42 has a maximum width portion at which the length in the lateral direction Y, which is orthogonal to the longitudinal direction X of the absorbent core 41, becomes the greatest; and the length, in the lateral direction Y, at the maximum width portion is the same as the length, in the lateral direction Y, of the absorbent core 41. Preferably, in a planar view of the absorbent core 41 as illustrated in Fig. 2, the raised portion 42 includes a raised central portion 421 in which the maximum width portion of the raised portion 42 is formed so as to extend over a predetermined length in the longitudinal direction X and conform to both lateral

side edges of the absorbent core 41 which extend along the longitudinal direction X. Stated differently, the raised central portion 421 extends continuously so as to span both the lateral side edges 41s, 41s of the absorbent core 41 which extend along the longitudinal direction X, and includes the raised portion 42's maximum width portion which spans the entire length, in the longitudinal direction X, of the continuous raised central portion 421. The length, in the lateral direction Y, of the maximum width portion of the raised central portion 421 is the same as the width of the absorbent core 41. Herein, the width of the absorbent core 41 refers to the width of the absorbent core 41 including the raised portion 42. Stated differently, in a cross-sectional view of the raised portion 42 in the lateral direction Y, if the width (skin-side width) of the raised portion 42--which is located more toward the skin-facing surface side than the height-wise position of the surface of the adjacent first region 41F and second region 41R on the skin-facing surface side--is the same as or greater than the width (non-skin-side width) of the raised portion 42 located on the non-skin-facing surface side, the maximum width of the raised portion 42 is considered the same as the width of absorbent core 41. It is preferable, however, that, in the maximum width portion of the raised portion 42, the skin-side width and the non-skin-side width are substantially the same, and particularly preferable that the maximum width portion is substantially uniform in the thickness direction. It is preferable to form the absorbent core 41 so that the area of the raised central portion 421 is as large as possible in order to be able to achieve sufficient absorption performance, even if the absorbent article is attached slightly out of position. From this viewpoint, it is preferable that the distance is constant between both lateral side edges 41s, 41s of the absorbent core 41, which extend along the longitudinal direction X, in the maximum width portion of the raised central portion 421, and that both the lateral side edges 41s, 41s are parallel to the longitudinal direction X and are rectilinear. However, a slight difference between the width of the raised portion 42 and the width of the absorbent core 41--such as a difference within a range of about 5% of the width of the maximum width portion--due to misalignment, in the lateral direction Y, of the raised portion 42 in the absorbent core 41, chipping of the raised portion 42, the draft of a mold ascribable to the manufacturing method, and rounding or beveling at end portions, is considered the same width. The maximum width refers to the distance in the lateral direction Y at the longest position. Note that, in Fig. 2, the length, in the lateral direction Y, at

the maximum width portion in the lateral direction Y of the raised portion 42 is the same as the maximum length, in the lateral direction Y, of the middle region 41M of the absorbent core 41, and is the same as the maximum length, in the lateral direction Y, of the absorbent core 41.

5 [0028]

In the napkin 1, in a cross-sectional view as illustrated in Fig. 3, the raised central portion 421 of the raised portion 42 is formed such that its height decreases from the central portion in the lateral direction Y toward both lateral side edge portions which extend along the longitudinal direction X. Stated differently, the raised central portion 421's central portion located on the center line CL extending in the longitudinal direction X is formed with the greatest height. By forming the raised central portion 421 in this way, fluid absorptivity etc. can be improved in the excretion-section opposing zone B.

[0029]

15 In the napkin 1, in a cross-sectional view as illustrated in Fig. 3, the raised central portion 421 of the raised portion 42 is formed such that its basis weight decreases from the central portion in the lateral direction Y toward both lateral side edge portions which extend along the longitudinal direction X. Stated differently, the raised central portion 421's central portion located on the center line CL extending in the longitudinal direction X is formed with the greatest basis weight. By forming the raised central portion 421 in this way, fluid absorptivity etc. can be improved in the excretion-section opposing zone B.

[0030]

25 In the raised central portion 421 of the napkin 1, in a cross-sectional view as illustrated in Fig. 3, the ratio (T1/T2) of the height (T1) of the central portion located on the center line CL to the height (T2) at the lateral side edge 41s having the smallest height is preferably 1.1 or greater--more preferably 1.3 or greater--from the viewpoint of allowing the raised portion to tightly contact the excretion section with as small a gap as possible, and is preferably 4 or less--more preferably 3 or less--from the viewpoint of causing minimal uncomfortableness while worn, and

more specifically, is preferably from 1.1 to 4, more preferably from 1.3 to 3.

Further, the raised portion 42 is formed so as not to have, on the skin-facing surface side, a depression in which the basis weight is lower than the basis weight of the first region 41F and that of the second region 41R in the absorbent core 41.

5 In cases where the first region 41F and the second region 41R include a groove 45, the basis weight of the first region 41F, as well as the basis weight of the second region 41R, refers to the basis weight in a section excluding the groove 45. If there is a low-basis-weight depression on the skin-facing surface side of the raised portion 42, unexpected creases or bends/folds may be created in the napkin 1. If
10 the low-basis-weight depression is a longitudinal groove that longitudinally traverses the raised portion 42 in the longitudinal direction X on the skin-facing surface of the raised portion 42, the raised portion 42 is prone to be divided/separated in the width direction by the longitudinal groove; this will not only make it likely for a crease originating from the longitudinal groove to be
15 created along the longitudinal direction of the napkin 1 when the napkin is worn, but also the absorbent core may get divided and separated at the longitudinal groove by movement of the wearer of the napkin 1. Division/separation of the absorbent core makes it more likely for a gap to be formed between the napkin 1 and the body, which significantly reduces the absorption capacity, causing to fluid leakage.

20 [0031]

The raised portion 42 includes a front-side projection 422 or a rear-side projection 423 in which its length, in the lateral direction Y, becomes narrower than the raised portion 42's maximum width portion from the raised central portion 421 toward the front zone A or the rear zone C. Stated differently, in a planar view of
25 the absorbent core 41 as illustrated in Fig. 2, the raised portion 42 includes at least either one of: a front-side projection 422 that projects from the front end portion, in the longitudinal direction X, of the raised central portion 421 toward the first region 41F side; and a rear-side projection 423 that projects from the rear end portion, in the longitudinal direction X, of the raised central portion 421 toward the second
30 region 41R side. In this napkin 1, the raised portion 42 includes both the front-side projection 422 and the rear-side projection 423. Stated differently, in the napkin 1, the raised portion 42 is divided into the front-side projection 422, the raised central portion 421, and the rear-side projection 423.

[0032]

As illustrated in Fig. 2, in the absorbent core 41 in the napkin 1, there is one front-side projection 422 arranged at the front end portion of the raised central portion 421, and there is one rear-side projection 423 arranged at the rear end portion of the raised central portion 421. In the front-side projection 422, the apex 422t of the front-side projection 422 is located on the center line CL extending along the longitudinal direction X, and both lateral sides 422s, 422s forming the front-side projection 422 extend rectilinearly from the apex 422t to the absorbent core 41's respective lateral side edges 41s extending along the longitudinal direction X. Similar to the front-side projection 422, in the rear-side projection 423, the apex 423t of the rear-side projection 423 is located on the center line CL extending along the longitudinal direction X, and both lateral sides 423s, 423s forming the rear-side projection 423 extend from the apex 423t to the absorbent core 41's respective lateral side edges 41s extending along the longitudinal direction X.

[0033]

In the napkin 1, as illustrated in Fig. 2, each of the front-side projection 422 and the rear-side projection 423 in the absorbent core 41 is formed such that its width d gradually decreases from both lateral sides which extend along the longitudinal direction X toward the apex 422t, 423t located in the central portion in the lateral direction Y. Preferably, in the front-side projection 422 in the absorbent core 41 of the napkin 1, the distance (width d) between both lateral sides 422s, 422s gradually decreases toward the apex 422t from the absorbent core 41's lateral side edges 41s, 41s which extend along the longitudinal direction X. Likewise, in the rear-side projection 423 in the absorbent core 41 of the napkin 1, the distance (width d) between both lateral sides 423s, 423s gradually decreases toward the apex 423t from the absorbent core 41's lateral side edges 41s, 41s which extend along the longitudinal direction X. Herein, the expression "the width d gradually decreases" means that the width d continuously decreases, little by little, toward the apex 422t, 423t.

