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(58) Field of search

**UK CL (Edition K) A3V, A5R RPA**

**INT CL<sup>5</sup> A41B 13/00, A61F 13/15**

(54) Absorbent article

(57) An absorbent article 1 which is generally rectangular in plan view and which comprises a liquid-permeable surface sheet 4, a liquid-retentive absorbent member 6 and a liquid-impermeable antileak sheet 3, bendable tabs 2 extending from each lateral edge of the article and located at a position displaced from the middle of the article, the article having liquid-impermeable members on both lateral edges at least at positions which correspond to those of the tabs, i.e. even the liquid permeable sheet 4 is rendered liquid impermeable at these positions.

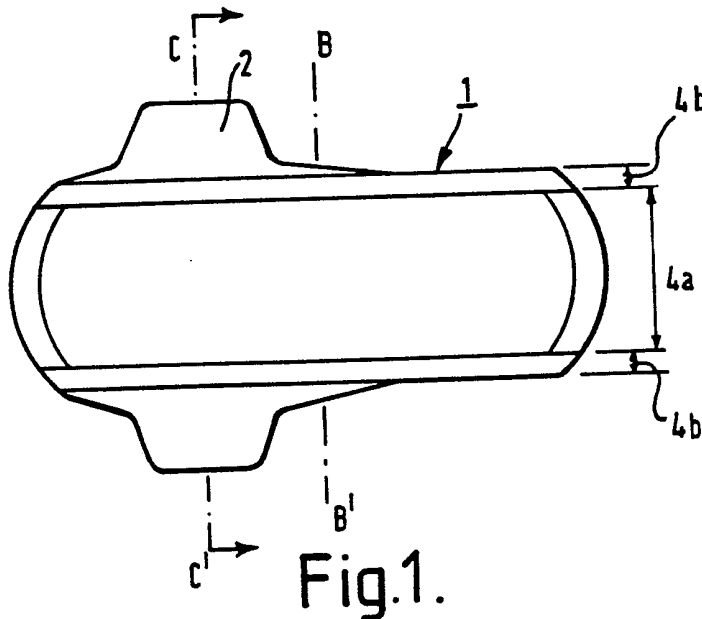


Fig.1.

