

Description

The present device relates to a sanitary napkin for menstrual discharge.

A sanitary napkin according to the preamble of claim 1 is known from GB-A-2 151 488.

A purpose of the invention and device is to provide a sanitary napkin which exhibits an improvement in shape-retentivity in the production thereof without scattering the materials constituting its absorber and which displays excellent absorbency.

Brief Description of the Drawings:

Figs.1 to 4 show examples of the napkin according to the present invention, among which Figs.1 and 2 are transverse cross-sectional views of the napkin, while Figs.3 and 4 are longitudinal cross-sectional views thereof. Figs.5 to 7 are transverse cross-sectional views of the napkin according to the prior art.

Fig.8 shows an example of the sanitary napkin according to the present device, wherein (a) is a plan view thereof and (b) is a cross-sectional view thereof taken along line X-X'.

Fig.9 is a perspective view of the form after the application to the crotch of the sanitary napkin according to the prior art.

Figs.11(a) to (d) are plan views of examples of the arrangement of slip inhibitors of the sanitary napkin according to the present invention. Figs.12(a) to (d) are plan views of the arrangement of slip inhibitors of the napkin according to the prior art. Fig.10 is a plan view of the form of a sanitary napkin taken when the napkin is applied to the crotch or when the wearer assumes various postures.

An ordinary napkin comprises an absorber made of absorbent paper and/or fluff pulp, also called cottony pulp, a liquid-impermeable leakproof material covering the bottom and both sides of the absorber, a liquid-permeable surface material covering the whole of the absorber covered with the leakproof material and a fastening tape attached to the non-use surface, as shown, for example, in Fig.5 wherein numeral 1 is the surface material, numeral 2 is the absorbent paper, numeral 3 is the leakproof material and numeral 7 is the tape.

Recently, a polymeric absorbent material has been frequently used as the absorber of sanitary napkins for the purpose of enhancing the absorption capacity, as shown, for example, in Figs.6 and 7 wherein numeral 2' is absorbent paper for piling cottony pulp, numeral 4 is cottony pulp, numeral 5 is polymeric absorbent material and numeral 6 is cottony staple.

Although a sanitary napkin containing a polymeric absorbent material as described above has been generally thought to exhibit an enhanced absorption capacity, the following problems have not been solved as yet. For example, with respect to the napkin shown in Fig. 6, polymeric absorbent material 5 is present at a position near the non-use surface. Therefore, when the amount of menstrual blood is small, the blood is absorbed and retained only by the cottony pulp 4 or the absorbent paper 2', which is an ordinary absorbent material according to the prior art, so that the blood does not reach the polymeric absorbent material 5. This results in an ineffective use of the polymeric absorbent material 5. Further, when the cottony pulp 4 and the absorbent paper 2' are superimposed to produce an absorber, these constituent members each tend to shift and the cottony pulp tends to become scattered from the edge. The scattered cottony pulp tends to adhere to portions of the production line or falls down to give a product contaminated therewith which is unfavourable for sanitary reasons.

On the other hands, the napkin shown in Fig.7 contains an absorber produced by spraying a cottony pulp 4 with a polymeric absorbent material 5 and folding the resulting pulp at both ends into an "e"-shape. In this napkin, the shifting of the constituent members caused in the production of the absorber is remarkably reduced as compared with that of the napkin shown in Fig.6. However, the scattering of cottony pulp still occurs from the area b, and thus the problem has not been completely solved.

The napkin shown in Fig.7 exhibits better absorbency than the one shown in Fig.6 because the polymeric absorbent material 5 is nearer to the use surface in the former than in the latter. The former is superior to the latter in the effective utilization of the polymeric absorbent material. Accordingly, when the amount of menstrual blood is small, the napkin shown in Fig.7 exhibits absorbency unlike the napkin shown in Fig.6. However, when the amount of menstrual blood is large, the amount of the menstrual blood to be absorbed per unit volume of the absorber exceeds the absorption capacity of the absorber, because the absorber does not contain any material which can diffuse blood, for example, absorbent paper as disclosed in GB-A-2151488. This problem can be solved to some extent by increasing the content of polymeric absorbent material or the amount of cottony pulp. However, these means bring about an increase in cost and in thickness thus reducing comfort in use. In other words, the napkin shown in Fig.7 has a disadvantage in that not the whole thereof can be utilized.