[0034]

Taking the front-side projection 422--among the front-side projection 422 and

the rear-side projection 423--as an example, in the absorbent core 41 of the napkin 1, both lateral sides 422s, 422s extend in a straight line without curving. From the viewpoint of improving fittability to the body shape and conformability during movement, the angle α formed between one lateral side 422s and the center line CL extending in the longitudinal direction X is preferably 20° or greater, more preferably 30° or greater, and preferably 75° or less, more preferably 60° or less, and more specifically, preferably from 20° to 75°, more preferably from 30° to 60°. The rear-side projection 423 is the same as the front-side projection 422.

[0035]

The raised portion 42's entire length L2 in the longitudinal direction X with respect to the absorbent core 41's entire length L1 in the longitudinal direction X is preferably 25% or greater, more preferably 30% or greater, and preferably 90% or less, more preferably 75% or less, and preferably from 25 to 90%, more preferably from 30 to 75%.

Note that the entire length L1 refers to the distance of the absorbent core 41 at the longest position in the longitudinal direction X, and the entire length L2 refers to the distance of the raised portion 42 at the longest position in the longitudinal direction X.

[0036]

The entire length L3, in the longitudinal direction X, of the raised central portion 421 constituting the raised portion 42 with respect to the raised portion 42's entire length L2 is preferably 20% or greater, more preferably 30% or greater, and preferably 80% or less, more preferably 70% or less, and preferably from 20 to 80%, more preferably from 30 to 70%.

[0037]

The entire length L4, in the longitudinal direction X, of the front-side projection 422 constituting the raised portion 42 with respect to the entire length L2 of the raised portion 42 is preferably 5% or greater, more preferably 10% or greater, and preferably 50% or less, more preferably 30% or less, and preferably from 5 to 50%, more preferably from 10 to 30%. The entire length, in the longitudinal

direction X, of the rear-side projection 423 constituting the raised portion 42 is the same as the front-side projection 422's entire length L4 in the longitudinal direction X.

Note that the entire length L4 refers to the distance of the front-side projection 422 at the longest position in the longitudinal direction X.

[0038]

In the napkin 1, as illustrated in Fig. 2, the absorbent core 41 includes, in the middle region 41M, a raised-portion boundary groove 43 defining a boundary between the raised portion 42 and a portion other than the raised portion 42. In the napkin 1, the raised-portion boundary groove 43 includes: a front raised-portion boundary groove 43a that extends along both lateral sides 422s, 422s forming the front-side projection 422 constituting the raised portion 42; and a rear raised-portion boundary groove 43c that extends along both lateral sides 423s, 423s forming the rear-side projection 423. The front raised-portion boundary groove 43a and the rear raised-portion boundary groove 43c are each formed so as to span the entire length (entire width), in the lateral direction Y, of the absorbent core 41. Thus, force exerted from the legs toward the absorbent core 41's inner side in the width direction is less likely to create longitudinal creases in the longitudinal direction of the napkin 1, and thus, the napkin 1 can easily fit the body shape in a three-dimensional manner. As described above, in the absorbent core 41, the front raised-portion boundary groove 43a and the rear raised-portion boundary groove 43c define the boundary of the raised portion 42.

[0039]

In the napkin 1, from the viewpoint of improving fluid absorptivity etc. in the excretion-section opposing zone B, the groove width of the raised-portion boundary groove 43 in the absorbent core 41 is preferably 0.1 mm or greater, more preferably 0.5 mm or greater, and preferably 5.0 mm or less, more preferably 3.0 mm or less, and preferably from 0.1 to 5.0 mm, more preferably from 0.5 to 3.0 mm. The groove width and the later-described thickness of the raised-portion boundary groove 43 are found by performing cutting in the direction orthogonal to the direction in which the raised-portion boundary groove 43 extends, and measuring

the dimensions in a photograph of the cut end surface.

In the napkin 1, from the viewpoint of improving fluid absorptivity etc. in the excretion-section opposing zone B, the thickness of the raised-portion boundary groove 43 in the absorbent core 41 is preferably 0.08 mm or greater, more preferably 0.15 mm or greater, and preferably 7.0 mm or less, more preferably 3.5 mm or less, and preferably from 0.08 mm to 7.0 mm, more preferably from 0.15 to 3.5 mm.

[0040]

In the napkin 1, the raised-portion boundary groove 43 is formed so as to have a lower basis weight than the basis weight of the raised portion 42 as well as the basis weight of the first region 41F and the basis weight of the second region 41R in the absorbent core 41. In cases where there is a groove 45, the basis weight of the first region 41F, as well as the basis weight of the second region 41R, refers to the basis weight in a section excluding the groove 45. The basis weight of the raised-portion boundary groove 43 is preferably 10 g/m² or greater, more preferably 20 g/m² or greater, and preferably 350 g/m² or less, more preferably 250 g/m² or less, and more specifically, preferably from 10 to 350 g/m², more preferably from 20 to 250 g/m². The basis weight of the raised-portion boundary groove 43 is calculated by dividing the mass of a sample of a portion of the raised-portion boundary groove 43--which has been cut out as explained in the aforementioned Method for Measuring Thickness in Various Portions of Absorbent Core 41--by the area of the sample's surface on the skin-facing surface side.

[0041]

In the napkin 1, as illustrated in Fig. 2, the absorbent core 41 includes, in the middle region 41M, a raised-portion adjacent portion 44 in a region other than the raised portion 42 and the raised-portion boundary groove 43. Stated differently, in the napkin 1, the middle region 41M of the absorbent core 41 is constituted by the raised portion 42, the raised-portion boundary groove 43, and the raised-portion adjacent portion 44. The raised-portion adjacent portion 44 includes, in the middle region 41M: a front raised-portion adjacent portion 44a that is adjacent to the front-side projection 422 constituting the raised portion 42 and that is arranged on

the first region 41F side; and a rear raised-portion adjacent portion 44c that is adjacent to the rear-side projection 423 constituting the raised portion 42 and that is arranged on the second region 41R side. The front raised-portion adjacent portion 44a is formed having left-right symmetry with respect to the center line CL extending in the longitudinal direction X. Each half of the front raised-portion adjacent portion 44a located more toward the absorbent core 41's one lateral side edge 41s, which extends along the longitudinal direction X, than the center line CL is formed such that its length in the longitudinal direction X gradually decreases from the aforementioned one lateral side edge 41s toward the center line CL. Like the front raised-portion adjacent portion 44a, the rear raised-portion adjacent portion 44c is formed having left-right symmetry with respect to the center line CL extending in the longitudinal direction X. Each half of the rear raised-portion adjacent portion 44c located more toward the absorbent core 41's one lateral side edge 41s, which extends along the longitudinal direction X, than the center line CL is formed such that its length in the longitudinal direction X gradually decreases from the aforementioned one lateral side edge 41s toward the center line CL.

[0042]

In the napkin 1, as illustrated in Fig. 4, the raised-portion adjacent portion 44 is formed so as to have a thickness that is greater than the thickness of the raised-portion boundary groove 43 and smaller than the thickness of the raised portion 42 in the absorbent core 41. Further, from the viewpoint of conformability to body movement, it is preferable that the raised-portion adjacent portion 44 has a thickness that is the same as or smaller than the thickness of the first region 41F and the thickness of the second region 41R. It should be noted that, from the viewpoint of the strength of the absorbent core 41 when repeatedly deformed by body movement, the thickness of the raised-portion adjacent portion 44 may be greater than the thickness of the first region 41F and the thickness of the second region 41R.

The thickness of the raised-portion adjacent portion 44 is preferably 0.5 mm or greater, more preferably 1.0 mm or greater, and preferably 10.0 mm or less, more preferably 7.0 mm or less, and preferably from 0.5 to 10.0 mm, more preferably from 1.0 to 7.0 mm.

