

PATENT SPECIFICATION

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DRAWINGS ATTACHED

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(54) IMPROVEMENTS IN AND RELATING TO SANITARY TOWELS AND DIAPERS

(71) We, KIMBERLY-CLARK CORPORATION, a corporation organized under the Laws of the State of Delaware, United States of America, of Neenah, Wisconsin, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to sanitary or catamenial napkins, and babies disposable diapers.

Absorbent pads, such as sanitary or catamenial napkins, are customarily enclosed in a fluid pervious wrapper. This wrapper serves several functions. It holds together the various components of the pad; and, in addition, it may provide extensions beyond each end of the pad which serve as tabs for attachment of the pad to a suspension device, such as a sanitary belt, whereby the pad may be suitably positioned against the body of a wearer. The wrapper must permit the body exudate to pass through into the absorbent pad under the normal conditions and preferably has little absorbent capacity in itself so that the surface remains relatively dry in use, i.e. absorbed fluids should not wick along fibers in the wrapper.

Various materials have been used for wrappers. These include woven gauze, non-woven adhesively bonded thread webs, woven thread webs adhesively stabilized at the thread intersections, non-woven carded fiber webs, knit fabrics, and the like.

While certain of these wrapper materials have functioned in a satisfactory manner, one universal problem has arisen namely that the disposability is a messy, disagreeable task. While the absorbent pad element itself may be easily disposed of by flushing in the conventional toilet system, the pad wrapper must first be separated from the pad and disposed of by other means.

Conventional wrappers are generally of woven or knitted construction, or are bonded

together by a strong, permanent adhesive to provide the requisite strength in use and, therefore, should not be deposited in a water closet because of the obvious plugging problems, which would result. Such wrappers also are generally not biodegradable and, even if successfully flushed into a septic system, will hasten the need for periodic cleaning. Disposal of the conventional sanitary napkin by flushing therefore involves separating the wrapper from the pad, depositing the pad in the toilet system and then separately disposing of the wrapper in a waste basket or by other means.

Previous attempts to provide a "flushable" pad wrapper by use of water soluble adhesives have been successful in providing flushability, but only at the expense of other desirable features. If made strong enough to support the pad by tabs alone, i.e. without additional support, permeability is reduced and the water soluble adhesive dissolves too slowly for rapid flushability. If made sufficiently permeable, the wrapper is too weak for tab support.

In accordance with the invention a catamenial or diaper absorption device comprises a combination of an elongated absorbent pad enclosed in a fluid pervious wrapper having an extension beyond at least one end of the pad to form a tab, the wrapper comprising staple fibres discontinuously bonded together with a water soluble adhesive in an amount insufficient to provide the bonded wrapper by itself with adequate strength to support the pad in use, and a backing layer of material to provide support for the wrapped pad in use.

The pad wrapper may comprise a non-woven web of stable fibres discontinuously bonded together with a water soluble adhesive that is more soluble in cold water than in hot water. To this end, a nonwoven web may be provided which is formed of staple fibres of varying length and having an average length of about 1 1/2 inches. The web is preferably relatively lightweight, i.e. less

than about 1 ounce per square yard and preferably about 1/2 ounce per square yard or less. To provide the requisite strength, the fibre is preferably oriented in the web in the machine direction so that the strength of the web in that direction is generally about 4 or 5 times that of the strength in the cross direction. A machine direction strength of about 2 pounds/inch of width is satisfactory. Higher strengths are, of course, preferred.

While any means may be employed to form the base web, the desired strength and weight can be readily obtained by combining a plurality of carded webs. The denier of the stable fibres may vary from about 1 to about 8, with a denier of less than about 2 being preferred. While rayon fibres are preferred, other types of synthetic fibre may be employed either alone or in combination.