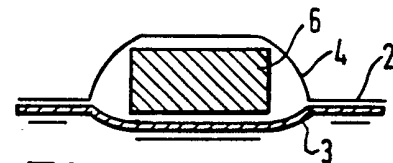


Fig.4

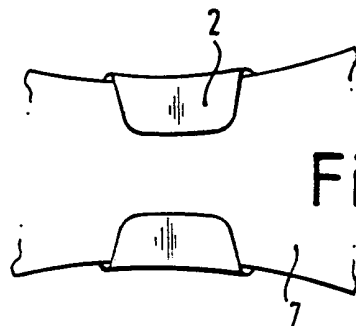
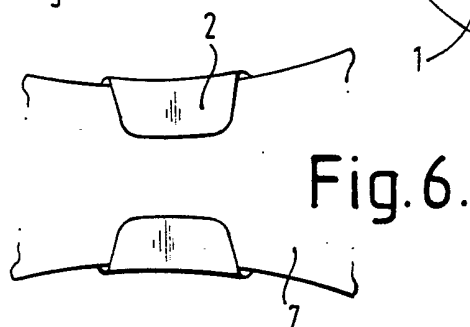
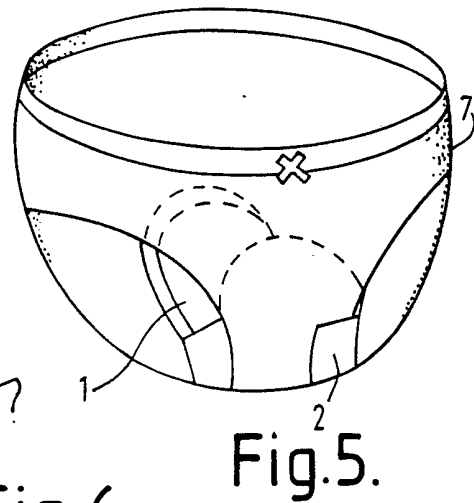
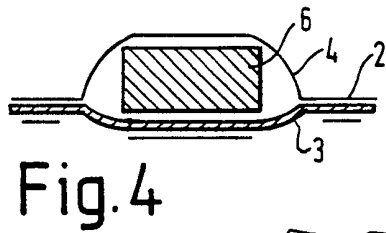
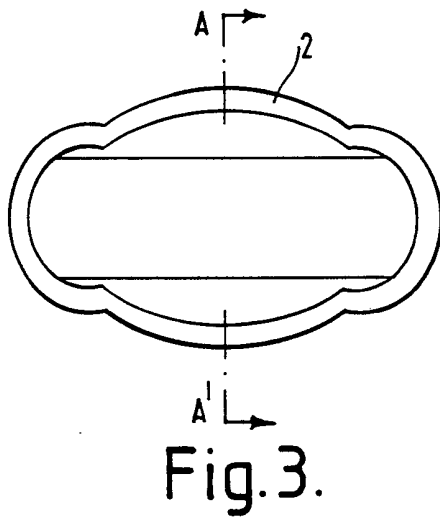
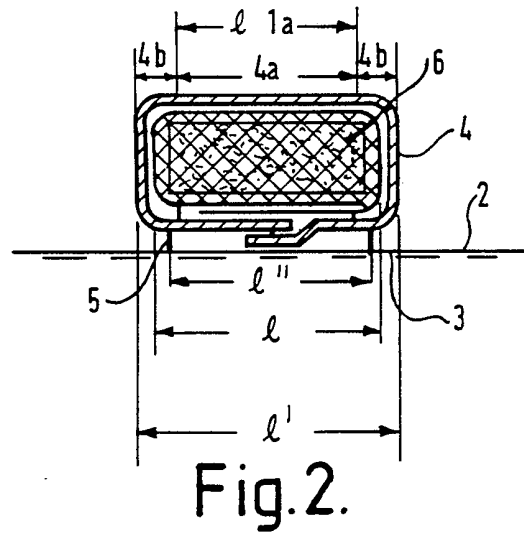
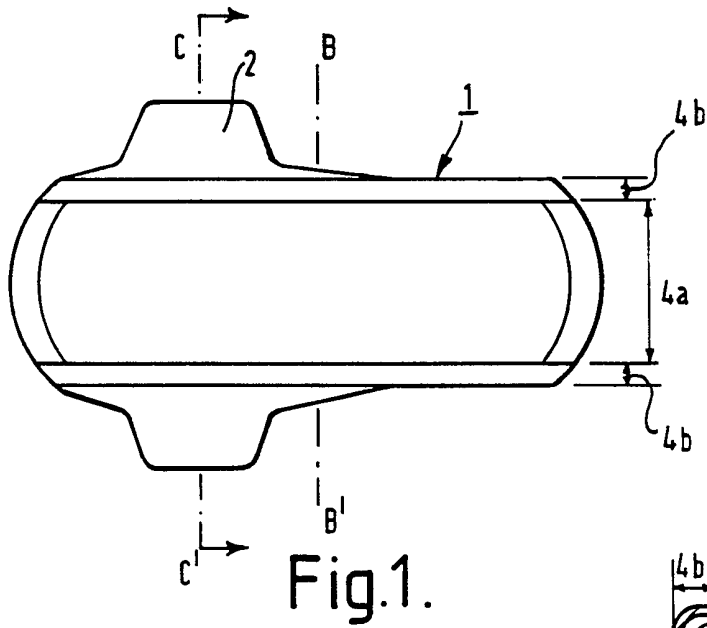


Fig.6.

