

SANITARY NAPKIN WITH ANTI-LEAK UNEVEN AREAS

5 This invention relates to a sanitary napkin having a high capacity for preventing leakage and particularly to a sanitary napkin having side flaps adapted to prevent shifting of the napkin and leakage of menses during use.

10 A sanitary napkin having side flaps can be stably secured to the crotch portion of shorts or underpants by means of the side flaps. Therefore, it is considered that with a sanitary napkin of this type it is more difficult for the underpants to become soiled than when using a napkin having no side flaps. Sanitary napkins of this type are widely used because they give a psychological sense of security to the wearers whether or not they actually exhibit the above effect.

20 Representative publications describing a sanitary napkin having side flaps are Japanese Patent Early Laid-Open Publication No. Sho 60-75058 and Japanese Patent Early Laid-Open Publication No. Sho 64-70050.

25 In Publication No. Sho 60-75058, the sanitary napkin has flexible flaps which, in use, form anti-leakage walls for preventing sideward leakage of fluid.

30 However, there are in practice only very few cases where the side flaps can actually form effective anti-leakage walls, due e.g. to the particular body shape of the wearers or the particular relationship between the crotch portion of the underpants and the napkin. Even in these few cases, the anti-leakage walls are often collapsed because the crotch portion of the wearers is so narrow.

Therefore, the conventional sanitary napkin of the type discussed is incapable of effectively preventing fluid leakage.

5 Publication No. Sho 64-70050 discloses a sanitary napkin, in which a liquid permeable topsheet which is formed of a stereoscopically apertured plastic film and extends from a central absorbent assembly including an absorbent member to side flaps, and a backsheet substantially
10 coplanar with the topsheet are heat sealed along their outer border (entire marginal area), and a seal portion is applied to the border between the central absorbent assembly and each flap.

15 However, in the above sanitary napkin, since the whole area of the topsheet excepting the seal portions is apertured, menses absorbed in the absorbent member returns to the outer surface of the topsheet at the apertures in the vicinity of the seal portions and climbs
20 over the seal portions to soil the flaps and underpants.

Therefore, the conventional sanitary napkins of the type discussed above is also incapable of effectively preventing fluid leakage.

25 Furthermore, all the above conventional sanitary napkins fails to provide a comfortable "feel" against the wearer's skin, in use.

30 Moreover, conventional sanitary napkins having side flaps cannot be correctly and easily fitted to the crotch portion of underpants and readily twist and/or shift, in use.

Conventional sanitary napkins have side flaps other than those mentioned above also all have problems relating to one or more of fluid leakage prevention, "feel" and fit.

5 It is therefore an object of the present invention to provide a sanitary napkin which has excellent fluid leakage prevention properties, a good "feel" and fits well, i.e. can be easily applied and does not then twist or shift.

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According to the present invention there is provided a sanitary napkin comprising an elongate central absorbent assembly including a liquid impermeable backsheet, an absorbent member comprising pulp fibres and water
15 absorbent polymer material, and a liquid permeable topsheet comprising apertured plastic film; and extending outwardly from each side of the central absorbent assembly, each flap being formed of superposed substantially coplanar portions of the backsheet and
20 topsheet, the said portions being connected together along their outer marginal areas, the backsheet being provided on its outer surface with an adhesive layer on the absorbent assembly and on each of the flaps and with peelable sheets covering the outer surface of the
25 adhesive layers, the topsheet being characterised by: (1) side edge areas extending along both side edges of the central absorbent assembly, the side edge areas having an uneven surface configuration and not being apertured; (2) border areas formed between the side edge areas and the
30 flaps, the border areas not being apertured, the topsheet being connected to the backsheet at the border areas; and (3) flap central areas defined by the outer marginal areas of the flaps and the border areas, the flap central areas having an uneven surface configuration and not

being apertured, the topsheet not being connected to the backsheet 2 at the flap central areas.