The thickness of the raised-portion adjacent portion 44 is measured according

to the aforementioned Method for Measuring Thickness in Various Portions of Absorbent Core 41.

[0043]

5 In the napkin 1, the raised-portion adjacent portion 44 is formed so as to have a basis weight that is smaller than the basis weight of the raised portion 42 of the absorbent core 41 and greater than the basis weight of the raised-portion boundary groove 43. Further, from the viewpoint of conformability to body movement, it is preferable that the raised-portion adjacent portion 44 has a basis weight that is the same as or smaller than the basis weight of the first region 41F and the basis weight of the second region 41R in the absorbent core 41. It should be noted that, from the viewpoint of the strength of the absorbent core 41 when repeatedly deformed by body movement, the basis weight of the raised-portion adjacent portion 44 may be greater than the basis weight of the first region 41F and the basis weight of the second region 41R. In cases where there is a groove 45, the basis weight of the first region 41F, as well as the basis weight of the second region 41R, refers to the basis weight in a section excluding the groove 45. The basis weight of the raised-portion adjacent portion 44 is preferably 20 g/m² or greater, more preferably 50 g/m² or greater, and preferably 800 g/m² or less, more preferably 700 g/m² or less, and more specifically, preferably from 20 to 800 g/m², more preferably from 50 to 700 g/m². The basis weight of the raised-portion adjacent portion 44 is calculated by dividing the mass of a sample of the raised-portion adjacent portion 44--which has been cut out as explained in the aforementioned Method for Measuring Thickness in Various Portions of Absorbent Core 41--by the area of the sample's surface on the skin-facing surface side.

25 [0044]

In the napkin 1, as illustrated in Fig. 2, each of the first region 41F and the second region 41R in the absorbent core 41 includes grooves 45 having a relatively small basis weight and small absorbent portions 46 having a relatively large basis weight. Preferably, the grooves 45 consist of: longitudinal grooves 45X extending in the longitudinal direction X; and lateral grooves 45Y extending in the lateral direction Y. The longitudinal grooves 45X extending in the longitudinal direction

X are arranged at constant intervals in the lateral direction Y, and the lateral grooves 45Y extending in the lateral direction Y are arranged at constant intervals in the longitudinal direction X. The small absorbent portions 46 are respectively located at the lattice cells partitioned by the longitudinal grooves 44X and the lateral grooves 44Y. The aforementioned thickness and basis weight of the first region 41F and the second region 41R refer to the thickness and basis weight of the small absorbent portions 46.

[0045]

In the napkin 1, the absorbent core 41--which includes the grooves 45 and the small absorbent portions 46 in the first region 41F and the second region 41R and includes the raised portion 42, the raised-portion boundary groove 43, and the raised-portion adjacent portion 44 in the middle region 41M--is integrally molded as a whole. "Integrally molded" means that the core is made by using the same material and formed integrally in a single step, as opposed to joining components that have been manufactured in separate steps by joining means such as an adhesive or compression.

[0046]

The aforementioned absorbent core 41 of the napkin 1 can be manufactured, for example, by employing a fiber-stacking device including a fiber-stacking drum 54 that has collecting/stacking depressions 55 in the outer peripheral surface thereof and that rotates in one direction R as illustrated in Fig. 5(a), and a duct (not illustrated) for supplying core material in an airborne and dispersed state onto the outer peripheral surface of the fiber-stacking drum 54.

A plurality of the collecting/stacking depressions 55 are formed in the outer peripheral surface of the fiber-stacking drum 54 at predetermined intervals in the circumferential direction. The bottom surface 56 of each collecting/stacking depression 55 is made, for example, of a mesh plate, and has a multitude of fine holes that function as suction holes.

[0047]

As illustrated in Fig. 5(a), a depression 56b for forming the middle region

41M of the absorbent core 41 is formed in a portion of the bottom surface 56 of a single collecting/stacking depression 55. First sparingly-air-permeable members 57 for forming the respective raised-portion boundary grooves 43, which are for partitioning the raised portion 42 and the raised-portion adjacent portions 44, are arranged at the bottom surface of the depression 56b. The first sparingly-air-permeable members 57 are arranged at positions corresponding to the respective raised-portion boundary grooves 43 and are fixed so as to project from the bottom surface of the depression 56b. Further, second sparingly-air-permeable members 58 for forming the respective grooves 45 are arranged at the bottom surface 56 in an upstream-side region and a downstream-side region which are adjacent to the depression 56b in the rotating direction R. The second sparingly-air-permeable members 58 are arranged at positions corresponding to the respective longitudinal grooves 44Y and lateral grooves 44X, and are fixed so as to project from the bottom surface 56 of the collecting/stacking depression 55. The first sparingly-air-permeable members 57 and the second sparingly-air-permeable members 58 may be air-impermeable members, and may be made, for example, of metal, plastic, or ceramic.

[0048]

Like known fiber-stacking devices including a fiber-stacking drum, by supplying core material, which is a mixture of a water-absorbing polymer and pulp fiber, into the duct while performing suction from the bottom surface of the collecting/stacking depression 55, the core material accumulates in the collecting/stacking depression 55 so as to have a predetermined shape, as illustrated in Fig. 5(b). The accumulation 40 is removed from the collecting/stacking depression 55, to obtain a precursor of an absorbent core 41. The absorbent core 41's precursor is then covered by a core-wrap sheet (not illustrated), is then cut by, for example, a rotary cutter, and transported in a transporting direction by a transporting means such as a belt conveyor. In this way, an absorbent core 41 is obtained. The thus-obtained absorbent core 41, which is covered by a core-wrap sheet (not illustrated), is entirely or partially pressurized and moderately compressed by, for example, being passed between a pair of rollers once or a plurality of times. Thus, the portion that has accumulated in the depression 56b becomes the raised portion 42 having a relatively large basis weight and thickness.

Similarly, the portions made of the core material and having accumulated in the upstream-side region and the downstream-side region which are adjacent to the depression 56b respectively become the absorbent core 41's first region 41F and second region 41R which have a relatively small basis weight. The portions made of the core material and having accumulated on the first sparingly-air-permeable members 57 of the depression 56b respectively become the raised-portion boundary grooves 43 which have a relatively smaller basis weight than the basis weight of the first region 41F and the second region 41R. The portions made of the core material and having accumulated on the second sparingly-air-permeable members 58 in the upstream-side region and the downstream-side region which are adjacent to the depression 56b respectively become the grooves 45 which have a relatively smaller basis weight than the small absorbent portions 46.

[0049]

Materials for forming the various constituent members of the aforementioned napkin 1 of the present embodiment are described below.

The skin-side sheet 2 forming the skin-facing surface is liquid-permeable and is made of a material including a thermoplastic synthetic resin. For example, a fiber nonwoven fabric, such as an air-through fiber nonwoven fabric, a spun-bonded nonwoven fabric, or a point-bond nonwoven fabric, can be suitably used. Examples of thermoplastic resins include, although not limited to, olefin-based polymers, such as ethylene and propylene, and polyethylene terephthalate. For example, the skin-side sheet 2 preferably has a basis weight from 10 to 100 g/m² and a thickness from 0.5 to 5.0 mm. For the skin-side sheet 2, any material conventionally used in this technical field may be employed without particular limitation, and for example, a perforated film can be used.

[0050]

The non-skin-side sheet 3 is sparingly-liquid-permeable or liquid-impermeable, and is made of a material including a thermoplastic synthetic resin. Examples include, although not limited to: synthetic resin films; a laminate of a synthetic resin film and a nonwoven fabric; and water-repellent nonwoven fabrics with high water pressure resistance, such as

spun-bonded/melt-blown/spun-bonded laminated fiber nonwoven fabric, air-through fiber nonwoven fabric, point-bond fiber nonwoven fabric, and spun-bonded fiber nonwoven fabric. Any material conventionally used in this technical field may be employed without particular limitation. For example, the non-skin-side sheet 3 preferably has a basis weight from 10 to 50 g/m² and a thickness from 8 to 200 μm.