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

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ABSORBENT ARTICLE

The present invention relates to an absorbent article having high antileak properties. More particularly, the present invention is concerned with an absorbent article, such as a sanitary towel or a pad for incontinent persons, which is worn at the narrow crotch by a user together with clothing.

The conventional absorbent articles such as sanitary towels or disposable nappies or diapers, basically comprise a liquid-permeable surface material, a liquid-retentive absorbent member and a liquid-impermeable antileak material.

In recent years, attempts have been made to improve the absorption performance of absorbent articles by incorporation of a novel material, such as an absorbent polymer or a hydrophobic surface material, in accordance with the rapid progress of technology. However, none of such absorbent articles, although made up from individual components displaying excellent properties, fully exhibits its potential performance when used in practice. This is apparent from the fact that the primary dissatisfaction of the user in these absorbent articles is still caused by leaks from the crotch or the hip.

The major cause of such leaks is the occurrence of a gap between the body and the absorbent article, which is attributed to (1) the

dislocation (hereinafter referred to as "slippage") of the absorbent article from the predetermined site due to irregular stresses applied to the worn absorbent article by, for example, the motion of the user and (2) the occurrence of irregular deformation (hereinafter referred to as "twist") of the absorbent article.

Leaks due to the above causes are also largely influenced by the type of the clothing worn by the user. In the case of pants which do not fit the body closely, the leakage is likely to occur at relatively low absorption. On the other hand, when pants which fit the body tightly are worn, there is a problem of discomfort, such as the feeling of pressure or wetness.

U.S. patents 4 589 876 and 4 936 839 disclose that an absorbent article can be anchored in pants by means of a flexible tab extending from both side portions at the lengthwise middle position of the absorbent article, thereby improving the antileak properties. It is true that when an absorbent article according to such proposals is properly worn, leakage from the crotch can be prevented to a certain extent. However, depending on the type of the clothing to be worn, for example, when the pants do not fit the body closely or when the width of the crotch of the pants is larger than that of the

absorbent member, the tab entirely covers the surface of the absorbent article so that effective leak prevention cannot always be attained.

According to the invention, an absorbent article is rectangular in plan view and comprises a liquid-permeable surface sheet, a liquid-retentive absorbent member and a liquid-impermeable antileak sheet, and is characterised in that flexible tabs extend from both lateral side edges of the article, said tabs being provided at positions displaced in the longitudinal direction from the center of the article, the article being provided with liquid-impermeable members at least on the two longitudinal edges at positions corresponding to the positions of the tabs.

Such an article prevents leakage from the crotch and the hip, regardless of the type of pants to which the article is attached. It is also comfortable to wear.

The liquid-impermeable members may extend along the length of the side edges.

The surface sheet is preferably uneven on the surface and in addition a recess in the uneven structure may have a vertical wall having openings therein. The openings may be 0.1 to 2mm in size and the number of the openings may range from 10 to 100 per cm<sup>2</sup>.

It is preferable that the tabs are displaced by 20 to 40mm from the center of the article. The tabs are displaced towards the front of the user.

The surface sheet may be formed as an integrated composite of film and fiber.

The surface sheet may be folded extending to the bottom part of the absorbent member and the surface sheet and the liquid-impermeable antileak sheet may be fixed to each other in a region corresponding to the absorbent member.

An absorbent article embodying the invention will now be described with reference to the accompanying drawings, in which:

Fig. 1 is a front view of the absorbent article of the present invention;

Fig. 2 is a cross-sectional view taken along line C-C' of Fig. 1;

Fig. 3 is a front view of one form of conventional absorbent article;

Fig. 4 is a cross-sectional view taken along line A-A' of Fig. 3;

Fig. 5 is a perspective view showing how the absorbent article shown in Fig. 1 is worn;

and Fig. 6 is a diagram showing the absorbent article shown in Fig. 1 being worn.

Fig. 1 is a front view of an embodiment of the absorbent article according to the present

invention, and Fig. 2 is a cross-sectional view taken along line C-C' of Fig. 1.