However, we believe that such a napkin will still exhibit insufficient absorption characteristics, particularly poor resistance to side leakage, even if the highly absorbent polymer functions effectively. Such side leakage occurs because a sanitary napkin is significantly deformed by pressure brought about by the application thereof to the crotch.

That is to say, when a sanitary napkin is applied to the crotch, it is in a deformed state as shown in Fig.9, so that most of the leakage occurs from the sides in the central part of the longitudinal direction. More precisely, when pressure due to the closing of the legs or walking is applied to a wet sanitary napkin containing absorbed blood, the napkin is twisted in the central part of the longitudinal direction, so that the distance between the sides and the blood-absorbing area (the central part in the lateral direction when the napkin is accurately worn) is reduced so as to cause leakage, though there are still parts wherein no blood is absorbed.

In view of the above problem, we have extensively investigated the constitution of a sanitary napkin which is protected from deformation and twisting in use without a reduction in comfort and which exhibits effectively reduced side leakage by enhancing the fit of the napkin to the crotch and the pubic region.

The present device provides a sanitary napkin which comprises a liquid-permeable surface material (1), a liquid-impermeable leakproof material (3) and an absorber inserted between said surface material and said leakproof material, said absorber comprising a first absorbent paper (21), a second absorbent paper (22) and an absorbent material (4,5) inserted between both papers, said first absorbent paper covering at least a part of said second absorbent paper, characterised in that said first absorbent paper (21) is fixed to the leakproof material (3) at the portion thereof covering the second absorbent paper (22).

It is preferred that said absorbent material comprises fluff pulp and an absorbent polymer.

It is preferred to have a tape means to inhibit the napkin from slipping out of the contact with the skin of a user.

The absorbent material having indeterminate form and inserted between the first absorbent paper and the second absorbent paper may be, for example, a laminate or a mixture of cottony pulp, called also fluff pulp, and an absorbent polymer.

The sanitary napkin according to the present device has the following advantages due to the structure described above:

(1) The whole of an absorber containing a polymeric absorbent material can be effectively utilized independently of whether the amount of menstrual blood to be absorbed is large or small.

(2) In the production of the napkin, the scattering of absorber-constituting materials, which causes the contamination of a product, is inhibited so that the obtained napkin is highly hygienic.

(3) The cost is low.

(4) Shifting and twisting of the absorber can be inhibited.

The present device will be described in more detail by referring to the Figures.

Figs. 1 to 4 shows examples of the napkin according to the present device, among which Figs.1 and 2 are transverse cross-sectional views (in the minor axis direction), while Figs.3 and 4 are longitudinal cross-sectional views (in the major axis direction). The napkin shown in Fig.1 can be produced by piling cottony pulp 4 on the first absorbent paper 21 having a width slightly larger than that of the minor axis of the final product, spraying the piled cottony pulp 4 with a polymeric absorbent material 5 to fix the material 5 on the pulp 4, laying the second absorbent paper 22 on the sprayed pulp, folding the first absorbent paper 21 in such a way that the first absorbent paper 21 wraps round both transverse ends of the second absorbent paper 22 to form an absorber, covering the bottom and both sides of the absorber with a leakproof material 3; bonding a part 8 of the area wrapping round the second absorbent paper 22 of the first absorbent paper 21 to the leakproof material 3, covering the whole of the obtained intermediate product with surface material 1 and fixing a shift-inhibiting tape 7 to the non-use surface.

The napkin shown in Fig.2 is characterised by using an absorbent paper having a width larger than that of the first absorbent paper 21 used in the napkin shown in Fig.1 as the first absorbent paper and completely wrapping round the second absorbent paper 22 in the first absorbent paper 21 in such a way that both transverse ends of the first absorbent paper 21 overlap each other. Figs.3 and 4 show napkins wherein the first absorbent paper 21 wraps both longitudinal ends of the second absorbent paper 22.