[0051]

The core material of the absorbent core 41 includes a fiber aggregate made of fiber material such as pulp fiber. For the fiber material, various materials conventionally used for absorbent members of absorbent articles, such as sanitary napkins, pantliners, and disposable diapers, may be used without particular limitation, with examples including staple fibers of cellulose fibers, such as pulp fiber, rayon fiber, or cotton fiber, and staple fibers of synthetic fibers, such as polyethylene. One type of the aforementioned fiber may be used alone, or two or more types may be used in combination. It is preferable that a portion of, or all of, the fiber materials is pulp fiber, and the proportion of pulp fiber within the fiber materials is preferably from 50 to 100 mass%, more preferably from 80 to 100 mass%, even more preferably 100 mass%.

The absorbent core 41 may include a water-absorbing polymer. Examples of water-absorbing polymers include sodium polyacrylate, acrylic acid-vinyl alcohol copolymers, sodium polyacrylate crosslinked products, starch-acrylic acid graft copolymers, isobutylene-maleic anhydride copolymers and saponified products thereof, and polyaspartic acid. The inclusion of a water-absorbing polymer allows excreted fluid, such as large amounts of blood, to be absorbed quickly and retained more stably.

The absorbent core 41 may also include a deodorant, an antibacterial agent, or the like, if necessary.

[0052]

The core-wrap sheet (not illustrated) covering the absorbent core 41 may be, for example, tissue paper or a water-permeable nonwoven fabric. The absorbent member 4 is formed by covering the upper and lower surfaces of the absorbent core 41 by the core-wrap sheet (not illustrated). The core-wrap sheet (not illustrated) is

used with the aim of preventing the material(s) for forming the absorbent core 41 from spilling out and also improving the shape retainability of the absorbent core 41. It is preferable that the skin-side sheet 2 and the core-wrap sheet (not illustrated) covering the skin-facing surface side of the absorbent core 41, as well as the non-skin-side sheet 3 and the core-wrap sheet (not illustrated) covering the non-skin-facing surface side of the absorbent core 41, are joined together by an adhesive applied according to a pattern, such as a dotted pattern, a spiral pattern, or a stripe pattern.

[0053]

For the side sheets 5, various materials conventionally used in this technical field can be employed without particular limitation, with examples including liquid-impermeable or water-repellent resin films and laminates of a resin film and nonwoven fabric. Examples of other materials include water-repellent (hydrophobic) nonwoven fabrics, such as spun-bonded nonwoven fabric, composite sheets including spun-bonded nonwoven fabric (S) and melt-blown nonwoven fabric (M) (e.g., SM, SMS, or SMMS), heat-rolled nonwoven fabric, and air-through nonwoven fabric.

[0054]

The joined regions 6 where the side sheet 5 and the skin-side sheet 2 are joined can be formed according to ordinary methods by heat sealing.

The linear compressed groove 7 (the first lateral compressed grooves 71, the second lateral compressed grooves 72, and the longitudinal compressed grooves 73) can be formed according to ordinary methods by embossing, such as ultrasonic embossing or compression (so-called embossing) which may or may not involve heat.

[0055]

The effects of the napkin 1 of the foregoing embodiment are described.

As illustrated in Figs. 1 and 2, the napkin 1 includes a raised portion 42 in the middle region 41M of the absorbent core 41; in a planar view of the absorbent core 41 as illustrated in Fig. 2, the raised portion 42 has a maximum width portion at

which the length in the lateral direction Y of the absorbent core 41 becomes the
 greatest; and the length, in the lateral direction Y, at the maximum width portion is
 the same as the length, in the lateral direction Y, of the absorbent core 41 in the
 middle region 41M. Thus, the napkin 1--i.e., the absorbent article--is less likely to
 5 cause uncomfortableness to the wearer thanks to excellent conformability to the
 shape of the body, and also sufficient absorption performance can be achieved
 because the napkin is less likely to form a gap between it and the wearer's skin,
 even if the napkin 1 is attached slightly out of position. Particularly, the napkin 1
 includes a raised central portion 421 in which the maximum width portion is formed
 10 so as to extend over a predetermined length in the longitudinal direction X and
 conform to both lateral side edges of the absorbent core 41 which extend along the
 longitudinal direction X. Thus, the amount of excreted fluid absorbed can be
 increased, and also, sufficient absorption performance can be achieved while
 conforming to the posture of the body during sleep and body movement while the
 15 napkin is worn, even if the napkin 1--i.e., the absorbent article--is attached slightly
 out of position. Further, in a planar view as illustrated in Fig. 2, the raised portion
 42 includes a raised central portion 421, and at least either one of: a front-side
 projection 422 that projects from the front end portion, in the longitudinal direction
 X, of the raised central portion 421 toward the first region 41F side; and a rear-side
 20 projection 423 that projects from the rear end portion, in the longitudinal direction
 X, of the raised central portion 421 toward the second region 41R side. When the
 raised portion 42 includes at least one of the front-side projection 422 and the
 rear-side projection 423, the front-side projection 422 and the rear-side projection
 423 deform in response to force from the thighs toward the inner side, in the lateral
 25 direction Y, of the napkin 1 even if the napkin 1 is attached slightly out of position,
 and thus, the raised portion 42 has excellent conformability to the body shape and is
 less likely to cause uncomfortableness to the wearer. Further, when the raised
 portion 42 includes at least one of the front-side projection 422 and the rear-side
 projection 423, sufficient absorption performance can be achieved because the
 30 napkin is less likely to form a gap between it and the wearer's skin, even if the
 napkin 1 is attached slightly out of position. Thus, fittability to the body while the
 napkin 1 is worn can be maintained, and fluid leakage is less prone to occur.
 Particularly, in the napkin 1, since the raised portion 42 includes both the front-side
 projection 422 and the rear-side projection 423, the aforementioned effects can be

achieved more significantly.

[0056]

Further, in the napkin 1, as illustrated in Fig. 2, each of the front-side projection 422 and the rear-side projection 423 in the absorbent core 41 is formed such that its width d gradually decreases from both lateral sides, which extend along the longitudinal direction X, toward its apex 422t, 423t located in the central portion in the lateral direction Y. Thus, even better conformability to the body shape is achieved, and the napkin is even less likely to cause uncomfortableness to the wearer, even if the napkin 1 is attached slightly out of position.

[0057]

Further, as illustrated in Fig. 2, napkin 1 includes, in the middle region 41M of the absorbent core 41, a raised-portion boundary groove 43 defining a boundary between the raised portion 42 and a portion other than the raised portion 42. The raised-portion boundary groove 43 is formed so as to have a lower basis weight than the raised portion 42 and a lower basis weight than the basis weight of the first region 41F and the second region 41R in the absorbent core 41. Thus, the napkin can easily bend at the raised-portion boundary groove 43, and is less likely to cause uncomfortableness to the wearer. Further, the raised-portion boundary groove 43 is formed so as to span the entire length, in the lateral direction Y, of the absorbent core 41, and thus, the absorbent core 41's lateral side edge portions in the width direction can easily bend to conform to the wearer's body shape and movement, and thus fittability is further improved.

[0058]

Further, as illustrated in Fig. 2, the napkin 1 includes, in the middle region 41M of the absorbent core 41: a front raised-portion adjacent portion 44a that is adjacent to the front-side projection 422 constituting the raised portion 42 and that is arranged on the first region 41F side; and a rear raised-portion adjacent portion 44c that is adjacent to the rear-side projection 423 constituting the raised portion 42 and that is arranged on the second region 41R side. Further, the thickness of the raised-portion adjacent portion 44 is formed so as to be equal to or smaller than the

thickness of the first region 41F and the thickness of the second region 41R in the absorbent core 41, and smaller than the thickness of the raised portion 42. Thus, sufficient absorption performance can be expected because the napkin is less likely to form a gap between it and the wearer's skin, even if the napkin 1 is attached slightly out of position. In the napkin 1, the basis weight of the raised-portion adjacent portion 44 is formed so as to be smaller than the basis weight of the first region 41F and the basis weight of the second region 41R in the absorbent core 41, and greater than the basis weight of the raised-portion boundary groove 43, and thus, the effect of suppressing uncomfortableness to the wearer, among the aforementioned effects, can be further improved.