The absorbent article 1 comprises a liquid-permeable surface material 4, a liquid-retentive absorbent member 6 and a liquid-impermeable antileak material 3. The article is longitudinally extended. The absorbent article 1 is characterised in that flexible tabs 2 extend from both lateral edges at positions displaced in the longitudinal direction from the middle of the absorbent article, and in that liquid-impermeable portions 4b are present in both lateral edges of the article at positions corresponding to those of the tabs.

The liquid-impermeable member 4b extends from the edge of the article to the line of the upper surface where the opening-having area starts. The lower surface of the edge is impermeable to liquid.

A surface sheet 4 as disclosed in EP-A 304 617 is preferred from the viewpoint of liquid permeability, liquid return prevention, shielding after absorption and feeling of dryness. That document discloses a hydrophobic film disposed on the side to be brought into contact with the skin, and having an uneven structure with a top, a bottom, and a wall connecting them, pores provided in at least part of the wall and no pores present in the bottom. The porosity of the film layer is determined taking

into consideration the balance between liquid permeability, liquid return prevention and shielding after absorption, and it is generally preferred that the pores have a size of from 0.1 to 2mm and a density of from 10 to 100/cm<sup>2</sup>.

The material for forming such a film layer may be any type of hydrophobic film-forming resin. Examples thereof include synthetic resins, such as a polyolefin resin, a copolymer resin of an olefin with another monomer (for example, vinyl acetate or ethyl acrylate), a polyester, a nylon or an acetate resin, and mixtures thereof. From the viewpoints of feel and ease of production, a polyolefin, a copolymer resin of an olefin with another monomer or a blend polymer thereof are preferred. Among others a low-density polyethylene, a linear, low-density polyethylene, an ethylene-vinyl acetate copolymer and blends thereof are especially preferred.

Further, as means for controlling liquid permeability and liquid return prevention, it is possible to render the surface of the film layer hydrophilic by physical treatment such as coating with a surfactant or irradiation with plasma, or chemical treatment such as treatment with mineral acid. Conversely, it is possible to render the surface of the film layer water-repellent by, for example, coating with silicones or fluorocarbons in



order to improve the hand or feel, etc., the film layer may be calendered or embossed with fine patterns.

Moreover, a surface material comprising the above-described film integrated with an assembly of hydrophilic fibers, such as a laminated nonwoven fabric or a laminated paper, may preferably be used from the viewpoint of absorption properties, especially absorption rate.

The term "fiber assembly" used herein means a web comprising slightly entangled fibers and a nonwoven fabric or a paper comprising fibers anchored by entanglement or adhesion. The composition of the fibers is not critical. However, from the viewpoint of the shape retention of the surface material, it is preferred that the composition contain a synthetic fiber, such as a polyolefin, a polyester, an acrylic or a polyamide fiber, in an amount of at least 50% by weight. Especially preferred among them are polypropylene, a polyester, a conjugated fiber of polyethylene and polypropylene, a conjugated fiber of polyethylene and a polyester, and a conjugated fiber of a low-melting polyethylene and a polyester, which have high elasticity and readily give stable hand. When a synthetic fiber is used, it is preferred from the viewpoint of liquid permeability that the surface of the fiber be subjected to appropriate treatment

for rendering it hydrophilic. Generally, the thickness of the fiber is preferably in the range of from 1 to 10 denier for the purpose of ensuring the desired liquid permeability and hand. The weight per unit area of the fiber layer can be freely determined as long as the surface material has satisfactory shape retentivity and excellent hand. However, it is generally preferred that the weight per unit area be 5 to 100 g/m<sup>2</sup>, especially 10 to 50 g/m<sup>2</sup>.

The surface material 4 of the absorbent article as shown in Figs. 1 and 2 which is one embodiment of the present invention has pores only in a central region 4a, while lengthwise side regions 4b only have the same texture as the central regions but no pores, thereby forming liquid-impermeable portions.