5 In order to fit the sanitary napkin of the present invention to a pair of underpants, the peelable sheets are peeled off and thereafter the central absorbent member assembly is secured at a predetermined position to the inner surface of the crotch portion of the underpants by the adhesive layer, and the flaps are bent around in
10 such a manner as to sandwich the crotch portion in order to secure the flaps to the outer surface of the crotch portion by the further adhesive layers. In the sanitary napkin of the present invention, the side edge areas and the flap areas are provided with an uneven or irregular surface
15 configuration, e.g. a plurality of projections, dimples, ridges or the like but the border areas formed between the side edge areas and the flap areas are not provided with such an uneven or irregular surface configuration. The border areas serve as seal portions, and the topsheet and backsheet are connected together over the entire
20 marginal area. As a result, the fitting operation can be performed correctly and easily.

When underpants fitted with a sanitary napkin of the present invention in the manner discussed are worn, since
25 the topsheet at the side edge areas of the sanitary napkin has an uneven surface configuration and is not apertured, bodily fluid absorbed in the absorbent member is prevented from returning to the upper surface of the topsheet at apertures in the vicinity of the seal
30 portions and climbing over the seal portion to soil the flaps and underpants. Moreover, the bodily fluid absorbed in the absorbent member is prevented from migrating to the flaps by the seal portions. In addition, movement of the absorbent member is restricted

by the seal portions, and shifting and twisting of the absorbent member is prevented.

5 Furthermore, when underpants with a sanitary napkin of the present invention fitted thereto are worn, they feel comfortable against the skin because the side edge areas and flap central areas are provided with an uneven surface configuration.

10 Further features and details of the invention will be apparent from the following description of one specific embodiment of the invention which is given by way of example with reference to the accompanying drawings, in which:-

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Figure 1 is a perspective view of a sanitary napkin according to the present invention;

Figure 2 is a scrap sectional view of the sanitary napkin of Figure 1; and

20 Figure 3 is a scrap sectional view showing the sanitary napkin of Figure 1 fitted to a pair of underpants.

The illustrated sanitary napkin according to this embodiment comprises a central elongate absorbent assembly 10 including a liquid impermeable backsheet 2, 25 an absorbent member 3 chiefly composed of pulp fibres and highly water absorbent polymer material, and a liquid permeable topsheet 1 composed of apertured plastic film. A flap 20 extends outwardly from the centre of each side of the central absorbent assembly 10, each flap 20 being 30 formed of extension portions extending from the backsheet 2 and topsheet 1 and being superposed one upon the other so as to be generally coplanar with each other, the extension portions being connected together along their

entire marginal areas. The backsheet 2 is provided on its outer surface thereof with adhesive layers 4,7 and peelable sheets 6,9 cover the outer surface of the adhesive layers 4,7.

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The topsheet 1 of the sanitary napkin is formed of a perforated plastic film which is apertured in its central portion which abuts the skin of the wearer. The plastic film of the topsheet 1 is liquid impermeable except for the apertured portion.

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The principal features of the illustrated sanitary napkin can be itemised as follows:

(1) Side edge areas B located along both side edges of the central absorbent assembly 10 which are uneven, in this case by virtue of the presence of embossed portions 12, and are not apertured.

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(2) Border areas C formed between the side edge areas B and the flaps which are not apertured. The topsheet is connected to the backsheet 2 at the border areas C.

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(3) Flap central areas E which are located between the entire marginal area A and the border areas C and have an uneven surface by virtue of the presence of a plurality of small protrusions 21 and are not apertured. The topsheet 1 is not connected to the backsheet 2 at the flap central areas E.

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The materials used for the backsheet, the absorbent member and the topsheet may be selected at will and conventional materials as are used for known sanitary napkins may be used. Specific examples of such materials are as follows:

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One possible material for the backsheet 2 includes a

liquid impermeable, vapour permeable sheet obtained by adding a filler to a thermoplastic resin and stretching it. The material may also be a composite material of film and non-woven fabric or of film and woven fabric.

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The absorbent member 3 is preferably formed chiefly of an open cell pulp and also of a highly water absorbent polymer material. Other preferred examples of the absorbent member 3 include a mixture of a thermoplastic resin, a cellulosic fibre and a highly water absorbent polymer material subjected to heat treatment. The water absorbent polymer material may be mixed with pulp. The highly water absorbent polymer is preferably in granular form with the ability to absorb and retain more than twenty times its own weight of water and to be gelled. Preferred examples of such a water absorbent polymer are starch-acrylic (salt) graft copolymer, a saponified starch-acrylonitrile copolymer and bridged material of sodium carboxymethylcellulose and acrylic (salt) polymer and the like.