[0059]

If there is a possibility that the raised-portion adjacent portion 44 may break and absorption performance may be impaired as a result of the napkin 1 being deformed repeatedly by body movement, particularly in cases where the napkin 1 is worn for a long time, the thickness of the raised-portion adjacent portion 44 may be made greater than the thickness of the first region 41F and the second region 41R in the absorbent core 41.

Further, if there is a possibility that the raised-portion adjacent portion 44 may break and absorption performance may be impaired as a result of repeated deformation by body movement, the basis weight of the raised-portion adjacent portion 44 may be made greater than the basis weight of the first region 41F and the second region 41R in the absorbent core 41.

[0060]

Further, as illustrated in Fig. 2, the napkin 1 includes grooves 45 and small absorbent portions 46 in the first region 41F and the second region 41R of the absorbent core 41. Thus, the napkin can easily bend at the grooves 45 and is less likely to cause uncomfortableness to the wearer.

[0061]

The invention has been described above according to preferred embodiments thereof, but the absorbent article of the invention is not limited to the napkin 1 of

the foregoing embodiment and may be modified as appropriate.

[0062]

For example, in the front-side projection 422 in the absorbent core 41 of the napkin 1, as illustrated in Fig. 2, both lateral sides 422s, 422s extend rectilinearly in a straight line--without curving--toward the apex 422t from the absorbent core 41's respective lateral side edges 41s extending along the longitudinal direction X, and the width d of the front-side projection 422 gradually decreases continuously toward the apex 422t from the absorbent core 41's respective lateral side edges 41s extending along the longitudinal direction X. However, so long as the width d of the front-side projection 422 gradually decreases, the width may gradually decrease stepwise. A configuration in which the front-side projection 422 extends rectilinear in a straight line and the width d of the front-side projection 422 gradually decreases continuously toward the apex 422t from the absorbent core 41's respective lateral side edges 41s, 41s extending along the longitudinal direction X is preferable, in terms that fittability to the body is improved and removability is improved when removing the absorbent core from the collecting/stacking depression 55 of the fiber-stacking device. Examples in which the width d of the front-side projection 422 gradually decreases are described below, with reference to the examples illustrated in Figs. 6(a) to 6(e). The same applies to the rear-side projection 423.

[0063]

The front-side projection 422 of the absorbent core 41 illustrated in Fig. 6(a) is formed toward the apex 422t from the absorbent core 41's respective lateral side edges 41s extending along the longitudinal direction X, so as to depict a curved line having a constant radius of curvature. The width d of the front-side projection 422 gradually decreases because the front-side projection depicts a projecting shape toward the apex 422t.

[0064]

Next, the front-side projection 422 of the absorbent core 41 illustrated in Fig. 6(b) is formed toward the apex 422t from the absorbent core 41's respective lateral

side edges 41s extending along the longitudinal direction X, the lateral sides 422s each forming a straight line with bends in the middle. The width d of the front-side projection 422 gradually decreases because the front-side projection depicts a projecting shape toward the apex 422t.

5 [0065]

Next, the front-side projection 422 of the absorbent core 41 illustrated in Fig. 6(c) is formed toward the apex 422t from the absorbent core 41's respective lateral side edges 41s extending along the longitudinal direction X, so as to depict several curved lines with different radii of curvature. The width d of the front-side projection 422 gradually decreases stepwise because the front-side projection depicts a projecting shape toward the apex 422t.

[0066]

Next, the front-side projection 422 of the absorbent core 41 illustrated in Fig. 6(d) is formed toward the apex 422t from the absorbent core 41's respective lateral side edges 41s extending along the longitudinal direction X, the lateral sides 422s each forming a straight line up to a midpoint, and then depicting a curved line with a constant radius of curvature from the midpoint. The width d of the front-side projection 422 gradually decreases because the front-side projection depicts a projecting shape toward the apex 422t.

20 [0067]

Next, the front-side projection 422 of the absorbent core 41 illustrated in Fig. 6(e) is formed toward the apex 422t from the absorbent core 41's respective lateral side edges 41s extending along the longitudinal direction X, the lateral sides 422s each depicting a curved line with a constant radius of curvature up to a midpoint and then depicting a straight line from the midpoint, in contrast to the front-side projection 422 of the absorbent core 41 illustrated in Fig. 6(d). The width d of the front-side projection 422 gradually decreases because the front-side projection depicts a projecting shape toward the apex 422t.

[0068]

Further, in the aforementioned napkin 1, only one front-side projection 422 is arranged at the front end portion of the raised central portion 421 as illustrated in Fig. 2, but a plurality of front-side projections may be arranged at the front end portion of the raised central portion 421 as illustrated in Fig. 6(f).

5 [0069]

In the napkin 1, the first region 41F and the second region 41R have the same thickness, but the thicknesses may be different so long as the thicknesses are smaller than the thickness of the raised portion 42. Further, in the napkin 1, the first region 41F and the second region 41R have the same basis weight, but the basis
10 weights may be different so long as the basis weights are smaller than the basis weight of the raised portion 42. Further, the first region 41F and the second region 41R of the napkin 1 have grooves 45 and small absorbent portions 46, but they do not have to include grooves and small absorbent portions, or they may include grooves 45 and small absorbent portions 46 with different shapes.

15 [0070]

The absorbent core 41 of the napkin 1 is integrally molded as a whole, but the core does not have to be integrally molded. For example, the absorbent core 41 may first be formed of a core material with the same height from the first region 41F up to the second region 41R, and then, the raised portion 42 may be formed by
20 arranging a component formed of a separate core material.

[0071]

Further, the absorbent core 41 of the napkin 1 may include a continuous layer that is not divided/separated over the entire planar direction.

[0072]

25 Further, the napkin 1 includes side sheets 5 arranged at the skin-side sheet 2's respective lateral sides which extend along the longitudinal direction X on the skin-facing surface, as illustrated in Fig. 1. An elastic member in a stretched state may be arranged in the longitudinal direction X along the free end of each side sheet 5, to form a leak-proof cuff.

[0073]

Further, the napkin 1 includes a pair of wings 1W, 1W on respective lateral sides which extend along the longitudinal direction X in the excretion-section opposing zone B, as illustrated in Fig. 1. The pair of wings 1W, 1W, however, does not have to be provided. Further, in addition to the pair of wings 1W, 1W, a pair of rear flaps may be provided on respective lateral sides which extend along the longitudinal direction X in the rear zone C.

[0074]

Further, the napkin 1 illustrated in Fig. 1 includes, as a linear groove formed by compressing and integrating the skin-side sheet 2 and the absorbent core 41, a pair of longitudinal compressed grooves 73 that extends along the absorbent core 41's longitudinal direction X; and the longitudinal compressed grooves 73 are formed so as to run longitudinally through the raised portion 42, the raised-portion boundary groove 43, and the raised-portion adjacent portion 44 of the absorbent core 41 along the longitudinal direction X, from the viewpoint of further preventing leakage. Instead, as in the napkin 1 illustrated in Fig. 7, second lateral compressed grooves 72 extending in the lateral direction Y may be provided at respective front and rear end portions, in the longitudinal direction X, of the absorbent member 4 in the excretion-section opposing zone B and on the inner side of the pair of longitudinal compressed grooves 73 and the pair of first lateral compressed grooves 71. By providing second lateral compressed grooves 72 on the inner side of the napkin 1, the napkin 1 can deform at the second lateral compressed grooves 72, thus further improving fittability to the skin.

[0075]

Further, as in the napkin 1 illustrated in Fig. 8, a pair of longitudinal compressed grooves 73A, 73A may be provided on the outer side, in the width direction Y, of the pair of longitudinal compressed grooves 73, 73 extending along the longitudinal direction X in the excretion-section opposing zone B. By providing these longitudinal compressed grooves 73A, 73A, twisting/bunching at the excretion section can be further prevented while maintaining the absorptivity and flexibility of the first region 41F and the second region 41R. It is preferable to

arrange the longitudinal compressed grooves 73A, 73A in the middle region 41M in the longitudinal direction X from the viewpoint of fittability and prevention of twisting/bunching.