Although the width of the porous central region 4a may be freely varied depending upon the width of the absorbent article, it is preferably 35 to 80mm, especially from 60 to 75mm, being the same as or smaller than that of the crotch of the shorts worn together with the absorbent article, which is generally 60 to 80mm. If this width is smaller than 35mm, the non-porous region 4b may be located at an excretion site, depending upon the wearing method and especially if incorrectly worn, thereby causing leakage. If this width is greater than 80mm, the

article is so much wider than the crotch region that it is likely to become deformed at the time of wearing thus reducing absorptivity and at the same time causing discomfort.

The width of each of the non-porous regions (liquid-impermeable portion) 4b is preferably 2 to 20mm, more preferably 3 to 10mm. If this width exceeds 20mm, the width of the central region 4a is inevitably reduced, and if this width is smaller than 2mm, an irregular stress is applied to the worn absorbent article by, for example, movement of the user so that the fluid readily oozes out of the pores at the side edges of the article.

An example of a preferred form of the absorbent article of the present invention is one which comprises a surface material 4 and a liquid-impermeable antileak material 3 bonded to it at an anchoring site 5 in a region where the absorbent member is present, which is different from the conventional absorbent articles shown in Figs. 3 and 4.

The effect of the non-porous region 4b of the surface material can be markedly enhanced by wrapping the surface material around and bonding it to the antileak material 3 as shown in Fig. 2. In the method in which the surface material 4 and the antileak material 3 are bonded outside the side edges

of the absorbent member 6 as in the case of the conventional absorbent articles shown in Fig. 3, various forces act on the absorbent article at the time of anchoring the tabs 2 to a pair of shorts, thereby tending to cause undesirable deformation of the article. As a result of wrapping the surface material 4 around and anchoring it to the antileak material 3, the sites of anchoring to a pair of shorts are located in a region where the absorbent member 6 is present, and the shorts and the absorbent article are anchored to each other by way of these anchoring sites so as to prevent the deforming force of the tab 2 from acting directly on the absorbent member 6, thereby markedly improving the absorptivity.

Regarding the site 5 where the surface material 4 and the antileak material 3 are anchored, it is necessary that  $\ell$  be greater than  $\ell''$  and it is preferred that  $\ell''$  be small than  $\ell$  but not smaller than  $\ell_{4a}$ , i.e.,  $\ell_{4a} \leq \ell'' < \ell$ , wherein  $\ell$  represents the width of the absorbent member,  $\ell$  that of the absorbent article,  $\ell''$  that of the anchoring site and  $\ell_{4a}$  that of the porous region of the surface material, as shown in Fig. 2.

The surface material 4 and the antileak material 3 may be anchored by known means. When ease of production is taken into consideration, the use of

a hot-melt adhesive is preferred. Although the anchoring may be conducted in bead form or in parallel, the bead form is preferred from the viewpoint of preventing leakage from the bottom of the absorbent member.

Further, in the absorbent article of the present invention, as shown in Fig. 1, the flexible tabs 2 extend from both lateral side edges at positions displaced in the lengthwise direction from the middle of the absorbent article 1, so that in all the length of the absorbent member behind the tab portions substantially corresponding to the portion where the bodily fluid is excreted is larger than that of the absorbent member in front of the tab portions. The center line B-B' in the lengthwise direction of the absorbent article be 10mm or more further from the center line C-C' in the lengthwise direction of the tabs 2.

In the present invention, the tab 2 may be of any type provided that it is sufficiently flexible to bend easily when anchored to shorts or underpants 7 as shown in Fig. 5. However, a tab comprising a film and a hydrophilic fiber assembly integrated therewith, for example, a laminated nonwoven fabric or a laminated paper, is preferred for the purpose of improving shape retention and feel at the site of contact of the tab with the skin.