An absorbent body suitable for use in the catemerial or diaper absorption device in accordance with the invention comprises, according to a further aspect of the present invention, an elongated absorbent pad enclosed in a fluid pervious wrapper having an extension beyond at least one end of the pad to form a tab, the wrapper comprising staple fibres discontinuously bonded together with a water soluble adhesive, present in an amount up to 10% by weight of the fibres and comprising up to 40% of the wrapper surface area, said amount being insufficient to provide the bonded wrapper by itself with adequate strength to support the pad in use.

To bond the fibres together to achieve the strength levels required, a water-soluble adhesive such as polyvinyl alcohol or methyl cellulose is preferably employed. The adhesive is printed on or otherwise applied to provide discontinuous bonding so that the adhesive forms a series of discrete lines. Preferably about 25% or less of the area of the web should be covered with the adhesive. Carded webs may also be sprayed with adhesive but this gives a stiffer, less satisfactory product.

In the preferred embodiment, polyvinyl alcohol is the adhesive that is employed. This may be applied to the web by rotogravure printing employing a polyvinyl alcohol-water solution with from about 5 to 15% by weight solids. To improve the softness, a plasticizer such as glycerine may be substituted for a minor percentage of the polyvinyl alcohol, from about 5 to 10% by weight generally being sufficient. It has been found particularly advantageous to employ a polyvinyl alcohol (PVA) which has a percent hydrolysis of from 79 to 82 and a viscosity (4% PVA by weight water solution at 20°C) of from 22 to 26 cps. PVA of such composition dissolves more readily in cold water than it does in warm water.

To further enhance the softness of the wrapper material it is preferred to "work" the bonded web by embossing, creeping or

the use of breaker rolls. It has been found that needling or "pin embossing" is particularly advantageous in that it reduces stiffness by as much as about 50% or more while at the same time improving the performance of the wrapper material by increasing the porosity.

The invention will now be further described by way of example with reference to the accompanying drawings in which:—

Figure 1 is a perspective view of one embodiment of sanitary napkin in accordance with the invention and illustrating a pad enclosed in a wrapper having extensions beyond each end of the pad, which are shorter in length than the pad, that serve as tabs for attachment of the pad to a suspension device. Hereinafter these extensions will be referred to as short tabs;

Figure 2 is a perspective view of another embodiment of the present invention and showing a pad wrapper with a short tab on one end;

Figure 3 is a front elevation of a bikini-type panty in the approximate shape the panty assumes on a wearer during use and showing the relative location of the attachment means that are used to hold a sanitary napkin of the type shown in Figure 2 in position;

Figure 4 is an enlarged view taken of the interior of the front portion of the panty shown in Figure 3;

Figure 5 is a plan view of one embodiment of the means for attaching the sanitary napkin to the bikini-type panty shown in Figure 3;

Figure 6 is a plan view of another type of supporter which may be used with the double short tab construction of Figure 1; and

Figure 7 is a perspective view of the holder of Figure 6 in the approximate position it would assume on wearer's body (and with pad in place).

Referring to Figure 1, a pad is enclosed in a nonwoven wrapper of staple fibres discontinuously bonded together by a water soluble adhesive as described above. The water soluble adhesive is present in an amount insufficient to provide the bonded wrapper by itself with adequate strength to support the pad, namely in an amount up to 10% by weight of the fibres and comprising up to 40% of the wrapper surface area. A wrapper 10 has short tabs 12, 12' extending from both ends of the pad. The edges of the wrapper 10 will generally overlap and may be bonded by a line of adhesive running the length of the overlap, as shown at 14. In Figure 2 a pad is enclosed by a wrapper 20 made of the same discontinuously bonded staple fibres as described above and having a single short tab 22 extending from one end of the wrapper.

The construction of the pad itself is not critical and many suitable constructions are well known. As an example, the absorptive pad could comprise multiple plies of cellulose

wadding with a central pad of wood fluff. Other known absorbent materials such as batts or cotton and/or various types of synthetic fibres may also be used for the main or central portion of the pad.