[0076]

- 5 Further, in the absorbent core 41 of the napkin 1, grooves 45 may be formed on the non-skin-facing surface side. This improves fluid diffusibility and fluid retentiveness.

[0077]

- 10 Further, in the napkin 1, the size of the front zone A of the napkin 1 and the size of the first region 41F of the absorbent core 41 are substantially the same, but they do not have to be the same. Further, the size of the rear zone C of the napkin 1 and the size of the second region 41R of the absorbent core 41 are substantially the same, but they do not have to be the same.

[0078]

- 15 The absorbent article of the invention may be, for example, a pantiliner (sheet for vaginal discharge) or an incontinence pad, other than a sanitary napkin.

[0079]

In relation to the foregoing embodiments of the invention, the following absorbent articles are further disclosed.

- 20 [0080]

{1}

An absorbent article comprising an absorbent core having a shape that is long in a longitudinal direction corresponding to a wearer's front-to-rear direction, the absorbent article having a front zone and a rear zone, wherein:

- 25 the absorbent core has a first region located on the front zone side, a second region located on the rear zone side, and a middle region located between the first region and the second region;

the absorbent core includes, in the middle region, a raised portion that has a

greater thickness than the thickness of the first region and that of the second region;

in a planar view of the absorbent core, the raised portion has a maximum width portion at which the length in a lateral direction, which is orthogonal to the longitudinal direction of the absorbent core, becomes the greatest; and

5 the length, in the lateral direction, at the maximum width portion is the same as the length, in the lateral direction, of the absorbent core.

{2}

The absorbent article as set forth in clause {1}, wherein the raised portion includes a raised central portion in which the maximum width portion is formed so
10 as to extend over a predetermined length in the longitudinal direction and conform to both lateral side edges of the absorbent core which extend along the longitudinal direction.

[0081]

{3}

15 The absorbent article as set forth in clause {2}, wherein the raised portion includes a front-side projection or a rear-side projection in which its length, in the lateral direction, becomes narrower than the maximum width portion from the raised central portion toward the front side or the rear side.

{4}

20 The absorbent article as set forth in clause {3}, wherein the raised portion includes the front-side projection and the rear-side projection.

{5}

The absorbent article as set forth in clause {4}, wherein:

25 the front-side projection is singular in quantity and is arranged at a front end portion, in the longitudinal direction, of the raised central portion;

the rear-side projection is singular in quantity and is arranged at a rear end portion, in the longitudinal direction, of the raised central portion; and

30 each of the front-side projection and the rear-side projection is formed such that its length in the lateral direction gradually decreases from both lateral sides which extend along the longitudinal direction toward an apex located in a central portion in the lateral direction.

{6}

The absorbent article as set forth in any one of clauses {1} to {5}, wherein

the raised portion does not have, on a skin-facing surface side, a depression in which the basis weight is lower than the basis weight of the first region and that of the second region in the absorbent core.

{7}

- 5 The absorbent article as set forth in any one of clauses {1} to {6}, wherein the raised portion is formed so as to have a higher basis weight than the basis weight of the first region and the basis weight of the second region in the absorbent core.

{8}

- 10 The absorbent article as set forth in any one of clauses {1} to {7}, wherein:
 the absorbent core includes, in the middle region, a raised-portion boundary groove defining a boundary between the raised portion and a portion other than the raised portion; and
 the raised-portion boundary groove is formed so as to span the entire length,
 15 in the lateral direction, of the absorbent core.

{9}

 The absorbent article as set forth in clause {8}, wherein the raised-portion boundary groove is formed so as to have a lower basis weight than the basis weight of the first region and the basis weight of the second region in the absorbent core.

{10}

- 20 The absorbent article as set forth in any one of clauses {1} to {9}, wherein:
 the raised portion includes a raised central portion in which the maximum width portion is formed so as to extend over a predetermined length in the longitudinal direction and conform to both lateral side edges of the absorbent core
 25 which extend along the longitudinal direction; and
 in a cross-sectional view, the raised central portion is formed such that its height decreases from its central portion in the lateral direction toward both lateral sides which extend along the longitudinal direction.

{11}

- 30 The absorbent article as set forth in any one of clauses {1} to {9}, wherein:
 the raised portion includes a raised central portion in which the maximum width portion is formed so as to extend over a predetermined length in the longitudinal direction and conform to both lateral side edges of the absorbent core which extend along the longitudinal direction; and

in a cross-sectional view, the raised central portion is formed such that its basis weight decreases from its central portion in the lateral direction toward both lateral sides which extend along the longitudinal direction.

{12}

5 The absorbent article as set forth in any one of clauses {1} to {11}, wherein:
the absorbent core includes, in the middle region, a raised-portion boundary groove defining a boundary between the raised portion and a portion other than the raised portion, and includes, in the middle region, a raised-portion adjacent portion in a region other than the raised portion and the raised-portion boundary groove;
10 and

the raised-portion adjacent portion has a basis weight that is smaller than the basis weight of the raised portion and greater than the basis weight of the raised-portion boundary groove.

{13}

15 The absorbent article as set forth in clause {12}, wherein the raised-portion adjacent portion has a basis weight that is the same as or smaller than the basis weight of the first region and that of the second region in the absorbent core.

{14}

The absorbent article as set forth in any one of clauses {1} to {13}, wherein:
20 the absorbent core includes, in the middle region, a raised-portion boundary groove defining a boundary between the raised portion and a portion other than the raised portion, and includes, in the middle region, a raised-portion adjacent portion in a region other than the raised portion and the raised-portion boundary groove;
and

25 the raised-portion adjacent portion has a thickness that is greater than the thickness of the raised-portion boundary groove and smaller than the thickness of the raised portion.

{15}

30 The absorbent article as set forth in clause {14}, wherein the raised-portion adjacent portion has a thickness that is the same as or smaller than the thickness of the first region and that of the second region in the absorbent core.

{16}

The absorbent article as set forth in any one of clauses {1} to {15}, wherein the absorbent core includes a continuous layer that is not divided/separated over the

entire planar direction.

{17}

The absorbent article as set forth in any one of clauses {1} to {16}, wherein the entire length, in the longitudinal direction, of the raised portion is from 25 to 80% of the entire length, in the longitudinal direction, of the absorbent core.

{18}

The absorbent article as set forth in any one of clauses {2} to {5}, wherein the entire length, in the longitudinal direction, of the raised central portion in the raised portion is from 20 to 80% of the entire length, in the longitudinal direction, of the raised portion.

{19}

The absorbent article as set forth in any one of clauses {1} to {18}, wherein:
the absorbent article includes a skin-side sheet forming a skin-facing surface, a non-skin-side sheet forming a non-skin-facing surface, and the absorbent core interposed between the two sheets;

the absorbent core includes a raised-portion boundary groove defining a boundary between the raised portion and a portion other than the raised portion, and includes, in the middle region, a raised-portion adjacent portion in a region other than the raised portion and the raised-portion boundary groove;

the absorbent article includes, as a linear groove formed by compressing and integrating the skin-side sheet and the absorbent core, a pair of longitudinal compressed grooves that extend along the absorbent core's longitudinal direction; and

the longitudinal compressed grooves are formed so as to run longitudinally through the raised portion, the raised-portion boundary groove, and the raised-portion adjacent portion along the longitudinal direction.

{20}

The absorbent article as set forth in clause {19}, wherein the absorbent article includes a lateral compressed groove extending in the lateral direction on an inner side of the pair of longitudinal compressed grooves.

{21}

The absorbent article as set forth in clause {19} or {20}, wherein the absorbent article includes a pair of second longitudinal compressed grooves on an outer side, in a width direction, of the pair of longitudinal compressed grooves

extending along the longitudinal direction in the middle region.

{22}

The absorbent article as set forth in any one of clauses {1} to {21}, wherein:

a groove extending in the lateral direction is arranged in each of the first
5 region and the second region of the absorbent core; and

the basis weight of a material forming the absorbent core is lower in the
groove than in a portion other than the groove in the first region and the second
region.