The process for bonding the area wrapping round the second absorbent paper 22 of the first absorbent paper 21 to the leakproof material 3 is not particularly limited and may be heat-bonding or adhesive-bonding.

The sanitary napkin of the present device thus produced contains a polymeric absorbent material 5 at a position near the use surface. Therefore, even when the amount of menstrual blood is small, the blood rapidly reaches the polymeric absorbent material 5 and is effectively absorbed and retained by it, while when the amount is large, the blood is diffused in the longitudinal direction of the napkin by the second

absorbent paper 22 present beneath the polymeric absorbent material. Thus, the whole of the sanitary napkin can effectively contribute to the absorption of blood, so that the napkin is excellent in absorbency and is free from leakage or stickiness in use. Further, the napkin of the present device has a structure wherein the whole of the edge of the cottony pulp 4 is wrapped in the first absorbent paper 21 and the second absorbent paper 22, so that the scattering of cottony pulp 4 is inhibited, thereby solving problems of contamination of the product. Furthermore, in the sanitary napkin of the present device, the first absorbent paper is bonded to the leakproof material, so that the leakproof material is fixed to the absorber. Therefore, shifting and twisting of the absorber is remarkably reduced. The sanitary napkin of the present device is also advantageous in cost, because it only requires slight enlargement of part of the absorbent paper of the prior art, but does not necessitate any other additional constituent member. Furthermore, the bonding of the first absorbent paper to the leakproof layer can be carried out by heat-bonding with a heated roll or the like or adhesive-bonding with a very small amount of adhesive.

The invention provides a sanitary napkin preferably with a tape means to prevent the napkin from slipping. The tape means will be illustrated below.

The present device provides a substantially slender sanitary napkin provided with slip inhibitors on its non-use surface, characterised in that the line formed by connecting the ends of the slip inhibitors nearer the front end of the napkin is concave.

The present device will be described in more detail by referring to the Figures.

Fig.12 shows the forms of slip inhibitors provided on the non-use surface of the sanitary napkin according to the prior art, wherein Figs.12(a) shows one of the commonest forms wherein a double-coated adhesive tape 101 is fixed transversely. Most of the sanitary napkins which are now commercially available are of this type, which is called "one transverse tape type". A sanitary napkin of this type is easier to wear than the one of other type, but has the disadvantage in that it is poor in slip-inhibiting effect which is an essential object of slip inhibitors.

Fig.12(b) shows an embodiment mainly using hot-melt adhesive wherein hot-melt adhesive 102 is applied in an area longitudinally, which is called "one longitudinal tape type". Although the napkin of this type is expected to exhibit side slip inhibiting power higher than that of the napkin of the "one transverse tape type", this is not really achieved in practice and it tends to slip and cause discomfort.

Figs.12(c) and (d) show the arrangement of slip inhibitors which has been proposed with the purpose of enhancing the side slip inhibiting power, among which Fig.12(c) is a case wherein two double-coated adhesive tapes 101 are arranged transversely and Fig.12(d) is a case wherein hot-melt adhesive 102 is applied in two areas longitudinally. The napkins of the two transverse or longitudinal tape type have a disadvantage which is substantially similar to that of the napkin of the above one longitudinal tape type.

As described above, none of the slip inhibitors according to the prior art can exhibit any sufficient effect of inhibiting slippage particularly sideways.

We have studied the shape of a sanitary napkin adopted when a wearer assumes various postures (such as sitting or walking) and have found that the hatched area 103 of the napkin shown in Fig.10 corresponds to the area which is in a bent state in use, so that arrangement of slip inhibitors in the hatched area reduces their slip inhibiting power as described above. Accordingly, the slip inhibiting power of a slip inhibitor is thought to be effectively exhibited when the slip inhibitor is arranged in the other area 104 wherein the deformation caused by wearing and adoption of various postures is slight. Further, when no slip inhibitor is arranged in the area to be touched by a wearer in the application of the napkin to the crotch, i.e. the area near the front end, fitting of the napkin does not cause adhesive to become applied to the hand, so that the napkin can be easily fitted without causing discomfort.