The specific water soluble adhesives that have been described above, such as polyvinyl alcohol, are preferably employed in the wrappers shown in Figures 1 and 2. These adhesives are more soluble in cold water than in hot and thus the passage of a normal discharge of body exudate through the wrapper causes a sufficient decrease in strength so that a pad wrapper cannot be supported purely by its ends in the conventional manner. Rather a supplemental supporting means to act as a backing for the wrapper has to be employed.

Figures 3 through 5 show one embodiment of a support for the wrapper with the tab construction shown in Figure 2. As illustrated in Figure 3, the support includes a panty 30 of a bikini-type construction with a rear panel 32, a front panel 34, side means 36, a crotch piece 38, a waistband 40 and leg openings 42. The garment may be made of stretch yarn and have a reinforced construction in the crotch area 44 such as a double-ply of material starting at seam 46 and extending a similar distance to a seam at the rear of the garment. At the seam 46, where there is adequate strength of fabric, there is secured a fastener 48 through which a short tab end 50 of the sanitary napkin 52 is threaded.

As is shown in Figures 4 and 5, the fastener 48 is of a flat, generally oblong configuration and comprises a pair of side bars 54, 54' interconnected at their lower ends by transverse bar 58 to form aperture 60. The opposite or upper end of the side bars is provided with a split top bar in the form of end bars 62, 62' extending toward each other to form an access slot 64 above aperture 60. This fastener may be attached to the front portion of the panty by any suitable means such as by threads not shown.

FIGS. 6 and 7 illustrate a suitable supporting means for the pad wrapper of FIG. 1.

This support comprises a backing member 70 generally indicated at 70 formed as a laminate of a fluid-proof plastics material layer on the inner side and a cotton backing layer on the outside. The forward end 72 of the backing member is wider than the rear end 74 and each end is formed with two slots 76 and 78 respectively to receive the ends of the two straps 80 of an elastic material, the length of the straps being adjustable by means of buckles 82.

The support is provided with a tab 84 at end end, each tab being folded obliquely in half to form a V, see Fig. 6, with one half of a press-stud 86 attached to the point of the V and arranged to engage with a corresponding half on the backing member 70 so that

the tabs 88 of a sanitary napkin 90 can be sandwiched between the studs 86 against the backing member as can be seen in FIG. 6.

The spacing and angulation of the slots 76 and 78 allow the straps 82 to assume a position in which, when the holder is in use (see FIG. 7), they extend around the front of each leg of the wearer at approximately the crease line where the top of the leg is jointed to the body, and around the back. As the two front slots 76 are spaced apart further than the two rear slots 78, the suspension for the backing member is very comfortable and does not chafe. At the same time "roping" or twisting is prevented because of the spacing apart of the two rear slots 78.

The side edges of the backing member are bound with a fabric bias tape so as to provide a rim which not only helps to connect the layers of the backing member together, but also means that the holder, when in use, "cups" or "cradles" the sanitary napkin to help to prevent leakage from the sanitary napkin.

Thus, as will be appreciated, the present invention provides a sanitary napkin pad and a wrapper material therefore which may be both readily disposed of by placing in a conventional toilet system yet which has the requisite durability and strength in conjunction with a supplementary support means. As will also be appreciated the pad and wrapper construction may be used for babies disposable diapers.

WHAT WE CLAIM IS:—

1. A catemerial or diaper absorption device comprising in combination an elongated absorbent pad enclosed in a fluid pervious wrapper having an extension beyond at least one end of the pad to form a tab, the wrapper comprising staple fibres discontinuously bonded together with a water soluble adhesive in an amount insufficient to provide the bonded wrapper by itself with adequate strength to support the pad in use, and a backing layer of material to provide support for the wrapped pad in use.

2. A device as claimed in claim 1 wherein the backing layer has attachment means for holding the tab to maintain the wrapped pad in position adjacent the backing layer.

3. A device as claimed in claim 1 or 2 wherein the backing layer providing support comprises a panty having a waistband, leg openings, and a crotch area defined by front and back seams extending transversely of the garment.