A preferred size of the tab 2 according to the present invention cannot be generally given because it varies depending upon the size of the absorbent article. However, in the case of a large sanitary towel for use in the night wherein the length and width of the absorbent member are about 250mm and 70mm, respectively, in general, the length and width of the tab are preferably 30 to 70mm and 25 to 50mm, respectively, in order to achieve stable anchoring to shorts or underpants and easy anchoring operation. It is preferred to displace the position of the tabs by about 20 to 40mm towards the edge from the center in the lengthwise direction of the absorbent article.

As shown in Fig. 5, the absorbent article of the present invention is used in a known manner by folding the tabs 2 round underpants 7 for anchoring. The absorption performance is remarkably influenced by the method of wearing the absorbent article.

In the present invention, in anchoring the absorbent article to the pants, it is favourable to pull out the tabs 2 from the pants as shown in Fig. 6 and to position the anchoring sites between the surface material and the antileak material at the crotch of the pants because a significant improvement in absorption performance is thus attained exhibited.

As proposed in Japanese Patent Laid-Open No.

75058/1985, in the method of wearing in which the tabs form a wall, the tabs cover the surface of the absorbent member when a user wears clothing which is not close fitting. This brings about leakage through the tabs, which makes it impossible to attain the absorption performance which is achievable by the present invention.

As described above, the effect of the present invention, i.e., the effect of preventing leakage at a liquid-impermeable portion located at the longitudinal side portions is fully exhibited without causing the tabs to cover the surface of the absorbent member by pulling out the tabs from the pants and positioning the anchoring sites between the surface material and antileak material at the crotch of the pants.

Further, when the tabs are pulled out from pants and anchored to the reverse face of the crotch of the pants with a pressure-sensitive adhesive or the like, the absorbent article provides a protrusion when it is worn by the user and therefore the performance of the absorbent article can be effectively exhibited.

In addition, the pants always fit the body of a user more tightly at the crotch edges. The surface sheet of the absorbent article is folded downwardly and fixed to the antileak sheet in a

region narrower than the absorbent member. For these reasons, the antileak effect can be achieved fully by pulling out the tabs from the pants and positioning the anchoring sites between the surface material and the antileak material at the crotch of the pants.

As described above, the absorbent article of the present invention can exhibit a consistent performance when used with a wide variety of pants ranging from those which fit the body poorly to those which fit the body well. The antileak effect is improved particularly at the edges where there is no opening.



CLAIMS:

1. An absorbent article which is generally rectangular in plan view and which comprises a liquid-permeable surface sheet, a liquid-retentive absorbent member and a liquid-impermeable antileak sheet, flexible tabs extending from each lateral edge of the article and located at a position displaced in the longitudinal direction from the middle of the article, the article having liquid-impermeable members on both lateral edges at least at positions which correspond to those of the tabs.

2. The article as claimed in claim 1, in which the liquid-impermeable members extend over the side edges.

3. The article as claimed in claim 1, in which the surface sheet has an uneven surface.

4. The article as claimed in claim 1, in which the surface sheet has an uneven surface and a recess in the uneven surface has a vertical wall having an opening therein.

5. The article as claimed in claim 1, in

which the surface has an uneven surface and a recess in the uneven surface has a vertical wall having 10 to 100 openings 0.1 to 2mm in size per cm<sup>2</sup>.

6. The article as claimed in claim 1, in which the tabs are displaced by 20 to 40mm from the middle of the article.

7. The article as claimed in claim 1, in which the surface sheet comprises an integrated composite of film and fibers.

8. The article as claimed in claim 1, in which the liquid-impermeable members are 2 to 20mm wide.

9. The article as claimed in claim 1, in which the liquid-impermeable members are 3 to 10mm wide.

10. The article as claimed in claim 1, in which the surface sheet is folded so that it extends to the bottom part of the absorbent member and the surface sheet and the liquid-impermeable antileak sheet are fixed to each other in a region corresponding to the absorbent member.