On the basis of the above finding, we have studied the effectiveness of slip inhibitors arranged in various forms and have confirmed that a sanitary napkin provided with slip inhibitors which are present in such a way that the line formed by connecting the ends of the slip inhibitors nearer the front end of the napkin is concave can be especially effective.

Among the sanitary napkins according to the present invention, those further characterised in that the slip inhibitors are unevenly arranged on the front part are preferred. Particularly preferred are napkins in which the line formed by connecting the ends of the slip inhibitors farther apart from the front end is convex. Further, it is preferred that the napkin is provided with at least three linear slip inhibitors.

Although the material of the slip inhibitor to be used in the present invention is not particularly limited, examples include double-coated adhesive tape, pressure-sensitive adhesive and hot-melt adhesive.

According to the present invention, a slip inhibitor is generally applied to the non-use surface of a sanitary napkin either by linearly discharging it from a nozzle or by linearly coating a release paper with an adhesive and transferring the adhesive to the non-use surface of the sanitary napkin, though other processes are possible. Further, the concave arrangement of the ends of slip inhibitors nearer the front end

of the napkin can be easily achieved by using nozzles arranged not in a straight line but in zigzags. The preferred width of the slip inhibitor is 3 to 6 mm.

According to the present invention, there are no critical limits with respect to the following factors:

- (1) raw materials and production process of the surface material,
- (2) raw materials, amount and necessity of the cottony staple,
- (3) amount of the cottony pulp,
- (4) kind and content of the polymeric absorbent material,
- (5) production process and amount of the absorbent paper,
- (6) kind and characteristics of the poly laminated waterproof paper (kind of the laminating resin and whether the resin is applied to both surface or to either surface),
- (7) kind, application position and amount of the shift-inhibiting material,
- (8) kind, application length and amount of the adhesive,
- (9) process for the heat-bonding.

When the slip-inhibitors are arranged in arrowhead formation, the bonding area is widely spread. Although such a wide and effective bonding area can be also attained by applying an adhesive over a rectangular area, this necessitates use of a larger amount of adhesive, resulting in increased cost.

The present invention will be further described in more detail with reference to the following non-limiting Examples:

Examples 1 to 4 and Comparative Examples 1 to 3

Various napkins were produced from the constituent members which will be described below and examined for their hygienic qualities and also after being worn for 2 hours. The results are shown in Table 1.

< Constituent members >

1) Non-woven fabric (surface material):

Olefin non-woven fabric produced by heat-bonding

Weight per unit area: 20 g/m²

2) First absorbent paper:

Ordinary one made of 100% of pulp

Weight per unit area: 18 g/m²

3) Second absorbent paper:

Ordinary one made of 100% of pulp

Weight per unit area: 30 g/m²

4) Leakproof material:

A product obtained by laminating a waterproof paper having a weight per unit area of 25 g/m² and polyethylene (10 μ)

5) Cottony pulp:

NBKP type

6) Polymeric absorbent material:

Polymer of acrylic derivatives (Amount; 0.3 g)

It should be understood from the results shown in Table 1 that the napkin of the present invention can be produced without scattering pulp or polymer and exhibits remarkably reduced shift and twist of the absorber and therefore displays excellent absorbency and comfort when worn. That is to say, the napkin is excellent both in use and also in its hygienic qualities.

Table 1

	Structure of napkin	State after wearing and hygienic qualities ^{*1}	
Comp. Ex. 1	Fig.5	good	○
Comp. Ex. 2	Fig. 6	Shift and twist of the absorber, separation of the absorber from the leakproof material and scattering of pulp were observed.	△
Comp Ex.3	Fig. 7	Shift of the absorber was not observed, but twist of the absorber, separation of the absorber from the leakproof material and scattering of pulp were observed.	⊙
Ex.1	Fig.1	Neither shift nor twist of the absorber, nor separation of the absorber from the leakproof material nor scattering of pulp was observed.	○
Ex.2	Fig. 2	do.	○
Ex.3	Fig.3	do.	○
Ex. 4	Fig. 4	do.	○
Note) ^{*1} ○: Neither pulp nor polymer scattered from the absorber nor from the napkin at all ⊙: Pulp and polymer slightly scattered from the absorber △: Pulp and polymer slightly scattered from the absorber and from the napkin			