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Examples of the topsheet 1 include a hydrophobic thermoplastic resin sheet such as a polyolefin, a copolymer olefin and other vinyl monomers, such as acrylic ester and vinyl acetate, polyester and polyamide. A hydrophobic thermoplastic resin sheet such as polyolefin, a copolymer of olefin and other monomers, or polymer blend series is preferred in view of its feel and appearance and its handling.

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The topsheet 1 of the central absorbent assembly 10 is located above the absorbent member 3. The topsheet 1 is provided with an apertured portion in which apertures 13 are formed. The width B_w of the apertured portion is

generally equal to that of the absorbent member 3, and is preferably from 50 to 80mm.

5 The density of the apertures 13 is dictated by the requirements relating to fluid permeation and fluid return. If the density is too small, the fluid permeation is inferior. As the density becomes larger, the sheet formation is impaired. Therefore, taking these factors into consideration, the density of the apertures 13 is
10 preferably from $10/\text{cm}^2$ to $100/\text{cm}^2$, and more preferably from $30/\text{cm}^2$ to $60/\text{cm}^2$. The area of each aperture 13 is preferably 0.25 to 5mm^2 .

15 The side edge areas B located at each side of the central absorbent assembly 10 have an uneven surface configuration and are not apertured. The side edge areas B extend over the longitudinal side portions of the upper surface of the absorbent member 3 and then down the side surfaces thereof. More specifically, each side edge area
20 B has a width B_L when viewed from above or from one end of the sanitary napkin and a length or height B_D when viewed from one end or one side which extends from the upper surface of the absorbent member 3 to the outer surface of the longitudinal side portion (a little before the
25 backsheet 2). The width B_L is preferably from 2 to 10mm, while the length B_D is preferably from 3 to 8mm.

30 The side edge areas B of the topsheet 1, unlike the central absorbent assembly 10, are not provided with apertures 13. The areas B are provided with only the uneven portions 12. Since the topsheet 1 is not provided with apertures 13 at the side edge areas B, leakage of fluid from these areas is prevented and thus fluid is prevented from flowing to the flaps 20.

5 The uneven portions 12 formed at the side edge areas B can be formed in any desired configuration by suitably selecting the embossing pattern. The depth of the uneven portions 12 is preferably from 0.1 to 1.0mm. If the depth is greater than 1.0mm, the side edge areas have a rough feel to the skin. On the other hand, if it is less than 0.1mm, the side edge areas feel sticky to the skin.

10 The border areas C of the topsheet 1, when expanded as shown in Figure 2, extend linearly toward the flaps 20 from the side edge portions B. Although no uneven portions are formed in these border areas C in this embodiment, very tiny irregularities may be formed. Owing to the flatness of the border areas C, the sanitary
15 napkin can be bent easily at those areas. Moreover, the foregoing arrangement enhances the fit of the napkin to the wearer.

20 The width of the border areas C is generally equal to the thickness of the crotch portion 8 of the underpants. This means that the border areas C, as shown in Figure 3, can be easily bent around the thickness of the crotch portion between the side edge areas B and the flap areas E.

25 The width of the topsheet 1 between the border areas C is preferably from 5 to 20mm, and particularly preferably from 8 to 15mm.

30 At these border areas C, the topsheet 1 is adhered to the backsheet 2 by the seal portion 14.

Means known per se, such as hot melt, heat sealing and ultrasonic welding, can be used as the seal portion 14.

By adhering the topsheet 1 to the backsheet 2 at the border areas C, discharged fluid is prevented from migrating from the side edges of the absorbent member 3 toward the flaps 20.

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The topsheet 1 is connected to the backsheet 2 along the entire marginal area A around the napkin. The width of the marginal area A is from 3 to 15mm, and is preferably uniform.

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Since the absorbent member 3 is held surrounded by the marginal area A which is located front and back of the absorbent member 3 and the seal portions 14 located at the sides of the absorbent member 3, twisting and shifting of the absorbent member 3 is prevented, in use.

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The flaps 2 extending outwardly from the centre of both sides of the central absorbent assembly 10 are formed of the topsheet 1 and the backsheet 2 connected together, only the peripheral portion thereof being connected as part of the marginal area A and the flap central area E being not connected. Since the topsheet 1 is provided with the uneven portions 21 at this flap central area E, a cushion function and a comfortable feel are provided.