{23}

10 The absorbent article as set forth in any one of clauses {1} to {22}, wherein:

a groove extending in the longitudinal direction is arranged in each of the first
region and the second region of the absorbent core; and

the basis weight of a material forming the absorbent core is lower in the
groove than in a portion other than the groove in the first region and the second
15 region.

[0082]

{24}

The absorbent article as set forth in any one of clauses {1} to {23}, wherein
the absorbent core is made by integral molding.

20 {25}

The absorbent article as set forth in any one of clauses {1} to {24}, wherein:

the absorbent article includes a pair of wings on respective outer sides, in the
lateral direction, of the absorbent article; and

the middle region is present between the wings' joining bases, the joining
25 bases being arranged with a spacing therebetween in the longitudinal direction in
each wing.

{26}

The absorbent article as set forth in any one of clauses {1} to {25}, wherein
the middle region of the absorbent article is present so as to span the wings' joining
30 bases.

{27}

The absorbent article as set forth in any one of clauses {1} to {26}, wherein
the length, in the longitudinal direction, of the middle region of the absorbent article

is the same as the length between the wing's joining bases.

{28}

The absorbent article as set forth in any one of clauses {1} to {27}, wherein the absorbent article includes a rear flap in a rear region, in the lateral direction, of the second region.

{29}

The absorbent article as set forth in any one of clauses {1} to {28}, wherein the absorbent article includes leak-proof guards capable of standing up toward the wearer side, the leak-proof guards being provided on respective left and right sides extending along the front-to-rear direction of the absorbent article.

{30}

The absorbent article as set forth in any one of clauses {1} to {29}, wherein the absorbent article is a sanitary napkin having an entire length of 30 cm or longer.

Examples

[0083]

The invention is described in further detail below according to Examples thereof. The invention, however, is not limited to the following Examples.

[0084]

{Example 1}

An absorbent core having the shape illustrated in Fig. 9 was manufactured. The absorbent core 41 was formed as a mixed fiber stack including pulp fiber and a water-absorbing polymer. The absorbent core 41 had a raised portion 42 in the middle region 41M, and the raised portion 42 included: a raised central portion 421 spanning the entire width of the absorbent core 41; and a front-side projection 422 and a rear-side projection 423 at the front and rear end portions of the raised central portion 421, respectively. The thickness of the raised portion 42 was 3.5 mm, and the thickness of the first region 41F and the thickness of the second region 41R were 2.3 mm. The basis weight of the raised portion 42 was 350 g/m², and the basis weight of the first region 41F and the basis weight of the second region 41R were 250 g/m². The thickness and the basis weight were measured according to the aforementioned methods. The entire length L2, in the longitudinal direction X,

of the raised portion 42 was 63% of the entire length L1, in the longitudinal direction X, of the absorbent core 41.

Then, the absorbent core having the shape illustrated in Fig. 9 was covered by tissue paper to form an absorbent member, and the absorbent member was sandwiched between a skin-side sheet and a non-skin-side sheet, to form a napkin of Example 1. The absorbent member and the skin-side sheet, as well as the absorbent member and the non-skin-side sheet, were joined by an adhesive.

The following materials were used for the skin-side sheet and the outer sheet.

Skin-side sheet: Air-through nonwoven fabric having a basis weight of 30 g/m².

Non-skin-side sheet: Non-moisture-permeable polyethylene film sheet having a basis weight of 25 g/m².

[0085]

{Comparative Example 1}

A napkin of Comparative Example 1 was prepared as in the napkin of Example 1, except that an absorbent core 41' having the shape illustrated in Fig. 10(a) was used to manufacture a sanitary napkin. The absorbent core 41' having the shape illustrated in Fig. 10(a) was different from the absorbent core illustrated in Fig. 9 in terms that the raised portion 42' did not include a front-side projection 422 and a rear-side projection 423 and only included a raised central portion 421'. The thickness and the basis weight of the raised portion 42' were the same as those of the napkin of Example 1, and the thickness and the basis weight of the first region 41F' and the second region 41R' were the same as those of the napkin of Example 1. The entire length, in the longitudinal direction X, of the raised portion 42' was 63% of the entire length, in the longitudinal direction X, of the absorbent core 41'.

[0086]

{Comparative Example 2}

A napkin of Comparative Example 2 was prepared as in the napkin of Example 1, except that an absorbent core 41' having the shape illustrated in Fig. 10(b) was used to manufacture a sanitary napkin. The absorbent core 41' having

the shape illustrated in Fig. 10(b) was different from the absorbent core illustrated in Fig. 9 in terms that the raised portion 42' had a raised portion 421X that does not span the entire width of the absorbent core 41. The thickness and the basis weight of the raised portion 42' were the same as those of the napkin of Example 1, and the thickness and the basis weight of the first region 41F' and the second region 41R' were the same as those of the napkin of Example 1. The entire length, in the longitudinal direction X, of the raised portion 42' was 63% of the entire length, in the longitudinal direction X, of the absorbent core 41'.

[0087]

10 {Comparative Example 3}

A napkin of Comparative Example 3 was prepared as in the napkin of Example 1, except that an absorbent core 41' having the shape illustrated in Fig. 10(c) was used to manufacture a sanitary napkin. The absorbent core 41' having the shape illustrated in Fig. 10(c) was different from the absorbent core illustrated in Fig. 9 in terms that the raised portion 42' had a raised portion 421X that does not span the entire width of the absorbent core 41, and that the raised portion 421X was formed in a cross-shape. The thickness and the basis weight of the raised portion 42' were the same as those of the napkin of Example 1, and the thickness and the basis weight of the first region 41F' and the second region 41R' were the same as those of the napkin of Example 1. The entire length, in the longitudinal direction X, of the raised portion 42' was 63% of the entire length, in the longitudinal direction X, of the absorbent core 41'.

[0088]

{Evaluation}

25 The rigidity of the napkin of Example 1 and the napkins of Comparative Examples 1 to 3 were evaluated according to the following method.

First, the napkin of Example 1 and the napkins of Comparative Examples 1 to 3 that were prepared were stored in a test room at a temperature of 23°C and humidity of 50% for 24 hours. These napkins were then employed as measurement samples, and the rigidity value thereof was measured under the same environmental conditions according to the Handle-O-Meter method (JIS L-1096). A

Handle-O-Meter from Daiei Kagaku Seiki Mfg. Co., Ltd. (model type HOM-200) was used. The measurement sample was placed on a sample stage with the non-skin-side sheet facing downward such that the longitudinal direction of the sample was at right angles to the 10-m-wide slot. Then, starting from a position located 10 mm away toward the front zone side from the raised portion's tip end on the front zone side, the blade of a penetrator was lowered at positions of every 10 mm toward the raised portion at a constant speed of 200 mm/min, and the maximum value indicated by an indicator (load meter) when the penetrator was pressed-in to a depth of 8 mm was read off. Five samples were measured for each of the napkin of Example 1 and the napkins of Comparative Examples 1 to 3. The respective average values of the measurement results are shown in Fig. 11.

[0089]

As is clear from the results shown in Fig. 11, in the napkin of the Example 1, the rigidity value increases smoothly in a region around the raised portion's tip end on the front zone side, compared to the napkins of Comparative Examples 1 to 3. It was found that the napkin of Example 1 was capable of deforming flexibly and was less likely to form bent/folded portions because there was no section where the rigidity increased sharply. By using the napkin of Example 1, the napkin is less likely to cause uncomfortableness to the wearer thanks to excellent conformability to the shape of the body, and also sufficient absorption performance can be expected because the napkin is less likely to form a gap between it and the wearer's skin, even if the napkin is attached slightly out of position.

Industrial Applicability

[0090]

According to the invention, the absorbent article is less likely to cause uncomfortableness to the wearer thanks to excellent conformability to the shape of the body, and also sufficient absorption performance can be achieved because the absorbent article is less likely to form a gap between it and the wearer's skin, even if the absorbent article is attached slightly out of position.