Example 5

The sanitary napkin shown in Fig.8 is an embodiment of the invention in which a first absorber and a second absorber are used. In the drawing, (a) is a plan view and (b) is a cross-sectional view taken along line X-X'. In the sanitary napkin shown in Fig.8, the first absorber is made of absorbent paper 40 and the second absorber is made of cottony pulp 41 containing a highly absorbent polymer 42 and both absorbers are covered with an absorbent paper 40', while the first absorber is fixed to the absorbent paper 40' by bonding 33. Rayon staple cotton 43 is laid on the above absorbers and the bottom and the sides of the resulting laminate are covered with leakproof material 34 and wrapped in a surface material 35. Further, the non-use surface is provided with a pressure-sensitive adhesive tape 38. The surface material 35 is fixed to the leakproof material 34 by bonding 36,36, while the leakproof material 34 is fixed to the absorber paper 40' by bonding 37.

Example 6

A plurality of linear slip inhibitors 105 were applied on the non-use surface of a sanitary napkin in such a way that the line formed by connecting the ends of the slip inhibitors nearer the front end of the napkin was concave, to obtain a sanitary napkin as shown in Fig.11(a).

Example 7

A plurality of slip inhibitors 105 were applied to a sanitary napkin in such a way that they are continuously arranged over the front part and the back part of the napkin as shown in Fig.11(b).

Example 8

The front part of an adhesive tape used in the napkin of the "one transverse tape type" was cut concavely and the back part thereof was cut convexly. The resulting cut tape was applied to a sanitary napkin to obtain a sanitary napkin as shown in Fig.11(c).

Example 9

Some of the slip inhibitors were removed from the sanitary napkin shown in Fig.11(a). A release paper 106 was laid on the surface of the resulting napkin so as to cover the top surface of the remaining slip inhibitors (the release paper may have any form, provided that the slip inhibitors can be completely covered with it, and particularly, easily strippable ones are preferred). Thus, the sanitary napkin shown in Fig.11(d) was obtained.

These four napkins were examined after being worn. they exhibited reduced slip and twist without any bonding of adhesive portions to one another. Further, they were comfortable to wear.

Claims

1. A sanitary napkin which comprises a liquid-permeable surface material (1), a liquid-impermeable leakproof material (3) and an absorber inserted between said surface material and said leakproof material, said absorber comprising a first absorbent paper (21), a second absorbent paper (22) and an absorbent material (4,5) inserted between both papers, said first absorbent paper covering at least a part of said second absorbent paper, characterised in that said first absorbent paper (21) is fixed to the leakproof material (3) at the portion thereof covering the second absorbent paper (22).
2. A sanitary napkin as claimed in claim 1, in which said absorbent material comprises fluff pulp and an absorbent polymer.
3. A sanitary napkin as claimed in claim 1, which further comprises a tape means to inhibit the napkin from slipping.

Patentansprüche

1. Binde, umfassend ein Flüssigkeit durchlässiges Oberflächenmaterial (1), ein Flüssigkeit undurchlässiges auslauffestes Material (3) und einen zwischen das Oberflächenmaterial und das auslauffeste Material eingefügten Absorber, wobei der Absorber ein erstes absorbierendes Papier (21), ein zweites absorbierendes Papier (22) und ein zwischen beide Papiere eingeschobenes absorbierendes Material (4), (5) umfaßt, und das erste absorbierende Papier wenigstens einen Teil des zweiten absorbierenden Papiers bedeckt, dadurch gekennzeichnet, daß das erste absorbierende Papier (21) an das auslauffeste Material (3) an dem Teil, der das zweite absorbierende Papier (22) bedeckt, fixiert ist.
2. Binde nach Anspruch 1, wobei das absorbierende Material flusige Pulpe und ein absorbierendes Polymer umfaßt.
3. Binde nach Anspruch 1, umfassend weiterhin ein Band, um ein Gleiten der Binde zu verhindern.