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The depth of the uneven portion 21 is preferably from 0.1 to 1.0mm. If the depth is greater than 1.0mm, there is a rough feel to the skin. On the other hand, if it is less than 0.1mm, there is a sticky feel to the skin.

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The shape, size and depth of the uneven portions at the side edge areas B and central areas E are not necessarily equal to each other.

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By virtue of the construction mentioned above, the flaps

20 appear to be massive and flexible. Since the topsheet 1 is not provided with apertures at the flaps 20 and the flaps 20 and the absorbent member 3 are separated by the seal portions 14, stresses in the width direction can be absorbed and breakage of the central absorbent assembly 10 can be prevented, in use.

Specifically, the sanitary napkin of the present invention exhibits the following technical effects.

(1) Since the topsheet at the side edge areas B has an uneven surface with projection portions 12 and is not apertured, fluid leakage from the side edge areas B is prevented. Bodily fluid returned to the apertures 13 in the topsheet is also prevented from climbing over the uneven portions 12 at the side edge areas B and flowing to the flaps 20.

(2) Since both side edges of the border areas C serve as border lines between the uneven portions 12 and the uneven portions 21, the flaps 20 can be easily bent along these two border lines, particularly the border line on the flap side. As a result, the sanitary napkin can be correctly and easily fitted to the crotch portion of the underpants with the marginal areas C held along the thickness of the underpants.

(3) Since the side edge areas B, which contact the legs of the wearer, and the flap central areas E of the topsheet are provided with uneven portions 12, 21 in order to make the outer surface of the topsheet 1 flexible, a comfortable wearing "feel" is produced.

(4) Since the topsheet 1 and the backsheet 2 are connected (sealed) at the border areas C, migration of bodily fluid from the side edges of the absorbent member 3 to between the sheets of the flaps 20 is prevented, and movement of the absorbent member is also prevented.

(5) Since the absorbent member 3 is held surrounded by the marginal area A which is located front and back of the absorbent member 3 and the seal portions 14 located at the side portions of the absorbent member 3, twisting and shifting of the absorbent member 3 is prevented, in use.

(6) The flaps 20 are formed of two layers, namely the topsheet 1 and backsheet 2, and the topsheet 1 is provided with uneven portions 21 at the flap central areas E, and only the marginal areas of the flaps 20 are connected. Therefore, the flaps 20 appear to be massive and flexible. In addition, a comfortable wearing feel is provided.

(7) Since the topsheet 1 is not apertured at the flaps 20 and the seal portions are located between the flaps 20 and the absorbent member 3, stresses in the width direction can be accommodated whilst fitting the napkin and during the time the napkin is worn and breakage of the flaps can be prevented.



CLAIMS

1. A sanitary napkin comprising an elongate central absorbent assembly including a liquid impermeable backsheet, an absorbent member, comprising pulp fibres and water absorbent polymer material, and a liquid permeable topsheet comprising apertured plastic film; and a flap extending outwardly from each side of the central absorbent assembly, each flap being formed of superposed substantially coplanar portions of the backsheet and topsheet, the said portions being connected together along their outer marginal areas, the backsheet being provided on its outer surface with an adhesive layer on the absorbent assembly and on each of the flaps and with peelable sheets covering the outer surface of the adhesive layers, the topsheet being characterised by:
- (1) side edge areas extending along both side edges of the central absorbent assembly, the side edge areas having an uneven surface configuration and not being apertured; (2) border areas formed between the side edge areas and the flaps, the border areas not being apertured, the topsheet being connected to the backsheet at the border areas; and (3) flap central areas defined by the outer marginal areas of the flaps and the border areas, the flap central areas having an uneven surface configuration and not being apertured, the topsheet not being connected to the backsheet at the flap central areas.
2. A sanitary napkin as claimed in claim 1, wherein the side edge areas extend over the longitudinal side portions of the upper surface of the absorbent member and over the side surfaces thereof.



3. A sanitary napkin as claimed in claim 1 or 2 which is affixed to a pair of underpants by means of the adhesive layers, wherein the width of the border areas is substantially equal to the thickness of the crotch portion of the underpants.

4. A sanitary napkin substantially as specifically herein described with reference to the accompanying drawings.