4. A device as claimed in claim 1 or 2 wherein the backing layer providing support comprises an elongated body portion with one end broader than the other and being formed with slots and support straps having ends which are received in the slots.

5. An absorbent body suitable for the



wadding with a central pad of wood fluff. Other known absorbent materials such as batts or cotton and/or various types of synthetic fibres may also be used for the main or central portion of the pad.

The specific water soluble adhesives that have been described above, such as polyvinyl alcohol, are preferably employed in the wrappers shown in Figures 1 and 2. These adhesives are more soluble in cold water than in hot and thus the passage of a normal discharge of body exudate through the wrapper causes a sufficient decrease in strength so that a pad wrapper cannot be supported purely by its ends in the conventional manner. Rather a supplemental supporting means to act as a backing for the wrapper has to be employed.

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As is shown in Figures 4 and 5, the fastener 48 is of a flat, generally oblong configuration and comprises a pair of side bars 54, 54' interconnected at their lower ends by transverse bar 58 to form aperture 60. The opposite or upper end of the side bars is provided with a split top bar in the form of end bars 62, 62' extending toward each other to form an access slot 64 above aperture 60. This fastener may be attached to the front portion of the panty by any suitable means such as by threads not shown.

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the tabs 88 of a sanitary napkin 90 can be sandwiched between the studs 86 against the backing member as can be seen in FIG. 6.

The spacing and angulation of the slots 76 and 78 allow the straps 82 to assume a position in which, when the holder is in use (see FIG. 7), they extend around the front of each leg of the wearer at approximately the crease line where the top of the leg is jointed to the body, and around the back. As the two front slots 76 are spaced apart further than the two rear slots 78, the suspension for the backing member is very comfortable and does not chafe. At the same time "roping" or twisting is prevented because of the spacing apart of the two rear slots 78.

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Thus, as will be appreciated, the present invention provides a sanitary napkin pad and a wrapper material therefore which may be both readily disposed of by placing in a conventional toilet system yet which has the requisite durability and strength in conjunction with a supplementary support means. As will also be appreciated the pad and wrapper construction may be used for babies disposable diapers.

WHAT WE CLAIM IS:—

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2. A device as claimed in claim 1 wherein the backing layer has attachment means for holding the tab to maintain the wrapped pad in position adjacent the backing layer.

3. A device as claimed in claim 1 or 2 wherein the backing layer providing support comprises a panty having a waistband, leg openings, and a crotch area defined by front and back seams extending transversely of the garment.

4. A device as claimed in claim 1 or 2 wherein the backing layer providing support comprises an elongated body portion with one end broader than the other and being formed with slots and support straps having ends which are received in the slots.

5. An absorbent body suitable for the

device as claimed in claim 1 and comprising an elongated absorbent pad enclosed in a fluid pervious wrapper having an extension beyond at least one end of the pad to form a tab, the wrapper comprising staple fibres discontinuously bonded together with a water soluble adhesive, present in an amount up to 10% by weight of the fibres and comprising up to 40% of the wrapper surface area, said amount being insufficient to provide the bonded wrapper by itself with adequate strength to support the pad in use.

6. An absorbent body according to claim 5 wherein the adhesive is relatively more soluble in cold water than in warm water.

7. An absorbent body as claimed in claims 5 or 6 wherein tabs formed by the wrapper extend from both ends of the absorbent pad.

8. An absorbent body as claimed in any of claims 5—7 wherein the adhesive forms a series of discrete lines.

9. An absorbent body as claimed in any of claims 5—8 wherein the adhesive is polyvinyl alcohol.

10. An absorbent body as claimed in claim 9 wherein the polyvinyl alcohol has a percent hydrolysis of from about 79 to 82 and a viscosity of from about 22 to 26 cps.

11. A sanitary napkin substantially as hereinbefore described with reference to FIG. 1, with or without the support described with reference to FIGS. 6 and 7, or FIG. 2 with or without the support described with reference to FIGS. 3—5.

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