CLAIMS

1. An absorbent article comprising an absorbent core having a shape that is long in a longitudinal direction corresponding to a wearer's front-to-rear direction, the absorbent article having a front zone and a rear zone, wherein:

5 the absorbent core has a first region located on the front zone side, a second region located on the rear zone side, and a middle region located between the first region and the second region;

the absorbent core includes, in the middle region, a raised portion that has a greater thickness than the thickness of the first region and that of the second region;

10

in a planar view of the absorbent core, the raised portion has a maximum width portion at which the length in a lateral direction, which is orthogonal to the longitudinal direction of the absorbent core, becomes the greatest; and

15 the length, in the lateral direction, at the maximum width portion is the same as the length, in the lateral direction, of the absorbent core.

2. The absorbent article according to claim 1, wherein the raised portion includes a raised central portion in which the maximum width portion is formed so as to extend over a predetermined length in the longitudinal direction and conform to both lateral side edges of the absorbent core which extend along the longitudinal direction.

20

3. The absorbent article according to claim 2, wherein the raised portion includes a front-side projection or a rear-side projection in which its length, in the lateral direction, becomes narrower than the maximum width portion from the raised central portion toward the front side or the rear side.

25

4. The absorbent article according to claim 3, wherein the raised portion includes the front-side projection and the rear-side projection.

5. The absorbent article according to claim 4, wherein:
the front-side projection is singular in quantity and is arranged at a front end portion, in the longitudinal direction, of the raised central portion;
the rear-side projection is singular in quantity and is arranged at a rear end portion, in the longitudinal direction, of the raised central portion; and
each of the front-side projection and the rear-side projection is formed such that its length in the lateral direction gradually decreases from both lateral sides which extend along the longitudinal direction toward an apex located in a central portion in the lateral direction.
6. The absorbent article according to any one of claims 1 to 5, wherein the raised portion does not have, on a skin-facing surface side, a depression in which the basis weight is lower than the basis weight of the first region and that of the second region in the absorbent core.
7. The absorbent article according to any one of claims 1 to 6, wherein the raised portion is formed so as to have a higher basis weight than the basis weight of the first region and the basis weight of the second region in the absorbent core.
8. The absorbent article according to any one of claims 1 to 7, wherein:
the absorbent core includes, in the middle region, a raised-portion boundary groove defining a boundary between the raised portion and a portion other than the raised portion; and
the raised-portion boundary groove is formed so as to span the entire length, in the lateral direction, of the absorbent core.
9. The absorbent article according to claim 8, wherein the raised-portion boundary groove is formed so as to have a lower basis weight than the basis weight of the first region and the basis weight of the second region in the absorbent core.
10. The absorbent article according to any one of claims 1 to 9, wherein:

the raised portion includes a raised central portion in which the maximum width portion is formed so as to extend over a predetermined length in the longitudinal direction and conform to both lateral side edges of the absorbent core which extend along the longitudinal direction; and

- 5 in a cross-sectional view, the raised central portion is formed such that its height decreases from its central portion in the lateral direction toward both lateral sides which extend along the longitudinal direction.

11. The absorbent article according to any one of claims 1 to 9, wherein:

10 the raised portion includes a raised central portion in which the maximum width portion is formed so as to extend over a predetermined length in the longitudinal direction and conform to both lateral side edges of the absorbent core which extend along the longitudinal direction; and

15 in a cross-sectional view, the raised central portion is formed such that its basis weight decreases from its central portion in the lateral direction toward both lateral sides which extend along the longitudinal direction.

12. The absorbent article according to any one of claims 1 to 11, wherein:

20 the absorbent core includes, in the middle region, a raised-portion boundary groove defining a boundary between the raised portion and a portion other than the raised portion, and includes, in the middle region, a raised-portion adjacent portion in a region other than the raised portion and the raised-portion boundary groove; and

 the raised-portion adjacent portion has a basis weight that is smaller than the basis weight of the raised portion and greater than the basis weight of the raised-portion boundary groove.

25 13. The absorbent article according to claim 12, wherein the raised-portion adjacent portion has a basis weight that is the same as or smaller than the basis weight of the first region and that of the second region in the absorbent core.

14. The absorbent article according to any one of claims 1 to 13, wherein:

the absorbent core includes, in the middle region, a raised-portion boundary groove defining a boundary between the raised portion and a portion other than the raised portion, and includes, in the middle region, a raised-portion adjacent portion in a region other than the raised portion and the raised-portion boundary groove;
 5 and

the raised-portion adjacent portion has a thickness that is greater than the thickness of the raised-portion boundary groove and smaller than the thickness of the raised portion.

15. The absorbent article according to claim 14, wherein the raised-portion adjacent portion has a thickness that is the same as or smaller than the thickness of the first region and that of the second region in the absorbent core.
 10

16. The absorbent article according to any one of claims 1 to 15, wherein the absorbent core includes a continuous layer that is not divided/separated over the entire planar direction.

15 17. The absorbent article according to any one of claims 1 to 16, wherein the entire length, in the longitudinal direction, of the raised portion is from 25 to 80% of the entire length, in the longitudinal direction, of the absorbent core.

18. The absorbent article according to any one of claims 2 to 5, wherein the entire length, in the longitudinal direction, of the raised central portion in the raised portion is from 20 to 80% of the entire length, in the longitudinal direction, of the raised portion.
 20

19. The absorbent article according to any one of claims 1 to 18, wherein:
 the absorbent article includes a skin-side sheet forming a skin-facing surface, a non-skin-side sheet forming a non-skin-facing surface, and the absorbent core interposed between the two sheets;
 25

the absorbent core includes a raised-portion boundary groove defining a boundary between the raised portion and a portion other than the raised portion, and includes, in the middle region, a raised-portion adjacent portion in a region other

than the raised portion and the raised-portion boundary groove;

the absorbent article includes, as a linear groove formed by compressing and integrating the skin-side sheet and the absorbent core, a pair of longitudinal compressed grooves that extend along the absorbent core's longitudinal direction;
5 and

the longitudinal compressed grooves are formed so as to run longitudinally through the raised portion, the raised-portion boundary groove, and the raised-portion adjacent portion along the longitudinal direction.

20. The absorbent article according to claim 19, wherein the absorbent article
10 includes a lateral compressed groove extending in the lateral direction on an inner side of the pair of longitudinal compressed grooves.

21. The absorbent article according to claim 19 or 20, wherein the absorbent article includes a pair of second longitudinal compressed grooves on an outer side, in a width direction, of the pair of longitudinal compressed grooves extending along
15 the longitudinal direction in the middle region.

22. The absorbent article according to any one of claims 1 to 21, wherein:
a groove extending in the lateral direction is arranged in each of the first region and the second region of the absorbent core; and
the basis weight of a material forming the absorbent core is lower in the
20 groove than in a portion other than the groove in the first region and the second region.

23. The absorbent article according to any one of claims 1 to 22, wherein:
a groove extending in the longitudinal direction is arranged in each of the first region and the second region of the absorbent core; and
25 the basis weight of a material forming the absorbent core is lower in the groove than in a portion other than the groove in the first region and the second region.

24. The absorbent article according to any one of claims 1 to 23, wherein the

absorbent core is made by integral molding.

25. The absorbent article according to any one of claims 1 to 24, wherein:
the absorbent article includes a pair of wings on respective outer sides, in the lateral direction, of the absorbent article; and

5 the middle region is present between the wings' joining bases, the joining bases being arranged with a spacing therebetween in the longitudinal direction in each wing.

26. The absorbent article according to claim 25, wherein the middle region of the absorbent article is present so as to span the wings' joining bases.

10 27. The absorbent article according to claim 25 or 26, wherein the length, in the longitudinal direction, of the middle region of the absorbent article is the same as the length between the wing's joining bases.

15 28. The absorbent article according to any one of claims 1 to 27, wherein the absorbent article includes a rear flap in a rear region, in the lateral direction, of the second region.

29. The absorbent article according to any one of claims 1 to 28, wherein the absorbent article includes leak-proof guards capable of standing up toward the wearer side, the leak-proof guards being provided on respective left and right sides extending along the front-to-rear direction of the absorbent article.

20 30. The absorbent article according to any one of claims 1 to 29, wherein the absorbent article is a sanitary napkin having an entire length of 30 cm or longer.