Revendications

1. Serviette hygiénique qui comprend une matière de surface perméable aux liquides (1), une matière étanche imperméable aux liquides (3) et un élément absorbant inséré entre ladite matière de surface et ladite matière étanche, ledit élément absorbant comprenant un premier papier absorbant (21), un second papier absorbant (22) et une matière absorbante (4, 5) insérée entre les deux papiers, ledit premier papier absorbant couvrant au moins une partie dudit second papier absorbant, caractérisée en ce que ledit premier papier absorbant (21) est fixé à la matière étanche (3) au niveau de sa partie qui couvre le second papier absorbant (22).
2. Serviette hygiénique selon la revendication 1, dans laquelle ladite matière absorbante comprend de la pâte pour duvet de cellulose et un polymère absorbant.
3. Serviette hygiénique selon la revendication 1, qui comprend de plus un moyen en forme de bande pour empêcher la serviette de glisser.

Example 9

Some of the slip inhibitors were removed from the sanitary napkin shown in Fig.11(a). A release paper 106 was laid on the surface of the resulting napkin so as to cover the top surface of the remaining slip inhibitors (the release paper may have any form, provided that the slip inhibitors can be completely covered with it, and particularly, easily strippable ones are preferred). Thus, the sanitary napkin shown in Fig.11(d) was obtained.

These four napkins were examined after being worn; they exhibited reduced slip and twist without any bonding of adhesive portions to one another. Further, they were comfortable to wear.

Claims

1. A sanitary napkin which comprises a liquid-permeable surface material (1), a liquid-impermeable leakproof material (3) and an absorber inserted between said surface material and said leakproof material, said absorber comprising a first absorbent paper (21), a second absorbent paper (22) and an absorbent material (4,5) inserted between both papers, said first absorbent paper covering at least a part of said second absorbent paper, characterised in that said first absorbent paper (21) is fixed to the leakproof material (3) at the portion thereof covering the second absorbent paper (22).
2. A sanitary napkin as claimed in claim 1, in which said absorbent material comprises fluff pulp and an absorbent polymer.
3. A sanitary napkin as claimed in claim 1, which further comprises a tape means to inhibit the napkin from slipping.

Patentansprüche

1. Binde, umfassend ein Flüssigkeit durchlässiges Oberflächenmaterial (1), ein Flüssigkeit undurchlässiges auslauffestes Material (3) und einen zwischen das Oberflächenmaterial und das auslauffeste Material eingefügten Absorber, wobei der Absorber ein erstes absorbierendes Papier (21), ein zweites absorbierendes Papier (22) und ein zwischen beide Papiere eingeschobenes absorbierendes Material (4), (5) umfaßt, und das erste absorbierende Papier wenigstens einen Teil des zweiten absorbierenden Papiers bedeckt, dadurch gekennzeichnet, daß das erste absorbierende Papier (21) an das auslauffeste Material (3) an dem Teil, der das zweite absorbierende Papier (22) bedeckt, fixiert ist.
2. Binde nach Anspruch 1, wobei das absorbierende Material flusige Pulpe und ein absorbierendes Polymer umfaßt.
3. Binde nach Anspruch 1, umfassend weiterhin ein Band, um ein Gleiten der Binde zu verhindern.

Revendications

1. Serviette hygiénique qui comprend une matière de surface perméable aux liquides (1), une matière étanche imperméable aux liquides (3) et un élément absorbant inséré entre ladite matière de surface et ladite matière étanche, ledit élément absorbant comprenant un premier papier absorbant (21), un second papier absorbant (22) et une matière absorbante (4, 5) insérée entre les deux papiers, ledit premier papier absorbant couvrant au moins une partie dudit second papier absorbant, caractérisée en ce que ledit premier papier absorbant (21) est fixé à la matière étanche (3) au niveau de sa partie qui couvre le second papier absorbant (22).
2. Serviette hygiénique selon la revendication 1, dans laquelle ladite matière absorbante comprend de la pâte pour duvet de cellulose et un polymère absorbant.
3. Serviette hygiénique selon la revendication 1, qui comprend de plus un moyen en forme de bande pour empêcher la serviette de glisser.

